IRIS ENVIRONMENTAL

Via Email and US Mail

08 October 2012

John Moody, US EPA Project Manager
US EPA, Region IX
Waste Management Division
75 Hawthorne Street (WST-4)
San Francisco, California 94105

Re: **Vapor Intrusion Modeling Input Parameters**
Consent Order, Docket No RCRA (AO)-09-2008-03
Former Romic Environmental Technologies Corp. Facility
Chandler, Arizona

Dear Mr. Moody:

Pursuant to the amended changes to the Romic RFI Work Plan requested in the USEPA approval letter dated April 30, 2012, Romic Environmental Technologies Corp. ("Romic") is transmitting the enclosed input parameters package for calculating risk-based screening levels for volatile chemicals of potential concern in soil gas at the former Romic facility.

Soil gas screening levels will be protective of vapor intrusion from soil gas into the indoor air space of future overlying commercial/industrial buildings, considering both cancer and chronic noncancer health effects. The soil gas screening levels will be developed by combining: 1) risk-based target concentrations of chemicals in indoor air; and 2) attenuation factors which represent the reduction in chemical concentrations during transport from soil gas to indoor air.

Cancer- and noncancer-based target chemical concentrations in indoor air will be developed in accordance with standard USEPA inhalation risk assessment methodology (USEPA, 1989; 2009), standard USEPA default exposure assumptions for commercial/industrial land use (USEPA, 1989; 1991), and current USEPA-recommended inhalation toxicity values (USEPA, 2012). Cancer- and noncancer-based indoor air concentrations will be based on target risk level of 1×10^{-6} and target noncancer hazard quotient of 1.0, respectively.

As described in the RFI Work Plan, the transport of volatile chemicals from soil gas to indoor air will be modeled using the USEPA-recommended Johnson and Ettinger (J&E) advanced model for soil gas (SG-ADV Version 3.1) (Johnson and Ettinger, 1991; USEPA, 2004) as modified by Iris Environmental to allow the processing of multiple chemicals at one time.

Two sets of attenuation factors will be calculated with the J&E model: 1) default attenuation factors based on conservative default soil properties; and 2) site-specific attenuation factors based on measured site-specific soil properties.

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- For developing default attenuation factors, soil properties and other J&E model inputs will be set to conservative default values used by the California Environmental Protection Agency (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA) in calculating California Human Health Screening Levels (CHHSLs) for shallow soil gas under future commercial/industrial buildings (Cal/EPA, 2005). Under this default scenario, soil gas impacts will be assumed present at a depth of 49 centimeters (1.6 feet) below grade, beneath a 30-cm thick layer of engineered fill, 10-centimeter thick layer of sand, and 9-centimeter thick building slab.
- For developing site-specific attenuation factors, the depth to soil gas contamination will be assumed to be 152.4 centimeters (5.0 feet) or 304 centimeters (10.0 feet), consistent with the depth to the top of the SVE well screens. The site lithology between the ground surface and 10 feet bgs will be modeled as a single layer of fill material with site-specific soil properties calculated from the geotechnical analyses of soil samples GTB-01 @ 5.5-6 feet and 16.0-16.5 feet. The geotechnical laboratory report is included in Appendix B. Other J&E model inputs will be set to OEHHA default values, consistent with the default modeling scenario.

The attenuation factors calculated with the J&E model will be combined with the risk-based target indoor air concentrations to calculate default and site-specific risk-based soil gas screening levels.

The risk-based soil gas screening levels will be used to evaluate the soil gas data collected during the June 2011 sampling event, which was conducted on the seven shallow screened SVE wells following a 16-month rebound since the SVE was shut down on February 20, 2010 and subsequently decommissioned. The June 2011 TO-15 data are presented in Appendix A. The screening levels will be used to quantity the cumulative (multi-chemical) vapor intrusion cancer risk and noncancer hazard index for each soil gas sample.

For evaluation purposes and to demonstrate how the input parameters will be applied, Iris Environmental has run the J&E model assuming a future building scenario. Proposed model input data and calculations are documented in the attached tables:

- Default exposure assumptions for commercial industrial land use and current USEPA inhalation toxicity values are presented in Tables 1 and 2, respectively;
- The calculation of target chemical concentrations in indoor air is documented in Table 3.
- Measured site-specific soil properties are presented in Table 4.
- Proposed Johnson & Ettinger model input values, including soil properties, are presented in Table 5.
- Physicochemical properties are documented in Table 6.
- The calculation of attenuation factors is presented in Table 7 (default scenario), Table 8 (site-specific soil properties; source at 5 feet bgs), and Table 9 (site-specific soil properties; source at 10 feet bgs).

- The attenuation factors are combined with target indoor air concentrations to calculate soil gas screening levels in Table 10 (default scenario), Table 11 (site-specific soil properties; source at 5 feet bgs), and Table 12 (site-specific soil properties; source at 10 feet bgs).
- Risk-based soil gas screening levels are applied to the June 2011 TO-15 data to quantity the cumulative (multi-chemical) vapor intrusion risk and hazard for each soil gas sample, in Table 13 (default scenario), Table 14 (site-specific soil properties; source at 5 feet bgs), and Table 15 (site-specific soil properties; source at 10 feet bgs).
- Estimated cumulative vapor intrusion risk and hazard are summarized in Table 16.

Following review and comment for the above input parameters and model application, Iris Environmental will proceed with finalizing the future building scenario calculations.

We seek clarification regarding your April 30, 2012 request to perform vapor intrusion transport modeling with and *without* the presence of a building slab. We note the basic purpose of the J&E model is to simulate the advective (pressure-driven) flow of soil gas upwards through the floor-wall seam of the building slab into the indoor air space of the building. Are you requesting an evaluation of transport to indoor air in the absence of a building slab, or an evaluation of transport to outdoor air? Thank you for clarifying your request.

Please do not hesitate to contact us at (510) 834-4747 x21 or calger@irisenv.com if you have any questions or comments regarding this submittal.

Sincerely,

IRIS ENVIRONMENTAL

Christopher S. Alger, P.G.
Principal Engineering Geologist

Gregory S. Noblet, P.E.
Senior Manager

cc: Katherine Baylor, US Environmental Protection Agency
Wayne Kiso, Clarus Management Solutions
Thomas Suriano, Clear Creek Associates

Attachments: Tables 1-16
Appendix A June 2011 TO-15 Laboratory Report
Appendix B Geotechnical Laboratory Report

Table 1. Exposure Assumptions – Commercial/Industrial Land Use

Parameter		Units	Value	Note
TRISK	Target risk	none	1.0E-06	–
THQ	Target hazard quotient	none	1.0	–
ET	Exposure time	hr/d	8	USEPA default (USEPA, 2009)
EF	Exposure frequency	d/yr	250	USEPA default (USEPA, 1991)
ED	Exposure duration	yr	25	USEPA default (USEPA, 1991)
ATca	Averaging time, cancer effects	d	25,550	USEPA default (USEPA, 1989)
ATnc	Averaging time, noncancer effects	d	9,125	USEPA default (USEPA, 1989)

Notes:

(1) Exposure assumptions are consistent with default USEPA assumptions for commercial/industrial land use (USEPA, 1989; 1991; 2009).

Table 2. Cancer and Noncancer Inhalation Toxicity Values

Chemical	Unit Risk Factor		Chronic Reference Concentration	
	Value (per µg/m^3)	Source	Value (µg/m^3)	Source
Acetone	nc		3.1E+04	RSLs-A
Butanone, 2-	nc		5.0E+03	IRIS
Chloroform	2.3E-05	IRIS	9.8E+01	RSLs-A
Dichloroethane, 1,1-	1.6E-06	RSLs-C	7.0E+02	RSLs-P (rtr)
Dichloroethane, 1,2-	2.6E-05	IRIS	7.0E+00	RSLs-P
Dichloroethene, 1,1-	nc		2.0E+02	IRIS
Dichloroethene, 1,2-, cis-	nc		7.0E+00	IRIS (rtr)
Methylene chloride	4.7E-07	IRIS	1.0E+03	RSLs-A
Tetrachloroethene	5.9E-06	RSLs-C	2.7E+02	RSLs-A
Trichloroethane, 1,1,1-	nc		5.0E+03	IRIS
Trichloroethane, 1,1,2-	1.6E-05	IRIS	2.0E-01	RSLs-X
Trichloroethene TCE	4.8E-06	IRIS	2.0E+00	IRIS
Trichlorofluoromethane	nc		7.0E+02	RSLs-H
Trichlorotrifluoroethane, 1,1,2-, 1,2,2-	nc		3.0E+04	RSLs-H

Notes:

(1) The sources of inhalation toxicity values are:

IRIS – USEPA Integrated Risk Information System (IRIS) database (USEPA, 2012b);

RSLs – USEPA Regional Screening Levels (RSLs) table (USEPA, 2012a) where primary sources are: I – IRIS; P – PPRTV; A – ATSDR; C – Cal/EPA; X – PPRTV Appendix; and H – HEAST.

(2) "rtr" indicates route-to-route extrapolation – a published oral toxicity value is assumed to be applicable to the inhalation pathway. First, an inhalation reference dose (mg/kg/d) is assumed to be equal in value to the published oral reference dose (mg/kg/d). The inhalation reference dose (mg/kg/d) is then converted to an inhalation reference exposure level (µg/m^3) by assuming a receptor breathing rate of 20 m^3/d and body weight of 70 kg.

(3) "nc" indicates chemical is a noncarcinogen.

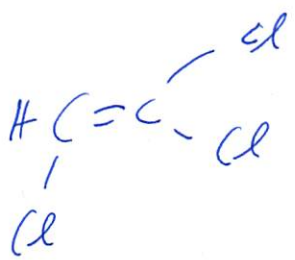


Table 3. Indoor Air Risk-based Screening Levels – Commercial/Industrial Land Use

	Cancer Effects							Noncancer Effects						
Chemical	Unit Risk Factor, URF (per µg/m^3)	Exposure Time, ET (hr/d)	Exposure Frequency, EF (d/yr)	Exposure Duration, ED (yr)	Averaging Time, ATca (d)	Target Risk, TR	Risk-based Screening Level, IASLca (µg/m^3)	Reference Concentration, RfC (µg/m^3)	Exposure Time, ET (hr/d)	Exposure Frequency, EF (d/yr)	Exposure Duration, ED (yr)	Averaging Time, ATnc (d)	Target Hazard Quotient, THQ	Risk-based Screening Level, IASLnc (µg/m^3)
Acetone	nc	8	250	25	25,550	1.E-06	nc	3.10E+04	8	250	25	9,125	1.E+00	1.4E+05
Butanone, 2-	nc	8	250	25	25,550	1.E-06	nc	5.00E+03	8	250	25	9,125	1.E+00	2.2E+04
Chloroform	2.30E-05	8	250	25	25,550	1.E-06	5.3E-01	9.80E+01	8	250	25	9,125	1.E+00	4.3E+02
Dichloroethane, 1,1-	1.60E-06	8	250	25	25,550	1.E-06	7.7E+00	7.00E+02	8	250	25	9,125	1.E+00	3.1E+03
Dichloroethane, 1,2-	2.60E-05	8	250	25	25,550	1.E-06	4.7E-01	7.00E+00	8	250	25	9,125	1.E+00	3.1E+01
Dichloroethene, 1,1-	nc	8	250	25	25,550	1.E-06	nc	2.00E+02	8	250	25	9,125	1.E+00	8.8E+02
Dichloroethene, 1,2-, cis-	nc	8	250	25	25,550	1.E-06	nc	7.00E+00	8	250	25	9,125	1.E+00	3.1E+01
Methylene chloride	4.70E-07	8	250	25	25,550	1.E-06	2.6E+01	1.00E+03	8	250	25	9,125	1.E+00	4.4E+03
Tetrachloroethene	5.90E-06	8	250	25	25,550	1.E-06	2.1E+00	2.70E+02	8	250	25	9,125	1.E+00	1.2E+03
Trichloroethane, 1,1,1-	nc	8	250	25	25,550	1.E-06	nc	5.00E+03	8	250	25	9,125	1.E+00	2.2E+04
Trichloroethane, 1,1,2-	1.60E-05	8	250	25	25,550	1.E-06	7.7E-01	2.00E-01	8	250	25	9,125	1.E+00	8.8E-01
Trichloroethene .	4.80E-06	8	250	25	25,550	1.E-06	2.6E+00	2.00E+00	8	250	25	9,125	1.E+00	8.8E+00
Trichlorofluoromethane	nc	8	250	25	25,550	1.E-06	nc	7.00E+02	8	250	25	9,125	1.E+00	3.1E+03
Trichlorotrifluoroethane, 1,1,2-, 1,2,2	nc	8	250	25	25,550	1.E-06	nc	3.00E+04	8	250	25	9,125	1.E+00	1.3E+05

Notes:

(1) Indoor air screening levels are developed in accordance with USEPA methodology and assumptions for commercial/industrial land use (USEPA, 1989; 1991; 2009; 2012a; 2012b). Cancer- and noncancer-based concentrations are based on target risk of 1E-06 and target hazard quotient of 1.0, respectively.

Table 4. Site-specific Soil Properties

Sample ID	Sample Depth (ft)	Dry Bulk Density (g/cm^3)	Water Content (g/g)	Total Porosity (cm^3/cm^3)	Water Density (g/cm^3)	Water-filled Porosity (cm^3/cm^3)
GTB-01@5.5-6.0	5.5-6.0	1.79	0.099	0.335	1.00	0.177
GTB-01@16.0-16.5	16.0-16.5	1.65	0.227	0.366	1.00	0.366

Notes:

(1) Dry bulk density, water content, and total porosity are from Speedie and Associates Laboratory Report No. 120880LA.

(2) Water density is assumed.

(3) Water-filled porosity (θ_w) is calculated from:

$$\theta_w = \omega \times \frac{\rho_s}{\rho_w}$$

where ω is water content, ρ_s is dry bulk density, and ρ_w is water density. If this calculated value of water-filled porosity exceeds the measured total porosity (which is physically impossible), then the water-filled porosity is set equal to the total porosity (and thus air-filled porosity is zero).

(4) The properties of sample GTB-01@5.5-6.0 are used as site-specific J&E model inputs.

Table 5. Johnson & Ettinger Model Input Data

Parameter	Units	Default	Site-specific, 5ft bgs	Site-specific, 10 feet bgs
Lithology and Soil Properties				
General				
Average soil temperature, T_S	°C	22	20	20
Stratum A				
Thickness, h^A	cm	9	457	457
Dry bulk density, ρ_b^A	g/cm^3	1.66	1.79	1.79
Total porosity, n^A	cm^3/cm^3	0.375	0.335	0.335
Water-filled porosity, θ_w^A	cm^3/cm^3	0.054	0.177	0.177
Stratum B				
Thickness, h^B	cm	10	0	0
Dry bulk density, ρ_b^B	g/cm3	1.66	1.50	1.50
Total porosity, n^B	cm^3/cm^3	0.375	0.430	0.430
Water-filled porosity, θ_w^B	cm^3/cm^3	0.054	0.150	0.150
Stratum C				
Thickness, h^C	cm	30	0	0
Dry bulk density, ρ_b^C	g/cm3	1.80	1.50	1.50
Total porosity, n^C	cm^3/cm^3	0.300	0.430	0.430
Water-filled porosity, θ_w^C	cm^3/cm^3	0.150	0.150	0.150
Building Properties				
Depth below grade to bottom of enclosed space floor, L_F	cm	9	9	9
Enclosed space floor thickness, L_{crack}	cm	9	9	9
Enclosed space floor length, L_B	cm	1,000	1,000	1,000
Enclosed space floor width, W_B	cm	1,000	1,000	1,000
Enclosed space floor height, H_B	cm	244	244	244
Floor-wall seam crack width, w	cm	0.1	0.1	0.1
Indoor air exchange rate, ER	hr^{-1}	1.00	1.00	1.00
Average vapor flow rate into building, Q_{soil}	L/min	5	5	5
Source Characterization				
Chemical	none	varies	varies	varies
Soil gas concentration, C_g	µg/m^3	1	1	1
Depth below grade to contamination, L_S	cm	49	152	305

Table 5. Johnson & Ettinger Model Input Data

Parameter	Units	Default	Site-specific, 5ft bgs	Site-specific, 10 feet bgs

Notes:

(1) Site-specific input values are highlighted. All other input values are Cal/EPA OEHHA default values (Cal/EPA, 2005).

Table 6. Physicochemical Properties

Chemical	Enthalpy of Vaporization at the Normal Boiling Point (cal/mol)	Normal Boiling Point (K)	Critical Temperature (K)	Henry's Law Constant at Reference Temperature (atm·m3/mol)	Henry's Law Constant Reference Temperature (°C)	Diffusivity in Air (cm2/s)	Diffusivity in Water (cm2/s)
Acetone	6.96E+03	3.29E+02	5.08E+02	3.87E-05	2.50E+01	1.24E-01	1.14E-05
Butanone, 2-	7.48E+03	3.53E+02	5.37E+02	5.58E-05	2.50E+01	8.08E-02	9.80E-06
Chloroform	6.99E+03	3.34E+02	5.36E+02	3.66E-03	2.50E+01	1.04E-01	1.00E-05
Dichloroethane, 1,1-	6.90E+03	3.31E+02	5.23E+02	5.61E-03	2.50E+01	7.42E-02	1.05E-05
Dichloroethane, 1,2-	7.64E+03	3.57E+02	5.61E+02	9.77E-04	2.50E+01	1.04E-01	9.90E-06
Dichloroethene, 1,1-	6.25E+03	3.05E+02	5.76E+02	2.60E-02	2.50E+01	9.00E-02	1.04E-05
Dichloroethene, 1,2-, cis-	7.19E+03	3.34E+02	5.44E+02	4.07E-03	2.50E+01	7.36E-02	1.13E-05
Methylene chloride	6.71E+03	3.13E+02	5.10E+02	2.18E-03	2.50E+01	1.01E-01	1.17E-05
Tetrachloroethene	8.29E+03	3.94E+02	6.20E+02	1.84E-02	2.50E+01	7.20E-02	8.20E-06
Trichloroethane, 1,1,1-	7.14E+03	3.47E+02	5.45E+02	1.72E-02	2.50E+01	7.80E-02	8.80E-06
Trichloroethane, 1,1,2-	8.32E+03	3.86E+02	6.02E+02	9.11E-04	2.50E+01	7.80E-02	8.80E-06
Trichloroethene	7.51E+03	3.60E+02	5.44E+02	1.03E-02	2.50E+01	7.90E-02	9.10E-06
Trichlorofluoromethane	6.00E+03	2.97E+02	4.71E+02	9.68E-02	2.50E+01	8.70E-02	9.70E-06
Trichlorotrifluoroethane, 1,1,2-, 1,2,2-	6.46E+03	3.21E+02	4.87E+02	4.80E-01	2.50E+01	7.80E-02	8.20E-06

Notes:

(1) Source of physicochemical properties is USEPA Johnson and Ettinger Model (USEPA, 2004a; 2004b).

Table 7. Soil Gas-to-Indoor Air Transport Calculations (Johnson and Ettinger Advanced Soil Gas Model) – Default Evaluation

Chemical	Enthalpy of Vaporization at the Average Soil Temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's Law Constant at the Average Soil Temperature, H_{TS} (atm-m3/mol)	Henry's Law Constant at the Average Soil Temperature, H'_{TS} (unitless)	Stratum A Effective Diffusion Coefficient, D_{eff}^{A} (cm2/s)	Stratum B Effective Diffusion Coefficient, D_{eff}^{B} (cm2/s)	Stratum C Effective Diffusion Coefficient, D_{eff}^{C} (cm2/s)	Source-building Separation, L_T (cm)	Total Effective Diffusivity, D_{eff}^{T} (cm2/s)	Average Vapor Flow Rate into Building, Q_{soil} (cm3/s)	Area of Enclosed Space below Grade, A_B (cm2)	Building Ventilation Rate, $Q_{building}$ (cm3/s)	Infinite Source Indoor Attenuation Coefficient, α (unitless)
Acetone	7.41E+03	3.41E-05	1.41E-03	2.00E-02	2.00E-02	2.63E-03	40	3.36E-03	8.33E+01	1.04E+06	6.78E+04	6.28E-04
Butanone, 2-	8.27E+03	4.84E-05	2.00E-03	1.30E-02	1.30E-02	1.71E-03	40	2.18E-03	8.33E+01	1.04E+06	6.78E+04	4.97E-04
Chloroform	7.43E+03	3.22E-03	1.33E-01	1.67E-02	1.67E-02	2.07E-03	40	2.66E-03	8.33E+01	1.04E+06	6.78E+04	5.56E-04
Dichloroethane, 1,1-	7.32E+03	4.94E-03	2.04E-01	1.19E-02	1.19E-02	1.48E-03	40	1.89E-03	8.33E+01	1.04E+06	6.78E+04	4.56E-04
Dichloroethane, 1,2-	8.39E+03	8.46E-04	3.49E-02	1.67E-02	1.67E-02	2.08E-03	40	2.66E-03	8.33E+01	1.04E+06	6.78E+04	5.56E-04
Dichloroethene, 1,1-	6.31E+03	2.34E-02	9.65E-01	1.45E-02	1.45E-02	1.79E-03	40	2.30E-03	8.33E+01	1.04E+06	6.78E+04	5.12E-04
Dichloroethene, 1,2-, cis-	7.61E+03	3.57E-03	1.47E-01	1.19E-02	1.19E-02	1.47E-03	40	1.88E-03	8.33E+01	1.04E+06	6.78E+04	4.53E-04
Methylene chloride	6.91E+03	1.94E-03	8.01E-02	1.63E-02	1.63E-02	2.02E-03	40	2.58E-03	8.33E+01	1.04E+06	6.78E+04	5.47E-04
Tetrachloroethene	9.43E+03	1.56E-02	6.45E-01	1.16E-02	1.16E-02	1.43E-03	40	1.84E-03	8.33E+01	1.04E+06	6.78E+04	4.47E-04
Trichloroethane, 1,1,1-	7.75E+03	1.50E-02	6.20E-01	1.26E-02	1.26E-02	1.55E-03	40	1.99E-03	8.33E+01	1.04E+06	6.78E+04	4.70E-04
Trichloroethane, 1,1,2-	9.44E+03	7.75E-04	3.20E-02	1.26E-02	1.26E-02	1.56E-03	40	2.00E-03	8.33E+01	1.04E+06	6.78E+04	4.71E-04
Trichloroethene	8.41E+03	8.89E-03	3.67E-01	1.27E-02	1.27E-02	1.57E-03	40	2.02E-03	8.33E+01	1.04E+06	6.78E+04	4.74E-04
Trichlorofluoromethane	6.02E+03	8.73E-02	3.60E+00	1.40E-02	1.40E-02	1.73E-03	40	2.22E-03	8.33E+01	1.04E+06	6.78E+04	5.02E-04
Trichlorotrifluoroethane, 1,1,2-, 1,2,2-	6.81E+03	4.27E-01	1.76E+01	1.26E-02	1.26E-02	1.55E-03	40	1.99E-03	8.33E+01	1.04E+06	6.78E+04	4.70E-04

Notes:

(1) Transport calculations are consistent with USEPA Johnson and Ettinger Advanced Soil Gas Model (USEPA, 2004a' 2004b).

Table 8. Soil Gas-to-Indoor Air Transport Calculations (Johnson and Ettinger Advanced Soil Gas Model) – Site-specific Evaluation, 5 feet bgs

Chemical	Enthalpy of Vaporization at the Average Soil Temperature, $\Delta H_{v,ts}$ (cal/mol)	Henry's Law Constant at the Average Soil Temperature, H_{ts} (atm-m3/mol)	Henry's Law Constant at the Average Soil Temperature, H'_{ts} (unitless)	Stratum A Effective Diffusion Coefficient, D_{eff}^{A} (cm2/s)	Stratum B Effective Diffusion Coefficient, D_{eff}^{B} (cm2/s)	Stratum C Effective Diffusion Coefficient, D_{eff}^{C} (cm2/s)	Source-building Separation, L_T (cm)	Total Effective Diffusivity, D_{eff}^{T} (cm2/s)	Average Vapor Flow Rate into Building, Q_{soil} (cm3/s)	Area of Enclosed Space below Grade, A_B (cm2)	Building Ventilation Rate, $Q_{building}$ (cm3/s)	Infinite Source Indoor Attenuation Coefficient, α (unitless)
Acetone	7.43E+03	3.12E-05	1.30E-03	2.60E-03	9.72E-03	9.72E-03	143	2.60E-03	8.33E+01	1.04E+06	6.78E+04	2.26E-04
Butanone, 2-	8.29E+03	4.39E-05	1.83E-03	1.68E-03	6.33E-03	6.33E-03	143	1.68E-03	8.33E+01	1.04E+06	6.78E+04	1.57E-04
Chloroform	7.45E+03	2.95E-03	1.23E-01	1.98E-03	8.08E-03	8.08E-03	143	1.98E-03	8.33E+01	1.04E+06	6.78E+04	1.80E-04
Dichloroethane, 1,1-	7.34E+03	4.54E-03	1.89E-01	1.41E-03	5.76E-03	5.76E-03	143	1.41E-03	8.33E+01	1.04E+06	6.78E+04	1.34E-04
Dichloroethane, 1,2-	8.41E+03	7.67E-04	3.19E-02	1.98E-03	8.08E-03	8.08E-03	143	1.98E-03	8.33E+01	1.04E+06	6.78E+04	1.80E-04
Dichloroethene, 1,1-	6.33E+03	2.17E-02	9.02E-01	1.71E-03	6.99E-03	6.99E-03	143	1.71E-03	8.33E+01	1.04E+06	6.78E+04	1.59E-04
Dichloroethene, 1,2-, cis-	7.63E+03	3.27E-03	1.36E-01	1.40E-03	5.72E-03	5.72E-03	143	1.40E-03	8.33E+01	1.04E+06	6.78E+04	1.33E-04
Methylene chloride	6.93E+03	1.79E-03	7.44E-02	1.92E-03	7.85E-03	7.85E-03	143	1.92E-03	8.33E+01	1.04E+06	6.78E+04	1.76E-04
Tetrachloroethene	9.45E+03	1.40E-02	5.81E-01	1.37E-03	5.59E-03	5.59E-03	143	1.37E-03	8.33E+01	1.04E+06	6.78E+04	1.30E-04
Trichloroethane, 1,1,1-	7.78E+03	1.37E-02	5.70E-01	1.48E-03	6.06E-03	6.06E-03	143	1.48E-03	8.33E+01	1.04E+06	6.78E+04	1.40E-04
Trichloroethane, 1,1,2-	9.46E+03	6.94E-04	2.88E-02	1.49E-03	6.06E-03	6.06E-03	143	1.49E-03	8.33E+01	1.04E+06	6.78E+04	1.41E-04
Trichloroethene	8.43E+03	8.06E-03	3.35E-01	1.50E-03	6.14E-03	6.14E-03	143	1.50E-03	8.33E+01	1.04E+06	6.78E+04	1.42E-04
Trichlorofluoromethane	6.04E+03	8.13E-02	3.38E+00	1.65E-03	6.76E-03	6.76E-03	143	1.65E-03	8.33E+01	1.04E+06	6.78E+04	1.54E-04
Trichlorotrifluoroethane, 1,1,2-, 1,2,2-	6.84E+03	3.94E-01	1.64E+01	1.48E-03	6.06E-03	6.06E-03	143	1.48E-03	8.33E+01	1.04E+06	6.78E+04	1.40E-04

Notes:

(1) Transport calculations are consistent with USEPA Johnson and Ettinger Advanced Soil Gas Model (USEPA, 2004a' 2004b).

Table 9. Soil Gas-to-Indoor Air Transport Calculations (Johnson and Ettinger Advanced Soil Gas Model) – Site-specific Evaluation, 10 feet bgs

Chemical	Enthalpy of Vaporization at the Average Soil Temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's Law Constant at the Average Soil Temperature, H_{TS} (atm-m3/mol)	Henry's Law Constant at the Average Soil Temperature, H'_{TS} (unitless)	Stratum A Effective Diffusion Coefficient, D_{eff}^{A} (cm2/s)	Stratum B Effective Diffusion Coefficient, D_{eff}^{B} (cm2/s)	Stratum C Effective Diffusion Coefficient, D_{eff}^{C} (cm2/s)	Source-building Separation, L_T (cm)	Total Effective Diffusivity, D_{eff}^{T} (cm2/s)	Average Vapor Flow Rate into Building, Q_{soil} (cm3/s)	Area of Enclosed Space below Grade, A_B (cm2)	Building Ventilation Rate, $Q_{building}$ (cm3/s)	Infinite Source Indoor Attenuation Coefficient, α (unitless)
Acetone	7.43E+03	3.12E-05	1.30E-03	2.60E-03	9.72E-03	9.72E-03	296	2.60E-03	8.33E+01	1.04E+06	6.78E+04	1.21E-04
Butanone, 2-	8.29E+03	4.39E-05	1.83E-03	1.68E-03	6.33E-03	6.33E-03	296	1.68E-03	8.33E+01	1.04E+06	6.78E+04	8.13E-05
Chloroform	7.45E+03	2.95E-03	1.23E-01	1.98E-03	8.08E-03	8.08E-03	296	1.98E-03	8.33E+01	1.04E+06	6.78E+04	9.44E-05
Dichloroethane, 1,1-	7.34E+03	4.54E-03	1.89E-01	1.41E-03	5.76E-03	5.76E-03	296	1.41E-03	8.33E+01	1.04E+06	6.78E+04	6.88E-05
Dichloroethane, 1,2-	8.41E+03	7.67E-04	3.19E-02	1.98E-03	8.08E-03	8.08E-03	296	1.98E-03	8.33E+01	1.04E+06	6.78E+04	9.47E-05
Dichloroethene, 1,1-	6.33E+03	2.17E-02	9.02E-01	1.71E-03	6.99E-03	6.99E-03	296	1.71E-03	8.33E+01	1.04E+06	6.78E+04	8.25E-05
Dichloroethene, 1,2-, cis-	7.63E+03	3.27E-03	1.36E-01	1.40E-03	5.72E-03	5.72E-03	296	1.40E-03	8.33E+01	1.04E+06	6.78E+04	6.84E-05
Methylene chloride	6.93E+03	1.79E-03	7.44E-02	1.92E-03	7.85E-03	7.85E-03	296	1.92E-03	8.33E+01	1.04E+06	6.78E+04	9.20E-05
Tetrachloroethene	9.45E+03	1.40E-02	5.81E-01	1.37E-03	5.59E-03	5.59E-03	296	1.37E-03	8.33E+01	1.04E+06	6.78E+04	6.69E-05
Trichloroethane, 1,1,1-	7.78E+03	1.37E-02	5.70E-01	1.48E-03	6.06E-03	6.06E-03	296	1.48E-03	8.33E+01	1.04E+06	6.78E+04	7.21E-05
Trichloroethane, 1,1,2-	9.46E+03	6.94E-04	2.88E-02	1.49E-03	6.06E-03	6.06E-03	296	1.49E-03	8.33E+01	1.04E+06	6.78E+04	7.25E-05
Trichloroethene	8.43E+03	8.06E-03	3.35E-01	1.50E-03	6.14E-03	6.14E-03	296	1.50E-03	8.33E+01	1.04E+06	6.78E+04	7.30E-05
Trichlorofluoromethane	6.04E+03	8.13E-02	3.38E+00	1.65E-03	6.76E-03	6.76E-03	296	1.65E-03	8.33E+01	1.04E+06	6.78E+04	7.99E-05
Trichlorotrifluoroethane, 1,1,2-, 1,2,2-	6.84E+03	3.94E-01	1.64E+01	1.48E-03	6.06E-03	6.06E-03	296	1.48E-03	8.33E+01	1.04E+06	6.78E+04	7.21E-05

Notes:

(1) Transport calculations are consistent with USEPA Johnson and Ettinger Advanced Soil Gas Model (USEPA, 2004a' 2004b).

Table 10. Soil Gas Risk-based Screening Levels – Default Evaluation

Chemical	Indoor Air RBSL		Attenuation Factor	Soil Gas RBSL	
	Cancer Effects ($\mu g/m^3$)	Noncancer Effects ($\mu g/m^3$)		Cancer Effects ($\mu g/m^3$)	Noncancer Effects ($\mu g/m^3$)
Acetone	nc	1.4E+05	6.3E-04	nc	2.2E+08
Butanone, 2-	nc	2.2E+04	5.0E-04	nc	4.4E+07
Chloroform	5.3E-01	4.3E+02	5.6E-04	9.6E+02	7.7E+05
Dichloroethane, 1,1-	7.7E+00	3.1E+03	4.6E-04	1.7E+04	6.7E+06
Dichloroethane, 1,2-	4.7E-01	3.1E+01	5.6E-04	8.5E+02	5.5E+04
Dichloroethene, 1,1-	nc	8.8E+02	5.1E-04	nc	1.7E+06
Dichloroethene, 1,2-, cis-	nc	3.1E+01	4.5E-04	nc	6.8E+04
Methylene chloride	2.6E+01	4.4E+03	5.5E-04	4.8E+04	8.0E+06
Tetrachloroethene	2.1E+00	1.2E+03	4.5E-04	4.7E+03	2.6E+06
Trichloroethane, 1,1,1-	nc	2.2E+04	4.7E-04	nc	4.7E+07
Trichloroethane, 1,1,2-	7.7E-01	8.8E-01	4.7E-04	1.6E+03	1.9E+03
Trichloroethene	2.6E+00	8.8E+00	4.7E-04	5.4E+03	1.8E+04
Trichlorofluoromethane	nc	3.1E+03	5.0E-04	nc	6.1E+06
Trichlorotrifluoroethane, 1,1,2-, 1,2,2	nc	1.3E+05	4.7E-04	nc	2.8E+08

Notes:

(1) Cancer- and noncancer-based screening levels are based on target risk of 1E-06 and target hazard quotient of 1.0, respectively.

(2) "nc" indicates chemical is a noncarcinogen.

Table 11. Soil Gas Risk-based Screening Levels – Site-specific Evaluation, 5 feet bgs

Chemical	Indoor Air RBSL		Attenuation Factor	Soil Gas RBSL	
	Cancer Effects ($\mu g/m^3$)	Noncancer Effects ($\mu g/m^3$)		Cancer Effects ($\mu g/m^3$)	Noncancer Effects ($\mu g/m^3$)
Acetone	nc	1.4E+05	2.3E-04	nc	6.0E+08
Butanone, 2-	nc	2.2E+04	1.6E-04	nc	1.4E+08
Chloroform	5.3E-01	4.3E+02	1.8E-04	3.0E+03	2.4E+06
Dichloroethane, 1,1-	7.7E+00	3.1E+03	1.3E-04	5.7E+04	2.3E+07
Dichloroethane, 1,2-	4.7E-01	3.1E+01	1.8E-04	2.6E+03	1.7E+05
Dichloroethene, 1,1-	nc	8.8E+02	1.6E-04	nc	5.5E+06
Dichloroethene, 1,2-, cis-	nc	3.1E+01	1.3E-04	nc	2.3E+05
Methylene chloride	2.6E+01	4.4E+03	1.8E-04	1.5E+05	2.5E+07
Tetrachloroethene	2.1E+00	1.2E+03	1.3E-04	1.6E+04	9.1E+06
Trichloroethane, 1,1,1-	nc	2.2E+04	1.4E-04	nc	1.6E+08
Trichloroethane, 1,1,2-	7.7E-01	8.8E-01	1.4E-04	5.4E+03	6.2E+03
Trichloroethene	2.6E+00	8.8E+00	1.4E-04	1.8E+04	6.2E+04
Trichlorofluoromethane	nc	3.1E+03	1.5E-04	nc	2.0E+07
Trichlorotrifluoroethane, 1,1,2-, 1,2,2	nc	1.3E+05	1.4E-04	nc	9.4E+08

Notes:

(1) Cancer- and noncancer-based screening levels are based on target risk of 1E-06 and target hazard quotient of 1.0, respectively.

(2) "nc" indicates chemical is a noncarcinogen.

18,000 c

62,000 N/c

Table 12. Soil Gas Risk-based Screening Levels – Site-specific Evaluation, 10 feet bgs

Chemical	Indoor Air RBSL		Attenuation Factor	Soil Gas RBSL	
	Cancer Effects ($\mu g/m^3$)	Noncancer Effects ($\mu g/m^3$)		Cancer Effects ($\mu g/m^3$)	Noncancer Effects ($\mu g/m^3$)
Acetone	nc	1.4E+05	1.2E-04	nc	1.1E+09
Butanone, 2-	nc	2.2E+04	8.1E-05	nc	2.7E+08
Chloroform	5.3E-01	4.3E+02	9.4E-05	5.6E+03	4.5E+06
Dichloroethane, 1,1-	7.7E+00	3.1E+03	6.9E-05	1.1E+05	4.5E+07
Dichloroethane, 1,2-	4.7E-01	3.1E+01	9.5E-05	5.0E+03	3.2E+05
Dichloroethene, 1,1-	nc	8.8E+02	8.2E-05	nc	1.1E+07
Dichloroethene, 1,2-, cis-	nc	3.1E+01	6.8E-05	nc	4.5E+05
Methylene chloride	2.6E+01	4.4E+03	9.2E-05	2.8E+05	4.8E+07
Tetrachloroethene	2.1E+00	1.2E+03	6.7E-05	3.1E+04	1.8E+07
Trichloroethane, 1,1,1-	nc	2.2E+04	7.2E-05	nc	3.0E+08
Trichloroethane, 1,1,2-	7.7E-01	8.8E-01	7.2E-05	1.1E+04	1.2E+04
Trichloroethene	2.6E+00	8.8E+00	7.3E-05	3.5E+04	1.2E+05
Trichlorofluoromethane	nc	3.1E+03	8.0E-05	nc	3.8E+07
Trichlorotrifluoroethane, 1,1,2-, 1,2,2	nc	1.3E+05	7.2E-05	nc	1.8E+09

Notes:

(1) Cancer- and noncancer-based screening levels are based on target risk of 1E-06 and target hazard quotient of 1.0, respectively.

(2) "nc" indicates chemical is a noncarcinogen.

Table 13. Vapor Intrusion Cumulative Risk and Hazard – Default Evaluation

Chemical	Soil Gas RBSL		VSP-061611-SVE-1			VSP-061611-SVE-2S			VSP-061611-SVE-3S			VSP-061611-SVE-4S			VSP-061611-SVE-5S		
	Cancer (µg/m3)	Noncancer (µg/m3)	Conc. (µg/m3)	Risk	Hazard	Conc. (µg/m3)	Risk	Hazard	Conc. (µg/m3)	Risk	Hazard	Conc. (µg/m3)	Risk	Hazard	Conc. (µg/m3)	Risk	Hazard
Acetone	nc	2.16E+08	84	nc	3.9E-07	32	nc	1.5E-07	22	nc	1.0E-07	25	nc	1.2E-07	36	nc	1.7E-07
Butanone, 2-	nc	4.41E+07	15	nc	3.4E-07	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00
Chloroform	9.59E+02	7.72E+05	20	2.1E-08	2.6E-05	32	3.3E-08	4.1E-05	6.6	6.9E-09	8.5E-06	10	1.0E-08	1.3E-05	11	1.1E-08	1.4E-05
Dichloroethane, 1,1-	1.68E+04	6.73E+06	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	4.8	2.9E-10	7.1E-07
Dichloroethane, 1,2-	8.48E+02	5.51E+04	ND	0.0E+00	0.0E+00	20	2.4E-08	3.6E-04	13	1.5E-08	2.4E-04	8.4	9.9E-09	1.5E-04	ND	0.0E+00	0.0E+00
Dichloroethene, 1,1-	nc	1.71E+06	430	nc	2.5E-04	22	nc	1.3E-05	82	nc	4.8E-05	6.9	nc	4.0E-06	13	nc	7.6E-06
Dichloroethene, 1,2-, cis-	nc	6.76E+04	ND	nc	0.0E+00	ND	nc	0.0E+00	5.8	nc	8.6E-05	ND	nc	0.0E+00	18	nc	2.7E-04
Methylene chloride	4.77E+04	8.00E+06	4.9	1.0E-10	6.1E-07	12	2.5E-10	1.5E-06	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Tetrachloroethene	4.65E+03	2.65E+06	2,400	5.2E-07	9.1E-04	1,500	3.2E-07	5.7E-04	1,500	3.2E-07	5.7E-04	1,100	2.4E-07	4.2E-04	1,400	3.0E-07	5.3E-04
Trichloroethane, 1,1,1-	nc	4.66E+07	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00	14	nc	3.0E-07	20	nc	4.3E-07
Trichloroethane, 1,1,2-	1.63E+03	1.86E+03	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	6.4	3.9E-09	3.4E-03	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Trichloroethene	5.39E+03	1.85E+04	900	1.7E-07	4.9E-02	340	6.3E-08	1.8E-02	500	9.3E-08	2.7E-02	120	2.2E-08	6.5E-03	170	3.2E-08	9.2E-03
Trichlorofluoromethane	nc	6.11E+06	ND	nc	0.0E+00	ND	nc	0.0E+00	43	nc	7.0E-06	ND	nc	0.0E+00	8.7	nc	1.4E-06
Trichlorotrifluoroethane, 1,1,2-, 1,2,2-	nc	2.80E+08	150	nc	5.4E-07	39	nc	1.4E-07	73	nc	2.6E-07	15	nc	5.4E-08	13	nc	4.6E-08
Cumulative (multi-chemical)				**7.0E-07**	**5.0E-02**		**4.4E-07**	**1.9E-02**		**4.4E-07**	**3.1E-02**		**2.8E-07**	**7.1E-03**		**3.4E-07**	**1.0E-02**

Notes:

(1) The cancer risk or noncancer hazard associated with each detected concentration is calculated by ratioing the result to the cancer- or noncancer-based screening level, and multiplying by the target risk (1E-06) or target hazard quotient (1.0).

(2) Non-detect results are assumed to be zero.

5 340.0

18,500.0

Table 13. Vapor Intrusion Cumulative Risk and Hazard – Default Evaluation

Chemical	Soil Gas RBSL		VSP-061611-SVE-6S			VSP-061611-SVE-7S			VSP-061611-SVE-7S-DUP		
	Cancer (µg/m3)	Noncancer (µg/m3)	Conc. (µg/m3)	Risk	Hazard	Conc. (µg/m3)	Risk	Hazard	Conc. (µg/m3)	Risk	Hazard
Acetone	nc	2.16E+08	15	nc	6.9E-08	23	nc	1.1E-07	20	nc	9.3E-08
Butanone, 2-	nc	4.41E+07	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00
Chloroform	9.59E+02	7.72E+05	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Dichloroethane, 1,1-	1.68E+04	6.73E+06	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Dichloroethane, 1,2-	8.48E+02	5.51E+04	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Dichloroethene, 1,1-	nc	1.71E+06	18	nc	1.1E-05	38	nc	2.2E-05	38	nc	2.2E-05
Dichloroethene, 1,2-, cis-	nc	6.76E+04	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00
Methylene chloride	4.77E+04	8.00E+06	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Tetrachloroethene	4.65E+03	2.65E+06	370	8.0E-08	1.4E-04	1,000	2.1E-07	3.8E-04	970	2.1E-07	3.7E-04
Trichloroethane, 1,1,1-	nc	4.66E+07	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00
Trichloroethane, 1,1,2-	1.63E+03	1.86E+03	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Trichloroethene	5.39E+03	1.85E+04	59	1.1E-08	3.2E-03	160	3.0E-08	8.7E-03	150	2.8E-08	8.1E-03
Trichlorofluoromethane	nc	6.11E+06	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00
Trichlorotrifluoroethane, 1,1,2-, 1,2,2-	nc	2.80E+08	14	nc	5.0E-08	33	nc	1.2E-07	30	nc	1.1E-07
Cumulative (multi-chemical)				**9.0E-08**	**3.3E-03**		**2.4E-07**	**9.1E-03**		**2.4E-07**	**8.5E-03**

Notes:

(1) The cancer risk or noncancer hazard associated with each detected concentration is calculated by ratioing the result to the cancer- or noncancer-based screening level, and multiplying by the target risk (1E-06) or target hazard quotient (1.0).

(2) Non-detect results are assumed to be zero.

Table 14. Vapor Intrusion Cumulative Risk and Hazard – Site-specific Evaluation, 5 feet bgs

Chemical	Soil Gas RBSL		VSP-061611-SVE-1			VSP-061611-SVE-2S			VSP-061611-SVE-3S			VSP-061611-SVE-4S			VSP-061611-SVE-5S		
	Cancer (µg/m3)	Noncancer (µg/m3)	Conc. (µg/m3)	Risk	Hazard	Conc. (µg/m3)	Risk	Hazard	Conc. (µg/m3)	Risk	Hazard	Conc. (µg/m3)	Risk	Hazard	Conc. (µg/m3)	Risk	Hazard
Acetone	nc	6.00E+08	84	nc	1.4E-07	32	nc	5.3E-08	22	nc	3.7E-08	25	nc	4.2E-08	36	nc	6.0E-08
Butanone, 2-	nc	1.40E+08	15	nc	1.1E-07	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00
Chloroform	2.96E+03	2.38E+06	20	6.8E-09	8.4E-06	32	1.1E-08	1.3E-05	6.6	2.2E-09	2.8E-06	10	3.4E-09	4.2E-06	11	3.7E-09	4.6E-06
Dichloroethane, 1,1-	5.72E+04	2.29E+07	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	4.8	8.4E-11	2.1E-07
Dichloroethane, 1,2-	2.61E+03	1.70E+05	ND	0.0E+00	0.0E+00	20	7.7E-09	1.2E-04	13	5.0E-09	7.7E-05	8.4	3.2E-09	4.9E-05	ND	0.0E+00	0.0E+00
Dichloroethene, 1,1-	nc	5.52E+06	430	nc	7.8E-05	22	nc	4.0E-06	82	nc	1.5E-05	6.9	nc	1.3E-06	13	nc	2.4E-06
Dichloroethene, 1,2-, cis-	nc	2.30E+05	ND	nc	0.0E+00	ND	nc	0.0E+00	5.8	nc	2.5E-05	ND	nc	0.0E+00	18	nc	7.8E-05
Methylene chloride	1.48E+05	2.49E+07	4.9	3.3E-11	2.0E-07	12	8.1E-11	4.8E-07	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Tetrachloroethene	1.59E+04	9.07E+06	2,400	1.5E-07	2.6E-04	1,500	9.4E-08	1.7E-04	1,500	9.4E-08	1.7E-04	1,100	6.9E-08	1.2E-04	1,400	8.8E-08	1.5E-04
Trichloroethane, 1,1,1-	nc	1.56E+08	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00	14	nc	9.0E-08	20	nc	1.3E-07
Trichloroethane, 1,1,2-	5.45E+03	6.23E+03	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	6.4	1.2E-09	1.0E-03	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Trichloroethene	1.80E+04	6.18E+04	900	5.0E-08	1.5E-02	340	1.9E-08	5.5E-03	500	2.8E-08	8.1E-03	120	6.7E-09	1.9E-03	170	9.4E-09	2.7E-03
Trichlorofluoromethane	nc	1.99E+07	ND	nc	0.0E+00	ND	nc	0.0E+00	43	nc	2.2E-06	ND	nc	0.0E+00	8.7	nc	4.4E-07
Trichlorotrifluoroethane, 1,1,2-, 1,2,2-	nc	9.39E+08	150	nc	1.6E-07	39	nc	4.2E-08	73	nc	7.8E-08	15	nc	1.6E-08	13	nc	1.4E-08
Cumulative (multi-chemical)				**2.1E-07**	**1.5E-02**		**1.3E-07**	**5.8E-03**		**1.3E-07**	**9.4E-03**		**8.2E-08**	**2.1E-03**		**1.0E-07**	**3.0E-03**

Notes:

(1) The cancer risk or noncancer hazard associated with each detected concentration is calculated by ratioing the result to the cancer- or noncancer-based screening level, and multiplying by the target risk (1E-06) or target hazard quotient (1.0).

(2) Non-detect results are assumed to be zero.

Table 14. Vapor Intrusion Cumulative Risk and Hazard – Site-specific Evaluation, 5 feet bgs

Chemical	Soil Gas RBSL		VSP-061611-SVE-6S			VSP-061611-SVE-7S			VSP-061611-SVE-7S-DUP		
	Cancer (µg/m3)	Noncancer (µg/m3)	Conc. (µg/m3)	Risk	Hazard	Conc. (µg/m3)	Risk	Hazard	Conc. (µg/m3)	Risk	Hazard
Acetone	nc	6.00E+08	15	nc	2.5E-08	23	nc	3.8E-08	20	nc	3.3E-08
Butanone, 2-	nc	1.40E+08	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00
Chloroform	2.96E+03	2.38E+06	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Dichloroethane, 1,1-	5.72E+04	2.29E+07	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Dichloroethane, 1,2-	2.61E+03	1.70E+05	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Dichloroethene, 1,1-	nc	5.52E+06	18	nc	3.3E-06	38	nc	6.9E-06	38	nc	6.9E-06
Dichloroethene, 1,2-, cis-	nc	2.30E+05	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00
Methylene chloride	1.48E+05	2.49E+07	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Tetrachloroethene	1.59E+04	9.07E+06	370	2.3E-08	4.1E-05	1,000	6.3E-08	1.1E-04	970	6.1E-08	1.1E-04
Trichloroethane, 1,1,1-	nc	1.56E+08	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00
Trichloroethane, 1,1,2-	5.45E+03	6.23E+03	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Trichloroethene	1.80E+04	6.18E+04	59	3.3E-09	9.5E-04	160	8.9E-09	2.6E-03	150	8.3E-09	2.4E-03
Trichlorofluoromethane	nc	1.99E+07	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00
Trichlorotrifluoroethane, 1,1,2-, 1,2,2-	nc	9.39E+08	14	nc	1.5E-08	33	nc	3.5E-08	30	nc	3.2E-08
Cumulative (multi-chemical)				**2.6E-08**	**1.0E-03**		**7.2E-08**	**2.7E-03**		**6.9E-08**	**2.5E-03**

Notes:

(1) The cancer risk or noncancer hazard associated with each detected concentration is calculated by ratioing the result to the cancer- or noncancer-based screening level, and multiplying by the target risk (1E-06) or target hazard quotient (1.0).

(2) Non-detect results are assumed to be zero.

Table 15. Vapor Intrusion Cumulative Risk and Hazard – Site-specific Evaluation, 10 feet bgs

Chemical	Soil Gas RBSL		VSP-061611-SVE-1			VSP-061611-SVE-2S			VSP-061611-SVE-3S			VSP-061611-SVE-4S			VSP-061611-SVE-5S		
	Cancer (µg/m3)	Noncancer (µg/m3)	Conc. (µg/m3)	Risk	Hazard	Conc. (µg/m3)	Risk	Hazard	Conc. (µg/m3)	Risk	Hazard	Conc. (µg/m3)	Risk	Hazard	Conc. (µg/m3)	Risk	Hazard
Acetone	nc	1.12E+09	84	nc	7.5E-08	32	nc	2.9E-08	22	nc	2.0E-08	25	nc	2.2E-08	36	nc	3.2E-08
Butanone, 2-	nc	2.69E+08	15	nc	5.6E-08	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00
Chloroform	5.65E+03	4.55E+06	20	3.5E-09	4.4E-06	32	5.7E-09	7.0E-06	6.6	1.2E-09	1.5E-06	10	1.8E-09	2.2E-06	11	1.9E-09	2.4E-06
Dichloroethane, 1,1-	1.11E+05	4.45E+07	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	4.8	4.3E-11	1.1E-07
Dichloroethane, 1,2-	4.98E+03	3.24E+05	ND	0.0E+00	0.0E+00	20	4.0E-09	6.2E-05	13	2.6E-09	4.0E-05	8.4	1.7E-09	2.6E-05	ND	0.0E+00	0.0E+00
Dichloroethene, 1,1-	nc	1.06E+07	430	nc	4.0E-05	22	nc	2.1E-06	82	nc	7.7E-06	6.9	nc	6.5E-07	13	nc	1.2E-06
Dichloroethene, 1,2-, cis-	nc	4.49E+05	ND	nc	0.0E+00	ND	nc	0.0E+00	5.8	nc	1.3E-05	ND	nc	0.0E+00	18	nc	4.0E-05
Methylene chloride	2.84E+05	4.76E+07	4.9	1.7E-11	1.0E-07	12	4.2E-11	2.5E-07	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Tetrachloroethene	3.11E+04	1.77E+07	2,400	7.7E-08	1.4E-04	1,500	4.8E-08	8.5E-05	1,500	4.8E-08	8.5E-05	1,100	3.5E-08	6.2E-05	1,400	4.5E-08	7.9E-05
Trichloroethane, 1,1,1-	nc	3.04E+08	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00	14	nc	4.6E-08	20	nc	6.6E-08
Trichloroethane, 1,1,2-	1.06E+04	1.21E+04	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	6.4	6.1E-10	5.3E-04	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Trichloroethene	3.50E+04	1.20E+05	900	2.6E-08	7.5E-03	340	9.7E-09	2.8E-03	500	1.4E-08	4.2E-03	120	3.4E-09	1.0E-03	170	4.9E-09	1.4E-03
Trichlorofluoromethane	nc	3.84E+07	ND	nc	0.0E+00	ND	nc	0.0E+00	43	nc	1.1E-06	ND	nc	0.0E+00	8.7	nc	2.3E-07
Trichlorotrifluoroethane, 1,1,2-, 1,2,2-	nc	1.82E+09	150	nc	8.2E-08	39	nc	2.1E-08	73	nc	4.0E-08	15	nc	8.2E-09	13	nc	7.1E-09
Cumulative (multi-chemical)				**1.1E-07**	**7.7E-03**		**6.8E-08**	**3.0E-03**		**6.7E-08**	**4.8E-03**		**4.2E-08**	**1.1E-03**		**5.2E-08**	**1.5E-03**

Notes:

(1) The cancer risk or noncancer hazard associated with each detected concentration is calculated by ratioing the result to the cancer- or noncancer-based screening level, and multiplying by the target risk (1E-06) or target hazard quotient (1.0).

(2) Non-detect results are assumed to be zero.

Table 15. Vapor Intrusion Cumulative Risk and Hazard – Site-specific Evaluation, 10 feet bgs

Chemical	Soil Gas RBSL		VSP-061611-SVE-6S			VSP-061611-SVE-7S			VSP-061611-SVE-7S-DUP		
	Cancer (µg/m3)	Noncancer (µg/m3)	Conc. (µg/m3)	Risk	Hazard	Conc. (µg/m3)	Risk	Hazard	Conc. (µg/m3)	Risk	Hazard
Acetone	nc	1.12E+09	15	nc	1.3E-08	23	nc	2.1E-08	20	nc	1.8E-08
Butanone, 2-	nc	2.69E+08	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00
Chloroform	5.65E+03	4.55E+06	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Dichloroethane, 1,1-	1.11E+05	4.45E+07	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Dichloroethane, 1,2-	4.98E+03	3.24E+05	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Dichloroethene, 1,1-	nc	1.06E+07	18	nc	1.7E-06	38	nc	3.6E-06	38	nc	3.6E-06
Dichloroethene, 1,2-, cis-	nc	4.49E+05	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00
Methylene chloride	2.84E+05	4.76E+07	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Tetrachloroethene	3.11E+04	1.77E+07	370	1.2E-08	2.1E-05	1,000	3.2E-08	5.7E-05	970	3.1E-08	5.5E-05
Trichloroethane, 1,1,1-	nc	3.04E+08	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00
Trichloroethane, 1,1,2-	1.06E+04	1.21E+04	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00	ND	0.0E+00	0.0E+00
Trichloroethene	3.50E+04	1.20E+05	59	1.7E-09	4.9E-04	160	4.6E-09	1.3E-03	150	4.3E-09	1.2E-03
Trichlorofluoromethane	nc	3.84E+07	ND	nc	0.0E+00	ND	nc	0.0E+00	ND	nc	0.0E+00
Trichlorotrifluoroethane, 1,1,2-, 1,2,2-	nc	1.82E+09	14	nc	7.7E-09	33	nc	1.8E-08	30	nc	1.6E-08
Cumulative (multi-chemical)				**1.4E-08**	**5.1E-04**		**3.7E-08**	**1.4E-03**		**3.5E-08**	**1.3E-03**

Notes:

(1) The cancer risk or noncancer hazard associated with each detected concentration is calculated by ratioing the result to the cancer- or noncancer-based screening level, and multiplying by the target risk (1E-06) or target hazard quotient (1.0).

(2) Non-detect results are assumed to be zero.

Table 16. Summary of Vapor Intrusion Cumulative Risk and Hazard

	Default Evaluation		Site-specific Evaluation, 5 feet bgs		Site-specific Evaluation, 10 feet bgs	
Soil Gas Sample	Cancer Risk	Noncancer Hazard Index	Cancer Risk	Noncancer Hazard Index	Cancer Risk	Noncancer Hazard Index
VSP-061611-SVE-1	7.0E-07	5.0E-02	2.1E-07	1.5E-02	1.1E-07	7.7E-03
VSP-061611-SVE-2S	4.4E-07	1.9E-02	1.3E-07	5.8E-03	6.8E-08	3.0E-03
VSP-061611-SVE-3S	4.4E-07	3.1E-02	1.3E-07	9.4E-03	6.7E-08	4.8E-03
VSP-061611-SVE-4S	2.8E-07	7.1E-03	8.2E-08	2.1E-03	4.2E-08	1.1E-03
VSP-061611-SVE-5S	3.4E-07	1.0E-02	1.0E-07	3.0E-03	5.2E-08	1.5E-03
VSP-061611-SVE-6S	9.0E-08	3.3E-03	2.6E-08	1.0E-03	1.4E-08	5.1E-04
VSP-061611-SVE-7S	2.4E-07	9.1E-03	7.2E-08	2.7E-03	3.7E-08	1.4E-03
VSP-061611-SVE-7S-DUP	2.4E-07	8.5E-03	6.9E-08	2.5E-03	3.5E-08	1.3E-03

Air Toxics LTD.
Laboratory Services Since 1989

7/5/2011
Mr. Bob Forsberg
LFR Levine-Fricke
14201 N. 87th Street
Suite 135
Scottsdale AZ 85260

Project Name: Romic
Project #: STO10094.0004
Workorder #: 1106425

Dear Mr. Bob Forsberg

The following report includes the data for the above referenced project for sample(s) received on 6/20/2011 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

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 .FAX (916) 985-1020
Hours 6:30 A.M to 5:30 PST

Air Toxics LTD.
Laboratory Services Since 1989

WORK ORDER #: 1106425

Work Order Summary

CLIENT:	Mr. Bob Forsberg ARCADIS, Inc. 14201 N. 87th Street Suite 135 Scottsdale, AZ 85260	**BILL TO:**	Accounts Payable ARCADIS, Inc. 630 Plaza Drive Suite 130 Highlands Ranch, CO 80129
PHONE:	480-905-9311	**P.O. #**	ST010094.0004
FAX:	480-905-9353	**PROJECT #**	STO10094.0004 Romic
DATE RECEIVED:	06/20/2011	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	07/05/2011		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	VSP-061611-SVE-1	Modified TO-15	4.6 "Hg	15 psi
02A	VSP-061611-SVE-2S	Modified TO-15	4.0 "Hg	15 psi
03A	VSP-061611-SVE-3S	Modified TO-15	3.0 "Hg	15 psi
04A	VSP-061611-SVE-4S	Modified TO-15	3.2 "Hg	15 psi
05A	VSP-061611-SVE-5S	Modified TO-15	3.8 "Hg	15 psi
06A	VSP-061611-SVE-6S	Modified TO-15	4.2 "Hg	15 psi
07A	VSP-061611-SVE-7S	Modified TO-15	4.2 "Hg	15 psi
08A	VSP-061611-SVE-7S-DUP	Modified TO-15	3.2 "Hg	15 psi
09A	Lab Blank	Modified TO-15	NA	NA
09B	Lab Blank	Modified TO-15	NA	NA
10A	CCV	Modified TO-15	NA	NA
10B	CCV	Modified TO-15	NA	NA
11A	LCS	Modified TO-15	NA	NA
11AA	LCSD	Modified TO-15	NA	NA
11B	LCS	Modified TO-15	NA	NA
11BB	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Linda L. Freeman DATE: 07/05/11

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

This report shall not be reproduced, except in full, without the written approval of Air Toxics Ltd.

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

Air Toxics LTD.
Laboratory Services Since 1989

LABORATORY NARRATIVE
EPA Method TO-15
LFR Levine-Fricke
Workorder# 1106425

Eight 1 Liter Summa Canister samples were received on June 20, 2011. The laboratory performed analysis via 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

There were no analytical discrepancies.

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: VSP-061611-SVE-1

Lab ID#: 1106425-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	1.2	20	9.2	150
1,1-Dichloroethene	1.2	110	4.7	430
Acetone	4.8	35	11	84
Methylene Chloride	1.2	1.4	4.2	4.9
2-Butanone (Methyl Ethyl Ketone)	4.8	5.0	14	15
Chloroform	1.2	4.0	5.8	20
1,2-Dichloroethane	1.2	6.0	4.8	24
Trichloroethene	1.2	170	6.4	900
Tetrachloroethene	1.2	360	8.1	2400

Client Sample ID: VSP-061611-SVE-2S

Lab ID#: 1106425-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	1.2	5.0	8.9	39
1,1-Dichloroethene	1.2	5.7	4.6	22
Acetone	4.7	14	11	32
Methylene Chloride	1.2	3.4	4.0	12
Chloroform	1.2	6.5	5.7	32
1,2-Dichloroethane	1.2	4.9	4.7	20
Trichloroethene	1.2	63	6.3	340
Tetrachloroethene	1.2	220	7.9	1500

Client Sample ID: VSP-061611-SVE-3S

Lab ID#: 1106425-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	1.1	7.6	6.3	43
Freon 113	1.1	9.5	8.6	73
1,1-Dichloroethene	1.1	21	4.4	82
Acetone	4.5	9.4	11	22

Air Toxics LTD.
Laboratory Services Since 1989

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

Client Sample ID: VSP-061611-SVE-3S

Lab ID#: 1106425-03A

cis-1,2-Dichloroethene	1.1	1.5	4.4	5.8
Chloroform	1.1	1.4	5.5	6.6
1,2-Dichloroethane	1.1	3.2	4.5	13
Trichloroethene	1.1	93	6.0	500
1,1,2-Trichloroethane	1.1	1.2	6.1	6.4
Tetrachloroethene	1.1	220	7.6	1500

Client Sample ID: VSP-061611-SVE-4S

Lab ID#: 1106425-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	1.1	1.9	8.7	15
1,1-Dichloroethene	1.1	1.7	4.5	6.9
Acetone	4.5	10	11	25
Chloroform	1.1	2.0	5.5	10
1,1,1-Trichloroethane	1.1	2.6	6.2	14
1,2-Dichloroethane	1.1	2.1	4.6	8.4
Trichloroethene	1.1	23	6.1	120
Tetrachloroethene	1.1	160	7.7	1100

Client Sample ID: VSP-061611-SVE-5S

Lab ID#: 1106425-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	1.2	1.6	6.5	8.7
Freon 113	1.2	1.7	8.8	13
1,1-Dichloroethene	1.2	3.2	4.6	13
Acetone	4.6	15	11	36
1,1-Dichloroethane	1.2	1.2	4.7	4.8
cis-1,2-Dichloroethene	1.2	4.5	4.6	18
Chloroform	1.2	2.2	5.6	11
1,1,1-Trichloroethane	1.2	3.8	6.3	20
Trichloroethene	1.2	31	6.2	170

Air Toxics LTD.
Laboratory Services Since 1989

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

Client Sample ID: VSP-061611-SVE-5S

Lab ID#: 1106425-05A

Tetrachloroethene	1.2	210	7.8	1400

Client Sample ID: VSP-061611-SVE-6S

Lab ID#: 1106425-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	1.2	1.8	9.0	14
1,1-Dichloroethene	1.2	4.4	4.6	18
Acetone	4.7	6.5	11	15
Trichloroethene	1.2	11	6.3	59
Tetrachloroethene	1.2	54	8.0	370

Client Sample ID: VSP-061611-SVE-7S

Lab ID#: 1106425-07A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	1.2	4.4	9.0	33
1,1-Dichloroethene	1.2	9.7	4.6	38
Acetone	4.7	9.8	11	23
Trichloroethene	1.2	29	6.3	160
Tetrachloroethene	1.2	150	8.0	1000

Client Sample ID: VSP-061611-SVE-7S-DUP

Lab ID#: 1106425-08A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	1.1	3.9	8.7	30
1,1-Dichloroethene	1.1	9.5	4.5	38
Acetone	4.5	8.4	11	20
Trichloroethene	1.1	27	6.1	150
Tetrachloroethene	1.1	140	7.7	970

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: VSP-061611-SVE-1

Lab ID#: 1106425-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	o062723	Date of Collection:	6/16/11 5:30:00 PM
Dil. Factor:	2.39	Date of Analysis:	6/28/11 06:36 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	Not Detected	5.9	Not Detected
Freon 114	1.2	Not Detected	8.4	Not Detected
Chloromethane	4.8	Not Detected	9.9	Not Detected
Vinyl Chloride	1.2	Not Detected	3.0	Not Detected
1,3-Butadiene	1.2	Not Detected	2.6	Not Detected
Bromomethane	1.2	Not Detected	4.6	Not Detected
Chloroethane	4.8	Not Detected	13	Not Detected
Freon 11	1.2	Not Detected	6.7	Not Detected
Ethanol	4.8	Not Detected	9.0	Not Detected
Freon 113	1.2	20	9.2	150
1,1-Dichloroethene	1.2	110	4.7	430
Acetone	4.8	35	11	84
2-Propanol	4.8	Not Detected	12	Not Detected
Carbon Disulfide	4.8	Not Detected	15	Not Detected
3-Chloropropene	4.8	Not Detected	15	Not Detected
Methylene Chloride	1.2	1.4	4.2	4.9
Methyl tert-butyl ether	1.2	Not Detected	4.3	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.7	Not Detected
Hexane	1.2	Not Detected	4.2	Not Detected
1,1-Dichloroethane	1.2	Not Detected	4.8	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.8	5.0	14	15
cis-1,2-Dichloroethene	1.2	Not Detected	4.7	Not Detected
Tetrahydrofuran	1.2	Not Detected	3.5	Not Detected
Chloroform	1.2	4.0	5.8	20
1,1,1-Trichloroethane	1.2	Not Detected	6.5	Not Detected
Cyclohexane	1.2	Not Detected	4.1	Not Detected
Carbon Tetrachloride	1.2	Not Detected	7.5	Not Detected
2,2,4-Trimethylpentane	1.2	Not Detected	5.6	Not Detected
Benzene	1.2	Not Detected	3.8	Not Detected
1,2-Dichloroethane	1.2	6.0	4.8	24
Heptane	1.2	Not Detected	4.9	Not Detected
Trichloroethene	1.2	170	6.4	900
1,2-Dichloropropane	1.2	Not Detected	5.5	Not Detected
1,4-Dioxane	4.8	Not Detected	17	Not Detected
Bromodichloromethane	1.2	Not Detected	8.0	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.4	Not Detected
4-Methyl-2-pentanone	1.2	Not Detected	4.9	Not Detected
Toluene	1.2	Not Detected	4.5	Not Detected
trans-1,3-Dichloropropene	1.2	Not Detected	5.4	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.5	Not Detected
Tetrachloroethene	1.2	360	8.1	2400

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: VSP-061611-SVE-1

Lab ID#: 1106425-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062723**	**Date of Collection:**	**6/16/11 5:30:00 PM**
Dil. Factor:	**2.39**	**Date of Analysis:**	**6/28/11 06:36 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Hexanone	4.8	Not Detected	20	Not Detected
Dibromochloromethane	1.2	Not Detected	10	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	9.2	Not Detected
Chlorobenzene	1.2	Not Detected	5.5	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
Styrene	1.2	Not Detected	5.1	Not Detected
Bromoform	1.2	Not Detected	12	Not Detected
Cumene	1.2	Not Detected	5.9	Not Detected
1,1,2,2-Tetrachloroethane	1.2	Not Detected	8.2	Not Detected
Propylbenzene	1.2	Not Detected	5.9	Not Detected
4-Ethyltoluene	1.2	Not Detected	5.9	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.9	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.9	Not Detected
1,3-Dichlorobenzene	1.2	Not Detected	7.2	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	7.2	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.2	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	7.2	Not Detected
1,2,4-Trichlorobenzene	4.8	Not Detected	35	Not Detected
Hexachlorobutadiene	4.8	Not Detected	51	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	118	70-130
1,2-Dichloroethane-d4	109	70-130
4-Bromofluorobenzene	107	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: VSP-061611-SVE-2S

Lab ID#: 1106425-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062724**	**Date of Collection:**	**6/16/11 5:10:00 PM**
Dil. Factor:	**2.33**	**Date of Analysis:**	**6/28/11 07:15 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	Not Detected	5.8	Not Detected
Freon 114	1.2	Not Detected	8.1	Not Detected
Chloromethane	4.7	Not Detected	9.6	Not Detected
Vinyl Chloride	1.2	Not Detected	3.0	Not Detected
1,3-Butadiene	1.2	Not Detected	2.6	Not Detected
Bromomethane	1.2	Not Detected	4.5	Not Detected
Chloroethane	4.7	Not Detected	12	Not Detected
Freon 11	1.2	Not Detected	6.5	Not Detected
Ethanol	4.7	Not Detected	8.8	Not Detected
Freon 113	1.2	5.0	8.9	39
1,1-Dichloroethene	1.2	5.7	4.6	22
Acetone	4.7	14	11	32
2-Propanol	4.7	Not Detected	11	Not Detected
Carbon Disulfide	4.7	Not Detected	14	Not Detected
3-Chloropropene	4.7	Not Detected	14	Not Detected
Methylene Chloride	1.2	3.4	4.0	12
Methyl tert-butyl ether	1.2	Not Detected	4.2	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Hexane	1.2	Not Detected	4.1	Not Detected
1,1-Dichloroethane	1.2	Not Detected	4.7	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.7	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Tetrahydrofuran	1.2	Not Detected	3.4	Not Detected
Chloroform	1.2	6.5	5.7	32
1,1,1-Trichloroethane	1.2	Not Detected	6.4	Not Detected
Cyclohexane	1.2	Not Detected	4.0	Not Detected
Carbon Tetrachloride	1.2	Not Detected	7.3	Not Detected
2,2,4-Trimethylpentane	1.2	Not Detected	5.4	Not Detected
Benzene	1.2	Not Detected	3.7	Not Detected
1,2-Dichloroethane	1.2	4.9	4.7	20
Heptane	1.2	Not Detected	4.8	Not Detected
Trichloroethene	1.2	63	6.3	340
1,2-Dichloropropane	1.2	Not Detected	5.4	Not Detected
1,4-Dioxane	4.7	Not Detected	17	Not Detected
Bromodichloromethane	1.2	Not Detected	7.8	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.3	Not Detected
4-Methyl-2-pentanone	1.2	Not Detected	4.8	Not Detected
Toluene	1.2	Not Detected	4.4	Not Detected
trans-1,3-Dichloropropene	1.2	Not Detected	5.3	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.4	Not Detected
Tetrachloroethene	1.2	220	7.9	1500

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: VSP-061611-SVE-2S

Lab ID#: 1106425-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062724**	**Date of Collection:**	**6/16/11 5:10:00 PM**
Dil. Factor:	**2.33**	**Date of Analysis:**	**6/28/11 07:15 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Hexanone	4.7	Not Detected	19	Not Detected
Dibromochloromethane	1.2	Not Detected	9.9	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	9.0	Not Detected
Chlorobenzene	1.2	Not Detected	5.4	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
Styrene	1.2	Not Detected	5.0	Not Detected
Bromoform	1.2	Not Detected	12	Not Detected
Cumene	1.2	Not Detected	5.7	Not Detected
1,1,2,2-Tetrachloroethane	1.2	Not Detected	8.0	Not Detected
Propylbenzene	1.2	Not Detected	5.7	Not Detected
4-Ethyltoluene	1.2	Not Detected	5.7	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.7	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.7	Not Detected
1,3-Dichlorobenzene	1.2	Not Detected	7.0	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	7.0	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.0	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	7.0	Not Detected
1,2,4-Trichlorobenzene	4.7	Not Detected	34	Not Detected
Hexachlorobutadiene	4.7	Not Detected	50	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	119	70-130
1,2-Dichloroethane-d4	110	70-130
4-Bromofluorobenzene	106	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: VSP-061611-SVE-3S

Lab ID#: 1106425-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062725**	**Date of Collection:**	**6/16/11 5:50:00 PM**
Dil. Factor:	**2.24**	**Date of Analysis:**	**6/28/11 07:53 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.1	Not Detected	5.5	Not Detected
Freon 114	1.1	Not Detected	7.8	Not Detected
Chloromethane	4.5	Not Detected	9.2	Not Detected
Vinyl Chloride	1.1	Not Detected	2.9	Not Detected
1,3-Butadiene	1.1	Not Detected	2.5	Not Detected
Bromomethane	1.1	Not Detected	4.3	Not Detected
Chloroethane	4.5	Not Detected	12	Not Detected
Freon 11	1.1	7.6	6.3	43
Ethanol	4.5	Not Detected	8.4	Not Detected
Freon 113	1.1	9.5	8.6	73
1,1-Dichloroethene	1.1	21	4.4	82
Acetone	4.5	9.4	11	22
2-Propanol	4.5	Not Detected	11	Not Detected
Carbon Disulfide	4.5	Not Detected	14	Not Detected
3-Chloropropene	4.5	Not Detected	14	Not Detected
Methylene Chloride	1.1	Not Detected	3.9	Not Detected
Methyl tert-butyl ether	1.1	Not Detected	4.0	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.4	Not Detected
Hexane	1.1	Not Detected	3.9	Not Detected
1,1-Dichloroethane	1.1	Not Detected	4.5	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.5	Not Detected	13	Not Detected
cis-1,2-Dichloroethene	1.1	1.5	4.4	5.8
Tetrahydrofuran	1.1	Not Detected	3.3	Not Detected
Chloroform	1.1	1.4	5.5	6.6
1,1,1-Trichloroethane	1.1	Not Detected	6.1	Not Detected
Cyclohexane	1.1	Not Detected	3.8	Not Detected
Carbon Tetrachloride	1.1	Not Detected	7.0	Not Detected
2,2,4-Trimethylpentane	1.1	Not Detected	5.2	Not Detected
Benzene	1.1	Not Detected	3.6	Not Detected
1,2-Dichloroethane	1.1	3.2	4.5	13
Heptane	1.1	Not Detected	4.6	Not Detected
Trichloroethene	1.1	93	6.0	500
1,2-Dichloropropane	1.1	Not Detected	5.2	Not Detected
1,4-Dioxane	4.5	Not Detected	16	Not Detected
Bromodichloromethane	1.1	Not Detected	7.5	Not Detected
cis-1,3-Dichloropropene	1.1	Not Detected	5.1	Not Detected
4-Methyl-2-pentanone	1.1	Not Detected	4.6	Not Detected
Toluene	1.1	Not Detected	4.2	Not Detected
trans-1,3-Dichloropropene	1.1	Not Detected	5.1	Not Detected
1,1,2-Trichloroethane	1.1	1.2	6.1	6.4
Tetrachloroethene	1.1	220	7.6	1500

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: VSP-061611-SVE-3S

Lab ID#: 1106425-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062725**	**Date of Collection:**	**6/16/11 5:50:00 PM**
Dil. Factor:	**2.24**	**Date of Analysis:**	**6/28/11 07:53 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Hexanone	4.5	Not Detected	18	Not Detected
Dibromochloromethane	1.1	Not Detected	9.5	Not Detected
1,2-Dibromoethane (EDB)	1.1	Not Detected	8.6	Not Detected
Chlorobenzene	1.1	Not Detected	5.2	Not Detected
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
Styrene	1.1	Not Detected	4.8	Not Detected
Bromoform	1.1	Not Detected	12	Not Detected
Cumene	1.1	Not Detected	5.5	Not Detected
1,1,2,2-Tetrachloroethane	1.1	Not Detected	7.7	Not Detected
Propylbenzene	1.1	Not Detected	5.5	Not Detected
4-Ethyltoluene	1.1	Not Detected	5.5	Not Detected
1,3,5-Trimethylbenzene	1.1	Not Detected	5.5	Not Detected
1,2,4-Trimethylbenzene	1.1	Not Detected	5.5	Not Detected
1,3-Dichlorobenzene	1.1	Not Detected	6.7	Not Detected
1,4-Dichlorobenzene	1.1	Not Detected	6.7	Not Detected
alpha-Chlorotoluene	1.1	Not Detected	5.8	Not Detected
1,2-Dichlorobenzene	1.1	Not Detected	6.7	Not Detected
1,2,4-Trichlorobenzene	4.5	Not Detected	33	Not Detected
Hexachlorobutadiene	4.5	Not Detected	48	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	121	70-130
1,2-Dichloroethane-d4	112	70-130
4-Bromofluorobenzene	106	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: VSP-061611-SVE-4S

Lab ID#: 1106425-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	o062726	Date of Collection:	6/16/11 4:10:00 PM
Dil. Factor:	2.26	Date of Analysis:	6/28/11 08:35 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.1	Not Detected	5.6	Not Detected
Freon 114	1.1	Not Detected	7.9	Not Detected
Chloromethane	4.5	Not Detected	9.3	Not Detected
Vinyl Chloride	1.1	Not Detected	2.9	Not Detected
1,3-Butadiene	1.1	Not Detected	2.5	Not Detected
Bromomethane	1.1	Not Detected	4.4	Not Detected
Chloroethane	4.5	Not Detected	12	Not Detected
Freon 11	1.1	Not Detected	6.3	Not Detected
Ethanol	4.5	Not Detected	8.5	Not Detected
Freon 113	1.1	1.9	8.7	15
1,1-Dichloroethene	1.1	1.7	4.5	6.9
Acetone	4.5	10	11	25
2-Propanol	4.5	Not Detected	11	Not Detected
Carbon Disulfide	4.5	Not Detected	14	Not Detected
3-Chloropropene	4.5	Not Detected	14	Not Detected
Methylene Chloride	1.1	Not Detected	3.9	Not Detected
Methyl tert-butyl ether	1.1	Not Detected	4.1	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Hexane	1.1	Not Detected	4.0	Not Detected
1,1-Dichloroethane	1.1	Not Detected	4.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.5	Not Detected	13	Not Detected
cis-1,2-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Tetrahydrofuran	1.1	Not Detected	3.3	Not Detected
Chloroform	1.1	2.0	5.5	10
1,1,1-Trichloroethane	1.1	2.6	6.2	14
Cyclohexane	1.1	Not Detected	3.9	Not Detected
Carbon Tetrachloride	1.1	Not Detected	7.1	Not Detected
2,2,4-Trimethylpentane	1.1	Not Detected	5.3	Not Detected
Benzene	1.1	Not Detected	3.6	Not Detected
1,2-Dichloroethane	1.1	2.1	4.6	8.4
Heptane	1.1	Not Detected	4.6	Not Detected
Trichloroethene	1.1	23	6.1	120
1,2-Dichloropropane	1.1	Not Detected	5.2	Not Detected
1,4-Dioxane	4.5	Not Detected	16	Not Detected
Bromodichloromethane	1.1	Not Detected	7.6	Not Detected
cis-1,3-Dichloropropene	1.1	Not Detected	5.1	Not Detected
4-Methyl-2-pentanone	1.1	Not Detected	4.6	Not Detected
Toluene	1.1	Not Detected	4.2	Not Detected
trans-1,3-Dichloropropene	1.1	Not Detected	5.1	Not Detected
1,1,2-Trichloroethane	1.1	Not Detected	6.2	Not Detected
Tetrachloroethene	1.1	160	7.7	1100

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: VSP-061611-SVE-4S

Lab ID#: 1106425-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062726**	**Date of Collection:**	**6/16/11 4:10:00 PM**
Dil. Factor:	**2.26**	**Date of Analysis:**	**6/28/11 08:35 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Hexanone	4.5	Not Detected	18	Not Detected
Dibromochloromethane	1.1	Not Detected	9.6	Not Detected
1,2-Dibromoethane (EDB)	1.1	Not Detected	8.7	Not Detected
Chlorobenzene	1.1	Not Detected	5.2	Not Detected
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
Styrene	1.1	Not Detected	4.8	Not Detected
Bromoform	1.1	Not Detected	12	Not Detected
Cumene	1.1	Not Detected	5.6	Not Detected
1,1,2,2-Tetrachloroethane	1.1	Not Detected	7.8	Not Detected
Propylbenzene	1.1	Not Detected	5.6	Not Detected
4-Ethyltoluene	1.1	Not Detected	5.6	Not Detected
1,3,5-Trimethylbenzene	1.1	Not Detected	5.6	Not Detected
1,2,4-Trimethylbenzene	1.1	Not Detected	5.6	Not Detected
1,3-Dichlorobenzene	1.1	Not Detected	6.8	Not Detected
1,4-Dichlorobenzene	1.1	Not Detected	6.8	Not Detected
alpha-Chlorotoluene	1.1	Not Detected	5.8	Not Detected
1,2-Dichlorobenzene	1.1	Not Detected	6.8	Not Detected
1,2,4-Trichlorobenzene	4.5	Not Detected	34	Not Detected
Hexachlorobutadiene	4.5	Not Detected	48	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	120	70-130
1,2-Dichloroethane-d4	113	70-130
4-Bromofluorobenzene	106	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: VSP-061611-SVE-5S

Lab ID#: 1106425-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	o062727	Date of Collection:	6/16/11 4:28:00 PM
Dil. Factor:	2.31	Date of Analysis:	6/28/11 09:13 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	Not Detected	5.7	Not Detected
Freon 114	1.2	Not Detected	8.1	Not Detected
Chloromethane	4.6	Not Detected	9.5	Not Detected
Vinyl Chloride	1.2	Not Detected	3.0	Not Detected
1,3-Butadiene	1.2	Not Detected	2.6	Not Detected
Bromomethane	1.2	Not Detected	4.5	Not Detected
Chloroethane	4.6	Not Detected	12	Not Detected
Freon 11	1.2	1.6	6.5	8.7
Ethanol	4.6	Not Detected	8.7	Not Detected
Freon 113	1.2	1.7	8.8	13
1,1-Dichloroethene	1.2	3.2	4.6	13
Acetone	4.6	15	11	36
2-Propanol	4.6	Not Detected	11	Not Detected
Carbon Disulfide	4.6	Not Detected	14	Not Detected
3-Chloropropene	4.6	Not Detected	14	Not Detected
Methylene Chloride	1.2	Not Detected	4.0	Not Detected
Methyl tert-butyl ether	1.2	Not Detected	4.2	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Hexane	1.2	Not Detected	4.1	Not Detected
1,1-Dichloroethane	1.2	1.2	4.7	4.8
2-Butanone (Methyl Ethyl Ketone)	4.6	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	1.2	4.5	4.6	18
Tetrahydrofuran	1.2	Not Detected	3.4	Not Detected
Chloroform	1.2	2.2	5.6	11
1,1,1-Trichloroethane	1.2	3.8	6.3	20
Cyclohexane	1.2	Not Detected	4.0	Not Detected
Carbon Tetrachloride	1.2	Not Detected	7.3	Not Detected
2,2,4-Trimethylpentane	1.2	Not Detected	5.4	Not Detected
Benzene	1.2	Not Detected	3.7	Not Detected
1,2-Dichloroethane	1.2	Not Detected	4.7	Not Detected
Heptane	1.2	Not Detected	4.7	Not Detected
Trichloroethene	1.2	31	6.2	170
1,2-Dichloropropane	1.2	Not Detected	5.3	Not Detected
1,4-Dioxane	4.6	Not Detected	17	Not Detected
Bromodichloromethane	1.2	Not Detected	7.7	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.2	Not Detected
4-Methyl-2-pentanone	1.2	Not Detected	4.7	Not Detected
Toluene	1.2	Not Detected	4.4	Not Detected
trans-1,3-Dichloropropene	1.2	Not Detected	5.2	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.3	Not Detected
Tetrachloroethene	1.2	210	7.8	1400

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: VSP-061611-SVE-5S

Lab ID#: 1106425-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062727**	**Date of Collection:**	**6/16/11 4:28:00 PM**
Dil. Factor:	**2.31**	**Date of Analysis:**	**6/28/11 09:13 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Hexanone	4.6	Not Detected	19	Not Detected
Dibromochloromethane	1.2	Not Detected	9.8	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	8.9	Not Detected
Chlorobenzene	1.2	Not Detected	5.3	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
Styrene	1.2	Not Detected	4.9	Not Detected
Bromoform	1.2	Not Detected	12	Not Detected
Cumene	1.2	Not Detected	5.7	Not Detected
1,1,2,2-Tetrachloroethane	1.2	Not Detected	7.9	Not Detected
Propylbenzene	1.2	Not Detected	5.7	Not Detected
4-Ethyltoluene	1.2	Not Detected	5.7	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.7	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.7	Not Detected
1,3-Dichlorobenzene	1.2	Not Detected	6.9	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	6.9	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.0	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	6.9	Not Detected
1,2,4-Trichlorobenzene	4.6	Not Detected	34	Not Detected
Hexachlorobutadiene	4.6	Not Detected	49	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	120	70-130
1,2-Dichloroethane-d4	114	70-130
4-Bromofluorobenzene	107	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: VSP-061611-SVE-6S

Lab ID#: 1106425-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	o062806	Date of Collection:	6/16/11 4:40:00 PM
Dil. Factor:	2.35	Date of Analysis:	6/28/11 02:11 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	Not Detected	5.8	Not Detected
Freon 114	1.2	Not Detected	8.2	Not Detected
Chloromethane	4.7	Not Detected	9.7	Not Detected
Vinyl Chloride	1.2	Not Detected	3.0	Not Detected
1,3-Butadiene	1.2	Not Detected	2.6	Not Detected
Bromomethane	1.2	Not Detected	4.6	Not Detected
Chloroethane	4.7	Not Detected	12	Not Detected
Freon 11	1.2	Not Detected	6.6	Not Detected
Ethanol	4.7	Not Detected	8.8	Not Detected
Freon 113	1.2	1.8	9.0	14
1,1-Dichloroethene	1.2	4.4	4.6	18
Acetone	4.7	6.5	11	15
2-Propanol	4.7	Not Detected	12	Not Detected
Carbon Disulfide	4.7	Not Detected	15	Not Detected
3-Chloropropene	4.7	Not Detected	15	Not Detected
Methylene Chloride	1.2	Not Detected	4.1	Not Detected
Methyl tert-butyl ether	1.2	Not Detected	4.2	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Hexane	1.2	Not Detected	4.1	Not Detected
1,1-Dichloroethane	1.2	Not Detected	4.8	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.7	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Tetrahydrofuran	1.2	Not Detected	3.5	Not Detected
Chloroform	1.2	Not Detected	5.7	Not Detected
1,1,1-Trichloroethane	1.2	Not Detected	6.4	Not Detected
Cyclohexane	1.2	Not Detected	4.0	Not Detected
Carbon Tetrachloride	1.2	Not Detected	7.4	Not Detected
2,2,4-Trimethylpentane	1.2	Not Detected	5.5	Not Detected
Benzene	1.2	Not Detected	3.8	Not Detected
1,2-Dichloroethane	1.2	Not Detected	4.8	Not Detected
Heptane	1.2	Not Detected	4.8	Not Detected
Trichloroethene	1.2	11	6.3	59
1,2-Dichloropropane	1.2	Not Detected	5.4	Not Detected
1,4-Dioxane	4.7	Not Detected	17	Not Detected
Bromodichloromethane	1.2	Not Detected	7.9	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.3	Not Detected
4-Methyl-2-pentanone	1.2	Not Detected	4.8	Not Detected
Toluene	1.2	Not Detected	4.4	Not Detected
trans-1,3-Dichloropropene	1.2	Not Detected	5.3	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.4	Not Detected
Tetrachloroethene	1.2	54	8.0	370

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: VSP-061611-SVE-6S

Lab ID#: 1106425-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062806**	**Date of Collection:**	**6/16/11 4:40:00 PM**
Dil. Factor:	**2.35**	**Date of Analysis:**	**6/28/11 02:11 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Hexanone	4.7	Not Detected	19	Not Detected
Dibromochloromethane	1.2	Not Detected	10	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	9.0	Not Detected
Chlorobenzene	1.2	Not Detected	5.4	Not Detected
Ethyl Benzene	1.2	Not Detected	5.1	Not Detected
m,p-Xylene	1.2	Not Detected	5.1	Not Detected
o-Xylene	1.2	Not Detected	5.1	Not Detected
Styrene	1.2	Not Detected	5.0	Not Detected
Bromoform	1.2	Not Detected	12	Not Detected
Cumene	1.2	Not Detected	5.8	Not Detected
1,1,2,2-Tetrachloroethane	1.2	Not Detected	8.1	Not Detected
Propylbenzene	1.2	Not Detected	5.8	Not Detected
4-Ethyltoluene	1.2	Not Detected	5.8	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.8	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.8	Not Detected
1,3-Dichlorobenzene	1.2	Not Detected	7.1	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	7.1	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.1	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	7.1	Not Detected
1,2,4-Trichlorobenzene	4.7	Not Detected	35	Not Detected
Hexachlorobutadiene	4.7	Not Detected	50	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	119	70-130
1,2-Dichloroethane-d4	113	70-130
4-Bromofluorobenzene	107	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: VSP-061611-SVE-7S

Lab ID#: 1106425-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	o062807	Date of Collection:	6/16/11 6:20:00 PM
Dil. Factor:	2.35	Date of Analysis:	6/28/11 03:03 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	Not Detected	5.8	Not Detected
Freon 114	1.2	Not Detected	8.2	Not Detected
Chloromethane	4.7	Not Detected	9.7	Not Detected
Vinyl Chloride	1.2	Not Detected	3.0	Not Detected
1,3-Butadiene	1.2	Not Detected	2.6	Not Detected
Bromomethane	1.2	Not Detected	4.6	Not Detected
Chloroethane	4.7	Not Detected	12	Not Detected
Freon 11	1.2	Not Detected	6.6	Not Detected
Ethanol	4.7	Not Detected	8.8	Not Detected
Freon 113	1.2	4.4	9.0	33
1,1-Dichloroethene	1.2	9.7	4.6	38
Acetone	4.7	9.8	11	23
2-Propanol	4.7	Not Detected	12	Not Detected
Carbon Disulfide	4.7	Not Detected	15	Not Detected
3-Chloropropene	4.7	Not Detected	15	Not Detected
Methylene Chloride	1.2	Not Detected	4.1	Not Detected
Methyl tert-butyl ether	1.2	Not Detected	4.2	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Hexane	1.2	Not Detected	4.1	Not Detected
1,1-Dichloroethane	1.2	Not Detected	4.8	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.7	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Tetrahydrofuran	1.2	Not Detected	3.5	Not Detected
Chloroform	1.2	Not Detected	5.7	Not Detected
1,1,1-Trichloroethane	1.2	Not Detected	6.4	Not Detected
Cyclohexane	1.2	Not Detected	4.0	Not Detected
Carbon Tetrachloride	1.2	Not Detected	7.4	Not Detected
2,2,4-Trimethylpentane	1.2	Not Detected	5.5	Not Detected
Benzene	1.2	Not Detected	3.8	Not Detected
1,2-Dichloroethane	1.2	Not Detected	4.8	Not Detected
Heptane	1.2	Not Detected	4.8	Not Detected
Trichloroethene	1.2	29	6.3	160
1,2-Dichloropropane	1.2	Not Detected	5.4	Not Detected
1,4-Dioxane	4.7	Not Detected	17	Not Detected
Bromodichloromethane	1.2	Not Detected	7.9	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.3	Not Detected
4-Methyl-2-pentanone	1.2	Not Detected	4.8	Not Detected
Toluene	1.2	Not Detected	4.4	Not Detected
trans-1,3-Dichloropropene	1.2	Not Detected	5.3	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.4	Not Detected
Tetrachloroethene	1.2	150	8.0	1000

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: VSP-061611-SVE-7S

Lab ID#: 1106425-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062807**	**Date of Collection:**	**6/16/11 6:20:00 PM**
Dil. Factor:	**2.35**	**Date of Analysis:**	**6/28/11 03:03 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Hexanone	4.7	Not Detected	19	Not Detected
Dibromochloromethane	1.2	Not Detected	10	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	9.0	Not Detected
Chlorobenzene	1.2	Not Detected	5.4	Not Detected
Ethyl Benzene	1.2	Not Detected	5.1	Not Detected
m,p-Xylene	1.2	Not Detected	5.1	Not Detected
o-Xylene	1.2	Not Detected	5.1	Not Detected
Styrene	1.2	Not Detected	5.0	Not Detected
Bromoform	1.2	Not Detected	12	Not Detected
Cumene	1.2	Not Detected	5.8	Not Detected
1,1,2,2-Tetrachloroethane	1.2	Not Detected	8.1	Not Detected
Propylbenzene	1.2	Not Detected	5.8	Not Detected
4-Ethyltoluene	1.2	Not Detected	5.8	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.8	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.8	Not Detected
1,3-Dichlorobenzene	1.2	Not Detected	7.1	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	7.1	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.1	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	7.1	Not Detected
1,2,4-Trichlorobenzene	4.7	Not Detected	35	Not Detected
Hexachlorobutadiene	4.7	Not Detected	50	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	121	70-130
1,2-Dichloroethane-d4	116	70-130
4-Bromofluorobenzene	107	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: VSP-061611-SVE-7S-DUP

Lab ID#: 1106425-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062808**	**Date of Collection:**	**6/16/11 6:20:00 PM**
Dil. Factor:	**2.26**	**Date of Analysis:**	**6/28/11 03:42 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.1	Not Detected	5.6	Not Detected
Freon 114	1.1	Not Detected	7.9	Not Detected
Chloromethane	4.5	Not Detected	9.3	Not Detected
Vinyl Chloride	1.1	Not Detected	2.9	Not Detected
1,3-Butadiene	1.1	Not Detected	2.5	Not Detected
Bromomethane	1.1	Not Detected	4.4	Not Detected
Chloroethane	4.5	Not Detected	12	Not Detected
Freon 11	1.1	Not Detected	6.3	Not Detected
Ethanol	4.5	Not Detected	8.5	Not Detected
Freon 113	1.1	3.9	8.7	30
1,1-Dichloroethene	1.1	9.5	4.5	38
Acetone	4.5	8.4	11	20
2-Propanol	4.5	Not Detected	11	Not Detected
Carbon Disulfide	4.5	Not Detected	14	Not Detected
3-Chloropropene	4.5	Not Detected	14	Not Detected
Methylene Chloride	1.1	Not Detected	3.9	Not Detected
Methyl tert-butyl ether	1.1	Not Detected	4.1	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Hexane	1.1	Not Detected	4.0	Not Detected
1,1-Dichloroethane	1.1	Not Detected	4.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.5	Not Detected	13	Not Detected
cis-1,2-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Tetrahydrofuran	1.1	Not Detected	3.3	Not Detected
Chloroform	1.1	Not Detected	5.5	Not Detected
1,1,1-Trichloroethane	1.1	Not Detected	6.2	Not Detected
Cyclohexane	1.1	Not Detected	3.9	Not Detected
Carbon Tetrachloride	1.1	Not Detected	7.1	Not Detected
2,2,4-Trimethylpentane	1.1	Not Detected	5.3	Not Detected
Benzene	1.1	Not Detected	3.6	Not Detected
1,2-Dichloroethane	1.1	Not Detected	4.6	Not Detected
Heptane	1.1	Not Detected	4.6	Not Detected
Trichloroethene	1.1	27	6.1	150
1,2-Dichloropropane	1.1	Not Detected	5.2	Not Detected
1,4-Dioxane	4.5	Not Detected	16	Not Detected
Bromodichloromethane	1.1	Not Detected	7.6	Not Detected
cis-1,3-Dichloropropene	1.1	Not Detected	5.1	Not Detected
4-Methyl-2-pentanone	1.1	Not Detected	4.6	Not Detected
Toluene	1.1	Not Detected	4.2	Not Detected
trans-1,3-Dichloropropene	1.1	Not Detected	5.1	Not Detected
1,1,2-Trichloroethane	1.1	Not Detected	6.2	Not Detected
Tetrachloroethene	1.1	140	7.7	970

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: VSP-061611-SVE-7S-DUP

Lab ID#: 1106425-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062808**	**Date of Collection:**	**6/16/11 6:20:00 PM**
Dil. Factor:	**2.26**	**Date of Analysis:**	**6/28/11 03:42 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Hexanone	4.5	Not Detected	18	Not Detected
Dibromochloromethane	1.1	Not Detected	9.6	Not Detected
1,2-Dibromoethane (EDB)	1.1	Not Detected	8.7	Not Detected
Chlorobenzene	1.1	Not Detected	5.2	Not Detected
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
Styrene	1.1	Not Detected	4.8	Not Detected
Bromoform	1.1	Not Detected	12	Not Detected
Cumene	1.1	Not Detected	5.6	Not Detected
1,1,2,2-Tetrachloroethane	1.1	Not Detected	7.8	Not Detected
Propylbenzene	1.1	Not Detected	5.6	Not Detected
4-Ethyltoluene	1.1	Not Detected	5.6	Not Detected
1,3,5-Trimethylbenzene	1.1	Not Detected	5.6	Not Detected
1,2,4-Trimethylbenzene	1.1	Not Detected	5.6	Not Detected
1,3-Dichlorobenzene	1.1	Not Detected	6.8	Not Detected
1,4-Dichlorobenzene	1.1	Not Detected	6.8	Not Detected
alpha-Chlorotoluene	1.1	Not Detected	5.8	Not Detected
1,2-Dichlorobenzene	1.1	Not Detected	6.8	Not Detected
1,2,4-Trichlorobenzene	4.5	Not Detected	34	Not Detected
Hexachlorobutadiene	4.5	Not Detected	48	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	120	70-130
1,2-Dichloroethane-d4	116	70-130
4-Bromofluorobenzene	107	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1106425-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	o062708	Date of Collection: NA	
Dil. Factor:	1.00	Date of Analysis: 6/27/11 12:33 PM	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	2.0	Not Detected	4.1	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	0.50	Not Detected	1.9	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	2.0	Not Detected	3.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	2.0	Not Detected	4.8	Not Detected
2-Propanol	2.0	Not Detected	4.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
3-Chloropropene	2.0	Not Detected	6.3	Not Detected
Methylene Chloride	0.50	Not Detected	1.7	Not Detected
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.2	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1106425-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062708**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/27/11 12:33 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Hexanone	2.0	Not Detected	8.2	Not Detected
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	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
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	111	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	106	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1106425-09B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062805**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/28/11 01:09 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	2.0	Not Detected	4.1	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	0.50	Not Detected	1.9	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	2.0	Not Detected	3.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	2.0	Not Detected	4.8	Not Detected
2-Propanol	2.0	Not Detected	4.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
3-Chloropropene	2.0	Not Detected	6.3	Not Detected
Methylene Chloride	0.50	Not Detected	1.7	Not Detected
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.2	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1106425-09B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062805**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/28/11 01:09 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Hexanone	2.0	Not Detected	8.2	Not Detected
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	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
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	121	70-130
1,2-Dichloroethane-d4	115	70-130
4-Bromofluorobenzene	106	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: CCV

Lab ID#: 1106425-10A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062705**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/27/11 10:07 AM**	

Compound	%Recovery
Freon 12	94
Freon 114	94
Chloromethane	87
Vinyl Chloride	89
1,3-Butadiene	81
Bromomethane	86
Chloroethane	86
Freon 11	91
Ethanol	81
Freon 113	92
1,1-Dichloroethene	86
Acetone	86
2-Propanol	84
Carbon Disulfide	84
3-Chloropropene	76
Methylene Chloride	86
Methyl tert-butyl ether	82
trans-1,2-Dichloroethene	83
Hexane	83
1,1-Dichloroethane	85
2-Butanone (Methyl Ethyl Ketone)	85
cis-1,2-Dichloroethene	85
Tetrahydrofuran	86
Chloroform	90
1,1,1-Trichloroethane	91
Cyclohexane	86
Carbon Tetrachloride	95
2,2,4-Trimethylpentane	89
Benzene	86
1,2-Dichloroethane	93
Heptane	89
Trichloroethene	100
1,2-Dichloropropane	90
1,4-Dioxane	87
Bromodichloromethane	94
cis-1,3-Dichloropropene	92
4-Methyl-2-pentanone	94
Toluene	101
trans-1,3-Dichloropropene	78
1,1,2-Trichloroethane	83
Tetrachloroethene	92

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: CCV

Lab ID#: 1106425-10A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062705**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/27/11 10:07 AM**	

Compound	**%Recovery**
2-Hexanone	84
Dibromochloromethane	91
1,2-Dibromoethane (EDB)	88
Chlorobenzene	81
Ethyl Benzene	84
m,p-Xylene	83
o-Xylene	83
Styrene	84
Bromoform	92
Cumene	82
1,1,2,2-Tetrachloroethane	87
Propylbenzene	83
4-Ethyltoluene	83
1,3,5-Trimethylbenzene	82
1,2,4-Trimethylbenzene	83
1,3-Dichlorobenzene	87
1,4-Dichlorobenzene	86
alpha-Chlorotoluene	85
1,2-Dichlorobenzene	86
1,2,4-Trichlorobenzene	90
Hexachlorobutadiene	89

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
Toluene-d8	110	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	107	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: CCV
Lab ID#: 1106425-10B
EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	o062802	Date of Collection: NA	
Dil. Factor:	1.00	Date of Analysis: 6/28/11 10:56 AM	

Compound	%Recovery
Freon 12	108
Freon 114	98
Chloromethane	92
Vinyl Chloride	88
1,3-Butadiene	78
Bromomethane	90
Chloroethane	85
Freon 11	102
Ethanol	82
Freon 113	95
1,1-Dichloroethene	82
Acetone	85
2-Propanol	85
Carbon Disulfide	82
3-Chloropropene	74
Methylene Chloride	83
Methyl tert-butyl ether	82
trans-1,2-Dichloroethene	82
Hexane	80
1,1-Dichloroethane	88
2-Butanone (Methyl Ethyl Ketone)	81
cis-1,2-Dichloroethene	82
Tetrahydrofuran	87
Chloroform	96
1,1,1-Trichloroethane	101
Cyclohexane	85
Carbon Tetrachloride	107
2,2,4-Trimethylpentane	93
Benzene	85
1,2-Dichloroethane	104
Heptane	92
Trichloroethene	101
1,2-Dichloropropane	92
1,4-Dioxane	88
Bromodichloromethane	103
cis-1,3-Dichloropropene	98
4-Methyl-2-pentanone	105
Toluene	110
trans-1,3-Dichloropropene	75
1,1,2-Trichloroethane	79
Tetrachloroethene	91

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: CCV

Lab ID#: 1106425-10B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062802**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/28/11 10:56 AM**	

Compound	**%Recovery**
2-Hexanone	81
Dibromochloromethane	91
1,2-Dibromoethane (EDB)	88
Chlorobenzene	83
Ethyl Benzene	85
m,p-Xylene	85
o-Xylene	86
Styrene	86
Bromoform	95
Cumene	86
1,1,2,2-Tetrachloroethane	92
Propylbenzene	86
4-Ethyltoluene	86
1,3,5-Trimethylbenzene	84
1,2,4-Trimethylbenzene	86
1,3-Dichlorobenzene	93
1,4-Dichlorobenzene	91
alpha-Chlorotoluene	89
1,2-Dichlorobenzene	91
1,2,4-Trichlorobenzene	92
Hexachlorobutadiene	92

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
Toluene-d8	119	70-130
1,2-Dichloroethane-d4	114	70-130
4-Bromofluorobenzene	112	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCS

Lab ID#: 1106425-11A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062706**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/27/11 11:06 AM**	

Compound	%Recovery
Freon 12	96
Freon 114	95
Chloromethane	91
Vinyl Chloride	95
1,3-Butadiene	82
Bromomethane	85
Chloroethane	87
Freon 11	93
Ethanol	79
Freon 113	95
1,1-Dichloroethene	91
Acetone	88
2-Propanol	82
Carbon Disulfide	104
3-Chloropropene	88
Methylene Chloride	86
Methyl tert-butyl ether	85
trans-1,2-Dichloroethene	94
Hexane	83
1,1-Dichloroethane	85
2-Butanone (Methyl Ethyl Ketone)	83
cis-1,2-Dichloroethene	87
Tetrahydrofuran	84
Chloroform	91
1,1,1-Trichloroethane	93
Cyclohexane	86
Carbon Tetrachloride	98
2,2,4-Trimethylpentane	88
Benzene	85
1,2-Dichloroethane	92
Heptane	88
Trichloroethene	97
1,2-Dichloropropane	88
1,4-Dioxane	81
Bromodichloromethane	92
cis-1,3-Dichloropropene	90
4-Methyl-2-pentanone	89
Toluene	98
trans-1,3-Dichloropropene	76
1,1,2-Trichloroethane	81
Tetrachloroethene	90

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCS
Lab ID#: 1106425-11A
EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062706**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/27/11 11:06 AM**	

Compound	**%Recovery**
2-Hexanone	78
Dibromochloromethane	89
1,2-Dibromoethane (EDB)	88
Chlorobenzene	80
Ethyl Benzene	82
m,p-Xylene	83
o-Xylene	82
Styrene	80
Bromoform	88
Cumene	80
1,1,2,2-Tetrachloroethane	86
Propylbenzene	81
4-Ethyltoluene	78
1,3,5-Trimethylbenzene	80
1,2,4-Trimethylbenzene	79
1,3-Dichlorobenzene	85
1,4-Dichlorobenzene	84
alpha-Chlorotoluene	70
1,2-Dichlorobenzene	83
1,2,4-Trichlorobenzene	81
Hexachlorobutadiene	83

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
Toluene-d8	110	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	107	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCSD
Lab ID#: 1106425-11AA
EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062707**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/27/11 11:44 AM**	

Compound	%Recovery
Freon 12	96
Freon 114	94
Chloromethane	89
Vinyl Chloride	92
1,3-Butadiene	80
Bromomethane	81
Chloroethane	85
Freon 11	93
Ethanol	80
Freon 113	94
1,1-Dichloroethene	91
Acetone	85
2-Propanol	82
Carbon Disulfide	101
3-Chloropropene	95
Methylene Chloride	83
Methyl tert-butyl ether	83
trans-1,2-Dichloroethene	93
Hexane	81
1,1-Dichloroethane	85
2-Butanone (Methyl Ethyl Ketone)	82
cis-1,2-Dichloroethene	85
Tetrahydrofuran	82
Chloroform	90
1,1,1-Trichloroethane	93
Cyclohexane	86
Carbon Tetrachloride	99
2,2,4-Trimethylpentane	87
Benzene	84
1,2-Dichloroethane	91
Heptane	86
Trichloroethene	98
1,2-Dichloropropane	87
1,4-Dioxane	81
Bromodichloromethane	92
cis-1,3-Dichloropropene	90
4-Methyl-2-pentanone	89
Toluene	97
trans-1,3-Dichloropropene	75
1,1,2-Trichloroethane	79
Tetrachloroethene	87

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCSD

Lab ID#: 1106425-11AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062707**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/27/11 11:44 AM**	

Compound	%Recovery
2-Hexanone	77
Dibromochloromethane	87
1,2-Dibromoethane (EDB)	85
Chlorobenzene	80
Ethyl Benzene	81
m,p-Xylene	82
o-Xylene	80
Styrene	78
Bromoform	87
Cumene	80
1,1,2,2-Tetrachloroethane	84
Propylbenzene	80
4-Ethyltoluene	77
1,3,5-Trimethylbenzene	78
1,2,4-Trimethylbenzene	78
1,3-Dichlorobenzene	85
1,4-Dichlorobenzene	82
alpha-Chlorotoluene	70
1,2-Dichlorobenzene	83
1,2,4-Trichlorobenzene	81
Hexachlorobutadiene	83

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	110	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	107	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCS

Lab ID#: 1106425-11B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062803**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/28/11 11:43 AM**	

Compound	%Recovery
Freon 12	111
Freon 114	99
Chloromethane	92
Vinyl Chloride	94
1,3-Butadiene	82
Bromomethane	85
Chloroethane	85
Freon 11	102
Ethanol	79
Freon 113	94
1,1-Dichloroethene	89
Acetone	85
2-Propanol	82
Carbon Disulfide	98
3-Chloropropene	83
Methylene Chloride	85
Methyl tert-butyl ether	84
trans-1,2-Dichloroethene	90
Hexane	78
1,1-Dichloroethane	86
2-Butanone (Methyl Ethyl Ketone)	77
cis-1,2-Dichloroethene	83
Tetrahydrofuran	82
Chloroform	95
1,1,1-Trichloroethane	100
Cyclohexane	84
Carbon Tetrachloride	108
2,2,4-Trimethylpentane	90
Benzene	83
1,2-Dichloroethane	102
Heptane	89
Trichloroethene	100
1,2-Dichloropropane	89
1,4-Dioxane	81
Bromodichloromethane	101
cis-1,3-Dichloropropene	94
4-Methyl-2-pentanone	96
Toluene	106
trans-1,3-Dichloropropene	72
1,1,2-Trichloroethane	75
Tetrachloroethene	88

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCS

Lab ID#: 1106425-11B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062803**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 6/28/11 11:43 AM**

Compound	%Recovery
2-Hexanone	74
Dibromochloromethane	87
1,2-Dibromoethane (EDB)	85
Chlorobenzene	81
Ethyl Benzene	82
m,p-Xylene	83
o-Xylene	83
Styrene	80
Bromoform	89
Cumene	83
1,1,2,2-Tetrachloroethane	89
Propylbenzene	83
4-Ethyltoluene	80
1,3,5-Trimethylbenzene	79
1,2,4-Trimethylbenzene	80
1,3-Dichlorobenzene	88
1,4-Dichlorobenzene	87
alpha-Chlorotoluene	72
1,2-Dichlorobenzene	86
1,2,4-Trichlorobenzene	82
Hexachlorobutadiene	86

Container Type: NA - Not Applicable

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

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCSD

Lab ID#: 1106425-11BB

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062804**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/28/11 12:21 PM**	

Compound	%Recovery
Freon 12	106
Freon 114	98
Chloromethane	90
Vinyl Chloride	92
1,3-Butadiene	80
Bromomethane	84
Chloroethane	86
Freon 11	101
Ethanol	78
Freon 113	94
1,1-Dichloroethene	85
Acetone	80
2-Propanol	81
Carbon Disulfide	92
3-Chloropropene	91
Methylene Chloride	79
Methyl tert-butyl ether	82
trans-1,2-Dichloroethene	89
Hexane	78
1,1-Dichloroethane	86
2-Butanone (Methyl Ethyl Ketone)	76
cis-1,2-Dichloroethene	81
Tetrahydrofuran	80
Chloroform	93
1,1,1-Trichloroethane	98
Cyclohexane	82
Carbon Tetrachloride	106
2,2,4-Trimethylpentane	88
Benzene	82
1,2-Dichloroethane	100
Heptane	88
Trichloroethene	98
1,2-Dichloropropane	87
1,4-Dioxane	79
Bromodichloromethane	99
cis-1,3-Dichloropropene	94
4-Methyl-2-pentanone	95
Toluene	104
trans-1,3-Dichloropropene	71
1,1,2-Trichloroethane	74
Tetrachloroethene	86

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCSD

Lab ID#: 1106425-11BB

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o062804**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/28/11 12:21 PM**	

Compound	**%Recovery**
2-Hexanone	72
Dibromochloromethane	85
1,2-Dibromoethane (EDB)	83
Chlorobenzene	79
Ethyl Benzene	81
m,p-Xylene	82
o-Xylene	82
Styrene	79
Bromoform	88
Cumene	82
1,1,2,2-Tetrachloroethane	87
Propylbenzene	82
4-Ethyltoluene	79
1,3,5-Trimethylbenzene	78
1,2,4-Trimethylbenzene	80
1,3-Dichlorobenzene	88
1,4-Dichlorobenzene	85
alpha-Chlorotoluene	70
1,2-Dichlorobenzene	86
1,2,4-Trichlorobenzene	82
Hexachlorobutadiene	85

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
Toluene-d8	120	70-130
1,2-Dichloroethane-d4	111	70-130
4-Bromofluorobenzene	111	70-130

SPEEDIE AND ASSOCIATES
Geotechnical ▪ Environmental ▪ Materials Engineers
3331 EAST WOOD STREET • PHOENIX, ARIZONA 85040

LABORATORY REPORT

Physical Properties of Soils and Aggregates

Client: Clear Creek Associates, PLC
Attention: Geno Mammini
6155 E. Indian School, Suite 200
Scottsdale, AZ 85251

Project No. 120880LA
Report Date: 07-09-12

Project: Romic Project
Location: Confidential
Material: In-Place (Sleeve) — Sampled By: D. Giles — Date: 06/28/12
Source/ID: Listed Below — Submitted By: D. Giles — Date: 06/28/12
Supplier: Unknown — Authorized By: Client — Date: 06/28/12

Laboratory Test Results

Speedie Lab ID	Sample Location	Total Organic Carbon (%)	Wet Density (pcf)	Dry Density (pcf)	Moisture content (%)	Soil Specific Gravity (20°C)	Porosity (%)	Volumetric Water Content (%)
374153	GTB-01 @ 16.0'-16.5'	Not Tested	126.8	103.3	22.7	2.571	36.59	37.04
374154	GTB-01 @ 5.5'-6.0'	Not Tested	122.7	111.6	9.9	2.688	33.47	17.78

Test Methods Used:

Laboratory Determination of Water Content of Soil & Rock by Mass (ASTM D2216)

Density of Soil in Place by the Drive-Cylinder Method (ASTM D2937)

Specific Gravity of Soil Solids by Water Pycnometer (ASTM D854)

Comments:

Laboratory test results reported herein apply only to the specific sample on which the test was run. The above services and report were performed pursuant to the terms and conditions of the agreement or proposal, if any, between SA and client. SA warrants that this work was performed under the appropriate standard of care, including the skill and judgement that is reasonably expected from similarly situated professionals. No other warranty, guaranty, or representation, either express or implied is included or intended.

Reviewed by _____
Laboratory Manager

SPEEDIE AND ASSOCIATES
Geotechnical ▪ Environmental ▪ Materials Engineers
3331 EAST WOOD STREET • PHOENIX, ARIZONA 85040

PARTICLE SIZE ANALYSIS OF SOILS - HYDROMETER

ASTM D-422

CLIENT:	**Clear Creek Associates, PLC**	SAMPLED BY:	**D. Giles**	DATE:	**6/28/2012**
PROJECT:	**Romic Project**	SUBMITTED BY:	**D. Giles**	DATE:	**6/28/2012**
PROJECT NC	**120880LA**	TESTED BY:	**WSH**	DATE:	**7/5/2012**
MATERIAL:	**In-Place (Sleeve)**	REVIEWED BY:	**BSW**	DATE:	**7/9/2012**
SOURCE/ID:	**GTB-01 @ 16.0' - 16.5'**			LAB NO:	**374153**

DISPERSION SAMPLE

Air Dry Wt., gms	60.18
Specific Gravity of Soil	2.571
Specific Gravity of Liquid	1.000

HYGROSCOPIC MOISTURE SAMPLE

Wt. of Container + Air Dry Sample, gms	35.04
Wt. of Container + Oven Dry Sample, gms	34.95
Wt. Container (tare), gms	19.40
Hygroscopic Moisture Content, %	0.58%

HYDROMETER CALCULATIONS

Wt. Soil Dispersed, gms	59.83
Oven Dry Mass - Total Sample, gms	84.20
% Gravel	17.2
% Sand	23.3
% Silt	35.4
% Clay	24.1

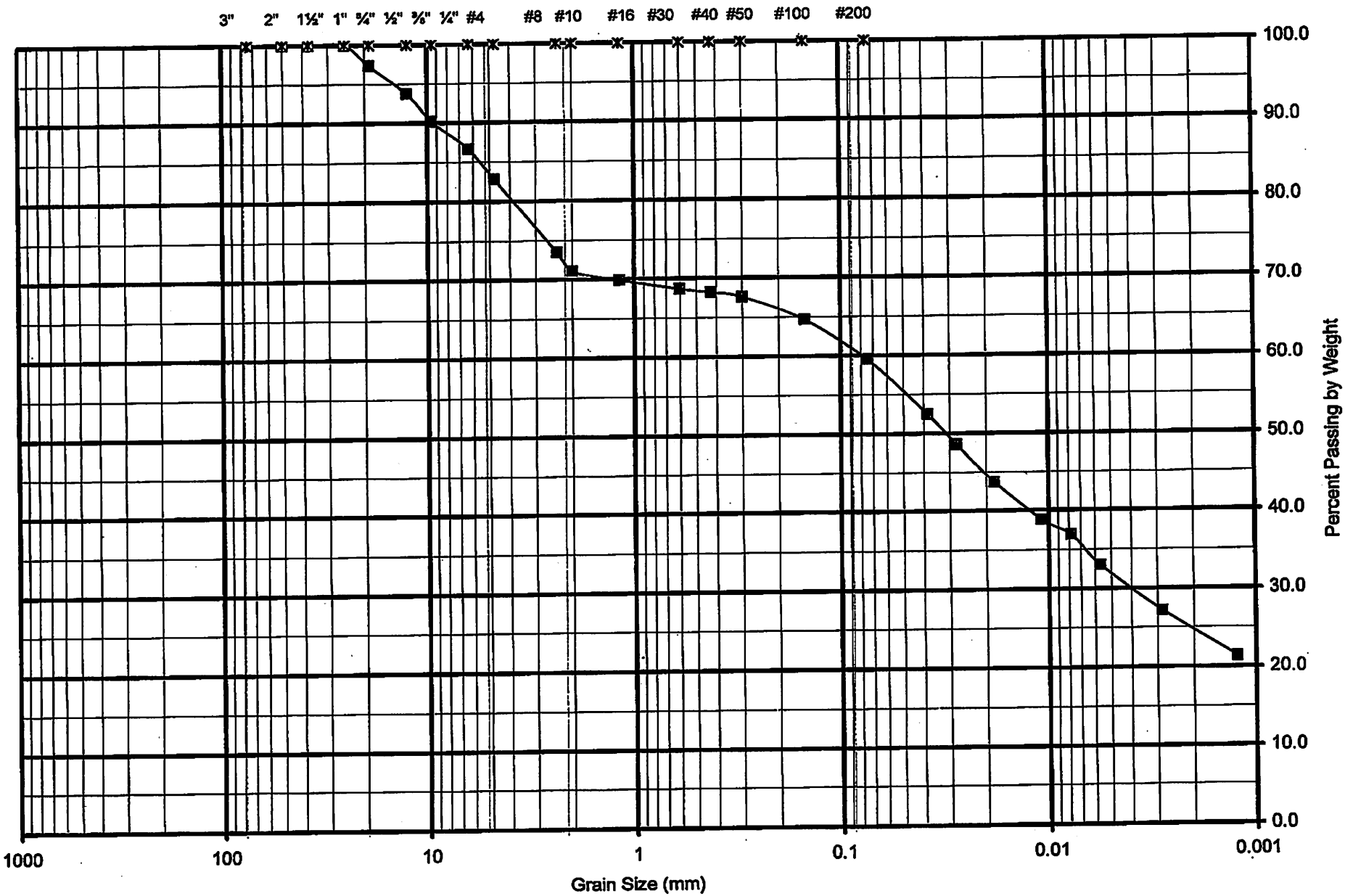
SIEVE ANALYSIS

Sieve Size	Percent Passing
3"	100.0
2"	100.0
1½"	100.0
1"	100.0
3/4"	97.3
1/2"	93.7
3/8"	90.2
1/4"	86.6
#4	82.8
#8	73.5
#10	71.1
#16	69.9
#30	68.7
#40	68.2
#50	67.6
#100	64.7
#200	59.5
.020 mm	44.6
.005 mm	31.7
.002 mm	24.1
.001 mm	20.5

Elapsed Time, (minutes)	Temp °C	Hydrometer Reading	Correction	R - Corr	Percent Passing	Effective Depth (L), (cm)	Constant (K)	Particle Diameter, (mm)
1	25.2	1.0300	0.0030	1.0270	52.5	8.4	0.01318	0.038200
2	25.3	1.0280	0.0030	1.0250	48.6	8.9	0.01318	0.027804
5	25.2	1.0255	0.0030	1.0225	43.7	9.7	0.01318	0.018358
15	25.3	1.0230	0.0030	1.0200	38.9	10.2	0.01318	0.010869
30	25.3	1.0220	0.0030	1.0190	36.9	10.5	0.01318	0.007797
60	25.3	1.0200	0.0030	1.0170	33.0	11.0	0.01318	0.005643
250	25.5	1.0170	0.0030	1.0140	27.2	11.8	0.013105	0.002847
1440	25.1	1.0140	0.0030	1.0110	21.4	12.6	0.01318	0.001233

U.S. Standard Sieve Sizes

Particle Size Analysis of Soils - ASTM D422



374153- Hydrometer Report

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PARTICLE SIZE ANALYSIS OF SOILS - HYDROMETER

ASTM D-422

CLIENT:	**Clear Creek Associates, PLC**	SAMPLED BY:	**D. Giles**	DATE:	**6/28/2012**
PROJECT:	**Romic Project**	SUBMITTED BY:	**D. Giles**	DATE:	**6/28/2012**
PROJECT NC	**120880LA**	TESTED BY:	**WSH**	DATE:	**7/5/2012**
MATERIAL:	**In-Place (Sleeve)**	REVIEWED BY:	**BSW**	DATE:	**7/9/2012**
SOURCE/ID:	**GTB-01 @ 5.5' - 6.0'**			LAB NO:	**374154**

DISPERSION SAMPLE

Air Dry Wt., gms	60.66
Specific Gravity of Soil	2.688
Specific Gravity of Liquid	1.000

HYGROSCOPIC MOISTURE SAMPLE

Wt. of Container + Air Dry Sample, gms	37.65
Wt. of Container + Oven Dry Sample, gms	37.55
Wt. Container (tare), gms	19.48
Hygroscopic Moisture Content, %	0.55%

HYDROMETER CALCULATIONS

Wt. Soil Dispersed, gms	60.33
Oven Dry Mass - Total Sample, gms	102.49
% Gravel	27.6
% Sand	42.4
% Silt	21.5
% Clay	8.4

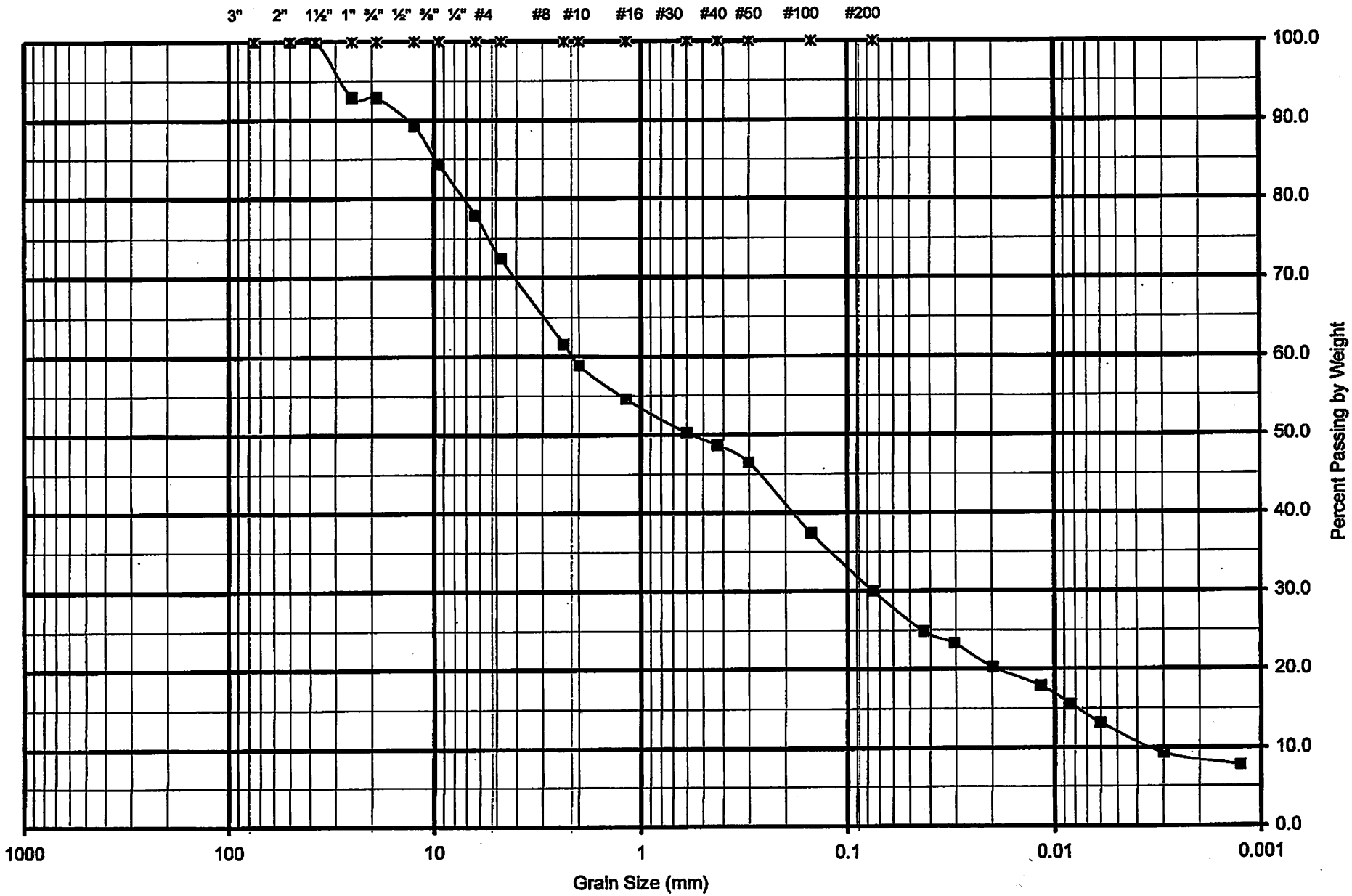
SIEVE ANALYSIS

Sieve Size	Percent Passing
3"	100.0
2"	100.0
1½"	100.0
1"	92.9
3/4"	92.9
1/2"	89.2
3/8"	84.3
1/4"	77.9
#4	72.4
#8	61.6
#10	58.9
#16	54.6
#30	50.3
#40	48.7
#50	46.5
#100	37.4
#200	30.0
.020 mm	20.3
.005 mm	11.9
.002 mm	8.4
.001 mm	7.5

Elapsed Time, (minutes)	Temp °C	Hydrometer Reading	Correction	R - Corr	Percent Passing	Effective Depth (L), (cm)	Constant (K)	Particle Diameter, (mm)
1	25.2	1.0190	0.0030	1.0160	24.9	11.3	0.012715	0.042744
2	25.2	1.0180	0.0030	1.0150	23.3	11.5	0.012715	0.030491
5	25.2	1.0160	0.0030	1.0130	20.2	12.1	0.012715	0.019781
15	25.2	1.0145	0.0030	1.0115	17.9	12.6	0.012715	0.011654
30	25.2	1.0130	0.0030	1.0100	15.5	12.9	0.012715	0.008338
60	25.3	1.0115	0.0030	1.0085	13.2	13.4	0.012715	0.006009
250	25.5	1.0090	0.0030	1.0060	9.3	13.9	0.012645	0.002982
1440	25.1	1.0080	0.0030	1.0050	7.8	14.2	0.01272	0.001263

U.S. Standard Sieve Sizes

Particle Size Analysis of Soils - ASTM D422



374154- Hydrometer Report

KB's analysis

Romic Chandler

US EPA VAPOR INTRUSION ASSESSMENT MODEL (VIA_MODEL.xls)

Site Name: Romic Chandler default screening

Note: Cells with borders indicate parameters that may be changed by the user.

Parameter	Units	Symbol	Value	Default	Flag	Comment
Source Characteristics:						
Source medium		Source	Soil Gas			
Soil vapor concentration	(ug/m3)	Cmedium	900	—		900 µg/m³
Depth below grade to soil gas sample	(m)	Ls	1.20			
Average vadose zone temperature	(°C)	Ts	24	15		
Calc: Source vapor concentration	(ug/m3)	Cs	900			
Chemical:						
Chemical Name		Chem	Trichloroethylene	→		TCE
CAS No.		CAS	79016			
Toxicity Factors						
Unit risk factor	$(ug/m^3)^{-1}$	URF	1.10E-04	1.10E-04		
Reference concentration	(ug/m^3)	RfC	4.00E+01	4.00E+01		
Building Characteristics:						
Building setting		Bldg_Setting	Commercial	Commercial	→	Commercial Slab-on-Grade
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.20	0.20		
Foundation thickness	(m)	Lf	0.20	0.20		
Fraction of foundation area with cracks	(-)	eta	1.00E-03	1.00E-03		
Enclosed space floor area	(m2)	Ab	300	500		
Enclosed space mixing height	(m)	Hb	3.56	3.00		
Indoor air exchange rate	(1/hr)	ach	0.50	1.00		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.004	0.002		
Calc: Building ventilation rate	(m3/hr)	Qb	534.00	1500.00		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	2.14	3.00		
Vadose zone characteristics:						
Stratum A (Top of soil profile):						
Stratum A SCS soil type		SCS_A	Sand			
Stratum A thickness (from surface)	(m)	hSA	1.20			
Stratum A total porosity	(-)	nSA	0.375	0.375		
Stratum A water-filled porosity	(-)	nwSA	0.054	0.054		
Stratum A bulk density	(g/cm^3)	rhoSA	1.660	1.660		
Stratum B (Soil layer below Stratum A):						
Stratum B SCS soil type		SCS_B	Not Present			
Stratum B thickness	(m)	hSB	0.00			
Stratum B total porosity	(-)	nSB	0.000			
Stratum B water-filled porosity	(-)	nwSB				
Stratum B bulk density	(g/cm^3)	rhoSB				
Statum C (Soil layer below Stratum B):						
Stratum C SCS soil type		SCS_C	Not Present			
Stratum C thickness	(m)	hSC				
Stratum C total porosity	(-)	nSC				
Stratum C water-filled porosity	(-)	nwSC				
Stratum C bulk density	(g/cm^3)	rhoSC				
Stratum containing soil vapor sample						
Stratum A, B, or C		src_soil	Stratum A			
Exposure Parameters:						
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06		
Target hazard quotient for non-carcinog	(-)	Target_HQ	1	1		
Exposure Scenario		Scenario	Commercial	Commercial		
Averaging time for carcinogens	(yrs)	ATc	70	70		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25		
Exposure duration	(yrs)	ED	25	25		
Exposure frequency	(days/yr)	EF	250	250		
Exposure time	(hrs/24 hrs)	ET	8	8		

Very rough calcs — not for official record

US EPA VAPOR INTRUSION ASSESSMENT MODEL (VIA_MODEL.xls)

Site Name:

Fate and Transport Calculations	Units	Symbol	Value	Default	Flag	Comment
Chemical Properties						
Pure component water solubility	(mg/L)	S	1.47E+03	1.47E+03		
Henry's Law Constant @ 25°C	(atm-m^3/mc	Hc	1.03E-02	1.03E-02		
Calc: Henry's Law Constant @ 25°C	(-)	Hr	4.20E-01	4.20E-01		
Calc: Henry's Law Constant @ system temperature	(-)	Hs	4.02E-01	2.64E-01		
Diffusivity in air	(cm2/s)	Dair	7.90E-02	7.90E-02		
Diffusivity in water	(cm2/s)	Dwater	9.10E-06	9.10E-06		
Source to Indoor Air Attenuation Factor						
Soil vapor to indoor air attenuation coefficient	(-)	alpha	1.61E-03	8.85E-04		
Predicted Indoor Air Concentration						
Indoor air concentration due to vapor intrusion	(ug/m3)	Cia	1.45E+00	7.96E-01		
Diffusive Transport Upward Through Vadose Zone						
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	1.28E-02	1.28E-02		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB				
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC				
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.28E-02	1.28E-02		
Critical Parameters						
α for diffusive transport from source to building with dirt floor fou	(-)	A_Param	2.70E-03	1.59E-03		
Pe for transport through the foundation (advection / diffusion)	(-)	B_Param	2.96E+02	2.52E+02		
α for convective transport from subslab to building	(-)	C_Param	4.00E-03	2.00E-03		

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil and advection through foundation both control intrusion.

Critical Parameters

Hb, Ls, DeffT, ach, Qsoil_Qb

Non-Critical Parameters

Lf, DeffA, eta

Predicted Concentration versus Depth Profile

To be completed.....

Risk Calculations						
Risk-Based Target Screening Levels						
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	1		
Target indoor air concentration	(ug/m3)	Target_IA	1.11E-01	1.11E-01		
Target soil vapor concentration	(ug/m3)	Target_SV	6.91E+01	1.24E+02		
Incremental Risk Estimates						
Incremental cancer risk from vapor intrusion	(-)		1.30E-05	7.14E-06		
Hazard quotient from vapor intrusion	(-)		8.28E-03	4.55E-03		

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US EPA VAPOR INTRUSION ASSESSMENT MODEL (VIA_MODEL.xls)

Site Name: Romic Chandler default screening

Note: Cells with borders indicate parameters that may be changed by the user.

Parameter	Units	Symbol	Value	Default	Flag	Comment
Source Characteristics:						
Source medium		Source	Soil Gas			
Soil vapor concentration	(ug/m3)	Cmedium	900			900 µg/m³
Depth below grade to soil gas sample	(m)	Ls	2.00			
Average vadose zone temperature	(°C)	Ts	20	15		
Calc: Source vapor concentration	(ug/m3)	Cs	900			
Chemical:						
Chemical Name		Chem	Trichloroethylene			TCE
CAS No.		CAS	79016			
Toxicity Factors						
Unit risk factor	$(ug/m^3)^{-1}$	URF	1.10E-04	1.10E-04		
Reference concentration	(ug/m^3)	RfC	4.00E+01	4.00E+01		
Building Characteristics:						
Building setting		Bldg_Setting	Commercial	Commercial		Commercial
Foundation type		Found_Type	Crawlspace w/ dirt floo	Crawlspace w/ dirt		Crawlspace w/dirt floor
Depth below grade to base of foundation	(m)	Lb	1.00	1.00		
Foundation thickness	(m)	Lf	0.00	0.00		
Fraction of foundation area with cracks	(-)	eta	1.00E+00	1.00E+00		
Enclosed space floor area	(m2)	Ab	300	500		
Enclosed space mixing height	(m)	Hb	3.56	3.50		
Indoor air exchange rate	(1/hr)	ach	0.50	1.00		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.004	0.002		
Calc: Building ventilation rate	(m3/hr)	Qb	534.00	1750.00		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	2.14	3.50		
Vadose zone characteristics:						
Stratum A (Top of soil profile):						
Stratum A SCS soil type		SCS_A	Sand			
Stratum A thickness (from surface)	(m)	hSA	2.00			
Stratum A total porosity	(-)	nSA	0.375	0.375		
Stratum A water-filled porosity	(-)	nwSA	0.054	0.054		
Stratum A bulk density	(g/cm^3)	rhoSA	1.660	1.660		
Stratum B (Soil layer below Stratum A):						
Stratum B SCS soil type		SCS_B	Not Present			
Stratum B thickness	(m)	hSB	0.00			
Stratum B total porosity	(-)	nSB	0.000			
Stratum B water-filled porosity	(-)	nwSB				
Stratum B bulk density	(g/cm^3)	rhoSB				
Statum C (Soil layer below Stratum B):						
Stratum C SCS soil type		SCS_C	Not Present			
Stratum C thickness	(m)	hSC				
Stratum C total porosity	(-)	nSC				
Stratum C water-filled porosity	(-)	nwSC				
Stratum C bulk density	(g/cm^3)	rhoSC				
Stratum containing soil vapor sample						
Stratum A, B, or C		src_soil	Stratum A			
Exposure Parameters:						
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06		
Target hazard quotient for non-carcinog	(-)	Target_HQ	1	1		
Exposure Scenario		Scenario	Commercial	Commercial		
Averaging time for carcinogens	(yrs)	ATc	70	70		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25		
Exposure duration	(yrs)	ED	25	25		
Exposure frequency	(days/yr)	EF	250	250		
Exposure time	(hrs/24 hrs)	ET	8	8		

US EPA VAPOR INTRUSION ASSESSMENT MODEL (VIA_MODEL.xls)

Site Name:

Fate and Transport Calculations	Units	Symbol	Value	Default	Flag	Comment
Chemical Properties						
Pure component water solubility	(mg/L)	S	1.47E+03	1.47E+03		
Henry's Law Constant @ 25°C	(atm-m^3/mc	Hc	1.03E-02	1.03E-02		
Calc: Henry's Law Constant @ 25°C	(-)	Hr	4.20E-01	4.20E-01		
Calc: Henry's Law Constant @ system temperature	(-)	Hs	3.35E-01	2.64E-01		
Diffusivity in air	(cm2/s)	Dair	7.90E-02	7.90E-02		
Diffusivity in water	(cm2/s)	Dwater	9.10E-06	9.10E-06		
Source to Indoor Air Attenuation Factor						
Soil vapor to indoor air attenuation coefficient	(-)	alpha	3.17E-03	1.55E-03		
Predicted Indoor Air Concentration						
Indoor air concentration due to vapor intrusion	(ug/m3)	Cia	2.85E+00	1.39E+00		
Diffusive Transport Upward Through Vadose Zone						
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	1.28E-02	1.28E-02		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB				
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC				
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.28E-02	1.28E-02		
Critical Parameters						
α for diffusive transport from source to building with dirt floor fou	(-)	A_Param	3.18E-03	1.55E-03		
Pe for transport through the foundation (advection / diffusion)	(-)	B_Param	0.00E+00	0.00E+00		
α for convective transport from subslab to building	(-)	C_Param	4.00E-03	2.00E-03		

Interpretation

Diffusion is the dominant mechanism across the foundation.

Diffusion through soil is the overall rate limiting process.

Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Predicted Concentration versus Depth Profile

To be completed.....

Risk Calculations						
Risk-Based Target Screening Levels						
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	1		
Target indoor air concentration	(ug/m3)	Target_IA	1.11E-01	1.11E-01		
Target soil vapor concentration	(ug/m3)	Target_SV	3.52E+01	7.21E+01		
Incremental Risk Estimates						
Incremental cancer risk from vapor intrusion	(-)		2.56E-05	1.25E-05		
Hazard quotient from vapor intrusion	(-)		1.63E-02	7.94E-03		

US EPA VAPOR INTRUSION ASSESSMENT MODEL (VIA_MODEL.xls)

Site Name: Romic Chandler default screening

Note: Cells with borders indicate parameters that may be changed by the user.

Parameter	Units	Symbol	Value	Default	Flag	Comment
Source Characteristics:						
Source medium		Source	Soil Gas			
Soil vapor concentration	(ug/m3)	Cmedium	900			900 µg/m³
Depth below grade to soil gas sample	(m)	Ls	1.10			
Average vadose zone temperature	(°C)	Ts	24	15		
Calc: Source vapor concentration	(ug/m3)	Cs	900			
Chemical:						
Chemical Name		Chem	Trichloroethylene			TCE
CAS No.		CAS	79016			
Toxicity Factors						
Unit risk factor	$(ug/m^3)^{-1}$	URF	1.10E-04	1.10E-04		
Reference concentration	(ug/m^3)	RfC	4.00E+01	4.00E+01		
Building Characteristics:						
Building setting		Bldg_Setting	Residential	Residential		Residential
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.10	0.10		
Foundation thickness	(m)	Lf	0.10	0.10		
Fraction of foundation area with cracks	(-)	eta	1.00E-03	1.00E-03		
Enclosed space floor area	(m2)	Ab	300	150		
Enclosed space mixing height	(m)	Hb	3.56	2.44		
Indoor air exchange rate	(1/hr)	ach	0.50	0.50		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.020	0.020		
Calc: Building ventilation rate	(m3/hr)	Qb	534.00	183.00		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	10.68	3.66		
Vadose zone characteristics:						
Stratum A (Top of soil profile):						
Stratum A SCS soil type		SCS_A	Sand			
Stratum A thickness (from surface)	(m)	hSA	1.10			
Stratum A total porosity	(-)	nSA	0.375	0.375		
Stratum A water-filled porosity	(-)	nwSA	0.054	0.054		
Stratum A bulk density	(g/cm^3)	rhoSA	1.660	1.660		
Stratum B (Soil layer below Stratum A):						
Stratum B SCS soil type		SCS_B	Not Present			
Stratum B thickness	(m)	hSB	0.00			
Stratum B total porosity	(-)	nSB	0.000			
Stratum B water-filled porosity	(-)	nwSB				
Stratum B bulk density	(g/cm^3)	rhoSB				
Statum C (Soil layer below Stratum B):						
Stratum C SCS soil type		SCS_C	Not Present			
Stratum C thickness	(m)	hSC				
Stratum C total porosity	(-)	nSC				
Stratum C water-filled porosity	(-)	nwSC				
Stratum C bulk density	(g/cm^3)	rhoSC				
Stratum containing soil vapor sample						
Stratum A, B, or C		src_soil	Stratum A			
Exposure Parameters:						
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06		
Target hazard quotient for non-carcinog	(-)	Target_HQ	1	1		
Exposure Scenario		Scenario	Residential	Residential		
Averaging time for carcinogens	(yrs)	ATc	70	70		
Averaging time for non-carcinogens	(yrs)	ATnc	30	30		
Exposure duration	(yrs)	ED	30	30		
Exposure frequency	(days/yr)	EF	350	350		
Exposure time	(hrs/24 hrs)	ET	24	24		

US EPA VAPOR INTRUSION ASSESSMENT MODEL (VIA_MODEL.xls)

Site Name:

Fate and Transport Calculations	Units	Symbol	Value	Default	Flag	Comment
Chemical Properties						
Pure component water solubility	(mg/L)	S	1.47E+03	1.47E+03		
Henry's Law Constant @ 25°C	(atm-m³/mc	Hc	1.03E-02	1.03E-02		
Calc: Henry's Law Constant @ 25°C	(-)	Hr	4.20E-01	4.20E-01		
Calc: Henry's Law Constant @ system temperature	(-)	Hs	4.02E-01	2.64E-01		
Diffusivity in air	(cm2/s)	Dair	7.90E-02	7.90E-02		
Diffusivity in water	(cm2/s)	Dwater	9.10E-06	9.10E-06		
Source to Indoor Air Attenuation Factor						
Soil vapor to indoor air attenuation coefficient	**(-)**	**alpha**	**2.33E-03**	**3.26E-03**		
Predicted Indoor Air Concentration						
Indoor air concentration due to vapor intrusion	**(ug/m3)**	**Cia**	**2.10E+00**	**2.93E+00**		
Diffusive Transport Upward Through Vadose Zone						
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	1.28E-02	1.28E-02		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB				
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC				
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.28E-02	1.28E-02		
Critical Parameters						
α for diffusive transport from source to building with dirt floor fou	(-)	A_Param	2.64E-03	3.89E-03		
Pe for transport through the foundation (advection / diffusion)	(-)	B_Param	7.57E+02	5.14E+02		
α for convective transport from subslab to building	(-)	C_Param	2.00E-02	2.00E-02		

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil and advection through foundation both control intrusion.

Critical Parameters

Hb, Ls, DeffT, ach, Qsoil_Qb

Non-Critical Parameters

Lf, DeffA, eta

Predicted Concentration versus Depth Profile

To be completed.....

Risk Calculations	Units	Symbol	Value	Default
Risk-Based Target Screening Levels				
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	1
Target indoor air concentration	(ug/m3)	Target_IA	2.21E-02	2.21E-02
Target soil vapor concentration	(ug/m3)	Target_SV	9.48E+00	6.79E+00
Incremental Risk Estimates				
Incremental cancer risk from vapor intrusion	(-)		9.50E-05	1.33E-04
Hazard quotient from vapor intrusion	(-)		5.04E-02	7.03E-02

1.3×10^{-4}

US EPA VAPOR INTRUSION ASSESSMENT MODEL (VIA_MODEL.xls)

Site Name: Romic Chandler default screening

Note: Cells with borders indicate parameters that may be changed by the user.

Parameter	Units	Symbol	Value	Default	Flag	Comment
Source Characteristics:						
Source medium		Source	Soil Gas			
Soil vapor concentration	(ug/m3)	Cmedium	2400			2400 µg/m³
Depth below grade to soil gas sample	(m)	Ls	1.10			
Average vadose zone temperature	(°C)	Ts	24	15		
Calc: Source vapor concentration	(ug/m3)	Cs	2400			
Chemical:						
Chemical Name		Chem	Tetrachloroethylene			PCE
CAS No.		CAS	127184			
Toxicity Factors						
Unit risk factor	$(ug/m^3)^{-1}$	URF	5.90E-06	5.90E-06		
Reference concentration	(ug/m^3)	RfC	6.00E+02	6.00E+02		
Building Characteristics:						
Building setting		Bldg_Setting	Residential	Residential		Residential
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade		
Depth below grade to base of foundation	(m)	Lb	0.10	0.10		
Foundation thickness	(m)	Lf	0.10	0.10		
Fraction of foundation area with cracks	(-)	eta	1.00E-03	1.00E-03		
Enclosed space floor area	(m2)	Ab	300	150		
Enclosed space mixing height	(m)	Hb	3.56	2.44		
Indoor air exchange rate	(1/hr)	ach	0.50	0.50		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.020	0.020		
Calc: Building ventilation rate	(m3/hr)	Qb	534.00	183.00		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	10.68	3.66		
Vadose zone characteristics:						
Stratum A (Top of soil profile):						
Stratum A SCS soil type		SCS_A	Sand			
Stratum A thickness (from surface)	(m)	hSA	1.10			
Stratum A total porosity	(-)	nSA	0.375	0.375		
Stratum A water-filled porosity	(-)	nwSA	0.054	0.054		
Stratum A bulk density	(g/cm^3)	rhoSA	1.660	1.660		
Stratum B (Soil layer below Stratum A):						
Stratum B SCS soil type		SCS_B	Not Present			
Stratum B thickness	(m)	hSB	0.00			
Stratum B total porosity	(-)	nSB	0.000			
Stratum B water-filled porosity	(-)	nwSB				
Stratum B bulk density	(g/cm^3)	rhoSB				
Statum C (Soil layer below Stratum B):						
Stratum C SCS soil type		SCS_C	Not Present			
Stratum C thickness	(m)	hSC				
Stratum C total porosity	(-)	nSC				
Stratum C water-filled porosity	(-)	nwSC				
Stratum C bulk density	(g/cm^3)	rhoSC				
Stratum containing soil vapor sample						
Stratum A, B, or C		src_soil	Stratum A			
Exposure Parameters:						
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06		
Target hazard quotient for non-carcinog	(-)	Target_HQ	1	1		
Exposure Scenario		Scenario	Residential	Residential		
Averaging time for carcinogens	(yrs)	ATc	70	70		
Averaging time for non-carcinogens	(yrs)	ATnc	30	30		
Exposure duration	(yrs)	ED	30	30		
Exposure frequency	(days/yr)	EF	350	350		
Exposure time	(hrs/24 hrs)	ET	24	24		

US EPA VAPOR INTRUSION ASSESSMENT MODEL (VIA_MODEL.xls)

Site Name:

Fate and Transport Calculations	Units	Symbol	Value	Default	Flag	Comment
Chemical Properties						
Pure component water solubility	(mg/L)	S	2.00E+02	2.00E+02		
Henry's Law Constant @ 25°C	(atm-m^3/mc	Hc	1.84E-02	1.84E-02		
Calc: Henry's Law Constant @ 25°C	(-)	Hr	7.51E-01	7.51E-01		
Calc: Henry's Law Constant @ system temperature	(-)	Hs	7.14E-01	4.45E-01		
Diffusivity in air	(cm2/s)	Dair	7.20E-02	7.20E-02		
Diffusivity in water	(cm2/s)	Dwater	8.20E-06	8.20E-06		
Source to Indoor Air Attenuation Factor						
Soil vapor to indoor air attenuation coefficient	(-)	alpha	2.15E-03	3.01E-03		
Predicted Indoor Air Concentration						
Indoor air concentration due to vapor intrusion	(ug/m3)	Cia	5.16E+00	7.23E+00		
Diffusive Transport Upward Through Vadose Zone						
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	1.16E-02	1.16E-02		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB				
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC				
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.16E-02	1.16E-02		
Critical Parameters						
α for diffusive transport from source to building with dirt floor fou	(-)	A_Param	2.41E-03	3.55E-03		
Pe for transport through the foundation (advection / diffusion)	(-)	B_Param	8.30E+02	5.64E+02		
α for convective transport from subslab to building	(-)	C_Param	2.00E-02	2.00E-02		

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil and advection through foundation both control intrusion.

Critical Parameters

Hb, Ls, DeffT, ach, Qsoil_Qb

Non-Critical Parameters

Lf, DeffA, eta

Predicted Concentration versus Depth Profile

To be completed.....

Risk Calculations						
Risk-Based Target Screening Levels						
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	1		
Target indoor air concentration	(ug/m3)	Target_IA	4.12E-01	4.12E-01		
Target soil vapor concentration	(ug/m3)	Target_SV	1.92E+02	1.92E+02		
Incremental Risk Estimates						
Incremental cancer risk from vapor intrusion	(-)		1.25E-05	1.75E-05		
Hazard quotient from vapor intrusion	(-)		8.24E-03	1.16E-02		

1.75×10^{-5}