

**Appendix L**  
**SESOIL Modeling to Support “Contained-In” Determination**  
**River Terrace Site Remedial Investigation**



**APPENDIX L: SESOIL MODELING TO SUPPORT THE "CONTAINED IN" DETERMINATION FOR EXCAVATED SOILS AND IDW GENERATED AT THE RIVER TERRACE SITE**

Modeling activities consisting of a leaching assessment and groundwater transport analysis were performed to support the "Contained In" determination for excavated soils and IDW generated at the RTRVP contaminated site. Approximately 125 cubic feet of IDW contaminated soil stored in drums and approximately 100,000 cubic feet of soil contaminated by tetrachloroethylene (PCE) and its degradation products, which is currently held in soil cells on the RTRVP property, is addressed by this determination. These contaminated soils are considered part of the "contaminated site" at the RTRVP property.

The goal of the modeling activities was to evaluate the impact of PCE leaching from excavated soils spread on the site. This information will supply technical justification for proper placement of the soil spreading, to ensure that water quality standards will be met at the ordinary high water (OHW) level of the adjacent Kenai River.

Modeling was performed using the Seasonal Soil Compartment (SESOIL) model to simulate leaching through the vadose zone, and the Analytical Transient 1,2,3-Dimensional (AT 1,2,3-D) model to simulate groundwater transport. In general, input parameters were chosen to be conservative and over-predict leaching. A soil concentration of 11.5 mg/kg PCE was input into the model to represent the spread soils. This input concentration was based on the maximum allowable PCE concentration established for site soils in an August 27, 1997 letter from Lynn Kent of the ADEC to Gary Hinkle, site owner. The approximately 100,000 cubic feet of contaminated soil at the site was divided into three theoretical lift thicknesses (5-foot lift, 2-foot lift, and 1-foot lift) for modeling purposes.

Practical constraints exist for the spreading of approximately 100,000 cubic feet of soil on the RTRVP property: property boundaries, depth to groundwater, structures, existing grade, and the number of potential remedial alternatives being discussed for the site.

Some of the alternatives involve groundwater treatment along the river. If the state decides to install a groundwater treatment system, the ideal situation would be to spread all the soil above (upgradient of) the system. In this case, any PCE leachate would run through the groundwater treatment system, thereby minimizing the impact of PCE leaching on the Kenai River. Most of the proposed groundwater treatment systems include either an interception trench or subsurface treatment "wall" approximately 200 feet long. The orientation of the treatment systems is roughly parallel to the Kenai River between the Sterling Highway bridge abutment and about 60-70 feet beyond MW-5, located approximately 60 feet uphill from the river (near the existing fence). The surface area practically available above the treatment system location is approximately 20,000 square feet. This area corresponds to the area from the edge of the bluff (near MW-4A), northeastward to approximately MW-24, southeastward toward MW-3A. To place 100,000 cubic feet of soil in an area covering 20,000 square feet would require a 5-foot lift. The conclusion of modeling activities is that the stockpile soils can be spread on the site subject to the following conditions:

- Soil spreading should occur in locations where the minimum depth to groundwater (measured from the original, or pre-spreading, land surface) is 5 feet. A 5-foot depth to groundwater is a minimum depth observed in site monitoring wells located on RTRVP

property, excluding the sentry wells located along the Kenai River. The 5-foot depth to groundwater was used in the modeling simulations.

- Soil spreading should occur no closer than approximately 100-feet from the Kenai River. This distance is based on the minimum depth to groundwater distance (discussed in the previous condition) and practical site considerations (e.g., it would be impractical to spread soils on the embankment sloping toward the Kenai River).
- Soil spreading can occur in a lift thickness up to 2-feet without adversely impacting groundwater quality.
- Soil spreading should occur during late spring/early summer timeframe, after spring breakup, but as early in summer as possible. This will allow maximum time for PCE volatilization after spring breakup and before fall rains maximize water infiltration.
- Soil spreading should occur during periods of no precipitation to minimize runoff concerns and maximize volatilization of the contaminants. If practical, spreading in lifts of approximately 6 inches at a time will further increase volatilization.
- Snow covering the spread soils should be removed prior to breakup for a period of 5 years. This will minimize the slug of water infiltration occurring as a result of spring melting.
- Spread soils should be re-vegetated to increase evapotranspiration, increase stability, and enhance natural attenuation.
- Engineering controls must be utilized to ensure that no surface runoff occurs.

### **L.1.0 Background**

A series of site investigations performed between 1995 and 1997 identified an area of PCE contaminated soil, contaminated groundwater, and contaminated river sediments. The EPA Office of Environmental Cleanup, Emergency Response, Site Cleanup Unit One initiated a CERCLA time-critical removal order for the site that allowed the site owner to excavate and treat the contaminated soils and any contaminated groundwater generated through dewatering or sampling events. Two vapor extraction system cells were constructed and operated in 1998. The cells are currently still present at the site. EPA is evaluating post-cleanup characterization data to determine if the cells can be dismantled.

Together, the two soil cells are estimated to contain approximately 100,000 cubic feet of soil. Treatment cell closure sampling was conducted in June 1999. A total of 46 soil samples were collected from Treatment Cell 1, and 30 samples were collected from Treatment Cell 2. Detected PCE concentrations in Treatment Cell 1 ranged from 1.99 mg/kg to 9.66 mg/kg, with an average concentration of 3.57 mg/kg. Detected PCE concentrations in Treatment Cell 2 ranged from 1.19 mg/kg to 5.31 mg/kg, with an average concentration of 2.55 mg/kg.

Approximately 125 cubic feet of soil IDW is also temporarily stored on the site (in drums). The maximum PCE concentration detected in samples from the borings representing this IDW is 0.037 mg/kg. Since the volume of IDW is so small compared to the soil held in the

treatment cells, the treatment cell volume and PCE concentration are assumed to be representative of all subject soils, for purposes of the modeling.

### **L.2.0 Modeling Scenarios**

This letter reports the results of an analysis of the impact of spreading the soil currently contained in the soil cells across the site. The following scenarios were modeled:

- A. A 5-foot thick layer covering approximately 20,000 square feet
- B. A 2-foot thick layer covering approximately 50,000 square feet
- C. A 1-foot thick layer covering approximately 100,000 square feet

In all three scenarios, three of the four boundaries of the spread soil layers are pre-determined. Site topography constrains the northwest boundary to the bluff near the Sterling Highway. The practical northeast boundary is the former dry cleaner building (or near it). The southwest boundary is constrained by the proposed location of the groundwater remediation system, which will be located approximately 100 feet uphill from the Kenai River OHW, near MW-9.

The first scenario (Scenario A) would result in soils spread 5-feet thick over the area extending from three boundaries described above southeastward to approximately MW-3A, (approximately 20,000 square feet). This area would be entirely upgradient of the proposed groundwater remediation system, which would run approximately 200 feet parallel to the river near MW-9 (the southern terminus of the proposed soil spreading area).

The second scenario (Scenario B) would result in soils spread 2-feet thick over an area extending from the three boundaries described above approximately 550 feet to the southeast.

The third scenario (Scenario C) would result in soils spread 1-foot thick over an area extending from the three boundaries described above approximately 1,100 feet to the southeast. This is obviously a very large area (100,000 square feet), and the feasibility of spreading soils over this area has not been evaluated.

### **L.3.0 Soil Leaching Assessment**

OASIS/Bristol performed the soil leaching assessment with the Seasonal Soil Compartment (SESOIL) model. This model is a one-dimensional vertical transport model for the unsaturated zone. SESOIL simulates chemical leaching with infiltration water and partitions chemicals into air, soil moisture, and solid phase (adsorbed to the soil's organic fraction). Input into SESOIL includes site-specific climate information, chemical properties and application information, and site-specific soil information. SESOIL output includes time-varying chemical concentrations at various soil depths and pollutant loss from the unsaturated zone due to percolation to the groundwater, volatilization, and degradation.

### **L.4.0 Model Input Parameters and Calibration**

Input data used for the soil leaching assessment include Soldotna climatic data and soil properties and chemical application information from site investigation activities. Average Kenai monthly precipitation and temperature were input into the climate file. Cloudiness, relative humidity, and storm event data were not available for Soldotna; therefore, Anchorage and Homer data were averaged to provide an estimate of these parameters for Soldotna. No

evapotranspiration and no surface runoff were assumed; therefore, all precipitation will infiltrate the soil, and predicted leaching will be maximized.

Soil input parameters are summarized below in Table L.1:

**Table L.1: SESOIL Soil Input Parameter Summary**

Parameter	Value	Information Source
Soil density	1.8 g/cm <sup>3</sup>	Estimate of site-specific soil density
Effective porosity	0.3	Default value, calibration parameter.
Disconnectedness Index	12	This value is used to characterize the difference between the wetting curve and drying curve of the soil, and is a property of the soil type. The model recommends a default value of 3.7 for sandy soil, and a default value of 12 for clay. This value is used as the primary calibration parameter. It was set to a value of 12 to replicate soil moisture content measured in site soil samples.
Intrinsic permeability	1e-8 cm <sup>2</sup>	Conservative site-specific estimate based on hydraulic conductivity calculated from slug test result of MW-4A (6e-3 cm/sec, which is approximately equal to 6e-8 cm <sup>2</sup> intrinsic permeability, which was reduced to 1e-8 cm <sup>2</sup> to be conservative).
Organic carbon fraction	0.22 percent	Average site-specific value from soil sample analytical results.
Depth to groundwater	5 feet	Approximate average site depth to groundwater across the lower plume area at the site.

The model was calibrated by matching the simulated soil moisture percentage with observed soil moisture percentages. Soil analytical results indicate a range of site soil moisture values between 7 percent and 18 percent, with an average of 10.5 percent, on a mass basis. This converts to a volumetric soil moisture of approximately 17.5 percent. With the input parameters given in Table L.1 above, the model calibrated to 17.5 percent moisture.

Two soil layers were simulated. The top layer was the spread soil layer, and the second layer was the native site material. Thickness of the top layer varied from 1 feet to 5 feet, and second layer thickness was set at 5 feet. The soil characteristics of the two layers were assumed to be the same. Each layer was subdivided into 4 sublayers to increase the accuracy of the model predictions.

A PCE input concentration of 11.5 mg/kg was assumed for Layer 1. No PCE was assumed to be in the second layer. The second layer was assumed to be clean, because the purpose of this modeling exercise is to evaluate the effects of PCE leaching from spread soils, not in situ soils. Furthermore, the assumption of a clean second layer is reasonable for most of the likely footprint of the spread soils, because they will be spread on clean backfill from the 1997

excavation and will extend over uncontaminated sections of the site. The PCE chemical characteristics used in the model are summarized in Table L.2.

**Table L.2: PCE Chemical Characteristics**

Parameter	Value	Source
Molecular Weight	165.8	Pankow and Cherry, 1996
Solubility (mg/L)	150 <sup>(1)</sup>	<sup>(1)</sup> USEPA Basics of Pump-and-Treat Ground-Water Remediation Technology (USEPA, 1990)
Diffusion Coefficient in air (cm <sup>2</sup> /sec)	0.06968	USEPA Superfund Exposure Assessment Manual (USEPA, 1988); value cited for 10 degrees C
Diffusion Coefficient in water (cm <sup>2</sup> /sec)	8.2x10 <sup>-6</sup>	USEPA Soil Screening Guidance (USEPA, 1996a)
Henry's Law Constant (m <sup>3</sup> -atm/mol)	0.0153	Cohen and Mercer, 1993
Adsorption Coefficient on Organic Carbon (K <sub>oc</sub> ) (L/kg)	265 <sup>(1)</sup>	<sup>(1)</sup> USEPA Soil Screening Guidance (USEPA, 1996a) geometric mean value (measured)
Density (g/cm <sup>3</sup> )	1.63	Pankow and Cherry, 1996
Biodegradation rate	0	Conservative assumption

### L.5.0 Groundwater Transport Analysis

OASIS/Bristol performed the groundwater transport analysis with the Analytical Transient 1-, 2-, 3-Dimensional Model (AT123D). AT-123D is designed to be an assessment tool for estimating dissolved chemical concentration in three dimensions in the aquifer. Advection, dispersion, adsorption, and decay are the fate and transport processes simulated using AT-123D.

AT-123D is an analytical groundwater transport model that is linked to SESOIL such that it can directly import SESOIL modeling results. Data imported from SESOIL output include all chemical loading data, aquifer hydraulic conductivity, model run duration, time step, and error tolerance values. Additional input data required by the model include aquifer width and depth, hydraulic gradient, and dispersivities. Table L.3 below provides a summary of the input parameters.

**Table L.3: AT-123D Input Parameter Summary**

Parameter	Value	Information Source
Aquifer depth	1.5 m	Site data (approximately 5 feet)
Aquifer width	Infinite	Conservative estimate
Hydraulic conductivity	0.684 m/hr	Converted from 1.9e-02 cm/sec, which is the geometric mean slug test value for the alluvial material at the site.
Hydraulic gradient	.1	Conservative gradient. The maximum gradient measured at the site is between MW-4A and MW-10 (0.14). Elsewhere at the site, the hydraulic gradient is generally between 0.01 and 0.02.
Longitudinal dispersivity	5 m	Conservative value; User's Manual provides a range from 10-100 m as typical values for sand
Transverse and vertical dispersivities	.5, .05 m	Transverse dispersivity is often estimated as 1/10 of the longitudinal dispersivity (Domenico and Schwartz, 1990), vertical dispersivity was essentially set to zero.
Decay constant	0 (units per hour)	Conservative estimate

This model could not be calibrated, because these simulations are based on leaching from spread soils, which is a condition that does not yet exist at the site.

### L.6.0 Modeling Results

SESOIL and AT-123D were run for a 15-year period to simulate transport of dissolved PCE with the groundwater. The 15-year timeframe allows evaluation of the maximum simulated PCE concentrations in groundwater (this time period was chosen after running several initial simulations, which indicated that the time of maximum PCE breakthrough concentrations was between 4 years and 8 years). The "base case" scenario was run using the parameters listed in Tables L.1 through L.3 above. This is a very conservative base case; the conservative nature of this simulation is highlighted below:

- No biodegradation was assumed in either the SESOIL or the AT-123D modeling. Site monitoring data indicates that reductive dechlorination does occur in site groundwater; this process is not considered in the simulations. Due to this assumption, volatilization, adsorption, and dilution were the only PCE attenuation mechanisms simulated by the models.
- All of the precipitation was assumed to infiltrate the soil column. No evapotranspiration was input into the model, and no surface runoff was assumed. Together, these assumptions will tend to overestimate the amount of water infiltrating the soil, which will overestimate the mass of PCE leaching and underestimate the mass of PCE volatilizing.
- A uniform soil PCE concentration of 11.5 mg/kg was assumed for the spread soil layer. This is a very conservative assumption. Soil cell sampling in 1999 indicated soil concentrations between 1.2 mg/kg and 9.7 mg/kg, with an average of 3.17 mg/kg. PCE is a very volatile compound; during the process of removing soil from the cells and spreading it on the site, significant volatilization of remaining PCE will occur.

- Conservative PCE chemical parameter values were used, when a range was available. Literature solubilities range from 150 mg/L to 200 mg/L; the lower value was used to minimize volatilization. Literature Henry's Law Constant values range from 0.0153 m<sup>3</sup>-atm/mol to 0.0184 m<sup>3</sup>-atm/mol; the lower value was also used to minimize volatilization. Literature K<sub>oc</sub> values range between 155 L/kg and 365 L/kg; the median value of 265 L/kg was used to estimate adsorption.
- A conservative intrinsic permeability was used in the SESOIL simulations; 1e-08 cm<sup>2</sup>, which corresponds to a hydraulic conductivity less than the slug test conductivity in MW-4A (6.3e-03 cm/sec). This conductivity was the lowest conductivity measured in the monitoring wells in the alluvial material. A hydraulic conductivity of 3e-05 cm/sec was measured in the till of MW-15, but it is not reasonable to assume that the stockpiled soil is best characterized by the till measured in MW-15.
- Groundwater transport parameters were chosen to maximize groundwater transport. Relatively high hydraulic conductivity and hydraulic gradient values were input into AT-123D, which will maximize groundwater velocity. The hydraulic conductivity input into the model, which was the geometric mean of the alluvial aquifer slug testing results, is an order of magnitude higher than the hydraulic conductivity value corresponding to the intrinsic permeability input into the SESOIL model. Very low dispersivity values were input into the model.

Findings from the "base case" modeling scenario are listed below:

- In all "base case" modeling scenarios (e.g., 1-foot lift, 2-foot lift, and 5-foot lift), PCE will leach through to the water table aquifer located about 5 feet bgs.
- In the 1-foot and 2-foot lift scenarios, the maximum predicted PCE concentration in groundwater is less than 0.005 mg/L (the water quality standard). In the 1-foot lift scenario, the maximum predicted PCE concentration in groundwater is 2e-7 mg/L. In the 2-foot lift scenario, the maximum predicted PCE concentration in groundwater is 4e-5 mg/L. Both of these maximum predicted PCE concentrations occur 6 years after soil placement.
- In the 5-foot lift scenario, the maximum predicted PCE concentration in groundwater is 0.01 mg/L, which slightly exceeds the water quality criteria of 0.005 mg/L. The maximum predicted PCE concentration occurs 7 years after spreading soils.

Input data for the three scenarios mentioned above, output data from the SESOIL model from the 2-foot scenario, and Figure 1 comparing PCE concentration in the groundwater from the 1, 2 and 5-foot base case scenarios are also included in Appendix L.

### L.7.0 Sensitivity Analysis

As with any model, there is uncertainty in the SESOIL and AT-123D modeling results. The uncertainty associated with the modeling was addressed by performing a limited sensitivity analysis. As discussed above, the "base case" scenario is actually a very conservative scenario that will over predict PCE leaching. A sensitivity analysis was performed to evaluate the model's sensitivity to changes in key input parameters. Since volatilization is the major

mechanism for PCE attenuation in the model, the model results are most sensitive to changes in parameters affecting volatilization.

SESOIL models volatilization based on the Henry's Law constant, which is an equilibrium constant. Kinetics do not favor PCE volatilization to equilibrium. Therefore, SESOIL modeling results will tend to overestimate volatilization. However, the conservative assumptions made in the modeling analysis will compensate for this overestimation.

To examine the effects of increased leaching on the 2-foot lift scenario, 2 "worst case" scenarios were modeled by varying the following parameters:

- *Intrinsic permeability (used in SESOIL) was decreased by an order of magnitude to  $1e-9$  cm.<sup>2</sup>* This resulted in a predicted soil moisture of 22 percent, which exceeds the measured soil moisture at the site. Under this scenario, the predicted maximum PCE concentration in groundwater increased from  $4e-5$  mg/L to 0.01 mg/L for a 2-foot lift.
- *Precipitation was increased by 50 percent for the entire modeling period.* In reality, it is extremely unlikely that precipitation would increase by 50 percent consistently over the modeling timeframe (a 15-year period). Under this scenario, the predicted maximum PCE concentration in groundwater increased from  $4e-5$  mg/L to 0.005 mg/L for a 2-foot lift. Due to the increased infiltration, the time of the maximum predicted PCE concentration decreased to 4 years after soil spreading.

Each of these scenarios resulted in an increase in maximum predicted PCE leachate concentration. In both cases, the maximum predicted PCE concentrations in the 2-foot lift scenario are near or slightly above the water quality criteria of 0.005 mg/L.

To examine the effects of decreased leaching on the 5-foot lift scenario, 3 "more realistic case" scenarios were modeled. The 5-foot lift scenario was chosen for this sensitivity analysis, because the maximum predicted PCE concentrations in the 1-foot and 2-foot base case scenarios were already very low. The following parameters were varied to create the "more realistic case" scenarios:

- *A literature-based degradation rate (PCE half-life of 877 days) was input into the groundwater transport model.* Due to the short travel distance in the simulation and the relatively long PCE half-life, this scenario had very little effect on the maximum predicted PCE concentration in groundwater.
- *The soil input concentration was decreased to 3.2 mg/kg. This is the average soil concentration detected in 1999 treatment cell closure sampling, which is a more average input concentration than 11.5 mg/kg, which was used in the base case.* Under this scenario, the predicted maximum PCE concentration in groundwater decreased from 0.01 mg/L to  $5e-5$  mg/L (in 8 years) for a 5-foot lift.
- *Intrinsic permeability (used in SESOIL) was increased by an order of magnitude to  $1e-7$  cm.<sup>2</sup>. This increased intrinsic permeability could be a reasonable result of the decreased compaction likely in soils that have been excavated and spread on site, versus in situ soils.* Under this scenario, PCE is not predicted to leach to the groundwater in the 1-, 2-, or 5-foot lift scenarios.

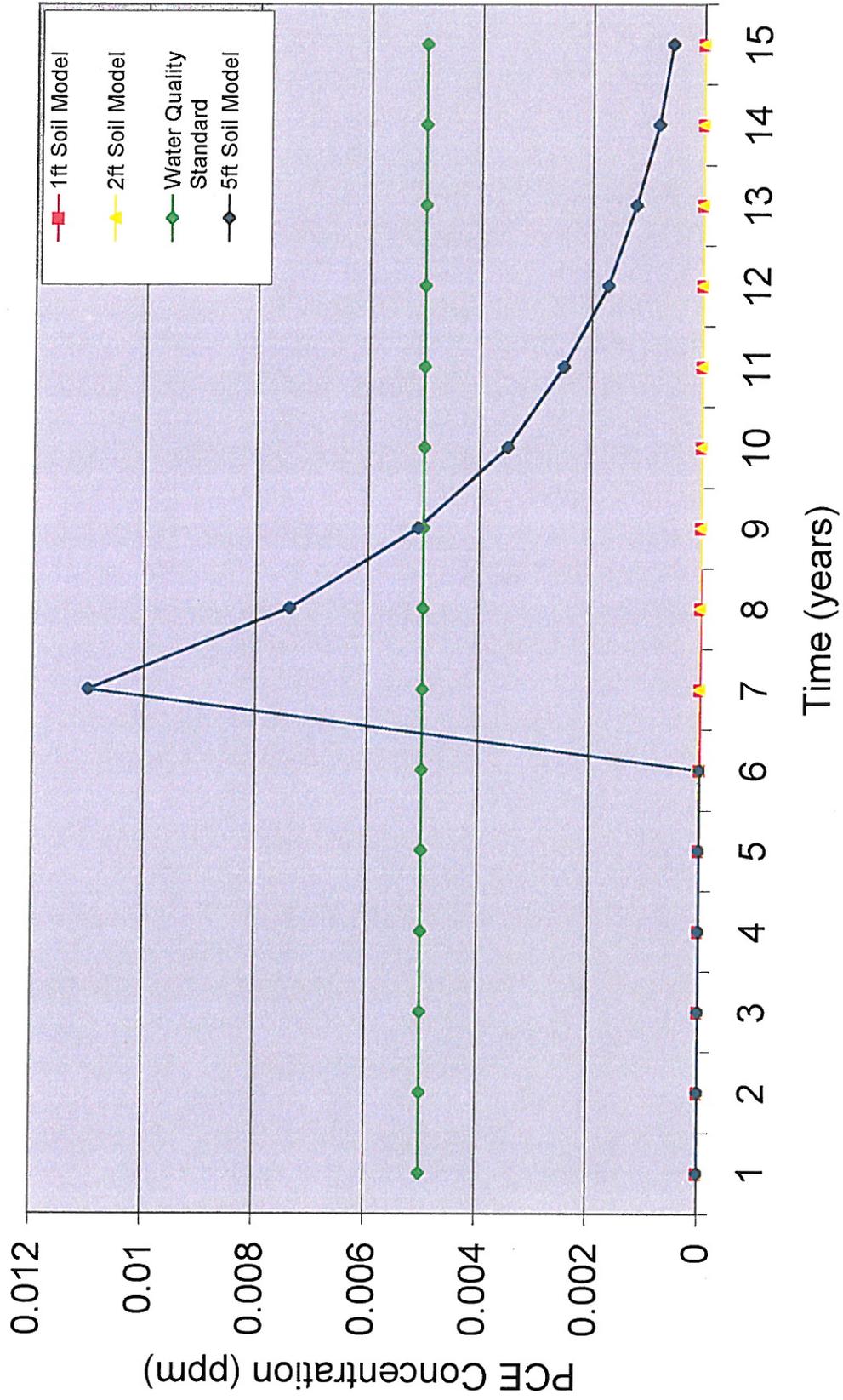
Each of these scenarios resulted in a decrease in maximum predicted PCE leachate concentration. In the second and third cases (decreasing soil input concentration and

increasing intrinsic permeability), the maximum predicted PCE concentrations in the 5-foot lift scenario are at least 2 orders of magnitude below the water quality criteria of 0.005 mg/L.

The overall conclusions of the sensitivity analysis indicate that the modeling is adequately conservative to be protective of the water quality criteria at the site.



Appendix L  
 Figure 1: SESOIL and AT-1,2,3-D Predicted PCE Concentrations  
 River Terrace RV Park





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\*\*\*\*\* SESOIL-84 : SEASONAL CYCLES OF WATER, SEDIMENT, AND POLLUTANTS  
IN SOIL ENVIRONMENTS \*\*\*\*\*

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\*\*\*\*\* DEVELOPERS: M. BONAZOUNTAS, ARTHUR D. LITTLE INC. , (617) 864-  
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\*\*\*\*\* VERSION : JANUARY 1995

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\*\*\*\*\* MONTHLY SESOIL MODEL OPERATION \*\*\*\*\*  
MONTHLY SITE SPECIFIC SIMULATION

REGION : Sold.  
SOIL TYPE : silty sand  
COMPOUND : PCE  
WASHLOAD DATA :  
APPLICATION AREA: River Terrace PCE 2 ft base

GENERAL INPUT PARAMETERS  
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-- SOIL INPUT PARAMETERS --

SOIL DENSITY (G/CM\*\*3) : 1.80  
INTRINSIC PERMEABILITY (CM\*\*2) : .100E-07  
DISCONNECTEDNESS INDEX (-) : 12.0  
POROSITY (-) : .300  
ORGANIC CARBON CONTENT (%) : .220  
CATION EXCHANGE CAPACITY (MILLI EQ./100G DRY SOIL) : .000  
FREUNDLICH EXPONENT (-) : 1.00

## -- CHEMICAL INPUT PARAMETERS --

SOLUBILITY (UG/ML) :	150.
DIFFUSION COEFFICIENT IN AIR (CM**2/SEC) :	.697E-01
HENRYS LAW CONSTANT (M**3-ATM/MOLE) :	.153E-01
ADSORPTION COEFFICIENT ON ORGANIC CARBON (KOC) :	265.
ADSORPTION COEFFICIENT ON SOIL (K) :	.000
MOLECULAR WEIGHT (G/MOL) :	166.
VALENCE (-) :	.000
NEUTRAL HYDROLYSIS CONSTANT (/DAY) :	.000
BASE HYDROLYSIS CONSTANT (L/MOL-DAY) :	.000
ACID HYDROLYSIS CONSTANT (L/MOL-DAY) :	.000
DEGRADATION RATE IN MOISTURE (/DAY) :	.000
DEGRADATION RATE ON SOIL (/DAY) :	.000
LIGAND-POLLUTANT STABILITY CONSTANT (-) :	.000
NO. MOLES LIGAND/MOLE POLLUTANT (-) :	.000
LIGAND MOLECULAR WEIGHT (G/MOL) :	.000

## -- APPLICATION INPUT PARAMETERS --

NUMBER OF SOIL LAYERS:	2
YEARS TO BE SIMULATED:	15
AREA (CM**2) :	0.470E+08
APPLICATION AREA LATITUDE (DEG.) :	60.0
SPILL (1) OR STEADY APPLICATION (0) :	0
MODIFIED SUMMERS MODEL USED (1) OR NOT (0) FOR GWR. CONC.:	1
INITIAL CHEMICAL CONCENTRATIONS GIVEN (1) OR NOT GIVEN (0)	1
DEPTHS (CM) :	61.
0.15E+03	
NUMBER OF SUBLAYERS/LAYER	4
4	
PH (CM) :	0.00
0.00	
INTRINSIC PERMEABILITIES (CM**2) :	0.00
0.00	
KDEL RATIOS (-) :	1.0
KDES RATIOS (-) :	1.0
OC RATIOS (-) :	1.0
CEC RATIOS (-) :	1.0
FRN RATIOS (-) :	1.0
ADS RATIOS (-) :	1.0

1

YEAR - 1 MONTHLY INPUT PARAMETERS  
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## -- CLIMATIC INPUT PARAMETERS --

	APR	MAY	JUN	OCT	JUL	NOV	AUG	DEC	JAN	FEB	MAR
TEMP. (DEG C)			1.360	-5.830	-9.970	-11.140	-8.690				
5.190	1.190	6.580	10.250	12.470	12.060	8.310					
CLOUD CVR (FRAC.)			0.680	0.650	0.630	0.610	0.630				
0.600	0.600	0.650	0.630	0.660	0.650	0.650					



SINKS-L (UG/CM\*\*2)        0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00  
 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00  
 LIG.INPUT-L (UG/CM\*\*2) 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00  
 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00  
 VOLATILIZATION MULT.-L 1.00E+00 1.00E+00 1.00E+00 1.00E+00 1.00E+00  
 1.00E+00 1.00E+00 1.00E+00 1.00E+00 1.00E+00 1.00E+00 1.00E+00

YEAR -    2-15        MONTHLY INPUT PARAMETERS  
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-- CLIMATIC INPUT PARAMETERS ARE SAME AS LAST YEAR  
 -- POLLUTANT INPUT PARAMETERS ARE SAME AS LAST YEAR

--MODIFIED SUMMERS MODEL PARAMETERS --  
 (INPUT FOR CALCULATION OF CONTAMINANT IN GROUNDWATER)

SATURATED HYDRAULIC CONDUCTIVITY (CM/DAY):                    1.64E+03  
 HORIZONTAL HYDRAULIC GRADIENT:                                1.00E-01  
 THICKNESS OF SATURATED CONE (CM):                             1.52E+02  
 WIDTH OF CONTAMINATED ZONE PERPENDICULAR TO FLOW (CM):     3.00E+04  
 BACKGROUND CONTAMINANT CONCENTRATION IN AQUIFER (UG/ML):   0.00E+00

YEAR -    1 ANNUAL SUMMARY REPORT  
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-- TOTAL INPUTS (UG) --

UPPER SOIL ZONE                    5.931E+10  
 LOWER SOIL ZONE                    0.000E+00

-- HYDROLOGIC CYCLE COMPONENTS --

AVERAGE SOIL MOISTURE ZONE 1 (%)                                17.558  
 AVERAGE SOIL MOISTURE BELOW ZONE 1 (%)                        17.558  
 TOTAL PRECIPITATION (CM)                                        48.848  
 TOTAL INFILTRATION (CM)                                         48.848  
 TOTAL EVAPOTRANSPIRATION (CM)                                  16.111  
 TOTAL SURFACE RUNOFF (CM)                                        0.000  
 TOTAL GRW RUNOFF (CM)    32.550  
 TOTAL MOISTURE RETENTION (CM)                                    0.187  
 TOTAL YIELD (CM)     32.550  
 0                    -- POLLUTANT MASS DISTRIBUTION IN COLUMN (UG) -- NOTE: IF  
 COMPONENT IS ZERO EACH MONTH, IT IS NOT PRINTED

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 FOR FINAL MASS IN SOIL MOI., ADS. ON SOIL, SOIL AIR, IMMOBIL CEC,  
 COMPLEXED, AND PURE PHASE FOR EACH SUBLAYER, SEE ABOVE (MONTH SEP)

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UPPER SOIL ZONE:

SUBLAYER 1		
	TOTAL VOLATILIZED	5.775E+10
SUBLAYER 2		
	TOTAL DIFFUSED (UP)	4.671E+10
SUBLAYER 3		
	TOTAL DIFFUSED (UP)	3.475E+10
SUBLAYER 4		
	TOTAL DIFFUSED (UP)	2.200E+10

LOWER SOIL ZONE:

SUBLAYER 1		
	TOTAL DIFFUSED (UP)	1.970E+09
SUBLAYER 2		
SUBLAYER 3		
SUBLAYER 4		

1 -- AVERAGE POLLUTANT CONCENTRATIONS -- NOTE:  
ONLY NON-ZERO VALUES ARE PRINTED --

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UPPER SOIL ZONE:

SUBLAYER 1			
	SOIL MOISTURE (UG/ML)	1.098E+00	
	ADSORBED SOIL (UG/G)	6.399E-01	
	SOIL AIR (UG/ML)	7.551E-01	
SUBLAYER 2			
	SOIL MOISTURE (UG/ML)	2.110E+00	
	ADSORBED SOIL (UG/G)	1.230E+00	
	SOIL AIR (UG/ML)	1.452E+00	

SUBLAYER 3

SOIL MOISTURE (UG/ML) 2.922E+00  
ADSORBED SOIL (UG/G) 1.704E+00  
SOIL AIR (UG/ML) 2.010E+00

SUBLAYER 4

SOIL MOISTURE (UG/ML) 3.455E+00  
ADSORBED SOIL (UG/G) 2.014E+00  
SOIL AIR (UG/ML) 2.375E+00

LOWER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 5.929E-01  
ADSORBED SOIL (UG/G) 3.457E-01  
SOIL AIR (UG/ML) 4.004E-01

MAX. POLL. DEPTH (M) 8.310E-01

YEAR - 2 ANNUAL SUMMARY REPORT

-- TOTAL INPUTS (UG) --

UPPER SOIL ZONE 0.000E+00  
LOWER SOIL ZONE 0.000E+00

-- HYDROLOGIC CYCLE COMPONENTS --

AVERAGE SOIL MOISTURE ZONE 1 (%) 17.563  
AVERAGE SOIL MOISTURE BELOW ZONE 1 (%) 17.563  
TOTAL PRECIPITATION (CM) 48.866  
TOTAL INFILTRATION (CM) 48.866  
TOTAL EVAPOTRANSPIRATION (CM) 16.111  
TOTAL SURFACE RUNOFF (CM) 0.000  
TOTAL GRW RUNOFF (CM) 32.755  
TOTAL MOISTURE RETENTION (CM) 0.000  
TOTAL YIELD (CM) 32.755

0 -- POLLUTANT MASS DISTRIBUTION IN COLUMN (UG) -- NOTE: IF  
COMPONENT IS ZERO EACH MONTH, IT IS NOT PRINTED

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-----  
FOR FINAL MASS IN SOIL MOI., ADS. ON SOIL, SOIL AIR, IMMOBIL CEC,  
COMPLEXED, AND PURE PHASE FOR EACH SUBLAYER, SEE ABOVE (MONTH SEP)  
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UPPER SOIL ZONE:

SUBLAYER 1		
	TOTAL VOLATILIZED	1.362E+09
SUBLAYER 2		
	TOTAL DIFFUSED (UP)	1.368E+09
SUBLAYER 3		
	TOTAL DIFFUSED (UP)	1.319E+09
SUBLAYER 4		
	TOTAL DIFFUSED (UP)	1.212E+09

LOWER SOIL ZONE:

SUBLAYER 1		
	TOTAL DIFFUSED (UP)	1.045E+09
SUBLAYER 2		
SUBLAYER 3		
SUBLAYER 4		

1 -- AVERAGE POLLUTANT CONCENTRATIONS -- NOTE:  
ONLY NON-ZERO VALUES ARE PRINTED --

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-----

UPPER SOIL ZONE:

SUBLAYER 1			
	SOIL MOISTURE (UG/ML)	2.766E-02	
	ADSORBED SOIL (UG/G)	1.612E-02	
	SOIL AIR (UG/ML)	1.892E-02	
SUBLAYER 2			
	SOIL MOISTURE (UG/ML)	5.553E-02	
	ADSORBED SOIL (UG/G)	3.237E-02	
	SOIL AIR (UG/ML)	3.800E-02	
SUBLAYER 3			
	SOIL MOISTURE (UG/ML)	8.251E-02	

ADSORBED SOIL (UG/G) 4.810E-02  
SOIL AIR (UG/ML) 5.646E-02

SUBLAYER 4

SOIL MOISTURE (UG/ML) 1.074E-01  
ADSORBED SOIL (UG/G) 6.263E-02  
SOIL AIR (UG/ML) 7.353E-02

LOWER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 1.616E-01  
ADSORBED SOIL (UG/G) 9.420E-02  
SOIL AIR (UG/ML) 1.106E-01

SUBLAYER 2

SOIL MOISTURE (UG/ML) 4.801E-03  
ADSORBED SOIL (UG/G) 2.799E-03  
SOIL AIR (UG/ML) 3.113E-03

MAX. POLL. DEPTH (M) 1.125E+00

YEAR - 3 ANNUAL SUMMARY REPORT

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-- TOTAL INPUTS (UG) --

UPPER SOIL ZONE 0.000E+00  
LOWER SOIL ZONE 0.000E+00

-- HYDROLOGIC CYCLE COMPONENTS --

AVERAGE SOIL MOISTURE ZONE 1 (%) 17.563  
AVERAGE SOIL MOISTURE BELOW ZONE 1 (%) 17.563  
TOTAL PRECIPITATION (CM) 48.866  
TOTAL INFILTRATION (CM) 48.866  
TOTAL EVAPOTRANSPIRATION (CM) 16.111  
TOTAL SURFACE RUNOFF (CM) 0.000  
TOTAL GRW RUNOFF (CM) 32.755  
TOTAL MOISTURE RETENTION (CM) 0.000  
TOTAL YIELD (CM) 32.755

0 -- POLLUTANT MASS DISTRIBUTION IN COLUMN (UG) -- NOTE: IF  
COMPONENT IS ZERO EACH MONTH, IT IS NOT PRINTED

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-----  
FOR FINAL MASS IN SOIL MOI., ADS. ON SOIL, SOIL AIR, IMMOBIL CEC,  
COMPLEXED, AND PURE PHASE FOR EACH SUBLAYER, SEE ABOVE (MONTH SEP)

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UPPER SOIL ZONE:

SUBLAYER 1		
	TOTAL VOLATILIZED	1.345E+08
SUBLAYER 2		
	TOTAL DIFFUSED (UP)	1.357E+08
SUBLAYER 3		
	TOTAL DIFFUSED (UP)	1.320E+08
SUBLAYER 4		
	TOTAL DIFFUSED (UP)	1.234E+08

LOWER SOIL ZONE:

SUBLAYER 1		
	TOTAL DIFFUSED (UP)	1.103E+08
SUBLAYER 2		
	TOTAL DIFFUSED (UP)	5.692E+07
SUBLAYER 3		
SUBLAYER 4		

1 -- AVERAGE POLLUTANT CONCENTRATIONS -- NOTE:  
ONLY NON-ZERO VALUES ARE PRINTED --

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UPPER SOIL ZONE:

SUBLAYER 1			
	SOIL MOISTURE (UG/ML)	2.708E-03	
	ADSORBED SOIL (UG/G)	1.579E-03	
	SOIL AIR (UG/ML)	1.843E-03	
SUBLAYER 2			
	SOIL MOISTURE (UG/ML)	5.445E-03	
	ADSORBED SOIL (UG/G)	3.175E-03	
	SOIL AIR (UG/ML)	3.705E-03	

SUBLAYER 3		SOIL MOISTURE (UG/ML)	8.110E-03
		ADSORBED SOIL (UG/G)	4.728E-03
		SOIL AIR (UG/ML)	5.518E-03
SUBLAYER 4		SOIL MOISTURE (UG/ML)	1.060E-02
		ADSORBED SOIL (UG/G)	6.181E-03
		SOIL AIR (UG/ML)	7.211E-03
LOWER SOIL ZONE:			
SUBLAYER 1		SOIL MOISTURE (UG/ML)	1.617E-02
		ADSORBED SOIL (UG/G)	9.425E-03
		SOIL AIR (UG/ML)	1.099E-02
SUBLAYER 2		SOIL MOISTURE (UG/ML)	1.875E-02
		ADSORBED SOIL (UG/G)	1.093E-02
		SOIL AIR (UG/ML)	1.275E-02
SUBLAYER 3		SOIL MOISTURE (UG/ML)	1.150E-04
		ADSORBED SOIL (UG/G)	6.704E-05
		SOIL AIR (UG/ML)	7.484E-05
		MAX. POLL. DEPTH (M)	1.419E+00

YEAR - 4 ANNUAL SUMMARY REPORT

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-- TOTAL INPUTS (UG) --

UPPER SOIL ZONE	0.000E+00
LOWER SOIL ZONE	0.000E+00

-- HYDROLOGIC CYCLE COMPONENTS --

AVERAGE SOIL MOISTURE ZONE 1 (%)	17.563
AVERAGE SOIL MOISTURE BELOW ZONE 1 (%)	17.563
TOTAL PRECIPITATION (CM)	48.866
TOTAL INFILTRATION (CM)	48.866
TOTAL EVAPOTRANSPIRATION (CM)	16.111
TOTAL SURFACE RUNOFF (CM)	0.000
TOTAL GRW RUNOFF (CM)	32.755

TOTAL MOISTURE RETENTION (CM) 0.000  
TOTAL YIELD (CM) 32.755  
0 -- POLLUTANT MASS DISTRIBUTION IN COLUMN (UG) -- NOTE: IF  
COMPONENT IS ZERO EACH MONTH, IT IS NOT PRINTED

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-----  
FOR FINAL MASS IN SOIL MOI., ADS. ON SOIL, SOIL AIR, IMMOBIL CEC,  
COMPLEXED, AND PURE PHASE FOR EACH SUBLAYER, SEE ABOVE (MONTH SEP)  
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UPPER SOIL ZONE:

SUBLAYER 1

TOTAL VOLATILIZED 3.292E+07

SUBLAYER 2

TOTAL DIFFUSED (UP) 3.353E+07

SUBLAYER 3

TOTAL DIFFUSED (UP) 3.327E+07

SUBLAYER 4

TOTAL DIFFUSED (UP) 3.210E+07

LOWER SOIL ZONE:

SUBLAYER 1

TOTAL DIFFUSED (UP) 2.998E+07

SUBLAYER 2

TOTAL DIFFUSED (UP) 1.931E+07

SUBLAYER 3

TOTAL DIFFUSED (UP) 4.457E+06

SUBLAYER 4

1 -- AVERAGE POLLUTANT CONCENTRATIONS -- NOTE:  
ONLY NON-ZERO VALUES ARE PRINTED --

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-----  
UPPER SOIL ZONE:

SUBLAYER 1		
	SOIL MOISTURE (UG/ML)	6.655E-04
	ADSORBED SOIL (UG/G)	3.880E-04
	SOIL AIR (UG/ML)	4.527E-04
SUBLAYER 2		
	SOIL MOISTURE (UG/ML)	1.346E-03
	ADSORBED SOIL (UG/G)	7.846E-04
	SOIL AIR (UG/ML)	9.155E-04
SUBLAYER 3		
	SOIL MOISTURE (UG/ML)	2.023E-03
	ADSORBED SOIL (UG/G)	1.180E-03
	SOIL AIR (UG/ML)	1.376E-03
SUBLAYER 4		
	SOIL MOISTURE (UG/ML)	2.680E-03
	ADSORBED SOIL (UG/G)	1.562E-03
	SOIL AIR (UG/ML)	1.823E-03
LOWER SOIL ZONE:		
SUBLAYER 1		
	SOIL MOISTURE (UG/ML)	4.218E-03
	ADSORBED SOIL (UG/G)	2.459E-03
	SOIL AIR (UG/ML)	2.868E-03
SUBLAYER 2		
	SOIL MOISTURE (UG/ML)	5.221E-03
	ADSORBED SOIL (UG/G)	3.044E-03
	SOIL AIR (UG/ML)	3.548E-03
SUBLAYER 3		
	SOIL MOISTURE (UG/ML)	3.849E-03
	ADSORBED SOIL (UG/G)	2.244E-03
	SOIL AIR (UG/ML)	2.591E-03
	MAX. POLL. DEPTH (M)	1.713E+00

YEAR - 5 ANNUAL SUMMARY REPORT

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-- TOTAL INPUTS (UG) --

UPPER SOIL ZONE 0.000E+00

LOWER SOIL ZONE

0.000E+00

-- HYDROLOGIC CYCLE COMPONENTS --

AVERAGE SOIL MOISTURE ZONE 1 (%)	17.563
AVERAGE SOIL MOISTURE BELOW ZONE 1 (%)	17.563
TOTAL PRECIPITATION (CM)	48.866
TOTAL INFILTRATION (CM)	48.866
TOTAL EVAPOTRANSPIRATION (CM)	16.111
TOTAL SURFACE RUNOFF (CM)	0.000
TOTAL GRW RUNOFF (CM)	32.755
TOTAL MOISTURE RETENTION (CM)	0.000
TOTAL YIELD (CM)	32.755

0 -- POLLUTANT MASS DISTRIBUTION IN COLUMN (UG) -- NOTE: IF COMPONENT IS ZERO EACH MONTH, IT IS NOT PRINTED

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-----  
FOR FINAL MASS IN SOIL MOI., ADS. ON SOIL, SOIL AIR, IMMOBIL CEC,  
COMPLEXED, AND PURE PHASE FOR EACH SUBLAYER, SEE ABOVE (MONTH SEP)  
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UPPER SOIL ZONE:

SUBLAYER 1

TOTAL VOLATILIZED 1.154E+07

SUBLAYER 2

TOTAL DIFFUSED (UP) 1.186E+07

SUBLAYER 3

TOTAL DIFFUSED (UP) 1.200E+07

SUBLAYER 4

TOTAL DIFFUSED (UP) 1.194E+07

LOWER SOIL ZONE:

SUBLAYER 1

TOTAL DIFFUSED (UP) 1.167E+07

SUBLAYER 2

TOTAL DIFFUSED (UP) 9.680E+06

SUBLAYER 3

TOTAL DIFFUSED (UP) 6.169E+06

SUBLAYER 4

TOTAL DIFFUSED (UP)

1.430E+02

1

-- AVERAGE POLLUTANT CONCENTRATIONS -- NOTE:

ONLY NON-ZERO VALUES ARE PRINTED --

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UPPER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML)	2.307E-04
ADSORBED SOIL (UG/G)	1.345E-04
SOIL AIR (UG/ML)	1.564E-04

SUBLAYER 2

SOIL MOISTURE (UG/ML)	4.689E-04
ADSORBED SOIL (UG/G)	2.734E-04
SOIL AIR (UG/ML)	3.178E-04

SUBLAYER 3

SOIL MOISTURE (UG/ML)	7.108E-04
ADSORBED SOIL (UG/G)	4.144E-04
SOIL AIR (UG/ML)	4.818E-04

SUBLAYER 4

SOIL MOISTURE (UG/ML)	9.526E-04
ADSORBED SOIL (UG/G)	5.554E-04
SOIL AIR (UG/ML)	6.458E-04

LOWER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML)	1.546E-03
ADSORBED SOIL (UG/G)	9.013E-04
SOIL AIR (UG/ML)	1.048E-03

SUBLAYER 2

SOIL MOISTURE (UG/ML)	2.044E-03
ADSORBED SOIL (UG/G)	1.192E-03
SOIL AIR (UG/ML)	1.387E-03

SUBLAYER 3

SOIL MOISTURE (UG/ML)	2.365E-03
ADSORBED SOIL (UG/G)	1.379E-03
SOIL AIR (UG/ML)	1.605E-03

SUBLAYER 4

SOIL MOISTURE (UG/ML) 8.260E-04  
ADSORBED SOIL (UG/G) 4.816E-04  
SOIL AIR (UG/ML) 5.507E-04

MAX. POLL. DEPTH (M) 2.007E+00

YEAR - 6 ANNUAL SUMMARY REPORT  
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-- TOTAL INPUTS (UG) --

UPPER SOIL ZONE 0.000E+00  
LOWER SOIL ZONE 0.000E+00

-- HYDROLOGIC CYCLE COMPONENTS --

AVERAGE SOIL MOISTURE ZONE 1 (%) 17.563  
AVERAGE SOIL MOISTURE BELOW ZONE 1 (%) 17.563  
TOTAL PRECIPITATION (CM) 48.866  
TOTAL INFILTRATION (CM) 48.866  
TOTAL EVAPOTRANSPIRATION (CM) 16.111  
TOTAL SURFACE RUNOFF (CM) 0.000  
TOTAL GRW RUNOFF (CM) 32.755  
TOTAL MOISTURE RETENTION (CM) 0.000  
TOTAL YIELD (CM) 32.755

0 -- POLLUTANT MASS DISTRIBUTION IN COLUMN (UG) -- NOTE: IF  
COMPONENT IS ZERO EACH MONTH, IT IS NOT PRINTED

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-----  
FOR FINAL MASS IN SOIL MOI., ADS. ON SOIL, SOIL AIR, IMMOBIL CEC,  
COMPLEXED, AND PURE PHASE FOR EACH SUBLAYER, SEE ABOVE (MONTH SEP)  
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UPPER SOIL ZONE:

SUBLAYER 1

TOTAL VOLATILIZED 5.017E+06

SUBLAYER 2

TOTAL DIFFUSED (UP) 5.171E+06

SUBLAYER 3

TOTAL DIFFUSED (UP) 5.257E+06

SUBLAYER 4

TOTAL DIFFUSED (UP) 5.270E+06

LOWER SOIL ZONE:

SUBLAYER 1

TOTAL DIFFUSED (UP) 5.206E+06

SUBLAYER 2

TOTAL DIFFUSED (UP) 4.598E+06

SUBLAYER 3

TOTAL DIFFUSED (UP) 3.583E+06

SUBLAYER 4

TOTAL DIFFUSED (UP) 2.336E+06

TOTAL IN GROUNDWATER RUNOFF 8.081E+05

1 -- AVERAGE POLLUTANT CONCENTRATIONS -- NOTE:  
ONLY NON-ZERO VALUES ARE PRINTED --

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UPPER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 1.005E-04  
ADSORBED SOIL (UG/G) 5.859E-05  
SOIL AIR (UG/ML) 6.798E-05

SUBLAYER 2

SOIL MOISTURE (UG/ML) 2.044E-04  
ADSORBED SOIL (UG/G) 1.192E-04  
SOIL AIR (UG/ML) 1.383E-04

SUBLAYER 3

SOIL MOISTURE (UG/ML) 3.104E-04  
ADSORBED SOIL (UG/G) 1.810E-04  
SOIL AIR (UG/ML) 2.100E-04

SUBLAYER 4

SOIL MOISTURE (UG/ML) 4.169E-04  
ADSORBED SOIL (UG/G) 2.431E-04  
SOIL AIR (UG/ML) 2.820E-04

LOWER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 6.803E-04  
ADSORBED SOIL (UG/G) 3.966E-04  
SOIL AIR (UG/ML) 4.602E-04

SUBLAYER 2

SOIL MOISTURE (UG/ML) 9.135E-04  
ADSORBED SOIL (UG/G) 5.326E-04  
SOIL AIR (UG/ML) 6.181E-04

SUBLAYER 3

SOIL MOISTURE (UG/ML) 1.097E-03  
ADSORBED SOIL (UG/G) 6.396E-04  
SOIL AIR (UG/ML) 7.426E-04

SUBLAYER 4

SOIL MOISTURE (UG/ML) 1.223E-03  
ADSORBED SOIL (UG/G) 7.132E-04  
SOIL AIR (UG/ML) 8.286E-04

MAX. POLL. DEPTH (M) 2.134E+00

AVE. CONTAMINANT CONCENTRATION IN GROUNDWATER (UG/ML) 3.122E-06

YEAR - 7 ANNUAL SUMMARY REPORT

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-- TOTAL INPUTS (UG) --

UPPER SOIL ZONE 0.000E+00  
LOWER SOIL ZONE 0.000E+00

-- HYDROLOGIC CYCLE COMPONENTS --

AVERAGE SOIL MOISTURE ZONE 1 (%) 17.563  
AVERAGE SOIL MOISTURE BELOW ZONE 1 (%) 17.563  
TOTAL PRECIPITATION (CM) 48.866  
TOTAL INFILTRATION (CM) 48.866  
TOTAL EVAPOTRANSPIRATION (CM) 16.111  
TOTAL SURFACE RUNOFF (CM) 0.000  
TOTAL GRW RUNOFF (CM) 32.755  
TOTAL MOISTURE RETENTION (CM) 0.000  
TOTAL YIELD (CM) 32.755

0 -- POLLUTANT MASS DISTRIBUTION IN COLUMN (UG) -- NOTE: IF

COMPONENT IS ZERO EACH MONTH, IT IS NOT PRINTED

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-----  
FOR FINAL MASS IN SOIL MOI., ADS. ON SOIL, SOIL AIR, IMMOBIL CEC,  
COMPLEXED, AND PURE PHASE FOR EACH SUBLAYER, SEE ABOVE (MONTH SEP)  
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UPPER SOIL ZONE:

SUBLAYER 1		
	TOTAL VOLATILIZED	2.614E+06
SUBLAYER 2		
	TOTAL DIFFUSED (UP)	2.695E+06
SUBLAYER 3		
	TOTAL DIFFUSED (UP)	2.743E+06
SUBLAYER 4		
	TOTAL DIFFUSED (UP)	2.753E+06

LOWER SOIL ZONE:

SUBLAYER 1		
	TOTAL DIFFUSED (UP)	2.722E+06
SUBLAYER 2		
	TOTAL DIFFUSED (UP)	2.402E+06
SUBLAYER 3		
	TOTAL DIFFUSED (UP)	1.816E+06
SUBLAYER 4		
	TOTAL DIFFUSED (UP)	9.960E+05
	TOTAL IN GROUNDWATER RUNOFF	1.009E+06

1 -- AVERAGE POLLUTANT CONCENTRATIONS -- NOTE:  
ONLY NON-ZERO VALUES ARE PRINTED --

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-----  
UPPER SOIL ZONE:

SUBLAYER 1

	SOIL MOISTURE (UG/ML)	5.236E-05
	ADSORBED SOIL (UG/G)	3.053E-05
	SOIL AIR (UG/ML)	3.543E-05
SUBLAYER 2		
	SOIL MOISTURE (UG/ML)	1.066E-04
	ADSORBED SOIL (UG/G)	6.212E-05
	SOIL AIR (UG/ML)	7.210E-05
SUBLAYER 3		
	SOIL MOISTURE (UG/ML)	1.619E-04
	ADSORBED SOIL (UG/G)	9.439E-05
	SOIL AIR (UG/ML)	1.096E-04
SUBLAYER 4		
	SOIL MOISTURE (UG/ML)	2.176E-04
	ADSORBED SOIL (UG/G)	1.269E-04
	SOIL AIR (UG/ML)	1.473E-04
LOWER SOIL ZONE:		
SUBLAYER 1		
	SOIL MOISTURE (UG/ML)	3.558E-04
	ADSORBED SOIL (UG/G)	2.074E-04
	SOIL AIR (UG/ML)	2.408E-04
SUBLAYER 2		
	SOIL MOISTURE (UG/ML)	4.782E-04
	ADSORBED SOIL (UG/G)	2.788E-04
	SOIL AIR (UG/ML)	3.237E-04
SUBLAYER 3		
	SOIL MOISTURE (UG/ML)	5.712E-04
	ADSORBED SOIL (UG/G)	3.330E-04
	SOIL AIR (UG/ML)	3.867E-04
SUBLAYER 4		
	SOIL MOISTURE (UG/ML)	6.224E-04
	ADSORBED SOIL (UG/G)	3.628E-04
	SOIL AIR (UG/ML)	4.214E-04
	MAX. POLL. DEPTH (M)	2.134E+00
AVE. CONTAMINANT CONCENTRATION IN GROUNDWATER (UG/ML)		3.568E-06

YEAR - 8 ANNUAL SUMMARY REPORT

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-- TOTAL INPUTS (UG) --

UPPER SOIL ZONE	0.000E+00
LOWER SOIL ZONE	0.000E+00

-- HYDROLOGIC CYCLE COMPONENTS --

AVERAGE SOIL MOISTURE ZONE 1 (%)	17.563
AVERAGE SOIL MOISTURE BELOW ZONE 1 (%)	17.563
TOTAL PRECIPITATION (CM)	48.866
TOTAL INFILTRATION (CM)	48.866
TOTAL EVAPOTRANSPIRATION (CM)	16.111
TOTAL SURFACE RUNOFF (CM)	0.000
TOTAL GRW RUNOFF (CM)	32.755
TOTAL MOISTURE RETENTION (CM)	0.000
TOTAL YIELD (CM)	32.755

0 -- POLLUTANT MASS DISTRIBUTION IN COLUMN (UG) -- NOTE: IF COMPONENT IS ZERO EACH MONTH, IT IS NOT PRINTED

-----  
 -----  
 FOR FINAL MASS IN SOIL MOI., ADS. ON SOIL, SOIL AIR, IMMOBIL CEC, COMPLEXED, AND PURE PHASE FOR EACH SUBLAYER, SEE ABOVE (MONTH SEP)  
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UPPER SOIL ZONE:

SUBLAYER 1	
TOTAL VOLATILIZED	1.333E+06
SUBLAYER 2	
TOTAL DIFFUSED (UP)	1.375E+06
SUBLAYER 3	
TOTAL DIFFUSED (UP)	1.399E+06
SUBLAYER 4	
TOTAL DIFFUSED (UP)	1.403E+06

LOWER SOIL ZONE:

SUBLAYER 1

TOTAL DIFFUSED (UP)	1.388E+06
SUBLAYER 2	
TOTAL DIFFUSED (UP)	1.223E+06
SUBLAYER 3	
TOTAL DIFFUSED (UP)	9.245E+05
SUBLAYER 4	
TOTAL DIFFUSED (UP)	5.067E+05
TOTAL IN GROUNDWATER RUNOFF	5.141E+05

1 -- AVERAGE POLLUTANT CONCENTRATIONS -- NOTE:  
 ONLY NON-ZERO VALUES ARE PRINTED --

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UPPER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML)	2.671E-05
ADSORBED SOIL (UG/G)	1.557E-05
SOIL AIR (UG/ML)	1.807E-05

SUBLAYER 2

SOIL MOISTURE (UG/ML)	5.435E-05
ADSORBED SOIL (UG/G)	3.169E-05
SOIL AIR (UG/ML)	3.678E-05

SUBLAYER 3

SOIL MOISTURE (UG/ML)	8.257E-05
ADSORBED SOIL (UG/G)	4.814E-05
SOIL AIR (UG/ML)	5.588E-05

SUBLAYER 4

SOIL MOISTURE (UG/ML)	1.110E-04
ADSORBED SOIL (UG/G)	6.470E-05
SOIL AIR (UG/ML)	7.510E-05

LOWER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML)	1.814E-04
ADSORBED SOIL (UG/G)	1.058E-04
SOIL AIR (UG/ML)	1.228E-04

SUBLAYER 2

SOIL MOISTURE (UG/ML)	2.438E-04
ADSORBED SOIL (UG/G)	1.421E-04
SOIL AIR (UG/ML)	1.650E-04

SUBLAYER 3

SOIL MOISTURE (UG/ML)	2.911E-04
ADSORBED SOIL (UG/G)	1.697E-04
SOIL AIR (UG/ML)	1.971E-04

SUBLAYER 4

SOIL MOISTURE (UG/ML)	3.171E-04
ADSORBED SOIL (UG/G)	1.849E-04
SOIL AIR (UG/ML)	2.147E-04

MAX. POLL. DEPTH (M)	2.134E+00
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AVE. CONTAMINANT CONCENTRATION IN GROUNDWATER (UG/ML)	1.818E-06
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YEAR - 9 ANNUAL SUMMARY REPORT

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-- TOTAL INPUTS (UG) --

UPPER SOIL ZONE	0.000E+00
LOWER SOIL ZONE	0.000E+00

-- HYDROLOGIC CYCLE COMPONENTS --

AVERAGE SOIL MOISTURE ZONE 1 (%)	17.563
AVERAGE SOIL MOISTURE BELOW ZONE 1 (%)	17.563
TOTAL PRECIPITATION (CM)	48.866
TOTAL INFILTRATION (CM)	48.866
TOTAL EVAPOTRANSPIRATION (CM)	16.111
TOTAL SURFACE RUNOFF (CM)	0.000
TOTAL GRW RUNOFF (CM)	32.755
TOTAL MOISTURE RETENTION (CM)	0.000
TOTAL YIELD (CM)	32.755

0 -- POLLUTANT MASS DISTRIBUTION IN COLUMN (UG) -- NOTE: IF COMPONENT IS ZERO EACH MONTH, IT IS NOT PRINTED

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 -----  
 FOR FINAL MASS IN SOIL MOI., ADS. ON SOIL, SOIL AIR, IMMOBIL CEC, COMPLEXED, AND PURE PHASE FOR EACH SUBLAYER, SEE ABOVE (MONTH SEP)  
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UPPER SOIL ZONE:

SUBLAYER 1

TOTAL VOLATILIZED 6.795E+05

SUBLAYER 2

TOTAL DIFFUSED (UP) 7.005E+05

SUBLAYER 3

TOTAL DIFFUSED (UP) 7.128E+05

SUBLAYER 4

TOTAL DIFFUSED (UP) 7.153E+05

LOWER SOIL ZONE:

SUBLAYER 1

TOTAL DIFFUSED (UP) 7.073E+05

SUBLAYER 2

TOTAL DIFFUSED (UP) 6.235E+05

SUBLAYER 3

TOTAL DIFFUSED (UP) 4.712E+05

SUBLAYER 4

TOTAL DIFFUSED (UP) 2.582E+05

TOTAL IN GROUNDWATER RUNOFF 2.620E+05

1 -- AVERAGE POLLUTANT CONCENTRATIONS -- NOTE:  
ONLY NON-ZERO VALUES ARE PRINTED --

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UPPER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 1.361E-05

ADSORBED SOIL (UG/G) 7.935E-06

SOIL AIR (UG/ML) 9.210E-06

SUBLAYER 2

SOIL MOISTURE (UG/ML) 2.770E-05

ADSORBED SOIL (UG/G) 1.615E-05

SOIL AIR (UG/ML) 1.874E-05

SUBLAYER 3		
	SOIL MOISTURE (UG/ML)	4.208E-05
	ADSORBED SOIL (UG/G)	2.453E-05
	SOIL AIR (UG/ML)	2.848E-05
SUBLAYER 4		
	SOIL MOISTURE (UG/ML)	5.656E-05
	ADSORBED SOIL (UG/G)	3.297E-05
	SOIL AIR (UG/ML)	3.828E-05
LOWER SOIL ZONE:		
SUBLAYER 1		
	SOIL MOISTURE (UG/ML)	9.245E-05
	ADSORBED SOIL (UG/G)	5.390E-05
	SOIL AIR (UG/ML)	6.257E-05
SUBLAYER 2		
	SOIL MOISTURE (UG/ML)	1.242E-04
	ADSORBED SOIL (UG/G)	7.243E-05
	SOIL AIR (UG/ML)	8.410E-05
SUBLAYER 3		
	SOIL MOISTURE (UG/ML)	1.483E-04
	ADSORBED SOIL (UG/G)	8.649E-05
	SOIL AIR (UG/ML)	1.004E-04
SUBLAYER 4		
	SOIL MOISTURE (UG/ML)	1.616E-04
	ADSORBED SOIL (UG/G)	9.423E-05
	SOIL AIR (UG/ML)	1.094E-04
	MAX. POLL. DEPTH (M)	2.134E+00
AVE. CONTAMINANT CONCENTRATION IN GROUNDWATER (UG/ML)		9.266E-07

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-- TOTAL INPUTS (UG) --

UPPER SOIL ZONE	0.000E+00
LOWER SOIL ZONE	0.000E+00

-- HYDROLOGIC CYCLE COMPONENTS --

AVERAGE SOIL MOISTURE ZONE 1 (%)	17.563
AVERAGE SOIL MOISTURE BELOW ZONE 1 (%)	17.563
TOTAL PRECIPITATION (CM)	48.866
TOTAL INFILTRATION (CM)	48.866
TOTAL EVAPOTRANSPIRATION (CM)	16.111
TOTAL SURFACE RUNOFF (CM)	0.000
TOTAL GRW RUNOFF (CM)	32.755
TOTAL MOISTURE RETENTION (CM)	0.000
TOTAL YIELD (CM)	32.755

0           -- POLLUTANT MASS DISTRIBUTION IN COLUMN (UG) -- NOTE: IF  
COMPONENT IS ZERO EACH MONTH, IT IS NOT PRINTED

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-----  
FOR FINAL MASS IN SOIL MOI., ADS. ON SOIL, SOIL AIR, IMMOBIL CEC,  
COMPLEXED, AND PURE PHASE FOR EACH SUBLAYER, SEE ABOVE (MONTH SEP)  
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UPPER SOIL ZONE:

SUBLAYER 1

TOTAL VOLATILIZED                   3.462E+05

SUBLAYER 2

TOTAL DIFFUSED (UP)               3.569E+05

SUBLAYER 3

TOTAL DIFFUSED (UP)               3.632E+05

SUBLAYER 4

TOTAL DIFFUSED (UP)               3.645E+05

LOWER SOIL ZONE:

SUBLAYER 1

TOTAL DIFFUSED (UP)               3.604E+05

SUBLAYER 2

TOTAL DIFFUSED (UP)               3.177E+05

SUBLAYER 3

TOTAL DIFFUSED (UP)               2.401E+05

SUBLAYER 4

TOTAL DIFFUSED (UP)               1.316E+05

TOTAL IN GROUNDWATER RUNOFF 1.335E+05  
1 -- AVERAGE POLLUTANT CONCENTRATIONS -- NOTE:  
ONLY NON-ZERO VALUES ARE PRINTED --

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UPPER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 6.935E-06  
ADSORBED SOIL (UG/G) 4.043E-06  
SOIL AIR (UG/ML) 4.693E-06

SUBLAYER 2

SOIL MOISTURE (UG/ML) 1.411E-05  
ADSORBED SOIL (UG/G) 8.228E-06  
SOIL AIR (UG/ML) 9.550E-06

SUBLAYER 3

SOIL MOISTURE (UG/ML) 2.144E-05  
ADSORBED SOIL (UG/G) 1.250E-05  
SOIL AIR (UG/ML) 1.451E-05

SUBLAYER 4

SOIL MOISTURE (UG/ML) 2.882E-05  
ADSORBED SOIL (UG/G) 1.680E-05  
SOIL AIR (UG/ML) 1.950E-05

LOWER SOIL ZONE:

SUBLAYER 1

SOIL MOISTURE (UG/ML) 4.711E-05  
ADSORBED SOIL (UG/G) 2.746E-05  
SOIL AIR (UG/ML) 3.188E-05

SUBLAYER 2

SOIL MOISTURE (UG/ML) 6.330E-05  
ADSORBED SOIL (UG/G) 3.691E-05  
SOIL AIR (UG/ML) 4.285E-05

SUBLAYER 3

SOIL MOISTURE (UG/ML) 7.559E-05  
ADSORBED SOIL (UG/G) 4.407E-05  
SOIL AIR (UG/ML) 5.118E-05

SUBLAYER 4

SOIL MOISTURE (UG/ML) 8.236E-05

ADSORBED SOIL (UG/G)	4.801E-05
SOIL AIR (UG/ML)	5.577E-05
MAX. POLL. DEPTH (M)	2.134E+00
AVE. CONTAMINANT CONCENTRATION IN GROUNDWATER (UG/ML)	4.722E-07

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-- TOTAL INPUTS (UG) --

UPPER SOIL ZONE	0.000E+00
LOWER SOIL ZONE	0.000E+00

-- HYDROLOGIC CYCLE COMPONENTS --

AVERAGE SOIL MOISTURE ZONE 1 (%)	17.563
AVERAGE SOIL MOISTURE BELOW ZONE 1 (%)	17.563
TOTAL PRECIPITATION (CM)	48.866
TOTAL INFILTRATION (CM)	48.866
TOTAL EVAPOTRANSPIRATION (CM)	16.111
TOTAL SURFACE RUNOFF (CM)	0.000
TOTAL GRW RUNOFF (CM)	32.755
TOTAL MOISTURE RETENTION (CM)	0.000
TOTAL YIELD (CM)	32.755

0 -- POLLUTANT MASS DISTRIBUTION IN COLUMN (UG) -- NOTE: IF COMPONENT IS ZERO EACH MONTH, IT IS NOT PRINTED

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 -----  
 FOR FINAL MASS IN SOIL MOI., ADS. ON SOIL, SOIL AIR, IMMOBIL CEC, COMPLEXED, AND PURE PHASE FOR EACH SUBLAYER, SEE ABOVE (MONTH SEP)  
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UPPER SOIL ZONE:

SUBLAYER 1

TOTAL VOLATILIZED	1.175E+04
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SUBLAYER 2

TOTAL DIFFUSED (UP)	1.212E+04
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SUBLAYER 3

