APPENDIX A

Johnson and Ettinger Spreadsheets

APPENDIX A

Johnson and Ettinger Spreadsheets

<u>Monitoring Well MW-BW-53-A</u>
    Sampled September 9, 2004
        Carbon Tetrachloride
        Trichloroethene
        Chloroform
    Sampled September 15, 2005
        Carbon Tetrachloride
        Trichloroethene
        Chloroform

<u>Monitoring Well MW-BW-49-A</u>
    Sampled September 15, 2004
        Carbon Tetrachloride
        Chloroform
    Sampled September 20, 2005
        Carbon Tetrachloride

<u>Soil Gas Location CTP-SGP-35 at 6 Feet BGS</u>
    Sampled June 18, 2004
        Carbon Tetrachloride
        Chloroform
        Tetrachloroethene
        Trichloroethene

GW-SCREEN Version 3.0; 04/03	CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)	**DTSC**

Vapor Intrusion Guidance

Interim Final 12/04

YES   [   ]

(last modified 1/21/05)

OR

Reset to Defaults

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES   [X   ]

ENTER Chemical CAS No. (numbers only, no dashes)	**ENTER** Initial groundwater conc., C_W (μg/L)	Chemical
56235	1.30E+01	Carbon tetrachloride

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	**ENTER** Depth below grade to water table, L_{WT} (cm)	**ENTER** SCS soil type directly above water table	**ENTER** Average soil/ groundwater temperature, T_S (°C)	**ENTER** Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	2930.96	S	18	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	**ENTER** User-defined vandose zone soil vapor permeability, k_v (cm^2)	**ENTER** Vadose zone SCS soil type [Lookup Soil Parameters]	**ENTER** Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	**ENTER** Vadose zone soil total porosity, n^V (unitless)	**ENTER** Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
S			S	1.66	0.375	0.054

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	**ENTER** Target hazard quotient for noncarcinogens, THQ (unitless)	**ENTER** Averaging time for carcinogens, AT_C (yrs)	**ENTER** Averaging time for noncarcinogens, AT_{NC} (yrs)	**ENTER** Exposure duration, ED (yrs)	**ENTER** Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

MW-BW-53-A_CT_090904.xls
4/18/2006
8:45 PM

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CHEMICAL PROPERTIES SHEET
Carbon Tetrachloride
for Well MW-BW-53-A
Sampled September 9, 2004

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^{o}C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^{o}K)	Critical temperature, T_C (^{o}K)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
7.80E-02	8.80E-06	3.03E-02	25	7,127	349.90	556.60	1.74E+02	7.93E+02	4.2E-05	4.0E-02

END

INTERMEDIATE CALCULATIONS SHEET
Carbon Tetrachloride
for Well MW-BW-53-A
Sampled September 9, 2004

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone soil effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
2915.96	0.321	0.003	1.01E-07	0.998	1.00E-07	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
3.39E+04	1.00E+06	5.00E-03	15	7,778	2.21E-02	9.26E-01	1.78E-04	1.26E-02	5.00E-04	1.10E-02

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (µg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source indoor bldg. conc., $C_{building}$ (µg/m³)	Unit risk factor, URF (µg/m³)⁻¹	Reference conc., RfC (mg/m³)
2915.96	15	1.20E+04	1.25	8.33E+01	1.26E-02	5.00E+03	5.50E+05	1.07E-04	1.29E+00	4.2E-05	4.0E-02

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RESULTS SHEET
Carbon Tetrachloride
for Well MW-BW-53-A
Sampled September 9, 2004

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS: INCREMENTAL RISK CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)		Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	7.93E+05	NA		2.2E-05	3.1E-02

MESSAGE SUMMARY BELOW:

END

GW-SCREEN
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Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

DTSC

Vapor Intrusion Guidance

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(last modified 1/21/05)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79016	4.90E+00	Trichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^{o}C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	2930.96	S	18	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type Lookup Soil Parameters	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
S			S	1.66	0.375	0.054

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based
groundwater concentration.

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DTSC Indoor Air Guidance
Unclassified Soil Screening Model

MW-BW-53-A_TCE_090904.xls
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ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^{o}C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^{o}K)	Critical temperature, T_C (^{o}K)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	2.0E-06	6.0E-01

END

INTERMEDIATE CALCULATIONS SHEET
Trichloroethene
for Well MW-BW-53-A
Sampled September 9, 2004

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone soil effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
2915.96	0.321	0.003	1.01E-07	0.998	1.00E-07	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
3.39E+04	1.00E+06	5.00E-03	15	8,458	7.29E-03	3.05E-01	1.78E-04	1.28E-02	5.08E-04	1.12E-02

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
2915.96	15	1.49E+03	1.25	8.33E+01	1.28E-02	5.00E+03	4.65E+05	1.08E-04	1.62E-01	2.0E-06	6.0E-01

MW-BW-53-A_TCE_090904.xls

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4/18/2006
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RESULTS SHEET
Trichloroethene
for Well MW-BW-53-A
Sampled September 9, 2004

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

INCREMENTAL RISK CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	1.47E+06	NA	1.3E-07	2.6E-04

MESSAGE SUMMARY BELOW:

END

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Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

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Vapor Intrusion Guidance
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(last modified 1/21/05)

YES | |

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES | X |

ENTER Chemical CAS No. (numbers only, no dashes)	**ENTER** Initial groundwater conc., C_W (μg/L)	Chemical
67663	1.60E+00	Chloroform

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	**ENTER** Depth below grade to water table, L_{WT} (cm)	**ENTER** SCS soil type directly above water table	**ENTER** Average soil/ groundwater temperature, T_S (°C)	**ENTER** Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	2930.96	S	18	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	**ENTER** User-defined vandose zone soil vapor permeability, k_v (cm^2)	**ENTER** Vadose zone SCS soil type [Lookup Soil Parameters]	**ENTER** Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	**ENTER** Vadose zone soil total porosity, n^V (unitless)	**ENTER** Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
S			S	1.66	0.375	0.054

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	**ENTER** Target hazard quotient for noncarcinogens, THQ (unitless)	**ENTER** Averaging time for carcinogens, AT_C (yrs)	**ENTER** Averaging time for noncarcinogens, AT_{NC} (yrs)	**ENTER** Exposure duration, ED (yrs)	**ENTER** Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

DTSC / HERD
Last Update: 11/1/03

DTSC Indoor Air Guidance
Unclassified Soil Screening Model

MW-BW-53-A_Chloroform_090904.xls
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CHEMICAL PROPERTIES SHEET
Chloroform
for Well MW-BW-53-A
Sampled September 9, 2004

ABC

Diffusivity in air, D_a (cm²/s)	Diffusivity in water, D_w (cm²/s)	Henry's law constant at reference temperature, H (atm-m³/mol)	Henry's law constant reference temperature, T_R (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Organic carbon partition coefficient, K_{oc} (cm³/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF (μg/m³)⁻¹	Reference conc., RfC (mg/m³)
1.04E-01	1.00E-05	3.66E-03	25	6,988	334.32	536.40	3.98E+01	7.92E+03	5.3E-06	3.0E-01

END

INTERMEDIATE CALCULATIONS SHEET
Chloroform
for Well MW-BW-53-A
Sampled September 9, 2004

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
2915.96	0.321	0.003	1.01E-07	0.998	1.00E-07	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
3.39E+04	1.00E+06	5.00E-03	15	7,471	2.70E-03	1.13E-01	1.78E-04	1.68E-02	6.73E-04	1.47E-02

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (µg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source indoor bldg. conc., $C_{building}$ (µg/m³)	Unit risk factor, URF (µg/m³)⁻¹	Reference conc., RfC (mg/m³)
2915.96	15	1.81E+02	1.25	8.33E+01	1.68E-02	5.00E+03	2.02E+04	1.41E-04	2.55E-02	5.3E-06	3.0E-01

MW-BW-53-A_Chloroform_090904.xls

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Last Update: 11/1/03

DTSC Indoor Air Guidance
Unclassified Soil Screening Model

4/18/2006
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RESULTS SHEET
Chloroform
for Well MW-BW-53-A
Sampled September 9, 2004

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS: INCREMENTAL RISK CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)		Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	7.92E+06	NA		5.5E-08	8.1E-05

MESSAGE SUMMARY BELOW:

END

GW-SCREEN
Version 3.0; 04/03

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

DTSC

Vapor Intrusion Guidance

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(last modified 1/21/05)

YES [　　　　　]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [　X　]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)	Chemical
56235	7.60E+00	Carbon tetrachloride

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	2930.96	S	18	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined vandose zone soil vapor permeability, k_v (cm²)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm³)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm³/cm³)
S	OR		S	1.66	0.375	0.054

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based
groundwater concentration.

DTSC / HERD
Last Update: 11/1/03

DTSC Indoor Air Guidance
Unclassified Soil Screening Model

MW-BW-53-A_CT_091505.xls
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CHEMICAL PROPERTIES SHEET
Carbon Tetrachloride
for Well MW-BW-53-A
Sampled September 15, 2005

ABC

Diffusivity in air, D_a (cm²/s)	Diffusivity in water, D_w (cm²/s)	Henry's law constant at reference temperature, H (atm-m³/mol)	Henry's law constant reference temperature, T_R (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Organic carbon partition coefficient, K_{oc} (cm³/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF (µg/m³)⁻¹	Reference conc., RfC (mg/m³)
7.80E-02	8.80E-06	3.03E-02	25	7,127	349.90	556.60	1.74E+02	7.93E+02	4.2E-05	4.0E-02

END

INTERMEDIATE CALCULATIONS SHEET
Carbon Tetrachloride
for Well MW-BW-53-A
Sampled September 15, 2005

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
2915.96	0.321	0.003	1.01E-07	0.998	1.00E-07	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
3.39E+04	1.00E+06	5.00E-03	15	7,778	2.21E-02	9.26E-01	1.78E-04	1.26E-02	5.00E-04	1.10E-02

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (µg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m³)	Unit risk factor, URF (µg/m³)⁻¹	Reference conc., RfC (mg/m³)
2915.96	15	7.04E+03	1.25	8.33E+01	1.26E-02	5.00E+03	5.50E+05	1.07E-04	7.52E-01	4.2E-05	4.0E-02

MW-BW-53-A_CT_091505.xls
DTSC / HERD
Last Update: 11/1/03
DTSC Indoor Air Guidance
Unclassified Soil Screening Model
4/18/2006
8:44 PM

RESULTS SHEET
Carbon Tetrachloride
for Well MW-BW-53-A
Sampled September 15, 2005

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:　　　　INCREMENTAL RISK CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	7.93E+05	NA	1.3E-05	1.8E-02

MESSAGE SUMMARY BELOW:

END

GW-SCREEN
Version 3.0; 04/03

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 1/21/05)

YES [   ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	**ENTER** Initial groundwater conc., C_W (µg/L)	Chemical
79016	1.90E+00	Trichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	**ENTER** Depth below grade to water table, L_{WT} (cm)	**ENTER** SCS soil type directly above water table	**ENTER** Average soil/ groundwater temperature, T_S (^{o}C)	**ENTER** Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	2930.96	S	18	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		**ENTER** User-defined vandose zone soil vapor permeability, k_v (cm^2)	**ENTER** Vadose zone SCS soil type Lookup Soil Parameters	**ENTER** Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	**ENTER** Vadose zone soil total porosity, n^V (unitless)	**ENTER** Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
S	OR		S	1.66	0.375	0.054

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	**ENTER** Target hazard quotient for noncarcinogens, THQ (unitless)	**ENTER** Averaging time for carcinogens, AT_C (yrs)	**ENTER** Averaging time for noncarcinogens, AT_{NC} (yrs)	**ENTER** Exposure duration, ED (yrs)	**ENTER** Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based
groundwater concentration.

DTSC / HERD
Last Update: 11/1/03

DTSC Indoor Air Guidance
Unclassified Soil Screening Model

MW-BW-53-A_TCE_091505.xls
4/18/2006
8:48 PM

CHEMICAL PROPERTIES SHEET
Trichloroethene
for Well MW-BW-53-A
Sampled September 15, 2005

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^{o}C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^{o}K)	Critical temperature, T_C (^{o}K)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	2.0E-06	6.0E-01

END

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
2915.96	0.321	0.003	1.01E-07	0.998	1.00E-07	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
3.39E+04	1.00E+06	5.00E-03	15	8,458	7.29E-03	3.05E-01	1.78E-04	1.28E-02	5.08E-04	1.12E-02

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (µg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m³)	Unit risk factor, URF (µg/m³)⁻¹	Reference conc., RfC (mg/m³)
2915.96	15	5.80E+02	1.25	8.33E+01	1.28E-02	5.00E+03	4.65E+05	1.08E-04	6.28E-02	2.0E-06	6.0E-01

DTSC / HERD
Last Update: 11/1/03

DTSC Indoor Air Guidance
Unclassified Soil Screening Model

MW-BW-53-A_TCE_091505.xls
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RESULTS SHEET
Trichloroethene
for Well MW-BW-53-A
Sampled September 15, 2005

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS: INCREMENTAL RISK CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)		Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	1.47E+06	NA		5.2E-08	1.0E-04

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET
Chloroform
for Well MW-BW-53-A
Sampled September 15, 2005

GW-SCREEN Version 3.0; 04/03	CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)	**DTSC**

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 1/21/05)

YES [ ]

OR

Reset to Defaults

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	**ENTER** Initial groundwater conc., C_W (μg/L)	Chemical
67663	7.30E-01	Chloroform

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	**ENTER** Depth below grade to water table, L_{WT} (cm)	**ENTER** SCS soil type directly above water table	**ENTER** Average soil/ groundwater temperature, T_S (^{o}C)	**ENTER** Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	2930.96	S	18	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		**ENTER** User-defined vandose zone soil vapor permeability, k_v (cm^2)	**ENTER** Vadose zone SCS soil type [Lookup Soil Parameters]	**ENTER** Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	**ENTER** Vadose zone soil total porosity, n^V (unitless)	**ENTER** Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
S	OR		S	1.66	0.375	0.054

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	**ENTER** Target hazard quotient for noncarcinogens, THQ (unitless)	**ENTER** Averaging time for carcinogens, AT_C (yrs)	**ENTER** Averaging time for noncarcinogens, AT_{NC} (yrs)	**ENTER** Exposure duration, ED (yrs)	**ENTER** Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

MW-BW-53-A_Chloroform_091505.xls

DTSC / HERD
Last Update: 11/1/03

DTSC Indoor Air Guidance
Unclassified Soil Screening Model

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CHEMICAL PROPERTIES SHEET
Chloroform
for Well MW-BW-53-A
Sampled September 15, 2005

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^{o}C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^{o}K)	Critical temperature, T_C (^{o}K)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
1.04E-01	1.00E-05	3.66E-03	25	6,988	334.32	536.40	3.98E+01	7.92E+03	5.3E-06	3.0E-01

END

INTERMEDIATE CALCULATIONS SHEET
Chloroform
for Well MW-BW-53-A
Sampled September 15, 2005

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone soil effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
2915.96	0.321	0.003	1.01E-07	0.998	1.00E-07	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
3.39E+04	1.00E+06	5.00E-03	15	7,471	2.70E-03	1.13E-01	1.78E-04	1.68E-02	6.73E-04	1.47E-02

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source indoor bldg. conc., $C_{building}$ (μg/m^3)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
2915.96	15	8.26E+01	1.25	8.33E+01	1.68E-02	5.00E+03	2.02E+04	1.41E-04	1.16E-02	5.3E-06	3.0E-01

MW-BW-53-A_Chloroform_091505.xls

DTSC / HERD
Last Update: 11/1/03

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Unclassified Soil Screening Model

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RESULTS SHEET
Chloroform
for Well MW-BW-53-A
Sampled September 15, 2005

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS: INCREMENTAL RISK CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)		Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	7.92E+06	NA		2.5E-08	3.7E-05

MESSAGE SUMMARY BELOW:

END

1 of 1

GW-SCREEN Version 3.0; 04/03

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 1/21/05)

Reset to Defaults

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	**ENTER** Initial groundwater conc., C_W ($\mu g/L$)	Chemical
56235	4.00E+00	Carbon tetrachloride

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	**ENTER** Depth below grade to water table, L_{WT} (cm)	**ENTER** SCS soil type directly above water table	**ENTER** Average soil/ groundwater temperature, T_S (^oC)	**ENTER** Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	1066.8	S	18	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		**ENTER** User-defined vandose zone soil vapor permeability, k_v (cm^2)	**ENTER** Vadose zone SCS soil type	Lookup Soil Parameters	**ENTER** Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	**ENTER** Vadose zone soil total porosity, n^V (unitless)	**ENTER** Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
S	OR		S		1.66	0.375	0.054

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	**ENTER** Target hazard quotient for noncarcinogens, THQ (unitless)	**ENTER** Averaging time for carcinogens, AT_C (yrs)	**ENTER** Averaging time for noncarcinogens, AT_{NC} (yrs)	**ENTER** Exposure duration, ED (yrs)	**ENTER** Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

DTSC / HERD
Last Update: 11/1/03

DTSC Indoor Air Guidance
Unclassified Soil Screening Model

MW-BW-49-A_CT_091504.xls
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CHEMICAL PROPERTIES SHEET
Carbon Tetrachloride
for Well MW-BW-49-A
Sampled September 15, 2004

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^{o}C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^{o}K)	Critical temperature, T_C (^{o}K)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
7.80E-02	8.80E-06	3.03E-02	25	7,127	349.90	556.60	1.74E+02	7.93E+02	4.2E-05	4.0E-02

END

INTERMEDIATE CALCULATIONS SHEET
Carbon Tetrachloride
for Well MW-BW-49-A
Sampled September 15, 2004

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
1051.8	0.321	0.003	1.01E-07	0.998	1.00E-07	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
3.39E+04	1.00E+06	5.00E-03	15	7,778	2.21E-02	9.26E-01	1.78E-04	1.26E-02	5.00E-04	9.06E-03

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (µg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source indoor bldg. conc., $C_{building}$ (µg/m³)	Unit risk factor, URF (µg/m³)⁻¹	Reference conc., RfC (mg/m³)
1051.8	15	3.70E+03	1.25	8.33E+01	1.26E-02	5.00E+03	5.50E+05	2.30E-04	8.53E-01	4.2E-05	4.0E-02

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RESULTS SHEET
Carbon Tetrachloride
for Well MW-BW-49-A
Sampled September 15, 2004

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS: INCREMENTAL RISK CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)		Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	7.93E+05	NA		1.5E-05	2.0E-02

MESSAGE SUMMARY BELOW:

END

GW-SCREEN
Version 3.0; 04/03

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

DTSC

Vapor Intrusion Guidance

Interim Final 12/04

(last modified 1/21/05)

YES [   ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X   ]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
67663	2.70E-01	Chloroform

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^{o}C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	1066.8	S	18	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type Lookup Soil Parameters	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
S	OR		S	1.66	0.375	0.054

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based
groundwater concentration.

DTSC / HERD
Last Update: 11/1/03

DTSC Indoor Air Guidance
Unclassified Soil Screening Model

MW-BW-49-A_Chloroform_091504.xls
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CHEMICAL PROPERTIES SHEET
Chloroform
for Well MW-BW-49-A
Sampled September 15, 2004

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^{o}C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^{o}K)	Critical temperature, T_C (^{o}K)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
1.04E-01	1.00E-05	3.66E-03	25	6,988	334.32	536.40	3.98E+01	7.92E+03	5.3E-06	3.0E-01

END

1 of 1

INTERMEDIATE CALCULATIONS SHEET
Chloroform
for Well MW-BW-49-A
Sampled September 15, 2004

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone soil effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
1051.8	0.321	0.003	1.01E-07	0.998	1.00E-07	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
3.39E+04	1.00E+06	5.00E-03	15	7,471	2.70E-03	1.13E-01	1.78E-04	1.68E-02	6.73E-04	1.21E-02

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (µg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source indoor bldg. conc., $C_{building}$ (µg/m³)	Unit risk factor, URF (µg/m³)$^{-1}$	Reference conc., RfC (mg/m³)
1051.8	15	3.06E+01	1.25	8.33E+01	1.68E-02	5.00E+03	2.02E+04	2.98E-04	9.12E-03	5.3E-06	3.0E-01

DTSC / HERD
Last Update: 11/1/03

DTSC Indoor Air Guidance
Unclassified Soil Screening Model

MW-BW-49-A_Chloroform_091504.xls
4/18/2006
8:42 PM

RESULTS SHEET
Chloroform
for Well MW-BW-49-A
Sampled September 15, 2004

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

INCREMENTAL RISK CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	7.92E+06	NA	2.0E-08	2.9E-05

MESSAGE SUMMARY BELOW:

END

]

GW-SCREEN Version 3.0; 04/03	CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)	**DTSC**

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 1/21/05)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	**ENTER** Initial groundwater conc., C_W (μg/L)	Chemical
56235	2.50E+00	Carbon tetrachloride

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	**ENTER** Depth below grade to water table, L_{WT} (cm)	**ENTER** SCS soil type directly above water table	**ENTER** Average soil/ groundwater temperature, T_S (^{o}C)	**ENTER** Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	1066.8	S	18	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	**ENTER** User-defined vandose zone soil vapor permeability, k_v (cm^2)	**ENTER** Vadose zone SCS soil type *(Lookup Soil Parameters)*	**ENTER** Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	**ENTER** Vadose zone soil total porosity, n^V (unitless)	**ENTER** Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
S			S	1.66	0.375	0.054

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	**ENTER** Target hazard quotient for noncarcinogens, THQ (unitless)	**ENTER** Averaging time for carcinogens, AT_C (yrs)	**ENTER** Averaging time for noncarcinogens, AT_{NC} (yrs)	**ENTER** Exposure duration, ED (yrs)	**ENTER** Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based
groundwater concentration.

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Last Update: 11/1/03

DTSC Indoor Air Guidance
Unclassified Soil Screening Model

MW-BW-49-A_CT_092005.xls
4/18/2006
8:47 PM

CHEMICAL PROPERTIES SHEET
Carbon Tetrachloride
for Well MW-BW-49-A
Sampled September 20, 2005

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^{o}C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^{o}K)	Critical temperature, T_C (^{o}K)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
7.80E-02	8.80E-06	3.03E-02	25	7,127	349.90	556.60	1.74E+02	7.93E+02	4.2E-05	4.0E-02

END

INTERMEDIATE CALCULATIONS SHEET
Carbon Tetrachloride
for Well MW-BW-49-A
Sampled September 20, 2005

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone soil effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
1051.8	0.321	0.003	1.01E-07	0.998	1.00E-07	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
3.39E+04	1.00E+06	5.00E-03	15	7,778	2.21E-02	9.26E-01	1.78E-04	1.26E-02	5.00E-04	9.06E-03

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source indoor bldg. conc., $C_{building}$ (μg/m^3)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
1051.8	15	2.31E+03	1.25	8.33E+01	1.26E-02	5.00E+03	5.50E+05	2.30E-04	5.33E-01	4.2E-05	4.0E-02

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Last Update: 11/1/03

DTSC Indoor Air Guidance
Unclassified Soil Screening Model

MW-BW-49-A_CT_092005.xls
4/18/2006
8:47 PM

RESULTS SHEET
Carbon Tetrachloride
for Well MW-BW-49-A
Sampled September 20, 2005

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS: INCREMENTAL RISK CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)		Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	7.93E+05	NA		9.2E-06	1.3E-02

MESSAGE SUMMARY BELOW:

END

SG-SCREEN
PA Version 2.0; 04/

Reset to
Defaults

DTSC

Vapor Intrusion Guidance

Interim Final 12/04

(last modified 1/21/05)

Soil Gas Concentration Data

ENTER	**ENTER**		**ENTER**	
Chemical CAS No. (numbers only, no dashes)	Soil gas conc., C_g ($\mu g/m^3$)	OR	Soil gas conc., C_g (ppmv)	Chemical
56235			5.40E-04	Carbon tetrachloride

MORE ↓

ENTER	**ENTER**	**ENTER**	**ENTER**		**ENTER**
Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	Soil gas sampling depth below grade, L_s (cm)	Average soil temperature, T_S (^{o}C)	Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	182.88	18	S		

MORE ↓

ENTER	**ENTER**	**ENTER**	**ENTER**	**ENTER**
Vandose zone SCS soil type [Lookup Soil Parameters]	Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	Vadose zone soil total porosity, n^V (unitless)	Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.66	0.375	0.054	5

MORE ↓

ENTER	**ENTER**	**ENTER**	**ENTER**
Averaging time for carcinogens, AT_C (yrs)	Averaging time for noncarcinogens, AT_{NC} (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)
70	30	30	350

END

CTP-SGP-35_CT.xls

DTSC / HERD
Last Update: 11/1/03

DTSC Indoor Air Guidance
Unclassified Soil Screening Model

4/19/2006
7:52 AM

CHEMICAL PROPERTIES SHEET
Carbon Tetrachloride
for CTP-SGP-35
Sampled June 18, 2004

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^{o}C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^{o}K)	Critical temperature, T_C (^{o}K)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)	Molecular weight, MW (g/mol)
7.80E-02	8.80E-06	3.03E-02	25	7,127	349.90	556.60	4.2E-05	4.0E-02	153.82

END

INTERMEDIATE CALCULATIONS SHEET
Carbon Tetrachloride
for CTP-SGP-35
Sampled June 18, 2004

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm³/s)
167.88	0.321	0.003	1.01E-07	0.998	1.00E-07	4,000	3.48E+00	3.39E+04

Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	7,778	2.21E-02	9.26E-01	1.78E-04	1.26E-02	167.88

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	3.48E+00	1.25	8.33E+01	1.26E-02	5.00E+03	5.50E+05	1.17E-03	4.05E-03

Unit risk factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m³)
4.2E-05	4.0E-02

END

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Last Update: 11/1/03

DTSC Indoor Air Guidance
Unclassified Soil Screening Model

CTP-SGP-35_CT.xls
4/19/2006
7:52 AM

RESULTS SHEET
Carbon Tetrachloride
for CTP-SGP-35
Sampled June 18, 2004

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
7.0E-08	9.7E-05

MESSAGE SUMMARY BELOW:

END

SG-SCREEN
PA Version 2.0; 04/

DTSC

Vapor Intrusion Guidance

Interim Final 12/04

(last modified 1/21/05)

Reset to
Defaults

Soil Gas Concentration Data

ENTER	**ENTER**		**ENTER**	
Chemical CAS No. (numbers only, no dashes)	Soil gas conc., C_g ($\mu g/m^3$)	OR	Soil gas conc., C_g (ppmv)	Chemical
67663			8.00E-05	Chloroform

MORE ↓

ENTER	**ENTER**	**ENTER**	**ENTER**		**ENTER**
Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	Soil gas sampling depth below grade, L_s (cm)	Average soil temperature, T_S (^oC)	Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	182.88	18	S		

MORE ↓

ENTER	**ENTER**	**ENTER**	**ENTER**	**ENTER**
Vandose zone SCS soil type (Lookup Soil Parameters)	Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	Vadose zone soil total porosity, n^V (unitless)	Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.66	0.375	0.054	5

MORE ↓

ENTER	**ENTER**	**ENTER**	**ENTER**
Averaging time for carcinogens, AT_C (yrs)	Averaging time for noncarcinogens, AT_{NC} (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)
70	30	30	350

END

CTP-SGP-35_chloroform.xls

DTSC / HERD
Last Update: 11/1/03

DTSC Indoor Air Guidance
Unclassified Soil Screening Model

4/19/2006
7:51 AM

CHEMICAL PROPERTIES SHEET
Chloroform
for CTP-SGP-35
Sampled June 18, 2004

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^{o}C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^{o}K)	Critical temperature, T_C (^{o}K)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)	Molecular weight, MW (g/mol)
1.04E-01	1.00E-05	3.66E-03	25	6,988	334.32	536.40	5.3E-06	3.0E-01	119.38

END

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
167.88	0.321	0.003	1.01E-07	0.998	1.00E-07	4,000	4.00E-01	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	7,471	2.70E-03	1.13E-01	1.78E-04	1.68E-02	167.88

Convection path length, L_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
15	4.00E-01	1.25	8.33E+01	1.68E-02	5.00E+03	2.02E+04	1.34E-03	5.37E-04

Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
5.3E-06	3.0E-01

END

CTP-SGP-35_chloroform.xls

DTSC / HERD
Last Update: 11/1/03

DTSC Indoor Air Guidance
Unclassified Soil Screening Model

4/19/2006
7:51 AM

RESULTS SHEET
Chloroform
for CTP-SGP-35
Sampled June 18, 2004

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.2E-09	1.7E-06

MESSAGE SUMMARY BELOW:

END

SG-SCREEN
PA Version 2.0; 04/

Reset to
Defaults

DTSC

Vapor Intrusion Guidance

Interim Final 12/04

(last modified 1/21/05)

Soil Gas Concentration Data

ENTER	ENTER		ENTER	
Chemical CAS No. (numbers only, no dashes)	Soil gas conc., C_g ($\mu g/m^3$)	OR	Soil gas conc., C_g (ppmv)	Chemical
127184			1.20E-04	Tetrachloroethylene

MORE ↓

ENTER	ENTER	ENTER	ENTER		ENTER
Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	Soil gas sampling depth below grade, L_s (cm)	Average soil temperature, T_S (^oC)	Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	182.88	18	S		

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER
Vandose zone SCS soil type [Lookup Soil Parameters]	Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	Vadose zone soil total porosity, n^V (unitless)	Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.66	0.375	0.054	5

MORE ↓

ENTER	ENTER	ENTER	ENTER
Averaging time for carcinogens, AT_C (yrs)	Averaging time for noncarcinogens, AT_{NC} (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)
70	30	30	350

END

DTSC / HERD
Last Update: 11/1/03

DTSC Indoor Air Guidance
Unclassified Soil Screening Model

CTP-SGP-35_PCE.xls
4/19/2006
7:50 AM

CHEMICAL PROPERTIES SHEET
Tetrachloroethene
for CTP-SGP-35
Sampled June 18, 2004

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

END

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m³)	Bldg. ventilation rate, $Q_{building}$ (cm³/s)
167.88	0.321	0.003	1.01E-07	0.998	1.00E-07	4,000	8.33E-01	3.39E+04

Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	9,472	1.25E-02	5.23E-01	1.78E-04	1.16E-02	167.88

Convection path length, L_p (cm)	Source vapor conc., C_{source} (μg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m³)
15	8.33E-01	1.25	8.33E+01	1.16E-02	5.00E+03	1.65E+06	1.12E-03	9.30E-04

Unit risk factor, URF (μg/m³)⁻¹	Reference conc., RfC (mg/m³)
5.9E-06	3.5E-02

END

DTSC / HERD
Last Update: 11/1/03

DTSC Indoor Air Guidance
Unclassified Soil Screening Model

CTP-SGP-35_PCE.xls
4/19/2006
7:50 AM

RESULTS SHEET
Tetrachloroethene
for CTP-SGP-35
Sampled June 18, 2004

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.3E-09	2.5E-05

MESSAGE SUMMARY BELOW:

END

SG-SCREEN
PA Version 2.0; 04/

DTSC

Vapor Intrusion Guidance

Interim Final 12/04

(last modified 1/21/05)

Reset to
Defaults

Soil Gas Concentration Data

ENTER	**ENTER**		**ENTER**	
Chemical	Soil	OR	Soil	
CAS No.	gas		gas	
(numbers only,	conc.,		conc.,	
no dashes)	C_g		C_g	
	($\mu g/m^3$)		(ppmv)	Chemical

| 79016 | | | 1.50E-04 | Trichloroethylene |

MORE ↓

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

| 15 | 182.88 | 18 | S | | |

MORE ↓

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

| S | 1.66 | 0.375 | 0.054 | 5 |

MORE ↓

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

| 70 | 30 | 30 | 350 |

END

CTP-SGP-35_TCE.xls

DTSC / HERD
Last Update: 11/1/03

DTSC Indoor Air Guidance
Unclassified Soil Screening Model

4/19/2006
7:52 AM

CHEMICAL PROPERTIES SHEET
Trichloroethene
for CTP-SGP-35
Sampled June 18, 2004

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^{o}C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^{o}K)	Critical temperature, T_C (^{o}K)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)	Molecular weight, MW (g/mol)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	2.0E-06	6.0E-01	131.39

END

INTERMEDIATE CALCULATIONS SHEET
Trichloroethene
for CTP-SGP-35
Sampled June 18, 2004

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
167.88	0.321	0.003	1.01E-07	0.998	1.00E-07	4,000	8.25E-01	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	8,458	7.29E-03	3.05E-01	1.78E-04	1.28E-02	167.88

Convection path length, L_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
15	8.25E-01	1.25	8.33E+01	1.28E-02	5.00E+03	4.65E+05	1.17E-03	9.68E-04

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

END

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
8.0E-10	1.5E-06

MESSAGE SUMMARY BELOW:

END