

US EPA ARCHIVE DOCUMENT

## TECHNICAL MEMORANDUM

**Date:** April 21, 2005

**To:** Cathy Pickrel, Ashland Inc.

**From:** Jo Hayes, Pei-fung Hurst, URS Corporation

**Re:** Johnson and Ettinger Modeling Using Groundwater Model  
Glenrose Avenue, Michigan

Modeling was performed using the Johnson and Ettinger Advanced Groundwater Model (USEPA, 2003). The model assumptions are briefly outlined below.

Dataset	Groundwater data from borehole location H6 were utilized in the evaluation and are presented in Table 1.
Model Concentrations:	The groundwater concentrations were detected at a depth interval of 45-50 feet below ground surface in borehole H6 for this evaluation.
Model Assumptions:	Lithology for H6 was used in the model. Depth intervals used for H6 lithology strata are presented in <b>Table 1</b> .
	The indoor exchange rate is 0.9 ACH. This value was taken from: USEPA. 1997. <i>Exposure Factors Handbook Volume III: Activity Factors</i> . Office of Research and Development. EPA/600/P-95/002Fc. August. This value is present in Chapter 17, page 17-10, second column, paragraph 1, line 10 (of paragraph) in the discussion of the Nazaroff <i>et al</i> (1988) evaluation of two separate studies. The 0.9 ACH is based on homes with a median age of 45 years (Grot and Clark, 1981). Homes in this area are approximately this age.

**Table 1** demonstrates the potential total incremental lifetime cancer risk (ILCR) and noncarcinogenic hazard estimated using the groundwater concentrations detected in borehole H6 are within USEPA's acceptable risk range of 1E-06 to 1E-04 and below a noncancer hazard index of 1.

**Attachment A** provides a summary of the supporting calculations for the model run.

Reference:

USEPA. 2003. *User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings*. Office of Emergency and Remedial Response. June.

[http://www.epa.gov/oswer/riskassessment/airmodel/johnson\\_ettinger.htm](http://www.epa.gov/oswer/riskassessment/airmodel/johnson_ettinger.htm)