

## Instructions for Using the J&E Model Macro

The EPA's Johnson and Ettinger (J&E) Model SG-ADV workbook was used to calculate the predicted indoor air concentrations, incremental lifetime cancer risks (ILCRs), and the non-cancer hazard indexes (non-cancer HIs) shown in Tables 3 and 4. The process was automated using a macro to insert each detected chemical and associated maximum Parcel A/B concentration and to output the results.

### Running the Macro

1. Open the J&E Model workbooks: *SG-ADV-Feb04\_SiteSpecific\_Table 3.xlsx* and *SG-ADV-Feb04\_SiteSpecific\_Table 4.xlsx*. The inputs from Table 2 of this memorandum have been entered into the "DATENTER" sheet of each workbook. A few notes about the inputs:
  - When run, the J&E Model macro will automatically fill in one CAS No. in cell E6 and the associated maximum soil gas concentration in cell F6 of the "DATENTER" sheet.
  - The Indoor Air Exchange Rate (ER) is either 1/h or 2/h, as discussed in Section 3.2.1 of this memorandum. An ER of 1/h is used for Table 3, and an ER of 2/h is used for Table 4.
  - The average vapor flow rate ( $Q_{\text{soil}}$ ) is either the default (20 L/m) or left blank to have the workbook calculate a site-specific value based on soil type, as discussed in Section 3.2.1 of this memorandum. A  $Q_{\text{soil}}$  of 20 L/m is used in Table 3, and a calculated  $Q_{\text{soil}}$  is used in Table 4. The calculated value (in units of  $\text{cm}^3/\text{sec}$ ) can be found in cell D31 of the "INTERCALCS" sheet of the SG-ADV workbook.
2. Open the workbook that contains the macro: *Screening Level HRA Calculations.xlsm*. This is where the macro is run and the results from the J&E Model workbooks are stored.
3. To run the macro, select the Developer tab<sup>1</sup> in the Excel Ribbon and click on Macros.<sup>2</sup>
4. With *JEModel* highlighted, click on Run.
5. The macro will automatically insert CAS numbers and maximum soil gas concentrations for one chemical at a time into the "DATENTER" sheet of the J&E Model

<sup>1</sup> To enable the Developer Tab, go to Excel Options. Under the Popular options check the box next to show Developer tab in the Ribbon.

<sup>2</sup> Macros must be enabled in Excel to run a macro. To enable them, go to Excel Options and then select the Trust Center. Click on Trust Center Settings and then select Macro Settings. Additionally, for the macro to run properly, formulas must be set to calculate automatically. This is the default setting, however, it can be changed in the Excel Options under Formulas. The box under Workbook Calculation should be checked for Automatic. These instructions are for Excel 2007 and may not be relevant to older versions.

workbooks. The macro then outputs the indoor air concentration from “INTERCALCS” sheet and the non-cancer HI and ILCR from the “RESULTS” sheet into the *Screening Level HRA Calculations.xlsm* workbook. The results for Tables 3 and 4 are stored in the “Table 3 Results” and “Table 4 Results” sheets respectively.

Chemicals not included in J&E Model Workbook

In order for an indoor air concentration, non-cancer HI, and/or ILCR to be calculated by the J&E Model SG-ADV Workbook, the chemical must be included in the “VLOOKUP” sheet, including all necessary chemical/physical parameters and inhalation cancer and/or non-cancer toxicity criteria (unit risk factors and reference concentrations, respectively), and a concentration in soil gas must be entered in the “DATAENTER” sheet. For purposes of this screening-level indoor air health risk assessment, the maximum detected concentration in soil gas was used. Chemicals that were not detected were excluded from the *Screening Level HRA Calculations.xlsm* workbook after ensuring that the maximum detection limit was below EPA screening criteria (see Table 1 of this memorandum); these chemicals are summarized below.

<b>Non-Detect Chemicals in Soil Gas in Parcels A/B</b>	
<b>CAS</b>	<b>Chemical</b>
71556	1,1,1-Trichloroethane
79345	1,1,2,2-Tetrachloroethane
96128	1,2-Dibromo-3-chloropropane
95501	1,2-Dichlorobenzene
994058	2-Methoxy-2-methyl-butane
100447	Benzyl Chloride
10061015	cis-1,3-Dichloropropene
637923	Ethyl t-butyl ether
108203	Isopropyl ether
156605	trans-1,2-Dichloroethylene
106934	Ethylene dibromide
10061026	trans-1,3-Dichloropropene

It should be noted that four chemicals detected in one or more soil gas samples from Parcels A/B have neither established inhalation toxicity criteria nor surrogate criteria



identified by NDEP.<sup>3</sup> These chemicals are summarized below (information excerpted from Table 1 of this memorandum).

Chemicals in Soil Gas in Parcels A/B for which No Inhalation Toxicity Criteria have been Established							
Chemical	Sample Count	Detection Count	Frequency of Detections	Minimum DL ( $\mu\text{g}/\text{m}^3$ )	Maximum DL ( $\mu\text{g}/\text{m}^3$ )	Minimum Detection ( $\mu\text{g}/\text{m}^3$ )	Maximum Detection ( $\mu\text{g}/\text{m}^3$ )
1,2-Dichlorotetrafluoroethane	9	5	56%	0.077	0.085	0.085	0.1
Ethanol	9	9	100%	-	-	2.3	32
n-Heptane	9	6	67%	0.098	0.11	0.24	0.72
n-Octane	9	4	44%	0.077	0.085	0.23	1.5

As can be seen in the above table, these chemicals were detected at very low concentrations in soil gas (the maximum concentration was for ethanol at  $32 \mu\text{g}/\text{m}^3$ ; three of the four chemicals were detected at maximum concentrations of  $1.5 \mu\text{g}/\text{m}^3$  or less). Accordingly, excluding these chemicals from the quantitative risk calculations should not affect the overall conclusions of the screening-level indoor air health risk assessment.

All of the calculations performed using the macro can be independently verified by manually entering the CAS No. and soil gas concentration into either the *SG-ADV-Feb04\_SiteSpecific\_Table 3.xlsx* and *SG-ADV-Feb04\_SiteSpecific\_Table 4.xlsx* workbooks and comparing the indoor air concentration in the “INTERCALCs” sheet and HI or ILCR in the “Results” sheet to the values in the “Table 3 Results” or “Table 4 Results” sheets in the *Screening Level HRA Calculations.xlsm* workbook or in Tables 3 and 4 of this memorandum.

<sup>3</sup> Personal communication (electronic mail message) from Shannon Harbor, NDEP, to Susan Crowley (Contractor), Tronox LLC, dated August 20, 2010.

