# Appendix C.4

# *Indoor/Outdoor Air Dilution/Dispersion Modeling Documentation*

Appendix C.4
Johnson & Ettinger Model - Data Entry Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - RME
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Whitney Barrel

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

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) | Chemical | ENTER 95% UCL groundwater conc., $C_w$ (µg/L) | ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (15 or 200 cm) | ENTER Depth below grade to water table, LWT (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, $T_S$ (°C) | ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR Note | ENTER User-defined vadose zone soil vapor permeability, $k_v$ ($cm^2$) | ENTER Vadose zone soil dry bulk density, $\rho_b^V$ ($g/cm^3$) | ENTER Vadose zone soil total porosity, $n^V$ (unitless) | ENTER Vadose zone soil water-filled porosity, $\theta_w^V$ ($cm^3/cm^3$) | 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) | ENTER Exposure time ET (hrs/day) | ENTER Conversion factor CF (hrs/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 4.62E+00 | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 79005 | 1,1,2-Trichloroethane | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 75343 | 1,1-Dichloroethane | 1.20E+02 | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 75354 | 1,1-Dichloroethylene | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 120821 | 1,2,4-Trichlorobenzene | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 95501 | 1,2-Dichlorobenzene | 7.43E+00 | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 541731 | Dichlorobenzene, 1,3- | 1.80E+01 | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 106467 | 1,4-Dichlorobenzene | 1.97E+02 | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 78933 | Butanone, 2- (MEK) | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 67641 | Acetone | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 71432 | Benzene | 9.60E+01 | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 74839 | Bromomethane | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 75150 | Carbon Disulfide | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 108907 | Chlorobenzene | 1.80E+01 | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 75003 | Ethyl Chloride | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 67663 | Chloroform | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 156592 | cis-1,2-Dichloroethylene | 4.80E+02 | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 110827 | Cyclohexane | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 100414 | Ethylbenzene | 4.00E+01 | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 98828 | Isopropylbenzene | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 108872 | Methyl cyclohexane | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 5.40E+02 | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 75092 | Methylene chloride | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 127184 | Tetrachloroethylene | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 108883 | Toluene | 1.20E+03 | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 156605 | trans-1,2-Dichloroethylene | 1.50E+01 | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 79016 | Trichloroethylene | 2.00E+00 | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 75014 | Vinyl chloride | 4.20E+02 | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 1330207 | Xylenes | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 98862 | Acetophenone | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 91203 | Naphthalene | 9.60E+00 | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 91576 | Methylnaphthalene, 2- | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 92524 | Biphenyl, 1,1- | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 208968 | Acenaphthylene | 3.20E+00 | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 83329 | Acenaphthene | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 86737 | Fluorene | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 85018 | Phenanthrene | 3.10E+00 | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 120127 | Anthracene | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| C9-C18 | C9-C18 Aliphatics | 9.60E+01 | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| C11-C22 | C11-C22 Aromatics | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| C5-C8 | C5-C8 Aliphatics | 4.45E+02 | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| C9-C10 | C9-C10 Aromatics | | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| C9-C12 | C9-C12 Aliphatics | 3.00E+01 | 15 | 74.99 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |

Note:
1) Default soil parameters from table 7 of User's Guide for Evaluating Subsurface Vapor Intrusion into Building (U.S. EPA June 19, 2003) were used for soil water filled porosity ($\theta_{ws}$), soil organic carbon fraction ($f_{oc}$), soil total porosity (n), and soil dry bulk density ($\rho_b$).

Appendix C.4
Johnson & Ettinger Model - Chemical Properties Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - RME
Southwest Prperties, Wells G&H Superfund Site, Operable Unit 2
Whitney Barrel

| Chemical CAS No. | Chemical | 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, $T_R$ (°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, $K_{oc}$ ($cm^3/g$) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu g/m^3)^{-1}$ | Reference conc., RfC ($mg/m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 7.80E-02 | 8.80E-06 | 1.72E-02 | 25 | 7,136 | 347.24 | 545.00 | 1.10E+02 | 1.33E+03 | N/A | 2.2E+00 |
| 76131 | Trichloro-1,2,2-triflouroethane, 1,1 | 2.88E-02 | 8.07E-06 | 5.17E-01 | 25 | 1,326 | 320.70 | 481.05 | 2.25E+02 | 1.70E+02 | N/A | 3.0E+01 |
| 79005 | 1,1,2-Trichloroethane | 7.80E-02 | 8.80E-06 | 9.12E-04 | 25 | 8,322 | 386.15 | 602.00 | 5.01E+01 | 4.42E+03 | 1.6E-05 | 2.2E+00 |
| 75343 | 1,1-Dichloroethane | 7.42E-02 | 1.05E-05 | 5.61E-03 | 25 | 6,895 | 330.55 | 523.00 | 3.16E+01 | 5.06E+03 | N/A | 5.0E-01 |
| 75354 | 1,1-Dichloroethylene | 9.00E-02 | 1.04E-05 | 2.61E-02 | 25 | 6,247 | 304.75 | 576.05 | 5.89E+01 | 2.25E+03 | N/A | 2.0E-01 |
| 120821 | 1,2,4-Trichlorobenzene | 3.00E-02 | 8.23E-06 | 1.42E-03 | 25 | 10,471 | 486.15 | 725.00 | 1.78E+03 | 3.00E+02 | N/A | 2.0E-01 |
| 95501 | 1,2-Dichlorobenzene | 6.88E-02 | 9.41E-06 | 1.62E-06 | 25 | 1,223 | 465.00 | 697.50 | 5.34E+01 | 2.77E+04 | N/A | N/A |
| 541731 | Dichlorobenzene, 1,3- | 4.14E-02 | 8.85E-06 | 4.70E-03 | 25 | 1,242 | 446.00 | 683.96 | 1.70E+02 | 6.88E+01 | N/A | N/A |
| 106467 | 1,4-Dichlorobenzene | 6.90E-02 | 7.90E-06 | 2.43E-03 | 25 | 9,271 | 447.21 | 684.75 | 6.17E+02 | 7.38E+01 | N/A | 8.0E-01 |
| 78933 | Butanone, 2- (MEK) | 8.08E-02 | 9.80E-06 | 5.60E-05 | 25 | 1,311 | 352.50 | 528.75 | 3.63E+00 | 2.23E+05 | N/A | N/A |
| 67641 | Acetone | 1.24E-01 | 1.14E-05 | 3.88E-05 | 25 | 6,955 | 329.20 | 508.10 | 5.75E-01 | 1.00E+06 | N/A | N/A |
| 71432 | Benzene | 8.80E-02 | 9.80E-06 | 5.56E-03 | 25 | 7,342 | 353.24 | 562.16 | 5.89E+01 | 1.75E+03 | 7.8E-06 | 3.0E-02 |
| 74839 | Bromomethane | 7.28E-02 | 1.21E-05 | 6.22E-03 | 25 | 1,362 | 276.50 | 414.75 | 1.43E+01 | 1.52E+04 | N/A | 5.0E-03 |
| 75150 | Carbon Disulfide | 1.04E-01 | 1.29E-05 | 1.27E-02 | 25 | 6,391 | 319.00 | 552.00 | 5.14E+01 | 2.67E+03 | N/A | 7.0E-01 |
| 108907 | Chlorobenzene | 7.30E-02 | 8.70E-06 | 3.71E-03 | 25 | 8,410 | 404.87 | 632.40 | 2.19E+02 | 4.72E+02 | N/A | 6.0E-02 |
| 75003 | Ethyl Chloride | 1.26E-01 | 6.50E-06 | 8.67E-03 | 25 | 1,355 | 249.00 | 373.50 | 1.43E+01 | 5.32E+03 | N/A | 1.0E+01 |
| 67663 | Chloroform | 1.04E-01 | 1.00E-05 | 3.66E-03 | 25 | 6,988 | 334.32 | 536.40 | 3.98E+01 | 7.92E+03 | 2.3E-05 | 5.0E-02 |
| 156592 | cis-1,2-Dichloroethylene | 7.36E-02 | 1.13E-05 | 4.07E-03 | 25 | 7,192 | 333.65 | 544.00 | 3.55E+01 | 3.50E+03 | N/A | 2.0E-01 |
| 110827 | Cyclohexane | 8.00E-02 | 9.00E-06 | 2.00E+00 | 25 | 1,309 | 353.85 | 530.78 | 1.60E+02 | 5.50E+01 | #N/A | #N/A |
| 100414 | Ethylbenzene | 7.50E-02 | 7.80E-06 | 7.88E-03 | 25 | 8,501 | 409.34 | 617.20 | 3.63E+02 | 1.69E+02 | N/A | 1.0E+00 |
| 98828 | Isopropylbenzene | 6.50E-02 | 7.83E-06 | 1.47E-02 | 25 | 1,259 | 425.40 | 631.01 | 9.31E+03 | 5.60E+01 | N/A | 4.0E-01 |
| 108872 | Methyl cyclohexane | 9.86E-02 | 8.52E-06 | 4.23E-01 | 25 | 1,296 | 373.90 | 560.85 | 2.68E+02 | 1.40E+01 | N/A | 3.0E+00 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 1.02E-01 | 1.05E-05 | 5.87E-04 | 25 | 1,324 | 328.36 | 497.11 | 3.84E+01 | 5.10E+04 | N/A | 3.0E+00 |
| 75092 | Methylene chloride | 1.01E-01 | 1.17E-05 | 2.19E-03 | 25 | 6,706 | 313.00 | 510.00 | 1.17E+01 | 1.30E+04 | 4.7E-07 | 3.0E+00 |
| 127184 | Tetrachloroethylene | 7.20E-02 | 8.20E-06 | 1.84E-02 | 25 | 8,288 | 394.40 | 620.20 | 1.55E+02 | 2.00E+02 | 5.9E-06 | N/A |
| 108883 | Toluene | 8.70E-02 | 8.60E-06 | 6.63E-03 | 25 | 7,930 | 383.78 | 591.79 | 1.82E+02 | 5.26E+02 | N/A | 4.0E-01 |
| 156605 | trans-1,2-Dichloroethylene | 7.07E-02 | 1.19E-05 | 9.39E-03 | 25 | 1,333 | 320.85 | 516.50 | 5.25E+01 | 6.30E+03 | N/A | 2.0E-01 |
| 79016 | Trichloroethylene | 7.90E-02 | 9.10E-06 | 1.03E-02 | 25 | 7,505 | 360.36 | 544.20 | 1.66E+02 | 1.10E+03 | 1.1E-04 | 4.0E-02 |
| 75014 | Vinyl chloride | 1.06E-01 | 1.23E-05 | 2.71E-02 | 25 | 5,250 | 259.25 | 432.00 | 1.86E+01 | 2.76E+03 | 8.8E-06 | 1.0E-01 |
| 1330207 | Xylenes | 7.69E-02 | 8.44E-06 | 6.73E-06 | 25 | 1,264 | 417.40 | 616.21 | 2.41E+02 | 2.20E+02 | N/A | 1.0E-01 |
| 98862 | Acetophenone | 6.00E-02 | 8.73E-06 | 1.02E-05 | 25 | 1,214 | 475.00 | 712.50 | 4.62E+01 | 6.13E+03 | N/A | N/A |
| 91203 | Naphthalene | 5.90E-02 | 7.50E-06 | 4.83E-04 | 25 | 10,373 | 491.14 | 748.40 | 2.00E+03 | 3.10E+01 | N/A | 3.0E-03 |
| 91576 | Methylnaphthalene, 2- | 4.84E-02 | 7.75E-06 | 1.01E-03 | 25 | 1,169 | 514.05 | 761.01 | 8.51E+03 | 2.46E+01 | N/A | N/A |
| 92524 | Biphenyl, 1,1'- | 4.04E-02 | 8.15E-06 | 3.03E-04 | 25 | 1,149 | 529.10 | 793.65 | 6.25E+03 | 6.94E+00 | N/A | N/A |
| 208968 | Acenaphthylene | 4.43E-02 | 7.44E-06 | 2.80E-04 | 25 | 1,118 | 553.00 | 792.01 | 4.79E+03 | 3.93E+00 | N/A | 3.0E-03 |
| 83329 | Acenaphthene | 4.21E-02 | 7.69E-06 | 1.55E-04 | 25 | 12,155 | 550.54 | 803.15 | 7.08E+03 | 4.24E+00 | N/A | 3.0E-03 |
| 86737 | Fluorene | 3.63E-02 | 7.88E-06 | 9.41E-06 | 25 | 12,666 | 570.44 | 870.00 | 7.71E+03 | 1.90E+00 | N/A | 3.0E-03 |
| 85018 | Phenanthrene | 3.30E-02 | 7.47E-06 | 1.30E-04 | 25 | 1,057 | 613.00 | 869.01 | 1.41E+04 | 1.28E+00 | N/A | 3.0E-03 |
| 120127 | Anthracene | 3.24E-02 | 7.74E-06 | 6.51E-05 | 25 | 13,121 | 615.18 | 873.00 | 2.95E+04 | 4.34E-02 | N/A | 3.0E-03 |
| C9-C18 | C9-C18 Aliphatics | 6.00E-02 | 1.00E-05 | 1.66E+00 | 25 | NA | NA | NA | 6.80E+05 | 1.00E+01 | N/A | 2.0E-01 |
| C11-C22 | C11-C22 Aromatics | 6.00E-02 | 1.00E-05 | 7.32E-04 | 25 | NA | NA | NA | 5.00E+03 | 5.80E+03 | N/A | 5.0E-02 |
| C5-C8 | C5-C8 Aliphatics | 6.00E-02 | 1.00E-05 | 1.30E+00 | 25 | NA | NA | NA | 2.27E+03 | 1.10E+04 | N/A | 2.0E-01 |
| C9-C10 | C9-C10 Aromatics | 6.00E-02 | 1.00E-05 | 7.92E-03 | 25 | NA | NA | NA | 1.78E+03 | 5.10E+04 | N/A | 5.0E-02 |
| C9-C12 | C9-C12 Aliphatics | 6.00E-02 | 1.00E-05 | 1.56E+00 | 25 | NA | NA | NA | 1.50E+05 | 7.00E+01 | N/A | 2.0E-01 |

Appendix C.4
Johnson & Ettinger Model - Calculations Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - RME
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Whitney Barrel

| | | Source-building separation, $L_T$ (cm) | Vadose zone soil air-filled porosity, $\theta_a^V$ ($cm^3/cm^3$) | 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, $k_v$ ($cm^2$) | 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, Xcrack (cm) | Bldg. ventilation rate, $Q_{building}$ ($cm^3/s$) | Area of enclosed space below grade, $A_B$ ($cm^2$) | Crack-to-total area ratio, $\eta$ (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 ve. groundwat temperature, $H'_{TS}$ (unitless) | Vapor viscosity at ave. soil temperature, $\mu_{TS}$ ($g/cm-s$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 7,885 | 8.50E-03 | 3.66E-01 | 1.75E-04 |
| 75131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 9,572 | 3.66E-04 | 1.67E-02 | 1.75E-04 |
| 79005 | 1,1,2-Trichloroethane | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 7,460 | 2.86E-03 | 1.24E-01 | 1.75E-04 |
| 75343 | 1,1-Dichloroethane | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 6,392 | 1.47E-02 | 6.34E-01 | 1.75E-04 |
| 75354 | 1,1-Dichloroethylene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 13,200 | 4.35E-04 | 1.87E-02 | 1.75E-04 |
| 120821 | 1,2,4-Trichlorobenzene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,521 | 1.41E-06 | 6.09E-05 | 1.75E-04 |
| 95501 | 1,2-Dichlorobenzene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,503 | 4.11E-03 | 1.77E-01 | 1.75E-04 |
| 541731 | Dichlorobenzene, 1,3- | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 11,243 | 8.89E-04 | 3.83E-02 | 1.75E-04 |
| 106467 | 1,4-Dichlorobenzene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,499 | 4.90E-05 | 2.11E-03 | 1.75E-04 |
| 78933 | Butanone, 2- (MEK) | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 7,599 | 1.97E-05 | 8.50E-04 | 1.75E-04 |
| 67641 | Acetone | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 8,122 | 2.69E-05 | 1.16E-03 | 1.75E-04 |
| 71432 | Benzene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 7,337 | 5.57E-03 | 2.38E-01 | 1.75E-04 |
| 74839 | Bromomethane | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 6,582 | 6.88E-03 | 3.01E-01 | 1.75E-04 |
| 75150 | Carbon Disulfide | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 6,943 | 1.54E-02 | 6.65E-02 | 1.76E-04 |
| 108907 | Chlorobenzene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,201 | 7.79E-03 | 3.35E-01 | 1.75E-04 |
| 75003 | Ethyl Chloride | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 7,554 | 1.86E-03 | 8.02E-02 | 1.75E-04 |
| 67663 | Chloroform | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 7,734 | 2.04E-03 | 8.77E-02 | 1.75E-04 |
| 156592 | cis-1,2-Dichloroethylene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,486 | 1.75E+00 | 7.54E+01 | 1.75E-04 |
| 110827 | Cyclohexane | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 10,155 | 3.18E-03 | 1.37E-01 | 1.75E-04 |
| 100414 | Ethylbenzene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,640 | 1.28E-02 | 5.51E-01 | 1.75E-04 |
| 98828 | Isopropylbenzene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,505 | 3.70E-01 | 1.59E+01 | 1.75E-04 |
| 108872 | Methyl cyclohexane | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,447 | 5.16E-04 | 2.22E-02 | 1.75E-04 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 7,034 | 1.17E-03 | 5.03E-02 | 1.75E-04 |
| 75092 | Methylene chloride | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 6,553 | 7.83E-03 | 3.37E-01 | 1.75E-04 |
| 127184 | Tetrachloroethylene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 8,164 | 2.92E-03 | 1.26E-01 | 1.75E-04 |
| 108883 | Toluene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,417 | 8.27E-03 | 3.56E-01 | 1.75E-04 |
| 156605 | trans-1,2-Dichloroethylene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 6,557 | 4.79E-03 | 2.06E-01 | 1.75E-04 |
| 79016 | Trichloroethylene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 6,000 | 1.73E-02 | 7.46E-01 | 1.75E-04 |
| 75014 | Vinyl chloride | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,542 | 5.86E-06 | 2.52E-04 | 1.75E-04 |
| 1330207 | Xylenes | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,516 | 8.91E-06 | 3.83E-04 | 1.75E-04 |
| 98862 | Acetophenone | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 12,913 | 1.62E-04 | 6.85E-03 | 1.75E-04 |
| 91203 | Naphthalene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,506 | 8.86E-04 | 3.81E-02 | 1.75E-04 |
| 91576 | Methylnaphthalene, 2- | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,472 | 2.66E-04 | 1.14E-02 | 1.75E-04 |
| 92524 | Biphenyl, 1,1- | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,513 | 2.45E-04 | 1.05E-02 | 1.75E-04 |
| 208968 | Acenaphthylene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 16,123 | 3.67E-05 | 1.58E-03 | 1.75E-04 |
| 83329 | Acenaphthene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 16,235 | 2.20E-06 | 9.48E-05 | 1.75E-04 |
| 86737 | Fluorene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,479 | 1.14E-04 | 4.90E-03 | 1.75E-04 |
| 85018 | Phenanthrene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 18,365 | 1.26E-06 | 5.43E-04 | 1.76E-04 |
| 120127 | Anthracene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | NA | 8.25E-01 | 3.56E+01 | 1.75E-04 |
| C9-C18 | C9-C18 Aliphatics | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | NA | 3.60E-04 | 1.55E-02 | 1.75E-04 |
| C11-C22 | C11-C22 Aromatics | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | NA | 9.48E-01 | 2.79E+01 | 1.75E-04 |
| C5-C8 | C5-C8 Aliphatics | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | NA | 3.96E-03 | 1.70E-01 | 1.75E-04 |
| C9-C10 | C9-C10 Aromatics | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | NA | 7.60E-01 | 3.36E+01 | 1.75E-04 |
| C9-C12 | C9-C12 Aliphatics | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | NA | | | |

Appendix C.4
Johnson & Ettinger Model - Calculations Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - RME
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Whitney Barrel

| | | 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) | 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) (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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 4.75E-04 | 4.46E-04 | 4.66E-04 | 59.98 | 15 | 1.68E+03 | 0.10 | 2.74E+01 | 4.75E-04 | 1.23E+03 | 4.39E+304 | 7.92E-06 | 1.34E-02 | N/A | 2.2E+00 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | 1.76E-04 | 1.63E-04 | 1.71E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 1.75E-04 | 1.23E+03 | #NUM! | 5.40E-06 | N/A | N/A | 3.0E+01 |
| 79005 | 1,1,2-Trichloroethane | 5.24E-04 | 4.85E-04 | 5.16E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 5.24E-04 | 1.23E+03 | 8.66E+275 | 8.14E-06 | N/A | 1.6E-05 | 2.2E+00 |
| 75343 | 1,1-Dichloroethane | 4.58E-04 | 4.29E-04 | 4.49E-04 | 59.98 | 15 | 1.49E+04 | 0.10 | 2.74E+01 | 4.58E-04 | 1.23E+03 | #NUM! | 7.84E-06 | 1.17E-01 | N/A | 5.0E-01 |
| 75354 | 1,1-Dichloroethylene | 5.47E-04 | 5.12E-04 | 5.36E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 5.47E-04 | 1.23E+03 | 3.92E+284 | 8.22E-06 | N/A | N/A | 2.0E-01 |
| 120821 | 1,2,4-Trichlorobenzene | 2.25E-04 | 2.14E-04 | 2.22E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 2.26E-04 | 1.23E+03 | #NUM! | 6.10E-06 | N/A | N/A | 2.0E-01 |
| 95501 | 1,2-Dichlorobenzene | 1.66E-02 | 1.80E-02 | 1.67E-02 | 59.98 | 15 | 4.52E-01 | 0.10 | 2.74E+01 | 1.66E-02 | 1.23E+03 | 1.91E+09 | 1.08E-05 | 4.86E-06 | N/A | N/A |
| 541731 | Dichlorobenzene, 1,3- | 2.66E-04 | 2.40E-04 | 2.51E-04 | 59.98 | 15 | 3.38E-03 | 0.10 | 2.74E+01 | 2.66E-04 | 1.23E+03 | #NUM! | 6.43E-06 | 2.18E-02 | N/A | N/A |
| 106467 | 1,4-Dichlorobenzene | 4.38E-04 | 4.12E-04 | 4.30E-04 | 59.98 | 15 | 7.64E+03 | 0.10 | 2.74E+01 | 4.38E-04 | 1.23E+03 | #NUM! | 7.75E-06 | 6.64E-02 | N/A | 8.0E-01 |
| 78933 | Butanone, 2- (MEK) | 9.45E-04 | 9.27E-04 | 9.40E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 9.45E-04 | 1.23E+03 | 1.18E+163 | 9.18E-06 | N/A | N/A | N/A |
| 67641 | Acetone | 2.07E-03 | 2.06E-03 | 2.07E-03 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 2.07E-03 | 1.23E+03 | 8.18E+69 | 1.00E-05 | N/A | N/A | N/A |
| 71432 | Benzene | 5.42E-04 | 5.07E-04 | 5.30E-04 | 59.98 | 15 | 9.95E+03 | 0.10 | 2.74E+01 | 5.42E-04 | 1.23E+03 | 1.61E+267 | 8.20E-06 | 5.16E-02 | 7.8E-06 | 3.0E-02 |
| 74839 | Bromomethane | 4.46E-04 | 4.18E-04 | 4.37E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 4.46E-04 | 1.23E+03 | #NUM! | 7.79E-06 | N/A | N/A | 5.0E-03 |
| 75150 | Carbon Disulfide | 6.34E-04 | 5.94E-04 | 6.21E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 6.34E-04 | 1.23E+03 | 1.25E+228 | 8.50E-06 | N/A | N/A | 7.0E-01 |
| 108907 | Chlorobenzene | 4.65E-04 | 4.27E-04 | 4.46E-04 | 59.98 | 15 | 1.20E+03 | 0.10 | 2.74E+01 | 4.66E-04 | 1.23E+03 | #NUM! | 7.83E-06 | 9.37E-03 | N/A | 5.0E-02 |
| 75003 | Ethyl Chloride | 7.66E-04 | 7.19E-04 | 7.49E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 7.66E-04 | 1.23E+03 | 1.14E+189 | 8.63E-06 | N/A | N/A | 1.0E+01 |
| 67663 | Chloroform | 6.43E-04 | 6.02E-04 | 6.29E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 6.43E-04 | 1.23E+03 | 1.76E+225 | 8.63E-06 | N/A | 2.3E-05 | 9.8E-02 |
| 156592 | cis-1,2-Dichloroethylene | 4.59E-04 | 4.30E-04 | 4.49E-04 | 59.98 | 15 | 4.21E+04 | 0.10 | 2.74E+01 | 4.59E-04 | 1.23E+03 | #NUM! | 7.85E-06 | 3.30E-01 | N/A | 2.0E-01 |
| 100414 | Ethylbenzene | 4.85E-04 | 4.53E-04 | 4.75E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 4.85E-04 | 1.23E+03 | 3.18E+298 | 7.97E-06 | N/A | #N/A | #N/A |
| 98828 | Isopropylbenzene | 3.96E-04 | 3.70E-04 | 3.87E-04 | 59.98 | 15 | 5.47E+03 | 0.10 | 2.74E+01 | 4.80E-04 | 1.23E+03 | #NUM! | 7.85E-06 | 4.30E-02 | N/A | 1.0E+00 |
| 108872 | Methyl cyclohexane | 5.98E-04 | 5.59E-04 | 5.86E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 3.95E-04 | 1.23E+03 | #NUM! | 7.51E-06 | N/A | N/A | 4.0E-01 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 6.67E-04 | 6.26E-04 | 6.54E-04 | 59.98 | 15 | 1.20E+04 | 0.10 | 2.74E+01 | 5.98E-04 | 1.23E+03 | 1.50E+242 | 8.39E-06 | N/A | N/A | 3.0E+00 |
| 75092 | Methylene chloride | 6.35E-04 | 5.95E-04 | 6.22E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 6.67E-04 | 1.23E+03 | 9.48E+216 | 8.60E-06 | 1.03E-01 | N/A | 3.0E+00 |
| 127184 | Tetrachloroethylene | 4.39E-04 | 4.11E-04 | 4.30E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 9.35E-04 | 1.23E+03 | 8.55E+227 | 8.51E-06 | N/A | 4.7E-07 | 3.0E+00 |
| 108883 | Toluene | 5.34E-04 | 5.00E-04 | 5.23E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 4.39E-04 | 1.23E+03 | #NUM! | 7.75E-06 | N/A | 5.9E-06 | N/A |
| 156605 | trans-1,2-Dichloroethylene | 4.32E-04 | 4.04E-04 | 4.23E-04 | 59.98 | 15 | 1.51E+05 | 0.10 | 2.74E+01 | 5.34E-04 | 1.23E+03 | 1.10E+271 | 8.17E-06 | 1.23E+00 | N/A | 4.0E-01 |
| 79016 | Trichloroethylene | 4.83E-04 | 4.52E-04 | 4.73E-04 | 59.98 | 15 | 6.34E+03 | 0.10 | 2.74E+01 | 4.32E-04 | 1.23E+03 | #NUM! | 7.71E-06 | 4.12E-02 | N/A | 2.0E-01 |
| 75014 | Vinyl chloride | 5.44E-04 | 5.02E-04 | 5.30E-04 | 59.98 | 15 | 4.13E+02 | 0.10 | 2.74E+01 | 4.83E-04 | 1.23E+03 | 3.77E+299 | 7.96E-06 | 3.28E-03 | 1.1E-04 | 4.0E-02 |
| 1330207 | Xylenes | 3.75E-03 | 3.81E-03 | 3.77E-03 | 59.98 | 15 | 3.13E+05 | 0.10 | 2.74E+01 | 6.44E-04 | 1.23E+03 | 5.27E+224 | 6.63E-06 | 2.67E+00 | 8.6E-06 | 1.0E-01 |
| 98862 | Acetophenone | 2.90E-03 | 2.56E-03 | 2.81E-03 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 3.75E-03 | 1.23E+03 | 4.03E+38 | 1.04E-05 | N/A | N/A | 1.0E-01 |
| 91203 | Naphthalene | 4.70E-04 | 4.50E-04 | 4.64E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 2.80E-03 | 1.23E+03 | 4.82E+65 | 1.02E-05 | N/A | N/A | N/A |
| 91576 | Methylnaphthalene, 2- | 3.13E-04 | 2.98E-04 | 3.07E-04 | 59.98 | 15 | 5.29E+01 | 0.10 | 2.74E+01 | 4.70E-04 | 1.23E+03 | 2.87E+307 | 7.92E-06 | 4.98E-04 | N/A | 3.0E-03 |
| 92524 | Biphenyl, 1,1'- | 3.16E-04 | 3.01E-04 | 3.10E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 3.13E-04 | 1.23E+03 | #NUM! | 6.96E-06 | N/A | N/A | N/A |
| 208968 | Acenaphthylene | 3.38E-04 | 3.22E-04 | 3.33E-04 | 59.98 | 15 | 3.37E+01 | 0.10 | 2.74E+01 | 3.16E-04 | 1.23E+03 | #NUM! | 6.96E-06 | N/A | N/A | N/A |
| 83329 | Acenaphthene | 7.33E-04 | 7.31E-04 | 7.33E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 3.38E-04 | 1.23E+03 | #NUM! | 7.15E-06 | 2.41E-04 | N/A | 3.0E-03 |
| 86737 | Fluorene | 8.16E-01 | 8.39E-01 | 8.23E-01 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 7.33E-04 | 1.23E+03 | 2.13E+197 | 8.79E-06 | N/A | N/A | 3.0E-03 |
| 85018 | Phenanthrene | 3.50E-04 | 3.41E-04 | 3.47E-04 | 59.98 | 15 | 1.62E+01 | 0.10 | 2.74E+01 | 3.16E-01 | 1.23E+03 | 1.60E+00 | 3.24E-06 | N/A | N/A | 3.0E-03 |
| 120127 | Anthracene | 1.60E-03 | 1.62E-03 | 1.60E-03 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 3.60E-04 | 1.23E+03 | #NUM! | 7.25E-06 | 1.10E-04 | N/A | 3.0E-03 |
| C9-C18 | C9-C18 Aliphatics | 3.64E-04 | 3.40E-04 | 3.56E-04 | 59.98 | 15 | 2.10E+06 | 0.10 | 2.74E+01 | 1.60E-03 | 1.23E+03 | 5.14E+80 | 9.81E-06 | | N/A | 3.0E-03 |
| C11-C22 | C11-C22 Aromatics | 4.27E-04 | 4.09E-04 | 4.20E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 3.64E-04 | 1.23E+03 | #NUM! | 7.32E-06 | 1.54E+01 | N/A | 2.0E-01 |
| C5-C8 | C5-C8 Aliphatics | 3.64E-04 | 3.40E-04 | 3.56E-04 | 59.98 | 15 | 1.25E+07 | 0.10 | 2.74E+01 | 4.27E-04 | 1.23E+03 | #NUM! | 7.70E-06 | N/A | N/A | 5.0E-02 |
| C9-C10 | C9-C10 Aromatics | 3.96E-04 | 3.48E-04 | 3.82E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 3.64E-04 | 1.23E+03 | #NUM! | 7.32E-06 | 9.14E+01 | N/A | 2.0E-01 |
| C9-C12 | C9-C12 Aliphatics | 3.64E-04 | 3.40E-04 | 3.56E-04 | 59.98 | 15 | 1.68E+06 | 0.10 | 2.74E+01 | 3.64E-04 | 1.23E+03 | #NUM! | 7.32E-06 | 1.23E+01 | N/A | 2.0E-01 |

Appendix C.4
Johnson & Ettinger Model - Results
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - RME
outhwest Prperties, Wells G&H Superfund Site, Operable Unit 2
itney Barrel

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) |
|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | NA | NA | NA | 1.33E+06 | NA | NA | 1.4E-06 |
| 76131 | Trichloro-1,2,2-triflouroethane, 1,1,2- | NA | NA | NA | 1.70E+05 | NA | NA | NA |
| 79005 | 1,1,2-Trichloroethane | NA | NA | NA | 4.42E+06 | NA | NA | NA |
| 75343 | 1,1-Dichloroethane | NA | NA | NA | 5.06E+06 | NA | NA | 5.3E-05 |
| 75354 | 1,1-Dichloroethylene | NA | NA | NA | 2.25E+06 | NA | NA | NA |
| 120821 | 1,2,4-Trichlorobenzene | NA | NA | NA | 3.00E+05 | NA | NA | NA |
| 95501 | 1,2-Dichlorobenzene | NA | NA | NA | 2.77E+07 | NA | NA | NA |
| 541731 | Dichlorobenzene, 1,3- | NA | NA | NA | 6.88E+04 | NA | NA | NA |
| 106467 | 1,4-Dichlorobenzene | NA | NA | NA | 7.38E+04 | NA | NA | 1.7E-05 |
| 78933 | Butanone, 2- (MEK) | NA | NA | NA | 2.23E+08 | NA | NA | NA |
| 67641 | Acetone | NA | NA | NA | 1.00E+09 | NA | NA | NA |
| 71432 | Benzene | NA | NA | NA | 1.75E+06 | NA | 5.2E-08 | 6.2E-04 |
| 74839 | Bromomethane | NA | NA | NA | 1.52E+07 | NA | NA | NA |
| 75150 | Carbon Disulfide | NA | NA | NA | 2.67E+06 | NA | NA | NA |
| 108907 | Chlorobenzene | NA | NA | NA | 4.72E+05 | NA | NA | 3.6E-05 |
| 75003 | Ethyl Chloride | NA | NA | NA | 5.32E+06 | NA | NA | NA |
| 67663 | Chloroform | NA | NA | NA | 7.92E+06 | NA | NA | NA |
| 156592 | cis-1,2-Dichloroethylene | NA | NA | NA | 3.50E+06 | NA | NA | 3.8E-04 |
| 110827 | Cyclohexane | NA | NA | NA | 5.50E+04 | NA | NA | NA |
| 100414 | Ethylbenzene | NA | NA | NA | 1.69E+05 | NA | NA | 9.8E-06 |
| 98828 | Isopropylbenzene | NA | NA | NA | 5.60E+04 | NA | NA | NA |
| 108872 | Methyl cyclohexane | NA | NA | NA | 1.40E+04 | NA | NA | NA |
| 34044 | Methyl-Tertiary-Butyl Ether | NA | NA | NA | 5.10E+07 | NA | NA | 7.8E-06 |
| 75092 | Methylene chloride | NA | NA | NA | 1.30E+07 | NA | NA | NA |
| 127184 | Tetrachloroethylene | NA | NA | NA | 2.00E+05 | NA | NA | NA |
| 108883 | Toluene | NA | NA | NA | 5.26E+05 | NA | NA | 7.0E-04 |
| 156605 | trans-1,2-Dichloroethylene | NA | NA | NA | 6.30E+06 | NA | NA | 4.7E-05 |
| 79016 | Trichloroethylene | NA | NA | NA | 1.10E+06 | NA | 2.9E-08 | 1.9E-05 |
| 75014 | Vinyl chloride | NA | NA | NA | 2.76E+06 | NA | 1.9E-06 | 6.1E-03 |
| 1330207 | Xylenes | NA | NA | NA | 2.20E+05 | NA | NA | NA |
| 98862 | Acetophenone | NA | NA | NA | 6.13E+06 | NA | NA | NA |
| 91203 | Naphthalene | NA | NA | NA | 3.10E+04 | NA | NA | 3.8E-05 |
| 91576 | Methylnaphthalene, 2- | NA | NA | NA | 2.46E+04 | NA | NA | NA |
| 92524 | Biphenyl, 1,1'- | NA | NA | NA | 6.94E+03 | NA | NA | NA |
| 208968 | Acenaphthylene | NA | NA | NA | 3.93E+03 | NA | NA | 1.8E-05 |
| 83329 | Acenaphthene | NA | NA | NA | 4.24E+03 | NA | NA | NA |
| 86737 | Fluorene | NA | NA | NA | 1.90E+03 | NA | NA | NA |
| 85018 | Phenanthrene | NA | NA | NA | 1.28E+03 | NA | NA | 8.4E-06 |
| 120127 | Anthracene | NA | NA | NA | 4.34E+01 | NA | NA | NA |
| C9-C18 | C9-C18 Aliphatics | NA | NA | NA | 1.00E+04 | NA | NA | 1.8E-02 |
| C11-C22 | C11-C22 Aromatics | NA | NA | NA | 5.80E+06 | NA | NA | NA |
| C5-C8 | C5-C8 Aliphatics | NA | NA | NA | 1.10E+07 | NA | NA | 1.0E-01 |
| C9-C10 | C9-C10 Aromatics | NA | NA | NA | 5.10E+07 | NA | NA | NA |
| C9-C12 | C9-C12 Aliphatics | NA | NA | NA | 7.00E+04 | NA | NA | 1.4E-02 |

| | 95% UCL Cancer Risk | 95% UCL HI |
|---|---|---|
| TOTAL: | 2E-06 | 1E-01 |

[ ] = Cancer risk > 1E-05 or HQ/HI>1E+00

END

Appendix C.4
Johnson & Ettinger Model - Data Entry Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - CT
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Whitney Barrel

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

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) | Chemical | ENTER 95% UCL groundwater conc., $C_W$ (µg/L) | ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (15 or 200 cm) | ENTER Depth below grade to water table, LWT (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, $T_S$ (°C) | ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR Note 1 | ENTER User-defined vadose zone soil vapor permeability, $k_v$ ($cm^2$) | ENTER Vadose zone soil dry bulk density, $\rho_b^V$ ($g/cm^3$) | ENTER Vadose zone soil total porosity, $n^V$ (unitless) | ENTER Vadose zone soil water-filled porosity, $\theta_w^V$ ($cm^3/cm^3$) | 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) | ENTER Exposure time ET (hrs/day) | ENTER Coversion factor CF (hrs/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 4.62E+00 | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 79005 | 1,1,2-Trichloroethane | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 75343 | 1,1-Dichloroethane | 2.64E+01 | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 75354 | 1,1-Dichloroethylene | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 120821 | 1,2,4-Trichlorobenzene | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 95501 | 1,2-Dichlorobenzene | 7.43E+00 | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 541731 | Dichlorobenzene, 1,3- | 6.10E+00 | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 106467 | 1,4-Dichlorobenzene | 4.11E+01 | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 78933 | Butanone, 2- (MEK) | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 67641 | Acetone | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 71432 | Benzene | 2.13E+01 | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 74839 | Bromomethane | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 75150 | Carbon Disulfide | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 108907 | Chlorobenzene | 4.90E+00 | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 75003 | Ethyl Chloride | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 67663 | Chloroform | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 156592 | cis-1,2-Dichloroethylene | 9.74E+01 | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 110827 | Cyclohexane | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 100414 | Ethylbenzene | 1.01E+01 | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 98828 | Isopropylbenzene | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 108872 | Methyl cyclohexane | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 1.28E+02 | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 75092 | Methylene chloride | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 127184 | Tetrachloroethylene | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 108883 | Toluene | 2.45E+02 | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 156605 | trans-1,2-Dichloroethylene | 4.30E+00 | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 79016 | Trichloroethylene | 2.00E+00 | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 75014 | Vinyl chloride | 6.50E+01 | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 1330207 | Xylenes | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 98862 | Acetophenone | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 91203 | Naphthalene | 9.60E+00 | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 91576 | Methylnaphthalene, 2- | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 92524 | Biphenyl, 1,1- | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 208968 | Acenaphthylene | 3.20E+00 | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 83329 | Acenaphthene | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 86737 | Fluorene | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 85018 | Phenanthrene | 3.10E+00 | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 120127 | Anthracene | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| C9-C18 | C9-C18 Aliphatics | 4.95E+01 | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| C11-C22 | C11-C22 Aromatics | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| C5-C8 | C5-C8 Aliphatics | 1.64E+02 | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| C9-C10 | C9-C10 Aromatics | | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| C9-C12 | C9-C12 Aliphatics | 2.67E+01 | 15 | 74.98 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |

Note:
1) Default soil parameters from table 7 of User's Guide for Evaluating Subsurface Vapor Intrusion into Building (U.S. EPA June 19, 2003) were used for soil water filled porosity ($\theta_w$), soil organic carbon fraction ($f_{oc}$), soil total porosity (n), and soil dry bulk density ($\rho_b$).

Appendix C.4
Johnson & Ettinger Model - Chemical Properties Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - CT
Southwest Prperties, Wells G&H Superfund Site, Operable Unit 2
Whitney Barrel

| Chemical CAS No. | Chemical | 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, $T_R$ (°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, $K_{oc}$ ($cm^3/g$) | Pure component water solubility, S (mg/L) | Unit risk factor, URF $(\mu g/m^3)^{-1}$ | Reference conc., RfC ($mg/m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 7.80E-02 | 8.80E-06 | 1.72E-02 | 25 | 7,136 | 347.24 | 545.00 | 1.10E+02 | 1.33E+03 | N/A | 2.2E+00 |
| 76131 | Trichloro-1,2,2-triflouroethane, 1, | 2.88E-02 | 8.07E-06 | 5.17E-01 | 25 | 1,326 | 320.70 | 481.05 | 2.25E+02 | 1.70E+02 | N/A | 3.0E+01 |
| 79005 | 1,1,2-Trichloroethane | 7.80E-02 | 8.80E-06 | 9.12E-04 | 25 | 8,322 | 386.15 | 602.00 | 5.01E+01 | 4.42E+03 | 1.6E-05 | 2.2E+00 |
| 75343 | 1,1-Dichloroethane | 7.42E-02 | 1.05E-05 | 5.61E-03 | 25 | 6,895 | 330.55 | 523.00 | 3.16E+01 | 5.06E+03 | N/A | 5.0E-01 |
| 75354 | 1,1-Dichloroethylene | 9.00E-02 | 1.04E-05 | 2.61E-02 | 25 | 6,247 | 304.75 | 576.05 | 5.89E+01 | 2.25E+03 | N/A | 2.0E-01 |
| 120821 | 1,2,4-Trichlorobenzene | 3.00E-02 | 8.23E-06 | 1.42E-03 | 25 | 10,471 | 486.15 | 725.00 | 1.78E+03 | 3.00E+02 | N/A | 2.0E-01 |
| 95501 | 1,2-Dichlorobenzene | 6.88E-02 | 9.41E-06 | 1.62E-06 | 25 | 1,223 | 465.00 | 697.50 | 5.34E+01 | 2.77E+04 | N/A | N/A |
| 541731 | Dichlorobenzene, 1,3- | 4.14E-02 | 8.85E-06 | 4.70E-03 | 25 | 1,242 | 446.00 | 683.96 | 1.70E+02 | 6.88E+01 | N/A | N/A |
| 106467 | 1,4-Dichlorobenzene | 6.90E-02 | 7.90E-06 | 2.43E-03 | 25 | 9,271 | 447.21 | 684.75 | 6.17E+02 | 7.38E+01 | N/A | 8.0E-01 |
| 78933 | Butanone, 2- (MEK) | 8.08E-02 | 9.80E-06 | 5.60E-05 | 25 | 1,311 | 352.50 | 528.75 | 3.83E+00 | 2.23E+05 | N/A | N/A |
| 67641 | Acetone | 1.24E-01 | 1.14E-05 | 3.88E-05 | 25 | 6,955 | 329.20 | 508.10 | 5.75E-01 | 1.00E+06 | N/A | N/A |
| 71432 | Benzene | 8.80E-02 | 9.80E-06 | 5.56E-03 | 25 | 7,342 | 353.24 | 562.16 | 5.89E+01 | 1.75E+03 | 7.8E-06 | 3.0E-02 |
| 74839 | Bromomethane | 7.28E-02 | 1.21E-05 | 6.22E-03 | 25 | 1,362 | 276.50 | 414.75 | 1.43E+01 | 1.52E+04 | N/A | 5.0E-03 |
| 75150 | Carbon Disulfide | 1.04E-01 | 1.29E-05 | 1.27E-02 | 25 | 0 | 319.00 | 552.00 | 5.14E+01 | 2.67E+03 | N/A | 7.0E-01 |
| 108907 | Chlorobenzene | 7.30E-02 | 8.70E-06 | 3.71E-03 | 25 | 8,410 | 404.87 | 632.40 | 2.19E+02 | 4.72E+02 | N/A | 6.0E-02 |
| 75003 | Ethyl Chloride | 1.26E-01 | 6.50E-06 | 8.67E-03 | 25 | 1,355 | 249.00 | 373.50 | 1.43E+01 | 5.32E+03 | N/A | 1.0E+01 |
| 67663 | Chloroform | 1.04E-01 | 1.00E-05 | 3.66E-03 | 25 | 6,988 | 334.32 | 536.40 | 3.98E+01 | 7.92E+03 | 2.3E-05 | 5.0E-02 |
| 156592 | cis-1,2-Dichloroethylene | 7.36E-02 | 1.13E-05 | 4.07E-03 | 25 | 7,192 | 333.65 | 544.00 | 3.55E+01 | 3.50E+03 | N/A | 2.0E-01 |
| 110827 | Cyclohexane | 8.00E-02 | 9.00E-06 | 2.00E+00 | 25 | 1,309 | 353.85 | 530.78 | 1.60E+02 | 5.50E+01 | #N/A | #N/A |
| 100414 | Ethylbenzene | 7.50E-02 | 7.80E-06 | 7.88E-03 | 25 | 8,501 | 409.34 | 617.20 | 3.63E+02 | 1.69E+02 | N/A | 1.0E+00 |
| 98828 | Isopropylbenzene | 6.50E-02 | 7.83E-06 | 1.47E-02 | 25 | 1,259 | 425.40 | 631.01 | 9.31E+03 | 5.60E+01 | N/A | 4.0E-01 |
| 108872 | Methyl cyclohexane | 9.86E-02 | 8.52E-06 | 4.23E-01 | 25 | 1,296 | 373.90 | 560.85 | 2.68E+02 | 1.40E+01 | N/A | 3.0E+00 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 1.02E-01 | 1.05E-05 | 5.87E-04 | 25 | 1,324 | 328.36 | 497.11 | 3.84E+01 | 5.10E+04 | N/A | 3.0E+00 |
| 75092 | Methylene chloride | 1.01E-01 | 1.17E-05 | 2.19E-03 | 25 | 0 | 313.00 | 510.00 | 1.17E+01 | 1.30E+04 | 4.7E-07 | 3.0E+00 |
| 127184 | Tetrachloroethylene | 7.20E-02 | 8.20E-06 | 1.84E-02 | 25 | 8,288 | 394.40 | 620.20 | 1.55E+02 | 2.00E+02 | 5.9E-06 | N/A |
| 108883 | Toluene | 8.70E-02 | 8.60E-06 | 6.63E-03 | 25 | 7,930 | 383.78 | 591.79 | 1.82E+02 | 5.26E+02 | N/A | 4.0E-01 |
| 156605 | trans-1,2-Dichloroethylene | 7.07E-02 | 1.19E-05 | 9.39E-03 | 25 | 1,333 | 320.85 | 516.50 | 5.25E+01 | 6.30E+03 | N/A | 2.0E-01 |
| 79016 | Trichloroethylene | 7.90E-02 | 9.10E-06 | 1.03E-02 | 25 | 7,505 | 360.36 | 544.20 | 1.66E+02 | 1.10E+03 | N/A | 4.0E-02 |
| 75014 | Vinyl chloride | 1.06E-01 | 1.23E-05 | 2.71E-02 | 25 | 0 | 259.25 | 432.00 | 1.86E+01 | 2.76E+03 | 8.8E-06 | 1.0E-01 |
| 1330207 | Xylenes | 7.69E-02 | 8.44E-06 | 6.73E-06 | 25 | 1,264 | 417.40 | 616.21 | 2.41E+02 | 2.20E+02 | N/A | 1.0E-01 |
| 98862 | Acetophenone | 6.00E-02 | 8.73E-06 | 1.02E-05 | 25 | 1,214 | 475.00 | 712.50 | 4.62E+01 | 6.13E+03 | N/A | N/A |
| 91203 | Naphthalene | 5.90E-02 | 7.50E-06 | 4.83E-04 | 25 | 10,373 | 491.14 | 748.40 | 2.00E+03 | 3.10E+01 | N/A | 3.0E-03 |
| 91576 | Methylnaphthalene, 2- | 4.84E-02 | 7.75E-06 | 1.01E-03 | 25 | 1,169 | 514.05 | 761.01 | 8.51E+03 | 2.46E+01 | N/A | 3.0E-03 |
| 92524 | Biphenyl, 1,1'- | 4.04E-02 | 8.15E-06 | 3.03E-04 | 25 | 1,149 | 529.10 | 793.65 | 6.25E+03 | 6.94E+00 | N/A | N/A |
| 208968 | Acenaphthylene | 4.43E-02 | 7.44E-06 | 2.80E-04 | 25 | 1,118 | 553.00 | 792.01 | 4.79E+03 | 3.93E+00 | N/A | 3.0E-03 |
| 83329 | Acenaphthene | 4.21E-02 | 7.69E-06 | 1.55E-04 | 25 | 12,155 | 550.54 | 803.15 | 7.08E+03 | 4.24E+00 | N/A | 3.0E-03 |
| 86737 | Fluorene | 3.63E-02 | 7.88E-06 | 9.41E-08 | 25 | 12,666 | 570.44 | 870.00 | 7.71E+03 | 1.90E+00 | N/A | 3.0E-03 |
| 85018 | Phenanthrene | 3.30E-02 | 7.47E-06 | 1.30E-04 | 25 | 1,057 | 613.00 | 869.01 | 1.41E+04 | 1.28E+00 | N/A | 3.0E-03 |
| 120127 | Anthracene | 3.24E-02 | 7.74E-06 | 6.51E-05 | 25 | 13,121 | 615.18 | 873.00 | 2.95E+04 | 4.34E-02 | N/A | 3.0E-03 |
| C9-C18 | C9-C18 Aliphatics | 6.00E-02 | 1.00E-05 | 1.66E+00 | 25 | NA | NA | NA | 6.80E+05 | 1.00E+01 | N/A | 2.0E-01 |
| C11-C22 | C11-C22 Aromatics | 6.00E-02 | 1.00E-05 | 7.32E-04 | 25 | NA | NA | NA | 5.00E+03 | 5.80E+03 | N/A | 5.0E-02 |
| C5-C8 | C5-C8 Aliphatics | 6.00E-02 | 1.00E-05 | 1.30E+00 | 25 | NA | NA | NA | 2.27E+03 | 1.10E+04 | N/A | 2.0E-01 |
| C9-C10 | C9-C10 Aromatics | 6.00E-02 | 1.00E-05 | 7.92E-03 | 25 | NA | NA | NA | 1.78E+03 | 5.10E+04 | N/A | 5.0E-02 |
| C9-C12 | C9-C12 Aliphatics | 6.00E-02 | 1.00E-05 | 1.56E+00 | 25 | NA | NA | NA | 1.50E+05 | 7.00E+01 | N/A | 2.0E-01 |

Appendix C.4
Johnson & Ettinger Model - Calculations Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - CT
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Whitney Barrel

| | | Source-building separation, $L_T$ (cm) | Vadose zone soil air-filled porosity, $\theta_a^V$ ($cm^3/cm^3$) | Vadose zone soil effective total fluid saturation, $S_{we}$ ($cm^3/cm^3$) | 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, Xcrack (cm) | Bldg. ventilation rate, $Q_{building}$ ($cm^3/s$) | Area of enclosed space below grade, $A_B$ ($cm^2$) | Crack-to-total area ratio, $\eta$ (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 ve. groundwat temperature, $H'_{TS}$ (unitless) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 7,885 | 8.50E-03 | 3.66E-01 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,436 | 4.55E-01 | 1.96E+01 |
| 79005 | 1,1,2-Trichloroethane | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 9,572 | 3.88E-04 | 1.67E-02 |
| 75343 | 1,1-Dichloroethane | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 7,450 | 2.88E-03 | 1.24E-01 |
| 75354 | 1,1-Dichloroethylene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 6,392 | 1.47E-02 | 6.34E-01 |
| 120821 | 1,2,4-Trichlorobenzene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 13,230 | 4.35E-04 | 1.87E-02 |
| 95501 | 1,2-Dichlorobenzene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,521 | 1.41E-06 | 6.09E-05 |
| 541731 | Dichlorobenzene, 1,3- | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,503 | 4.11E-03 | 1.77E-01 |
| 106467 | 1,4-Dichlorobenzene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 11,243 | 8.59E-04 | 3.83E-02 |
| 78933 | Butanone, 2- (MEK) | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 7,486 | 4.90E-05 | 2.11E-03 |
| 67641 | Acetone | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 7,559 | 1.97E-05 | 8.50E-04 |
| 71432 | Benzene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 8,122 | 2.69E-03 | 1.16E-01 |
| 74839 | Bromomethane | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,337 | 5.52E-03 | 2.38E-01 |
| 75150 | Carbon Disulfide | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 0 | 1.27E-02 | 5.47E-01 |
| 108907 | Chlorobenzene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 9,803 | 1.54E-03 | 6.65E-02 |
| 75003 | Ethyl Chloride | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,201 | 7.79E-03 | 3.35E-01 |
| 67663 | Chloroform | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 7,554 | 1.86E-03 | 8.02E-02 |
| 156592 | cis-1,2-Dichloroethylene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 7,734 | 2.04E-03 | 8.77E-02 |
| 110827 | Cyclohexane | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,486 | 1.75E+00 | 7.54E+01 |
| 100414 | Ethylbenzene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 10,155 | 3.18E-03 | 1.37E-01 |
| 98828 | Isopropylbenzene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,540 | 1.28E-02 | 5.51E-01 |
| 108872 | Methyl cyclohexane | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,505 | 3.70E-01 | 1.59E+01 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,447 | 5.16E-04 | 2.22E-02 |
| 75092 | Methylene chloride | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 0 | 2.19E-03 | 9.43E-02 |
| 127184 | Tetrachloroethylene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 9,553 | 7.83E-03 | 3.37E-01 |
| 108883 | Toluene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 9,154 | 2.92E-03 | 1.26E-01 |
| 156605 | trans-1,2-Dichloroethylene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,417 | 8.27E-03 | 3.56E-01 |
| 79016 | Trichloroethylene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 8,557 | 4.79E-03 | 2.06E-01 |
| 75014 | Vinyl chloride | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 0 | 2.71E-02 | 1.17E+00 |
| 1330207 | Xylenes | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,542 | 5.86E-06 | 2.52E-04 |
| 98862 | Acetophenone | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,518 | 8.91E-06 | 3.83E-04 |
| 91203 | Naphthalene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 12,913 | 1.52E-04 | 6.55E-03 |
| 91576 | Methylnaphthalene, 2- | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,506 | 8.86E-04 | 3.81E-02 |
| 92524 | Biphenyl, 1,1'- | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,472 | 2.66E-04 | 1.14E-02 |
| 208968 | Acenaphthylene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,513 | 2.45E-04 | 1.05E-02 |
| 83329 | Acenaphthene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 16,123 | 3.67E-06 | 1.58E-03 |
| 86737 | Fluorene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 16,235 | 2.20E-06 | 9.48E-04 |
| 85018 | Phenanthrene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 1,479 | 1.14E-04 | 4.90E-03 |
| 120127 | Anthracene | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | 18,353 | 1.26E-05 | 5.43E-04 |
| C9-C18 | C9-C18 Aliphatics | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | NA | 8.26E-01 | 3.56E+01 |
| C11-C22 | C11-C22 Aromatics | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | NA | 3.60E-04 | 1.55E-02 |
| C5-C8 | C5-C8 Aliphatics | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | NA | 6.48E-01 | 2.79E+01 |
| C9-C10 | C9-C10 Aromatics | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | NA | 3.96E-03 | 1.70E-01 |
| C9-C12 | C9-C12 Aliphatics | 59.98 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 1.72E+04 | 2.52E+06 | 9.50E+06 | 1.30E-04 | 15 | NA | 7.60E-01 | 3.36E+01 |

Appendix C.4
Johnson & Ettinger Model - Calculations Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - CT
Southwest Properties, Wells G&H Superfund Site, Oper.
Whitney Barrel

| | | Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (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, $D^{eff}_t$ ($cm^2/s$) | Diffusion path length, $L_d$ (cm) | Convection path length, $L_v$ (cm) | Source vapor conc., $C_{source}$ ($\mu g/m^3$) | Crack radius, $r_{crack}$ (cm) | Average vapor flow rate into bldg., $Q_{soil}$ ($cm^3/s$) | Crack effective diffusion coefficient, $D^{crack}$ ($cm^2/s$) | Area of crack, $A_{crack}$ ($cm^2$) | Exponent of equivalent foundation Peclet number, exp(Pe$^f$) (unitless) | Infinite source indoor attenuation coefficient, $\alpha$ (unitless) | Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$) | Unit risk factor, URF ($\mu g/m^3)^{-1}$ | Reference conc., RfC ($mg/m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 1.75E-04 | 4.75E-04 | 4.46E-04 | 4.65E-04 | 59.98 | 15 | 1.69E+03 | 0.10 | 2.74E+01 | 4.75E-04 | 1.23E+03 | 4.38E+304 | 7.92E-06 | 1.34E-02 | N/A | 2.2E+00 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | 1.75E-04 | 1.75E-04 | 1.63E-04 | 1.71E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 1.75E-04 | 1.23E+03 | #NUM! | 5.40E-06 | N/A | N/A | 3.0E+01 |
| 79005 | 1,1,2-Trichloroethane | 1.75E-04 | 5.24E-04 | 4.95E-04 | 5.15E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 5.24E-04 | 1.23E+03 | 8.56E+275 | 8.14E-06 | N/A | 1.6E-05 | 2.2E+00 |
| 75343 | 1,1-Dichloroethane | 1.75E-04 | 4.58E-04 | 4.29E-04 | 4.49E-04 | 59.98 | 15 | 3.15E+03 | 0.10 | 2.74E+01 | 4.58E-04 | 1.23E+03 | #NUM! | 7.84E-06 | 2.47E-02 | N/A | 5.0E-01 |
| 75354 | 1,1-Dichloroethylene | 1.75E-04 | 5.47E-04 | 5.12E-04 | 5.36E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 5.47E-04 | 1.23E+03 | 3.62E+264 | 8.22E-06 | N/A | N/A | 2.0E-01 |
| 120821 | 1,2,4-Trichlorobenzene | 1.75E-04 | 2.25E-04 | 2.14E-04 | 2.22E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 2.25E-04 | 1.23E+03 | #NUM! | 6.10E-06 | N/A | N/A | 2.0E-01 |
| 95501 | 1,2-Dichlorobenzene | 1.75E-04 | 1.56E-02 | 1.60E-02 | 1.57E-02 | 59.98 | 15 | 4.62E-01 | 0.10 | 2.74E+01 | 1.56E-02 | 1.23E+03 | 1.91E+09 | 1.06E-05 | 4.86E-06 | N/A | N/A |
| 541731 | Dichlorobenzene, 1,3- | 1.75E-04 | 2.56E-04 | 2.40E-04 | 2.51E-04 | 59.98 | 15 | 9.02E+02 | 0.10 | 2.74E+01 | 2.56E-04 | 1.23E+03 | #NUM! | 6.43E-06 | 5.80E-03 | N/A | N/A |
| 106467 | 1,4-Dichlorobenzene | 1.75E-04 | 4.38E-04 | 4.12E-04 | 4.30E-04 | 59.98 | 15 | 1.57E+03 | 0.10 | 2.74E+01 | 4.38E-04 | 1.23E+03 | #NUM! | 7.75E-06 | 1.22E-02 | N/A | 8.0E-01 |
| 78933 | Butanone, 2- (MEK) | 1.75E-04 | 9.45E-04 | 9.27E-04 | 9.40E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 9.45E-04 | 1.23E+03 | 1.18E+153 | 9.18E-06 | N/A | N/A | N/A |
| 67641 | Acetone | 1.75E-04 | 2.07E-03 | 2.06E-03 | 2.07E-03 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 2.07E-03 | 1.23E+03 | 9.18E+69 | 1.00E-05 | N/A | N/A | N/A |
| 71432 | Benzene | 1.75E-04 | 5.42E-04 | 5.07E-04 | 5.30E-04 | 59.98 | 15 | 2.46E+03 | 0.10 | 2.74E+01 | 5.42E-04 | 1.23E+03 | 1.61E+267 | 8.20E-06 | 2.02E-02 | 7.8E-06 | 3.0E-02 |
| 74839 | Bromomethane | 1.75E-04 | 4.46E-04 | 4.18E-04 | 4.37E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 4.46E-04 | 1.23E+03 | #NUM! | 7.79E-06 | N/A | N/A | 5.0E-03 |
| 75150 | Carbon Disulfide | 1.75E-04 | 6.30E-04 | 5.92E-04 | 6.19E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 6.30E-04 | 1.23E+03 | 6.02E+228 | 8.50E-06 | N/A | N/A | 7.0E-01 |
| 108907 | Chlorobenzene | 1.75E-04 | 4.55E-04 | 4.27E-04 | 4.46E-04 | 59.98 | 15 | 3.26E+02 | 0.10 | 2.74E+01 | 4.55E-04 | 1.23E+03 | #NUM! | 7.83E-06 | 2.55E-03 | N/A | 6.0E-02 |
| 75003 | Ethyl Chloride | 1.75E-04 | 7.66E-04 | 7.18E-04 | 7.49E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 7.66E-04 | 1.23E+03 | 1.14E+189 | 8.83E-06 | N/A | N/A | 1.0E+01 |
| 67663 | Chloroform | 1.75E-04 | 6.43E-04 | 6.02E-04 | 6.29E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 6.43E-04 | 1.23E+03 | 1.75E+225 | 8.53E-06 | N/A | 2.3E-05 | 5.0E-02 |
| 156592 | cis-1,2-Dichloroethylene | 1.75E-04 | 4.59E-04 | 4.30E-04 | 4.49E-04 | 59.98 | 15 | 8.64E+03 | 0.10 | 2.74E+01 | 4.59E-04 | 1.23E+03 | #NUM! | 7.85E-06 | 6.71E-02 | N/A | 2.0E-01 |
| 110827 | Cyclohexane | 1.75E-04 | 4.85E-04 | 4.53E-04 | 4.75E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 4.85E-04 | 1.23E+03 | 3.16E+296 | 7.97E-06 | N/A | #N/A | #N/A |
| 100414 | Ethylbenzene | 1.75E-04 | 4.60E-04 | 4.31E-04 | 4.51E-04 | 59.98 | 15 | 1.38E+03 | 0.10 | 2.74E+01 | 4.60E-04 | 1.23E+03 | #NUM! | 7.85E-06 | 1.09E-02 | N/A | 1.0E+00 |
| 98828 | Isopropylbenzene | 1.75E-04 | 3.95E-04 | 3.70E-04 | 3.87E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 3.95E-04 | 1.23E+03 | #NUM! | 7.51E-06 | N/A | N/A | 4.0E-01 |
| 108872 | Methyl cyclohexane | 1.75E-04 | 5.98E-04 | 5.59E-04 | 5.85E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 5.98E-04 | 1.23E+03 | 1.50E+242 | 8.39E-06 | N/A | N/A | 3.0E+00 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 1.75E-04 | 6.67E-04 | 6.28E-04 | 6.54E-04 | 59.98 | 15 | 2.64E+03 | 0.10 | 2.74E+01 | 6.67E-04 | 1.23E+03 | 9.48E+216 | 8.60E-06 | 2.44E-02 | N/A | 3.0E+00 |
| 75092 | Methylene chloride | 1.75E-04 | 6.24E-04 | 5.85E-04 | 6.11E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 6.24E-04 | 1.23E+03 | 6.71E+231 | 8.47E-06 | N/A | 4.7E-07 | 3.0E+00 |
| 127184 | Tetrachloroethylene | 1.75E-04 | 4.39E-04 | 4.11E-04 | 4.30E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 4.39E-04 | 1.23E+03 | #NUM! | 7.75E-06 | N/A | 5.8E-06 | N/A |
| 108883 | Toluene | 1.75E-04 | 5.34E-04 | 5.00E-04 | 5.23E-04 | 59.98 | 15 | 3.06E+04 | 0.10 | 2.74E+01 | 5.34E-04 | 1.23E+03 | 1.10E+271 | 8.17E-06 | 2.52E-01 | N/A | 4.0E-01 |
| 156605 | trans-1,2-Dichloroethylene | 1.75E-04 | 4.32E-04 | 4.04E-04 | 4.23E-04 | 59.98 | 15 | 1.53E+03 | 0.10 | 2.74E+01 | 4.32E-04 | 1.23E+03 | #NUM! | 7.71E-06 | 1.18E-02 | N/A | 2.0E-01 |
| 79016 | Trichloroethylene | 1.75E-04 | 4.83E-04 | 4.52E-04 | 4.73E-04 | 59.98 | 15 | 4.13E+02 | 0.10 | 2.74E+01 | 4.83E-04 | 1.23E+03 | 3.77E+299 | 7.96E-06 | 3.28E-03 | N/A | 4.0E-02 |
| 75014 | Vinyl chloride | 1.75E-04 | 5.43E-04 | 5.02E-04 | 5.30E-04 | 59.98 | 15 | 9.92E+04 | 0.10 | 2.74E+01 | 5.43E-04 | 1.23E+03 | 8.43E+224 | 8.53E-06 | 8.46E-01 | 8.8E-06 | 1.0E-01 |
| 1330207 | Xylenes | 1.75E-04 | 3.75E-03 | 3.81E-03 | 3.77E-03 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 3.75E-03 | 1.23E+03 | 4.03E+38 | 1.04E-05 | N/A | N/A | 1.0E-01 |
| 98862 | Acetophenone | 1.75E-04 | 2.60E-03 | 2.64E-03 | 2.61E-03 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 2.60E-03 | 1.23E+03 | 4.82E+55 | 1.02E-05 | N/A | N/A | N/A |
| 91203 | Naphthalene | 1.75E-04 | 4.70E-04 | 4.50E-04 | 4.64E-04 | 59.98 | 15 | 6.29E+01 | 0.10 | 2.74E+01 | 4.70E-04 | 1.23E+03 | 9.67E+307 | 7.92E-06 | 4.98E-04 | N/A | 3.0E-03 |
| 91576 | Methylnaphthalene, 2- | 1.75E-04 | 3.13E-04 | 2.95E-04 | 3.07E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 3.13E-04 | 1.23E+03 | #NUM! | 6.95E-06 | N/A | N/A | 3.0E-03 |
| 92524 | Biphenyl, 1,1'- | 1.75E-04 | 3.15E-04 | 3.01E-04 | 3.10E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 3.15E-04 | 1.23E+03 | #NUM! | 6.88E-06 | N/A | N/A | N/A |
| 208968 | Acenaphthylene | 1.75E-04 | 3.38E-04 | 3.22E-04 | 3.33E-04 | 59.98 | 15 | 3.37E+01 | 0.10 | 2.74E+01 | 3.38E-04 | 1.23E+03 | #NUM! | 7.15E-06 | 2.41E-04 | N/A | 3.0E-03 |
| 83329 | Acenaphthene | 1.75E-04 | 7.33E-04 | 7.31E-04 | 7.33E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 7.33E-04 | 1.23E+03 | 2.13E+197 | 8.79E-06 | N/A | N/A | 3.0E-03 |
| 86737 | Fluorene | 1.75E-04 | 8.16E-01 | 6.39E-01 | 6.23E-01 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 8.16E-01 | 1.23E+03 | 1.50E+00 | 3.24E-05 | N/A | N/A | 3.0E-03 |
| 85018 | Phenanthrene | 1.75E-04 | 3.50E-04 | 3.41E-04 | 3.47E-04 | 59.98 | 15 | 1.52E+01 | 0.10 | 2.74E+01 | 3.50E-04 | 1.23E+03 | #NUM! | 7.25E-06 | 1.10E-04 | N/A | 3.0E-03 |
| 120127 | Anthracene | 1.75E-04 | 1.60E-03 | 1.62E-03 | 1.60E-03 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 1.60E-03 | 1.23E+03 | 5.14E+90 | 9.61E-06 | N/A | N/A | 3.0E-03 |
| C9-C18 | C9-C18 Aliphatics | 1.75E-04 | 3.64E-04 | 3.40E-04 | 3.56E-04 | 59.98 | 15 | 1.76E+06 | 0.10 | 2.74E+01 | 3.64E-04 | 1.23E+03 | #NUM! | 7.32E-06 | 1.29E+01 | N/A | 2.0E-01 |
| C11-C22 | C11-C22 Aromatics | 1.75E-04 | 4.27E-04 | 4.05E-04 | 4.20E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 4.27E-04 | 1.23E+03 | #NUM! | 7.70E-06 | N/A | N/A | 5.0E-02 |
| C5-C8 | C5-C8 Aliphatics | 1.75E-04 | 3.64E-04 | 3.40E-04 | 3.56E-04 | 59.98 | 15 | 4.58E+06 | 0.10 | 2.74E+01 | 3.64E-04 | 1.23E+03 | #NUM! | 7.32E-06 | 3.35E+01 | N/A | 2.0E-01 |
| C9-C10 | C9-C10 Aromatics | 1.75E-04 | 3.69E-04 | 3.46E-04 | 3.62E-04 | 59.98 | 15 | N/A | 0.10 | 2.74E+01 | 3.69E-04 | 1.23E+03 | #NUM! | 7.35E-06 | N/A | N/A | 5.0E-02 |
| C9-C12 | C9-C12 Aliphatics | 1.75E-04 | 3.64E-04 | 3.40E-04 | 3.56E-04 | 59.98 | 15 | 8.95E+05 | 0.10 | 2.74E+01 | 3.64E-04 | 1.23E+03 | #NUM! | 7.32E-06 | 6.65E+00 | N/A | 2.0E-01 |

Appendix C.4
Johnson & Ettinger Model - Results
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - CT
Southwest Prperties, Wells G&H Superfund Site, Operable Unit 2
Whitney Barrel

| | | 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) |
| 71556 | 1,1,1-Trichloroethane | NA | NA | NA | 1.33E+06 | NA | NA | 1.2E-06 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | NA | NA | NA | 1.70E+05 | NA | NA | NA |
| 79005 | 1,1,2-Trichloroethane | NA | NA | NA | 4.42E+06 | NA | NA | NA |
| 75343 | 1,1-Dichloroethane | NA | NA | NA | 5.06E+06 | NA | NA | 9.9E-06 |
| 75354 | 1,1-Dichloroethylene | NA | NA | NA | 2.25E+06 | NA | NA | NA |
| 120821 | 1,2,4-Trichlorobenzene | NA | NA | NA | 3.00E+05 | NA | NA | NA |
| 95501 | 1,2-Dichlorobenzene | NA | NA | NA | 2.77E+07 | NA | NA | NA |
| 541731 | Dichlorobenzene, 1,3- | NA | NA | NA | 6.88E+04 | NA | NA | NA |
| 106467 | 1,4-Dichlorobenzene | NA | NA | NA | 7.38E+04 | NA | NA | 3.1E-06 |
| 78933 | Butanone, 2- (MEK) | NA | NA | NA | 2.23E+08 | NA | NA | NA |
| 67641 | Acetone | NA | NA | NA | 1.00E+09 | NA | NA | NA |
| 71432 | Benzene | NA | NA | NA | 1.75E+06 | NA | 4.0E-09 | 1.3E-04 |
| 74839 | Bromomethane | NA | NA | NA | 1.52E+07 | NA | NA | NA |
| 75150 | Carbon Disulfide | NA | NA | NA | 2.67E+06 | NA | NA | NA |
| 108907 | Chlorobenzene | NA | NA | NA | 4.72E+05 | NA | NA | 8.5E-06 |
| 75003 | Ethyl Chloride | NA | NA | NA | 5.32E+06 | NA | NA | NA |
| 67663 | Chloroform | NA | NA | NA | 7.92E+06 | NA | NA | NA |
| 156592 | cis-1,2-Dichloroethylene | NA | NA | NA | 3.50E+06 | NA | NA | 6.7E-05 |
| 110827 | Cyclohexane | NA | NA | NA | 5.50E+04 | NA | NA | NA |
| 100414 | Ethylbenzene | NA | NA | NA | 1.69E+05 | NA | NA | 2.2E-06 |
| 98828 | Isopropylbenzene | NA | NA | NA | 5.60E+04 | NA | NA | NA |
| 108872 | Methyl cyclohexane | NA | NA | NA | 1.40E+04 | NA | NA | NA |
| 1634044 | Methyl-Tertiary-Butyl Ether | NA | NA | NA | 5.10E+07 | NA | NA | 1.6E-06 |
| 75092 | Methylene chloride | NA | NA | NA | 1.30E+07 | NA | NA | NA |
| 127184 | Tetrachloroethylene | NA | NA | NA | 2.00E+05 | NA | NA | NA |
| 108883 | Toluene | NA | NA | NA | 5.26E+05 | NA | NA | 1.3E-04 |
| 156605 | trans-1,2-Dichloroethylene | NA | NA | NA | 6.30E+06 | NA | NA | 1.2E-05 |
| 79016 | Trichloroethylene | NA | NA | NA | 1.10E+06 | NA | NA | 1.6E-05 |
| 75014 | Vinyl chloride | NA | NA | NA | 2.76E+06 | NA | 1.9E-07 | 1.7E-03 |
| 1330207 | Xylenes | NA | NA | NA | 2.20E+05 | NA | NA | NA |
| 98862 | Acetophenone | NA | NA | NA | 6.13E+06 | NA | NA | NA |
| 91203 | Naphthalene | NA | NA | NA | 3.10E+04 | NA | NA | 3.3E-05 |
| 91576 | Methylnaphthalene, 2- | NA | NA | NA | 2.46E+04 | NA | NA | NA |
| 92524 | Biphenyl, 1,1'- | NA | NA | NA | 6.94E+03 | NA | NA | NA |
| 208968 | Acenaphthylene | NA | NA | NA | 3.93E+03 | NA | NA | 1.6E-05 |
| 83329 | Acenaphthene | NA | NA | NA | 4.24E+03 | NA | NA | NA |
| 86737 | Fluorene | NA | NA | NA | 1.90E+03 | NA | NA | NA |
| 85018 | Phenanthrene | NA | NA | NA | 1.28E+03 | NA | NA | 7.3E-06 |
| 120127 | Anthracene | NA | NA | NA | 4.34E+01 | NA | NA | NA |
| C9-C18 | C9-C18 Aliphatics | NA | NA | NA | 1.00E+04 | NA | NA | 1.3E-02 |
| C11-C22 | C11-C22 Aromatics | NA | NA | NA | 5.80E+06 | NA | NA | NA |
| C5-C8 | C5-C8 Aliphatics | NA | NA | NA | 1.10E+07 | NA | NA | 3.4E-02 |
| C9-C10 | C9-C10 Aromatics | NA | NA | NA | 5.10E+07 | NA | NA | NA |
| C9-C12 | C9-C12 Aliphatics | NA | NA | NA | 7.00E+04 | NA | NA | 6.5E-03 |

| | 95% UCL Cancer Risk | 95% UCL HI |
|---|---|---|
| TOTAL: | 2E-07 | 6E-02 |

[ ] = Cancer risk > 1E-05 or HQ/HI>1E+00

END

Appendix C.4
Johnson & Ettinger Model - Data Entry Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - RME
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Murphy Waste Oil

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

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) | Chemical | ENTER 95% UCL groundwater conc., $C_w$ (µg/L) | ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (15 or 200 cm) | ENTER Depth below grade to water table, LWT (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, $T_S$ (°C) | ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR Note | ENTER User-defined vadose zone soil vapor permeability, $k_v$ ($cm^2$) | ENTER Vadose zone soil dry bulk density, $\rho_b^V$ (g/$cm^3$) | ENTER Vadose zone soil total porosity, $n^V$ (unitless) | ENTER Vadose zone soil water-filled porosity, $\theta_w^V$ ($cm^3/cm^3$)[1] | 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) | ENTER Exposure time ET (hrs/day) | ENTER Coversion factor CF (hrs/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 5.27E+01 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 79005 | 1,1,2-Trichloroethane | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 75343 | 1,1-Dichloroethane | 7.24E+01 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 75354 | 1,1-Dichloroethylene | 9.00E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 120821 | 1,2,4-Trichlorobenzene | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 95501 | 1,2-Dichlorobenzene | 1.00E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 541731 | Dichlorobenzene, 1,3- | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 106467 | 1,4-Dichlorobenzene | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 78933 | Butanone, 2- (MEK) | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 67641 | Acetone | 2.42E+01 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 71432 | Benzene | 9.64E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 74839 | Bromomethane | 1.00E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 75150 | Carbon Disulfide | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 108907 | Chlorobenzene | 1.00E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 75003 | Ethyl Chloride | 3.05E+01 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 67663 | Chloroform | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 156592 | cis-1,2-Dichloroethylene | 7.43E+02 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 110827 | Cyclohexane | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 100414 | Ethylbenzene | 7.81E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 98828 | Isopropylbenzene | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 108872 | Methyl cyclohexane | 7.00E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 1634044 | Methyl-Tertiary-Butyl Ether | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 75092 | Methylene chloride | 1.59E+01 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 127184 | Tetrachloroethylene | 7.00E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 108883 | Toluene | 1.71E+01 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 156605 | trans-1,2-Dichloroethylene | 1.26E+01 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 79016 | Trichloroethylene | 3.31E+01 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 75014 | Vinyl chloride | 1.86E+02 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 1330207 | Xylenes | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 98862 | Acetophenone | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 91203 | Naphthalene | 9.09E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 91576 | Methylnaphthalene, 2- | 8.69E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 92524 | Biphenyl, 1,1- | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 208968 | Acenaphthylene | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 83329 | Acenaphthene | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 86737 | Fluorene | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 85018 | Phenanthrene | 5.74E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 120127 | Anthracene | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| C9-C18 | C9-C18 Aliphatics | 9.51E+02 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| C11-C22 | C11-C22 Aromatics | 4.19E+02 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| C5-C8 | C5-C8 Aliphatics | 1.15E+02 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| C9-C10 | C9-C10 Aromatics | 7.18E+01 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| C9-C12 | C9-C12 Aliphatics | 3.30E+01 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |

Note:
1) Default soil parameters from table 7 of User's Guide for Evaluating Subsurface Vapor Intrusion into Building (U.S. EPA June 19, 2003) were used for soil water filled porosity ($\theta_w$), soil organic carbon fraction ($f_{oc}$), soil total porosity (n), and soil dry bulk density ($\rho_b$).

Appendix C.4
Johnson & Ettinger Model - Chemical Properties Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - RME
Southwest Prperties, Wells G&H Superfund Site, Operable Unit 2
Murphy Waste Oil

| Chemical CAS No. | Chemical | 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, $T_R$ (°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, $K_{oc}$ ($cm^3/g$) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu g/m^3)^{-1}$ | Reference conc., RfC ($mg/m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 7.80E-02 | 8.80E-06 | 1.72E-02 | 25 | 7,136 | 347.24 | 545.00 | 1.10E+02 | 1.33E+03 | N/A | 2.2E+00 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1, | 2.88E-02 | 8.07E-06 | 5.17E-01 | 25 | 1,326 | 320.70 | 481.05 | 2.25E+02 | 1.70E+02 | N/A | 3.0E+01 |
| 79005 | 1,1,2-Trichloroethane | 7.80E-02 | 8.80E-06 | 9.12E-04 | 25 | 8,322 | 386.15 | 602.00 | 5.01E+01 | 4.42E+03 | 1.6E-05 | 2.2E+00 |
| 75343 | 1,1-Dichloroethane | 7.42E-02 | 1.05E-05 | 5.61E-03 | 25 | 6,895 | 330.55 | 523.00 | 3.16E+01 | 5.06E+03 | N/A | 5.0E-01 |
| 75354 | 1,1-Dichloroethylene | 9.00E-02 | 1.04E-05 | 2.61E-02 | 25 | 6,247 | 304.75 | 576.05 | 5.89E+01 | 2.25E+03 | N/A | 2.0E-01 |
| 120821 | 1,2,4-Trichlorobenzene | 3.00E-02 | 8.23E-06 | 1.42E-03 | 25 | 10,471 | 486.15 | 725.00 | 1.78E+03 | 3.00E+02 | N/A | 2.0E-01 |
| 95501 | 1,2-Dichlorobenzene | 6.88E-02 | 9.41E-06 | 1.62E-06 | 25 | 1,223 | 465.00 | 697.50 | 5.34E+01 | 2.77E+04 | N/A | N/A |
| 541731 | Dichlorobenzene, 1,3- | 4.14E-02 | 8.85E-06 | 4.70E-03 | 25 | 1,242 | 446.00 | 683.96 | 1.70E+02 | 6.88E+01 | N/A | N/A |
| 106467 | 1,4-Dichlorobenzene | 6.90E-02 | 7.90E-06 | 2.43E-03 | 25 | 9,271 | 447.21 | 684.75 | 6.17E+02 | 7.38E+01 | N/A | 8.0E-01 |
| 78933 | Butanone, 2- (MEK) | 8.08E-02 | 9.80E-06 | 5.60E-05 | 25 | 1,311 | 352.50 | 528.75 | 3.83E+00 | 2.23E+05 | N/A | N/A |
| 67641 | Acetone | 1.24E-01 | 1.14E-05 | 3.88E-05 | 25 | 6,955 | 329.20 | 508.10 | 5.75E-01 | 1.00E+06 | N/A | N/A |
| 71432 | Benzene | 8.80E-02 | 9.80E-06 | 5.56E-03 | 25 | 7,342 | 353.24 | 562.16 | 5.89E+01 | 1.75E+03 | 7.8E-06 | 3.0E-02 |
| 74839 | Bromomethane | 7.28E-02 | 1.21E-05 | 6.22E-03 | 25 | 1,362 | 276.50 | 414.75 | 1.43E+01 | 1.52E+04 | N/A | 5.0E-03 |
| 75150 | Carbon Disulfide | 1.04E-01 | 1.29E-05 | 1.27E-02 | 25 | 6,391 | 319.00 | 552.00 | 5.14E+01 | 2.67E+03 | N/A | 7.0E-01 |
| 108907 | Chlorobenzene | 7.30E-02 | 8.70E-06 | 3.71E-03 | 25 | 8,410 | 404.87 | 632.40 | 2.19E+02 | 4.72E+02 | N/A | 6.0E-02 |
| 75003 | Ethyl Chloride | 1.26E-01 | 6.50E-06 | 8.67E-03 | 25 | 1,355 | 249.00 | 373.50 | 1.43E+01 | 5.32E+03 | N/A | 1.0E+01 |
| 67663 | Chloroform | 1.04E-01 | 1.00E-05 | 3.66E-03 | 25 | 6,988 | 334.32 | 536.40 | 3.98E+01 | 7.92E+03 | 2.3E-05 | 5.0E-02 |
| 156592 | cis-1,2-Dichloroethylene | 7.36E-02 | 1.13E-05 | 4.07E-03 | 25 | 7,192 | 333.65 | 544.00 | 3.55E+01 | 3.50E+03 | N/A | 2.0E-01 |
| 110827 | Cyclohexane | 8.00E-02 | 9.00E-06 | 2.00E+00 | 25 | 1,309 | 353.85 | 530.78 | 1.60E+02 | 5.50E+01 | #N/A | #N/A |
| 100414 | Ethylbenzene | 7.50E-02 | 7.80E-06 | 7.88E-03 | 25 | 8,501 | 409.34 | 617.20 | 3.63E+02 | 1.69E+02 | N/A | 1.0E+00 |
| 98828 | Isopropylbenzene | 6.50E-02 | 7.83E-06 | 1.47E-02 | 25 | 1,259 | 425.40 | 631.01 | 9.31E+03 | 5.60E+01 | N/A | 4.0E-01 |
| 108872 | Methyl cyclohexane | 9.86E-02 | 8.52E-06 | 4.23E-01 | 25 | 1,296 | 373.90 | 560.85 | 2.68E+02 | 1.40E+01 | N/A | 3.0E+00 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 1.02E-01 | 1.05E-05 | 5.87E-04 | 25 | 1,324 | 328.36 | 497.11 | 3.84E+01 | 5.10E+04 | N/A | 3.0E+00 |
| 75092 | Methylene chloride | 1.01E-01 | 1.17E-05 | 2.19E-03 | 25 | 6,706 | 313.00 | 510.00 | 1.17E+01 | 1.30E+04 | 4.7E-07 | 3.0E+00 |
| 127184 | Tetrachloroethylene | 7.20E-02 | 8.20E-06 | 1.84E-02 | 25 | 8,288 | 394.40 | 620.20 | 1.55E+02 | 2.00E+02 | 5.9E-06 | N/A |
| 108883 | Toluene | 8.70E-02 | 8.60E-06 | 6.63E-03 | 25 | 7,930 | 383.78 | 591.79 | 1.82E+02 | 5.26E+02 | N/A | 4.0E-01 |
| 156605 | trans-1,2-Dichloroethylene | 7.07E-02 | 1.19E-05 | 9.39E-03 | 25 | 1,333 | 320.85 | 516.50 | 5.25E+01 | 6.30E+03 | N/A | 2.0E-01 |
| 79016 | Trichloroethylene | 7.90E-02 | 9.10E-06 | 1.03E-02 | 25 | 7,505 | 360.36 | 544.20 | 1.66E+02 | 1.10E+03 | N/A | 4.0E-02 |
| 75014 | Vinyl chloride | 1.06E-01 | 1.23E-05 | 2.71E-02 | 25 | 5,250 | 259.25 | 432.00 | 1.86E+01 | 2.76E+03 | 8.8E-06 | 1.0E-01 |
| 1330207 | Xylenes | 7.69E-02 | 8.44E-06 | 6.73E-06 | 25 | 1,264 | 417.40 | 616.21 | 2.41E+02 | 2.20E+02 | N/A | 1.0E-01 |
| 98862 | Acetophenone | 6.00E-02 | 8.73E-06 | 1.02E-05 | 25 | 1,214 | 475.00 | 712.50 | 4.62E+01 | 6.13E+03 | N/A | N/A |
| 91203 | Naphthalene | 5.90E-02 | 7.50E-06 | 4.83E-04 | 25 | 10,373 | 491.14 | 748.40 | 2.00E+03 | 3.10E+01 | N/A | 3.0E-03 |
| 91576 | Methylnaphthalene, 2- | 4.84E-02 | 7.75E-06 | 1.01E-03 | 25 | 1,169 | 514.05 | 761.01 | 8.51E+03 | 2.46E+01 | N/A | 3.0E-03 |
| 92524 | Biphenyl, 1,1'- | 4.04E-02 | 8.15E-06 | 3.03E-04 | 25 | 1,149 | 529.10 | 793.65 | 6.25E+03 | 6.94E+00 | N/A | N/A |
| 208968 | Acenaphthylene | 4.43E-02 | 7.44E-06 | 2.80E-04 | 25 | 1,118 | 553.00 | 792.01 | 4.79E+03 | 3.93E+00 | N/A | 3.0E-03 |
| 83329 | Acenaphthene | 4.21E-02 | 7.69E-06 | 1.55E-04 | 25 | 12,155 | 550.54 | 803.15 | 7.08E+03 | 4.24E+00 | N/A | 3.0E-03 |
| 86737 | Fluorene | 3.63E-02 | 7.88E-06 | 9.41E-08 | 25 | 12,666 | 570.44 | 870.00 | 7.71E+03 | 1.90E+00 | N/A | 3.0E-03 |
| 85018 | Phenanthrene | 3.30E-02 | 7.47E-06 | 1.30E-04 | 25 | 1,057 | 613.00 | 869.01 | 1.41E+04 | 1.28E+00 | N/A | 3.0E-03 |
| 120127 | Anthracene | 3.24E-02 | 7.74E-06 | 6.51E-05 | 25 | 13,121 | 615.18 | 873.00 | 2.95E+04 | 4.34E-02 | N/A | 3.0E-03 |
| C9-C18 | C9-C18 Aliphatics | 6.00E-02 | 1.00E-05 | 1.66E+00 | 25 | NA | NA | NA | 6.80E+05 | 1.00E+01 | N/A | 2.0E-01 |
| C11-C22 | C11-C22 Aromatics | 6.00E-02 | 1.00E-05 | 7.32E-04 | 25 | NA | NA | NA | 5.00E+03 | 5.80E+03 | N/A | 5.0E-02 |
| C5-C8 | C5-C8 Aliphatics | 6.00E-02 | 1.00E-05 | 1.30E+00 | 25 | NA | NA | NA | 2.27E+03 | 1.10E+04 | N/A | 2.0E-01 |
| C9-C10 | C9-C10 Aromatics | 6.00E-02 | 1.00E-05 | 7.92E-03 | 25 | NA | NA | NA | 1.78E+03 | 5.10E+04 | N/A | 5.0E-02 |
| C9-C12 | C9-C12 Aliphatics | 6.00E-02 | 1.00E-05 | 1.56E+00 | 25 | NA | NA | NA | 1.50E+05 | 7.00E+01 | N/A | 2.0E-01 |

Appendix C.4
Johnson & Ettinger Model - Calculations Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - RME
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Murphy Waste Oil

| | | Source-building separation, $L_T$ (cm) | Vadose zone soil air-filled porosity, $\theta_a^V$ ($cm^3/cm^3$) | Vadose zone effective total fluid saturation, $S_e$ ($cm^3/cm^3$) | Vadose zone soil intrinsic permeability, $k_i$ ($cm^2$) | Vadose zone soil relative air permeability, $k_{ra}$ ($cm^2$) | 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, Xcrack (cm) | Bldg. ventilation rate, $Q_{building}$ ($cm^3/s$) | Area of enclosed space below grade, $A_B$ ($cm^2$) | Crack-to-total area ratio, $\eta$ (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 vs. groundwat temperature, $H'_{TS}$ (unitless) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 7,865 | 8.50E-03 | 3.68E-01 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,436 | 4.55E-01 | 1.96E+01 |
| 79005 | 1,1,2-Trichloroethane | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 9,572 | 3.68E-04 | 1.67E-02 |
| 75343 | 1,1-Dichloroethane | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 7,490 | 2.88E-03 | 1.24E-01 |
| 75354 | 1,1-Dichloroethylene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 6,392 | 1.47E-02 | 6.34E-01 |
| 120821 | 1,2,4-Trichlorobenzene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 13,230 | 4.35E-04 | 1.87E-02 |
| 95501 | 1,2-Dichlorobenzene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,521 | 1.41E-06 | 6.09E-05 |
| 541731 | Dichlorobenzene, 1,3- | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,503 | 4.11E-03 | 1.77E-01 |
| 106467 | 1,4-Dichlorobenzene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 11,243 | 8.89E-04 | 3.83E-02 |
| 78933 | Butanone, 2- (MEK) | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,486 | 4.90E-05 | 2.11E-03 |
| 67641 | Acetone | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 7,559 | 1.97E-05 | 8.50E-04 |
| 71432 | Benzene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 8,122 | 2.69E-03 | 1.16E-01 |
| 74839 | Bromomethane | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,337 | 5.52E-03 | 2.38E-01 |
| 75150 | Carbon Disulfide | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 6,882 | 0.99E-03 | 3.01E-01 |
| 108907 | Chlorobenzene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 9,803 | 1.54E-03 | 6.65E-02 |
| 75003 | Ethyl Chloride | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,201 | 7.79E-03 | 3.35E-01 |
| 67663 | Chloroform | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 7,554 | 1.86E-03 | 8.02E-02 |
| 156592 | cis-1,2-Dichloroethylene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 7,734 | 2.04E-03 | 8.77E-02 |
| 110827 | Cyclohexane | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,486 | 1.75E+00 | 7.54E+01 |
| 100414 | Ethylbenzene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 10,155 | 3.18E-03 | 1.37E-01 |
| 98828 | Isopropylbenzene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,540 | 1.28E-02 | 5.51E-01 |
| 108872 | Methyl cyclohexane | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,505 | 3.70E-01 | 1.59E+01 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,447 | 5.16E-04 | 2.22E-02 |
| 75092 | Methylene chloride | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 7,034 | 1.17E-03 | 5.03E-02 |
| 127184 | Tetrachloroethylene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 9,553 | 7.83E-03 | 3.37E-01 |
| 108883 | Toluene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 9,154 | 2.92E-03 | 1.26E-01 |
| 156605 | trans-1,2-Dichloroethylene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,417 | 8.27E-03 | 3.56E-01 |
| 79016 | Trichloroethylene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 8,557 | 4.79E-03 | 2.06E-01 |
| 75014 | Vinyl chloride | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 5,000 | 1.73E-02 | 7.46E-01 |
| 1330207 | Xylenes | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,542 | 5.86E-06 | 2.52E-04 |
| 98862 | Acetophenone | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,518 | 8.91E-06 | 3.83E-04 |
| 91203 | Naphthalene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 12,913 | 1.52E-04 | 6.55E-03 |
| 91576 | Methylnaphthalene, 2- | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,508 | 8.86E-04 | 3.81E-02 |
| 92524 | Biphenyl, 1,1'- | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,472 | 2.66E-04 | 1.14E-02 |
| 208968 | Acenaphthylene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,513 | 2.45E-04 | 1.05E-02 |
| 83329 | Acenaphthene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 16,128 | 3.67E-05 | 1.58E-03 |
| 86737 | Fluorene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 16,235 | 2.20E-06 | 9.48E-05 |
| 85018 | Phenanthrene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,479 | 1.14E-04 | 4.90E-03 |
| 120127 | Anthracene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 18,353 | 1.26E-05 | 5.43E-04 |
| C9-C18 | C9-C18 Aliphatics | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | NA | 8.28E-01 | 3.56E+01 |
| C11-C22 | C11-C22 Aromatics | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | NA | 3.60E-04 | 1.55E-02 |
| C5-C8 | C5-C8 Aliphatics | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | NA | 6.48E-01 | 2.79E+01 |
| C9-C10 | C9-C10 Aromatics | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | NA | 3.96E-03 | 1.70E-01 |
| C9-C12 | C9-C12 Aliphatics | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | NA | 7.80E-01 | 3.36E+01 |

Appendix C.4
Johnson & Ettinger Model - Calculations Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - RME
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Murphy Waste Oil

| | | Vapor viscosity at ave. soil temperature, $\mu_{avg}$ [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, $D^{eff}_T$ ($cm^2/s$) | Diffusion path length, $L_d$ (cm) | Convection path length, $L_v$ (cm) | Source vapor conc., $C_{source}$ ($\mu g/m^3$) | Crack radius, $r_{crack}$ (cm) | Average vapor flow rate into bldg., $Q_{soil}$ ($cm^3/s$) | Crack effective diffusion coefficient, $D^{crack}$ ($cm^2/s$) | Area of crack, $A_{crack}$ ($cm^2$) | Exponent of equivalent foundation Peclet number, exp(Pe) (unitless) | Infinite source indoor attenuation coefficient, $\alpha$ (unitless) | Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$) | Unit risk factor, URF $(\mu g/m^3)^{-1}$ | Reference conc., RfC ($mg/m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 1.75E-04 | 4.75E-04 | 4.45E-04 | 4.63E-04 | 47.78 | 15 | 1.93E+04 | 0.10 | 1.04E+01 | 4.75E-04 | 6.45E+02 | 9.58E+220 | 1.06E-06 | 2.05E-01 | N/A | 2.2E+00 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | 1.75E-04 | 1.75E-04 | 1.63E-04 | 1.70E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 1.75E-04 | 6.45E+02 | #NUM! | 7.06E-06 | N/A | N/A | 3.0E+01 |
| 79005 | 1,1,2-Trichloroethane | 1.75E-04 | 5.24E-04 | 4.95E-04 | 5.13E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 5.24E-04 | 6.45E+02 | 1.44E+200 | 1.09E-05 | N/A | 1.6E-05 | 2.2E+00 |
| 75343 | 1,1-Dichloroethane | 1.75E-04 | 4.58E-04 | 4.29E-04 | 4.46E-04 | 47.78 | 15 | 5.97E+03 | 0.10 | 1.04E+01 | 4.58E-04 | 6.45E+02 | 1.67E+229 | 1.05E-05 | 9.43E-02 | N/A | 5.0E-01 |
| 75354 | 1,1-Dichloroethylene | 1.75E-04 | 5.47E-04 | 5.12E-04 | 5.33E-04 | 47.78 | 15 | 5.71E+03 | 0.10 | 1.04E+01 | 5.47E-04 | 6.45E+02 | 8.08E+191 | 1.10E-05 | 6.30E-02 | N/A | 2.0E-01 |
| 120821 | 1,2,4-Trichlorobenzene | 1.75E-04 | 2.25E-04 | 2.14E-04 | 2.21E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 2.25E-04 | 6.45E+02 | #NUM! | 8.04E-06 | N/A | N/A | 2.0E-01 |
| 95501 | 1,2-Dichlorobenzene | 1.75E-04 | 1.56E-02 | 1.60E-02 | 1.58E-02 | 47.78 | 15 | 6.09E-02 | 0.10 | 1.04E+01 | 1.56E-02 | 6.45E+02 | 5.40E+06 | 1.48E-05 | 9.02E-07 | N/A | N/A |
| 541731 | Dichlorobenzene, 1,3- | 1.75E-04 | 2.56E-04 | 2.40E-04 | 2.49E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 2.56E-04 | 6.45E+02 | #NUM! | 8.49E-06 | N/A | N/A | N/A |
| 106467 | 1,4-Dichlorobenzene | 1.75E-04 | 4.38E-04 | 4.12E-04 | 4.28E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 4.38E-04 | 6.45E+02 | 2.83E+239 | 1.04E-05 | N/A | N/A | 8.0E-01 |
| 78933 | Butanone, 2- (MEK) | 1.75E-04 | 9.45E-04 | 9.27E-04 | 9.36E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 9.45E-04 | 6.45E+02 | 1.09E+111 | 1.25E-05 | N/A | N/A | N/A |
| 67641 | Acetone | 1.75E-04 | 2.07E-03 | 2.06E-03 | 2.06E-03 | 47.78 | 15 | 2.06E+01 | 0.10 | 1.04E+01 | 2.07E-03 | 6.45E+02 | 5.63E+50 | 1.37E-05 | 2.83E-04 | N/A | N/A |
| 71432 | Benzene | 1.75E-04 | 5.42E-04 | 5.07E-04 | 5.28E-04 | 47.78 | 15 | 7.57E+02 | 0.10 | 1.04E+01 | 5.42E-04 | 6.45E+02 | 6.73E+193 | 1.10E-05 | 8.34E-03 | 7.8E-06 | 3.0E-02 |
| 74839 | Bromomethane | 1.75E-04 | 4.46E-04 | 4.18E-04 | 4.35E-04 | 47.78 | 15 | 2.38E+02 | 0.10 | 1.04E+01 | 4.46E-04 | 6.45E+02 | 1.91E+235 | 1.04E-05 | 2.47E-03 | N/A | 5.0E-03 |
| 75150 | Carbon Disulfide | 1.75E-04 | 6.34E-04 | 5.94E-04 | 6.18E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 6.34E-04 | 6.45E+02 | 2.67E+165 | 1.15E-05 | N/A | N/A | 7.0E-01 |
| 108907 | Chlorobenzene | 1.75E-04 | 4.55E-04 | 4.27E-04 | 4.44E-04 | 47.78 | 15 | 6.65E+01 | 0.10 | 1.04E+01 | 4.55E-04 | 6.45E+02 | 3.97E+230 | 1.05E-05 | 6.97E-04 | N/A | 5.0E-02 |
| 75003 | Ethyl Chloride | 1.75E-04 | 7.66E-04 | 7.16E-04 | 7.45E-04 | 47.78 | 15 | 1.02E+04 | 0.10 | 1.04E+01 | 7.66E-04 | 6.45E+02 | 1.38E+137 | 1.19E-05 | 1.22E-01 | N/A | 1.0E+01 |
| 67663 | Chloroform | 1.75E-04 | 6.43E-04 | 6.02E-04 | 6.26E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 6.43E-04 | 6.45E+02 | 2.45E+163 | 1.15E-05 | N/A | 2.3E-05 | 5.0E-02 |
| 156592 | cis-1,2-Dichloroethylene | 1.75E-04 | 4.59E-04 | 4.30E-04 | 4.47E-04 | 47.78 | 15 | 6.52E+04 | 0.10 | 1.04E+01 | 4.59E-04 | 6.45E+02 | 7.49E+228 | 1.05E-05 | 8.85E-01 | N/A | 2.0E-01 |
| 110827 | Cyclohexane | 1.75E-04 | 4.85E-04 | 4.53E-04 | 4.72E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 4.85E-04 | 6.45E+02 | 3.37E+216 | 1.07E-05 | N/A | #N/A | #N/A |
| 100414 | Ethylbenzene | 1.75E-04 | 4.60E-04 | 4.31E-04 | 4.48E-04 | 47.78 | 15 | 1.04E+03 | 0.10 | 1.04E+01 | 4.60E-04 | 6.45E+02 | 1.44E+228 | 1.05E-05 | 1.09E-02 | N/A | 1.0E+00 |
| 98828 | Isopropylbenzene | 1.75E-04 | 3.95E-04 | 3.70E-04 | 3.85E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 3.95E-04 | 6.45E+02 | 3.75E+265 | 1.00E-05 | N/A | N/A | 4.0E-01 |
| 108872 | Methyl cyclohexane | 1.75E-04 | 5.98E-04 | 5.59E-04 | 5.82E-04 | 47.78 | 15 | 1.11E+05 | 0.10 | 1.04E+01 | 5.98E-04 | 6.45E+02 | 4.68E+175 | 1.13E-05 | 1.26E+00 | N/A | 3.0E+00 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 1.75E-04 | 6.67E-04 | 6.28E-04 | 6.51E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 6.67E-04 | 6.45E+02 | 2.47E+157 | 1.16E-05 | N/A | N/A | 3.0E+00 |
| 75092 | Methylene chloride | 1.75E-04 | 6.35E-04 | 5.96E-04 | 6.19E-04 | 47.78 | 15 | 7.98E+02 | 0.10 | 1.04E+01 | 6.35E-04 | 6.45E+02 | 2.18E+165 | 1.15E-05 | 9.14E-03 | 4.7E-07 | 3.0E+00 |
| 127184 | Tetrachloroethylene | 1.75E-04 | 4.39E-04 | 4.11E-04 | 4.27E-04 | 47.78 | 15 | 2.36E+03 | 0.10 | 1.04E+01 | 4.39E-04 | 6.45E+02 | 1.92E+239 | 1.04E-05 | 2.45E-02 | 5.9E-06 | N/A |
| 108883 | Toluene | 1.75E-04 | 5.34E-04 | 5.00E-04 | 5.20E-04 | 47.78 | 15 | 2.16E+03 | 0.10 | 1.04E+01 | 5.34E-04 | 6.45E+02 | 4.07E+196 | 1.10E-05 | 2.37E-02 | N/A | 4.0E-01 |
| 156605 | trans-1,2-Dichloroethylene | 1.75E-04 | 4.32E-04 | 4.04E-04 | 4.20E-04 | 47.78 | 15 | 4.55E+03 | 0.10 | 1.04E+01 | 4.32E-04 | 6.45E+02 | 1.43E+243 | 1.03E-05 | 4.69E-02 | N/A | 2.0E-01 |
| 79016 | Trichloroethylene | 1.75E-04 | 4.83E-04 | 4.52E-04 | 4.70E-04 | 47.78 | 15 | 6.83E+03 | 0.10 | 1.04E+01 | 4.83E-04 | 6.45E+02 | 2.03E+217 | 1.07E-05 | 7.28E-02 | N/A | 4.0E-02 |
| 75014 | Vinyl chloride | 1.75E-04 | 5.44E-04 | 5.02E-04 | 5.27E-04 | 47.78 | 15 | 1.38E+05 | 0.10 | 1.04E+01 | 5.44E-04 | 6.45E+02 | 1.02E+183 | 1.15E-05 | 1.56E+00 | 8.8E-06 | 1.0E-01 |
| 1330207 | Xylenes | 1.75E-04 | 3.75E-03 | 3.81E-03 | 3.77E-03 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 3.75E-03 | 6.45E+02 | 1.01E+28 | 1.43E-05 | N/A | N/A | 1.0E-01 |
| 95862 | Acetophenone | 1.75E-04 | 2.60E-03 | 2.64E-03 | 2.62E-03 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 2.60E-03 | 6.45E+02 | 2.45E+40 | 1.40E-05 | N/A | N/A | N/A |
| 91203 | Naphthalene | 1.75E-04 | 4.70E-04 | 4.50E-04 | 4.62E-04 | 47.78 | 15 | 5.96E+01 | 0.10 | 1.04E+01 | 4.70E-04 | 6.45E+02 | 2.56E+223 | 1.06E-05 | 6.32E-04 | N/A | 3.0E-03 |
| 91576 | Methylnaphthalene, 2- | 1.75E-04 | 3.13E-04 | 2.95E-04 | 3.06E-04 | 47.78 | 15 | 2.24E+02 | 0.10 | 1.04E+01 | 3.13E-04 | 6.45E+02 | #NUM! | 9.23E-06 | 2.07E-03 | N/A | 3.0E-03 |
| 92524 | Biphenyl, 1,1'- | 1.75E-04 | 3.15E-04 | 3.01E-04 | 3.09E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 3.15E-04 | 6.45E+02 | #NUM! | 9.27E-06 | N/A | N/A | N/A |
| 208968 | Acenaphthylene | 1.76E-04 | 3.38E-04 | 3.22E-04 | 3.31E-04 | 47.76 | 15 | N/A | 0.10 | 1.04E+01 | 3.38E-04 | 6.45E+02 | #NUM! | 9.51E-06 | N/A | N/A | 3.0E-03 |
| 83329 | Acenaphthene | 1.75E-04 | 7.33E-04 | 7.31E-04 | 7.32E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 7.33E-04 | 6.45E+02 | 1.38E+143 | 1.19E-05 | N/A | N/A | 3.0E-03 |
| 86737 | Fluorene | 1.76E-04 | 8.16E-01 | 8.39E-01 | 8.25E-01 | 47.76 | 15 | N/A | 0.10 | 1.04E+01 | 8.16E-01 | 6.45E+02 | 1.34E+00 | 5.64E-05 | N/A | N/A | 3.0E-03 |
| 85018 | Phenanthrene | 1.75E-04 | 3.50E-04 | 3.41E-04 | 3.46E-04 | 47.78 | 15 | 2.61E+01 | 0.10 | 1.04E+01 | 3.50E-04 | 6.45E+02 | 2.10E+300 | 9.86E-06 | 2.72E-04 | N/A | 3.0E-03 |
| 120127 | Anthracene | 1.75E-04 | 1.60E-03 | 1.62E-03 | 1.61E-03 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 1.60E-03 | 6.45E+02 | 8.32E+65 | 1.34E-05 | N/A | N/A | 3.0E-03 |
| C9-C18 | C9-C18 Aliphatics | 1.75E-04 | 3.64E-04 | 3.40E-04 | 3.54E-04 | 47.78 | 15 | 3.39E+07 | 0.10 | 1.04E+01 | 3.64E-04 | 6.45E+02 | 4.68E+288 | 9.74E-06 | 3.30E+02 | N/A | 2.0E-01 |
| C11-C22 | C11-C22 Aromatics | 1.75E-04 | 4.27E-04 | 4.05E-04 | 4.18E-04 | 47.78 | 15 | 6.49E+03 | 0.10 | 1.04E+01 | 4.27E-04 | 6.45E+02 | 7.52E+245 | 1.03E-05 | 6.68E-02 | N/A | 5.0E-02 |
| C5-C8 | C5-C8 Aliphatics | 1.75E-04 | 3.64E-04 | 3.40E-04 | 3.54E-04 | 47.78 | 15 | 3.22E+06 | 0.10 | 1.04E+01 | 3.64E-04 | 6.45E+02 | 4.81E+288 | 9.74E-06 | 3.14E+01 | N/A | 2.0E-01 |
| C9-C10 | C9-C10 Aromatics | 1.75E-04 | 3.69E-04 | 3.46E-04 | 3.60E-04 | 47.78 | 15 | 1.22E+04 | 0.10 | 1.04E+01 | 3.69E-04 | 6.45E+02 | 1.62E+284 | 9.80E-06 | 1.20E-01 | N/A | 5.0E-02 |
| C9-C12 | C9-C12 Aliphatics | 1.75E-04 | 3.64E-04 | 3.40E-04 | 3.54E-04 | 47.78 | 15 | 1.11E+06 | 0.10 | 1.04E+01 | 3.64E-04 | 6.45E+02 | 4.67E+288 | 9.74E-06 | 1.06E+01 | N/A | 2.0E-01 |

Appendix C.4
Johnson & Ettinger Model - Results
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - RME
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Murphy Waste Oil

| | | 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) |
| 71556 | 1,1,1-Trichloroethane | NA | NA | NA | 1.33E+06 | NA | NA | 2.1E-05 |
| 76131 | Trichloro-1,2,2-triflouroethane, 1,1,2- | NA | NA | NA | 1.70E+05 | NA | NA | NA |
| 79005 | 1,1,2-Trichloroethane | NA | NA | NA | 4.42E+06 | NA | NA | NA |
| 75343 | 1,1-Dichloroethane | NA | NA | NA | 5.06E+06 | NA | NA | 4.3E-05 |
| 75354 | 1,1-Dichloroethylene | NA | NA | NA | 2.25E+06 | NA | NA | 7.2E-05 |
| 120821 | 1,2,4-Trichlorobenzene | NA | NA | NA | 3.00E+05 | NA | NA | NA |
| 95501 | 1,2-Dichlorobenzene | NA | NA | NA | 2.77E+07 | NA | NA | NA |
| 541731 | Dichlorobenzene, 1,3- | NA | NA | NA | 6.88E+04 | NA | NA | NA |
| 106467 | 1,4-Dichlorobenzene | NA | NA | NA | 7.38E+04 | NA | NA | NA |
| 78933 | Butanone, 2- (MEK) | NA | NA | NA | 2.23E+08 | NA | NA | NA |
| 67641 | Acetone | NA | NA | NA | 1.00E+09 | NA | NA | NA |
| 71432 | Benzene | NA | NA | NA | 1.75E+06 | NA | 5.3E-09 | 6.3E-05 |
| 74839 | Bromomethane | NA | NA | NA | 1.52E+07 | NA | NA | 1.1E-04 |
| 75150 | Carbon Disulfide | NA | NA | NA | 2.67E+06 | NA | NA | NA |
| 108907 | Chlorobenzene | NA | NA | NA | 4.72E+05 | NA | NA | 2.7E-06 |
| 75003 | Ethyl Chloride | NA | NA | NA | 5.32E+06 | NA | NA | 2.8E-06 |
| 67663 | Chloroform | NA | NA | NA | 7.92E+06 | NA | NA | NA |
| 156592 | cis-1,2-Dichloroethylene | NA | NA | NA | 3.50E+06 | NA | NA | 7.8E-04 |
| 110827 | Cyclohexane | NA | NA | NA | 5.50E+04 | NA | NA | NA |
| 100414 | Ethylbenzene | NA | NA | NA | 1.69E+05 | NA | NA | 2.5E-06 |
| 98828 | Isopropylbenzene | NA | NA | NA | 5.60E+04 | NA | NA | NA |
| 108872 | Methyl cyclohexane | NA | NA | NA | 1.40E+04 | NA | NA | 9.6E-05 |
| 1634044 | Methyl-Tertiary-Butyl Ether | NA | NA | NA | 5.10E+07 | NA | NA | NA |
| 75092 | Methylene chloride | NA | NA | NA | 1.30E+07 | NA | 3.5E-10 | 7.0E-07 |
| 127184 | Tetrachloroethylene | NA | NA | NA | 2.00E+05 | NA | 1.2E-08 | NA |
| 108883 | Toluene | NA | NA | NA | 5.26E+05 | NA | NA | 1.4E-05 |
| 156605 | trans-1,2-Dichloroethylene | NA | NA | NA | 6.30E+06 | NA | NA | 5.4E-05 |
| 79016 | Trichloroethylene | NA | NA | NA | 1.10E+06 | NA | NA | 4.2E-04 |
| 75014 | Vinyl chloride | NA | NA | NA | 2.76E+06 | NA | 1.1E-06 | 3.6E-03 |
| 1330207 | Xylenes | NA | NA | NA | 2.20E+05 | NA | NA | NA |
| 98862 | Acetophenone | NA | NA | NA | 6.13E+06 | NA | NA | NA |
| 91203 | Naphthalene | NA | NA | NA | 3.10E+04 | NA | NA | 4.8E-05 |
| 91576 | Methylnaphthalene, 2- | NA | NA | NA | 2.46E+04 | NA | NA | 1.6E-04 |
| 92524 | Biphenyl, 1,1'- | NA | NA | NA | 6.94E+03 | NA | NA | NA |
| 208968 | Acenaphthylene | NA | NA | NA | 3.93E+03 | NA | NA | NA |
| 83329 | Acenaphthene | NA | NA | NA | 4.24E+03 | NA | NA | NA |
| 86737 | Fluorene | NA | NA | NA | 1.90E+03 | NA | NA | NA |
| 85018 | Phenanthrene | NA | NA | NA | 1.28E+03 | NA | NA | 2.1E-05 |
| 120127 | Anthracene | NA | NA | NA | 4.34E+01 | NA | NA | NA |
| C9-C18 | C9-C18 Aliphatics | NA | NA | NA | 1.00E+04 | NA | NA | 3.8E-01 |
| C11-C22 | C11-C22 Aromatics | NA | NA | NA | 5.80E+06 | NA | NA | 3.0E-04 |
| C5-C8 | C5-C8 Aliphatics | NA | NA | NA | 1.10E+07 | NA | NA | 3.6E-02 |
| C9-C10 | C9-C10 Aromatics | NA | NA | NA | 5.10E+07 | NA | NA | 5.5E-04 |
| C9-C12 | C9-C12 Aliphatics | NA | NA | NA | 7.00E+04 | NA | NA | 1.2E-02 |

| | 95% UCL Cancer Risk | 95% UCL HI |
|---|---|---|
| TOTAL: | 1E-06 | 4E-01 |

[ ] = Cancer risk > 1E-05 or HQ/HI>1E+00

END

Appendix C.4
Johnson & Ettinger Model - Data Entry Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - CT
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Murphy Waste Oil

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

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) | Chemical | ENTER 95% UCL groundwater conc., $C_W$ (µg/L) | ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (15 or 200 cm) | ENTER Depth below grade to water table, LWT (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/groundwater temperature, $T_S$ (°C) | ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR Note | ENTER User-defined vadose zone soil vapor permeability, $k_v$ ($cm^2$) | ENTER Vadose zone soil dry bulk density, $\rho_b^V$ ($g/cm^3$) | ENTER Vadose zone soil total porosity, $n^V$ (unitless) | ENTER Vadose zone soil water-filled porosity, $\theta_w^V$ ($cm^3/cm^3$) | 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) | ENTER Exposure time ET (hrs/day) | ENTER Conversion factor CF (hrs/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 5.27E+01 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 79005 | 1,1,2-Trichloroethane | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 75343 | 1,1-Dichloroethane | 7.24E+01 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 75354 | 1,1-Dichloroethylene | 9.00E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 120821 | 1,2,4-Trichlorobenzene | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 95501 | 1,2-Dichlorobenzene | 1.00E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 541731 | Dichlorobenzene, 1,3- | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 106467 | 1,4-Dichlorobenzene | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 78933 | Butanone, 2- (MEK) | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 67641 | Acetone | 2.42E+01 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 71432 | Benzene | 8.64E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 74839 | Bromomethane | 1.00E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 75150 | Carbon Disulfide | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 108907 | Chlorobenzene | 1.00E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 75003 | Ethyl Chloride | 3.05E+01 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 67663 | Chloroform | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 156592 | cis-1,2-Dichloroethylene | 7.43E+02 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 110827 | Cyclohexane | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 100414 | Ethylbenzene | 7.61E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 98828 | Isopropylbenzene | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 108872 | Methyl cyclohexane | 7.00E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 1634044 | Methyl-Tertiary-Butyl Ether | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 75092 | Methylene chloride | 1.59E+01 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 127184 | Tetrachloroethylene | 7.00E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 108883 | Toluene | 1.71E+01 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 156605 | trans-1,2-Dichloroethylene | 1.28E+01 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 79016 | Trichloroethylene | 3.31E+01 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 75014 | Vinyl chloride | 1.85E+02 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 1330207 | Xylenes | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 98862 | Acetophenone | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 91203 | Naphthalene | 9.09E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 91576 | Methylnaphthalene, 2- | 5.89E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 92524 | Biphenyl, 1,1'- | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 208968 | Acenaphthylene | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 83329 | Acenaphthene | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 86737 | Fluorene | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 85018 | Phenanthrene | 8.74E+00 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 120127 | Anthracene | | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| C9-C18 | C9-C18 Aliphatics | 9.61E+02 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| C11-C22 | C11-C22 Aromatics | 4.19E+02 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| C5-C8 | C5-C8 Aliphatics | 1.15E+02 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| C9-C10 | C9-C10 Aromatics | 7.18E+01 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| C9-C12 | C9-C12 Aliphatics | 3.30E+01 | 15 | 62.78 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |

Note:
1) Default soil parameters from table 7 of User's Guide for Evaluating Subsurface Vapor Intrusion into Building (U.S. EPA June 19, 2003) were used for soil water filled porosity ($\theta_{ws}$), soil organic carbon fraction ($f_{oc}$), soil total porosity (n), and soil dry bulk density ($\rho_b$).

Appendix C.4
Johnson & Ettinger Model - Chemical Properties Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - CT
Southwest Prperties, Wells G&H Superfund Site, Operable Unit 2
Murphy Waste Oil

| Chemical CAS No. | Chemical | 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, $T_R$ (°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, $K_{oc}$ ($cm^3/g$) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu g/m^3)^{-1}$ | Reference conc., RfC ($mg/m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 7.80E-02 | 8.80E-06 | 1.72E-02 | 25 | 7,136 | 347.24 | 545.00 | 1.10E+02 | 1.33E+03 | N/A | 2.2E+00 |
| 76131 | Trichloro-1,2,2-triflouroethane, 1, | 2.88E-02 | 8.07E-06 | 5.17E-01 | 25 | 1,326 | 320.70 | 481.05 | 2.25E+02 | 1.70E+02 | N/A | 3.0E+01 |
| 79005 | 1,1,2-Trichloroethane | 7.80E-02 | 8.80E-06 | 9.12E-04 | 25 | 8,322 | 386.15 | 602.00 | 5.01E+01 | 4.42E+03 | 1.6E-05 | 2.2E+00 |
| 75343 | 1,1-Dichloroethane | 7.42E-02 | 1.05E-05 | 5.61E-03 | 25 | 6,895 | 330.55 | 523.00 | 3.16E+01 | 5.06E+03 | N/A | 5.0E-01 |
| 75354 | 1,1-Dichloroethylene | 9.00E-02 | 1.04E-05 | 2.61E-02 | 25 | 6,247 | 304.75 | 576.05 | 5.89E+01 | 2.25E+03 | N/A | 2.0E-01 |
| 120821 | 1,2,4-Trichlorobenzene | 3.00E-02 | 8.23E-06 | 1.42E-03 | 25 | 10,471 | 486.15 | 725.00 | 1.78E+03 | 3.00E+02 | N/A | 2.0E-01 |
| 95501 | 1,2-Dichlorobenzene | 6.88E-02 | 9.41E-06 | 1.62E-06 | 25 | 1,223 | 465.00 | 697.50 | 5.34E+01 | 2.77E+04 | N/A | N/A |
| 541731 | Dichlorobenzene, 1,3- | 4.14E-02 | 8.85E-06 | 4.70E-03 | 25 | 1,242 | 446.00 | 683.96 | 1.70E+02 | 6.88E+01 | N/A | N/A |
| 106467 | 1,4-Dichlorobenzene | 6.90E-02 | 7.90E-06 | 2.43E-03 | 25 | 9,271 | 447.21 | 684.75 | 6.17E+02 | 7.38E+01 | N/A | 8.0E-01 |
| 78933 | Butanone, 2- (MEK) | 8.08E-02 | 9.80E-06 | 5.60E-05 | 25 | 1,311 | 352.50 | 528.75 | 3.83E+00 | 2.23E+05 | N/A | N/A |
| 67641 | Acetone | 1.24E-01 | 1.14E-05 | 3.88E-05 | 25 | 6,955 | 329.20 | 508.10 | 5.75E-01 | 1.00E+06 | N/A | N/A |
| 71432 | Benzene | 8.80E-02 | 9.80E-06 | 5.56E-03 | 25 | 7,342 | 353.24 | 562.16 | 5.89E+01 | 1.75E+03 | 7.8E-06 | 3.0E-02 |
| 74839 | Bromomethane | 7.28E-02 | 1.21E-05 | 6.22E-03 | 25 | 1,362 | 276.50 | 414.75 | 1.43E+01 | 1.52E+04 | N/A | 5.0E-03 |
| 75150 | Carbon Disulfide | 1.04E-01 | 1.29E-05 | 1.27E-02 | 25 | 6,391 | 319.00 | 552.00 | 5.14E+01 | 2.67E+03 | N/A | 7.0E-01 |
| 108907 | Chlorobenzene | 7.30E-02 | 8.70E-06 | 3.71E-03 | 25 | 8,410 | 404.87 | 632.40 | 2.19E+02 | 4.72E+02 | N/A | 6.0E-02 |
| 75003 | Ethyl Chloride | 1.26E-01 | 6.50E-06 | 8.67E-03 | 25 | 1,355 | 249.00 | 373.50 | 1.43E+01 | 5.32E+03 | N/A | 1.0E+01 |
| 67663 | Chloroform | 1.04E-01 | 1.00E-05 | 3.66E-03 | 25 | 8,988 | 334.32 | 536.40 | 3.98E+01 | 7.92E+03 | 2.3E-05 | 5.0E-02 |
| 156592 | cis-1,2-Dichloroethylene | 7.36E-02 | 1.13E-05 | 4.07E-03 | 25 | 7,192 | 333.65 | 544.00 | 3.55E+01 | 3.50E+03 | N/A | 2.0E-01 |
| 110827 | Cyclohexane | 8.00E-02 | 9.00E-06 | 2.00E+00 | 25 | 1,309 | 353.85 | 530.78 | 1.60E+02 | 5.50E+01 | #N/A | #N/A |
| 100414 | Ethylbenzene | 7.50E-02 | 7.80E-06 | 7.88E-03 | 25 | 8,501 | 409.34 | 617.20 | 3.63E+02 | 1.69E+02 | N/A | 1.0E+00 |
| 98828 | Isopropylbenzene | 6.50E-02 | 7.83E-06 | 1.47E-02 | 25 | 1,259 | 425.40 | 631.01 | 9.31E+03 | 5.60E+01 | N/A | 4.0E-01 |
| 108872 | Methyl cyclohexane | 9.86E-02 | 8.52E-06 | 4.23E-01 | 25 | 1,296 | 373.90 | 560.85 | 2.68E+02 | 1.40E+01 | N/A | 3.0E+00 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 1.02E-01 | 1.05E-05 | 5.87E-04 | 25 | 1,324 | 328.36 | 497.11 | 3.84E+01 | 5.10E+04 | N/A | 3.0E+00 |
| 75092 | Methylene chloride | 1.01E-01 | 1.17E-05 | 2.19E-03 | 25 | 6,706 | 313.00 | 510.00 | 1.17E+01 | 1.30E+04 | 4.7E-07 | 3.0E+00 |
| 127184 | Tetrachloroethylene | 7.20E-02 | 8.20E-06 | 1.84E-02 | 25 | 8,288 | 394.40 | 620.20 | 1.55E+02 | 2.00E+02 | 5.9E-06 | N/A |
| 108883 | Toluene | 8.70E-02 | 8.60E-06 | 6.63E-03 | 25 | 7,930 | 383.78 | 591.79 | 1.82E+02 | 5.26E+02 | N/A | 4.0E-01 |
| 156605 | trans-1,2-Dichloroethylene | 7.07E-02 | 1.19E-05 | 9.39E-03 | 25 | 1,333 | 320.65 | 516.50 | 5.25E+01 | 6.30E+03 | N/A | 2.0E-01 |
| 79016 | Trichloroethylene | 7.90E-02 | 9.10E-06 | 1.03E-02 | 25 | 7,505 | 360.36 | 544.20 | 1.66E+02 | 1.10E+03 | N/A | 4.0E-02 |
| 75014 | Vinyl chloride | 1.06E-01 | 1.23E-05 | 2.71E-02 | 25 | 5,250 | 259.25 | 432.00 | 1.86E+01 | 2.76E+03 | 8.8E-06 | 1.0E-01 |
| 1330207 | Xylenes | 7.69E-02 | 8.44E-06 | 6.73E-06 | 25 | 1,264 | 417.40 | 616.21 | 2.41E+02 | 2.20E+02 | N/A | 1.0E-01 |
| 98862 | Acetophenone | 6.00E-02 | 8.73E-06 | 1.02E-05 | 25 | 1,214 | 475.00 | 712.50 | 4.62E+01 | 6.13E+03 | N/A | N/A |
| 91203 | Naphthalene | 5.90E-02 | 7.50E-06 | 4.83E-04 | 25 | 10,373 | 491.14 | 748.40 | 2.00E+03 | 3.10E+01 | N/A | 3.0E-03 |
| 91576 | Methylnaphthalene, 2- | 4.84E-02 | 7.75E-06 | 1.01E-03 | 25 | 1,169 | 514.05 | 761.01 | 8.51E+03 | 2.46E+01 | N/A | 3.0E-03 |
| 92524 | Biphenyl, 1,1'- | 4.04E-02 | 8.15E-06 | 3.03E-04 | 25 | 1,149 | 529.10 | 793.65 | 6.25E+03 | 6.94E+00 | N/A | N/A |
| 208968 | Acenaphthylene | 4.43E-02 | 7.44E-06 | 2.80E-04 | 25 | 1,118 | 553.00 | 792.01 | 4.79E+03 | 3.93E+00 | N/A | 3.0E-03 |
| 83329 | Acenaphthene | 4.21E-02 | 7.69E-06 | 1.55E-04 | 25 | 12,155 | 550.54 | 803.15 | 7.08E+03 | 4.24E+00 | N/A | 3.0E-03 |
| 86737 | Fluorene | 3.63E-02 | 7.88E-06 | 9.41E-08 | 25 | 12,666 | 570.44 | 870.00 | 7.71E+03 | 1.90E+00 | N/A | 3.0E-03 |
| 85018 | Phenanthrene | 3.30E-02 | 7.47E-06 | 1.30E-04 | 25 | 1,057 | 613.00 | 869.01 | 1.41E+04 | 1.28E+00 | N/A | 3.0E-03 |
| 120127 | Anthracene | 3.24E-02 | 7.74E-06 | 6.51E-05 | 25 | 13,121 | 615.18 | 873.00 | 2.95E+04 | 4.34E-02 | N/A | 3.0E-03 |
| C9-C18 | C9-C18 Aliphatics | 6.00E-02 | 1.00E-05 | 1.66E+00 | 25 | NA | NA | NA | 6.80E+05 | 1.00E+01 | N/A | 2.0E-01 |
| C11-C22 | C11-C22 Aromatics | 6.00E-02 | 1.00E-05 | 7.32E-04 | 25 | NA | NA | NA | 5.00E+03 | 5.80E+03 | N/A | 5.0E-02 |
| C5-C8 | C5-C8 Aliphatics | 6.00E-02 | 1.00E-05 | 1.30E+00 | 25 | NA | NA | NA | 2.27E+03 | 1.10E+04 | N/A | 2.0E-01 |
| C9-C10 | C9-C10 Aromatics | 6.00E-02 | 1.00E-05 | 7.92E-03 | 25 | NA | NA | NA | 1.78E+03 | 5.10E+04 | N/A | 5.0E-02 |
| C9-C12 | C9-C12 Allphatics | 6.00E-02 | 1.00E-05 | 1.56E+00 | 25 | NA | NA | NA | 1.50E+05 | 7.00E+01 | N/A | 2.0E-01 |

Appendix C.4
Johnson & Ettinger Model - Calculations Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - CT
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Murphy Waste Oil

| | | Source-building separation, $L_T$ (cm) | Vadose zone soil air-filled porosity, $\theta_a^v$ ($cm^3/cm^3$) | 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, $k_v$ ($cm^2$) | 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, Xcrack (cm) | Bldg. ventilation rate, $Q_{building}$ ($cm^3/s$) | Area of enclosed space below grade, $A_B$ ($cm^2$) | Crack-to-total area ratio, $\eta$ (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 ve. groundwat temperature, $H'_{ts}$ (unitless) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 7,885 | 8.90E-03 | 3.66E-01 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,436 | 4.55E-01 | 1.96E+01 |
| 79005 | 1,1,2-Trichloroethane | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 9,572 | 3.68E-04 | 1.67E-02 |
| 75343 | 1,1-Dichloroethane | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 7,450 | 2.86E-03 | 1.24E-01 |
| 75354 | 1,1-Dichloroethylene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 6,392 | 1.47E-02 | 6.34E-01 |
| 120821 | 1,2,4-Trichlorobenzene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 13,230 | 4.35E-04 | 1.87E-02 |
| 95501 | 1,2-Dichlorobenzene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,521 | 1.41E-06 | 6.09E-05 |
| 541731 | Dichlorobenzene, 1,3- | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,503 | 4.11E-03 | 1.77E-01 |
| 106467 | 1,4-Dichlorobenzene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 11,243 | 8.89E-04 | 3.83E-02 |
| 78933 | Butanone, 2- (MEK) | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+06 | 2.60E+06 | 2.48E-04 | 15 | 1,486 | 4.90E-05 | 2.11E-03 |
| 67641 | Acetone | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 7,559 | 1.97E-05 | 8.50E-04 |
| 71432 | Benzene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 8,122 | 2.69E-03 | 1.16E-01 |
| 74839 | Bromomethane | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,337 | 5.52E-03 | 2.38E-01 |
| 75150 | Carbon Disulfide | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 6,682 | 6.99E-03 | 3.01E-01 |
| 108907 | Chlorobenzene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 8,803 | 1.54E-03 | 6.65E-02 |
| 75003 | Ethyl Chloride | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,201 | 7.79E-03 | 3.35E-01 |
| 67663 | Chloroform | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 7,564 | 1.86E-03 | 8.02E-02 |
| 156592 | cis-1,2-Dichloroethylene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 7,734 | 2.04E-03 | 8.77E-02 |
| 110827 | Cyclohexane | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,466 | 1.75E+00 | 7.54E+01 |
| 100414 | Ethylbenzene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 10,155 | 3.18E-03 | 1.37E-01 |
| 98828 | Isopropylbenzene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,540 | 1.28E-02 | 5.51E-01 |
| 108872 | Methyl cyclohexane | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,505 | 3.70E-01 | 1.59E+01 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,447 | 5.16E-04 | 2.22E-02 |
| 75092 | Methylene chloride | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 7,034 | 1.17E-03 | 5.03E-02 |
| 127184 | Tetrachloroethylene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 9,553 | 7.83E-03 | 3.37E-01 |
| 108883 | Toluene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 9,154 | 2.92E-03 | 1.26E-01 |
| 156605 | trans-1,2-Dichloroethylene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,417 | 8.27E-03 | 3.56E-01 |
| 79016 | Trichloroethylene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 8,557 | 4.79E-03 | 2.06E-01 |
| 75014 | Vinyl chloride | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 5,000 | 1.73E-02 | 7.46E-01 |
| 1330207 | Xylenes | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,542 | 5.86E-06 | 2.52E-04 |
| 98862 | Acetophenone | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,518 | 8.91E-06 | 3.83E-04 |
| 91203 | Naphthalene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 12,913 | 1.52E-04 | 6.55E-03 |
| 91576 | Methylnaphthalene, 2- | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,595 | 8.86E-04 | 3.81E-02 |
| 92524 | Biphenyl, 1,1'- | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,472 | 2.66E-04 | 1.14E-02 |
| 208968 | Acenaphthylene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,513 | 2.45E-04 | 1.05E-02 |
| 83329 | Acenaphthene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 16,123 | 3.67E-05 | 1.58E-03 |
| 86737 | Fluorene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 18,235 | 2.20E-06 | 9.48E-05 |
| 85018 | Phenanthrene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 1,479 | 1.14E-04 | 4.90E-03 |
| 120127 | Anthracene | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | 18,353 | 1.26E-05 | 5.43E-04 |
| C9-C18 | C9-C18 Aliphatics | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | NA | 8.28E-01 | 3.56E+01 |
| C11-C22 | C11-C22 Aromatics | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | NA | 3.60E-04 | 1.55E-02 |
| C5-C8 | C5-C8 Aliphatics | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | NA | 6.48E-01 | 2.79E+01 |
| C9-C10 | C9-C10 Aromatics | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | NA | 3.96E-03 | 1.70E-01 |
| C9-C12 | C9-C12 Aliphatics | 47.78 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 6.55E+03 | 6.93E+05 | 2.60E+06 | 2.48E-04 | 15 | NA | 7.80E-01 | 3.36E+01 |

Appendix C.4
Johnson & Ettinger Model - Calculations Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - CT
Southwest Properties, Wells G&H Superfund Site, Oper.
Murphy Waste Oil

| | | Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (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) | Diffusion path length, $L_d$ (cm) | Convection path length, $L_v$ (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) (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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 1.75E-04 | 4.75E-04 | 4.45E-04 | 4.63E-04 | 47.78 | 15 | 1.93E+04 | 0.10 | 1.04E+01 | 4.75E-04 | 6.45E+02 | 9.58E+220 | 1.06E-05 | 2.05E-01 | N/A | 2.2E+00 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | 1.75E-04 | 1.75E-04 | 1.63E-04 | 1.70E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 1.75E-04 | 6.45E+02 | #NUM! | 7.06E-06 | N/A | N/A | 3.0E+01 |
| 79005 | 1,1,2-Trichloroethane | 1.75E-04 | 6.24E-04 | 4.95E-04 | 5.13E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 5.24E-04 | 6.45E+02 | 1.44E+200 | 1.09E-05 | N/A | 1.6E-05 | 2.2E+00 |
| 75354 | 1,1-Dichloroethylene | 1.75E-04 | 5.47E-04 | 4.58E-04 | 4.79E-04 | 47.78 | 15 | 6.97E+03 | 0.10 | 1.04E+01 | 4.58E-04 | 6.45E+02 | 1.67E+229 | 1.05E-05 | 9.43E-02 | N/A | 5.0E-01 |
| 120821 | 1,2,4-Trichlorobenzene | 1.75E-04 | 2.25E-04 | 2.14E-04 | 2.21E-04 | 47.78 | 15 | 5.71E+03 | 0.10 | 1.04E+01 | 5.47E-04 | 6.45E+02 | 8.08E+191 | 1.10E-05 | 6.30E-02 | N/A | 2.0E-01 |
| 95501 | 1,2-Dichlorobenzene | 1.75E-04 | 1.56E-02 | 1.60E-02 | 1.58E-02 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 2.25E-04 | 6.45E+02 | #NUM! | 8.04E-06 | N/A | N/A | 2.0E-01 |
| 541731 | Dichlorobenzene, 1,3- | 1.75E-04 | 2.58E-04 | 2.40E-04 | 2.49E-04 | 47.78 | 15 | 6.09E-02 | 0.10 | 1.04E+01 | 1.56E-02 | 6.45E+02 | 5.40E+06 | 1.48E-05 | 9.02E-07 | N/A | N/A |
| 106467 | 1,4-Dichlorobenzene | 1.75E-04 | 4.38E-04 | 4.12E-04 | 4.28E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 2.58E-04 | 6.45E+02 | #NUM! | 8.49E-06 | N/A | N/A | N/A |
| 78933 | Butanone, 2- (MEK) | 1.75E-04 | 9.46E-04 | 9.27E-04 | 9.38E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 4.36E-04 | 6.45E+02 | 2.63E+239 | 1.04E-05 | N/A | N/A | 8.0E-01 |
| 67641 | Acetone | 1.75E-04 | 2.07E-03 | 2.06E-03 | 2.06E-03 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 9.45E-04 | 6.45E+02 | 1.09E+111 | 1.25E-05 | N/A | N/A | N/A |
| 71432 | Benzene | 1.75E-04 | 5.42E-04 | 5.07E-04 | 5.28E-04 | 47.78 | 15 | 2.06E+01 | 0.10 | 1.04E+01 | 2.07E-03 | 6.45E+02 | 5.63E+50 | 1.37E-05 | 2.83E-04 | N/A | N/A |
| 74839 | Bromomethane | 1.75E-04 | 4.46E-04 | 4.18E-04 | 4.35E-04 | 47.78 | 15 | 7.57E+02 | 0.10 | 1.04E+01 | 5.42E-04 | 6.45E+02 | 6.73E+193 | 1.10E-05 | 5.34E-03 | 7.8E-06 | 5.0E-03 |
| 75150 | Carbon Disulfide | 1.75E-04 | 6.34E-04 | 5.94E-04 | 6.18E-04 | 47.78 | 15 | 2.38E+02 | 0.10 | 1.04E+01 | 4.46E-04 | 6.45E+02 | 1.81E+235 | 1.04E-05 | 2.47E-03 | N/A | 5.0E-02 |
| 108907 | Chlorobenzene | 1.75E-04 | 4.55E-04 | 4.27E-04 | 4.44E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 6.34E-04 | 6.45E+02 | 2.87E+165 | 1.15E-05 | N/A | N/A | 1.0E-01 |
| 75003 | Ethyl Chloride | 1.75E-04 | 7.66E-04 | 7.16E-04 | 7.45E-04 | 47.78 | 15 | 6.65E+01 | 0.10 | 1.04E+01 | 4.55E-04 | 6.45E+02 | 3.97E+200 | 1.05E-05 | 6.97E-04 | N/A | 6.0E-02 |
| 67663 | Chloroform | 1.75E-04 | 6.43E-04 | 6.02E-04 | 6.26E-04 | 47.78 | 15 | 1.02E+04 | 0.10 | 1.04E+01 | 7.66E-04 | 6.45E+02 | 1.38E+137 | 1.19E-05 | 1.22E-01 | N/A | 1.0E+01 |
| 156592 | cis-1,2-Dichloroethylene | 1.75E-04 | 4.56E-04 | 4.30E-04 | 4.47E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 6.43E-04 | 6.45E+02 | 2.45E+163 | 1.15E-05 | N/A | 2.3E-05 | 5.0E-02 |
| 110827 | Cyclohexane | 1.75E-04 | 4.65E-04 | 4.53E-04 | 4.72E-04 | 47.78 | 15 | 6.52E+04 | 0.10 | 1.04E+01 | 4.59E-04 | 6.45E+02 | 7.49E+226 | 1.05E-05 | 6.85E-01 | N/A | 2.0E-01 |
| 100414 | Ethylbenzene | 1.75E-04 | 4.60E-04 | 4.31E-04 | 4.48E-04 | 47.78 | 15 | 1.04E+03 | 0.10 | 1.04E+01 | 4.65E-04 | 6.45E+02 | 3.37E+216 | 1.07E-05 | N/A | #N/A | #N/A |
| 98828 | Isopropylbenzene | 1.75E-04 | 3.95E-04 | 3.70E-04 | 3.85E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 4.60E-04 | 6.45E+02 | 1.44E+228 | 1.05E-05 | 1.09E-02 | N/A | 1.0E+00 |
| 108872 | Methyl cyclohexane | 1.75E-04 | 5.98E-04 | 5.59E-04 | 5.82E-04 | 47.78 | 15 | 1.11E+05 | 0.10 | 1.04E+01 | 3.95E-04 | 6.45E+02 | 3.75E+265 | 1.00E-05 | N/A | N/A | 4.0E-01 |
| 1634044 | Methyl- Tertiary-Butyl Ether | 1.75E-04 | 6.67E-04 | 6.28E-04 | 6.51E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 5.98E-04 | 6.45E+02 | 4.68E+175 | 1.13E-05 | 1.26E+00 | N/A | 3.0E+00 |
| 75092 | Methylene chloride | 1.75E-04 | 6.35E-04 | 5.96E-04 | 6.19E-04 | 47.78 | 15 | 7.98E+02 | 0.10 | 1.04E+01 | 6.67E-04 | 6.45E+02 | 2.47E+157 | 1.16E-05 | N/A | N/A | 3.0E+00 |
| 127184 | Tetrachloroethylene | 1.75E-04 | 4.39E-04 | 4.11E-04 | 4.27E-04 | 47.78 | 15 | 2.36E+03 | 0.10 | 1.04E+01 | 6.35E-04 | 6.45E+02 | 2.18E+165 | 1.15E-05 | 9.14E-03 | 4.7E-07 | 3.0E+00 |
| 108883 | Toluene | 1.75E-04 | 5.34E-04 | 5.00E-04 | 5.20E-04 | 47.78 | 15 | 2.16E+03 | 0.10 | 1.04E+01 | 4.39E-04 | 6.45E+02 | 1.92E+239 | 1.04E-05 | 2.45E-02 | 5.9E-06 | N/A |
| 156605 | trans-1,2-Dichloroethylene | 1.75E-04 | 4.32E-04 | 4.04E-04 | 4.20E-04 | 47.78 | 15 | 4.55E+03 | 0.10 | 1.04E+01 | 5.34E-04 | 6.45E+02 | 4.07E+196 | 1.10E-05 | 2.37E-02 | N/A | 4.0E-01 |
| 79016 | Trichloroethylene | 1.75E-04 | 4.83E-04 | 4.52E-04 | 4.70E-04 | 47.78 | 15 | 8.83E+03 | 0.10 | 1.04E+01 | 4.32E-04 | 6.45E+02 | 1.43E+243 | 1.03E-05 | 4.69E-02 | N/A | 2.0E-01 |
| 75014 | Vinyl chloride | 1.75E-04 | 8.44E-04 | 6.02E-04 | 6.27E-04 | 47.78 | 15 | 1.38E+05 | 0.10 | 1.04E+01 | 4.83E-04 | 6.45E+02 | 2.03E+217 | 1.07E-05 | 7.28E-02 | N/A | 4.0E-02 |
| 1330207 | Xylenes | 1.75E-04 | 3.75E-03 | 3.81E-03 | 3.77E-03 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 6.44E-04 | 6.45E+02 | 1.02E+183 | 1.15E-05 | 1.59E+00 | 8.8E-06 | 1.0E-01 |
| 98862 | Acetophenone | 1.75E-04 | 2.60E-03 | 2.64E-03 | 2.62E-03 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 3.75E-03 | 6.45E+02 | 1.01E+28 | 1.43E-05 | N/A | N/A | 1.0E-01 |
| 91203 | Naphthalene | 1.75E-04 | 4.70E-04 | 4.56E-04 | 4.62E-04 | 47.78 | 15 | 5.96E+01 | 0.10 | 1.04E+01 | 2.60E-03 | 6.45E+02 | 2.45E+40 | 1.40E-05 | N/A | N/A | N/A |
| 91576 | Methylnaphthalene, 2- | 1.75E-04 | 3.13E-04 | 2.95E-04 | 3.06E-04 | 47.78 | 15 | 2.24E+02 | 0.10 | 1.04E+01 | 4.70E-04 | 6.45E+02 | 2.56E+223 | 1.06E-05 | 6.32E-04 | N/A | 3.0E-03 |
| 92524 | Biphenyl, 1,1'- | 1.75E-04 | 3.15E-04 | 3.01E-04 | 3.09E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 3.13E-04 | 6.45E+02 | #NUM! | 9.23E-06 | 2.07E-03 | N/A | 3.0E-03 |
| 208968 | Acenaphthylene | 1.75E-04 | 3.36E-04 | 3.22E-04 | 3.31E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 3.15E-04 | 6.45E+02 | #NUM! | 9.27E-06 | N/A | N/A | N/A |
| 83329 | Acenaphthene | 1.75E-04 | 7.33E-04 | 7.31E-04 | 7.32E-04 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 3.36E-04 | 6.45E+02 | #NUM! | 9.51E-06 | N/A | N/A | 3.0E-03 |
| 86737 | Fluorene | 1.75E-04 | 8.16E-01 | 8.39E-01 | 8.25E-01 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 7.33E-04 | 6.45E+02 | 1.38E+143 | 1.19E-05 | N/A | N/A | 3.0E-03 |
| 85018 | Phenanthrene | 1.75E-04 | 3.50E-04 | 3.41E-04 | 3.48E-04 | 47.78 | 15 | 2.61E+01 | 0.10 | 1.04E+01 | 8.16E-01 | 6.45E+02 | 1.34E+00 | 5.84E-05 | N/A | N/A | 3.0E-03 |
| 120127 | Anthracene | 1.75E-04 | 1.60E-03 | 1.62E-03 | 1.61E-03 | 47.78 | 15 | N/A | 0.10 | 1.04E+01 | 3.50E-04 | 6.45E+02 | 2.10E+300 | 9.66E-06 | 2.72E-04 | N/A | 3.0E-03 |
| C9-C18 | C9-C18 Aliphatics | 1.75E-04 | 3.64E-04 | 3.40E-04 | 3.54E-04 | 47.78 | 15 | 3.39E+07 | 0.10 | 1.04E+01 | 1.60E-03 | 6.45E+02 | 6.32E+65 | 1.34E-05 | N/A | N/A | 3.0E-03 |
| C11-C22 | C11-C22 Aromatics | 1.75E-04 | 4.27E-04 | 4.05E-04 | 4.18E-04 | 47.78 | 15 | 5.49E+03 | 0.10 | 1.04E+01 | 3.64E-04 | 6.45E+02 | 4.88E+268 | 9.74E-06 | 3.30E+02 | N/A | 2.0E-01 |
| C5-C8 | C5-C8 Aliphatics | 1.75E-04 | 3.64E-04 | 3.40E-04 | 3.54E-04 | 47.78 | 15 | 3.22E+06 | 0.10 | 1.04E+01 | 4.27E-04 | 6.45E+02 | 7.52E+245 | 1.03E-05 | 6.66E-02 | N/A | 5.0E-02 |
| C9-C10 | C9-C10 Aromatics | 1.75E-04 | 3.69E-04 | 3.46E-04 | 3.60E-04 | 47.78 | 15 | 1.22E+04 | 0.10 | 1.04E+01 | 3.64E-04 | 6.45E+02 | 4.81E+268 | 9.74E-06 | 3.14E+01 | N/A | 2.0E-01 |
| C9-C12 | C9-C12 Aliphatics | 1.75E-04 | 3.64E-04 | 3.40E-04 | 3.54E-04 | 47.78 | 15 | 1.11E+06 | 0.10 | 1.04E+01 | 3.69E-04 | 6.45E+02 | 1.62E+264 | 9.80E-06 | 1.20E-01 | N/A | 5.0E-02 |
| | | | | | | | | | | 1.04E+01 | 3.64E-04 | 6.45E+02 | 4.87E+268 | 9.74E-06 | 1.08E+01 | N/A | 2.0E-01 |

Appendix C.4
Johnson & Ettinger Model - Results
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - CT
Southwest Prperties, Wells G&H Superfund Site, Operable Unit 2
Murphy Waste Oil

| | | 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) |
| 71556 | 1,1,1-Trichloroethane | NA | NA | NA | 1.33E+06 | NA | NA | 1.9E-05 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | NA | NA | NA | 1.70E+05 | NA | NA | NA |
| 79005 | 1,1,2-Trichloroethane | NA | NA | NA | 4.42E+06 | NA | NA | NA |
| 75343 | 1,1-Dichloroethane | NA | NA | NA | 5.06E+06 | NA | NA | 3.8E-05 |
| 75354 | 1,1-Dichloroethylene | NA | NA | NA | 2.25E+06 | NA | NA | 6.3E-05 |
| 120821 | 1,2,4-Trichlorobenzene | NA | NA | NA | 3.00E+05 | NA | NA | NA |
| 95501 | 1,2-Dichlorobenzene | NA | NA | NA | 2.77E+07 | NA | NA | NA |
| 541731 | Dichlorobenzene, 1,3- | NA | NA | NA | 6.88E+04 | NA | NA | NA |
| 106467 | 1,4-Dichlorobenzene | NA | NA | NA | 7.38E+04 | NA | NA | NA |
| 78933 | Butanone, 2- (MEK) | NA | NA | NA | 2.23E+08 | NA | NA | NA |
| 67641 | Acetone | NA | NA | NA | 1.00E+09 | NA | NA | NA |
| 71432 | Benzene | NA | NA | NA | 1.75E+06 | NA | 1.7E-09 | 5.6E-05 |
| 74839 | Bromomethane | NA | NA | NA | 1.52E+07 | NA | NA | 9.9E-05 |
| 75150 | Carbon Disulfide | NA | NA | NA | 2.67E+06 | NA | NA | NA |
| 108907 | Chlorobenzene | NA | NA | NA | 4.72E+05 | NA | NA | 2.3E-06 |
| 75003 | Ethyl Chloride | NA | NA | NA | 5.32E+06 | NA | NA | 2.4E-06 |
| 67663 | Chloroform | NA | NA | NA | 7.92E+06 | NA | NA | NA |
| 156592 | cis-1,2-Dichloroethylene | NA | NA | NA | 3.50E+06 | NA | NA | 6.9E-04 |
| 110827 | Cyclohexane | NA | NA | NA | 5.50E+04 | NA | NA | NA |
| 100414 | Ethylbenzene | NA | NA | NA | 1.69E+05 | NA | NA | 2.2E-06 |
| 98828 | Isopropylbenzene | NA | NA | NA | 5.60E+04 | NA | NA | NA |
| 108872 | Methyl cyclohexane | NA | NA | NA | 1.40E+04 | NA | NA | 8.4E-05 |
| 1634044 | Methyl-Tertiary-Butyl Ether | NA | NA | NA | 5.10E+07 | NA | NA | NA |
| 75092 | Methylene chloride | NA | NA | NA | 1.30E+07 | NA | 1.1E-10 | 6.1E-07 |
| 127184 | Tetrachloroethylene | NA | NA | NA | 2.00E+05 | NA | 3.7E-09 | NA |
| 108883 | Toluene | NA | NA | NA | 5.26E+05 | NA | NA | 1.2E-05 |
| 156605 | trans-1,2-Dichloroethylene | NA | NA | NA | 6.30E+06 | NA | NA | 4.7E-05 |
| 79016 | Trichloroethylene | NA | NA | NA | 1.10E+06 | NA | NA | 3.6E-04 |
| 75014 | Vinyl chloride | NA | NA | NA | 2.76E+06 | NA | 3.6E-07 | 3.2E-03 |
| 1330207 | Xylenes | NA | NA | NA | 2.20E+05 | NA | NA | NA |
| 98862 | Acetophenone | NA | NA | NA | 6.13E+06 | NA | NA | NA |
| 91203 | Naphthalene | NA | NA | NA | 3.10E+04 | NA | NA | 4.2E-05 |
| 91576 | Methylnaphthalene, 2- | NA | NA | NA | 2.46E+04 | NA | NA | 1.4E-04 |
| 92524 | Biphenyl, 1,1'- | NA | NA | NA | 6.94E+03 | NA | NA | NA |
| 208968 | Acenaphthylene | NA | NA | NA | 3.93E+03 | NA | NA | NA |
| 83329 | Acenaphthene | NA | NA | NA | 4.24E+03 | NA | NA | NA |
| 86737 | Fluorene | NA | NA | NA | 1.90E+03 | NA | NA | NA |
| 85018 | Phenanthrene | NA | NA | NA | 1.28E+03 | NA | NA | 1.8E-05 |
| 120127 | Anthracene | NA | NA | NA | 4.34E+01 | NA | NA | NA |
| C9-C18 | C9-C18 Aliphatics | NA | NA | NA | 1.00E+04 | NA | NA | 3.3E-01 |
| C11-C22 | C11-C22 Aromatics | NA | NA | NA | 5.80E+06 | NA | NA | 2.7E-04 |
| C5-C8 | C5-C8 Aliphatics | NA | NA | NA | 1.10E+07 | NA | NA | 3.1E-02 |
| C9-C10 | C9-C10 Aromatics | NA | NA | NA | 5.10E+07 | NA | NA | 4.8E-04 |
| C9-C12 | C9-C12 Aliphatics | NA | NA | NA | 7.00E+04 | NA | NA | 1.1E-02 |

| | 95% UCL Cancer Risk | 95% UCL HI |
|---|---|---|
| TOTAL: | 4E-07 | 4E-01 |

[ ] = Cancer risk > 1E-05 or HQ/HI>1E+00

END

Appendix C.4
Johnson & Ettinger Model - Data Entry Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - RME
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Aberjona Auto Parts

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

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) | Chemical | Enter initial groundwater conc., $C_{gw}$ (ug/L) | ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (15 or 200 cm) | ENTER Depth below grade to water table, LWT (cm) | ENTER SCS soil type directly above water table | ENTER Average soil groundwater temperature, $T_S$ (°C) | ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR Note | ENTER User-defined vadose zone soil vapor permeability, $k_v$ ($cm^2$) | ENTER Vadose zone soil dry bulk density, $\rho_b^V$ (g/$cm^3$) | ENTER Vadose zone soil total porosity, $n^V$ (unitless) | ENTER Vadose zone soil water-filled porosity, $\theta_w^V$ ($cm^3/cm^3$) | 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) | ENTER Exposure time ET (hrs/day) | ENTER Coversion factor CF (hrs/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 79005 | 1,1,2-Trichloroethane | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 75343 | 1,1-Dichloroethane | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 75354 | 1,1-Dichloroethylene | 1.06E-01 | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 120821 | 1,2,4-Trichlorobenzene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 95501 | 1,2-Dichlorobenzene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 541731 | Dichlorobenzene, 1,3- | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 106467 | 1,4-Dichlorobenzene | 4.69E-01 | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 78933 | Butanone, 2- (MEK) | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 67641 | Acetone | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 71432 | Benzene | 2.61E-01 | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 74839 | Bromomethane | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 75150 | Carbon Disulfide | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 108907 | Chlorobenzene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 75003 | Ethyl Chloride | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 67663 | Chloroform | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 156592 | cis-1,2-Dichloroethylene | 2.90E+01 | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 110827 | Cyclohexane | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 100414 | EthylBenzene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 98828 | Isopropylbenzene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 108872 | Methyl cyclohexane | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 1.40E+01 | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 75092 | Methylene chloride | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 127184 | Tetrachloroethylene | 6.13E-01 | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 108883 | Toluene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 156605 | trans-1,2-Dichloroethylene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 79016 | Trichloroethylene | 2.50E+01 | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 75014 | Vinyl chloride | 2.17E-01 | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 1330207 | Xylenes | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 98862 | Acetophenone | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 91203 | Naphthalene | 2.70E+00 | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 91576 | Methylnaphthalene, 2- | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 92524 | Biphenyl, 1,1'- | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 208968 | Acenaphthylene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 83329 | Acenaphthene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 86737 | Fluorene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 85018 | Phenanthrene | 2.10E+00 | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| 120127 | Anthracene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| C9-C18 | C9-C18 Aliphatics | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| C11-C22 | C11-C22 Aromatics | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| C5-C8 | C5-C8 Aliphatics | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| C9-C10 | C9-C10 Aromatics | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |
| C9-C12 | C9-C12 Aliphatics | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 25 | 25 | 250 | 8 | 8760 |

Note:
1) Default soil parameters from table 7 of User's Guide for Evaluating Subsurface Vapor Intrusion into Building (U.S. EPA June 19, 2003) were used for soil water filled porosity ($\theta_w$), soil organic carbon fraction ($f_{oc}$), soil total porosity (n), and soil dry bulk density ($\rho_b$).

Appendix C.4
Johnson & Ettinger Model - Chemical Properties Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - RME
Southwest Prperties, Wells G&H Superfund Site, Operable Unit 2
Aberjona Auto Parts

| Chemical CAS No. | Chemical | Diffusivity in air, $D_a$ ($cm^2/s$) | Diffusivity in water, $D_w$ ($cm^2/s$) | Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$) | Henry's law constant reference temperature, $T_R$ (°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, $K_{oc}$ ($cm^3/g$) | Pure component water solubility, S (mg/L) | Unit risk factor, URF $(\mu g/m^3)^{-1}$ | Reference conc., RfC ($mg/m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 7.80E-02 | 8.80E-06 | 1.72E-02 | 25 | 7,136 | 347.24 | 545.00 | 1.10E+02 | 1.33E+03 | N/A | 2.2E+00 |
| 76131 | Trichloro-1,2,2-triflouroethane, 1, | 2.88E-02 | 8.07E-06 | 5.17E-01 | 25 | 1,326 | 320.70 | 481.05 | 2.25E+02 | 1.70E+02 | N/A | 3.0E+01 |
| 79005 | 1,1,2-Trichloroethane | 7.80E-02 | 8.80E-06 | 9.12E-04 | 25 | 8,322 | 386.15 | 602.00 | 5.01E+01 | 4.42E+03 | 1.6E-05 | 2.2E+00 |
| 75343 | 1,1-Dichloroethane | 7.42E-02 | 1.05E-05 | 5.61E-03 | 25 | 6,895 | 330.55 | 523.00 | 3.16E+01 | 5.06E+03 | N/A | 5.0E-01 |
| 75354 | 1,1-Dichloroethylene | 9.00E-02 | 1.04E-05 | 2.61E-02 | 25 | 6,247 | 304.75 | 576.05 | 5.89E+01 | 2.25E+03 | N/A | 2.0E-01 |
| 120821 | 1,2,4-Trichlorobenzene | 3.00E-02 | 8.23E-06 | 1.42E-03 | 25 | 10,471 | 486.15 | 725.00 | 1.78E+03 | 3.00E+02 | N/A | 2.0E-01 |
| 95501 | 1,2-Dichlorobenzene | 6.88E-02 | 9.41E-06 | 1.62E-06 | 25 | 1,223 | 465.00 | 697.50 | 5.34E+01 | 2.77E+04 | N/A | N/A |
| 541731 | Dichlorobenzene, 1,3- | 4.14E-02 | 8.85E-06 | 4.70E-03 | 25 | 1,242 | 446.00 | 683.96 | 1.70E+02 | 6.88E+01 | N/A | N/A |
| 106467 | 1,4-Dichlorobenzene | 6.90E-02 | 7.90E-06 | 2.43E-03 | 25 | 9,271 | 447.21 | 684.75 | 6.17E+02 | 7.38E+01 | N/A | 8.0E-01 |
| 78933 | Butanone, 2- (MEK) | 8.08E-02 | 9.80E-06 | 5.60E-05 | 25 | 1,311 | 352.50 | 528.75 | 3.63E+00 | 2.23E+05 | N/A | N/A |
| 67641 | Acetone | 1.24E-01 | 1.14E-05 | 3.88E-05 | 25 | 6,955 | 329.20 | 508.10 | 5.75E-01 | 1.00E+06 | N/A | N/A |
| 71432 | Benzene | 8.80E-02 | 9.80E-06 | 5.56E-03 | 25 | 7,342 | 353.24 | 562.16 | 5.89E+01 | 1.75E+03 | 7.8E-06 | 3.0E-02 |
| 74839 | Bromomethane | 7.28E-02 | 1.21E-05 | 6.22E-03 | 25 | 1,362 | 276.50 | 414.75 | 1.43E+01 | 1.52E+04 | N/A | 5.0E-03 |
| 75150 | Carbon Disulfide | 1.04E-01 | 1.29E-05 | 1.27E-02 | 25 | 6,391 | 319.00 | 552.00 | 5.14E+01 | 2.67E+03 | N/A | 7.0E-01 |
| 108907 | Chlorobenzene | 7.30E-02 | 8.70E-06 | 3.71E-03 | 25 | 8,410 | 404.87 | 632.40 | 2.19E+02 | 4.72E+02 | N/A | 6.0E-02 |
| 75003 | Ethyl Chloride | 1.26E-01 | 6.50E-06 | 8.67E-03 | 25 | 1,355 | 249.00 | 373.50 | 1.43E+01 | 5.32E+03 | N/A | 1.0E+01 |
| 67663 | Chloroform | 1.04E-01 | 1.00E-05 | 3.66E-03 | 25 | 6,988 | 334.32 | 536.40 | 3.98E+01 | 7.92E+03 | 2.3E-05 | 5.0E-02 |
| 156592 | cis-1,2-Dichloroethylene | 7.36E-02 | 1.13E-05 | 4.07E-03 | 25 | 7,192 | 333.65 | 544.00 | 3.55E+01 | 3.50E+03 | N/A | 2.0E-01 |
| 110827 | Cyclohexane | 8.00E-02 | 9.00E-06 | 2.00E+00 | 25 | 1,309 | 353.85 | 530.78 | 1.60E+02 | 5.50E+01 | #N/A | #N/A |
| 100414 | Ethylbenzene | 7.50E-02 | 7.80E-06 | 7.88E-03 | 25 | 8,501 | 409.34 | 617.20 | 3.63E+02 | 1.69E+02 | N/A | 1.0E+00 |
| 98828 | Isopropylbenzene | 6.50E-02 | 7.83E-06 | 1.47E-02 | 25 | 1,259 | 425.40 | 631.01 | 9.31E+03 | 5.60E+01 | N/A | 4.0E-01 |
| 108872 | Methyl cyclohexane | 9.86E-02 | 8.52E-06 | 4.23E-01 | 25 | 1,296 | 373.90 | 560.85 | 2.68E+02 | 1.40E+01 | N/A | 3.0E+00 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 1.02E-01 | 1.05E-05 | 5.87E-04 | 25 | 1,324 | 328.36 | 497.11 | 3.84E+01 | 5.10E+04 | N/A | 3.0E+00 |
| 75092 | Methylene chloride | 1.01E-01 | 1.17E-05 | 2.19E-03 | 25 | 6,706 | 313.00 | 510.00 | 1.17E+01 | 1.30E+04 | 4.7E-07 | 3.0E+00 |
| 127184 | Tetrachloroethylene | 7.20E-02 | 8.20E-06 | 1.84E-02 | 25 | 8,288 | 394.40 | 620.20 | 1.55E+02 | 2.00E+02 | 5.9E-06 | N/A |
| 108883 | Toluene | 8.70E-02 | 8.60E-06 | 6.63E-03 | 25 | 7,930 | 383.78 | 591.79 | 1.82E+02 | 5.26E+02 | N/A | 4.0E-01 |
| 156605 | trans-1,2-Dichloroethylene | 7.07E-02 | 1.19E-05 | 9.39E-03 | 25 | 1,333 | 320.85 | 516.50 | 5.25E+01 | 6.30E+03 | N/A | 2.0E-01 |
| 79016 | Trichloroethylene | 7.90E-02 | 9.10E-06 | 1.03E-02 | 25 | 7,505 | 360.36 | 544.20 | 1.66E+02 | 1.10E+03 | N/A | 4.0E-02 |
| 75014 | Vinyl chloride | 1.06E-01 | 1.23E-05 | 2.71E-02 | 25 | 5,250 | 259.25 | 432.00 | 1.86E+01 | 2.76E+03 | 8.8E-06 | 1.0E-01 |
| 1330207 | Xylenes | 7.69E-02 | 8.44E-06 | 6.73E-06 | 25 | 1,264 | 417.40 | 616.21 | 2.41E+02 | 2.20E+02 | N/A | 1.0E-01 |
| 98862 | Acetophenone | 6.00E-02 | 8.73E-06 | 1.02E-05 | 25 | 1,214 | 475.00 | 712.50 | 4.62E+01 | 6.13E+03 | N/A | N/A |
| 91203 | Naphthalene | 5.90E-02 | 7.50E-06 | 4.83E-04 | 25 | 10,373 | 491.14 | 748.40 | 2.00E+03 | 3.10E+01 | N/A | 3.0E-03 |
| 91576 | Methylnaphthalene, 2- | 4.84E-02 | 7.75E-06 | 1.01E-03 | 25 | 1,169 | 514.05 | 761.01 | 8.51E+03 | 2.46E+01 | N/A | 3.0E-03 |
| 92524 | Biphenyl, 1,1'- | 4.04E-02 | 8.15E-06 | 3.03E-04 | 25 | 1,149 | 529.10 | 793.65 | 6.25E+03 | 6.94E+00 | N/A | N/A |
| 208968 | Acenaphthylene | 4.43E-02 | 7.44E-06 | 2.80E-04 | 25 | 1,118 | 553.00 | 792.01 | 4.79E+03 | 3.93E+00 | N/A | 3.0E-03 |
| 83329 | Acenaphthene | 4.21E-02 | 7.69E-06 | 1.55E-04 | 25 | 12,155 | 550.54 | 803.15 | 7.08E+03 | 4.24E+00 | N/A | 3.0E-03 |
| 86737 | Fluorene | 3.63E-02 | 7.88E-06 | 9.41E-08 | 25 | 12,666 | 570.44 | 870.00 | 7.71E+03 | 1.90E+00 | N/A | 3.0E-03 |
| 85018 | Phenanthrene | 3.30E-02 | 7.47E-06 | 1.30E-04 | 25 | 1,057 | 613.00 | 869.01 | 1.41E+04 | 1.28E+00 | N/A | 3.0E-03 |
| 120127 | Anthracene | 3.24E-02 | 7.74E-06 | 6.51E-05 | 25 | 13,121 | 615.18 | 873.00 | 2.95E+04 | 4.34E-02 | N/A | 3.0E-03 |
| C9-C18 | C9-C18 Aliphatics | 6.00E-02 | 1.00E-05 | 1.66E+00 | 25 | NA | NA | NA | 6.80E+05 | 1.00E+01 | N/A | 2.0E-01 |
| C11-C22 | C11-C22 Aromatics | 6.00E-02 | 1.00E-05 | 7.32E-04 | 25 | NA | NA | NA | 5.00E+03 | 5.80E+03 | N/A | 5.0E-02 |
| C5-C8 | C5-C8 Aliphatics | 6.00E-02 | 1.00E-05 | 1.30E+00 | 25 | NA | NA | NA | 2.27E+03 | 1.10E+04 | N/A | 2.0E-01 |
| C9-C10 | C9-C10 Aromatics | 6.00E-02 | 1.00E-05 | 7.92E-03 | 25 | NA | NA | NA | 1.78E+03 | 5.10E+04 | N/A | 5.0E-02 |
| C9-C12 | C9-C12 Aliphatics | 6.00E-02 | 1.00E-05 | 1.56E+00 | 25 | NA | NA | NA | 1.50E+05 | 7.00E+01 | N/A | 2.0E-01 |

Appendix C.4
Johnson & Ettinger Model - Calculations Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - RME
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Abarjona Auto Parts

| | | Source-building separation, $L_T$ (cm) | Vadose zone soil air-filled porosity, $\theta_a^V$ ($cm^3/cm^3$) | Vadose zone effective total fluid saturation, $S_e$ ($cm^3/cm^3$) | 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, Xcrack (cm) | Bldg. ventilation rate, $Q_{building}$ ($cm^3/s$) | Area of enclosed space below grade, $A_B$ ($cm^2$) | Crack-to-total area ratio, $\eta$ (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 vs. groundwater temperature, $H'_{TS}$ (unitless) | Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 7,885 | 8.50E-03 | 3.66E-01 | 1.75E-04 |
| 76131 | Trichloro(1,2,2-trifluoroethane, 1,1,2- | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,436 | 4.55E-01 | 1.90E+01 | 1.75E-04 |
| 79005 | 1,1,2-Trichloroethane | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 9,572 | 3.88E-04 | 1.67E-02 | 1.75E-04 |
| 75343 | 1,1-Dichloroethane | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 7,460 | 5.58E-03 | 1.24E-01 | 1.75E-04 |
| 75354 | 1,1-Dichloroethylene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 6,392 | 1.47E-02 | 6.34E-01 | 1.75E-04 |
| 120821 | 1,2,4-Trichlorobenzene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 13,220 | 4.35E-04 | 1.87E-02 | 1.75E-04 |
| 95501 | 1,2-Dichlorobenzene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,521 | 1.41E-06 | 6.09E-05 | 1.75E-04 |
| 541731 | Dichlorobenzene, 1,3- | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,503 | 4.11E-03 | 1.77E-01 | 1.75E-04 |
| 106467 | 1,4-Dichlorobenzene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 11,243 | 8.89E-04 | 3.83E-02 | 1.75E-04 |
| 78933 | Butanone, 2- (MEK) | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,486 | 4.90E-05 | 2.11E-03 | 1.75E-04 |
| 67641 | Acetone | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 7,659 | 1.97E-05 | 8.50E-04 | 1.75E-04 |
| 71432 | Benzene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 8,122 | 2.69E-03 | 1.16E-01 | 1.75E-04 |
| 74839 | Bromomethane | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,337 | 5.52E-03 | 2.38E-01 | 1.75E-04 |
| 75150 | Carbon Disulfide | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 6,682 | 6.96E-03 | 3.01E-01 | 1.75E-04 |
| 108907 | Chlorobenzene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 9,803 | 1.54E-03 | 6.65E-02 | 1.75E-04 |
| 75003 | Ethyl Chloride | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,201 | 7.79E-03 | 3.35E-01 | 1.75E-04 |
| 67663 | Chloroform | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 7,554 | 1.86E-03 | 8.02E-02 | 1.75E-04 |
| 156592 | cis-1,2-Dichloroethylene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 7,734 | 2.04E-03 | 8.77E-02 | 1.75E-04 |
| 110827 | Cyclohexane | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,486 | 1.75E+00 | 7.54E+01 | 1.75E-04 |
| 100414 | Ethylbenzene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 10,155 | 3.18E-03 | 1.37E-01 | 1.75E-04 |
| 98828 | Isopropylbenzene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,540 | 1.28E-02 | 5.51E-01 | 1.75E-04 |
| 108872 | Methyl cyclohexane | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,505 | 3.70E-01 | 1.59E+01 | 1.75E-04 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,447 | 5.16E-04 | 2.22E-02 | 1.75E-04 |
| 75092 | Methylene chloride | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 7,034 | 1.17E-03 | 5.03E-02 | 1.75E-04 |
| 127184 | Tetrachloroethylene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 9,553 | 7.83E-03 | 3.37E-01 | 1.75E-04 |
| 108883 | Toluene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 9,154 | 2.92E-03 | 1.26E-01 | 1.75E-04 |
| 156605 | trans-1,2-Dichloroethylene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,417 | 8.27E-03 | 3.56E-01 | 1.75E-04 |
| 79016 | Trichloroethylene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 8,857 | 4.75E-03 | 2.04E-01 | 1.75E-04 |
| 75014 | Vinyl chloride | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 5,000 | 1.73E-02 | 7.49E-01 | 1.75E-04 |
| 1330207 | Xylenes | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,542 | 5.85E-06 | 2.52E-04 | 1.75E-04 |
| 98862 | Acetophenone | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,518 | 8.81E-06 | 3.83E-04 | 1.75E-04 |
| 91203 | Naphthalene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 12,913 | 1.62E-04 | 6.66E-03 | 1.75E-04 |
| 91576 | Methylnaphthalene, 2- | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,506 | 8.66E-04 | 3.81E-02 | 1.75E-04 |
| 92524 | Biphenyl, 1,1- | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,472 | 2.68E-04 | 1.14E-02 | 1.75E-04 |
| 208968 | Acenaphthylene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,513 | 2.45E-04 | 1.05E-02 | 1.75E-04 |
| 83329 | Acenaphthene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 16,123 | 3.67E-05 | 1.58E-03 | 1.75E-04 |
| 86737 | Fluorene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 19,236 | 2.20E-06 | 9.48E-05 | 1.75E-04 |
| 85018 | Phenanthrene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,479 | 1.14E-04 | 4.90E-03 | 1.75E-04 |
| 120127 | Anthracene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 18,353 | 1.26E-05 | 5.43E-04 | 1.75E-04 |
| C9-C18 | C9-C18 Aliphatics | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | NA | 8.28E-01 | 3.56E+01 | 1.75E-04 |
| C11-C22 | C11-C22 Aromatics | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | NA | 3.69E-04 | 1.59E-02 | 1.75E-04 |
| C5-C8 | C5-C8 Aliphatics | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | NA | 6.48E-01 | 2.79E+01 | 1.75E-04 |
| C9-C10 | C9-C10 Aromatics | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | NA | 3.96E-03 | 1.70E-01 | 1.75E-04 |
| C9-C12 | C9-C12 Aliphatics | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | NA | 7.90E-01 | 3.36E+01 | 1.75E-04 |

Appendix C.4
Johnson & Ettinger Model - Calculations Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - RME
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Aberfoyle Auto Parts

| | | 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, $D^{eff}_T$ ($cm^2/s$) | Diffusion path length, $L_d$ (cm) | Convection path length, $L_p$ (cm) | Source vapor conc., $C_{source}$ ($\mu g/m^3$) | Crack radius, $r_{crack}$ (cm) | Average vapor flow rate into bldg., $Q_{soil}$ ($cm^3/s$) | Crack effective diffusion coefficient, $D^{crack}$ ($cm^2/s$) | Area of crack, $A_{crack}$ ($cm^2$) | Exponent of equivalent foundation Peclet number, exp(Pe') (unitless) | Infinite source indoor attenuation coefficient, $\alpha$ (unitless) | Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$) | Unit risk factor, URF ($\mu g/m^3)^{-1}$ | Reference conc., RfC ($mg/m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 4.76E-04 | 4.45E-04 | 4.60E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 4.75E-04 | 3.01E+03 | 1.21E+216 | 2.36E-06 | N/A | N/A | 2.2E+00 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | 1.78E-04 | 1.63E-04 | 1.71E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 1.76E-04 | 3.01E+03 | #NUM! | 1.98E-06 | N/A | N/A | 3.0E+01 |
| 79005 | 1,1,2-Trichloroethane | 5.24E-04 | 4.96E-04 | 5.16E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 5.24E-04 | 3.01E+03 | 3.42E+197 | 2.38E-06 | N/A | 1.6E-05 | 2.2E+00 |
| 75354 | 1,1-Dichloroethylene | 4.58E-04 | 4.29E-04 | 4.50E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 4.58E-04 | 3.01E+03 | 1.65E+226 | 2.35E-06 | N/A | N/A | 2.0E-01 |
| 120821 | 1,2,4-Trichlorobenzene | 5.47E-04 | 5.12E-04 | 5.37E-04 | 67.6 | 15 | 6.71E+01 | 0.10 | 4.79E+01 | 5.47E-04 | 3.01E+03 | 2.45E+189 | 2.35E-06 | 1.60E-04 | N/A | 2.0E-01 |
| 95501 | 1,2-Dichlorobenzene | 2.26E-04 | 2.14E-04 | 2.22E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 2.25E-04 | 3.01E+03 | #NUM! | 2.10E-06 | N/A | N/A | 2.0E-01 |
| 541731 | Dichlorobenzene, 1,3- | 1.66E-02 | 1.60E-02 | 1.57E-02 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 1.56E-02 | 3.01E+03 | 4.41E+06 | 2.54E-06 | N/A | N/A | N/A |
| 106467 | 1,4-Dichlorobenzene | 2.56E-04 | 2.40E-04 | 2.51E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 2.56E-04 | 3.01E+03 | #NUM! | 2.16E-06 | N/A | N/A | N/A |
| 78933 | Butanone, 2- (MEK) | 4.38E-04 | 4.12E-04 | 4.31E-04 | 67.6 | 15 | 1.79E+01 | 0.10 | 4.79E+01 | 4.38E-04 | 3.01E+03 | 2.05E+236 | 2.34E-06 | 4.19E-05 | N/A | 8.0E-01 |
| 67641 | Acetone | 9.45E-04 | 9.27E-04 | 9.40E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 9.45E-04 | 3.01E+03 | 3.81E+109 | 2.49E-06 | N/A | N/A | N/A |
| 71432 | Benzene | 2.07E-03 | 2.06E-03 | 2.07E-03 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 2.07E-03 | 3.01E+03 | 1.22E+60 | 2.67E-06 | N/A | N/A | N/A |
| 74839 | Bromomethane | 5.42E-04 | 5.07E-04 | 5.32E-04 | 67.6 | 15 | 3.02E+01 | 0.10 | 4.79E+01 | 5.42E-04 | 3.01E+03 | 1.94E+181 | 2.39E-06 | 7.22E-05 | 7.8E-06 | 3.0E-02 |
| 75150 | Carbon Disulfide | 4.46E-04 | 4.18E-04 | 4.38E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 8.46E-04 | 3.01E+03 | 1.58E+232 | 2.34E-06 | N/A | N/A | 6.0E-03 |
| 108907 | Chlorobenzene | 6.34E-04 | 5.94E-04 | 6.23E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 6.34E-04 | 3.01E+03 | 1.99E+163 | 2.42E-06 | N/A | N/A | 7.0E-01 |
| 75003 | Ethyl Chloride | 4.55E-04 | 4.27E-04 | 4.47E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 4.55E-04 | 3.01E+03 | 3.77E+227 | 2.35E-06 | N/A | N/A | 6.0E-02 |
| 67663 | Chloroform | 7.56E-04 | 7.16E-04 | 7.51E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 7.66E-04 | 3.01E+03 | 2.20E+135 | 2.49E-06 | N/A | N/A | 1.0E+01 |
| 156592 | cis-1,2-Dichloroethylene | 6.43E-04 | 6.02E-04 | 6.31E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 6.43E-04 | 3.01E+03 | 1.77E+161 | 2.43E-06 | N/A | 2.3E-05 | 5.0E-02 |
| 110827 | Cyclohexane | 4.59E-04 | 4.30E-04 | 4.50E-04 | 67.6 | 15 | 2.54E+03 | 0.10 | 4.79E+01 | 4.59E-04 | 3.01E+03 | 7.48E+225 | 2.35E-06 | 5.97E-03 | N/A | 2.0E-01 |
| 100414 | Ethylbenzene | 4.85E-04 | 4.53E-04 | 4.76E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 4.85E-04 | 3.01E+03 | 4.89E+213 | 2.36E-06 | N/A | #N/A | #N/A |
| 98828 | Isopropylbenzene | 4.60E-04 | 4.31E-04 | 4.52E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 4.60E-04 | 3.01E+03 | 1.24E+262 | 2.31E-06 | N/A | N/A | 1.0E+00 |
| 108872 | Methyl cyclohexane | 3.96E-04 | 3.70E-04 | 3.88E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 4.90E-04 | 3.01E+03 | 1.47E+228 | 2.35E-06 | N/A | N/A | 1.0E+00 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 5.98E-04 | 5.59E-04 | 5.86E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 3.95E-04 | 3.01E+03 | 1.24E+262 | 2.31E-06 | N/A | N/A | 4.0E-01 |
| 75092 | Methylene chloride | 6.67E-04 | 6.28E-04 | 6.56E-04 | 67.6 | 15 | 3.11E+02 | 0.10 | 4.79E+01 | 5.96E-04 | 3.01E+03 | 2.33E+173 | 2.41E-06 | N/A | N/A | 3.0E+00 |
| 127184 | Tetrachloroethylene | 6.35E-04 | 5.96E-04 | 6.24E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 8.67E-04 | 3.01E+03 | 2.13E+155 | 2.43E-06 | 7.56E-04 | N/A | 3.0E+00 |
| 108883 | Toluene | 4.39E-04 | 4.11E-04 | 4.31E-04 | 67.6 | 15 | 1.41E+02 | 0.10 | 4.79E+01 | 8.35E-04 | 3.01E+03 | 1.48E+183 | 2.42E-06 | N/A | 4.7E-07 | 3.0E+00 |
| 156605 | trans-1,2-Dichloroethylene | 5.34E-04 | 5.00E-04 | 5.24E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 4.39E-04 | 3.01E+03 | 1.40E+238 | 2.34E-06 | 3.29E-04 | 5.9E-06 | N/A |
| 79016 | Trichloroethylene | 4.32E-04 | 4.04E-04 | 4.24E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 5.34E-04 | 3.01E+03 | 1.66E+194 | 2.39E-06 | N/A | N/A | 4.0E-01 |
| 75014 | Vinyl chloride | 4.83E-04 | 4.52E-04 | 4.74E-04 | 67.6 | 15 | 5.16E+03 | 0.10 | 4.79E+01 | 4.32E-04 | 3.01E+03 | 9.25E+239 | 2.33E-06 | N/A | N/A | 2.0E-01 |
| 1330207 | Xylenes | 6.44E-04 | 6.02E-04 | 6.32E-04 | 67.6 | 15 | 1.62E+02 | 0.10 | 4.79E+01 | 4.83E-04 | 3.01E+03 | 2.88E+214 | 2.34E-06 | 1.22E-02 | N/A | 4.0E-02 |
| 56552 | Acetophenone | 3.75E-03 | 3.61E-03 | 3.77E-03 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 8.44E-04 | 3.01E+03 | 7.47E+190 | 2.43E-06 | 3.83E-04 | 3.8E-06 | 1.0E-01 |
| 91203 | Naphthalene | 2.80E-03 | 2.64E-03 | 2.61E-03 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 3.76E-03 | 3.01E+03 | 4.33E+27 | 2.61E-06 | N/A | N/A | 1.0E-01 |
| 91576 | Methylnaphthalene, 2- | 4.70E-04 | 4.60E-04 | 4.64E-04 | 67.6 | 15 | 1.77E+01 | 0.10 | 4.79E+01 | 2.60E-03 | 3.01E+03 | 7.28E+39 | 2.69E-06 | N/A | N/A | N/A |
| 92524 | Biphenyl, 1,1'- | 3.13E-04 | 2.95E-04 | 3.08E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 4.70E-04 | 3.01E+03 | 3.02E+220 | 2.36E-06 | 4.17E-05 | N/A | 3.0E-03 |
| 208968 | Acenaphthylene | 3.15E-04 | 3.01E-04 | 3.11E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 3.13E-04 | 3.01E+03 | #NUM! | 2.23E-06 | N/A | N/A | 3.0E-03 |
| 83329 | Acenaphthene | 3.38E-04 | 3.22E-04 | 3.33E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 3.15E-04 | 3.01E+03 | #NUM! | 2.24E-06 | N/A | N/A | N/A |
| 86737 | Fluorene | 7.33E-04 | 7.31E-04 | 7.33E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 3.23E-04 | 3.01E+03 | 7.70E+306 | 2.26E-06 | N/A | N/A | 3.0E-03 |
| 85018 | Phenanthrene | 8.19E-01 | 8.39E-01 | 8.22E-01 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 7.33E-04 | 3.01E+03 | 1.83E+141 | 2.45E-06 | N/A | N/A | 3.0E-03 |
| 120127 | Anthracene | 3.50E-04 | 3.41E-04 | 3.47E-04 | 67.6 | 15 | 1.03E+01 | 0.10 | 4.79E+01 | 8.19E-01 | 3.01E+03 | 1.34E+03 | 1.04E-05 | N/A | N/A | 3.0E-03 |
| C9-C18 | C9-C18 Aliphatics | 1.90E-03 | 1.62E-03 | 1.80E-03 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 3.50E-04 | 3.01E+03 | 2.42E+256 | 2.27E-06 | 2.34E-05 | N/A | 3.0E-03 |
| C11-C22 | C11-C22 Aromatics | 3.64E-04 | 3.46E-04 | 3.57E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 1.80E-03 | 3.01E+02 | 5.67E+64 | 2.55E-06 | N/A | N/A | 3.0E-03 |
| C5-C8 | C5-C8 Aliphatics | 4.27E-04 | 4.05E-04 | 4.21E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 3.64E-04 | 3.01E+03 | 8.02E+284 | 2.26E-06 | N/A | N/A | 2.0E-01 |
| C9-C10 | C9-C10 Aromatics | 3.64E-04 | 3.40E-04 | 3.57E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 4.27E-04 | 3.01E+03 | 4.50E+242 | 2.33E-06 | N/A | N/A | 5.0E-02 |
| C9-C12 | C9-C12 Aliphatics | 3.68E-04 | 3.46E-04 | 3.63E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 3.64E-04 | 3.01E+03 | 7.91E+284 | 2.26E-06 | N/A | N/A | 2.0E-01 |
| | | 3.64E-04 | 3.40E-04 | 3.67E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 3.68E-04 | 3.01E+03 | 3.04E+260 | 2.29E-06 | N/A | N/A | 5.0E-02 |
| | | | | | | | | | | 3.64E-04 | 3.01E+03 | 7.99E+284 | 2.26E-06 | N/A | N/A | 2.0E-01 |

Appendix C.4
Johnson & Ettinger Model - Results
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - RME
outhwest Prperties, Wells G&H Superfund Site, Operable Unit 2
erjona Auto Parts

| | | 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) |
| 71556 | 1,1,1-Trichloroethane | NA | NA | NA | 1.33E+06 | N/A | NA | NA |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | NA | NA | NA | 1.70E+05 | N/A | NA | NA |
| 79005 | 1,1,2-Trichloroethane | NA | NA | NA | 4.42E+06 | N/A | NA | NA |
| 75343 | 1,1-Dichloroethane | NA | NA | NA | 5.06E+06 | N/A | NA | NA |
| 75354 | 1,1-Dichloroethylene | NA | NA | NA | 2.25E+06 | N/A | NA | 1.8E-07 |
| 120821 | 1,2,4-Trichlorobenzene | NA | NA | NA | 3.00E+05 | N/A | NA | NA |
| 95501 | 1,2-Dichlorobenzene | NA | NA | NA | 2.77E+07 | N/A | NA | NA |
| 541731 | Dichlorobenzene, 1,3- | NA | NA | NA | 6.88E+04 | N/A | NA | NA |
| 106467 | 1,4-Dichlorobenzene | NA | NA | NA | 7.38E+04 | N/A | NA | 1.2E-08 |
| 78933 | Butanone, 2- (MEK) | NA | NA | NA | 2.23E+08 | N/A | NA | NA |
| 67641 | Acetone | NA | NA | NA | 1.00E+09 | N/A | NA | NA |
| 71432 | Benzene | NA | NA | NA | 1.75E+06 | N/A | 4.6E-11 | 5.5E-07 |
| 74839 | Bromomethane | NA | NA | NA | 1.52E+07 | N/A | NA | NA |
| 75150 | Carbon Disulfide | NA | NA | NA | 2.67E+06 | N/A | NA | NA |
| 108907 | Chlorobenzene | NA | NA | NA | 4.72E+05 | N/A | NA | NA |
| 75003 | Ethyl Chloride | NA | NA | NA | 5.32E+06 | N/A | NA | NA |
| 67663 | Chloroform | NA | NA | NA | 7.92E+06 | N/A | NA | NA |
| 156592 | cis-1,2-Dichloroethylene | NA | NA | NA | 3.50E+06 | N/A | NA | 6.8E-06 |
| 110827 | Cyclohexane | NA | NA | NA | 5.50E+04 | N/A | NA | NA |
| 100414 | Ethylbenzene | NA | NA | NA | 1.69E+05 | N/A | NA | NA |
| 98828 | Isopropylbenzene | NA | NA | NA | 5.60E+04 | N/A | NA | NA |
| 108872 | Methyl cyclohexane | NA | NA | NA | 1.40E+04 | N/A | NA | NA |
| 1634044 | Methyl-Tertiary-Butyl Ether | NA | NA | NA | 5.10E+07 | N/A | NA | 5.8E-08 |
| 75092 | Methylene chloride | NA | NA | NA | 1.30E+07 | N/A | NA | NA |
| 127184 | Tetrachloroethylene | NA | NA | NA | 2.00E+05 | N/A | 1.6E-10 | NA |
| 108883 | Toluene | NA | NA | NA | 5.26E+05 | N/A | NA | NA |
| 156605 | trans-1,2-Dichloroethylene | NA | NA | NA | 6.30E+06 | N/A | NA | NA |
| 79016 | Trichloroethylene | NA | NA | NA | 1.10E+06 | N/A | NA | 7.0E-05 |
| 75014 | Vinyl chloride | NA | NA | NA | 2.76E+06 | N/A | 2.8E-10 | 9.0E-07 |
| 1330207 | Xylenes | NA | NA | NA | 2.20E+05 | N/A | NA | NA |
| 98862 | Acetophenone | NA | NA | NA | 6.13E+06 | N/A | NA | NA |
| 91203 | Naphthalene | NA | NA | NA | 3.10E+04 | N/A | NA | 3.2E-06 |
| 91576 | Methylnaphthalene, 2- | NA | NA | NA | 2.46E+04 | N/A | NA | NA |
| 92524 | Biphenyl, 1,1'- | NA | NA | NA | 6.94E+03 | N/A | NA | NA |
| 208968 | Acenaphthylene | NA | NA | NA | 3.93E+03 | N/A | NA | NA |
| 83329 | Acenaphthene | NA | NA | NA | 4.24E+03 | N/A | NA | NA |
| 86737 | Fluorene | NA | NA | NA | 1.90E+03 | N/A | NA | NA |
| 85018 | Phenanthrene | NA | NA | NA | 1.28E+03 | N/A | NA | 1.8E-06 |
| 120127 | Anthracene | NA | NA | NA | 4.34E+01 | N/A | NA | NA |
| C9-C18 | C9-C18 Aliphatics | NA | NA | NA | 1.00E+04 | N/A | NA | NA |
| C11-C22 | C11-C22 Aromatics | NA | NA | NA | 5.80E+06 | N/A | NA | NA |
| C5-C8 | C5-C8 Aliphatics | NA | NA | NA | 1.10E+07 | N/A | NA | NA |
| C9-C10 | C9-C10 Aromatics | NA | NA | NA | 5.10E+07 | N/A | NA | NA |
| C9-C12 | C9-C12 Aliphatics | NA | NA | NA | 7.00E+04 | N/A | NA | NA |

| | 95% UCL Cancer Risk | 95% UCL HI |
|---|---|---|
| TOTAL: | 5E-10 | 8E-05 |

[ ] = Cancer risk > 1E-05 or HQ/HI>1E+00

END

Appendix C.4
Johnson & Ettinger Model - Data Entry Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - CT
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Aberdeen Auto Parts

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

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) | Chemical | Enter initial groundwater conc., $C_w$ (ug/L) | ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (15 or 200 cm) | ENTER Depth below grade to water table, LWT (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/groundwater temperature, $T_S$ (°C) | ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR Note | ENTER User-defined vadose zone soil vapor permeability, $k_v$ ($cm^2$) | ENTER Vadose zone soil dry bulk density, $\rho_b^V$ ($g/cm^3$) | ENTER Vadose zone soil total porosity, $n^V$ (unitless) | ENTER Vadose zone soil water-filled porosity, $\theta_w^V$ ($cm^3/cm^3$) | 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) | ENTER Exposure time ET (hrs/day) | ENTER Coversion factor CF (hrs/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 79005 | 1,1,2-Trichloroethane | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 75343 | 1,1-Dichloroethane | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 75354 | 1,1-Dichloroethylene | 1.06E-01 | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 120821 | 1,2,4-Trichlorobenzene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 95501 | 1,2-Dichlorobenzene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 541731 | Dichlorobenzene, 1,3- | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 106467 | 1,4-Dichlorobenzene | 4.88E-01 | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 78933 | Butanone, 2- (MEK) | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 67641 | Acetone | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 71432 | Benzene | 2.61E-01 | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 74839 | Bromomethane | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 75150 | Carbon Disulfide | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 108907 | Chlorobenzene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 75003 | Ethyl Chloride | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 67663 | Chloroform | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 156592 | cis-1,2-Dichloroethylene | 6.79E+00 | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 110827 | Cyclohexane | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 100414 | Ethylbenzene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 98828 | Isopropylbenzene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 108872 | Methyl cyclohexane | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 4.21E+00 | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 75092 | Methylene chloride | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 127184 | Tetrachloroethylene | 4.18E-01 | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 108883 | Toluene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 156605 | trans-1,2-Dichloroethylene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 79016 | Trichloroethylene | 7.51E+00 | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 75014 | Vinyl chloride | 2.17E-01 | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 1330207 | Xylenes | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 98862 | Acetophenone | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 91203 | Naphthalene | 1.32E+00 | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 91576 | Methylnaphthalene, 2- | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 92524 | Biphenyl, 1,1'- | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 208968 | Acenaphthylene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 83329 | Acenaphthene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 86737 | Fluorene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 85018 | Phenanthrene | 2.10E+00 | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| 120127 | Anthracene | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| C9-C18 | C9-C18 Aliphatics | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| C11-C22 | C11-C22 Aromatics | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| C5-C8 | C5-C8 Aliphatics | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| C9-C10 | C9-C10 Aromatics | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |
| C9-C12 | C9-C12 Aliphatics | | 15 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 9 | 9 | 219 | 8 | 8760 |

Note:
1) Default soil parameters from table 7 of User's Guide for Evaluating Subsurface Vapor Intrusion into Building (U.S. EPA June 19, 2003) were used for soil water filled porosity ($\theta_{ws}$), soil organic carbon fraction ($f_{oc}$), soil total porosity (n), and soil dry bulk density ($\rho_b$).

Appendix C.4
Johnson & Ettinger Model - Chemical Properties Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - CT
Southwest Prperties, Wells G&H Superfund Site, Operable Unit 2
Aberjona Auto Parts

| Chemical CAS No. | Chemical | 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, $T_R$ (°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, $K_{oc}$ ($cm^3/g$) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu g/m^3)^{-1}$ | Reference conc., RfC ($mg/m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 7.80E-02 | 8.80E-06 | 1.72E-02 | 25 | 7,136 | 347.24 | 545.00 | 1.10E+02 | 1.33E+03 | N/A | 2.2E+00 |
| 76131 | Trichloro-1,2,2-triflouroethane, 1, | 2.88E-02 | 8.07E-06 | 5.17E-01 | 25 | 1,326 | 320.70 | 481.05 | 2.25E+02 | 1.70E+02 | N/A | 3.0E+01 |
| 79005 | 1,1,2-Trichloroethane | 7.80E-02 | 8.80E-06 | 9.12E-04 | 25 | 8,322 | 386.15 | 602.00 | 5.01E+01 | 4.42E+03 | 1.6E-05 | 2.2E+00 |
| 75343 | 1,1-Dichloroethane | 7.42E-02 | 1.05E-05 | 5.61E-03 | 25 | 6,895 | 330.55 | 523.00 | 3.16E+01 | 5.06E+03 | N/A | 5.0E-01 |
| 75354 | 1,1-Dichloroethylene | 9.00E-02 | 1.04E-05 | 2.61E-02 | 25 | 6,247 | 304.75 | 576.05 | 5.89E+01 | 2.25E+03 | N/A | 2.0E-01 |
| 120821 | 1,2,4-Trichlorobenzene | 3.00E-02 | 8.23E-06 | 1.42E-03 | 25 | 10,471 | 486.15 | 725.00 | 1.78E+03 | 3.00E+02 | N/A | 2.0E-01 |
| 95501 | 1,2-Dichlorobenzene | 6.88E-02 | 9.41E-06 | 1.62E-06 | 25 | 1,223 | 465.00 | 697.50 | 5.34E+01 | 2.77E+04 | N/A | N/A |
| 541731 | Dichlorobenzene, 1,3- | 4.14E-02 | 8.65E-06 | 4.70E-03 | 25 | 1,242 | 446.00 | 683.96 | 1.70E+02 | 6.88E+01 | N/A | N/A |
| 106467 | 1,4-Dichlorobenzene | 6.90E-02 | 7.90E-06 | 2.43E-03 | 25 | 9,271 | 447.21 | 684.75 | 6.17E+02 | 7.38E+01 | N/A | 8.0E-01 |
| 78933 | Butanone, 2- (MEK) | 8.08E-02 | 9.80E-06 | 5.60E-05 | 25 | 1,311 | 352.50 | 528.75 | 3.83E+00 | 2.23E+05 | N/A | N/A |
| 67641 | Acetone | 1.24E-01 | 1.14E-05 | 3.88E-05 | 25 | 6,955 | 329.20 | 508.10 | 5.75E-01 | 1.00E+06 | N/A | N/A |
| 71432 | Benzene | 8.80E-02 | 9.80E-06 | 5.56E-03 | 25 | 7,342 | 353.24 | 562.16 | 5.89E+01 | 1.75E+03 | 7.8E-06 | 3.0E-02 |
| 74839 | Bromomethane | 7.28E-02 | 1.21E-05 | 6.22E-03 | 25 | 1,362 | 276.50 | 414.75 | 1.43E+01 | 1.52E+04 | N/A | 5.0E-03 |
| 75150 | Carbon Disulfide | 1.04E-01 | 1.29E-05 | 1.27E-02 | 25 | 6,391 | 319.00 | 552.00 | 5.14E+01 | 2.67E+03 | N/A | 7.0E-01 |
| 108907 | Chlorobenzene | 7.30E-02 | 8.70E-06 | 3.71E-03 | 25 | 8,410 | 404.87 | 632.40 | 2.19E+02 | 4.72E+02 | N/A | 6.0E-02 |
| 75003 | Ethyl Chloride | 1.26E-01 | 6.50E-06 | 8.67E-03 | 25 | 1,355 | 249.00 | 373.50 | 1.43E+01 | 5.32E+03 | N/A | 1.0E+01 |
| 67663 | Chloroform | 1.04E-01 | 1.00E-05 | 3.66E-03 | 25 | 6,988 | 334.32 | 536.40 | 3.98E+01 | 7.92E+03 | 2.3E-05 | 5.0E-02 |
| 156592 | cis-1,2-Dichloroethylene | 7.36E-02 | 1.13E-05 | 4.07E-03 | 25 | 7,192 | 333.65 | 544.00 | 3.55E+01 | 3.50E+03 | N/A | 2.0E-01 |
| 110827 | Cyclohexane | 8.00E-02 | 9.00E-06 | 2.00E+00 | 25 | 1,309 | 353.85 | 530.78 | 1.60E+02 | 5.50E+01 | #N/A | #N/A |
| 100414 | Ethylbenzene | 7.50E-02 | 7.80E-06 | 7.88E-03 | 25 | 8,501 | 409.34 | 617.20 | 3.63E+02 | 1.69E+02 | N/A | 1.0E+00 |
| 98828 | Isopropylbenzene | 6.50E-02 | 7.83E-06 | 1.47E-02 | 25 | 1,259 | 425.40 | 631.01 | 9.31E+03 | 5.60E+01 | N/A | 4.0E-01 |
| 108872 | Methyl cyclohexane | 9.86E-02 | 8.52E-06 | 4.23E-01 | 25 | 1,296 | 373.90 | 560.85 | 2.68E+02 | 1.40E+01 | N/A | 3.0E+00 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 1.02E-01 | 1.05E-05 | 5.87E-04 | 25 | 1,324 | 328.36 | 497.11 | 3.84E+01 | 5.10E+04 | N/A | 3.0E+00 |
| 75092 | Methylene chloride | 1.01E-01 | 1.17E-05 | 2.19E-03 | 25 | 6,706 | 313.00 | 510.00 | 1.17E+01 | 1.30E+04 | 4.7E-07 | 3.0E+00 |
| 127184 | Tetrachloroethylene | 7.20E-02 | 8.20E-06 | 1.84E-02 | 25 | 8,288 | 394.40 | 620.20 | 1.55E+02 | 2.00E+02 | 5.9E-06 | N/A |
| 108883 | Toluene | 8.70E-02 | 8.60E-06 | 6.63E-03 | 25 | 7,930 | 383.78 | 591.79 | 1.82E+02 | 5.26E+02 | N/A | 4.0E-01 |
| 156605 | trans-1,2-Dichloroethylene | 7.07E-02 | 1.19E-05 | 9.39E-03 | 25 | 1,333 | 320.85 | 516.50 | 5.25E+01 | 6.30E+03 | N/A | 2.0E-01 |
| 79016 | Trichloroethylene | 7.90E-02 | 9.10E-06 | 1.03E-02 | 25 | 7,505 | 360.36 | 544.20 | 1.66E+02 | 1.10E+03 | N/A | 4.0E-02 |
| 75014 | Vinyl chloride | 1.06E-01 | 1.23E-05 | 2.71E-02 | 25 | 5,250 | 259.25 | 432.00 | 1.86E+01 | 2.76E+03 | 8.8E-06 | 1.0E-01 |
| 1330207 | Xylenes | 7.69E-02 | 8.44E-06 | 6.73E-06 | 25 | 1,264 | 417.40 | 616.21 | 2.41E+02 | 2.20E+02 | N/A | 1.0E-01 |
| 98862 | Acetophenone | 6.00E-02 | 8.73E-06 | 1.02E-05 | 25 | 1,214 | 475.00 | 712.50 | 4.62E+01 | 6.13E+03 | N/A | N/A |
| 91203 | Naphthalene | 5.90E-02 | 7.50E-06 | 4.83E-04 | 25 | 10,373 | 491.14 | 748.40 | 2.00E+03 | 3.10E+01 | N/A | 3.0E-03 |
| 91576 | Methylnaphthalene, 2- | 4.84E-02 | 7.75E-06 | 1.01E-03 | 25 | 1,169 | 514.05 | 761.01 | 8.51E+03 | 2.46E+01 | N/A | 3.0E-03 |
| 92524 | Biphenyl, 1,1'- | 4.04E-02 | 8.15E-06 | 3.03E-04 | 25 | 1,149 | 529.10 | 793.65 | 6.25E+03 | 6.94E+00 | N/A | N/A |
| 208968 | Acenaphthylene | 4.43E-02 | 7.44E-06 | 2.80E-04 | 25 | 1,118 | 553.00 | 792.01 | 4.79E+03 | 3.93E+00 | N/A | 3.0E-03 |
| 83329 | Acenaphthene | 4.21E-02 | 7.69E-06 | 1.55E-04 | 25 | 12,155 | 550.54 | 803.15 | 7.08E+03 | 4.24E+00 | N/A | 3.0E-03 |
| 86737 | Fluorene | 3.63E-02 | 7.88E-06 | 9.41E-06 | 25 | 12,666 | 570.44 | 870.00 | 7.71E+03 | 1.90E+00 | N/A | 3.0E-03 |
| 85018 | Phenanthrene | 3.30E-02 | 7.47E-06 | 1.30E-04 | 25 | 1,057 | 613.00 | 869.01 | 1.41E+04 | 1.28E+00 | N/A | 3.0E-03 |
| 120127 | Anthracene | 3.24E-02 | 7.74E-06 | 6.51E-05 | 25 | 13,121 | 615.18 | 873.00 | 2.95E+04 | 4.34E-02 | N/A | 3.0E-03 |
| C9-C18 | C9-C18 Aliphatics | 6.00E-02 | 1.00E-05 | 1.66E+00 | 25 | NA | NA | NA | 6.80E+05 | 1.00E+01 | N/A | 2.0E-01 |
| C11-C22 | C11-C22 Aromatics | 6.00E-02 | 1.00E-05 | 7.32E-04 | 25 | NA | NA | NA | 5.00E+03 | 5.80E+03 | N/A | 5.0E-02 |
| C5-C8 | C5-C8 Aliphatics | 6.00E-02 | 1.00E-05 | 1.30E+00 | 25 | NA | NA | NA | 2.27E+03 | 1.10E+04 | N/A | 2.0E-01 |
| C9-C10 | C9-C10 Aromatics | 6.00E-02 | 1.00E-05 | 7.92E-03 | 25 | NA | NA | NA | 1.78E+03 | 5.10E+04 | N/A | 5.0E-02 |
| C9-C12 | C9-C12 Aliphatics | 6.00E-02 | 1.00E-05 | 1.56E+00 | 25 | NA | NA | NA | 1.50E+05 | 7.00E+01 | N/A | 2.0E-01 |

Appendix C.4
Johnson & Ettinger Model - Calculations Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - CT
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Abenaki Auto Parts

| | | Source-building separation, $L_T$ (cm) | Vadose zone soil air-filled porosity, $\theta_a^V$ ($cm^3/cm^3$) | 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, $k_{ra}$ ($cm^2$) | 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, Xcrack (cm) | Bldg ventilation rate, $Q_{building}$ ($cm^3/s$) | Area of enclosed space below grade, $A_B$ ($cm^2$) | Crack-to-total area ratio, $\eta$ (unitless) | Crack depth below grade, $Z_{crack}$ (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,Tw}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, $H_{Tw}$ (atm-$m^3$/mol) | Henry's law constant at ave. groundwater temperature, $H'_{Tw}$ (unitless) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 7,885 | 8.50E-03 | 3.66E-01 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,436 | 4.55E-01 | 1.96E+01 |
| 79005 | 1,1,2-Trichloroethane | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 9,572 | 3.68E-04 | 1.67E-02 |
| 75343 | 1,1-Dichloroethane | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 7,450 | 2.58E-03 | 1.24E-01 |
| 75354 | 1,1-Dichloroethylene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 6,392 | 1.47E-02 | 6.34E-01 |
| 120821 | 1,2,4-Trichlorobenzene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 13,230 | 4.35E-04 | 1.87E-02 |
| 95501 | 1,2-Dichlorobenzene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,521 | 1.41E-06 | 6.09E-05 |
| 541731 | Dichlorobenzene, 1,3- | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,521 | 1.41E-06 | 6.09E-05 |
| 106467 | 1,4-Dichlorobenzene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,503 | 4.11E-03 | 1.77E-01 |
| 78933 | Butanone, 2- (MEK) | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 11,243 | 8.89E-04 | 3.83E-02 |
| 67641 | Acetone | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,486 | 4.90E-05 | 2.11E-03 |
| 71432 | Benzene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 7,559 | 1.97E-03 | 8.50E-02 |
| 74839 | Bromomethane | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 6,122 | 2.69E-03 | 1.16E-01 |
| 75150 | Carbon Disulfide | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,337 | 5.52E-03 | 2.38E-01 |
| 108907 | Chlorobenzene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 6,682 | 6.99E-03 | 3.01E-01 |
| 75003 | Ethyl Chloride | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 8,803 | 1.54E-03 | 6.65E-02 |
| 67663 | Chloroform | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,201 | 7.79E-03 | 3.35E-01 |
| 156592 | cis-1,2-Dichloroethylene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 7,554 | 1.86E-03 | 8.02E-02 |
| 110827 | Cyclohexane | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 7,734 | 2.04E-03 | 8.77E-02 |
| 100414 | Ethylbenzene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,486 | 1.75E+00 | 7.54E+01 |
| 98828 | Isopropylbenzene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 10,155 | 3.18E-03 | 1.37E-01 |
| 108872 | Methyl cyclohexane | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,540 | 1.28E-02 | 5.51E-01 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,505 | 3.70E-01 | 1.59E+01 |
| 75092 | Methylene chloride | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,447 | 5.16E-04 | 2.22E-02 |
| 127184 | Tetrachloroethylene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 7,034 | 1.17E-03 | 5.03E-02 |
| 108883 | Toluene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 9,553 | 7.83E-03 | 3.37E-01 |
| 156605 | trans-1,2-Dichloroethylene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 9,154 | 2.92E-03 | 1.26E-01 |
| 79016 | Trichloroethylene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,417 | 8.27E-03 | 3.56E-01 |
| 75014 | Vinyl chloride | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 8,557 | 4.79E-03 | 2.06E-01 |
| 1330207 | Xylenes | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 5,000 | 1.73E-02 | 7.46E-01 |
| 98862 | Acetophenone | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,542 | 5.86E-06 | 2.52E-04 |
| 91203 | Naphthalene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,518 | 8.81E-06 | 3.83E-04 |
| 91576 | Methylnaphthalene, 2- | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 12,913 | 1.52E-04 | 6.55E-03 |
| 92524 | Biphenyl, 1,1'- | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,506 | 8.86E-04 | 3.81E-02 |
| 208968 | Acenaphthylene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,472 | 2.66E-04 | 1.14E-02 |
| 83329 | Acenaphthene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,512 | 2.45E-04 | 1.05E-02 |
| 86737 | Fluorene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 15,123 | 3.67E-05 | 1.58E-03 |
| 85018 | Phenanthrene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 15,235 | 2.20E-06 | 9.48E-05 |
| 120127 | Anthracene | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 1,479 | 1.14E-04 | 4.90E-03 |
| C9-C18 | C9-C18 Aliphatics | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | 18,353 | 1.26E-05 | 5.43E-04 |
| C11-C22 | C11-C22 Aromatics | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | NA | 5.28E-01 | 3.56E+01 |
| C5-C8 | C5-C8 Aliphatics | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | NA | 3.60E-04 | 1.55E-02 |
| C9-C10 | C9-C10 Aromatics | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | NA | 6.48E-01 | 2.79E+01 |
| C9-C12 | C9-C12 Aliphatics | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | NA | 3.96E-03 | 1.70E-01 |
| C9-C12 | C9-C12 Aliphatics | 67.6 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 3.01E+04 | 1.81E+07 | 5.67E+07 | 5.31E-05 | 15 | NA | 7.80E-01 | 3.36E+01 |

Appendix C.4
Johnson & Ettinger Model - Calculations Screen
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - CT
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Aberjona Auto Parts

| | | Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (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, $D^{eff}_T$ ($cm^2/s$) | Diffusion path length, $L_d$ (cm) | Convection path length, $L_p$ (cm) | Source vapor conc., $C_{source}$ ($\mu g/m^3$) | Crack radius, $r_{crack}$ (cm) | Average vapor flow rate into bldg., $Q_{soil}$ ($cm^3/s$) | Crack effective diffusion coefficient, $D^{crack}$ ($cm^2/s$) | Area of crack, $A_{crack}$ ($cm^2$) | Exponent of equivalent foundation Peclet number, exp(Pe') (unitless) | Infinite source indoor attenuation coefficient, $\alpha$ (unitless) | Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$) | Unit risk factor, URF $(\mu g/m^3)^{-1}$ | Reference conc., RfC ($mg/m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 1.75E-04 | 4.75E-04 | 4.45E-04 | 4.68E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 4.75E-04 | 3.01E+03 | 1.21E+218 | 2.36E-06 | N/A | N/A | 2.2E+00 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | 1.75E-04 | 1.75E-04 | 1.63E-04 | 1.71E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 1.75E-04 | 3.01E+03 | #NUM! | 1.98E-06 | N/A | N/A | 3.0E+01 |
| 79005 | 1,1,2-Trichloroethane | 1.75E-04 | 5.24E-04 | 4.95E-04 | 5.16E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 5.24E-04 | 3.01E+03 | 3.42E+197 | 2.38E-06 | N/A | 1.6E-05 | 2.2E+00 |
| 75343 | 1,1-Dichloroethane | 1.75E-04 | 4.58E-04 | 4.29E-04 | 4.50E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 4.58E-04 | 3.01E+03 | 1.65E+226 | 2.35E-06 | N/A | N/A | 5.0E-01 |
| 75354 | 1,1-Dichloroethylene | 1.75E-04 | 5.47E-04 | 5.12E-04 | 5.37E-04 | 67.6 | 15 | 6.71E+01 | 0.10 | 4.79E+01 | 5.47E-04 | 3.01E+03 | 2.46E+189 | 2.39E-06 | 1.60E-04 | N/A | 2.0E-01 |
| 120821 | 1,2,4-Trichlorobenzene | 1.75E-04 | 2.25E-04 | 2.14E-04 | 2.22E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 2.25E-04 | 3.01E+03 | #NUM! | 2.10E-06 | N/A | N/A | 2.0E-01 |
| 95501 | 1,2-Dichlorobenzene | 1.75E-04 | 1.56E-02 | 1.60E-02 | 1.57E-02 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 1.56E-02 | 3.01E+03 | 4.41E+06 | 2.64E-06 | N/A | N/A | N/A |
| 541731 | Dichlorobenzene, 1,3- | 1.75E-04 | 2.56E-04 | 2.40E-04 | 2.51E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 2.56E-04 | 3.01E+03 | #NUM! | 2.16E-06 | N/A | N/A | N/A |
| 106467 | 1,4-Dichlorobenzene | 1.75E-04 | 4.38E-04 | 4.12E-04 | 4.31E-04 | 67.6 | 15 | 1.79E+01 | 0.10 | 4.79E+01 | 4.38E-04 | 3.01E+03 | 2.05E+236 | 2.34E-06 | 4.19E-05 | N/A | 8.0E-01 |
| 78933 | Butanone, 2- (MEK) | 1.75E-04 | 9.45E-04 | 9.27E-04 | 9.40E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 9.45E-04 | 3.01E+03 | 3.81E+109 | 2.49E-06 | N/A | N/A | N/A |
| 67641 | Acetone | 1.75E-04 | 2.07E-03 | 2.06E-03 | 2.07E-03 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 2.07E-03 | 3.01E+03 | 1.22E+50 | 2.57E-06 | N/A | N/A | N/A |
| 71432 | Benzene | 1.75E-04 | 5.42E-04 | 5.07E-04 | 5.32E-04 | 67.6 | 15 | 3.02E+01 | 0.10 | 4.79E+01 | 5.42E-04 | 3.01E+03 | 1.94E+191 | 2.39E-06 | 7.22E-05 | 7.8E-06 | 3.0E-02 |
| 74839 | Bromomethane | 1.75E-04 | 4.46E-04 | 4.18E-04 | 4.38E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 4.46E-04 | 3.01E+03 | 1.58E+232 | 2.34E-06 | N/A | N/A | 5.0E-03 |
| 75150 | Carbon Disulfide | 1.75E-04 | 6.34E-04 | 5.94E-04 | 6.23E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 6.34E-04 | 3.01E+03 | 1.95E+163 | 2.42E-06 | N/A | N/A | 7.0E-01 |
| 108907 | Chlorobenzene | 1.75E-04 | 4.55E-04 | 4.27E-04 | 4.47E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 4.55E-04 | 3.01E+03 | 3.77E+227 | 2.35E-06 | N/A | N/A | 6.0E-02 |
| 75003 | Ethyl Chloride | 1.75E-04 | 7.66E-04 | 7.16E-04 | 7.51E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 7.66E-04 | 3.01E+03 | 2.20E+135 | 2.45E-06 | N/A | N/A | 1.0E+01 |
| 67663 | Chloroform | 1.75E-04 | 6.43E-04 | 6.02E-04 | 6.31E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 6.43E-04 | 3.01E+03 | 1.77E+161 | 2.43E-06 | N/A | 2.3E-05 | 5.0E-02 |
| 156592 | cis-1,2-Dichloroethylene | 1.75E-04 | 4.59E-04 | 4.30E-04 | 4.50E-04 | 67.6 | 15 | 5.95E+02 | 0.10 | 4.79E+01 | 4.59E-04 | 3.01E+03 | 7.48E+225 | 2.35E-06 | 1.40E-03 | N/A | 2.0E-01 |
| 110827 | Cyclohexane | 1.75E-04 | 4.85E-04 | 4.53E-04 | 4.76E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 4.85E-04 | 3.01E+03 | 4.89E+213 | 2.36E-06 | N/A | #N/A | #N/A |
| 100414 | Ethylbenzene | 1.75E-04 | 4.60E-04 | 4.31E-04 | 4.52E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 4.60E-04 | 3.01E+03 | 1.47E+225 | 2.35E-06 | N/A | N/A | 1.0E+00 |
| 98828 | Isopropylbenzene | 1.75E-04 | 3.95E-04 | 3.70E-04 | 3.88E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 3.95E-04 | 3.01E+03 | 1.24E+262 | 2.31E-06 | N/A | N/A | 4.0E-01 |
| 108872 | Methyl cyclohexane | 1.75E-04 | 5.96E-04 | 5.59E-04 | 5.86E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 5.96E-04 | 3.01E+03 | 2.33E+173 | 2.41E-06 | N/A | N/A | 3.0E+00 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 1.75E-04 | 6.67E-04 | 6.28E-04 | 6.56E-04 | 67.6 | 15 | 9.35E+01 | 0.10 | 4.79E+01 | 6.67E-04 | 3.01E+03 | 2.13E+155 | 2.43E-06 | 2.28E-04 | N/A | 3.0E+00 |
| 75092 | Methylene chloride | 1.75E-04 | 6.35E-04 | 5.96E-04 | 6.24E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 6.35E-04 | 3.01E+03 | 1.48E+163 | 2.42E-06 | N/A | 4.7E-07 | 3.0E+00 |
| 127184 | Tetrachloroethylene | 1.75E-04 | 4.39E-04 | 4.11E-04 | 4.31E-04 | 67.6 | 15 | 1.41E+02 | 0.10 | 4.79E+01 | 4.39E-04 | 3.01E+03 | 1.40E+236 | 2.34E-06 | 3.29E-04 | 5.9E-06 | N/A |
| 108883 | Toluene | 1.75E-04 | 5.34E-04 | 5.00E-04 | 5.24E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 5.34E-04 | 3.01E+03 | 1.08E+194 | 2.39E-06 | N/A | N/A | 4.0E-01 |
| 156605 | trans-1,2-Dichloroethylene | 1.75E-04 | 4.32E-04 | 4.04E-04 | 4.24E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 4.32E-04 | 3.01E+03 | 9.26E+239 | 2.33E-06 | N/A | N/A | 2.0E-01 |
| 79016 | Trichloroethylene | 1.75E-04 | 4.83E-04 | 4.52E-04 | 4.74E-04 | 67.6 | 15 | 1.55E+03 | 0.10 | 4.79E+01 | 4.83E-04 | 3.01E+03 | 2.88E+214 | 2.36E-06 | 3.66E-03 | N/A | 4.0E-02 |
| 75014 | Vinyl chloride | 1.75E-04 | 6.44E-04 | 6.02E-04 | 6.32E-04 | 67.6 | 15 | 1.62E+02 | 0.10 | 4.79E+01 | 6.44E-04 | 3.01E+03 | 7.47E+160 | 2.43E-06 | 3.93E-04 | 8.8E-06 | 1.0E-01 |
| 1330207 | Xylenes | 1.75E-04 | 3.75E-03 | 3.81E-03 | 3.77E-03 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 3.75E-03 | 3.01E+03 | 4.33E+27 | 2.61E-06 | N/A | N/A | 1.0E-01 |
| 98862 | Acetophenone | 1.75E-04 | 2.60E-03 | 2.64E-03 | 2.61E-03 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 2.60E-03 | 3.01E+03 | 7.28E+99 | 2.59E-06 | N/A | N/A | N/A |
| 91203 | Naphthalene | 1.75E-04 | 4.70E-04 | 4.50E-04 | 4.64E-04 | 67.6 | 15 | 8.54E+00 | 0.10 | 4.79E+01 | 4.70E-04 | 3.01E+03 | 3.02E+220 | 2.36E-06 | 2.04E-06 | N/A | 3.0E-03 |
| 91576 | Methylnaphthalene, 2- | 1.75E-04 | 3.13E-04 | 2.95E-04 | 3.08E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 3.13E-04 | 3.01E+03 | #NUM! | 2.23E-06 | N/A | N/A | 3.0E-03 |
| 92524 | Biphenyl, 1,1- | 1.75E-04 | 3.15E-04 | 3.01E-04 | 3.11E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 3.15E-04 | 3.01E+03 | #NUM! | 2.24E-06 | N/A | N/A | N/A |
| 208968 | Acenaphthylene | 1.75E-04 | 3.38E-04 | 3.22E-04 | 3.33E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 3.38E-04 | 3.01E+03 | 7.70E+306 | 2.26E-06 | N/A | N/A | 3.0E-03 |
| 83329 | Acenaphthene | 1.75E-04 | 7.33E-04 | 7.31E-04 | 7.33E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 7.33E-04 | 3.01E+03 | 1.83E+141 | 2.45E-06 | N/A | N/A | 3.0E-03 |
| 86737 | Fluorene | 1.75E-04 | 8.16E-01 | 8.38E-01 | 8.22E-01 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 8.16E-01 | 3.01E+03 | 1.34E+00 | 1.04E-05 | N/A | N/A | 3.0E-03 |
| 85018 | Phenanthrene | 1.75E-04 | 3.50E-04 | 3.41E-04 | 3.47E-04 | 67.6 | 15 | 1.03E+01 | 0.10 | 4.79E+01 | 3.50E-04 | 3.01E+03 | 2.42E+296 | 2.27E-06 | 2.34E-05 | N/A | 3.0E-03 |
| 120127 | Anthracene | 1.75E-04 | 1.60E-03 | 1.62E-03 | 1.60E-03 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 1.60E-03 | 3.01E+03 | 8.67E+64 | 2.55E-06 | N/A | N/A | 3.0E-03 |
| C9-C18 | C9-C18 Aliphatics | 1.75E-04 | 3.64E-04 | 3.40E-04 | 3.57E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 3.64E-04 | 3.01E+03 | 8.02E+284 | 2.28E-06 | N/A | N/A | 2.0E-01 |
| C11-C22 | C11-C22 Aromatics | 1.75E-04 | 4.27E-04 | 4.05E-04 | 4.21E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 4.27E-04 | 3.01E+03 | 4.50E+242 | 2.33E-06 | N/A | N/A | 5.0E-02 |
| C5-C8 | C5-C8 Aliphatics | 1.75E-04 | 3.64E-04 | 3.40E-04 | 3.57E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 3.64E-04 | 3.01E+03 | 7.91E+284 | 2.28E-06 | N/A | N/A | 2.0E-01 |
| C9-C10 | C9-C10 Aromatics | 1.75E-04 | 3.66E-04 | 3.46E-04 | 3.63E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 3.66E-04 | 3.01E+03 | 3.04E+260 | 2.29E-06 | N/A | N/A | 5.0E-02 |
| C9-C12 | C9-C12 Aliphatics | 1.75E-04 | 3.64E-04 | 3.40E-04 | 3.57E-04 | 67.6 | 15 | N/A | 0.10 | 4.79E+01 | 3.64E-04 | 3.01E+03 | 7.99E+284 | 2.28E-06 | N/A | N/A | 2.0E-01 |

Appendix C.4
Johnson & Ettinger Model - Results
Inhalation of Volatiles from Groundwater
Future Commercial Scenario - CT
Southwest Prperties, Wells G&H Superfund Site, Operable Unit 2
Aberjona Auto Parts

| | | 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) |
| 71556 | 1,1,1-Trichloroethane | NA | NA | NA | 1.33E+06 | NA | NA | NA |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | NA | NA | NA | 1.70E+05 | NA | NA | NA |
| 79005 | 1,1,2-Trichloroethane | NA | NA | NA | 4.42E+06 | NA | NA | NA |
| 75343 | 1,1-Dichloroethane | NA | NA | NA | 5.06E+06 | NA | NA | NA |
| 75354 | 1,1-Dichloroethylene | NA | NA | NA | 2.25E+06 | NA | NA | 1.6E-07 |
| 120821 | 1,2,4-Trichlorobenzene | NA | NA | NA | 3.00E+05 | NA | NA | NA |
| 95501 | 1,2-Dichlorobenzene | NA | NA | NA | 2.77E+07 | NA | NA | NA |
| 541731 | Dichlorobenzene, 1,3- | NA | NA | NA | 6.88E+04 | NA | NA | NA |
| 106467 | 1,4-Dichlorobenzene | NA | NA | NA | 7.38E+04 | NA | NA | 1.0E-08 |
| 78933 | Butanone, 2- (MEK) | NA | NA | NA | 2.23E+08 | NA | NA | NA |
| 67641 | Acetone | NA | NA | NA | 1.00E+09 | NA | NA | NA |
| 71432 | Benzene | NA | NA | NA | 1.75E+06 | NA | 1.4E-11 | 4.8E-07 |
| 74839 | Bromomethane | NA | NA | NA | 1.52E+07 | NA | NA | NA |
| 75150 | Carbon Disulfide | NA | NA | NA | 2.67E+06 | NA | NA | NA |
| 108907 | Chlorobenzene | NA | NA | NA | 4.72E+05 | NA | NA | NA |
| 75003 | Ethyl Chloride | NA | NA | NA | 5.32E+06 | NA | NA | NA |
| 67663 | Chloroform | NA | NA | NA | 7.92E+06 | NA | NA | NA |
| 156592 | cis-1,2-Dichloroethylene | NA | NA | NA | 3.50E+06 | NA | NA | 1.4E-06 |
| 110827 | Cyclohexane | NA | NA | NA | 5.50E+04 | NA | NA | NA |
| 100414 | Ethylbenzene | NA | NA | NA | 1.69E+05 | NA | NA | NA |
| 98828 | Isopropylbenzene | NA | NA | NA | 5.60E+04 | NA | NA | NA |
| 108872 | Methyl cyclohexane | NA | NA | NA | 1.40E+04 | NA | NA | NA |
| 1634044 | Methyl-Tertiary-Butyl Ether | NA | NA | NA | 5.10E+07 | NA | NA | 1.5E-08 |
| 75092 | Methylene chloride | NA | NA | NA | 1.30E+07 | NA | NA | NA |
| 127184 | Tetrachloroethylene | NA | NA | NA | 2.00E+05 | NA | 5.0E-11 | NA |
| 108883 | Toluene | NA | NA | NA | 5.26E+05 | NA | NA | NA |
| 156605 | trans-1,2-Dichloroethylene | NA | NA | NA | 6.30E+06 | NA | NA | NA |
| 79016 | Trichloroethylene | NA | NA | NA | 1.10E+06 | NA | NA | 1.8E-05 |
| 75014 | Vinyl chloride | NA | NA | NA | 2.76E+06 | NA | 8.9E-11 | 7.9E-07 |
| 1330207 | Xylenes | NA | NA | NA | 2.20E+05 | NA | NA | NA |
| 98862 | Acetophenone | NA | NA | NA | 6.13E+06 | NA | NA | NA |
| 91203 | Naphthalene | NA | NA | NA | 3.10E+04 | NA | NA | 1.4E-06 |
| 91576 | Methylnaphthalene, 2- | NA | NA | NA | 2.46E+04 | NA | NA | NA |
| 92524 | Biphenyl, 1,1'- | NA | NA | NA | 6.94E+03 | NA | NA | NA |
| 208968 | Acenaphthylene | NA | NA | NA | 3.93E+03 | NA | NA | NA |
| 83329 | Acenaphthene | NA | NA | NA | 4.24E+03 | NA | NA | NA |
| 86737 | Fluorene | NA | NA | NA | 1.90E+03 | NA | NA | NA |
| 85018 | Phenanthrene | NA | NA | NA | 1.28E+03 | NA | NA | 1.6E-06 |
| 120127 | Anthracene | NA | NA | NA | 4.34E+01 | NA | NA | NA |
| C9-C18 | C9-C18 Aliphatics | NA | NA | NA | 1.00E+04 | NA | NA | NA |
| C11-C22 | C11-C22 Aromatics | NA | NA | NA | 5.80E+06 | NA | NA | NA |
| C5-C8 | C5-C8 Aliphatics | NA | NA | NA | 1.10E+07 | NA | NA | NA |
| C9-C10 | C9-C10 Aromatics | NA | NA | NA | 5.10E+07 | NA | NA | NA |
| C9-C12 | C9-C12 Aliphatics | NA | NA | NA | 7.00E+04 | NA | NA | NA |

| | 95% UCL Cancer Risk | 95% UCL HI |
|---|---|---|
| TOTAL: | 2E-10 | 2E-05 |

[ ] = Cancer risk > 1E-05 or HQ/HI>1E+00

END

Appendix C 4
Johnson & Ettinger Model - Data Entry Screen
Inhalation of Volatiles from Groundwater
Future Child Resident Scenario - RME
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Aberfoyle Auto Parts

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

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) | Chemical | Enter initial groundwater conc., $C_{GW}$ (ug/L) | ENTER 95% UCL groundwater conc... $C_{GW}$ (ug/L) | ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (15 or 200 cm) | ENTER Depth below grade to water table, LWT (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, $T_S$ (°C) | ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR Note | ENTER User-defined vadose zone soil vapor permeability, $k_v$ ($cm^2$) | ENTER Vadose zone soil dry bulk density, $\rho_b^V$ ($g/cm^3$) | ENTER Vadose zone soil total porosity, $n^V$ (unitless) | ENTER Vadose zone soil water-filled porosity, $\theta_w^V$ ($cm^3/cm^3$) | 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) | ENTER Exposure time ET (hrs/day) | ENTER Coversion factor CF (hr/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.6 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.6 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 79005 | 1,1,2-Trichloroethane | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.6 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 75343 | 1,1-Dichloroethene | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.6 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 75354 | 1,1-Dichloroethylene | 1.9E-01 | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 120821 | 1,2,4-Trichlorobenzene | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 95501 | 1,2-Dichlorobenzene | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 541731 | Dichlorobenzene, 1,3- | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 106467 | 1,4-Dichlorobenzene | 4.8E-01 | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 78933 | Butanone, 2- (MEK) | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.6 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 67641 | Acetone | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.6 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 71432 | Benzene | 1.0E-01 | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.6 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 74839 | Bromomethane | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 75150 | Carbon Disulfide | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 108907 | Chlorobenzene | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.6 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 75003 | Ethyl Chloride | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 67663 | Chloroform | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 156592 | cis-1,2-Dichloroethylene | 8.0E+00 | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.6 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 110827 | Cyclohexane | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.6 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 100414 | Ethylbenzene | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 98828 | Isopropylbenzene | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 108872 | Methyl cyclohexane | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 1634044 | Methyl Tertiary-Butyl Ether | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 75092 | Methylene chloride | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 127184 | Tetrachloroethylene | 4.1E-01 | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 108883 | Toluene | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 156605 | trans-1,2-Dichloroethylene | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.6 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 79016 | Trichloroethylene | 2.5E+01 | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.6 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 75014 | Vinyl chloride | 2.4E-01 | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 1330207 | Xylenes | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 98862 | Acetophenone | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 91203 | Naphthalene | 2.7E+00 | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 91576 | Methylnaphthalene, 2- | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.6 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 92524 | Biphenyl, 1,1- | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.6 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 208968 | Acenaphthylene | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 83329 | Acenaphthene | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 86737 | Fluorene | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 85018 | Phenanthrene | 2.1E+00 | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| 120127 | Anthracene | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| C9-C18 | C9-C18 Aliphatics | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| C11-C22 | C11-C22 Aromatics | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| C5-C8 | C5-C8 Aliphatics | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| C9-C10 | C9-C10 Aromatics | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |
| C9-C12 | C9-C12 Aliphatics | | 52.12 | 82.6 | LS | 10 | LS | 1 | | 1.5 | 0.43 | 0.3 | 1.0E-06 | 1 | 70 | 6 | 6 | 350 | 16 | 8760 |

Note:
1) Default soil parameters from table 7 of User's Guide for Evaluating Subsurface Vapor Intrusion into Building (U.S. EPA June 19, 2003) were used for soil water filled porosity ($\theta_w$), soil organic carbon fraction ($f_{oc}$), soil total porosity (n), and soil dry bulk density ($\rho_b$).

Appendix C.4
Johnson & Ettinger Model - Chemical Properties Screen
Inhalation of Volatiles from Groundwater
Future Child Resident Scenario - RME
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Aberjona Auto Parts

| Chemical CAS No. | Chemical | 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, $T_R$ (°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, $K_{oc}$ ($cm^3/g$) | Pure component water solubility, S (mg/L) | Unit risk factor, URF $(\mu g/m^3)^{-1}$ | Reference conc., RfC ($mg/m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 7.80E-02 | 8.80E-06 | 1.72E-02 | 25 | 7,136 | 347.24 | 545.00 | 1.10E+02 | 1.33E+03 | N/A | 2.2E+00 |
| 76131 | Trichloro-1,2,2-triflouroethane, 1, | 2.88E-02 | 8.07E-06 | 5.17E-01 | 25 | 1,326 | 320.70 | 481.05 | 2.25E+02 | 1.70E+02 | N/A | 3.0E+01 |
| 79005 | 1,1,2-Trichloroethane | 7.80E-02 | 8.80E-06 | 9.12E-04 | 25 | 8,322 | 386.15 | 602.00 | 5.01E+01 | 4.42E+03 | 1.6E-05 | 2.2E+00 |
| 75343 | 1,1-Dichloroethane | 7.42E-02 | 1.05E-05 | 5.61E-03 | 25 | 6,895 | 330.55 | 523.00 | 3.16E+01 | 5.06E+03 | N/A | 5.0E-01 |
| 75354 | 1,1-Dichloroethylene | 9.00E-02 | 1.04E-05 | 2.61E-02 | 25 | 6,247 | 304.75 | 576.05 | 5.89E+01 | 2.25E+03 | N/A | 2.0E-01 |
| 120821 | 1,2,4-Trichlorobenzene | 3.00E-02 | 8.23E-06 | 1.42E-03 | 25 | 10,471 | 486.15 | 725.00 | 1.78E+03 | 3.00E+02 | N/A | 2.0E-01 |
| 95501 | 1,2-Dichlorobenzene | 6.88E-02 | 9.41E-06 | 1.62E-06 | 25 | 1,223 | 465.00 | 697.50 | 5.34E+01 | 2.77E+04 | N/A | N/A |
| 541731 | Dichlorobenzene, 1,3- | 4.14E-02 | 8.85E-06 | 4.70E-03 | 25 | 1,242 | 446.00 | 683.96 | 1.70E+02 | 6.88E+01 | N/A | N/A |
| 106467 | 1,4-Dichlorobenzene | 6.90E-02 | 7.90E-06 | 2.43E-03 | 25 | 9,271 | 447.21 | 684.75 | 6.17E+02 | 7.38E+01 | N/A | 8.0E-01 |
| 78933 | Butanone, 2- (MEK) | 8.08E-02 | 9.80E-06 | 5.60E-05 | 25 | 1,311 | 352.50 | 528.75 | 3.83E+00 | 2.23E+05 | N/A | N/A |
| 67641 | Acetone | 1.24E-01 | 1.14E-05 | 3.88E-05 | 25 | 6,955 | 329.20 | 508.10 | 5.75E-01 | 1.00E+06 | N/A | N/A |
| 71432 | Benzene | 8.80E-02 | 9.80E-06 | 5.56E-03 | 25 | 7,342 | 353.24 | 562.16 | 5.89E+01 | 1.75E+03 | 7.8E-06 | 3.0E-02 |
| 74839 | Bromomethane | 7.28E-02 | 1.21E-05 | 6.22E-03 | 25 | 1,362 | 276.50 | 414.75 | 1.43E+01 | 1.52E+04 | N/A | 5.0E-03 |
| 75150 | Carbon Disulfide | 1.04E-01 | 1.29E-05 | 1.27E-02 | 25 | 6,391 | 319.00 | 552.00 | 5.14E+01 | 2.67E+03 | N/A | 7.0E-01 |
| 108907 | Chlorobenzene | 7.30E-02 | 8.70E-06 | 3.71E-03 | 25 | 8,410 | 404.87 | 632.40 | 2.19E+02 | 4.72E+02 | N/A | 6.0E-02 |
| 75003 | Ethyl Chloride | 1.26E-01 | 6.50E-06 | 8.67E-03 | 25 | 1,355 | 249.00 | 373.50 | 1.43E+01 | 5.32E+03 | N/A | 1.0E+01 |
| 67663 | Chloroform | 1.04E-01 | 1.00E-05 | 3.66E-03 | 25 | 6,988 | 334.32 | 536.40 | 3.98E+01 | 7.92E+03 | 2.3E-05 | 5.0E-02 |
| 156592 | cis-1,2-Dichloroethylene | 7.36E-02 | 1.13E-05 | 4.07E-03 | 25 | 7,192 | 333.65 | 544.00 | 3.55E+01 | 3.50E+03 | N/A | 2.0E-01 |
| 110827 | Cyclohexane | 8.00E-02 | 9.00E-06 | 2.00E+00 | 25 | 1,309 | 353.85 | 530.78 | 1.60E+02 | 5.50E+01 | #N/A | #N/A |
| 100414 | Ethylbenzene | 7.50E-02 | 7.80E-06 | 7.88E-03 | 25 | 8,501 | 409.34 | 617.20 | 3.63E+02 | 1.69E+02 | N/A | 1.0E+00 |
| 98828 | Isopropylbenzene | 6.50E-02 | 7.83E-06 | 1.47E-02 | 25 | 1,259 | 425.40 | 631.01 | 9.31E+03 | 5.60E+01 | N/A | 4.0E-01 |
| 108872 | Methyl cyclohexane | 9.86E-02 | 8.52E-06 | 4.23E-01 | 25 | 1,296 | 373.90 | 560.85 | 2.68E+02 | 1.40E+01 | N/A | 3.0E+00 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 1.02E-01 | 1.05E-05 | 5.87E-04 | 25 | 1,324 | 328.36 | 497.11 | 3.84E+01 | 5.10E+04 | N/A | 3.0E+00 |
| 75092 | Methylene chloride | 1.01E-01 | 1.17E-05 | 2.19E-03 | 25 | 6,706 | 313.00 | 510.00 | 1.17E+01 | 1.30E+04 | 4.7E-07 | 3.0E+00 |
| 127184 | Tetrachloroethylene | 7.20E-02 | 8.20E-06 | 1.84E-02 | 25 | 8,288 | 394.40 | 620.20 | 1.55E+02 | 2.00E+02 | 5.9E-06 | N/A |
| 108883 | Toluene | 8.70E-02 | 8.60E-06 | 6.63E-03 | 25 | 7,930 | 383.78 | 591.79 | 1.82E+02 | 5.26E+02 | N/A | 4.0E-01 |
| 156605 | trans-1,2-Dichloroethylene | 7.07E-02 | 1.19E-05 | 9.39E-03 | 25 | 1,333 | 320.85 | 516.50 | 5.25E+01 | 6.30E+03 | N/A | 2.0E-01 |
| 79016 | Trichloroethylene | 7.90E-02 | 9.10E-06 | 1.03E-02 | 25 | 7,505 | 360.36 | 544.20 | 1.66E+02 | 1.10E+03 | 1.1E-04 | 4.0E-02 |
| 75014 | Vinyl chloride | 1.06E-01 | 1.23E-05 | 2.71E-02 | 25 | 5,250 | 259.25 | 432.00 | 1.86E+01 | 2.76E+03 | 8.8E-06 | 1.0E-01 |
| 1330207 | Xylenes | 7.69E-02 | 8.44E-06 | 6.73E-06 | 25 | 1,264 | 417.40 | 616.21 | 2.41E+02 | 2.20E+02 | N/A | 1.0E-01 |
| 98862 | Acetophenone | 6.00E-02 | 8.73E-06 | 1.02E-05 | 25 | 1,214 | 475.00 | 712.50 | 4.62E+01 | 6.13E+03 | N/A | N/A |
| 91203 | Naphthalene | 5.90E-02 | 7.50E-06 | 4.83E-04 | 25 | 10,373 | 491.14 | 748.40 | 2.00E+03 | 3.10E+01 | N/A | 3.0E-03 |
| 91576 | Methylnaphthalene, 2- | 4.84E-02 | 7.75E-06 | 1.01E-03 | 25 | 1,169 | 514.05 | 761.01 | 8.51E+03 | 2.46E+01 | N/A | N/A |
| 92524 | Biphenyl, 1,1'- | 4.04E-02 | 8.15E-06 | 3.03E-04 | 25 | 1,149 | 529.10 | 793.65 | 6.25E+03 | 6.94E+00 | N/A | N/A |
| 208968 | Acenaphthylene | 4.43E-02 | 7.44E-06 | 2.80E-04 | 25 | 1,118 | 553.00 | 792.01 | 4.79E+03 | 3.93E+00 | N/A | 3.0E-03 |
| 83329 | Acenaphthene | 4.21E-02 | 7.69E-06 | 1.55E-04 | 25 | 12,155 | 550.54 | 803.15 | 7.08E+03 | 4.24E+00 | N/A | 3.0E-03 |
| 86737 | Fluorene | 3.63E-02 | 7.88E-06 | 9.41E-08 | 25 | 12,666 | 570.44 | 870.00 | 7.71E+03 | 1.90E+00 | N/A | 3.0E-03 |
| 85018 | Phenanthrene | 3.30E-02 | 7.47E-06 | 1.30E-04 | 25 | 1,057 | 613.00 | 869.01 | 1.41E+04 | 1.28E+00 | N/A | 3.0E-03 |
| 120127 | Anthracene | 3.24E-02 | 7.74E-06 | 6.51E-05 | 25 | 13,121 | 615.18 | 873.00 | 2.95E+04 | 4.34E-02 | N/A | 3.0E-03 |
| C9-C18 | C9-C18 Aliphatics | 6.00E-02 | 1.00E-05 | 1.66E+00 | 25 | NA | NA | NA | 6.80E+05 | 1.00E+01 | N/A | 2.0E-01 |
| C11-C22 | C11-C22 Aromatics | 6.00E-02 | 1.00E-05 | 7.32E-04 | 25 | NA | NA | NA | 5.00E+03 | 5.80E+03 | N/A | 5.0E-02 |
| C5-C8 | C5-C8 Aliphatics | 6.00E-02 | 1.00E-05 | 1.30E+00 | 25 | NA | NA | NA | 2.27E+03 | 1.10E+04 | N/A | 2.0E-01 |
| C9-C10 | C9-C10 Aromatics | 6.00E-02 | 1.00E-05 | 7.92E-03 | 25 | NA | NA | NA | 1.78E+03 | 5.10E+04 | N/A | 5.0E-02 |
| C9-C12 | C9-C12 Aliphatics | 6.00E-02 | 1.00E-05 | 1.56E+00 | 25 | NA | NA | NA | 1.50E+05 | 7.00E+01 | N/A | 2.0E-01 |

Appendix C.4
Johnson & Ettinger Model - Calculations Screen
Inhalation of Volatiles from Groundwater
Future Child Resident Scenario - RME
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Abertone Auto Parts

| | | Source-building separation, $L_T$ (cm) | Vadose zone soil air-filled porosity, $\theta_a^V$ ($cm^3/cm^3$) | 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, $k_v$ ($cm^2$) | 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, Xcrack (cm) | Bldg. ventilation rate, $Q_{building}$ ($cm^3/s$) | Area of enclosed space below grade, $A_B$ ($cm^2$) | Crack-to-total area ratio, $\eta$ (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, $H_{TS}$ ($atm\text{-}m^3/mol$) | Henry's law constant at ave. groundwater temperature, $H'_{TS}$ (unitless) | Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 7,365 | 8.50E-03 | 3.66E-01 | 1.75E-04 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 1,436 | 4.55E-01 | 1.96E+01 | 1.75E-04 |
| 79005 | 1,1,2-Trichloroethane | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 9,572 | 3.88E-04 | 1.67E-02 | 1.75E-04 |
| 75343 | 1,1-Dichloroethane | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 7,450 | 2.88E-03 | 1.24E-01 | 1.75E-04 |
| 75354 | 1,1-Dichloroethylene | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 6,392 | 1.47E-02 | 6.34E-01 | 1.75E-04 |
| 120821 | 1,2,4-Trichlorobenzene | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 13,230 | 4.35E-04 | 1.87E-02 | 1.75E-04 |
| 95501 | 1,2-Dichlorobenzene | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 1,521 | 1.41E-06 | 6.09E-05 | 1.75E-04 |
| 541731 | Dichlorobenzene, 1,3- | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 1,503 | 4.11E-03 | 1.77E-01 | 1.75E-04 |
| 106467 | 1,4-Dichlorobenzene | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 11,243 | 8.89E-04 | 3.83E-02 | 1.75E-04 |
| 78933 | Butanone, 2- (MEK) | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 1,486 | 4.90E-05 | 2.11E-03 | 1.75E-04 |
| 67641 | Acetone | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 7,659 | 1.97E-05 | 8.50E-04 | 1.75E-04 |
| 71432 | Benzene | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 8,122 | 2.69E-03 | 1.16E-01 | 1.75E-04 |
| 74839 | Bromomethane | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 1,337 | 5.62E-03 | 2.38E-01 | 1.75E-04 |
| 75150 | Carbon Disulfide | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 6,682 | 6.99E-03 | 3.01E-01 | 1.75E-04 |
| 108907 | Chlorobenzene | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 9,803 | 1.54E-03 | 6.65E-02 | 1.75E-04 |
| 75003 | Ethyl Chloride | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 1,201 | 7.79E-03 | 3.35E-01 | 1.75E-04 |
| 67663 | Chloroform | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 7,564 | 1.86E-03 | 8.02E-02 | 1.75E-04 |
| 156592 | cis-1,2-Dichloroethylene | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 7,734 | 2.04E-03 | 8.77E-02 | 1.75E-04 |
| 110827 | Cyclohexane | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 1,486 | 1.75E+00 | 7.64E+01 | 1.75E-04 |
| 100414 | Ethylbenzene | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 10,155 | 3.18E-03 | 1.37E-01 | 1.75E-04 |
| 98828 | Isopropylbenzene | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 1,540 | 1.28E-02 | 5.51E-01 | 1.75E-04 |
| 108872 | Methyl cyclohexane | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 1,505 | 3.70E-01 | 1.59E+01 | 1.75E-04 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 1,447 | 5.16E-04 | 2.22E-02 | 1.75E-04 |
| 75092 | Methylene chloride | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 7,034 | 1.17E-03 | 5.03E-02 | 1.75E-04 |
| 127184 | Tetrachloroethylene | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 9,553 | 7.83E-03 | 3.37E-01 | 1.75E-04 |
| 108883 | Toluene | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 9,154 | 2.92E-03 | 1.26E-01 | 1.75E-04 |
| 156605 | trans-1,2-Dichloroethylene | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 1,417 | 8.27E-03 | 3.56E-01 | 1.75E-04 |
| 79016 | Trichloroethylene | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 6,557 | 4.79E-03 | 2.06E-01 | 1.75E-04 |
| 75014 | Vinyl chloride | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 5,000 | 1.73E-02 | 7.46E-01 | 1.75E-04 |
| 1330207 | Xylenes | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 1,542 | 5.86E-06 | 2.52E-04 | 1.75E-04 |
| 98862 | Acetophenone | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 1,518 | 8.91E-06 | 3.83E-04 | 1.75E-04 |
| 91203 | Naphthalene | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 12,913 | 1.52E-04 | 6.55E-03 | 1.75E-04 |
| 91576 | Methylnaphthalene, 2- | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 1,506 | 8.86E-04 | 3.81E-02 | 1.75E-04 |
| 92524 | Biphenyl, 1,1'- | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 1,472 | 2.66E-04 | 1.14E-02 | 1.75E-04 |
| 208968 | Acenaphthylene | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 1,513 | 2.45E-04 | 1.05E-02 | 1.75E-04 |
| 83329 | Acenaphthene | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 18,123 | 3.67E-05 | 1.58E-03 | 1.75E-04 |
| 86737 | Fluorene | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 16,235 | 2.20E-08 | 9.48E-07 | 1.75E-04 |
| 85018 | Phenanthrene | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 1,479 | 1.14E-04 | 4.90E-03 | 1.75E-04 |
| 120127 | Anthracene | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | 18,353 | 1.26E-05 | 5.43E-04 | 1.75E-04 |
| C9-C18 | C9-C18 Aliphatics | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | NA | 8.28E-01 | 3.56E+01 | 1.75E-04 |
| C11-C22 | C11-C22 Aromatics | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | NA | 3.60E-04 | 1.55E-02 | 1.75E-04 |
| C5-C8 | C5-C8 Aliphatics | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | NA | 6.48E-01 | 2.79E+01 | 1.75E-04 |
| C9-C10 | C9-C10 Aromatics | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | NA | 3.96E-03 | 1.70E-01 | 1.75E-04 |
| C9-C12 | C9-C12 Aliphatics | 30.48 | 0.130 | 0.659 | 1.62E-08 | 0.390 | 6.33E-09 | 18.75 | 0.43 | 0.127 | 0.303 | 4.00E+03 | 2.54E+04 | 1.80E+06 | 2.22E-04 | 52.12 | NA | 7.80E-01 | 3.36E+01 | 1.75E-04 |

Appendix C.4
Johnson & Ettinger Model - Calculations Screen
Inhalation of Volatiles from Groundwater
Future Child Resident Scenario - RME
Southwest Properties, Wells G&H Superfund Site, Operable Unit 2
Aberions Auto Parts

| | | 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, $D^{eff}_T$ ($cm^2/s$) | Diffusion path length, $L_d$ (cm) | Convection path length, $L_v$ (cm) | Source vapor conc., $C_{source}$ ($\mu g/m^3$) | Crack radius, $r_{crack}$ (cm) | Average vapor flow rate into bldg., $Q_{soil}$ ($cm^3/s$) | Crack effective diffusion coefficient, $D^{crack}$ ($cm^2/s$) | Area of crack, $A_{crack}$ ($cm^2$) | Exponent of equivalent foundation Peclet number, exp(Pe') (unitless) | Infinite source indoor attenuation coefficient, $\alpha$ (unitless) | Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$) | Unit risk factor, URF $(\mu g/m^3)^{-1}$ | Reference conc., RfC ($mg/m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71556 | 1,1,1-Trichloroethane | 4.75E-04 | 4.45E-04 | 4.56E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 4.75E-04 | 4.00E+02 | 1.44E+179 | 1.72E-04 | N/A | N/A | 2.2E+00 |
| 76131 | Trichloro-1,2,2-trifluoroethane, 1,1,2- | 1.78E-04 | 1.63E-04 | 1.67E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 1.78E-04 | 4.00E+02 | #NUM! | 1.35E-04 | N/A | N/A | 3.0E+01 |
| 79005 | 1,1,2-Trichloroethane | 5.24E-04 | 4.95E-04 | 5.06E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 5.24E-04 | 4.00E+02 | 1.89E+182 | 1.75E-04 | N/A | 1.6E-05 | 2.0E+00 |
| 75343 | 1,1-Dichloroethane | 4.56E-04 | 4.29E-04 | 4.40E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 4.56E-04 | 4.00E+02 | 6.94E+166 | 1.71E-04 | N/A | N/A | 5.0E-01 |
| 75354 | 1,1-Dichloroethylene | 5.47E-04 | 5.12E-04 | 5.25E-04 | 30.48 | 52.12 | 1.23E+02 | 0.10 | 5.22E+00 | 5.47E-04 | 4.00E+02 | 3.87E+155 | 1.78E-04 | 2.19E-02 | N/A | 2.0E-01 |
| 120821 | 1,2,4-Trichlorobenzene | 2.25E-04 | 2.14E-04 | 2.18E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 2.25E-04 | 4.00E+02 | #NUM! | 1.48E-04 | N/A | N/A | 2.0E-01 |
| 95501 | 1,2-Dichlorobenzene | 1.56E-02 | 1.50E-02 | 1.52E-02 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 1.56E-02 | 4.00E+02 | 2.87E+05 | 2.04E-04 | N/A | N/A | N/A |
| 541731 | Dichlorobenzene, 1,3- | 2.56E-04 | 2.40E-04 | 2.46E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 2.56E-04 | 4.00E+02 | #NUM! | 1.51E-04 | N/A | N/A | N/A |
| 106467 | 1,4-Dichlorobenzene | 4.38E-04 | 4.12E-04 | 4.22E-04 | 30.48 | 52.12 | 1.85E+01 | 0.10 | 5.22E+00 | 4.38E-04 | 4.00E+02 | 1.36E+194 | 1.70E-04 | 3.15E-03 | N/A | 8.0E-01 |
| 78933 | Butanone, 2- (MEK) | 9.46E-04 | 9.27E-04 | 9.34E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 9.46E-04 | 4.00E+02 | 1.05E+90 | 1.88E-04 | N/A | N/A | N/A |
| 67641 | Acetone | 2.07E-03 | 2.06E-03 | 2.06E-03 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 2.07E-03 | 4.00E+02 | 1.40E+41 | 1.97E-04 | N/A | N/A | N/A |
| 71432 | Benzene | 5.42E-04 | 5.07E-04 | 5.20E-04 | 30.48 | 52.12 | 1.16E+01 | 0.10 | 5.22E+00 | 5.42E-04 | 4.00E+02 | 1.40E+157 | 1.76E-04 | 2.03E-03 | 7.8E-06 | 3.0E-02 |
| 74839 | Bromomethane | 4.48E-04 | 4.18E-04 | 4.28E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 4.48E-04 | 4.00E+02 | 5.87E+190 | 1.70E-04 | N/A | N/A | 5.0E-03 |
| 75150 | Carbon Disulfide | 6.34E-04 | 5.94E-04 | 6.09E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 6.34E-04 | 4.00E+02 | 1.33E+134 | 1.79E-04 | N/A | N/A | 7.0E-01 |
| 108907 | Chlorobenzene | 4.55E-04 | 4.27E-04 | 4.37E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 4.55E-04 | 4.00E+02 | 9.09E+186 | 1.71E-04 | N/A | N/A | 6.0E-02 |
| 75003 | Ethyl Chloride | 7.66E-04 | 7.16E-04 | 7.34E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 7.66E-04 | 4.00E+02 | 1.53E+111 | 1.83E-04 | N/A | N/A | 1.0E+01 |
| 67663 | Chloroform | 6.43E-04 | 6.02E-04 | 6.17E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 6.43E-04 | 4.00E+02 | 2.93E+132 | 1.80E-04 | N/A | 2.3E-05 | 9.0E-02 |
| 156592 | cis-1,2-Dichloroethylene | 4.56E-04 | 4.30E-04 | 4.41E-04 | 30.48 | 52.12 | 7.02E+02 | 0.10 | 5.22E+00 | 4.56E-04 | 4.00E+02 | 3.82E+185 | 1.71E-04 | 1.20E-01 | N/A | 2.0E-01 |
| 110827 | Cyclohexane | 4.85E-04 | 4.53E-04 | 4.65E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 4.85E-04 | 4.00E+02 | 3.54E+175 | 1.73E-04 | N/A | #N/A | #N/A |
| 100414 | Ethylbenzene | 4.60E-04 | 4.31E-04 | 4.42E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 4.60E-04 | 4.00E+02 | 9.52E+184 | 1.71E-04 | N/A | N/A | 1.0E+00 |
| 98828 | Isopropylbenzene | 3.95E-04 | 3.70E-04 | 3.79E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 3.95E-04 | 4.00E+02 | 2.06E+215 | 1.67E-04 | N/A | N/A | 4.0E-01 |
| 108872 | Methyl cyclohexane | 5.98E-04 | 5.59E-04 | 5.73E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 5.98E-04 | 4.00E+02 | 2.85E+142 | 1.78E-04 | N/A | N/A | 3.0E+00 |
| 1634044 | Methyl-Tertiary-Butyl Ether | 6.67E-04 | 6.28E-04 | 6.43E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 6.67E-04 | 4.00E+02 | 4.02E+127 | 1.81E-04 | N/A | N/A | 3.0E+00 |
| 75092 | Methylene chloride | 6.35E-04 | 5.96E-04 | 6.10E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 6.35E-04 | 4.00E+02 | 1.12E+134 | 1.80E-04 | N/A | 4.7E-07 | 3.0E+00 |
| 127184 | Tetrachloroethylene | 4.39E-04 | 4.11E-04 | 4.21E-04 | 30.48 | 52.12 | 1.41E+02 | 0.10 | 5.22E+00 | 4.39E-04 | 4.00E+02 | 9.83E+183 | 1.70E-04 | 2.39E-02 | 5.9E-06 | N/A |
| 108883 | Toluene | 5.34E-04 | 5.00E-04 | 5.13E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 5.34E-04 | 4.00E+02 | 2.51E+159 | 1.75E-04 | N/A | N/A | 4.0E-01 |
| 156605 | trans-1,2-Dichloroethylene | 4.32E-04 | 4.04E-04 | 4.14E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 4.32E-04 | 4.00E+02 | 1.37E+197 | 1.69E-04 | N/A | N/A | 2.0E-01 |
| 79016 | Trichloroethylene | 4.83E-04 | 4.52E-04 | 4.64E-04 | 30.48 | 52.12 | 5.16E+03 | 0.10 | 5.22E+00 | 4.83E-04 | 4.00E+02 | 1.62E+176 | 1.73E-04 | 8.90E-01 | 1.1E-04 | 4.0E-02 |
| 75014 | Vinyl chloride | 6.44E-04 | 6.02E-04 | 6.18E-04 | 30.48 | 52.12 | 1.79E+02 | 0.10 | 5.22E+00 | 6.44E-04 | 4.00E+02 | 1.44E+132 | 1.80E-04 | 3.22E-02 | 8.8E-06 | 1.0E-01 |
| 1330207 | Xylenes | 3.75E-03 | 3.51E-03 | 3.79E-03 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 3.75E-03 | 4.00E+02 | 5.06E+22 | 2.01E-04 | N/A | N/A | 1.0E-01 |
| 98862 | Acetophenone | 2.60E-03 | 2.64E-03 | 2.62E-03 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 2.60E-03 | 4.00E+02 | 6.59E+32 | 1.99E-04 | N/A | N/A | N/A |
| 91203 | Naphthalene | 4.70E-04 | 4.50E-04 | 4.57E-04 | 30.48 | 52.12 | 1.77E+01 | 0.10 | 5.22E+00 | 4.70E-04 | 4.00E+02 | 1.34E+151 | 1.72E-04 | 3.08E-03 | N/A | 3.0E-03 |
| 91576 | Methylnaphthalene, 2- | 3.13E-04 | 2.95E-04 | 3.02E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 3.13E-04 | 4.00E+02 | 4.83E+271 | 1.69E-04 | N/A | N/A | N/A |
| 92524 | Biphenyl, 1,1'- | 3.15E-04 | 3.01E-04 | 3.06E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 3.15E-04 | 4.00E+02 | 2.33E+270 | 1.69E-04 | N/A | N/A | N/A |
| 208968 | Acenaphthylene | 3.38E-04 | 3.22E-04 | 3.28E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 3.38E-04 | 4.00E+02 | 1.29E+252 | 1.62E-04 | N/A | N/A | 3.0E-03 |
| 83329 | Acenaphthene | 7.33E-04 | 7.31E-04 | 7.32E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 7.33E-04 | 4.00E+02 | 1.12E+115 | 1.83E-04 | N/A | N/A | 3.0E-03 |
| 86737 | Fluorene | 8.18E-01 | 8.39E-01 | 8.30E-01 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 8.18E-01 | 4.00E+02 | 1.27E+00 | 9.61E-04 | N/A | N/A | 3.0E-03 |
| 85018 | Phenanthrene | 3.50E-04 | 3.41E-04 | 3.44E-04 | 30.48 | 52.12 | 1.03E+01 | 0.10 | 5.22E+00 | 3.50E-04 | 4.00E+02 | 3.08E+243 | 1.64E-04 | 1.68E-03 | N/A | 3.0E-03 |
| 120127 | Anthracene | 1.60E-03 | 1.62E-03 | 1.61E-03 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 1.60E-03 | 4.00E+02 | 2.22E+53 | 1.93E-04 | N/A | N/A | 3.0E-03 |
| C9-C18 | C9-C18 Aliphatics | 3.64E-04 | 3.40E-04 | 3.49E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 3.64E-04 | 4.00E+02 | 1.13E+234 | 1.64E-04 | N/A | N/A | 2.0E-01 |
| C11-C22 | C11-C22 Aromatics | 4.27E-04 | 4.05E-04 | 4.13E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 4.27E-04 | 4.00E+02 | 2.20E+199 | 1.69E-04 | N/A | N/A | 5.0E-02 |
| C5-C8 | C5-C8 Aliphatics | 3.64E-04 | 3.40E-04 | 3.49E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 3.64E-04 | 4.00E+02 | 1.12E+234 | 1.64E-04 | N/A | N/A | 2.0E-01 |
| C9-C10 | C9-C10 Aromatics | 3.69E-04 | 3.46E-04 | 3.55E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 3.69E-04 | 4.00E+02 | 2.64E+230 | 1.65E-04 | N/A | N/A | 5.0E-02 |
| C9-C12 | C9-C12 Aliphatics | 3.64E-04 | 3.40E-04 | 3.49E-04 | 30.48 | 52.12 | N/A | 0.10 | 5.22E+00 | 3.64E-04 | 4.00E+02 | 1.13E+234 | 1.64E-04 | N/A | N/A | 2.0E-01 |