

**TABLE 2**  
**Sensitivity Analysis on Key Input Into Patrick Base Model**  
**Original Input Result 0.9971x 10<sup>-2</sup>**

Description:	File	New Input	Original Input	Results
Thickness				
Layer 5 – Upper Confining Unit	1a	0.158 (.032)m	1.58 (0.32)m	0.35x10 <sup>-1</sup>
	1b	15.8 (3.2)m	1.58(0.32)m	0.47x10 <sup>-14</sup>
**( )= Sublayer thickness, 5 sublayers				
<b>Vertical Darcy Velocity:</b>				
Layer 1 - HDPE	2a	3.9x10 <sup>-8</sup> m/yr	3.9x10 <sup>-9</sup> m/yr	0.997x10 <sup>-2</sup>
	2b	3.9x10 <sup>-10</sup> m/yr	3.9x10 <sup>-9</sup> m/yr	0.997x10 <sup>-2</sup>
Layer 2 - GCL	3a	3.9x10 <sup>-8</sup> m/yr	3.9x10 <sup>-9</sup> m/yr	0.997x10 <sup>-2</sup>
	3b	3.9x10 <sup>-10</sup> m/yr	3.9x10 <sup>-9</sup> m/yr	0.997x10 <sup>-2</sup>
Layer 3 - HDPE	4a	3.9x10 <sup>-8</sup> m/yr	3.9x10 <sup>-9</sup> m/yr	0.997x10 <sup>-2</sup>
	4b	3.9x10 <sup>-10</sup> m/yr	3.9x10 <sup>-9</sup> m/yr	0.997x10 <sup>-2</sup>
Layer 4 – Compacted Clay Liner	5a	1.3x10 <sup>-2</sup> m/yr	1.3x10 <sup>-3</sup> m/yr	0.176x10 <sup>-1</sup>
	5b	1.3x10 <sup>-4</sup> m/yr	1.3x10 <sup>-3</sup> m/yr	0.927x10 <sup>-2</sup>
Layer 5 – Upper Confining Unit	6a	7.7x10 <sup>-3</sup> m/yr	7.7x10 <sup>-4</sup> m/yr	0.166x10 <sup>-1</sup>
	6b	7.7x10 <sup>-5</sup> m/yr	7.7x10 <sup>-4</sup> m/yr	0.937x10 <sup>-2</sup>
<b>Vertical Dispersion:</b>				
Layer 1 - HDPE	7a	0.3x10 <sup>-5</sup> m <sup>2</sup> /yr	0.3x10 <sup>-4</sup> m <sup>2</sup> /yr	0.313x10 <sup>-2</sup>
	7b	0.3x10 <sup>-3</sup> m <sup>2</sup> /yr	0.3x10 <sup>-4</sup> m <sup>2</sup> /yr	0.126x10 <sup>-1</sup>
Layer 2 - GCL	8a	0.13x10 <sup>-2</sup> m <sup>2</sup> /yr	0.13x10 <sup>-1</sup> m <sup>2</sup> /yr	0.97x10 <sup>-2</sup>
	8b	0.13m <sup>2</sup> /yr	0.13x10 <sup>-1</sup> m <sup>2</sup> /yr	1.0x10 <sup>-2</sup>
Layer 3 - HDPE	9a	0.3x10 <sup>-5</sup> m <sup>2</sup> /yr	0.3x10 <sup>-4</sup>	0.316x10 <sup>-2</sup>
	9b	0.3x10 <sup>-3</sup> m <sup>2</sup> /yr	0.3x10 <sup>-4</sup>	0.126x10 <sup>-1</sup>
Layer 4 – Compacted Clay Liner	10a	0.18x10 <sup>-2</sup> m <sup>2</sup> /yr	0.18x10 <sup>-1</sup> m <sup>2</sup> /yr	0.122x10 <sup>-2</sup>
	10b	0.18m <sup>2</sup> /yr	0.18x10 <sup>-1</sup> m <sup>2</sup> /yr	0.158x10 <sup>-1</sup>
Layer 5 – Upper Confining Unit	11a	0.18x10 <sup>-2</sup> m <sup>2</sup> /yr	0.18x10 <sup>-1</sup> m <sup>2</sup> /yr	0.94x10 <sup>-4</sup>
	11b	0.18m <sup>2</sup> /yr	0.18x10 <sup>-1</sup> m <sup>2</sup> /yr	0.254x10 <sup>-1</sup>
<b>Aquifer Input:</b>				
Base Thickness	12a	0.61m	6.1m	0.333x10 <sup>-1</sup>
	12b	61.0m	6.1m	0.123x10 <sup>-2</sup>
Outflow Velocity	13a	0.073m/yr	0.73m/yr	0.994x10 <sup>-2</sup>
	13b	7.3m/yr	0.73m/yr	0.95x10 <sup>-2</sup>
Base Dispersion Coefficient	14a	3.9m <sup>2</sup> /yr	39m <sup>2</sup> /yr	0.997x10 <sup>-2</sup>
	14b	390m <sup>2</sup> /yr	39m <sup>2</sup> /yr	0.996x10 <sup>-2</sup>
<b>Horizontal Dispersion:</b>				
Layer 1, 2, and 3 – HDPE, GCL, HDPE	15a	0.3x10 <sup>-5</sup> m <sup>2</sup> /y	0.3x10 <sup>-4</sup> m <sup>2</sup> /yr	
		0.13x10 <sup>-2</sup> m <sup>2</sup> /yr	0.13x10 <sup>-1</sup> m <sup>2</sup> /yr	0.0997x10 <sup>-2</sup>
		0.3x10 <sup>-5</sup> m <sup>2</sup> /yr	0.3x10 <sup>-4</sup> m <sup>2</sup> /yr	
	15b	0.3x10 <sup>-3</sup> m <sup>2</sup> /yr	0.3x10 <sup>-4</sup> m <sup>2</sup> /yr	0.997x10 <sup>-2</sup>
		0.13m <sup>2</sup> /yr	0.13x10 <sup>-1</sup> m <sup>2</sup> /yr	
		0.3x10 <sup>-3</sup> m <sup>2</sup> /yr	0.3x10 <sup>-4</sup> m <sup>2</sup> /yr	

Grundy Ex 4

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*
*   M I G R A T E V 9   S I M U L A T I O N   *
*
*   RUN DATE -   11- 9- 8   *
*   TIME     -   8:21:54   *
*
*   REVISION - 09/05/1996   *
*
*   VERSION 9.0.9          *
*
*   COPYRIGHT(C) R.K. ROWE & J.R. BOOKER 1983-1996 *
*   LICENSED USER: Unknown *
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Willow Run SR 1b
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SURFACE BOUNDARY  
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SURFACE BOUNDARY CONDITION DEFINED BY A CONSTANT CONCENTRATION C0

OFFSET OF CENTER OF LANDFILL 1 IS 0.0000E+00  
 WIDTH OF BASE OF LANDFILL IS BETWEEN -363.5000< X < 363.5000  
 WIDTH OF SURFACE OF LANDFILL IS BETWEEN -363.5000< X < 363.5000

THE INITIAL SOURCE CONCENTRATION = 0.1000E+01

BASE BOUNDARY  
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BASE BOUNDARY CONDITION DEFINED BY  
 A PERMEABLE BASE STRATUM WITH THE FOLLOWING PROPERTIES:

BASE INTEGRATION WIDTH IS BETWEEN - 2181.0000< X < 2181.0000

BASE THICKNESS = 0.6100E+01  
 BASE POROSITY = 0.2000  
 OUTFLOW VELOCITY = 0.7300E+00  
 BASE DISPERSION COEFF. = 0.3900E+02

PROPERTIES OF THE MATRIX  
 =====

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LAYER	DISPERSION COEFF.		POROSITY	WRSR-1B		ADV. VELOCITY		THICKNESS
	VERT.	HORZ.		ADSORPTION COEFF.	DENSITY	HORZ.	VERT.	
1	.300E-04	.300E-04	1.000	0.000E+00	940.000	0.0000	0.0000	0.15E-02
2	.130E-01	.130E-01	0.700	0.000E+00	1000.000	0.0000	0.0000	0.61E-02
3	.300E-04	.300E-04	1.000	0.000E+00	940.000	0.0000	0.0000	0.15E-02
4	.180E-01	.180E-01	0.400	0.000E+00	1700.000	0.0000	0.0013	0.30
5	.180E-01	.180E-01	0.400	0.000E+00	1700.000	0.0000	0.0013	0.30
6	.180E-01	.180E-01	0.400	0.000E+00	1700.000	0.0000	0.0013	0.30
7	.180E-01	.180E-01	0.400	0.000E+00	1700.000	0.0000	0.0008	3.16
8	.180E-01	.180E-01	0.400	0.000E+00	1700.000	0.0000	0.0008	3.16
9	.180E-01	.180E-01	0.400	0.000E+00	1700.000	0.0000	0.0008	3.16
10	.180E-01	.180E-01	0.400	0.000E+00	1700.000	0.0000	0.0008	3.16
11	.180E-01	.180E-01	0.400	0.000E+00	1700.000	0.0000	0.0008	3.16

INTEGRATION PARAMETERS  
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THE PARAMETERS USED TO INVERT THE LAPLACE TRANSFORM ARE  
 TAU =0.700E+01 N = 80 SIG =0.000E+00 RNU =0.800E+01

SELECTED GAUSS QUADRATURE SAMPLE POINTS ARE:

GAUSSIAN INTEGRATION SUBINTERVAL SIZE = 0.100E-05  
 NUMBER OF SUBINTERVALS = 600  
 NUMBER OF SAMPLE POINTS USED PER STEP = 50

TOTAL WIDTH OF INTEGRATION 0.6000E-03

TOTAL NUMBER OF INTEGRATION POINTS 60000

RESULTS  
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CALCULATED CONCENTRATIONS AT SELECTED DEPTHS,  
 LATERAL DISTANCES AND TIMES:

TIME	LATERAL DISTANCE	DEPTH	CONCENTRATION
0.1150E+03	0.3870E+03	0.0000E+00	0.1372E+00
		0.1500E-02	0.1176E+00
		0.7600E-02	0.1173E+00
		0.9100E-02	0.9764E-01
		0.3124E+00	0.8647E-01
		0.6158E+00	0.7558E-01
		0.9191E+00	0.6524E-01
		0.4079E+01	0.4080E-02
		0.7239E+01	0.3179E-04
		0.1040E+02	0.2642E-07
		0.1356E+02	0.2410E-11
0.1672E+02	0.4669E-14		
0.1150E+03	0.3980E+03	0.0000E+00	0.1372E+00
		0.1500E-02	0.1175E+00
		0.7600E-02	0.1172E+00

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*      WRSR-1B
*      ANALYSIS      COMPLETED
*
*      TIME          -      8:22:39
*      EXECUTION TIME 0: 0:45
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