CASE NO. 14015
OCD EXHIBIT 20

STATE OF NEW MEXICO

OIL CONSERVATION DIVISION

Pit Release Modeling for the Permian and San Juan Basins

Output Files

Pit Release Modeling for the Permian and San Juan Basins

HELP Output Files for the Permian Basin

```
******************************************************************************
******************************************************************************
**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
******************************************************************************
******************************************************************************


PRECIPITATION DATA FILE:     C:\HELP7\lea\HO50.D4
TEMPERATURE DATA FILE:       C:\HELP7\lea\HO50.D7
SOLAR RADIATION DATA FILE:   C:\HELP7\lea\HO50.D13
EVAPOTRANSPIRATION DATA:     c:\help7\lea\HO50.D11
SOIL AND DESIGN DATA FILE:   C:\HELP7\lea\HPIT21NL.D10
OUTPUT DATA FILE:            C:\HELP7\lea\hpit21nl.OUT


TIME:  12:45     DATE:   9/ 7/2007


******************************************************************************

     TITLE:  Permian Basin Pit - 2' sandy loam cover - no liner

******************************************************************************


     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER
              WERE SPECIFIED BY THE USER.


                                  LAYER  1
                                  --------

                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER   6
          THICKNESS                    =     24.00   INCHES
          POROSITY                     =      0.4530 VOL/VOL
          FIELD CAPACITY               =      0.1900 VOL/VOL
          WILTING POINT                =      0.0850 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.1113 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.720000011000E-03 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  2.49
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
```

LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 9

THICKNESS	=	150.00	INCHES
POROSITY	=	0.5010	VOL/VOL
FIELD CAPACITY	=	0.2840	VOL/VOL
WILTING POINT	=	0.1350	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2830	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.190000006000E-03	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 6 WITH A POOR STAND OF GRASS, A SURFACE SLOPE OF 1.% AND A SLOPE LENGTH OF 75. FEET.

SCS RUNOFF CURVE NUMBER	=	80.90	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	0.500	ACRES
EVAPORATIVE ZONE DEPTH	=	20.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	2.226	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	9.060	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	1.700	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	45.121	INCHES
TOTAL INITIAL WATER	=	45.121	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM HOBBS NEW MEXICO

STATION LATITUDE	=	32.42	DEGREES
MAXIMUM LEAF AREA INDEX	=	1.60	
START OF GROWING SEASON (JULIAN DATE)	=	67	
END OF GROWING SEASON (JULIAN DATE)	=	317	
EVAPORATIVE ZONE DEPTH	=	20.0	INCHES
AVERAGE ANNUAL WIND SPEED	=	11.10	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	52.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	50.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	55.00	%

AVERAGE 4TH QUARTER RELATIVE HUMIDITY = 58.00 %

NOTE: PRECIPITATION DATA FOR HOBBS NEW MEXICO
WAS ENTERED FROM A EARTH INFO CLIMATEDATA.

NOTE: TEMPERATURE DATA FOR HOBBS NEW MEXICO
WAS ENTERED FROM A EARTH INFO CLIMATEDATA.

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR MIDLAND TEXAS
AND STATION LATITUDE = 32.43 DEGREES

****

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1951 THROUGH 2000

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	0.42	0.54	0.49	0.71	2.33	1.68
	2.27	2.35	2.51	1.57	0.67	0.57
STD. DEVIATIONS	0.54	0.62	0.57	0.74	2.28	1.42
	2.20	1.99	2.84	1.82	0.88	0.97
RUNOFF						
TOTALS	0.000	0.000	0.001	0.001	0.121	0.021
	0.122	0.103	0.218	0.076	0.018	0.003
STD. DEVIATIONS	0.000	0.000	0.004	0.004	0.572	0.073
	0.367	0.335	0.692	0.305	0.113	0.018
EVAPOTRANSPIRATION						
TOTALS	0.503	0.515	0.506	0.657	1.867	1.980
	1.860	2.095	1.671	1.189	0.871	0.545
STD. DEVIATIONS	0.527	0.558	0.490	0.598	1.238	1.405
	1.381	1.286	1.015	0.901	0.757	0.459
PERCOLATION/LEAKAGE THROUGH LAYER 2						
TOTALS	0.1775	0.1132	0.1087	0.0780	0.0495	0.0287

	0.0474	0.0514	0.0704	0.0954	0.1542	0.1974
STD. DEVIATIONS	0.3211	0.2262	0.2319	0.1838	0.1508	0.0859
	0.1985	0.1762	0.1708	0.1943	0.2984	0.3743

****

****

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1951 THROUGH 2000

	INCHES		CU. FEET	PERCENT
PRECIPITATION	16.12	(5.994)	29250.2	100.00
RUNOFF	0.683	(0.9939)	1239.50	4.238
EVAPOTRANSPIRATION	14.257	(4.1298)	25877.24	88.469
PERCOLATION/LEAKAGE THROUGH LAYER 2	1.17176	(1.59639)	2126.737	7.27085
CHANGE IN WATER STORAGE	0.004	(2.1321)	6.70	0.023

****

****

PEAK DAILY VALUES FOR YEARS 1951 THROUGH 2000

	(INCHES)	(CU. FT.)
PRECIPITATION	7.50	13612.500
RUNOFF	4.041	7334.1924
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.069410	125.97987
SNOW WATER	2.96	5372.9717

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.3492
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.0850

****

****

FINAL WATER STORAGE AT END OF YEAR 2000

LAYER	(INCHES)	(VOL/VOL)
1	2.7118	0.1130
2	42.5939	0.2840
SNOW WATER	0.000	

****
****

```
******************************************************************************
******************************************************************************
**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
******************************************************************************
******************************************************************************


PRECIPITATION DATA FILE:     C:\HELP7\lea\HO50.D4
TEMPERATURE DATA FILE:       C:\HELP7\lea\HO50.D7
SOLAR RADIATION DATA FILE:   C:\HELP7\lea\HO50.D13
EVAPOTRANSPIRATION DATA:     c:\help7\lea\HO50.D11
SOIL AND DESIGN DATA FILE:   C:\HELP7\lea\HPIT1LF.D10
OUTPUT DATA FILE:            C:\HELP7\lea\hpitllf.OUT


TIME:   9:59     DATE:   9/ 5/2007


******************************************************************************

     TITLE:  Lea County Pit - loam cover - liner - F.C.

******************************************************************************


     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER
              WERE SPECIFIED BY THE USER.


                                  LAYER  1
                                  --------

                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER   7
          THICKNESS                    =      6.00   INCHES
          POROSITY                     =      0.4730 VOL/VOL
          FIELD CAPACITY               =      0.2220 VOL/VOL
          WILTING POINT                =      0.1040 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.1335 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.520000001000E-03 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  2.49
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
```

LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 8

THICKNESS	=	36.00	INCHES
POROSITY	=	0.4630	VOL/VOL
FIELD CAPACITY	=	0.2320	VOL/VOL
WILTING POINT	=	0.1160	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1450	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.369999994000E-03	CM/SEC

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 8

THICKNESS	=	6.00	INCHES
POROSITY	=	0.4630	VOL/VOL
FIELD CAPACITY	=	0.2320	VOL/VOL
WILTING POINT	=	0.1160	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1450	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.369999994000E-03	CM/SEC
SLOPE	=	1.00	PERCENT
DRAINAGE LENGTH	=	10.0	FEET

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 36

THICKNESS	=	0.02	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.399999993000E-12	CM/SEC
FML PINHOLE DENSITY	=	1.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	10.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	4 - POOR	

LAYER 5

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 9

THICKNESS	=	150.00	INCHES
POROSITY	=	0.5010	VOL/VOL
FIELD CAPACITY	=	0.2840	VOL/VOL
WILTING POINT	=	0.1350	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2830	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.190000006000E-03	CM/SEC

LAYER 6

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 36

THICKNESS	=	0.02	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.399999993000E-12	CM/SEC
FML PINHOLE DENSITY	=	1.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	10.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	4 - POOR	

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 7 WITH A POOR STAND OF GRASS, A SURFACE SLOPE OF 1.% AND A SLOPE LENGTH OF 75. FEET.

SCS RUNOFF CURVE NUMBER	=	83.90	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	0.500	ACRES
EVAPORATIVE ZONE DEPTH	=	20.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	2.831	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	9.320	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	2.248	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	49.341	INCHES
TOTAL INITIAL WATER	=	49.341	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM

HOBBS NEW MEXICO

STATION LATITUDE	=	32.42 DEGREES
MAXIMUM LEAF AREA INDEX	=	1.60
START OF GROWING SEASON (JULIAN DATE)	=	67
END OF GROWING SEASON (JULIAN DATE)	=	317
EVAPORATIVE ZONE DEPTH	=	20.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	11.10 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	52.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	50.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	55.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	58.00 %

NOTE: PRECIPITATION DATA FOR HOBBS NEW MEXICO
WAS ENTERED FROM A EARTH INFO CLIMATEDATA.

NOTE: TEMPERATURE DATA FOR HOBBS NEW MEXICO
WAS ENTERED FROM A EARTH INFO CLIMATEDATA.

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR MIDLAND TEXAS
AND STATION LATITUDE = 32.43 DEGREES

****

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1951 THROUGH 2000

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	0.42	0.54	0.49	0.71	2.33	1.68
	2.27	2.35	2.51	1.57	0.67	0.57
STD. DEVIATIONS	0.54	0.62	0.57	0.74	2.28	1.42
	2.20	1.99	2.84	1.82	0.88	0.97
RUNOFF						
TOTALS	0.000	0.000	0.003	0.003	0.167	0.039
	0.168	0.150	0.285	0.111	0.025	0.006
STD. DEVIATIONS	0.000	0.000	0.012	0.012	0.675	0.112
	0.485	0.438	0.829	0.401	0.151	0.039

EVAPOTRANSPIRATION

TOTALS	0.521	0.503	0.500	0.675	1.855	1.999
	1.827	2.118	1.674	1.206	0.890	0.553
STD. DEVIATIONS	0.551	0.533	0.498	0.603	1.283	1.435
	1.326	1.322	1.036	0.918	0.781	0.457

LATERAL DRAINAGE COLLECTED FROM LAYER 3

TOTALS	0.0442	0.0272	0.0177	0.0093	0.0102	0.0349
	0.0149	0.0132	0.0748	0.1509	0.1258	0.0799
STD. DEVIATIONS	0.0894	0.0610	0.0462	0.0263	0.0482	0.2343
	0.0876	0.0466	0.2015	0.3950	0.2896	0.1707

PERCOLATION/LEAKAGE THROUGH LAYER 4

TOTALS	0.0214	0.0155	0.0120	0.0078	0.0057	0.0071
	0.0056	0.0071	0.0189	0.0343	0.0337	0.0280
STD. DEVIATIONS	0.0360	0.0274	0.0232	0.0162	0.0138	0.0323
	0.0229	0.0199	0.0354	0.0627	0.0581	0.0486

PERCOLATION/LEAKAGE THROUGH LAYER 6

TOTALS	0.0220	0.0197	0.0202	0.0175	0.0157	0.0131
	0.0118	0.0105	0.0105	0.0139	0.0177	0.0211
STD. DEVIATIONS	0.0320	0.0292	0.0303	0.0269	0.0247	0.0215
	0.0211	0.0211	0.0193	0.0208	0.0240	0.0292

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 4

AVERAGES	0.3833	0.2873	0.1888	0.1150	0.0802	0.1407
	0.0973	0.1189	0.3862	0.7228	0.7169	0.5453
STD. DEVIATIONS	0.6891	0.5589	0.4138	0.2800	0.2488	0.8073
	0.4847	0.3760	0.7705	1.4512	1.3330	1.0111

DAILY AVERAGE HEAD ON TOP OF LAYER 6

AVERAGES	0.3709	0.3654	0.3364	0.2946	0.2474	0.2065
	0.1766	0.1568	0.1559	0.2021	0.2823	0.3454
STD. DEVIATIONS	0.5845	0.5868	0.5459	0.4894	0.4230	0.3760
	0.3672	0.3889	0.3674	0.3635	0.4259	0.5179

****

****

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1951 THROUGH 2000

	INCHES		CU. FEET	PERCENT
PRECIPITATION	16.12	(5.994)	29250.2	100.00
RUNOFF	0.954	(1.2292)	1732.32	5.922
EVAPOTRANSPIRATION	14.321	(4.1769)	25991.94	88.861
LATERAL DRAINAGE COLLECTED FROM LAYER 3	0.60289	(1.06456)	1094.243	3.74098
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.19697	(0.24613)	357.498	1.22221
AVERAGE HEAD ON TOP OF LAYER 4	0.315	(0.425)		
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.19370	(0.25287)	351.559	1.20190
AVERAGE HEAD ON TOP OF LAYER 6	0.262	(0.376)		
CHANGE IN WATER STORAGE	0.044	(1.3966)	80.11	0.274

****

****

PEAK DAILY VALUES FOR YEARS 1951 THROUGH 2000

	(INCHES)	(CU. FT.)
PRECIPITATION	7.50	13612.500
RUNOFF	4.604	8356.8262
DRAINAGE COLLECTED FROM LAYER 3	0.20373	369.76349
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.013713	24.88862
AVERAGE HEAD ON TOP OF LAYER 4	11.651	
MAXIMUM HEAD ON TOP OF LAYER 4	14.492	
LOCATION OF MAXIMUM HEAD IN LAYER 3 (DISTANCE FROM DRAIN)	9.3 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.004041	7.33469

AVERAGE HEAD ON TOP OF LAYER 6	2.580	
SNOW WATER	2.96	5372.9717

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.3687
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1124

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

****

****

FINAL WATER STORAGE AT END OF YEAR 2000

LAYER	(INCHES)	(VOL/VOL)
1	0.6304	0.1051
2	6.9045	0.1918
3	1.3994	0.2332
4	0.0000	0.0000
5	42.6136	0.2841
6	0.0000	0.0000
SNOW WATER	0.000	

****
****

```
******************************************************************************
******************************************************************************
**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
******************************************************************************
******************************************************************************


PRECIPITATION DATA FILE:     C:\HELP7\lea\HO50.D4
TEMPERATURE DATA FILE:       C:\HELP7\lea\HO50.D7
SOLAR RADIATION DATA FILE:   C:\HELP7\lea\HO50.D13
EVAPOTRANSPIRATION DATA:     c:\help7\lea\HO50.D11
SOIL AND DESIGN DATA FILE:   C:\HELP7\lea\HPITlLFG.D10
OUTPUT DATA FILE:            C:\HELP7\lea\hpitllfg.OUT


TIME:  10:15     DATE:   9/ 5/2007


******************************************************************************

     TITLE:  Lea County Pit - loam cover - liner, good - F.C.

******************************************************************************


     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER
              WERE SPECIFIED BY THE USER.


                                  LAYER  1
                                  --------

                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER   7
          THICKNESS                  =      6.00   INCHES
          POROSITY                   =      0.4730 VOL/VOL
          FIELD CAPACITY             =      0.2220 VOL/VOL
          WILTING POINT              =      0.1040 VOL/VOL
          INITIAL SOIL WATER CONTENT =      0.1335 VOL/VOL
          EFFECTIVE SAT. HYD. COND.  =  0.520000001000E-03 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  2.49
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
```

LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 8

THICKNESS	=	36.00	INCHES
POROSITY	=	0.4630	VOL/VOL
FIELD CAPACITY	=	0.2320	VOL/VOL
WILTING POINT	=	0.1160	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1450	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.369999994000E-03	CM/SEC

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 8

THICKNESS	=	6.00	INCHES
POROSITY	=	0.4630	VOL/VOL
FIELD CAPACITY	=	0.2320	VOL/VOL
WILTING POINT	=	0.1160	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1450	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.369999994000E-03	CM/SEC
SLOPE	=	1.00	PERCENT
DRAINAGE LENGTH	=	10.0	FEET

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 36

THICKNESS	=	0.02	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.399999993000E-12	CM/SEC
FML PINHOLE DENSITY	=	1.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	4.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 5

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 9

THICKNESS	=	150.00	INCHES
POROSITY	=	0.5010	VOL/VOL
FIELD CAPACITY	=	0.2840	VOL/VOL
WILTING POINT	=	0.1350	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2830	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.190000006000E-03	CM/SEC

LAYER 6

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 36

THICKNESS	=	0.02	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.399999993000E-12	CM/SEC
FML PINHOLE DENSITY	=	1.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	4.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 7 WITH A POOR STAND OF GRASS, A SURFACE SLOPE OF 1.% AND A SLOPE LENGTH OF 75. FEET.

SCS RUNOFF CURVE NUMBER	=	83.90	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	0.500	ACRES
EVAPORATIVE ZONE DEPTH	=	20.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	2.831	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	9.320	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	2.248	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	49.341	INCHES
TOTAL INITIAL WATER	=	49.341	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM

HOBBS NEW MEXICO

STATION LATITUDE	=	32.42	DEGREES
MAXIMUM LEAF AREA INDEX	=	1.60	
START OF GROWING SEASON (JULIAN DATE)	=	67	
END OF GROWING SEASON (JULIAN DATE)	=	317	
EVAPORATIVE ZONE DEPTH	=	20.0	INCHES
AVERAGE ANNUAL WIND SPEED	=	11.10	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	52.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	50.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	55.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	58.00	%

NOTE: PRECIPITATION DATA FOR HOBBS NEW MEXICO
WAS ENTERED FROM A EARTH INFO CLIMATEDATA.

NOTE: TEMPERATURE DATA FOR HOBBS NEW MEXICO
WAS ENTERED FROM A EARTH INFO CLIMATEDATA.

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR MIDLAND TEXAS
AND STATION LATITUDE = 32.43 DEGREES

****

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1951 THROUGH 2000

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	0.42	0.54	0.49	0.71	2.33	1.68
	2.27	2.35	2.51	1.57	0.67	0.57
STD. DEVIATIONS	0.54	0.62	0.57	0.74	2.28	1.42
	2.20	1.99	2.84	1.82	0.88	0.97
RUNOFF						
TOTALS	0.000	0.000	0.003	0.003	0.167	0.039
	0.168	0.150	0.285	0.111	0.025	0.006
STD. DEVIATIONS	0.000	0.000	0.012	0.012	0.675	0.112
	0.485	0.438	0.829	0.401	0.151	0.039

EVAPOTRANSPIRATION

TOTALS	0.521	0.503	0.500	0.675	1.855	1.999
	1.827	2.118	1.674	1.206	0.890	0.553
STD. DEVIATIONS	0.551	0.533	0.498	0.603	1.283	1.435
	1.326	1.322	1.036	0.918	0.781	0.457

LATERAL DRAINAGE COLLECTED FROM LAYER 3

TOTALS	0.0559	0.0358	0.0250	0.0145	0.0156	0.0389
	0.0187	0.0166	0.0815	0.1657	0.1421	0.0951
STD. DEVIATIONS	0.1081	0.0740	0.0581	0.0351	0.0631	0.2452
	0.0991	0.0560	0.2109	0.4239	0.3160	0.1950

PERCOLATION/LEAKAGE THROUGH LAYER 4

TOTALS	0.0101	0.0076	0.0064	0.0046	0.0037	0.0040
	0.0033	0.0037	0.0085	0.0149	0.0149	0.0127
STD. DEVIATIONS	0.0160	0.0124	0.0109	0.0080	0.0070	0.0134
	0.0099	0.0087	0.0148	0.0261	0.0244	0.0209

PERCOLATION/LEAKAGE THROUGH LAYER 6

TOTALS	0.0086	0.0079	0.0085	0.0079	0.0078	0.0072
	0.0070	0.0066	0.0063	0.0072	0.0077	0.0085
STD. DEVIATIONS	0.0092	0.0085	0.0093	0.0089	0.0089	0.0084
	0.0085	0.0083	0.0078	0.0079	0.0080	0.0088

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 4

AVERAGES	0.4589	0.3607	0.2567	0.1748	0.1324	0.1804
	0.1309	0.1477	0.4242	0.7810	0.7897	0.6230
STD. DEVIATIONS	0.7812	0.6438	0.4933	0.3530	0.3163	0.8305
	0.5247	0.4195	0.8097	1.5138	1.4101	1.1007

DAILY AVERAGE HEAD ON TOP OF LAYER 6

AVERAGES	0.3211	0.3229	0.3175	0.3047	0.2868	0.2707
	0.2545	0.2376	0.2309	0.2536	0.2873	0.3120
STD. DEVIATIONS	0.3782	0.3857	0.3852	0.3772	0.3622	0.3551
	0.3512	0.3435	0.3333	0.3229	0.3373	0.3596

****

****

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1951 THROUGH 2000

	INCHES		CU. FEET	PERCENT
PRECIPITATION	16.12	(5.994)	29250.2	100.00
RUNOFF	0.954	(1.2292)	1732.32	5.922
EVAPOTRANSPIRATION	14.321	(4.1769)	25991.94	88.861
LATERAL DRAINAGE COLLECTED FROM LAYER 3	0.70532	(1.17344)	1280.148	4.37655
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.09435	(0.11042)	171.238	0.58543
AVERAGE HEAD ON TOP OF LAYER 4	0.372	(0.472)		
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.09107	(0.09637)	165.301	0.56513
AVERAGE HEAD ON TOP OF LAYER 6	0.283	(0.333)		
CHANGE IN WATER STORAGE	0.044	(1.3438)	80.46	0.275

****

****

PEAK DAILY VALUES FOR YEARS 1951 THROUGH 2000

	(INCHES)	(CU. FT.)
PRECIPITATION	7.50	13612.500
RUNOFF	4.604	8356.8262
DRAINAGE COLLECTED FROM LAYER 3	0.20819	377.86533
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.005563	10.09724
AVERAGE HEAD ON TOP OF LAYER 4	11.783	
MAXIMUM HEAD ON TOP OF LAYER 4	14.662	
LOCATION OF MAXIMUM HEAD IN LAYER 3 (DISTANCE FROM DRAIN)	9.3 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.001142	2.07289

AVERAGE HEAD ON TOP OF LAYER 6	1.643	
SNOW WATER	2.96	5372.9717

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.3687
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1124

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

****

****

FINAL WATER STORAGE AT END OF YEAR 2000

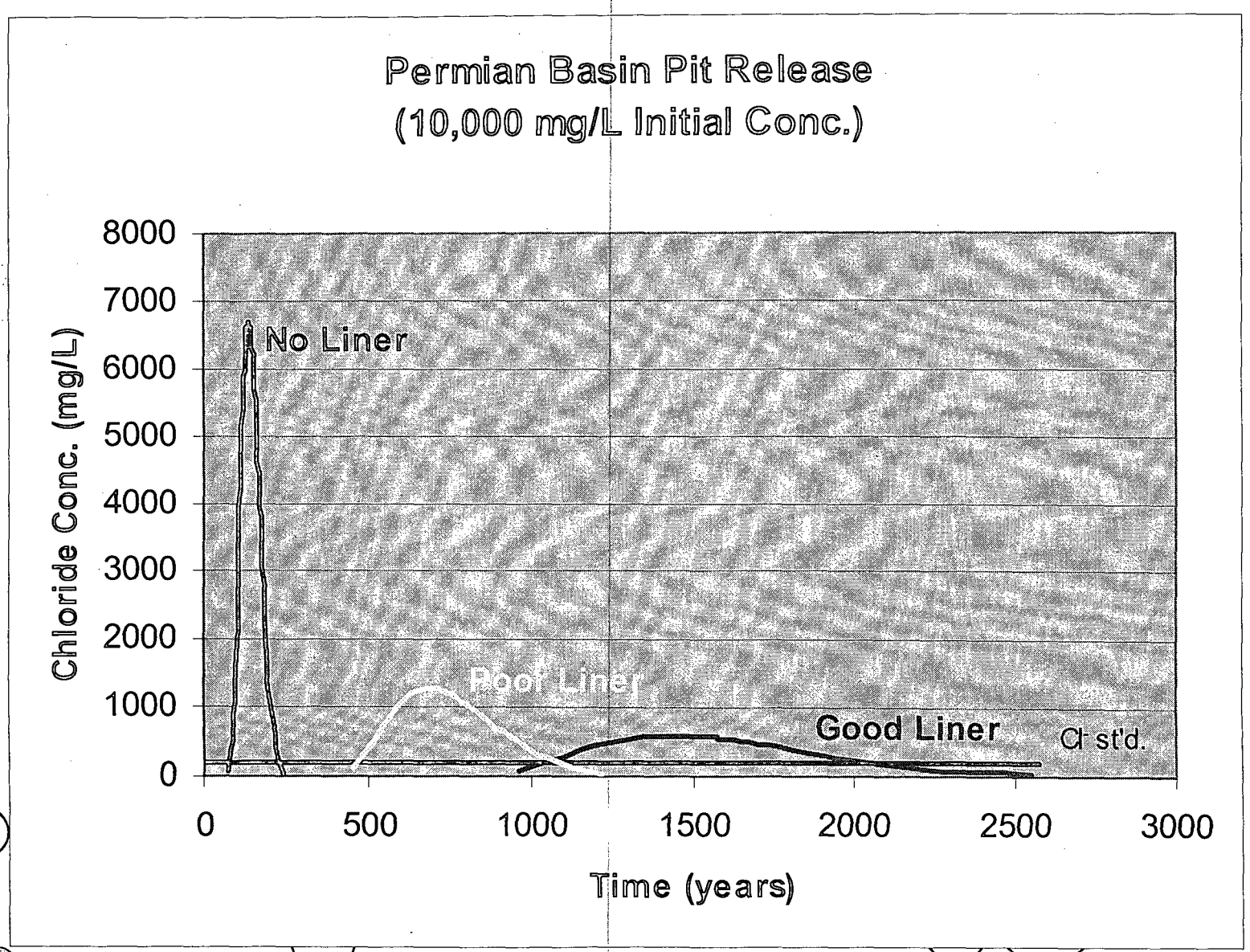
LAYER	(INCHES)	(VOL/VOL)
1	0.6304	0.1051
2	6.9045	0.1918
3	1.4091	0.2349
4	0.0000	0.0000
5	42.6136	0.2841
6	0.0000	0.0000
SNOW WATER	0.000	

****
****

Pit Release Modeling for the Permian and San Juan Basins

MULTIMED Output Files for the Permian Basin

Modeling Results



1
hplnlc2.out

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

1
Run options
--- -------

Proposed Permian Basin Pit; 50' to GW, Ksat of 1e-3 cm/sec

50 year ave. - 2' sandy loam cover - no liner - 10K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	15.20	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	15.2	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations
1

DATA FOR LAYER 1
---- --- -----
VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	15.2	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.298E-01	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	33.3	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.600E+02	0.00000E+00
0.700E+02	0.00000E+00
0.800E+02	0.56028E+02
0.900E+02	0.41264E+03
0.100E+03	0.11827E+04
0.110E+03	0.23533E+04
0.120E+03	0.38275E+04
0.130E+03	0.52699E+04
0.140E+03	0.62650E+04
0.150E+03	0.65477E+04
0.160E+03	0.61363E+04
0.170E+03	0.52536E+04
0.180E+03	0.41756E+04
0.190E+03	0.31084E+04
0.200E+03	0.21636E+04
0.210E+03	0.14033E+04
0.220E+03	0.85014E+03
0.230E+03	0.48974E+03
0.240E+03	0.23628E+03
0.250E+03	0.56132E+02

VTRNSPThplnlc2.doc

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME = 0.4685E+02	CONC = 0.1191E+02
AT TIME = 0.6205E+02	CONC = 0.4101E+01
AT TIME = 0.7471E+02	CONC = 0.9366E+02
AT TIME = 0.8527E+02	CONC = 0.6652E+03
AT TIME = 0.9407E+02	CONC = 0.1566E+04
AT TIME = 0.1014E+03	CONC = 0.2534E+04
AT TIME = 0.1075E+03	CONC = 0.3453E+04
AT TIME = 0.1126E+03	CONC = 0.4254E+04
AT TIME = 0.1168E+03	CONC = 0.4903E+04
AT TIME = 0.1204E+03	CONC = 0.5400E+04
AT TIME = 0.1229E+03	CONC = 0.5716E+04
AT TIME = 0.1254E+03	CONC = 0.5995E+04
AT TIME = 0.1279E+03	CONC = 0.6230E+04
AT TIME = 0.1304E+03	CONC = 0.6419E+04
AT TIME = 0.1329E+03	CONC = 0.6559E+04
AT TIME = 0.1354E+03	CONC = 0.6648E+04
AT TIME = 0.1379E+03	CONC = 0.6688E+04
AT TIME = 0.1404E+03	CONC = 0.6679E+04
AT TIME = 0.1429E+03	CONC = 0.6624E+04
AT TIME = 0.1454E+03	CONC = 0.6527E+04
AT TIME = 0.1479E+03	CONC = 0.6391E+04
AT TIME = 0.1504E+03	CONC = 0.6221E+04
AT TIME = 0.1529E+03	CONC = 0.6021E+04
AT TIME = 0.1554E+03	CONC = 0.5796E+04
AT TIME = 0.1579E+03	CONC = 0.5551E+04
AT TIME = 0.1604E+03	CONC = 0.5291E+04
AT TIME = 0.1629E+03	CONC = 0.5019E+04
AT TIME = 0.1654E+03	CONC = 0.4739E+04
AT TIME = 0.1679E+03	CONC = 0.4455E+04
AT TIME = 0.1704E+03	CONC = 0.4171E+04
AT TIME = 0.1739E+03	CONC = 0.3773E+04
AT TIME = 0.1781E+03	CONC = 0.3310E+04
AT TIME = 0.1832E+03	CONC = 0.2788E+04
AT TIME = 0.1893E+03	CONC = 0.2222E+04
AT TIME = 0.1967E+03	CONC = 0.1641E+04
AT TIME = 0.2055E+03	CONC = 0.1087E+04
AT TIME = 0.2160E+03	CONC = 0.6078E+03
AT TIME = 0.2287E+03	CONC = 0.2478E+03
AT TIME = 0.2439E+03	CONC = 0.2877E+02
AT TIME = 0.3175E+03	CONC = -.1345E+02

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION CONCENTRATION

1

nplnlc.out

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

1
Run options
--- -------

Proposed Lea County Pit 50' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - no liner - 10K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	15.20	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	15.2	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY - Number of different layers used 1
NTSTPS - Number of time values concentration calc 40

DUMMY	- Not presently used		1
ISOL	- Type of scheme used in unsaturated zone		1
N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
--- ---

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
--- --- ---

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	15.2	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry's law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

PAGE 0034

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.202E-01	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX

Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.
Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

TIME	CONCENTRATION
0.600E+02	0.00000E+00
0.700E+02	0.00000E+00
0.800E+02	0.00000E+00
0.900E+02	0.00000E+00
0.100E+03	0.00000E+00
0.110E+03	0.40943E+02
0.120E+03	0.10959E+03
0.130E+03	0.48091E+03
0.140E+03	0.94630E+03
0.150E+03	0.16400E+04
0.160E+03	0.25686E+04
0.170E+03	0.34876E+04
0.180E+03	0.41939E+04
0.190E+03	0.46355E+04
0.200E+03	0.47691E+04
0.210E+03	0.46297E+04
0.220E+03	0.42807E+04
0.230E+03	0.37973E+04
0.240E+03	0.32606E+04
0.250E+03	0.26892E+04

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME =	0.6900E+02	CONC = 0.1190E+02
AT TIME =	0.9138E+02	CONC = 0.2849E+01
AT TIME =	0.1100E+03	CONC = 0.1001E+03
AT TIME =	0.1256E+03	CONC = 0.6344E+03
AT TIME =	0.1385E+03	CONC = 0.1556E+04
AT TIME =	0.1493E+03	CONC = 0.2563E+04
AT TIME =	0.1583E+03	CONC = 0.3409E+04
AT TIME =	0.1658E+03	CONC = 0.4018E+04
AT TIME =	0.1721E+03	CONC = 0.4417E+04
AT TIME =	0.1773E+03	CONC = 0.4658E+04
AT TIME =	0.1798E+03	CONC = 0.4743E+04
AT TIME =	0.1823E+03	CONC = 0.4808E+04
AT TIME =	0.1848E+03	CONC = 0.4853E+04
AT TIME =	0.1873E+03	CONC = 0.4878E+04
AT TIME =	0.1898E+03	CONC = 0.4885E+04
AT TIME =	0.1923E+03	CONC = 0.4874E+04
AT TIME =	0.1948E+03	CONC = 0.4846E+04
AT TIME =	0.1973E+03	CONC = 0.4802E+04
AT TIME =	0.1998E+03	CONC = 0.4743E+04
AT TIME =	0.2023E+03	CONC = 0.4670E+04
AT TIME =	0.2048E+03	CONC = 0.4586E+04
AT TIME =	0.2073E+03	CONC = 0.4490E+04
AT TIME =	0.2098E+03	CONC = 0.4385E+04
AT TIME =	0.2123E+03	CONC = 0.4271E+04
AT TIME =	0.2148E+03	CONC = 0.4149E+04
AT TIME =	0.2173E+03	CONC = 0.4021E+04
AT TIME =	0.2198E+03	CONC = 0.3889E+04
AT TIME =	0.2223E+03	CONC = 0.3752E+04
AT TIME =	0.2248E+03	CONC = 0.3612E+04
AT TIME =	0.2273E+03	CONC = 0.3470E+04
AT TIME =	0.2325E+03	CONC = 0.3171E+04
AT TIME =	0.2387E+03	CONC = 0.2815E+04
AT TIME =	0.2462E+03	CONC = 0.2402E+04
AT TIME =	0.2552E+03	CONC = 0.1944E+04
AT TIME =	0.2660E+03	CONC = 0.1464E+04
AT TIME =	0.2790E+03	CONC = 0.9946E+03
AT TIME =	0.2945E+03	CONC = 0.5793E+03
AT TIME =	0.3132E+03	CONC = 0.2580E+03
AT TIME =	0.3356E+03	CONC = 0.5395E+02
AT TIME =	0.4380E+03	CONC = -.1927E+02

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed Lea County Pit 50' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - poor liner - 10K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	15.20	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	15.2	-999.	0.100E-08	-999.

PAGE 0040

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1

ISOL	- Type of scheme used in unsaturated zone		1
N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
--- ---

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
--- --- ---

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	15.2	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry's law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.490E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX

Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.
Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.300E+03	0.00000E+00
0.310E+03	0.00000E+00
0.320E+03	0.00000E+00
0.330E+03	0.00000E+00
0.340E+03	0.00000E+00
0.350E+03	0.00000E+00
0.360E+03	0.00000E+00
0.370E+03	0.00000E+00
0.380E+03	0.00000E+00
0.390E+03	0.00000E+00
0.400E+03	0.00000E+00
0.410E+03	0.00000E+00
0.420E+03	0.00000E+00
0.430E+03	0.00000E+00
0.440E+03	0.00000E+00
0.450E+03	0.00000E+00
0.460E+03	0.10090E+01
0.470E+03	0.51805E+02
0.480E+03	0.14090E+03
0.490E+03	0.21920E+03

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME =	0.2836E+03	CONC =	0.1915E+02
AT TIME =	0.3756E+03	CONC =	-.2377E+02
AT TIME =	0.4522E+03	CONC =	0.1000E+03
AT TIME =	0.5161E+03	CONC =	0.4909E+03
AT TIME =	0.5693E+03	CONC =	0.8643E+03
AT TIME =	0.6137E+03	CONC =	0.1104E+04
AT TIME =	0.6507E+03	CONC =	0.1222E+04
AT TIME =	0.6815E+03	CONC =	0.1262E+04
AT TIME =	0.7072E+03	CONC =	0.1259E+04
AT TIME =	0.7286E+03	CONC =	0.1233E+04
AT TIME =	0.7311E+03	CONC =	0.1229E+04
AT TIME =	0.7336E+03	CONC =	0.1225E+04
AT TIME =	0.7361E+03	CONC =	0.1220E+04
AT TIME =	0.7386E+03	CONC =	0.1215E+04
AT TIME =	0.7411E+03	CONC =	0.1211E+04
AT TIME =	0.7436E+03	CONC =	0.1205E+04
AT TIME =	0.7461E+03	CONC =	0.1200E+04
AT TIME =	0.7486E+03	CONC =	0.1194E+04
AT TIME =	0.7511E+03	CONC =	0.1189E+04
AT TIME =	0.7536E+03	CONC =	0.1183E+04
AT TIME =	0.7561E+03	CONC =	0.1177E+04
AT TIME =	0.7586E+03	CONC =	0.1170E+04
AT TIME =	0.7611E+03	CONC =	0.1164E+04
AT TIME =	0.7636E+03	CONC =	0.1157E+04
AT TIME =	0.7661E+03	CONC =	0.1151E+04
AT TIME =	0.7686E+03	CONC =	0.1144E+04
AT TIME =	0.7711E+03	CONC =	0.1137E+04
AT TIME =	0.7736E+03	CONC =	0.1130E+04
AT TIME =	0.7761E+03	CONC =	0.1122E+04
AT TIME =	0.7786E+03	CONC =	0.1115E+04
AT TIME =	0.7999E+03	CONC =	0.1047E+04
AT TIME =	0.8256E+03	CONC =	0.9578E+03
AT TIME =	0.8564E+03	CONC =	0.8452E+03
AT TIME =	0.8934E+03	CONC =	0.7104E+03
AT TIME =	0.9378E+03	CONC =	0.5586E+03
AT TIME =	0.9910E+03	CONC =	0.4006E+03
AT TIME =	0.1055E+04	CONC =	0.2518E+03
AT TIME =	0.1132E+04	CONC =	0.1288E+03
AT TIME =	0.1224E+04	CONC =	0.4366E+02
AT TIME =	0.1606E+04	CONC =	-.9799E+01

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION CONCENTRATION

1

npllcg.out

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

1

Run options
--- -------

Proposed Lea County Pit 50' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - good liner - 10K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model

1

1

UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system

1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	15.20	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	15.2	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1

ISOL	- Type of scheme used in unsaturated zone		1
N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

1

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	15.2	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.230E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX

Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.
Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

TIME	CONCENTRATION
0.800E+03	0.00000E+00
0.820E+03	0.00000E+00
0.840E+03	0.00000E+00
0.860E+03	0.00000E+00
0.880E+03	0.00000E+00
0.900E+03	0.00000E+00
0.920E+03	0.00000E+00
0.940E+03	0.00000E+00
0.960E+03	0.00000E+00
0.980E+03	0.11243E+02
0.100E+04	0.51871E+02
0.102E+04	0.83635E+02
0.104E+04	0.11325E+03
0.106E+04	0.14264E+03
0.108E+04	0.17201E+03
0.110E+04	0.19972E+03
0.112E+04	0.21969E+03
0.114E+04	0.25923E+03
0.116E+04	0.29062E+03
0.118E+04	0.32057E+03

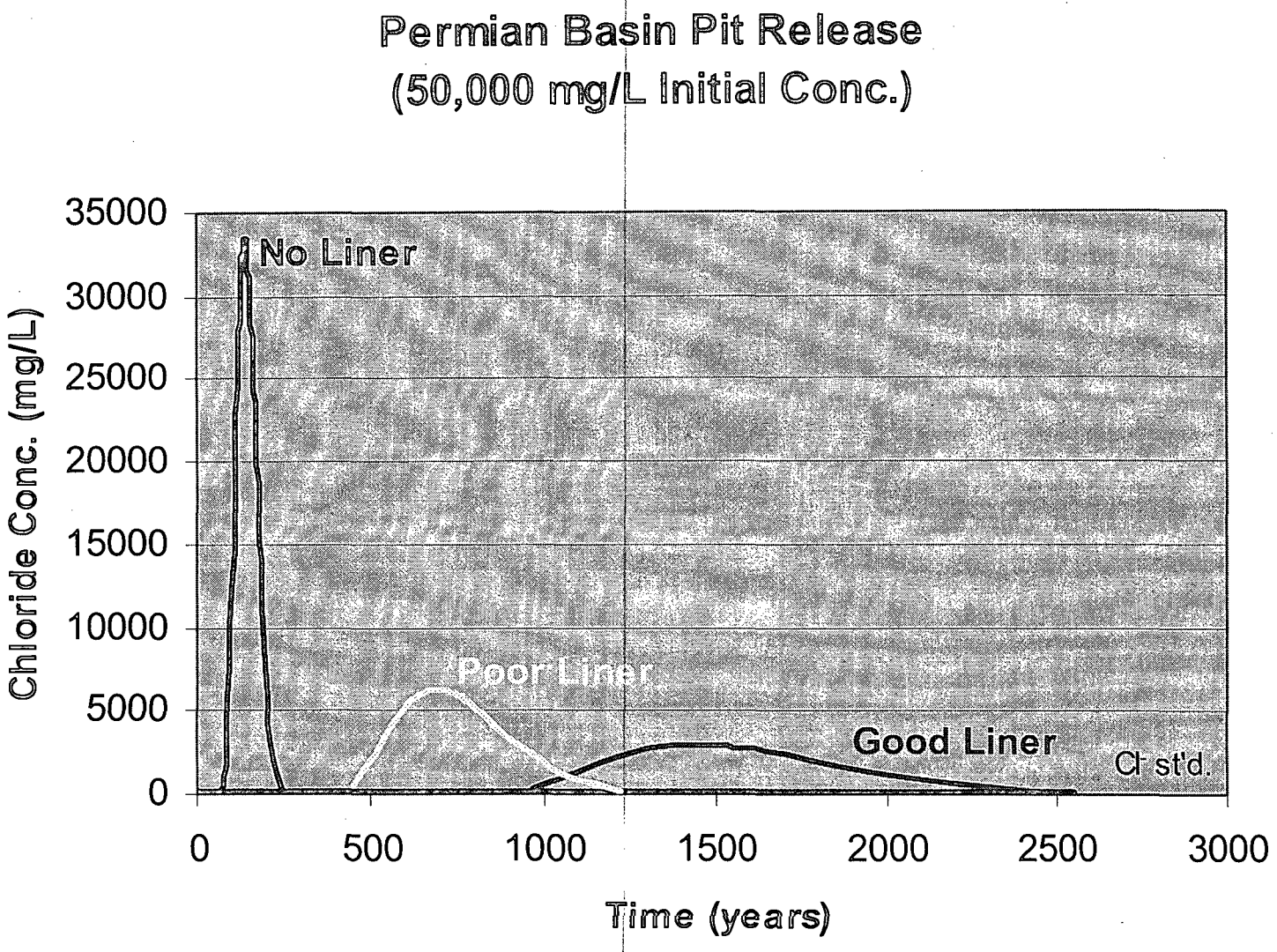
CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME =	0.6038E+03	CONC =	0.1294E+02
AT TIME =	0.7996E+03	CONC =	-.1557E+02
AT TIME =	0.9629E+03	CONC =	0.7466E+02
AT TIME =	0.1099E+04	CONC =	0.2758E+03
AT TIME =	0.1212E+04	CONC =	0.4459E+03
AT TIME =	0.1307E+04	CONC =	0.5448E+03
AT TIME =	0.1385E+04	CONC =	0.5873E+03
AT TIME =	0.1451E+04	CONC =	0.5956E+03
AT TIME =	0.1506E+04	CONC =	0.5862E+03
AT TIME =	0.1551E+04	CONC =	0.5690E+03
AT TIME =	0.1554E+04	CONC =	0.5679E+03
AT TIME =	0.1556E+04	CONC =	0.5667E+03
AT TIME =	0.1559E+04	CONC =	0.5655E+03
AT TIME =	0.1561E+04	CONC =	0.5643E+03
AT TIME =	0.1564E+04	CONC =	0.5630E+03
AT TIME =	0.1566E+04	CONC =	0.5618E+03
AT TIME =	0.1569E+04	CONC =	0.5605E+03
AT TIME =	0.1571E+04	CONC =	0.5592E+03
AT TIME =	0.1574E+04	CONC =	0.5579E+03
AT TIME =	0.1576E+04	CONC =	0.5566E+03
AT TIME =	0.1579E+04	CONC =	0.5552E+03
AT TIME =	0.1581E+04	CONC =	0.5539E+03
AT TIME =	0.1584E+04	CONC =	0.5525E+03
AT TIME =	0.1586E+04	CONC =	0.5511E+03
AT TIME =	0.1589E+04	CONC =	0.5497E+03
AT TIME =	0.1591E+04	CONC =	0.5482E+03
AT TIME =	0.1594E+04	CONC =	0.5468E+03
AT TIME =	0.1596E+04	CONC =	0.5453E+03
AT TIME =	0.1599E+04	CONC =	0.5438E+03
AT TIME =	0.1601E+04	CONC =	0.5423E+03
AT TIME =	0.1647E+04	CONC =	0.5126E+03
AT TIME =	0.1701E+04	CONC =	0.4722E+03
AT TIME =	0.1767E+04	CONC =	0.4200E+03
AT TIME =	0.1846E+04	CONC =	0.3560E+03
AT TIME =	0.1940E+04	CONC =	0.2826E+03
AT TIME =	0.2054E+04	CONC =	0.2049E+03
AT TIME =	0.2190E+04	CONC =	0.1306E+03
AT TIME =	0.2353E+04	CONC =	0.6831E+02
AT TIME =	0.2549E+04	CONC =	0.2449E+02
AT TIME =	0.3348E+04	CONC =	-.5026E+01

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION
CONCENTRATION			

Modeling Results



```
1
nplnla2.out
                    U. S.   E N V I R O N M E N T A L   P R O T E C T I O N   A G E N C Y

                                E X P O S U R E   A S S E S S M E N T

                                  M U L T I M E D I A   M O D E L

                                MULTIMED  (Version 1.01, June 1991)
1
 Run options
 --- -------



 Proposed Permian Basin Pit;  50' to GW, Ksat of 1e-3 cm/sec


 50 year ave. - 2' sandy loam cover - no liner - 50K
 Chemical simulated is DEFAULT CHEMICAL


 Option Chosen                          Saturated and unsaturated zone models
 Run was                                DETERMIN
 Infiltration input by user
 Run was transient
 Reject runs if Y coordinate outside plume
 Do not reject runs if Z coordinate outside plume
 Gaussian source used in saturated zone model
1
1
 UNSATURATED ZONE FLOW MODEL PARAMETERS
 (input parameter description and value)
 NP      - Total number of nodal points                  240
 NMAT    - Number of different porous materials            1
 KPROP   - Van Genuchten or Brooks and Corey               1
 IMSHGN  - Spatial discretization option                   1
 NVFLAYR - Number of layers in flow model                  1


 OPTIONS CHOSEN
 ------- ------
 Van Genuchten functional coefficients
 User defined coordinate system
1
```

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	15.20	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	15.2	-999.	0.100E-08	-999.

PAGE 0058

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
---- --- -----
VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	15.2	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.298E-01	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.500E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	33.3	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.600E+02	0.00000E+00
0.700E+02	0.00000E+00
0.800E+02	0.28014E+03
0.900E+02	0.20632E+04
0.100E+03	0.59133E+04
0.110E+03	0.11766E+05
0.120E+03	0.19138E+05
0.130E+03	0.26349E+05
0.140E+03	0.31325E+05
0.150E+03	0.32739E+05
0.160E+03	0.30682E+05
0.170E+03	0.26268E+05
0.180E+03	0.20878E+05
0.190E+03	0.15542E+05
0.200E+03	0.10818E+05
0.210E+03	0.70164E+04
0.220E+03	0.42507E+04
0.230E+03	0.24487E+04
0.240E+03	0.11814E+04
0.250E+03	0.28066E+03

VTRNSPThplnla2.doc

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME =	0.4685E+02	CONC =	0.5953E+02
AT TIME =	0.6205E+02	CONC =	0.2051E+02
AT TIME =	0.7471E+02	CONC =	0.4683E+03
AT TIME =	0.8527E+02	CONC =	0.3326E+04
AT TIME =	0.9407E+02	CONC =	0.7832E+04
AT TIME =	0.1014E+03	CONC =	0.1267E+05
AT TIME =	0.1075E+03	CONC =	0.1726E+05
AT TIME =	0.1126E+03	CONC =	0.2127E+05
AT TIME =	0.1168E+03	CONC =	0.2451E+05
AT TIME =	0.1204E+03	CONC =	0.2700E+05
AT TIME =	0.1229E+03	CONC =	0.2858E+05
AT TIME =	0.1254E+03	CONC =	0.2997E+05
AT TIME =	0.1279E+03	CONC =	0.3115E+05
AT TIME =	0.1304E+03	CONC =	0.3210E+05
AT TIME =	0.1329E+03	CONC =	0.3280E+05
AT TIME =	0.1354E+03	CONC =	0.3324E+05
AT TIME =	0.1379E+03	CONC =	0.3344E+05
AT TIME =	0.1404E+03	CONC =	0.3339E+05
AT TIME =	0.1429E+03	CONC =	0.3312E+05
AT TIME =	0.1454E+03	CONC =	0.3263E+05
AT TIME =	0.1479E+03	CONC =	0.3195E+05
AT TIME =	0.1504E+03	CONC =	0.3110E+05
AT TIME =	0.1529E+03	CONC =	0.3010E+05
AT TIME =	0.1554E+03	CONC =	0.2898E+05
AT TIME =	0.1579E+03	CONC =	0.2776E+05
AT TIME =	0.1604E+03	CONC =	0.2645E+05
AT TIME =	0.1629E+03	CONC =	0.2509E+05
AT TIME =	0.1654E+03	CONC =	0.2369E+05
AT TIME =	0.1679E+03	CONC =	0.2228E+05
AT TIME =	0.1704E+03	CONC =	0.2085E+05
AT TIME =	0.1739E+03	CONC =	0.1887E+05
AT TIME =	0.1781E+03	CONC =	0.1655E+05
AT TIME =	0.1832E+03	CONC =	0.1394E+05
AT TIME =	0.1893E+03	CONC =	0.1111E+05
AT TIME =	0.1967E+03	CONC =	0.8206E+04
AT TIME =	0.2055E+03	CONC =	0.5434E+04
AT TIME =	0.2160E+03	CONC =	0.3039E+04
AT TIME =	0.2287E+03	CONC =	0.1239E+04
AT TIME =	0.2439E+03	CONC =	0.1439E+03
AT TIME =	0.3175E+03	CONC =	-.6724E+02

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

1
Run options
--- -------

Proposed Lea County Pit 50' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - poor liner - 50K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO	LAYER THICKNESS	MATERIAL PROPERTY

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	STD DEV	LIMITS MIN	MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	15.2	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	STD DEV	LIMITS MIN	MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1
N	- Stehfest terms or number of increments	18
NTEL	- Points in Lagrangian interpolation	3
NGPTS	- Number of Gauss points	104
NIT	- Convolution integral segments	2
IBOUND	- Type of [illegible]	

ITSGEN - Time values generated or input 1
TMAX - Max simulation time -- 0.0
WTFUN - Weighting factor -- 1.2

OPTIONS CHOSEN
--- ---
Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations
1

DATA FOR LAYER 1
--- --- ---
VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	15.2	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+0[illegible]	-999.

Reference temperature	C	CONSTANT	20.0	-999.	0.000E+[illegible]	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
						1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	STD DEV	LIMITS MIN	MAX
Infiltration rate	m/yr	CONSTANT	0.490E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.500E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00
						1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	STD DEV	LIMITS MIN	MAX

Particle diameter	cm					
Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.300E+03	0.00000E+00
0.310E+03	0.00000E+00
0.320E+03	0.00000E+00
0.330E+03	0.00000E+00
0.340E+03	0.00000E+00
0.350E+03	0.00000E+00
0.360E+03	0.00000E+00
0.370E+03	0.00000E+00
0.380E+03	0.00000E+00
0.390E+03	0.00000E+00
0.400E+03	0.00000E+00
0.410E+03	0.00000E+00
0.420E+03	0.00000E+00
0.430E+03	0.00000E+00
0.440E+03	0.00000E+00
0.450E+03	0.00000E+00
0.460E+03	0.50450E+01
0.470E+03	0.25903E+03
0.480E+03	0.70449E+03
0.490E+03	0.10960E+04

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

```
AT TIME = 0.2836E+03  CONC = 0.9573E+02
AT TIME = 0.3756E+03  CONC = -.1188E+03
AT TIME = 0.4522E+03  CONC = 0.5002E+03
AT TIME = 0.5161E+03  CONC = 0.2455E+04
AT TIME = 0.5693E+03  CONC = 0.4322E+04
AT TIME = 0.6137E+03  CONC = 0.5519E+04
AT TIME = 0.6507E+03  CONC = 0.6112E+04
AT TIME = 0.6815E+03  CONC = 0.6312E+04
AT TIME = 0.7072E+03  CONC = 0.6293E+04
AT TIME = 0.7286E+03  CONC = 0.6166E+04
AT TIME = 0.7311E+03  CONC = 0.6146E+04
AT TIME = 0.7336E+03  CONC = 0.6124E+04
AT TIME = 0.7361E+03  CONC = 0.6101E+04
AT TIME = 0.7386E+03  CONC = 0.6077E+04
AT TIME = 0.7411E+03  CONC = 0.6053E+04
AT TIME = 0.7436E+03  CONC = 0.6027E+04
AT TIME = 0.7461E+03  CONC = 0.6000E+04
AT TIME = 0.7486E+03  CONC = 0.5972E+04
AT TIME = 0.7511E+03  CONC = 0.5944E+04
AT TIME = 0.7536E+03  CONC = 0.5914E+04
AT TIME = 0.7561E+03  CONC = 0.5884E+04
AT TIME = 0.7586E+03  CONC = 0.5852E+04
AT TIME = 0.7611E+03  CONC = 0.5820E+04
AT TIME = 0.7636E+03  CONC = 0.5787E+04
AT TIME = 0.7661E+03  CONC = 0.5754E+04
AT TIME = 0.7686E+03  CONC = 0.5719E+04
AT TIME = 0.7711E+03  CONC = 0.5684E+04
AT TIME = 0.7736E+03  CONC = 0.5649E+04
AT TIME = 0.7761E+03  CONC = 0.5612E+04
AT TIME = 0.7786E+03  CONC = 0.5575E+04
AT TIME = 0.7999E+03  CONC = 0.5235E+04
AT TIME = 0.8256E+03  CONC = 0.4789E+04
AT TIME = 0.8564E+03  CONC = 0.4226E+04
AT TIME = 0.8934E+03  CONC = 0.3552E+04
AT TIME = 0.9378E+03  CONC = 0.2793E+04
AT TIME = 0.9910E+03  CONC = 0.2003E+04
AT TIME = 0.1055E+04  CONC = 0.1259E+04
AT TIME = 0.1132E+04  CONC = 0.6438E+03
AT TIME = 0.1224E+04  CONC = 0.2183E+03
AT TIME = 0.1606E+04  CONC = -.4899E+02
```

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

1

npllag.out

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

1

Run options
--- -------

Proposed Lea County Pit 50' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - good liner - 50K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model

1
1

UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system

1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	15.20	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+02
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	15.2	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY - Number of different layers used 1
NTSTPS - Number of time values concentration calc 40

DUMMY	- Not presently used		1
ISOL	- Type of scheme used in unsaturated zone		1
N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
--- ---

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
--- --- ---

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	15.2	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.230E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.500E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX

Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.
Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.800E+03	0.00000E+00
0.820E+03	0.00000E+00
0.840E+03	0.00000E+00
0.860E+03	0.00000E+00
0.880E+03	0.00000E+00
0.900E+03	0.00000E+00
0.920E+03	0.00000E+00
0.940E+03	0.00000E+00
0.960E+03	0.00000E+00
0.980E+03	0.56217E+02
0.100E+04	0.25936E+03
0.102E+04	0.41817E+03
0.104E+04	0.56625E+03
0.106E+04	0.71319E+03
0.108E+04	0.86003E+03
0.110E+04	0.99858E+03
0.112E+04	0.10985E+04
0.114E+04	0.12961E+04
0.116E+04	0.14531E+04
0.118E+04	0.16029E+04

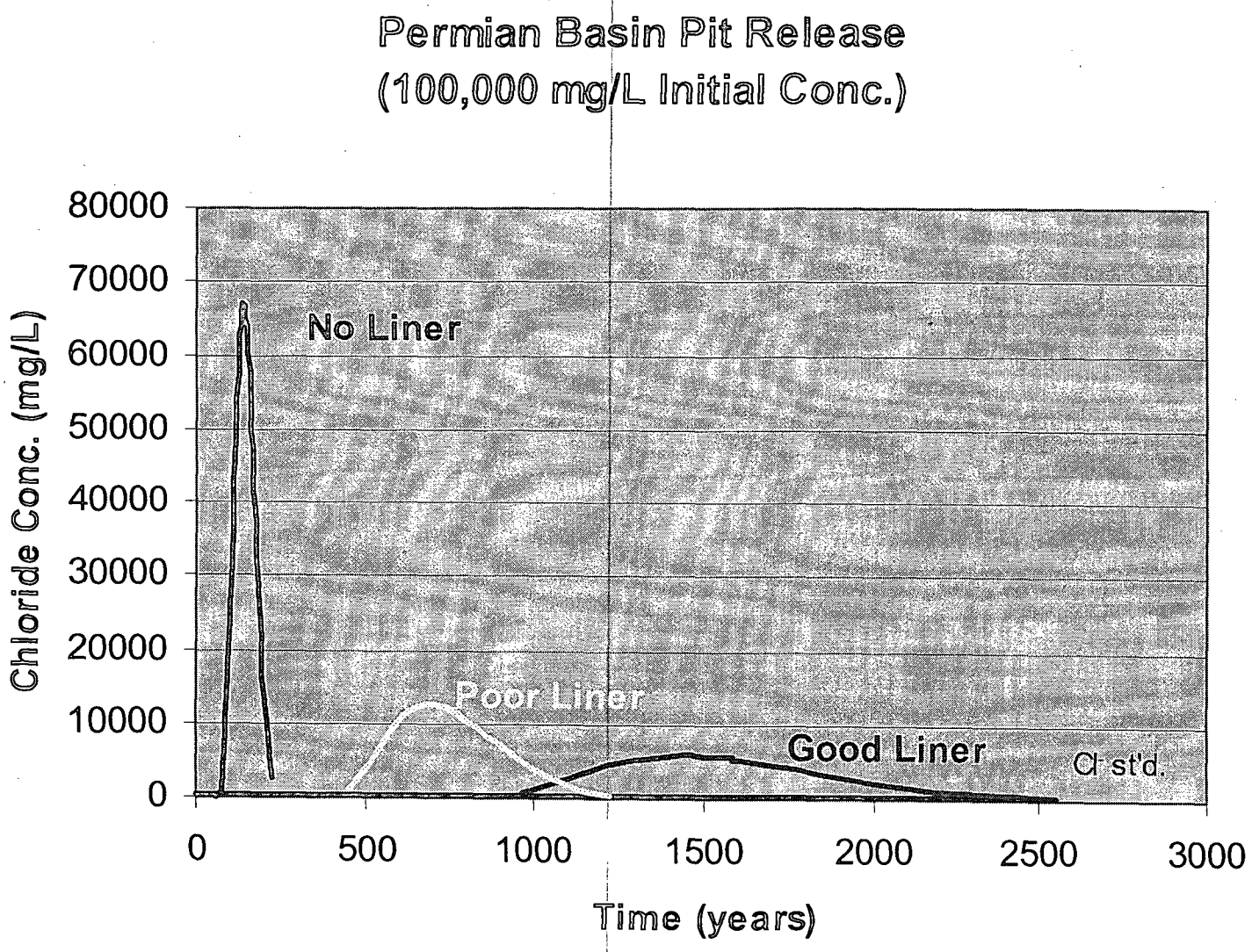
CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME =	0.6038E+03	CONC = 0.6470E+02
AT TIME =	0.7996E+03	CONC = -.7787E+02
AT TIME =	0.9629E+03	CONC = 0.3733E+03
AT TIME =	0.1099E+04	CONC = 0.1379E+04
AT TIME =	0.1212E+04	CONC = 0.2229E+04
AT TIME =	0.1307E+04	CONC = 0.2724E+04
AT TIME =	0.1385E+04	CONC = 0.2936E+04
AT TIME =	0.1451E+04	CONC = 0.2978E+04
AT TIME =	0.1506E+04	CONC = 0.2931E+04
AT TIME =	0.1551E+04	CONC = 0.2845E+04
AT TIME =	0.1554E+04	CONC = 0.2839E+04
AT TIME =	0.1556E+04	CONC = 0.2833E+04
AT TIME =	0.1559E+04	CONC = 0.2828E+04
AT TIME =	0.1561E+04	CONC = 0.2821E+04
AT TIME =	0.1564E+04	CONC = 0.2815E+04
AT TIME =	0.1566E+04	CONC = 0.2809E+04
AT TIME =	0.1569E+04	CONC = 0.2803E+04
AT TIME =	0.1571E+04	CONC = 0.2796E+04
AT TIME =	0.1574E+04	CONC = 0.2790E+04
AT TIME =	0.1576E+04	CONC = 0.2783E+04
AT TIME =	0.1579E+04	CONC = 0.2776E+04
AT TIME =	0.1581E+04	CONC = 0.2769E+04
AT TIME =	0.1584E+04	CONC = 0.2762E+04
AT TIME =	0.1586E+04	CONC = 0.2755E+04
AT TIME =	0.1589E+04	CONC = 0.2748E+04
AT TIME =	0.1591E+04	CONC = 0.2741E+04
AT TIME =	0.1594E+04	CONC = 0.2734E+04
AT TIME =	0.1596E+04	CONC = 0.2727E+04
AT TIME =	0.1599E+04	CONC = 0.2719E+04
AT TIME =	0.1601E+04	CONC = 0.2712E+04
AT TIME =	0.1647E+04	CONC = 0.2563E+04
AT TIME =	0.1701E+04	CONC = 0.2361E+04
AT TIME =	0.1767E+04	CONC = 0.2100E+04
AT TIME =	0.1846E+04	CONC = 0.1780E+04
AT TIME =	0.1940E+04	CONC = 0.1413E+04
AT TIME =	0.2054E+04	CONC = 0.1024E+04
AT TIME =	0.2190E+04	CONC = 0.6532E+03
AT TIME =	0.2353E+04	CONC = 0.3416E+03
AT TIME =	0.2549E+04	CONC = 0.1225E+03
AT TIME =	0.3348E+04	CONC = -.2513E+02

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION CONCENTRATION

Modeling Results



U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed Permian Basin Pit; 50' to GW, Ksat of 1e-3 cm/sec

50 year ave. - 2' sandy loam cover - no liner - 100K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model

UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	15.20	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	15.2	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
--- ---

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
--- --- ---

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	15.2	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.298E-01	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+06	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	33.3	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

TIME	CONCENTRATION
0.600E+02	0.00000E+00
0.700E+02	0.00000E+00
0.800E+02	0.56028E+03
0.900E+02	0.41264E+04
0.100E+03	0.11827E+05
0.110E+03	0.23533E+05
0.120E+03	0.38275E+05
0.130E+03	0.52699E+05
0.140E+03	0.62650E+05
0.150E+03	0.65477E+05
0.160E+03	0.61363E+05
0.170E+03	0.52536E+05
0.180E+03	0.41756E+05
0.190E+03	0.31084E+05
0.200E+03	0.21636E+05
0.210E+03	0.14033E+05
0.220E+03	0.85014E+04
0.230E+03	0.48974E+04
0.240E+03	0.23628E+04
0.250E+03	0.56132E+03

VTRNSPThplnlg2.doc

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME =	0.4685E+02	CONC = 0.1191E+03
AT TIME =	0.6205E+02	CONC = 0.4101E+02
AT TIME =	0.7471E+02	CONC = 0.9366E+03
AT TIME =	0.8527E+02	CONC = 0.6652E+04
AT TIME =	0.9407E+02	CONC = 0.1566E+05
AT TIME =	0.1014E+03	CONC = 0.2534E+05
AT TIME =	0.1075E+03	CONC = 0.3453E+05
AT TIME =	0.1126E+03	CONC = 0.4254E+05
AT TIME =	0.1168E+03	CONC = 0.4903E+05
AT TIME =	0.1204E+03	CONC = 0.5400E+05
AT TIME =	0.1229E+03	CONC = 0.5716E+05
AT TIME =	0.1254E+03	CONC = 0.5995E+05
AT TIME =	0.1279E+03	CONC = 0.6230E+05
AT TIME =	0.1304E+03	CONC = 0.6419E+05
AT TIME =	0.1329E+03	CONC = 0.6559E+05
AT TIME =	0.1354E+03	CONC = 0.6648E+05
AT TIME =	0.1379E+03	CONC = 0.6688E+05
AT TIME =	0.1404E+03	CONC = 0.6679E+05
AT TIME =	0.1429E+03	CONC = 0.6624E+05
AT TIME =	0.1454E+03	CONC = 0.6527E+05
AT TIME =	0.1479E+03	CONC = 0.6391E+05
AT TIME =	0.1504E+03	CONC = 0.6221E+05
AT TIME =	0.1529E+03	CONC = 0.6021E+05
AT TIME =	0.1554E+03	CONC = 0.5796E+05
AT TIME =	0.1579E+03	CONC = 0.5551E+05
AT TIME =	0.1604E+03	CONC = 0.5291E+05
AT TIME =	0.1629E+03	CONC = 0.5019E+05
AT TIME =	0.1654E+03	CONC = 0.4739E+05
AT TIME =	0.1679E+03	CONC = 0.4455E+05
AT TIME =	0.1704E+03	CONC = 0.4171E+05
AT TIME =	0.1739E+03	CONC = 0.3773E+05
AT TIME =	0.1781E+03	CONC = 0.3310E+05
AT TIME =	0.1832E+03	CONC = 0.2788E+05
AT TIME =	0.1893E+03	CONC = 0.2222E+05
AT TIME =	0.1967E+03	CONC = 0.1641E+05
AT TIME =	0.2055E+03	CONC = 0.1087E+05
AT TIME =	0.2160E+03	CONC = 0.6078E+04
AT TIME =	0.2287E+03	CONC = 0.2478E+04
AT TIME =	0.2439E+03	CONC = 0.2877E+03
AT TIME =	0.3175E+03	CONC = -.1345E+03

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed Lea County Pit 50' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - poor liner - 100K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model

UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	15.20	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	15.2	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
---- --- -----
VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	15.2	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.490E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+06	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.300E+03	0.00000E+00
0.310E+03	0.00000E+00
0.320E+03	0.00000E+00
0.330E+03	0.00000E+00
0.340E+03	0.00000E+00
0.350E+03	0.00000E+00
0.360E+03	0.00000E+00
0.370E+03	0.00000E+00
0.380E+03	0.00000E+00
0.390E+03	0.00000E+00
0.400E+03	0.00000E+00
0.410E+03	0.00000E+00
0.420E+03	0.00000E+00
0.430E+03	0.00000E+00
0.440E+03	0.00000E+00
0.450E+03	0.00000E+00
0.460E+03	0.10090E+02
0.470E+03	0.51805E+03
0.480E+03	0.14090E+04
0.490E+03	0.21920E+04

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME =	0.2836E+03	CONC =	0.1915E+03
AT TIME =	0.3756E+03	CONC =	-.2377E+03
AT TIME =	0.4522E+03	CONC =	0.1000E+04
AT TIME =	0.5161E+03	CONC =	0.4909E+04
AT TIME =	0.5693E+03	CONC =	0.8643E+04
AT TIME =	0.6137E+03	CONC =	0.1104E+05
AT TIME =	0.6507E+03	CONC =	0.1222E+05
AT TIME =	0.6815E+03	CONC =	0.1262E+05
AT TIME =	0.7072E+03	CONC =	0.1259E+05
AT TIME =	0.7286E+03	CONC =	0.1233E+05
AT TIME =	0.7311E+03	CONC =	0.1229E+05
AT TIME =	0.7336E+03	CONC =	0.1225E+05
AT TIME =	0.7361E+03	CONC =	0.1220E+05
AT TIME =	0.7386E+03	CONC =	0.1215E+05
AT TIME =	0.7411E+03	CONC =	0.1211E+05
AT TIME =	0.7436E+03	CONC =	0.1205E+05
AT TIME =	0.7461E+03	CONC =	0.1200E+05
AT TIME =	0.7486E+03	CONC =	0.1194E+05
AT TIME =	0.7511E+03	CONC =	0.1189E+05
AT TIME =	0.7536E+03	CONC =	0.1183E+05
AT TIME =	0.7561E+03	CONC =	0.1177E+05
AT TIME =	0.7586E+03	CONC =	0.1170E+05
AT TIME =	0.7611E+03	CONC =	0.1164E+05
AT TIME =	0.7636E+03	CONC =	0.1157E+05
AT TIME =	0.7661E+03	CONC =	0.1151E+05
AT TIME =	0.7686E+03	CONC =	0.1144E+05
AT TIME =	0.7711E+03	CONC =	0.1137E+05
AT TIME =	0.7736E+03	CONC =	0.1130E+05
AT TIME =	0.7761E+03	CONC =	0.1122E+05
AT TIME =	0.7786E+03	CONC =	0.1115E+05
AT TIME =	0.7999E+03	CONC =	0.1047E+05
AT TIME =	0.8256E+03	CONC =	0.9578E+04
AT TIME =	0.8564E+03	CONC =	0.8452E+04
AT TIME =	0.8934E+03	CONC =	0.7104E+04
AT TIME =	0.9378E+03	CONC =	0.5586E+04
AT TIME =	0.9910E+03	CONC =	0.4006E+04
AT TIME =	0.1055E+04	CONC =	0.2518E+04
AT TIME =	0.1132E+04	CONC =	0.1288E+04
AT TIME =	0.1224E+04	CONC =	0.4366E+03
AT TIME =	0.1606E+04	CONC =	-.9799E+02

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed Lea County Pit 50' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - good liner - 100K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1

UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	15.20	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	15.2	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

1

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	15.2	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.230E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+06	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

TIME	CONCENTRATION
0.800E+03	0.00000E+00
0.820E+03	0.00000E+00
0.840E+03	0.00000E+00
0.860E+03	0.00000E+00
0.880E+03	0.00000E+00
0.900E+03	0.00000E+00
0.920E+03	0.00000E+00
0.940E+03	0.00000E+00
0.960E+03	0.00000E+00
0.980E+03	0.11243E+03
0.100E+04	0.51871E+03
0.102E+04	0.83635E+03
0.104E+04	0.11325E+04
0.106E+04	0.14264E+04
0.108E+04	0.17201E+04
0.110E+04	0.19972E+04
0.112E+04	0.21969E+04
0.114E+04	0.25923E+04
0.116E+04	0.29062E+04
0.118E+04	0.32057E+04

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME =	0.6038E+03	CONC = 0.1294E+03
AT TIME =	0.7996E+03	CONC = -.1557E+03
AT TIME =	0.9629E+03	CONC = 0.7466E+03
AT TIME =	0.1099E+04	CONC = 0.2758E+04
AT TIME =	0.1212E+04	CONC = 0.4459E+04
AT TIME =	0.1307E+04	CONC = 0.5448E+04
AT TIME =	0.1385E+04	CONC = 0.5873E+04
AT TIME =	0.1451E+04	CONC = 0.5956E+04
AT TIME =	0.1506E+04	CONC = 0.5862E+04
AT TIME =	0.1551E+04	CONC = 0.5690E+04
AT TIME =	0.1554E+04	CONC = 0.5679E+04
AT TIME =	0.1556E+04	CONC = 0.5667E+04
AT TIME =	0.1559E+04	CONC = 0.5655E+04
AT TIME =	0.1561E+04	CONC = 0.5643E+04
AT TIME =	0.1564E+04	CONC = 0.5630E+04
AT TIME =	0.1566E+04	CONC = 0.5618E+04
AT TIME =	0.1569E+04	CONC = 0.5605E+04
AT TIME =	0.1571E+04	CONC = 0.5592E+04
AT TIME =	0.1574E+04	CONC = 0.5579E+04
AT TIME =	0.1576E+04	CONC = 0.5566E+04
AT TIME =	0.1579E+04	CONC = 0.5552E+04
AT TIME =	0.1581E+04	CONC = 0.5539E+04
AT TIME =	0.1584E+04	CONC = 0.5525E+04
AT TIME =	0.1586E+04	CONC = 0.5511E+04
AT TIME =	0.1589E+04	CONC = 0.5497E+04
AT TIME =	0.1591E+04	CONC = 0.5482E+04
AT TIME =	0.1594E+04	CONC = 0.5468E+04
AT TIME =	0.1596E+04	CONC = 0.5453E+04
AT TIME =	0.1599E+04	CONC = 0.5438E+04
AT TIME =	0.1601E+04	CONC = 0.5423E+04
AT TIME =	0.1647E+04	CONC = 0.5126E+04
AT TIME =	0.1701E+04	CONC = 0.4722E+04
AT TIME =	0.1767E+04	CONC = 0.4200E+04
AT TIME =	0.1846E+04	CONC = 0.3560E+04
AT TIME =	0.1940E+04	CONC = 0.2826E+04
AT TIME =	0.2054E+04	CONC = 0.2049E+04
AT TIME =	0.2190E+04	CONC = 0.1306E+04
AT TIME =	0.2353E+04	CONC = 0.6831E+03
AT TIME =	0.2549E+04	CONC = 0.2449E+03
AT TIME =	0.3348E+04	CONC = -.5026E+02

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

Pit Release Modeling for the Permian and San Juan Basins

HELP Output Files for the San Juan Basin

```
******************************************************************************
******************************************************************************
**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
******************************************************************************
******************************************************************************


PRECIPITATION DATA FILE:     C:\HELP7\rio\DU50.D4
TEMPERATURE DATA FILE:       C:\HELP7\rio\du50.D7
SOLAR RADIATION DATA FILE:   C:\HELP7\rio\du50.D13
EVAPOTRANSPIRATION DATA:     c:\help7\rio\du50.D11
SOIL AND DESIGN DATA FILE:   C:\HELP7\rio\DPIT2LNL.D10
OUTPUT DATA FILE:            C:\HELP7\rio\dpit2lnl.OUT


TIME:  11:48     DATE:   9/ 7/2007
```

```
******************************************************************************

     TITLE:  San Juan Basin Pit - 2' loam cover - no liner

******************************************************************************


     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER
              WERE SPECIFIED BY THE USER.


                                  LAYER  1
                                  --------

                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER   6
          THICKNESS                    =     24.00   INCHES
          POROSITY                     =      0.4530 VOL/VOL
          FIELD CAPACITY               =      0.1900 VOL/VOL
          WILTING POINT                =      0.0850 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.1113 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.720000011000E-03 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  2.01
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
```

LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 9

THICKNESS	=	150.00	INCHES
POROSITY	=	0.5010	VOL/VOL
FIELD CAPACITY	=	0.2840	VOL/VOL
WILTING POINT	=	0.1350	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2830	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.190000006000E-03	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 6 WITH A POOR STAND OF GRASS, A SURFACE SLOPE OF 1.% AND A SLOPE LENGTH OF 75. FEET.

SCS RUNOFF CURVE NUMBER	=	80.90	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	0.500	ACRES
EVAPORATIVE ZONE DEPTH	=	21.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	2.337	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	9.513	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	1.785	INCHES
INITIAL SNOW WATER	=	6.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	45.121	INCHES
TOTAL INITIAL WATER	=	51.121	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
Dulce New Mexico

STATION LATITUDE	=	36.56	DEGREES
MAXIMUM LEAF AREA INDEX	=	1.20	
START OF GROWING SEASON (JULIAN DATE)	=	111	
END OF GROWING SEASON (JULIAN DATE)	=	291	
EVAPORATIVE ZONE DEPTH	=	21.0	INCHES
AVERAGE ANNUAL WIND SPEED	=	8.70	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	52.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	46.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	50.00	%

AVERAGE 4TH QUARTER RELATIVE HUMIDITY = 54.00 %

NOTE: PRECIPITATION DATA FOR Dulce NEW MEXICO
WAS ENTERED FROM A EARTH INFO CLIMATEDATA.

NOTE: TEMPERATURE DATA FOR Dulce NEW MEXICO
WAS ENTERED FROM A EARTH INFO CLIMATEDATA.

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR PUEBLO COLORADO
AND STATION LATITUDE = 36.56 DEGREES

****

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1951 THROUGH 2000

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	1.45	1.14	1.44	1.07	1.17	0.75
	1.78	2.70	1.53	1.55	1.34	1.33
STD. DEVIATIONS	1.13	0.76	0.98	0.68	0.98	0.67
	1.17	1.63	1.03	1.45	0.92	1.28
RUNOFF						
TOTALS	0.163	0.215	0.406	0.118	0.002	0.000
	0.004	0.017	0.039	0.006	0.001	0.063
STD. DEVIATIONS	0.368	0.367	0.687	0.483	0.009	0.000
	0.018	0.072	0.269	0.022	0.006	0.185
EVAPOTRANSPIRATION						
TOTALS	0.800	0.963	1.605	1.535	1.266	0.959
	1.701	2.444	1.732	1.118	0.974	0.702
STD. DEVIATIONS	0.274	0.296	0.561	0.698	0.853	0.743
	1.056	1.184	0.973	0.812	0.470	0.296
PERCOLATION/LEAKAGE THROUGH LAYER 2						
TOTALS	0.0536	0.0447	0.0327	0.0336	0.0567	0.0920

	0.0649	0.0381	0.0177	0.0234	0.0280	0.0407
STD. DEVIATIONS	0.1485	0.1416	0.1103	0.0829	0.1007	0.1749
	0.1635	0.1118	0.0634	0.1025	0.1177	0.1209

****

****

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1951 THROUGH 2000

	INCHES		CU. FEET	PERCENT
PRECIPITATION	17.26	(4.446)	31322.9	100.00
RUNOFF	1.033	(0.9869)	1874.44	5.984
EVAPOTRANSPIRATION	15.797	(3.5446)	28671.01	91.534
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.52600	(0.89632)	954.698	3.04792
CHANGE IN WATER STORAGE	-0.098	(2.4149)	-177.23	-0.566

****

****

PEAK DAILY VALUES FOR YEARS 1951 THROUGH 2000

	(INCHES)	(CU. FT.)
PRECIPITATION	1.97	3575.550
RUNOFF	1.568	2845.6382
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.030687	55.69637
SNOW WATER	6.32	11467.4902

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.3060
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.0850

****

****

FINAL WATER STORAGE AT END OF YEAR 2000

LAYER	(INCHES)	(VOL/VOL)
1	3.6417	0.1517
2	42.5970	0.2840
SNOW WATER	0.000	

****
****

```
******************************************************************************
******************************************************************************
**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
******************************************************************************
******************************************************************************


PRECIPITATION DATA FILE:     C:\HELP7\rio\DU50.D4
TEMPERATURE DATA FILE:       C:\HELP7\rio\du50.D7
SOLAR RADIATION DATA FILE:   C:\HELP7\rio\du50.D13
EVAPOTRANSPIRATION DATA:     c:\help7\rio\du50.D11
SOIL AND DESIGN DATA FILE:   C:\HELP7\rio\DPITLLFP.D10
OUTPUT DATA FILE:            C:\HELP7\rio\dpitllfp.OUT


TIME:  10:27     DATE:   9/ 7/2007
```

```
******************************************************************************

     TITLE:  San Juan Basin Pit - loam cover - liner, poor

******************************************************************************


     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER
              WERE SPECIFIED BY THE USER.


                                  LAYER  1
                                  --------

                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER   7
          THICKNESS                    =      6.00   INCHES
          POROSITY                     =      0.4730 VOL/VOL
          FIELD CAPACITY               =      0.2220 VOL/VOL
          WILTING POINT                =      0.1040 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.1335 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.520000001000E-03 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  2.01
                FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
```

LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 8

THICKNESS	=	36.00	INCHES
POROSITY	=	0.4630	VOL/VOL
FIELD CAPACITY	=	0.2320	VOL/VOL
WILTING POINT	=	0.1160	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1450	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.369999994000E-03	CM/SEC

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 8

THICKNESS	=	6.00	INCHES
POROSITY	=	0.4630	VOL/VOL
FIELD CAPACITY	=	0.2320	VOL/VOL
WILTING POINT	=	0.1160	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1450	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.369999994000E-03	CM/SEC
SLOPE	=	1.00	PERCENT
DRAINAGE LENGTH	=	10.0	FEET

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 36

THICKNESS	=	0.02	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.399999993000E-12	CM/SEC
FML PINHOLE DENSITY	=	1.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	10.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	4 - POOR	

LAYER 5

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 9

THICKNESS	=	150.00	INCHES
POROSITY	=	0.5010	VOL/VOL
FIELD CAPACITY	=	0.2840	VOL/VOL
WILTING POINT	=	0.1350	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2830	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.190000006000E-03	CM/SEC

LAYER 6

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 36

THICKNESS	=	0.02	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.399999993000E-12	CM/SEC
FML PINHOLE DENSITY	=	1.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	10.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	4 - POOR	

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 7 WITH A POOR STAND OF GRASS, A SURFACE SLOPE OF 1.% AND A SLOPE LENGTH OF 75. FEET.

SCS RUNOFF CURVE NUMBER	=	83.90	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	0.500	ACRES
EVAPORATIVE ZONE DEPTH	=	21.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	2.976	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	9.783	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	2.364	INCHES
INITIAL SNOW WATER	=	6.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	49.341	INCHES
TOTAL INITIAL WATER	=	55.341	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM

Dulce New Mexico

STATION LATITUDE	=	36.56 DEGREES
MAXIMUM LEAF AREA INDEX	=	1.20
START OF GROWING SEASON (JULIAN DATE)	=	111
END OF GROWING SEASON (JULIAN DATE)	=	291
EVAPORATIVE ZONE DEPTH	=	21.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	8.70 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	52.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	46.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	50.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	54.00 %

NOTE: PRECIPITATION DATA FOR Dulce NEW MEXICO
WAS ENTERED FROM A EARTH INFO CLIMATEDATA.

NOTE: TEMPERATURE DATA FOR Dulce NEW MEXICO
WAS ENTERED FROM A EARTH INFO CLIMATEDATA.

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR PUEBLO COLORADO
AND STATION LATITUDE = 36.56 DEGREES

****

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1951 THROUGH 2000

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	1.45	1.14	1.44	1.07	1.17	0.75
	1.78	2.70	1.53	1.55	1.34	1.33
STD. DEVIATIONS	1.13	0.76	0.98	0.68	0.98	0.67
	1.17	1.63	1.03	1.45	0.92	1.28
RUNOFF						
TOTALS	0.165	0.219	0.415	0.120	0.005	0.000
	0.007	0.034	0.040	0.013	0.003	0.065
STD. DEVIATIONS	0.373	0.373	0.696	0.489	0.019	0.000
	0.023	0.119	0.269	0.038	0.008	0.187

EVAPOTRANSPIRATION

TOTALS	0.794	0.961	1.624	1.602	1.269	0.975
	1.686	2.432	1.728	1.125	0.947	0.698
STD. DEVIATIONS	0.275	0.276	0.558	0.710	0.853	0.749
	1.047	1.166	0.945	0.774	0.441	0.291

LATERAL DRAINAGE COLLECTED FROM LAYER 3

TOTALS	0.0228	0.0116	0.0074	0.0234	0.0431	0.0351
	0.0210	0.0130	0.0175	0.0110	0.0189	0.0374
STD. DEVIATIONS	0.0860	0.0425	0.0261	0.0775	0.1079	0.0763
	0.0460	0.0307	0.0904	0.0549	0.0650	0.1565

PERCOLATION/LEAKAGE THROUGH LAYER 4

TOTALS	0.0096	0.0064	0.0055	0.0112	0.0182	0.0170
	0.0131	0.0096	0.0085	0.0065	0.0083	0.0119
STD. DEVIATIONS	0.0285	0.0196	0.0158	0.0268	0.0375	0.0334
	0.0261	0.0181	0.0233	0.0185	0.0216	0.0356

PERCOLATION/LEAKAGE THROUGH LAYER 6

TOTALS	0.0103	0.0088	0.0087	0.0081	0.0097	0.0112
	0.0123	0.0119	0.0111	0.0107	0.0096	0.0103
STD. DEVIATIONS	0.0178	0.0164	0.0176	0.0164	0.0187	0.0206
	0.0227	0.0221	0.0200	0.0192	0.0169	0.0169

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 4

AVERAGES	0.1732	0.1194	0.0837	0.2023	0.3392	0.3182
	0.2195	0.1461	0.1411	0.0972	0.1452	0.2248
STD. DEVIATIONS	0.5703	0.3992	0.2683	0.5398	0.7414	0.6504
	0.4560	0.2934	0.5019	0.3653	0.4431	0.7733

DAILY AVERAGE HEAD ON TOP OF LAYER 6

AVERAGES	0.1474	0.1396	0.1257	0.1198	0.1425	0.1760
	0.1917	0.1858	0.1754	0.1590	0.1433	0.1453
STD. DEVIATIONS	0.2850	0.2984	0.2929	0.2811	0.3120	0.3595
	0.3841	0.3709	0.3365	0.3050	0.2735	0.2615

****

****

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1951 THROUGH 2000

	INCHES		CU. FEET	PERCENT
PRECIPITATION	17.26	(4.446)	31322.9	100.00
RUNOFF	1.086	(1.0017)	1970.43	6.291
EVAPOTRANSPIRATION	15.842	(3.5596)	28753.86	91.798
LATERAL DRAINAGE COLLECTED FROM LAYER 3	0.26212	(0.47533)	475.742	1.51883
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.12575	(0.20483)	228.241	0.72867
AVERAGE HEAD ON TOP OF LAYER 4	0.184	(0.312)		
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.12275	(0.19978)	222.795	0.71128
AVERAGE HEAD ON TOP OF LAYER 6	0.154	(0.276)		
CHANGE IN WATER STORAGE	-0.055	(2.3769)	-99.93	-0.319

****

****

PEAK DAILY VALUES FOR YEARS 1951 THROUGH 2000

	(INCHES)	(CU. FT.)
PRECIPITATION	1.97	3575.550
RUNOFF	1.565	2841.3074
DRAINAGE COLLECTED FROM LAYER 3	0.03936	71.44133
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.006699	12.15947
AVERAGE HEAD ON TOP OF LAYER 4	4.881	
MAXIMUM HEAD ON TOP OF LAYER 4	5.885	
LOCATION OF MAXIMUM HEAD IN LAYER 3 (DISTANCE FROM DRAIN)	8.4 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.002846	5.16610
AVERAGE HEAD ON TOP OF LAYER 6	1.646	
SNOW WATER	6.32	11467.4902

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.3429
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1126

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

****

****

FINAL WATER STORAGE AT END OF YEAR 2000

LAYER	(INCHES)	(VOL/VOL)
1	1.4597	0.2433
2	7.1365	0.1982
3	1.3920	0.2320
4	0.0000	0.0000
5	42.6000	0.2840
6	0.0000	0.0000
SNOW WATER	0.000	

****
****

```
******************************************************************************
******************************************************************************
**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
******************************************************************************
******************************************************************************


PRECIPITATION DATA FILE:     C:\HELP7\rio\DU50.D4
TEMPERATURE DATA FILE:       C:\HELP7\rio\du50.D7
SOLAR RADIATION DATA FILE:   C:\HELP7\rio\du50.D13
EVAPOTRANSPIRATION DATA:     c:\help7\rio\du50.D11
SOIL AND DESIGN DATA FILE:   C:\HELP7\rio\DPITLLFg.D10
OUTPUT DATA FILE:            C:\HELP7\rio\dpitllfg.OUT


TIME:  10:34     DATE:   9/ 7/2007


******************************************************************************

     TITLE:  San Juan Basin Pit - loam cover - liner, good

******************************************************************************


     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER
              WERE SPECIFIED BY THE USER.


                                  LAYER  1
                                  --------

                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER   7
          THICKNESS                  =      6.00   INCHES
          POROSITY                   =      0.4730 VOL/VOL
          FIELD CAPACITY             =      0.2220 VOL/VOL
          WILTING POINT              =      0.1040 VOL/VOL
          INITIAL SOIL WATER CONTENT =      0.1335 VOL/VOL
          EFFECTIVE SAT. HYD. COND.  =  0.520000001000E-03 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  2.01
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
```

LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 8

THICKNESS	=	36.00	INCHES
POROSITY	=	0.4630	VOL/VOL
FIELD CAPACITY	=	0.2320	VOL/VOL
WILTING POINT	=	0.1160	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1450	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.369999994000E-03	CM/SEC

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 8

THICKNESS	=	6.00	INCHES
POROSITY	=	0.4630	VOL/VOL
FIELD CAPACITY	=	0.2320	VOL/VOL
WILTING POINT	=	0.1160	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1450	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.369999994000E-03	CM/SEC
SLOPE	=	1.00	PERCENT
DRAINAGE LENGTH	=	10.0	FEET

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 36

THICKNESS	=	0.02	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.399999993000E-12	CM/SEC
FML PINHOLE DENSITY	=	1.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	4.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 5

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 9

THICKNESS	=	150.00	INCHES
POROSITY	=	0.5010	VOL/VOL
FIELD CAPACITY	=	0.2840	VOL/VOL
WILTING POINT	=	0.1350	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2830	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.190000006000E-03	CM/SEC

LAYER 6

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 36

THICKNESS	=	0.02	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.399999993000E-12	CM/SEC
FML PINHOLE DENSITY	=	1.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	4.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 7 WITH A POOR STAND OF GRASS, A SURFACE SLOPE OF 1.% AND A SLOPE LENGTH OF 75. FEET.

SCS RUNOFF CURVE NUMBER	=	83.90	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	0.500	ACRES
EVAPORATIVE ZONE DEPTH	=	21.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	2.976	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	9.783	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	2.364	INCHES
INITIAL SNOW WATER	=	6.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	49.341	INCHES
TOTAL INITIAL WATER	=	55.341	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM

Dulce New Mexico

STATION LATITUDE	=	36.56	DEGREES
MAXIMUM LEAF AREA INDEX	=	1.20	
START OF GROWING SEASON (JULIAN DATE)	=	111	
END OF GROWING SEASON (JULIAN DATE)	=	291	
EVAPORATIVE ZONE DEPTH	=	21.0	INCHES
AVERAGE ANNUAL WIND SPEED	=	8.70	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	52.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	46.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	50.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	54.00	%

NOTE: PRECIPITATION DATA FOR Dulce NEW MEXICO
WAS ENTERED FROM A EARTH INFO CLIMATEDATA.

NOTE: TEMPERATURE DATA FOR Dulce NEW MEXICO
WAS ENTERED FROM A EARTH INFO CLIMATEDATA.

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR PUEBLO COLORADO
AND STATION LATITUDE = 36.56 DEGREES

****

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1951 THROUGH 2000

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	1.45	1.14	1.44	1.07	1.17	0.75
	1.78	2.70	1.53	1.55	1.34	1.33
STD. DEVIATIONS	1.13	0.76	0.98	0.68	0.98	0.67
	1.17	1.63	1.03	1.45	0.92	1.28
RUNOFF						
TOTALS	0.165	0.219	0.415	0.120	0.005	0.000
	0.007	0.034	0.040	0.013	0.003	0.065
STD. DEVIATIONS	0.373	0.373	0.696	0.489	0.019	0.000
	0.023	0.119	0.269	0.038	0.008	0.187

EVAPOTRANSPIRATION

TOTALS	0.794	0.961	1.624	1.602	1.269	0.975
	1.686	2.432	1.728	1.125	0.947	0.698
STD. DEVIATIONS	0.275	0.276	0.558	0.710	0.853	0.749
	1.047	1.166	0.945	0.774	0.441	0.291

LATERAL DRAINAGE COLLECTED FROM LAYER 3

TOTALS	0.0283	0.0155	0.0107	0.0277	0.0510	0.0433
	0.0280	0.0180	0.0222	0.0150	0.0228	0.0433
STD. DEVIATIONS	0.1001	0.0526	0.0345	0.0863	0.1250	0.0927
	0.0595	0.0379	0.0994	0.0643	0.0716	0.1708

PERCOLATION/LEAKAGE THROUGH LAYER 4

TOTALS	0.0049	0.0035	0.0031	0.0052	0.0081	0.0077
	0.0063	0.0049	0.0045	0.0037	0.0044	0.0059
STD. DEVIATIONS	0.0123	0.0088	0.0075	0.0116	0.0162	0.0148
	0.0120	0.0088	0.0104	0.0085	0.0093	0.0150

PERCOLATION/LEAKAGE THROUGH LAYER 6

TOTALS	0.0051	0.0045	0.0048	0.0045	0.0048	0.0049
	0.0052	0.0052	0.0050	0.0051	0.0048	0.0051
STD. DEVIATIONS	0.0064	0.0058	0.0063	0.0059	0.0063	0.0065
	0.0070	0.0071	0.0068	0.0069	0.0064	0.0064

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 4

AVERAGES	0.2130	0.1551	0.1151	0.2348	0.3813	0.3676
	0.2707	0.1952	0.1887	0.1403	0.1850	0.2664
STD. DEVIATIONS	0.6270	0.4594	0.3280	0.5866	0.8135	0.7352
	0.5444	0.3703	0.5481	0.4127	0.4775	0.8177

DAILY AVERAGE HEAD ON TOP OF LAYER 6

AVERAGES	0.1693	0.1661	0.1593	0.1546	0.1613	0.1723
	0.1787	0.1794	0.1780	0.1735	0.1680	0.1694
STD. DEVIATIONS	0.2389	0.2365	0.2322	0.2264	0.2363	0.2572
	0.2736	0.2781	0.2733	0.2658	0.2554	0.2431

****

****

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1951 THROUGH 2000

	INCHES		CU. FEET	PERCENT
PRECIPITATION	17.26	(4.446)	31322.9	100.00
RUNOFF	1.086	(1.0017)	1970.43	6.291
EVAPOTRANSPIRATION	15.842	(3.5596)	28753.86	91.798
LATERAL DRAINAGE COLLECTED FROM LAYER 3	0.32553	(0.57468)	590.845	1.88630
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.06233	(0.09731)	113.136	0.36119
AVERAGE HEAD ON TOP OF LAYER 4	0.226	(0.373)		
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.05902	(0.07211)	107.128	0.34201
AVERAGE HEAD ON TOP OF LAYER 6	0.169	(0.231)		
CHANGE IN WATER STORAGE	-0.055	(2.3563)	-99.36	-0.317

****

****

PEAK DAILY VALUES FOR YEARS 1951 THROUGH 2000

	(INCHES)	(CU. FT.)
PRECIPITATION	1.97	3575.550
RUNOFF	1.565	2841.3074
DRAINAGE COLLECTED FROM LAYER 3	0.04157	75.45475
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.002757	5.00444
AVERAGE HEAD ON TOP OF LAYER 4	5.030	
MAXIMUM HEAD ON TOP OF LAYER 4	6.069	
LOCATION OF MAXIMUM HEAD IN LAYER 3 (DISTANCE FROM DRAIN)	8.5 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.000844	1.53198
AVERAGE HEAD ON TOP OF LAYER 6	1.112	
SNOW WATER	6.32	11467.4902

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.3429
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1126

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

****

****

FINAL WATER STORAGE AT END OF YEAR 2000

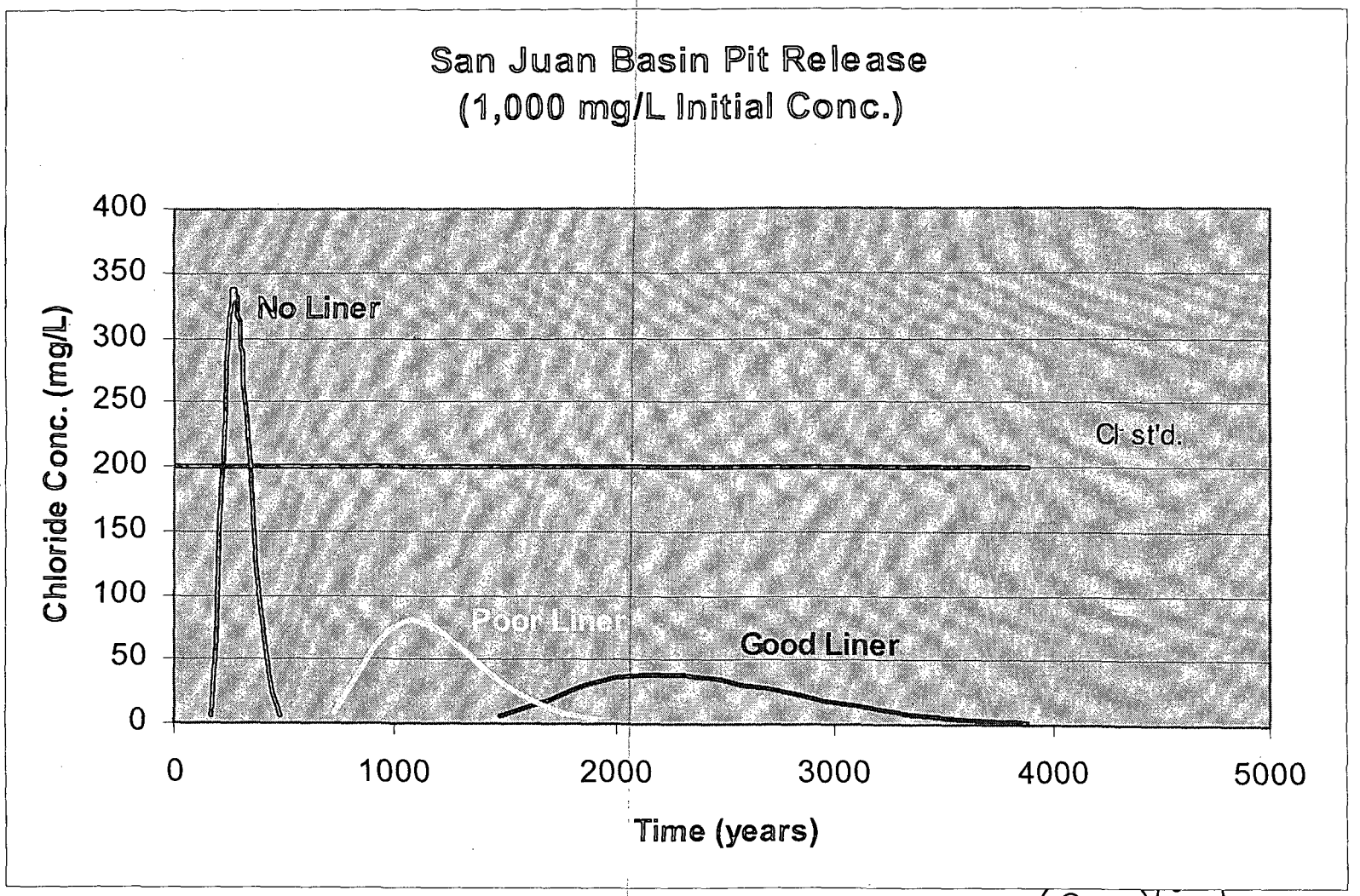
LAYER	(INCHES)	(VOL/VOL)
1	1.4597	0.2433
2	7.1365	0.1982
3	1.3921	0.2320
4	0.0000	0.0000
5	42.6155	0.2841
6	0.0000	0.0000
SNOW WATER	0.000	

****
****

Pit Release Modeling for the Permian and San Juan Basins

MULTIMED Output Files for the San Juan Basin

Modeling Results



1
dplnla.out

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

1
Run options
--- -------

Proposed San Juan Basin Pit; 50'to GW, Ksat of 1e-3 cm/sec

50 year ave. - 2' sandy loam cover - no liner - 1K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	15.20	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	15.2	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

1

DATA FOR LAYER 1
---- --- -----
VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	15.2	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	l/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	l/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.134E-01	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+04	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.100E+03	0.00000E+00
0.110E+03	0.00000E+00
0.120E+03	0.00000E+00
0.130E+03	0.00000E+00
0.140E+03	0.00000E+00
0.150E+03	0.44693E+00
0.160E+03	0.30513E+01
0.170E+03	0.53133E+01
0.180E+03	0.16073E+02
0.190E+03	0.51052E+02
0.200E+03	0.69068E+02
0.210E+03	0.12393E+03
0.220E+03	0.15720E+03
0.230E+03	0.21372E+03
0.240E+03	0.24993E+03
0.250E+03	0.28326E+03
0.260E+03	0.31040E+03
0.270E+03	0.32648E+03
0.280E+03	0.33204E+03
0.290E+03	0.32820E+03

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME =	0.1039E+03	CONC = 0.1121E+01
AT TIME =	0.1376E+03	CONC = 0.1099E+01
AT TIME =	0.1657E+03	CONC = 0.6763E+01
AT TIME =	0.1891E+03	CONC = 0.6584E+02
AT TIME =	0.2086E+03	CONC = 0.1540E+03
AT TIME =	0.2248E+03	CONC = 0.2313E+03
AT TIME =	0.2384E+03	CONC = 0.2840E+03
AT TIME =	0.2496E+03	CONC = 0.3148E+03
AT TIME =	0.2591E+03	CONC = 0.3302E+03
AT TIME =	0.2669E+03	CONC = 0.3359E+03
AT TIME =	0.2694E+03	CONC = 0.3365E+03
AT TIME =	0.2719E+03	CONC = 0.3364E+03
AT TIME =	0.2744E+03	CONC = 0.3358E+03
AT TIME =	0.2769E+03	CONC = 0.3347E+03
AT TIME =	0.2794E+03	CONC = 0.3330E+03
AT TIME =	0.2819E+03	CONC = 0.3308E+03
AT TIME =	0.2844E+03	CONC = 0.3282E+03
AT TIME =	0.2869E+03	CONC = 0.3251E+03
AT TIME =	0.2894E+03	CONC = 0.3216E+03
AT TIME =	0.2919E+03	CONC = 0.3178E+03
AT TIME =	0.2944E+03	CONC = 0.3135E+03
AT TIME =	0.2969E+03	CONC = 0.3090E+03
AT TIME =	0.2994E+03	CONC = 0.3041E+03
AT TIME =	0.3019E+03	CONC = 0.2990E+03
AT TIME =	0.3044E+03	CONC = 0.2936E+03
AT TIME =	0.3069E+03	CONC = 0.2880E+03
AT TIME =	0.3094E+03	CONC = 0.2822E+03
AT TIME =	0.3119E+03	CONC = 0.2762E+03
AT TIME =	0.3144E+03	CONC = 0.2700E+03
AT TIME =	0.3169E+03	CONC = 0.2638E+03
AT TIME =	0.3247E+03	CONC = 0.2435E+03
AT TIME =	0.3341E+03	CONC = 0.2186E+03
AT TIME =	0.3454E+03	CONC = 0.1889E+03
AT TIME =	0.3590E+03	CONC = 0.1551E+03
AT TIME =	0.3752E+03	CONC = 0.1188E+03
AT TIME =	0.3947E+03	CONC = 0.8251E+02
AT TIME =	0.4181E+03	CONC = 0.4964E+02
AT TIME =	0.4462E+03	CONC = 0.2353E+02
AT TIME =	0.4799E+03	CONC = 0.6361E+01
AT TIME =	0.6278E+03	CONC = -.1868E+01

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

1
Run options
--- -------

Proposed San Juan Basin Pit; 50' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - poor liner - 1K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	15.20	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	15.2	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	15.2	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.310E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+04	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.100E+04	0.66016E+02
0.102E+04	0.68491E+02
0.104E+04	0.69456E+02
0.106E+04	0.70304E+02
0.108E+04	0.70923E+02
0.110E+04	0.70539E+02
0.112E+04	0.69989E+02
0.114E+04	0.68998E+02
0.116E+04	0.67809E+02
0.118E+04	0.66271E+02
0.120E+04	0.64295E+02
0.122E+04	0.61893E+02
0.124E+04	0.59096E+02
0.126E+04	0.56410E+02
0.128E+04	0.53590E+02
0.130E+04	0.50872E+02
0.132E+04	0.47230E+02
0.134E+04	0.45643E+02
0.136E+04	0.41574E+02
0.138E+04	0.38375E+02

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME = 0.4480E+03	CONC = 0.1605E+01	
AT TIME = 0.5934E+03	CONC = -.1967E+01	
AT TIME = 0.7145E+03	CONC = 0.8796E+01	
AT TIME = 0.8154E+03	CONC = 0.3527E+02	
AT TIME = 0.8996E+03	CONC = 0.5849E+02	
AT TIME = 0.9697E+03	CONC = 0.7241E+02	
AT TIME = 0.1028E+04	CONC = 0.7869E+02	
AT TIME = 0.1077E+04	CONC = 0.8023E+02	
AT TIME = 0.1117E+04	CONC = 0.7927E+02	
AT TIME = 0.1151E+04	CONC = 0.7716E+02	
AT TIME = 0.1154E+04	CONC = 0.7696E+02	
AT TIME = 0.1156E+04	CONC = 0.7676E+02	
AT TIME = 0.1159E+04	CONC = 0.7656E+02	
AT TIME = 0.1161E+04	CONC = 0.7634E+02	
AT TIME = 0.1164E+04	CONC = 0.7613E+02	
AT TIME = 0.1166E+04	CONC = 0.7591E+02	
AT TIME = 0.1169E+04	CONC = 0.7568E+02	
AT TIME = 0.1171E+04	CONC = 0.7545E+02	
AT TIME = 0.1174E+04	CONC = 0.7521E+02	
AT TIME = 0.1176E+04	CONC = 0.7497E+02	
AT TIME = 0.1179E+04	CONC = 0.7473E+02	
AT TIME = 0.1181E+04	CONC = 0.7448E+02	
AT TIME = 0.1184E+04	CONC = 0.7422E+02	
AT TIME = 0.1186E+04	CONC = 0.7397E+02	
AT TIME = 0.1189E+04	CONC = 0.7371E+02	
AT TIME = 0.1191E+04	CONC = 0.7344E+02	
AT TIME = 0.1194E+04	CONC = 0.7317E+02	
AT TIME = 0.1196E+04	CONC = 0.7290E+02	
AT TIME = 0.1199E+04	CONC = 0.7262E+02	
AT TIME = 0.1201E+04	CONC = 0.7234E+02	
AT TIME = 0.1235E+04	CONC = 0.6823E+02	
AT TIME = 0.1275E+04	CONC = 0.6272E+02	
AT TIME = 0.1324E+04	CONC = 0.5564E+02	
AT TIME = 0.1383E+04	CONC = 0.4704E+02	
AT TIME = 0.1453E+04	CONC = 0.3722E+02	
AT TIME = 0.1537E+04	CONC = 0.2690E+02	
AT TIME = 0.1638E+04	CONC = 0.1707E+02	
AT TIME = 0.1759E+04	CONC = 0.8868E+01	
AT TIME = 0.1904E+04	CONC = 0.3127E+01	
AT TIME = 0.2501E+04	CONC = -.6574E+00	

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

lpllag.out

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed San Juan Basin Pit; 50' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - good liner - 1K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1

UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	15.20	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	15.2	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
--- ---

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

1

DATA FOR LAYER 1
--- --- ---

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	15.2	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.150E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+04	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.210E+04	0.24850E+02
0.212E+04	0.25168E+02
0.214E+04	0.25246E+02
0.216E+04	0.25318E+02
0.218E+04	0.25375E+02
0.220E+04	0.25427E+02
0.222E+04	0.25480E+02
0.224E+04	0.25452E+02
0.226E+04	0.25261E+02
0.228E+04	0.25110E+02
0.230E+04	0.24971E+02
0.232E+04	0.24890E+02
0.234E+04	0.24533E+02
0.236E+04	0.24228E+02
0.238E+04	0.23983E+02
0.240E+04	0.23786E+02
0.242E+04	0.23443E+02
0.244E+04	0.23089E+02
0.246E+04	0.22514E+02
0.248E+04	0.22044E+02

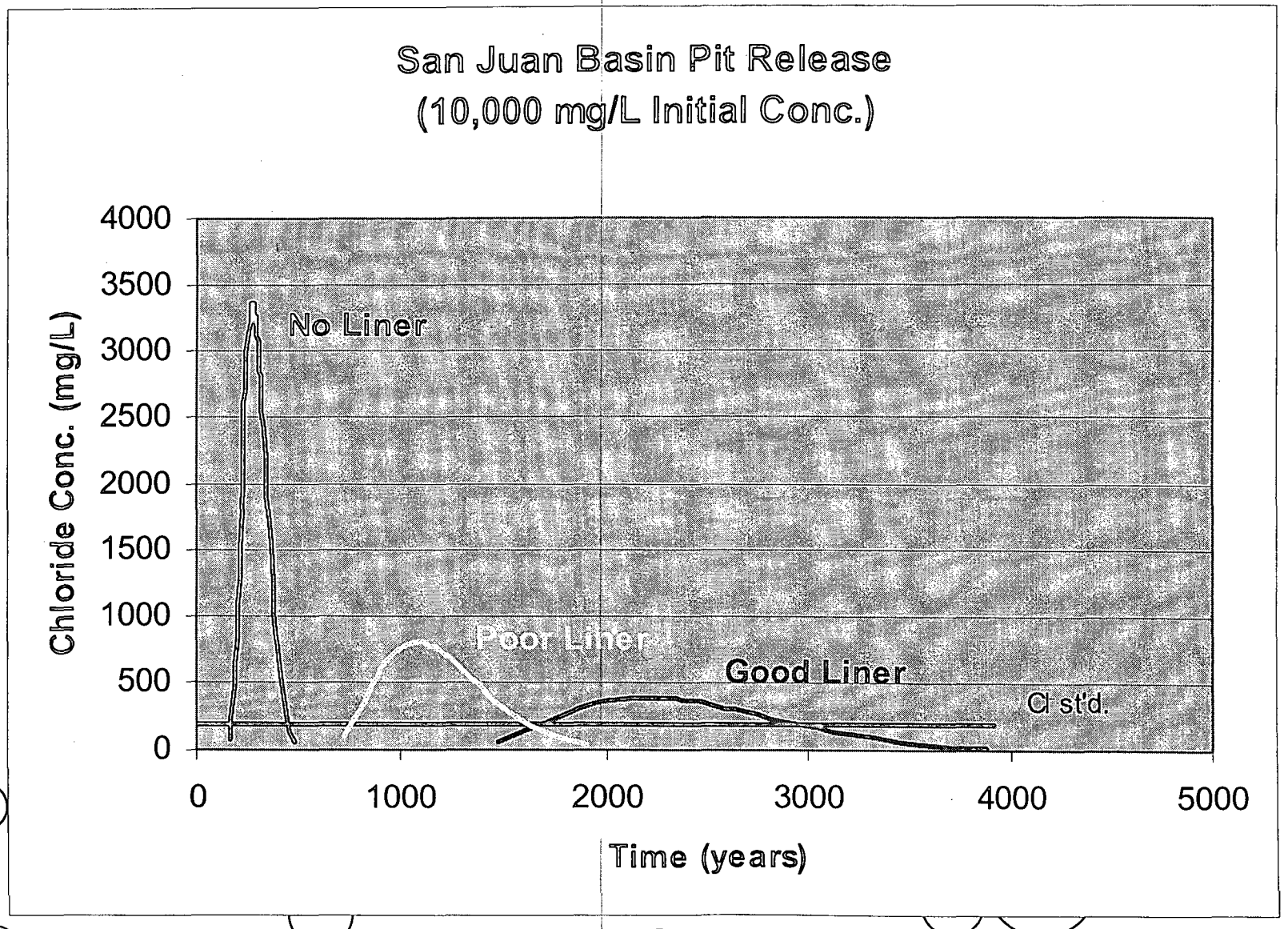
CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME = 0.9256E+03	CONC = 0.8936E+00	
AT TIME = 0.1226E+04	CONC = -.1049E+01	
AT TIME = 0.1476E+04	CONC = 0.5529E+01	
AT TIME = 0.1685E+04	CONC = 0.1891E+02	
AT TIME = 0.1858E+04	CONC = 0.2983E+02	
AT TIME = 0.2003E+04	CONC = 0.3599E+02	
AT TIME = 0.2124E+04	CONC = 0.3849E+02	
AT TIME = 0.2224E+04	CONC = 0.3883E+02	
AT TIME = 0.2308E+04	CONC = 0.3808E+02	
AT TIME = 0.2378E+04	CONC = 0.3686E+02	
AT TIME = 0.2381E+04	CONC = 0.3681E+02	
AT TIME = 0.2383E+04	CONC = 0.3676E+02	
AT TIME = 0.2386E+04	CONC = 0.3670E+02	
AT TIME = 0.2388E+04	CONC = 0.3665E+02	
AT TIME = 0.2391E+04	CONC = 0.3660E+02	
AT TIME = 0.2393E+04	CONC = 0.3654E+02	
AT TIME = 0.2396E+04	CONC = 0.3649E+02	
AT TIME = 0.2398E+04	CONC = 0.3643E+02	
AT TIME = 0.2401E+04	CONC = 0.3637E+02	
AT TIME = 0.2403E+04	CONC = 0.3632E+02	
AT TIME = 0.2406E+04	CONC = 0.3626E+02	
AT TIME = 0.2408E+04	CONC = 0.3620E+02	
AT TIME = 0.2411E+04	CONC = 0.3614E+02	
AT TIME = 0.2413E+04	CONC = 0.3608E+02	
AT TIME = 0.2416E+04	CONC = 0.3603E+02	
AT TIME = 0.2418E+04	CONC = 0.3597E+02	
AT TIME = 0.2421E+04	CONC = 0.3591E+02	
AT TIME = 0.2423E+04	CONC = 0.3585E+02	
AT TIME = 0.2426E+04	CONC = 0.3578E+02	
AT TIME = 0.2428E+04	CONC = 0.3572E+02	
AT TIME = 0.2498E+04	CONC = 0.3384E+02	
AT TIME = 0.2582E+04	CONC = 0.3124E+02	
AT TIME = 0.2682E+04	CONC = 0.2786E+02	
AT TIME = 0.2803E+04	CONC = 0.2368E+02	
AT TIME = 0.2948E+04	CONC = 0.1885E+02	
AT TIME = 0.3122E+04	CONC = 0.1372E+02	
AT TIME = 0.3330E+04	CONC = 0.8785E+01	
AT TIME = 0.3580E+04	CONC = 0.4626E+01	
AT TIME = 0.3881E+04	CONC = 0.1685E+01	
AT TIME = 0.5100E+04	CONC = -.3347E+00	

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

Modeling Results



U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed San Juan Basin Pit; 50'to GW, Ksat of 1e-3 cm/sec

50 year ave. - 2' sandy loam cover - no liner - 10K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	15.20	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	15.2	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
--- ---

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

1

DATA FOR LAYER 1
--- --- ---

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	15.2	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.134E-01	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.100E+03	0.00000E+00
0.110E+03	0.00000E+00
0.120E+03	0.00000E+00
0.130E+03	0.00000E+00
0.140E+03	0.00000E+00
0.150E+03	0.44693E+01
0.160E+03	0.30513E+02
0.170E+03	0.53133E+02
0.180E+03	0.16073E+03
0.190E+03	0.51052E+03
0.200E+03	0.69068E+03
0.210E+03	0.12393E+04
0.220E+03	0.15720E+04
0.230E+03	0.21372E+04
0.240E+03	0.24993E+04
0.250E+03	0.28326E+04
0.260E+03	0.31040E+04
0.270E+03	0.32648E+04
0.280E+03	0.33204E+04
0.290E+03	0.32820E+04

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

```
AT TIME = 0.1039E+03  CONC = 0.1121E+02
AT TIME = 0.1376E+03  CONC = 0.1099E+02
AT TIME = 0.1657E+03  CONC = 0.6763E+02
AT TIME = 0.1891E+03  CONC = 0.6584E+03
AT TIME = 0.2086E+03  CONC = 0.1540E+04
AT TIME = 0.2248E+03  CONC = 0.2313E+04
AT TIME = 0.2384E+03  CONC = 0.2840E+04
AT TIME = 0.2496E+03  CONC = 0.3148E+04
AT TIME = 0.2591E+03  CONC = 0.3302E+04
AT TIME = 0.2669E+03  CONC = 0.3359E+04
AT TIME = 0.2694E+03  CONC = 0.3365E+04
AT TIME = 0.2719E+03  CONC = 0.3364E+04
AT TIME = 0.2744E+03  CONC = 0.3358E+04
AT TIME = 0.2769E+03  CONC = 0.3347E+04
AT TIME = 0.2794E+03  CONC = 0.3330E+04
AT TIME = 0.2819E+03  CONC = 0.3308E+04
AT TIME = 0.2844E+03  CONC = 0.3282E+04
AT TIME = 0.2869E+03  CONC = 0.3251E+04
AT TIME = 0.2894E+03  CONC = 0.3216E+04
AT TIME = 0.2919E+03  CONC = 0.3178E+04
AT TIME = 0.2944E+03  CONC = 0.3135E+04
AT TIME = 0.2969E+03  CONC = 0.3090E+04
AT TIME = 0.2994E+03  CONC = 0.3041E+04
AT TIME = 0.3019E+03  CONC = 0.2990E+04
AT TIME = 0.3044E+03  CONC = 0.2936E+04
AT TIME = 0.3069E+03  CONC = 0.2880E+04
AT TIME = 0.3094E+03  CONC = 0.2822E+04
AT TIME = 0.3119E+03  CONC = 0.2762E+04
AT TIME = 0.3144E+03  CONC = 0.2700E+04
AT TIME = 0.3169E+03  CONC = 0.2638E+04
AT TIME = 0.3247E+03  CONC = 0.2435E+04
AT TIME = 0.3341E+03  CONC = 0.2186E+04
AT TIME = 0.3454E+03  CONC = 0.1889E+04
AT TIME = 0.3590E+03  CONC = 0.1551E+04
AT TIME = 0.3752E+03  CONC = 0.1188E+04
AT TIME = 0.3947E+03  CONC = 0.8251E+03
AT TIME = 0.4181E+03  CONC = 0.4964E+03
AT TIME = 0.4462E+03  CONC = 0.2353E+03
AT TIME = 0.4799E+03  CONC = 0.6361E+02
AT TIME = 0.6278E+03  CONC = -.1868E+02
```

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed San Juan Basin Pit; 50' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - poor liner - 10K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	15.20	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	15.2	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

1

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	15.2	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.310E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.700E+03	0.00000E+00
0.720E+03	0.22670E-01
0.740E+03	0.51842E+02
0.760E+03	0.11659E+03
0.780E+03	0.17039E+03
0.800E+03	0.22264E+03
0.820E+03	0.26287E+03
0.840E+03	0.31365E+03
0.860E+03	0.38277E+03
0.880E+03	0.43958E+03
0.900E+03	0.49337E+03
0.920E+03	0.51783E+03
0.940E+03	0.57065E+03
0.960E+03	0.61237E+03
0.980E+03	0.63269E+03
0.100E+04	0.66016E+03
0.102E+04	0.68491E+03
0.104E+04	0.69456E+03
0.106E+04	0.70304E+03
0.108E+04	0.70923E+03

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME = 0.4480E+03	CONC = 0.1605E+02	
AT TIME = 0.5934E+03	CONC = -.1967E+02	
AT TIME = 0.7145E+03	CONC = 0.8796E+02	
AT TIME = 0.8154E+03	CONC = 0.3527E+03	
AT TIME = 0.8996E+03	CONC = 0.5849E+03	
AT TIME = 0.9697E+03	CONC = 0.7241E+03	
AT TIME = 0.1028E+04	CONC = 0.7869E+03	
AT TIME = 0.1077E+04	CONC = 0.8023E+03	
AT TIME = 0.1117E+04	CONC = 0.7927E+03	
AT TIME = 0.1151E+04	CONC = 0.7716E+03	
AT TIME = 0.1154E+04	CONC = 0.7696E+03	
AT TIME = 0.1156E+04	CONC = 0.7676E+03	
AT TIME = 0.1159E+04	CONC = 0.7656E+03	
AT TIME = 0.1161E+04	CONC = 0.7634E+03	
AT TIME = 0.1164E+04	CONC = 0.7613E+03	
AT TIME = 0.1166E+04	CONC = 0.7591E+03	
AT TIME = 0.1169E+04	CONC = 0.7568E+03	
AT TIME = 0.1171E+04	CONC = 0.7545E+03	
AT TIME = 0.1174E+04	CONC = 0.7521E+03	
AT TIME = 0.1176E+04	CONC = 0.7497E+03	
AT TIME = 0.1179E+04	CONC = 0.7473E+03	
AT TIME = 0.1181E+04	CONC = 0.7448E+03	
AT TIME = 0.1184E+04	CONC = 0.7422E+03	
AT TIME = 0.1186E+04	CONC = 0.7397E+03	
AT TIME = 0.1189E+04	CONC = 0.7371E+03	
AT TIME = 0.1191E+04	CONC = 0.7344E+03	
AT TIME = 0.1194E+04	CONC = 0.7317E+03	
AT TIME = 0.1196E+04	CONC = 0.7290E+03	
AT TIME = 0.1199E+04	CONC = 0.7262E+03	
AT TIME = 0.1201E+04	CONC = 0.7234E+03	
AT TIME = 0.1235E+04	CONC = 0.6823E+03	
AT TIME = 0.1275E+04	CONC = 0.6272E+03	
AT TIME = 0.1324E+04	CONC = 0.5564E+03	
AT TIME = 0.1383E+04	CONC = 0.4704E+03	
AT TIME = 0.1453E+04	CONC = 0.3722E+03	
AT TIME = 0.1537E+04	CONC = 0.2690E+03	
AT TIME = 0.1638E+04	CONC = 0.1707E+03	
AT TIME = 0.1759E+04	CONC = 0.8868E+02	
AT TIME = 0.1904E+04	CONC = 0.3127E+02	
AT TIME = 0.2501E+04	CONC = -.6574E+01	

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

1

Run options
--- -------

Proposed San Juan Basin Pit; 50' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - good liner - 10K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model

1
1

UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------

Van Genuchten functional coefficients
User defined coordinate system

1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	15.20	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	15.2	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

1

DATA FOR LAYER 1
---- --- -----
VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	15.2	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.150E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.160E+04	0.60855E+02
0.162E+04	0.70677E+02
0.164E+04	0.80501E+02
0.166E+04	0.90324E+02
0.168E+04	0.10015E+03
0.170E+04	0.10501E+03
0.172E+04	0.11838E+03
0.174E+04	0.12894E+03
0.176E+04	0.13866E+03
0.178E+04	0.14829E+03
0.180E+04	0.15791E+03
0.182E+04	0.16753E+03
0.184E+04	0.17715E+03
0.186E+04	0.18600E+03
0.188E+04	0.19059E+03
0.190E+04	0.19917E+03
0.192E+04	0.20602E+03
0.194E+04	0.21256E+03
0.196E+04	0.21907E+03
0.198E+04	0.22558E+03

VTRNSPTdpllbg.doc

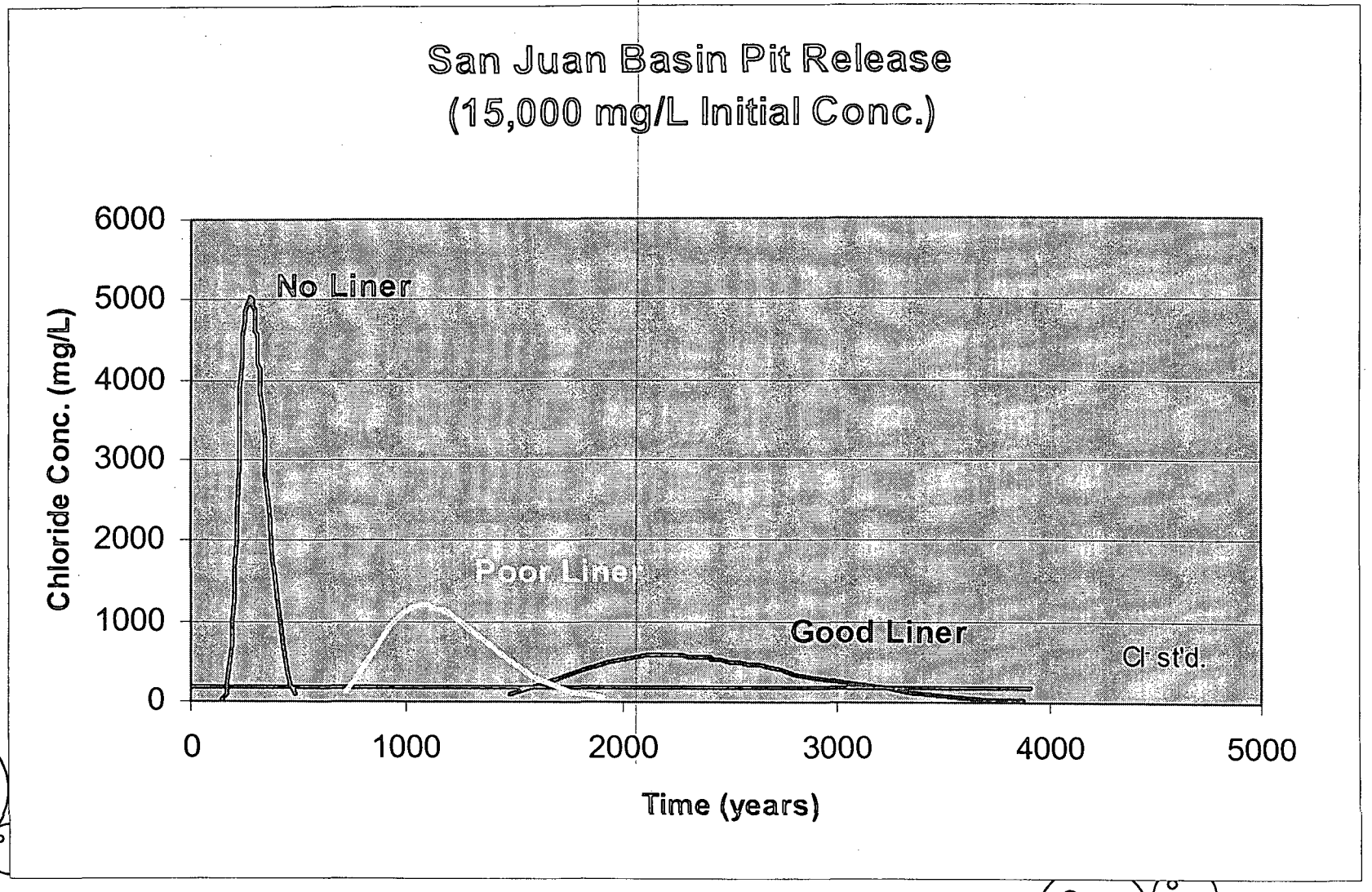
CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME =	0.9256E+03	CONC =	0.8936E+01
AT TIME =	0.1226E+04	CONC =	-.1049E+02
AT TIME =	0.1476E+04	CONC =	0.5529E+02
AT TIME =	0.1685E+04	CONC =	0.1891E+03
AT TIME =	0.1858E+04	CONC =	0.2983E+03
AT TIME =	0.2003E+04	CONC =	0.3599E+03
AT TIME =	0.2124E+04	CONC =	0.3849E+03
AT TIME =	0.2224E+04	CONC =	0.3883E+03
AT TIME =	0.2308E+04	CONC =	0.3808E+03
AT TIME =	0.2378E+04	CONC =	0.3686E+03
AT TIME =	0.2381E+04	CONC =	0.3681E+03
AT TIME =	0.2383E+04	CONC =	0.3676E+03
AT TIME =	0.2386E+04	CONC =	0.3670E+03
AT TIME =	0.2388E+04	CONC =	0.3665E+03
AT TIME =	0.2391E+04	CONC =	0.3660E+03
AT TIME =	0.2393E+04	CONC =	0.3654E+03
AT TIME =	0.2396E+04	CONC =	0.3649E+03
AT TIME =	0.2398E+04	CONC =	0.3643E+03
AT TIME =	0.2401E+04	CONC =	0.3637E+03
AT TIME =	0.2403E+04	CONC =	0.3632E+03
AT TIME =	0.2406E+04	CONC =	0.3626E+03
AT TIME =	0.2408E+04	CONC =	0.3620E+03
AT TIME =	0.2411E+04	CONC =	0.3614E+03
AT TIME =	0.2413E+04	CONC =	0.3608E+03
AT TIME =	0.2416E+04	CONC =	0.3603E+03
AT TIME =	0.2418E+04	CONC =	0.3597E+03
AT TIME =	0.2421E+04	CONC =	0.3591E+03
AT TIME =	0.2423E+04	CONC =	0.3585E+03
AT TIME =	0.2426E+04	CONC =	0.3578E+03
AT TIME =	0.2428E+04	CONC =	0.3572E+03
AT TIME =	0.2498E+04	CONC =	0.3384E+03
AT TIME =	0.2582E+04	CONC =	0.3124E+03
AT TIME =	0.2682E+04	CONC =	0.2786E+03
AT TIME =	0.2803E+04	CONC =	0.2368E+03
AT TIME =	0.2948E+04	CONC =	0.1885E+03
AT TIME =	0.3122E+04	CONC =	0.1372E+03
AT TIME =	0.3330E+04	CONC =	0.8785E+02
AT TIME =	0.3580E+04	CONC =	0.4626E+02
AT TIME =	0.3881E+04	CONC =	0.1685E+02
AT TIME =	0.5100E+04	CONC =	-.3347E+01

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

Modeling Results



1
dplnlc.out

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

1
Run options
--- -------

Proposed San Juan Basin Pit; 50'to GW, Ksat of 1e-3 cm/sec

50 year ave. - 2' sandy loam cover - no liner - 15K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	15.20	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	15.2	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	15.2	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.134E-01	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.150E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.100E+03	0.00000E+00
0.110E+03	0.00000E+00
0.120E+03	0.00000E+00
0.130E+03	0.00000E+00
0.140E+03	0.00000E+00
0.150E+03	0.67039E+01
0.160E+03	0.45770E+02
0.170E+03	0.79699E+02
0.180E+03	0.24109E+03
0.190E+03	0.76578E+03
0.200E+03	0.10360E+04
0.210E+03	0.18589E+04
0.220E+03	0.23579E+04
0.230E+03	0.32058E+04
0.240E+03	0.37489E+04
0.250E+03	0.42489E+04
0.260E+03	0.46560E+04
0.270E+03	0.48972E+04
0.280E+03	0.49806E+04
0.290E+03	0.49230E+04

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

```
AT TIME = 0.1039E+03  CONC = 0.1681E+02
AT TIME = 0.1376E+03  CONC = 0.1648E+02
AT TIME = 0.1657E+03  CONC = 0.1014E+03
AT TIME = 0.1891E+03  CONC = 0.9876E+03
AT TIME = 0.2086E+03  CONC = 0.2310E+04
AT TIME = 0.2248E+03  CONC = 0.3469E+04
AT TIME = 0.2384E+03  CONC = 0.4261E+04
AT TIME = 0.2496E+03  CONC = 0.4723E+04
AT TIME = 0.2591E+03  CONC = 0.4953E+04
AT TIME = 0.2669E+03  CONC = 0.5039E+04
AT TIME = 0.2694E+03  CONC = 0.5047E+04
AT TIME = 0.2719E+03  CONC = 0.5046E+04
AT TIME = 0.2744E+03  CONC = 0.5037E+04
AT TIME = 0.2769E+03  CONC = 0.5020E+04
AT TIME = 0.2794E+03  CONC = 0.4995E+04
AT TIME = 0.2819E+03  CONC = 0.4962E+04
AT TIME = 0.2844E+03  CONC = 0.4923E+04
AT TIME = 0.2869E+03  CONC = 0.4877E+04
AT TIME = 0.2894E+03  CONC = 0.4825E+04
AT TIME = 0.2919E+03  CONC = 0.4767E+04
AT TIME = 0.2944E+03  CONC = 0.4703E+04
AT TIME = 0.2969E+03  CONC = 0.4635E+04
AT TIME = 0.2994E+03  CONC = 0.4562E+04
AT TIME = 0.3019E+03  CONC = 0.4485E+04
AT TIME = 0.3044E+03  CONC = 0.4404E+04
AT TIME = 0.3069E+03  CONC = 0.4320E+04
AT TIME = 0.3094E+03  CONC = 0.4233E+04
AT TIME = 0.3119E+03  CONC = 0.4143E+04
AT TIME = 0.3144E+03  CONC = 0.4051E+04
AT TIME = 0.3169E+03  CONC = 0.3957E+04
AT TIME = 0.3247E+03  CONC = 0.3652E+04
AT TIME = 0.3341E+03  CONC = 0.3279E+04
AT TIME = 0.3454E+03  CONC = 0.2834E+04
AT TIME = 0.3590E+03  CONC = 0.2327E+04
AT TIME = 0.3752E+03  CONC = 0.1782E+04
AT TIME = 0.3947E+03  CONC = 0.1238E+04
AT TIME = 0.4181E+03  CONC = 0.7446E+03
AT TIME = 0.4462E+03  CONC = 0.3530E+03
AT TIME = 0.4799E+03  CONC = 0.9541E+02
AT TIME = 0.6278E+03  CONC = -.2801E+02
```

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

1
Run options
--- -------

Proposed San Juan Basin Pit; 50' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - poor liner - 15K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	15.20	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	15.2	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

1

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	15.2	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.310E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.150E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.700E+03	0.00000E+00
0.720E+03	0.34005E-01
0.740E+03	0.77764E+02
0.760E+03	0.17488E+03
0.780E+03	0.25558E+03
0.800E+03	0.33395E+03
0.820E+03	0.39431E+03
0.840E+03	0.47047E+03
0.860E+03	0.57415E+03
0.880E+03	0.65938E+03
0.900E+03	0.74006E+03
0.920E+03	0.77674E+03
0.940E+03	0.85598E+03
0.960E+03	0.91856E+03
0.980E+03	0.94903E+03
0.100E+04	0.99024E+03
0.102E+04	0.10274E+04
0.104E+04	0.10418E+04
0.106E+04	0.10546E+04
0.108E+04	0.10638E+04

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME =	0.4480E+03	CONC = 0.2407E+02
AT TIME =	0.5934E+03	CONC = -.2950E+02
AT TIME =	0.7145E+03	CONC = 0.1319E+03
AT TIME =	0.8154E+03	CONC = 0.5291E+03
AT TIME =	0.8996E+03	CONC = 0.8773E+03
AT TIME =	0.9697E+03	CONC = 0.1086E+04
AT TIME =	0.1028E+04	CONC = 0.1180E+04
AT TIME =	0.1077E+04	CONC = 0.1203E+04
AT TIME =	0.1117E+04	CONC = 0.1189E+04
AT TIME =	0.1151E+04	CONC = 0.1157E+04
AT TIME =	0.1154E+04	CONC = 0.1154E+04
AT TIME =	0.1156E+04	CONC = 0.1151E+04
AT TIME =	0.1159E+04	CONC = 0.1148E+04
AT TIME =	0.1161E+04	CONC = 0.1145E+04
AT TIME =	0.1164E+04	CONC = 0.1142E+04
AT TIME =	0.1166E+04	CONC = 0.1139E+04
AT TIME =	0.1169E+04	CONC = 0.1135E+04
AT TIME =	0.1171E+04	CONC = 0.1132E+04
AT TIME =	0.1174E+04	CONC = 0.1128E+04
AT TIME =	0.1176E+04	CONC = 0.1125E+04
AT TIME =	0.1179E+04	CONC = 0.1121E+04
AT TIME =	0.1181E+04	CONC = 0.1117E+04
AT TIME =	0.1184E+04	CONC = 0.1113E+04
AT TIME =	0.1186E+04	CONC = 0.1110E+04
AT TIME =	0.1189E+04	CONC = 0.1106E+04
AT TIME =	0.1191E+04	CONC = 0.1102E+04
AT TIME =	0.1194E+04	CONC = 0.1098E+04
AT TIME =	0.1196E+04	CONC = 0.1093E+04
AT TIME =	0.1199E+04	CONC = 0.1089E+04
AT TIME =	0.1201E+04	CONC = 0.1085E+04
AT TIME =	0.1235E+04	CONC = 0.1024E+04
AT TIME =	0.1275E+04	CONC = 0.9408E+03
AT TIME =	0.1324E+04	CONC = 0.8346E+03
AT TIME =	0.1383E+04	CONC = 0.7055E+03
AT TIME =	0.1453E+04	CONC = 0.5584E+03
AT TIME =	0.1537E+04	CONC = 0.4035E+03
AT TIME =	0.1638E+04	CONC = 0.2561E+03
AT TIME =	0.1759E+04	CONC = 0.1330E+03
AT TIME =	0.1904E+04	CONC = 0.4690E+02
AT TIME =	0.2501E+04	CONC = -.9860E+01

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

1
Run options
--- -------

Proposed San Juan Basin Pit; 50' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - good liner - 15K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	15.20	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	15.2	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
--- ---

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

1

DATA FOR LAYER 1
--- --- ---

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	15.2	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.150E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.150E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

TIME	CONCENTRATION
0.140E+04	0.00000E+00
0.142E+04	0.00000E+00
0.144E+04	0.00000E+00
0.146E+04	0.00000E+00
0.148E+04	0.11363E-03
0.150E+04	0.12939E+02
0.152E+04	0.31705E+02
0.154E+04	0.47018E+02
0.156E+04	0.61809E+02
0.158E+04	0.76548E+02
0.160E+04	0.91283E+02
0.162E+04	0.10602E+03
0.164E+04	0.12075E+03
0.166E+04	0.13549E+03
0.168E+04	0.15022E+03
0.170E+04	0.15751E+03
0.172E+04	0.17757E+03
0.174E+04	0.19341E+03
0.176E+04	0.20799E+03
0.178E+04	0.22244E+03

VTRNSPTdpllcg.doc

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME =	0.9256E+03	CONC =	0.1340E+02
AT TIME =	0.1226E+04	CONC =	-.1574E+02
AT TIME =	0.1476E+04	CONC =	0.8293E+02
AT TIME =	0.1685E+04	CONC =	0.2836E+03
AT TIME =	0.1858E+04	CONC =	0.4474E+03
AT TIME =	0.2003E+04	CONC =	0.5398E+03
AT TIME =	0.2124E+04	CONC =	0.5774E+03
AT TIME =	0.2224E+04	CONC =	0.5825E+03
AT TIME =	0.2308E+04	CONC =	0.5712E+03
AT TIME =	0.2378E+04	CONC =	0.5529E+03
AT TIME =	0.2381E+04	CONC =	0.5521E+03
AT TIME =	0.2383E+04	CONC =	0.5514E+03
AT TIME =	0.2386E+04	CONC =	0.5506E+03
AT TIME =	0.2388E+04	CONC =	0.5498E+03
AT TIME =	0.2391E+04	CONC =	0.5489E+03
AT TIME =	0.2393E+04	CONC =	0.5481E+03
AT TIME =	0.2396E+04	CONC =	0.5473E+03
AT TIME =	0.2398E+04	CONC =	0.5465E+03
AT TIME =	0.2401E+04	CONC =	0.5456E+03
AT TIME =	0.2403E+04	CONC =	0.5448E+03
AT TIME =	0.2406E+04	CONC =	0.5439E+03
AT TIME =	0.2408E+04	CONC =	0.5430E+03
AT TIME =	0.2411E+04	CONC =	0.5422E+03
AT TIME =	0.2413E+04	CONC =	0.5413E+03
AT TIME =	0.2416E+04	CONC =	0.5404E+03
AT TIME =	0.2418E+04	CONC =	0.5395E+03
AT TIME =	0.2421E+04	CONC =	0.5386E+03
AT TIME =	0.2423E+04	CONC =	0.5377E+03
AT TIME =	0.2426E+04	CONC =	0.5368E+03
AT TIME =	0.2428E+04	CONC =	0.5358E+03
AT TIME =	0.2498E+04	CONC =	0.5075E+03
AT TIME =	0.2582E+04	CONC =	0.4687E+03
AT TIME =	0.2682E+04	CONC =	0.4179E+03
AT TIME =	0.2803E+04	CONC =	0.3551E+03
AT TIME =	0.2948E+04	CONC =	0.2828E+03
AT TIME =	0.3122E+04	CONC =	0.2058E+03
AT TIME =	0.3330E+04	CONC =	0.1318E+03
AT TIME =	0.3580E+04	CONC =	0.6939E+02
AT TIME =	0.3881E+04	CONC =	0.2527E+02
AT TIME =	0.5100E+04	CONC =	-.5021E+01

1 UNSATURATED ZONE TRANSPORT RESULTS

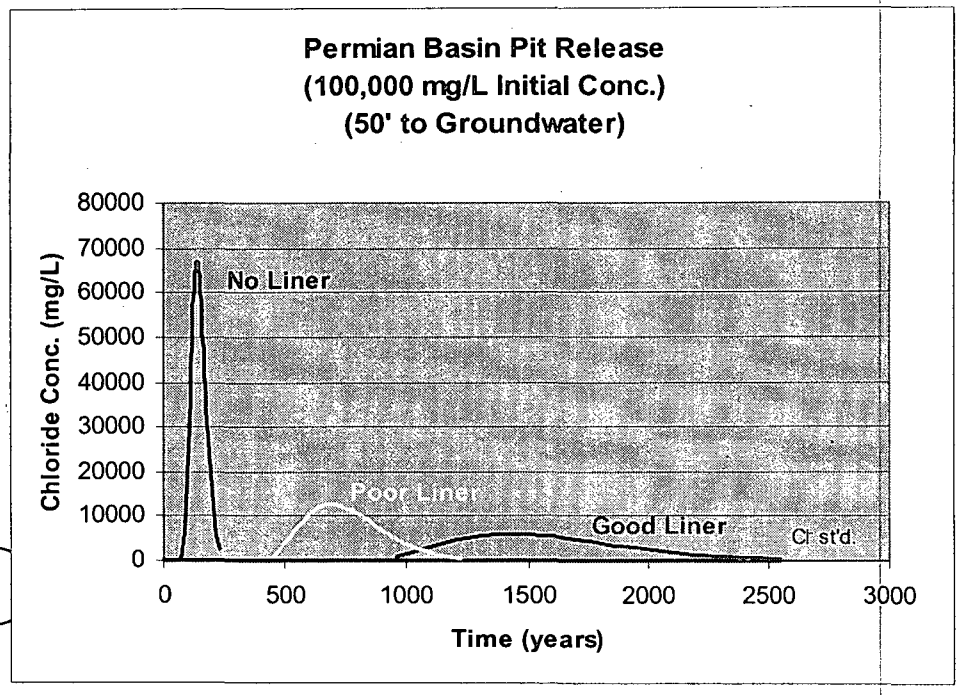
NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION CONCENTRATION

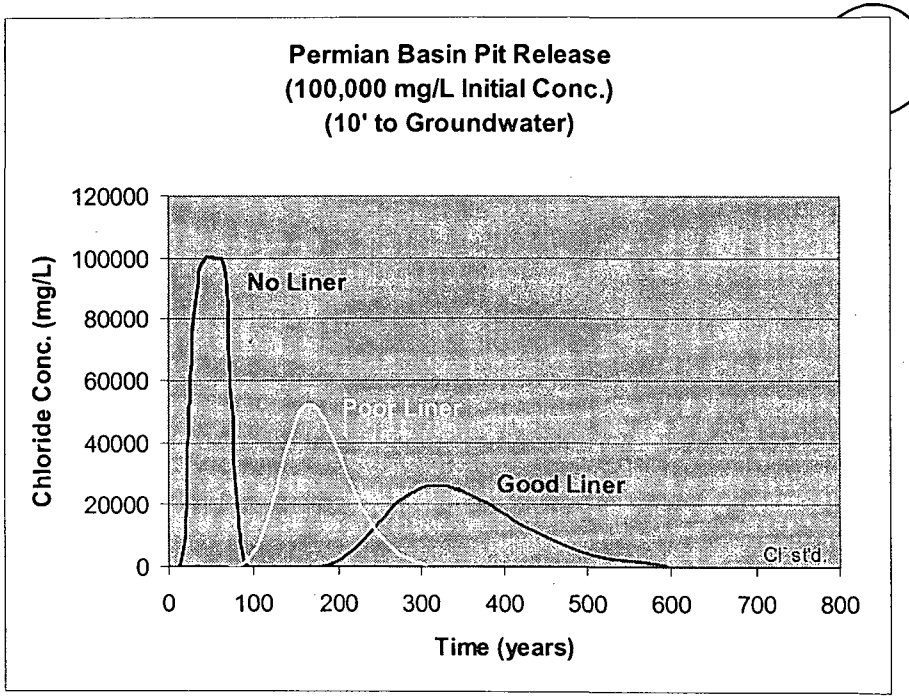
Pit Release Modeling for the Permian and San Juan Basins

MULTIMED Output Files for the Permian Basin

(varying depth to groundwater)

Modeling Results





1
nplnlt2.out

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

1
Run options
--- -------

Proposed Permian Basin Pit; 10' to GW, Ksat of 1e-3 cm/sec

50 year ave. - 2' sandy loam cover - no liner - 100K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	3.05	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	3.05	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

1

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	3.05	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.298E-01	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+06	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	33.3	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.000E+00	0.00000E+00
0.100E+02	0.00000E+00
0.200E+02	0.39670E+03
0.300E+02	0.26552E+05
0.400E+02	0.75661E+05
0.500E+02	0.95811E+05
0.600E+02	0.98926E+05
0.700E+02	0.98453E+05
0.800E+02	0.72066E+05
0.900E+02	0.23157E+05
0.100E+03	0.33032E+04
0.110E+03	0.47213E+03
0.120E+03	0.19638E+03
0.130E+03	0.11837E+03
0.140E+03	0.52346E+02
0.150E+03	0.93713E+01
0.160E+03	0.00000E+00
0.170E+03	0.00000E+00
0.180E+03	0.00000E+00
0.190E+03	0.00000E+00

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME = 0.8110E+01	CONC = -.3122E+02	
AT TIME = 0.1161E+02	CONC = 0.1676E+03	
AT TIME = 0.1452E+02	CONC = 0.9598E+03	
AT TIME = 0.1695E+02	CONC = 0.6144E+04	
AT TIME = 0.1898E+02	CONC = 0.1512E+05	
AT TIME = 0.2066E+02	CONC = 0.2521E+05	
AT TIME = 0.2207E+02	CONC = 0.3463E+05	
AT TIME = 0.2324E+02	CONC = 0.4268E+05	
AT TIME = 0.2421E+02	CONC = 0.4927E+05	
AT TIME = 0.2503E+02	CONC = 0.5458E+05	
AT TIME = 0.2753E+02	CONC = 0.6913E+05	
AT TIME = 0.3003E+02	CONC = 0.8041E+05	
AT TIME = 0.3253E+02	CONC = 0.8843E+05	
AT TIME = 0.3503E+02	CONC = 0.9372E+05	
AT TIME = 0.3753E+02	CONC = 0.9696E+05	
AT TIME = 0.4003E+02	CONC = 0.9879E+05	
AT TIME = 0.4253E+02	CONC = 0.9971E+05	
AT TIME = 0.4503E+02	CONC = 0.1001E+06	
AT TIME = 0.4753E+02	CONC = 0.1002E+06	
AT TIME = 0.5003E+02	CONC = 0.1001E+06	
AT TIME = 0.5253E+02	CONC = 0.1000E+06	
AT TIME = 0.5503E+02	CONC = 0.9991E+05	
AT TIME = 0.5753E+02	CONC = 0.9988E+05	
AT TIME = 0.6003E+02	CONC = 0.9963E+05	
AT TIME = 0.6253E+02	CONC = 0.9961E+05	
AT TIME = 0.6503E+02	CONC = 0.9818E+05	
AT TIME = 0.6753E+02	CONC = 0.9148E+05	
AT TIME = 0.7003E+02	CONC = 0.7857E+05	
AT TIME = 0.7253E+02	CONC = 0.6202E+05	
AT TIME = 0.7503E+02	CONC = 0.4527E+05	
AT TIME = 0.7584E+02	CONC = 0.4023E+05	
AT TIME = 0.7682E+02	CONC = 0.3457E+05	
AT TIME = 0.7799E+02	CONC = 0.2843E+05	
AT TIME = 0.7939E+02	CONC = 0.2204E+05	
AT TIME = 0.8108E+02	CONC = 0.1577E+05	
AT TIME = 0.8311E+02	CONC = 0.1008E+05	
AT TIME = 0.8553E+02	CONC = 0.5461E+04	
AT TIME = 0.8845E+02	CONC = 0.2236E+04	
AT TIME = 0.9195E+02	CONC = 0.4709E+03	
AT TIME = 0.1900E+03	CONC = -.2744E+02	

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

1
ıplltp.out

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

1
Run options
--- -------

Proposed Lea County Pit 10' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - poor liner - 100K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	3.05	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	3.05	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

1

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	3.05	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.490E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+06	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.500E+02	0.00000E+00
0.700E+02	0.00000E+00
0.900E+02	0.50471E+03
0.110E+03	0.52120E+04
0.130E+03	0.19881E+05
0.150E+03	0.39342E+05
0.170E+03	0.50818E+05
0.190E+03	0.48008E+05
0.210E+03	0.36666E+05
0.230E+03	0.24049E+05
0.250E+03	0.13922E+05
0.270E+03	0.64972E+04
0.290E+03	0.25886E+04
0.310E+03	0.59045E+03
0.330E+03	0.31565E+03
0.350E+03	0.21005E+03
0.370E+03	0.12297E+03
0.390E+03	0.39458E+02
0.410E+03	0.00000E+00
0.430E+03	0.00000E+00

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

```
AT TIME = 0.4930E+02  CONC = -.3122E+02
AT TIME = 0.7057E+02  CONC = 0.1682E+03
AT TIME = 0.8828E+02  CONC = 0.9681E+03
AT TIME = 0.1031E+03  CONC = 0.6131E+04
AT TIME = 0.1154E+03  CONC = 0.1494E+05
AT TIME = 0.1256E+03  CONC = 0.2507E+05
AT TIME = 0.1342E+03  CONC = 0.3418E+05
AT TIME = 0.1413E+03  CONC = 0.4113E+05
AT TIME = 0.1472E+03  CONC = 0.4590E+05
AT TIME = 0.1522E+03  CONC = 0.4892E+05
AT TIME = 0.1547E+03  CONC = 0.5009E+05
AT TIME = 0.1572E+03  CONC = 0.5101E+05
AT TIME = 0.1597E+03  CONC = 0.5167E+05
AT TIME = 0.1622E+03  CONC = 0.5209E+05
AT TIME = 0.1647E+03  CONC = 0.5226E+05
AT TIME = 0.1672E+03  CONC = 0.5220E+05
AT TIME = 0.1697E+03  CONC = 0.5193E+05
AT TIME = 0.1722E+03  CONC = 0.5144E+05
AT TIME = 0.1747E+03  CONC = 0.5077E+05
AT TIME = 0.1772E+03  CONC = 0.4992E+05
AT TIME = 0.1797E+03  CONC = 0.4892E+05
AT TIME = 0.1822E+03  CONC = 0.4778E+05
AT TIME = 0.1847E+03  CONC = 0.4651E+05
AT TIME = 0.1872E+03  CONC = 0.4515E+05
AT TIME = 0.1897E+03  CONC = 0.4369E+05
AT TIME = 0.1922E+03  CONC = 0.4217E+05
AT TIME = 0.1947E+03  CONC = 0.4058E+05
AT TIME = 0.1972E+03  CONC = 0.3896E+05
AT TIME = 0.1997E+03  CONC = 0.3731E+05
AT TIME = 0.2022E+03  CONC = 0.3564E+05
AT TIME = 0.2071E+03  CONC = 0.3233E+05
AT TIME = 0.2130E+03  CONC = 0.2844E+05
AT TIME = 0.2202E+03  CONC = 0.2401E+05
AT TIME = 0.2287E+03  CONC = 0.1918E+05
AT TIME = 0.2390E+03  CONC = 0.1421E+05
AT TIME = 0.2513E+03  CONC = 0.9488E+04
AT TIME = 0.2660E+03  CONC = 0.5432E+04
AT TIME = 0.2837E+03  CONC = 0.2405E+04
AT TIME = 0.3050E+03  CONC = 0.5660E+03
AT TIME = 0.4300E+03  CONC = 0.3935E+02
```

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

1
Run options
--- -------

Proposed Lea County Pit 10' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - good liner - 100K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	3.05	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	3.05	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

1

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	3.05	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.230E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+06	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

TIME	CONCENTRATION
0.100E+03	0.00000E+00
0.120E+03	0.00000E+00
0.140E+03	0.00000E+00
0.160E+03	0.99599E+01
0.180E+03	0.38612E+03
0.200E+03	0.88150E+03
0.220E+03	0.52254E+04
0.240E+03	0.92159E+04
0.260E+03	0.14237E+05
0.280E+03	0.19623E+05
0.300E+03	0.23471E+05
0.320E+03	0.25468E+05
0.340E+03	0.25411E+05
0.360E+03	0.23870E+05
0.380E+03	0.21360E+05
0.400E+03	0.18223E+05
0.420E+03	0.15052E+05
0.440E+03	0.12124E+05
0.460E+03	0.92779E+04
0.480E+03	0.66784E+04

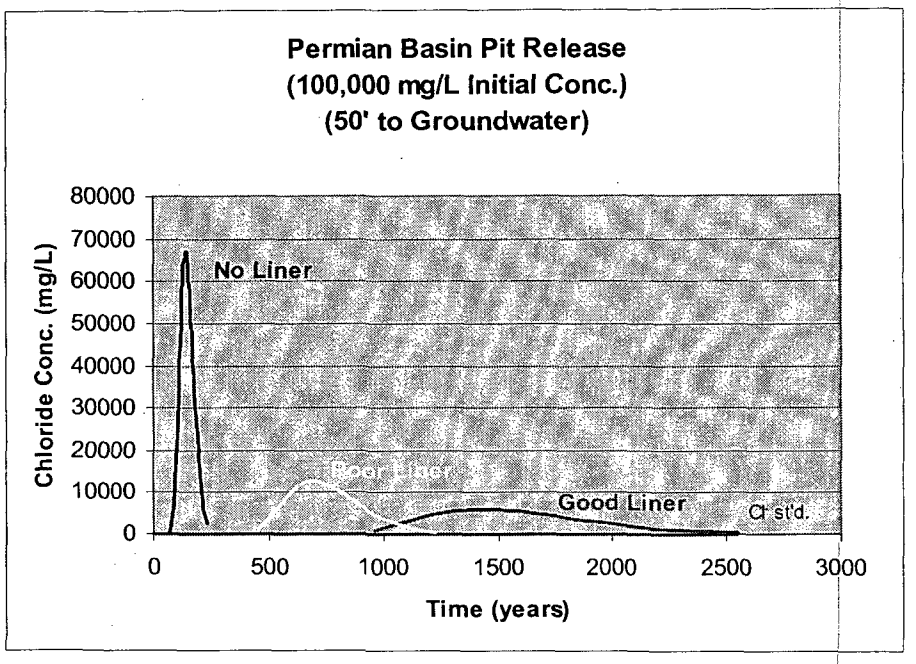
CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

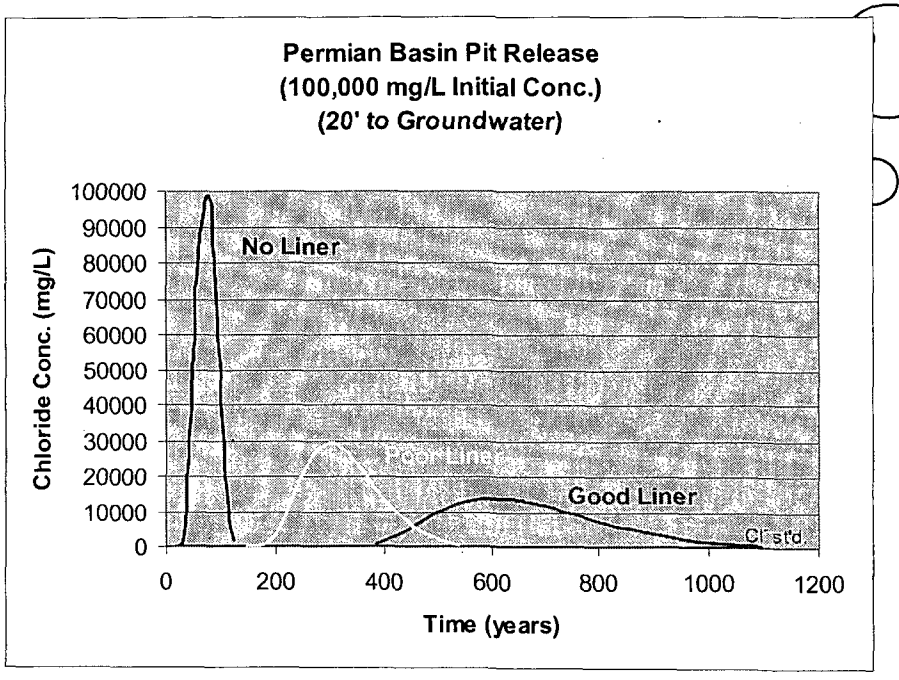
```
AT TIME = 0.1050E+03  CONC = -.3164E+02
AT TIME = 0.1503E+03  CONC = 0.2098E+03
AT TIME = 0.1881E+03  CONC = 0.7785E+03
AT TIME = 0.2195E+03  CONC = 0.5946E+04
AT TIME = 0.2457E+03  CONC = 0.1343E+05
AT TIME = 0.2676E+03  CONC = 0.1957E+05
AT TIME = 0.2858E+03  CONC = 0.2339E+05
AT TIME = 0.3010E+03  CONC = 0.2532E+05
AT TIME = 0.3136E+03  CONC = 0.2603E+05
AT TIME = 0.3241E+03  CONC = 0.2604E+05
AT TIME = 0.3266E+03  CONC = 0.2598E+05
AT TIME = 0.3291E+03  CONC = 0.2588E+05
AT TIME = 0.3316E+03  CONC = 0.2577E+05
AT TIME = 0.3341E+03  CONC = 0.2563E+05
AT TIME = 0.3366E+03  CONC = 0.2547E+05
AT TIME = 0.3391E+03  CONC = 0.2529E+05
AT TIME = 0.3416E+03  CONC = 0.2508E+05
AT TIME = 0.3441E+03  CONC = 0.2486E+05
AT TIME = 0.3466E+03  CONC = 0.2463E+05
AT TIME = 0.3491E+03  CONC = 0.2437E+05
AT TIME = 0.3516E+03  CONC = 0.2410E+05
AT TIME = 0.3541E+03  CONC = 0.2381E+05
AT TIME = 0.3566E+03  CONC = 0.2351E+05
AT TIME = 0.3591E+03  CONC = 0.2320E+05
AT TIME = 0.3616E+03  CONC = 0.2288E+05
AT TIME = 0.3641E+03  CONC = 0.2254E+05
AT TIME = 0.3666E+03  CONC = 0.2220E+05
AT TIME = 0.3691E+03  CONC = 0.2184E+05
AT TIME = 0.3716E+03  CONC = 0.2148E+05
AT TIME = 0.3741E+03  CONC = 0.2111E+05
AT TIME = 0.3847E+03  CONC = 0.1950E+05
AT TIME = 0.3973E+03  CONC = 0.1749E+05
AT TIME = 0.4125E+03  CONC = 0.1509E+05
AT TIME = 0.4307E+03  CONC = 0.1235E+05
AT TIME = 0.4525E+03  CONC = 0.9413E+04
AT TIME = 0.4787E+03  CONC = 0.6506E+04
AT TIME = 0.5102E+03  CONC = 0.3911E+04
AT TIME = 0.5479E+03  CONC = 0.1889E+04
AT TIME = 0.5932E+03  CONC = 0.5874E+03
AT TIME = 0.7359E+03  CONC = -.1492E+03
```

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION
CONCENTRATION			

Modeling Results





```
>lnlp2.out
                    U. S.   E N V I R O N M E N T A L   P R O T E C T I O N   A G E N C Y

                                E X P O S U R E   A S S E S S M E N T

                                  M U L T I M E D I A   M O D E L

                                MULTIMED  (Version 1.01, June 1991)

Run options
--- -------


Proposed Permian Basin Pit;  20' to GW, Ksat of 1e-3 cm/sec


50 year ave. - 2' sandy loam cover - no liner - 100K
Chemical simulated is DEFAULT CHEMICAL


Option Chosen                          Saturated and unsaturated zone models
Run was                                DETERMIN
Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model


UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)
NP      - Total number of nodal points                240
NMAT    - Number of different porous materials          1
KPROP   - Van Genuchten or Brooks and Corey             1
IMSHGN  - Spatial discretization option                 1
NVFLAYR - Number of layers in flow model                1


OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
```

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	6.10	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	6.10	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

1

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	6.10	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.298E-01	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+06	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	33.3	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.100E+02	0.00000E+00
0.200E+02	0.71297E-08
0.300E+02	0.42683E+02
0.400E+02	0.28944E+04
0.500E+02	0.23143E+05
0.600E+02	0.55422E+05
0.700E+02	0.80762E+05
0.800E+02	0.93604E+05
0.900E+02	0.95684E+05
0.100E+03	0.76471E+05
0.110E+03	0.43919E+05
0.120E+03	0.18455E+05
0.130E+03	0.53299E+04
0.140E+03	0.68279E+03
0.150E+03	0.50946E+02
0.160E+03	0.45788E+02
0.170E+03	0.77447E+02
0.180E+03	0.12037E+03
0.190E+03	0.14073E+03
0.200E+03	0.17553E+03

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

```
AT TIME = 0.1797E+02  CONC = 0.3239E+02
AT TIME = 0.2446E+02  CONC = 0.1204E+03
AT TIME = 0.2987E+02  CONC = 0.9572E+03
AT TIME = 0.3438E+02  CONC = 0.6408E+04
AT TIME = 0.3813E+02  CONC = 0.1545E+05
AT TIME = 0.4126E+02  CONC = 0.2543E+05
AT TIME = 0.4387E+02  CONC = 0.3468E+05
AT TIME = 0.4604E+02  CONC = 0.4259E+05
AT TIME = 0.4786E+02  CONC = 0.4908E+05
AT TIME = 0.4937E+02  CONC = 0.5431E+05
AT TIME = 0.5187E+02  CONC = 0.6244E+05
AT TIME = 0.5437E+02  CONC = 0.6974E+05
AT TIME = 0.5687E+02  CONC = 0.7611E+05
AT TIME = 0.5937E+02  CONC = 0.8152E+05
AT TIME = 0.6187E+02  CONC = 0.8602E+05
AT TIME = 0.6437E+02  CONC = 0.8974E+05
AT TIME = 0.6687E+02  CONC = 0.9264E+05
AT TIME = 0.6937E+02  CONC = 0.9475E+05
AT TIME = 0.7187E+02  CONC = 0.9638E+05
AT TIME = 0.7437E+02  CONC = 0.9777E+05
AT TIME = 0.7687E+02  CONC = 0.9876E+05
AT TIME = 0.7937E+02  CONC = 0.9879E+05
AT TIME = 0.8187E+02  CONC = 0.9725E+05
AT TIME = 0.8437E+02  CONC = 0.9378E+05
AT TIME = 0.8687E+02  CONC = 0.8833E+05
AT TIME = 0.8937E+02  CONC = 0.8119E+05
AT TIME = 0.9187E+02  CONC = 0.7283E+05
AT TIME = 0.9437E+02  CONC = 0.6382E+05
AT TIME = 0.9687E+02  CONC = 0.5468E+05
AT TIME = 0.9937E+02  CONC = 0.4584E+05
AT TIME = 0.1009E+03  CONC = 0.4080E+05
AT TIME = 0.1027E+03  CONC = 0.3512E+05
AT TIME = 0.1049E+03  CONC = 0.2891E+05
AT TIME = 0.1075E+03  CONC = 0.2241E+05
AT TIME = 0.1106E+03  CONC = 0.1598E+05
AT TIME = 0.1144E+03  CONC = 0.1010E+05
AT TIME = 0.1189E+03  CONC = 0.5254E+04
AT TIME = 0.1243E+03  CONC = 0.1844E+04
AT TIME = 0.1308E+03  CONC = -.1975E+02
AT TIME = 0.2000E+03  CONC = 0.2106E+03
```

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

1
Run options
--- -------

Proposed Lea County Pit 20' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - poor liner - 100K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	6.10	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	6.10	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	6.10	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.490E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+06	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.100E+03	0.00000E+00
0.120E+03	0.44555E+01
0.140E+03	0.99404E+02
0.160E+03	0.16928E+03
0.180E+03	0.61196E+03
0.200E+03	0.26554E+04
0.220E+03	0.67412E+04
0.240E+03	0.14148E+05
0.260E+03	0.20929E+05
0.280E+03	0.25977E+05
0.300E+03	0.28724E+05
0.320E+03	0.28701E+05
0.340E+03	0.26605E+05
0.360E+03	0.23359E+05
0.380E+03	0.19428E+05
0.400E+03	0.15329E+05
0.420E+03	0.11473E+05
0.440E+03	0.84441E+04
0.460E+03	0.61810E+04
0.480E+03	0.42703E+04

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME =	0.1092E+03	CONC =	0.2661E+02
AT TIME =	0.1486E+03	CONC =	0.1708E+03
AT TIME =	0.1815E+03	CONC =	0.7222E+03
AT TIME =	0.2088E+03	CONC =	0.6359E+04
AT TIME =	0.2316E+03	CONC =	0.1447E+05
AT TIME =	0.2507E+03	CONC =	0.2127E+05
AT TIME =	0.2665E+03	CONC =	0.2567E+05
AT TIME =	0.2797E+03	CONC =	0.2806E+05
AT TIME =	0.2907E+03	CONC =	0.2909E+05
AT TIME =	0.2999E+03	CONC =	0.2933E+05
AT TIME =	0.3024E+03	CONC =	0.2930E+05
AT TIME =	0.3049E+03	CONC =	0.2923E+05
AT TIME =	0.3074E+03	CONC =	0.2913E+05
AT TIME =	0.3099E+03	CONC =	0.2900E+05
AT TIME =	0.3124E+03	CONC =	0.2883E+05
AT TIME =	0.3149E+03	CONC =	0.2863E+05
AT TIME =	0.3174E+03	CONC =	0.2840E+05
AT TIME =	0.3199E+03	CONC =	0.2815E+05
AT TIME =	0.3224E+03	CONC =	0.2786E+05
AT TIME =	0.3249E+03	CONC =	0.2756E+05
AT TIME =	0.3274E+03	CONC =	0.2723E+05
AT TIME =	0.3299E+03	CONC =	0.2687E+05
AT TIME =	0.3324E+03	CONC =	0.2650E+05
AT TIME =	0.3349E+03	CONC =	0.2611E+05
AT TIME =	0.3374E+03	CONC =	0.2571E+05
AT TIME =	0.3399E+03	CONC =	0.2529E+05
AT TIME =	0.3424E+03	CONC =	0.2485E+05
AT TIME =	0.3449E+03	CONC =	0.2440E+05
AT TIME =	0.3474E+03	CONC =	0.2394E+05
AT TIME =	0.3499E+03	CONC =	0.2347E+05
AT TIME =	0.3591E+03	CONC =	0.2169E+05
AT TIME =	0.3701E+03	CONC =	0.1949E+05
AT TIME =	0.3833E+03	CONC =	0.1685E+05
AT TIME =	0.3991E+03	CONC =	0.1383E+05
AT TIME =	0.4181E+03	CONC =	0.1059E+05
AT TIME =	0.4409E+03	CONC =	0.7350E+04
AT TIME =	0.4683E+03	CONC =	0.4428E+04
AT TIME =	0.5012E+03	CONC =	0.2122E+04
AT TIME =	0.5406E+03	CONC =	0.6150E+03
AT TIME =	0.6930E+03	CONC =	-.1776E+03

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED
SERIAL NUMBER TIME DEPTH CONCENTRATION
CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed Lea County Pit 20' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - good liner - 100K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	6.10	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	6.10	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

1

DATA FOR LAYER 1
---- --- -----
VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	6.10	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.230E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+06	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.200E+03	0.00000E+00
0.220E+03	0.00000E+00
0.240E+03	0.00000E+00
0.260E+03	0.00000E+00
0.280E+03	0.00000E+00
0.300E+03	0.00000E+00
0.320E+03	0.00000E+00
0.340E+03	0.00000E+00
0.360E+03	0.00000E+00
0.380E+03	0.00000E+00
0.400E+03	0.23043E+03
0.420E+03	0.21569E+04
0.440E+03	0.37232E+04
0.460E+03	0.45231E+04
0.480E+03	0.69189E+04
0.500E+03	0.82676E+04
0.520E+03	0.97421E+04
0.540E+03	0.11034E+05
0.560E+03	0.11918E+05
0.580E+03	0.12501E+05

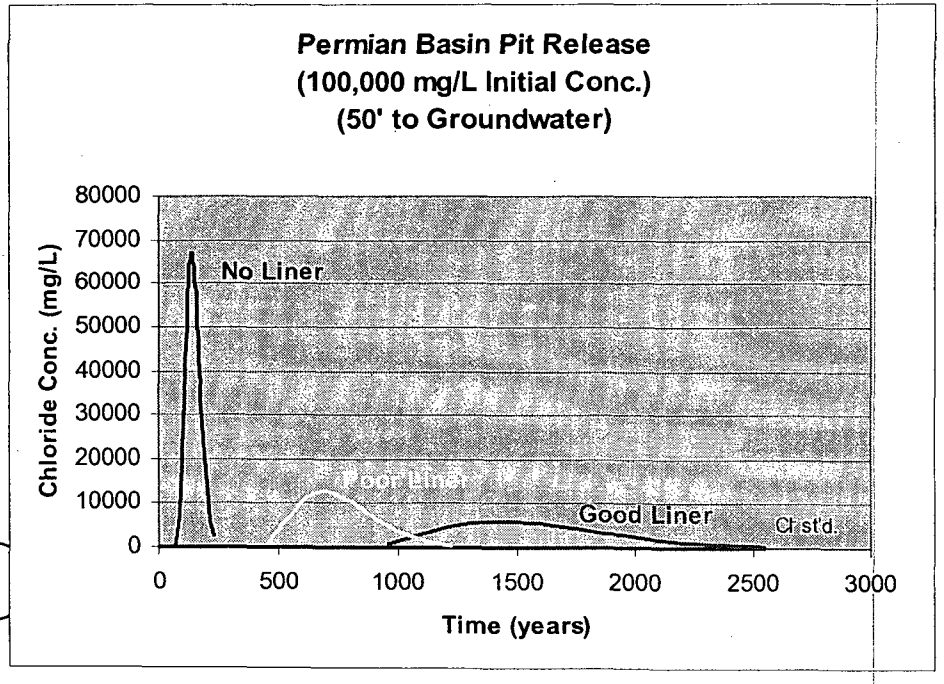
CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

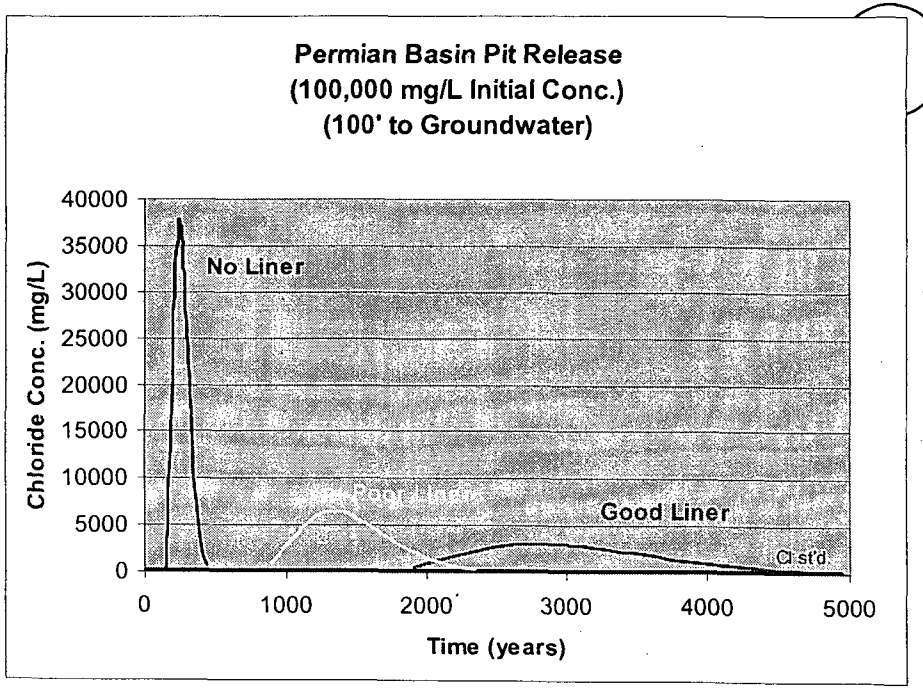
AT TIME =	0.2325E+03	CONC = 0.7423E+02
AT TIME =	0.3165E+03	CONC = -.8767E+02
AT TIME =	0.3865E+03	CONC = 0.9076E+03
AT TIME =	0.4449E+03	CONC = 0.5020E+04
AT TIME =	0.4935E+03	CONC = 0.9239E+04
AT TIME =	0.5340E+03	CONC = 0.1204E+05
AT TIME =	0.5677E+03	CONC = 0.1346E+05
AT TIME =	0.5958E+03	CONC = 0.1397E+05
AT TIME =	0.6193E+03	CONC = 0.1396E+05
AT TIME =	0.6388E+03	CONC = 0.1369E+05
AT TIME =	0.6413E+03	CONC = 0.1365E+05
AT TIME =	0.6438E+03	CONC = 0.1359E+05
AT TIME =	0.6463E+03	CONC = 0.1354E+05
AT TIME =	0.6488E+03	CONC = 0.1348E+05
AT TIME =	0.6513E+03	CONC = 0.1342E+05
AT TIME =	0.6538E+03	CONC = 0.1336E+05
AT TIME =	0.6563E+03	CONC = 0.1329E+05
AT TIME =	0.6588E+03	CONC = 0.1322E+05
AT TIME =	0.6613E+03	CONC = 0.1315E+05
AT TIME =	0.6638E+03	CONC = 0.1308E+05
AT TIME =	0.6663E+03	CONC = 0.1300E+05
AT TIME =	0.6688E+03	CONC = 0.1292E+05
AT TIME =	0.6713E+03	CONC = 0.1284E+05
AT TIME =	0.6738E+03	CONC = 0.1276E+05
AT TIME =	0.6763E+03	CONC = 0.1267E+05
AT TIME =	0.6788E+03	CONC = 0.1259E+05
AT TIME =	0.6813E+03	CONC = 0.1250E+05
AT TIME =	0.6838E+03	CONC = 0.1241E+05
AT TIME =	0.6863E+03	CONC = 0.1231E+05
AT TIME =	0.6888E+03	CONC = 0.1222E+05
AT TIME =	0.7083E+03	CONC = 0.1144E+05
AT TIME =	0.7318E+03	CONC = 0.1042E+05
AT TIME =	0.7599E+03	CONC = 0.9150E+04
AT TIME =	0.7937E+03	CONC = 0.7641E+04
AT TIME =	0.8342E+03	CONC = 0.5962E+04
AT TIME =	0.8828E+03	CONC = 0.4235E+04
AT TIME =	0.9411E+03	CONC = 0.2632E+04
AT TIME =	0.1011E+04	CONC = 0.1329E+04
AT TIME =	0.1095E+04	CONC = 0.4457E+03
AT TIME =	0.1406E+04	CONC = -.1033E+03

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED
SERIAL NUMBER TIME DEPTH CONCENTRATION
CONCENTRATION

Modeling Results





U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed Permian Basin Pit; 100'to GW, Ksat of 1e-3 cm/sec

50 year ave. - 2' sandy loam cover - no liner - 100K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1

UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	30.40	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	30.4	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
--- ---

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
--- --- ---

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	30.4	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.298E-01	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+06	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	33.3	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.100E+03	0.00000E+00
0.120E+03	0.00000E+00
0.140E+03	0.77633E+02
0.160E+03	0.97206E+03
0.180E+03	0.68520E+04
0.200E+03	0.17482E+05
0.220E+03	0.29140E+05
0.240E+03	0.35897E+05
0.260E+03	0.37110E+05
0.280E+03	0.33705E+05
0.300E+03	0.27755E+05
0.320E+03	0.21108E+05
0.340E+03	0.14960E+05
0.360E+03	0.95675E+04
0.380E+03	0.57206E+04
0.400E+03	0.31641E+04
0.420E+03	0.16750E+04
0.440E+03	0.48758E+03
0.460E+03	0.31942E+03
0.480E+03	0.17922E+03

VTRNSPThplnlh2.doc

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME =	0.9449E+02	CONC = 0.1551E+03
AT TIME =	0.1241E+03	CONC = 0.7716E+02
AT TIME =	0.1487E+03	CONC = 0.7086E+03
AT TIME =	0.1692E+03	CONC = 0.6553E+04
AT TIME =	0.1863E+03	CONC = 0.1582E+05
AT TIME =	0.2006E+03	CONC = 0.2443E+05
AT TIME =	0.2125E+03	CONC = 0.3064E+05
AT TIME =	0.2224E+03	CONC = 0.3449E+05
AT TIME =	0.2306E+03	CONC = 0.3660E+05
AT TIME =	0.2375E+03	CONC = 0.3758E+05
AT TIME =	0.2400E+03	CONC = 0.3776E+05
AT TIME =	0.2425E+03	CONC = 0.3786E+05
AT TIME =	0.2450E+03	CONC = 0.3787E+05
AT TIME =	0.2475E+03	CONC = 0.3780E+05
AT TIME =	0.2500E+03	CONC = 0.3766E+05
AT TIME =	0.2525E+03	CONC = 0.3744E+05
AT TIME =	0.2550E+03	CONC = 0.3715E+05
AT TIME =	0.2575E+03	CONC = 0.3679E+05
AT TIME =	0.2600E+03	CONC = 0.3637E+05
AT TIME =	0.2625E+03	CONC = 0.3590E+05
AT TIME =	0.2650E+03	CONC = 0.3537E+05
AT TIME =	0.2675E+03	CONC = 0.3480E+05
AT TIME =	0.2700E+03	CONC = 0.3418E+05
AT TIME =	0.2725E+03	CONC = 0.3352E+05
AT TIME =	0.2750E+03	CONC = 0.3283E+05
AT TIME =	0.2775E+03	CONC = 0.3210E+05
AT TIME =	0.2800E+03	CONC = 0.3135E+05
AT TIME =	0.2825E+03	CONC = 0.3058E+05
AT TIME =	0.2850E+03	CONC = 0.2978E+05
AT TIME =	0.2875E+03	CONC = 0.2897E+05
AT TIME =	0.2944E+03	CONC = 0.2669E+05
AT TIME =	0.3026E+03	CONC = 0.2390E+05
AT TIME =	0.3125E+03	CONC = 0.2061E+05
AT TIME =	0.3244E+03	CONC = 0.1688E+05
AT TIME =	0.3386E+03	CONC = 0.1289E+05
AT TIME =	0.3557E+03	CONC = 0.8921E+04
AT TIME =	0.3763E+03	CONC = 0.5334E+04
AT TIME =	0.4009E+03	CONC = 0.2493E+04
AT TIME =	0.4305E+03	CONC = 0.6307E+03
AT TIME =	0.5668E+03	CONC = -.1894E+03

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

1
Run options
--- -------

Proposed Lea County Pit 100'to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - poor liner - 100K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	30.40	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	30.4	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

1

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	30.4	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.490E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+06	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.600E+03	0.00000E+00
0.620E+03	0.00000E+00
0.640E+03	0.00000E+00
0.660E+03	0.00000E+00
0.680E+03	0.00000E+00
0.700E+03	0.00000E+00
0.720E+03	0.00000E+00
0.740E+03	0.00000E+00
0.760E+03	0.00000E+00
0.780E+03	0.00000E+00
0.800E+03	0.00000E+00
0.820E+03	0.00000E+00
0.840E+03	0.00000E+00
0.860E+03	0.00000E+00
0.880E+03	0.00000E+00
0.900E+03	0.77244E+00
0.920E+03	0.38015E+03
0.940E+03	0.81414E+03
0.960E+03	0.11792E+04
0.980E+03	0.15350E+04

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME = 0.5678E+03	CONC = 0.1548E+03	
AT TIME = 0.7454E+03	CONC = -.1933E+03	
AT TIME = 0.8935E+03	CONC = 0.8195E+03	
AT TIME = 0.1017E+04	CONC = 0.3023E+04	
AT TIME = 0.1120E+04	CONC = 0.4881E+04	
AT TIME = 0.1205E+04	CONC = 0.5966E+04	
AT TIME = 0.1277E+04	CONC = 0.6438E+04	
AT TIME = 0.1336E+04	CONC = 0.6538E+04	
AT TIME = 0.1386E+04	CONC = 0.6443E+04	
AT TIME = 0.1427E+04	CONC = 0.6262E+04	
AT TIME = 0.1430E+04	CONC = 0.6248E+04	
AT TIME = 0.1432E+04	CONC = 0.6234E+04	
AT TIME = 0.1435E+04	CONC = 0.6220E+04	
AT TIME = 0.1437E+04	CONC = 0.6206E+04	
AT TIME = 0.1440E+04	CONC = 0.6191E+04	
AT TIME = 0.1442E+04	CONC = 0.6176E+04	
AT TIME = 0.1445E+04	CONC = 0.6161E+04	
AT TIME = 0.1447E+04	CONC = 0.6146E+04	
AT TIME = 0.1450E+04	CONC = 0.6130E+04	
AT TIME = 0.1452E+04	CONC = 0.6114E+04	
AT TIME = 0.1455E+04	CONC = 0.6098E+04	
AT TIME = 0.1457E+04	CONC = 0.6082E+04	
AT TIME = 0.1460E+04	CONC = 0.6065E+04	
AT TIME = 0.1462E+04	CONC = 0.6048E+04	
AT TIME = 0.1465E+04	CONC = 0.6031E+04	
AT TIME = 0.1467E+04	CONC = 0.6014E+04	
AT TIME = 0.1470E+04	CONC = 0.5996E+04	
AT TIME = 0.1472E+04	CONC = 0.5979E+04	
AT TIME = 0.1475E+04	CONC = 0.5961E+04	
AT TIME = 0.1477E+04	CONC = 0.5943E+04	
AT TIME = 0.1518E+04	CONC = 0.5617E+04	
AT TIME = 0.1568E+04	CONC = 0.5176E+04	
AT TIME = 0.1627E+04	CONC = 0.4606E+04	
AT TIME = 0.1699E+04	CONC = 0.3908E+04	
AT TIME = 0.1784E+04	CONC = 0.3106E+04	
AT TIME = 0.1887E+04	CONC = 0.2256E+04	
AT TIME = 0.2011E+04	CONC = 0.1442E+04	
AT TIME = 0.2159E+04	CONC = 0.7553E+03	
AT TIME = 0.2336E+04	CONC = 0.2703E+03	
AT TIME = 0.3093E+04	CONC = -.5514E+02	

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION CONCENTRATION

1
npllhg.out

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

1
Run options
--- -------

Proposed Lea County Pit 100'to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - good liner - 100K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	30.40	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	30.4	-999.	0.100E-08	-999.

PAGE 0284

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

1

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	30.4	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.230E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+06	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

TIME	CONCENTRATION
0.160E+04	0.00000E+00
0.162E+04	0.00000E+00
0.164E+04	0.00000E+00
0.166E+04	0.00000E+00
0.168E+04	0.00000E+00
0.170E+04	0.00000E+00
0.172E+04	0.00000E+00
0.174E+04	0.00000E+00
0.176E+04	0.00000E+00
0.178E+04	0.00000E+00
0.180E+04	0.00000E+00
0.182E+04	0.00000E+00
0.184E+04	0.00000E+00
0.186E+04	0.00000E+00
0.188E+04	0.00000E+00
0.190E+04	0.15042E-14
0.192E+04	0.49655E+02
0.194E+04	0.15807E+03
0.196E+04	0.24365E+03
0.198E+04	0.32501E+03

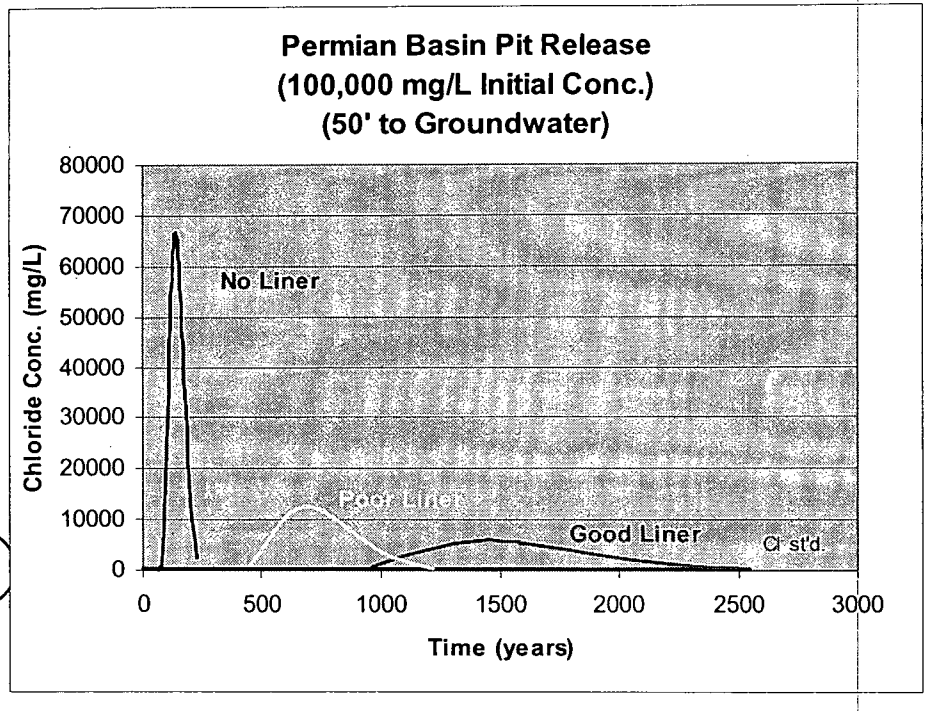
CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

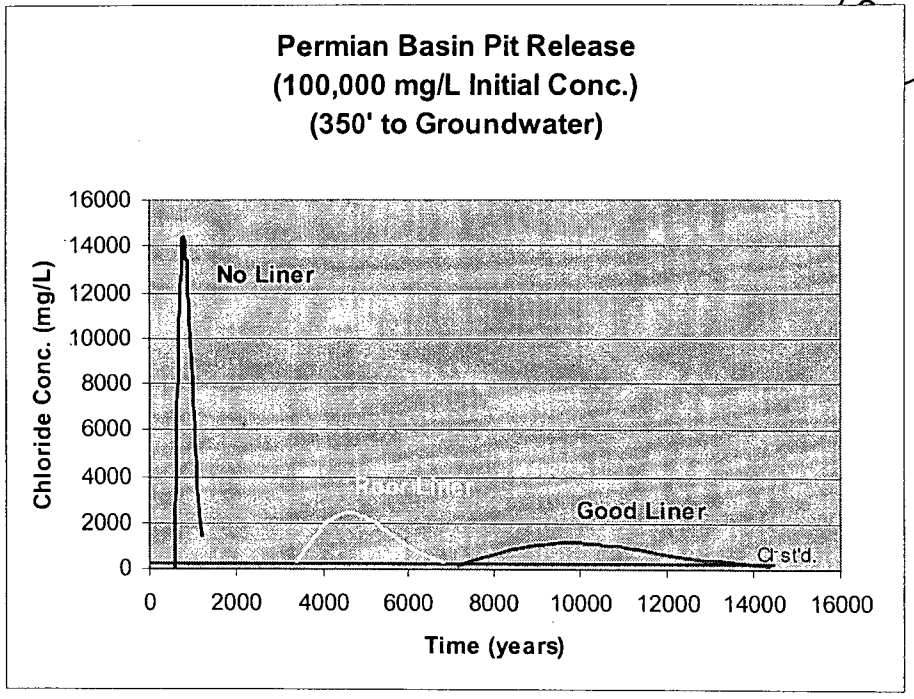
AT TIME = 0.1207E+04	CONC = 0.7675E+02	
AT TIME = 0.1585E+04	CONC = -.9342E+02	
AT TIME = 0.1900E+04	CONC = 0.4751E+03	
AT TIME = 0.2162E+04	CONC = 0.1543E+04	
AT TIME = 0.2380E+04	CONC = 0.2393E+04	
AT TIME = 0.2563E+04	CONC = 0.2865E+04	
AT TIME = 0.2714E+04	CONC = 0.3052E+04	
AT TIME = 0.2841E+04	CONC = 0.3072E+04	
AT TIME = 0.2946E+04	CONC = 0.3009E+04	
AT TIME = 0.3034E+04	CONC = 0.2911E+04	
AT TIME = 0.3037E+04	CONC = 0.2908E+04	
AT TIME = 0.3039E+04	CONC = 0.2905E+04	
AT TIME = 0.3042E+04	CONC = 0.2901E+04	
AT TIME = 0.3044E+04	CONC = 0.2898E+04	
AT TIME = 0.3047E+04	CONC = 0.2895E+04	
AT TIME = 0.3049E+04	CONC = 0.2891E+04	
AT TIME = 0.3052E+04	CONC = 0.2888E+04	
AT TIME = 0.3054E+04	CONC = 0.2884E+04	
AT TIME = 0.3057E+04	CONC = 0.2881E+04	
AT TIME = 0.3059E+04	CONC = 0.2877E+04	
AT TIME = 0.3062E+04	CONC = 0.2874E+04	
AT TIME = 0.3064E+04	CONC = 0.2870E+04	
AT TIME = 0.3067E+04	CONC = 0.2866E+04	
AT TIME = 0.3069E+04	CONC = 0.2863E+04	
AT TIME = 0.3072E+04	CONC = 0.2859E+04	
AT TIME = 0.3074E+04	CONC = 0.2855E+04	
AT TIME = 0.3077E+04	CONC = 0.2852E+04	
AT TIME = 0.3079E+04	CONC = 0.2848E+04	
AT TIME = 0.3082E+04	CONC = 0.2844E+04	
AT TIME = 0.3084E+04	CONC = 0.2840E+04	
AT TIME = 0.3172E+04	CONC = 0.2694E+04	
AT TIME = 0.3277E+04	CONC = 0.2493E+04	
AT TIME = 0.3404E+04	CONC = 0.2227E+04	
AT TIME = 0.3556E+04	CONC = 0.1898E+04	
AT TIME = 0.3738E+04	CONC = 0.1517E+04	
AT TIME = 0.3956E+04	CONC = 0.1108E+04	
AT TIME = 0.4218E+04	CONC = 0.7134E+03	
AT TIME = 0.4533E+04	CONC = 0.3781E+03	
AT TIME = 0.4911E+04	CONC = 0.1391E+03	
AT TIME = 0.6506E+04	CONC = -.2697E+02	

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

Modeling Results





U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed Permian Basin Pit; 350' to GW, Ksat of 1e-3 cm/sec

50 year ave. - 2' sandy loam cover - no liner - 100K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model

UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------

Van Genuchten functional coefficients
User defined coordinate system

1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	107.00	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	107.	-999.	0.100E-08	-999.

PAGE 0294

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	107.	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.298E-01	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+06	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	33.3	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

TIME	CONCENTRATION
0.500E+03	0.00000E+00
0.550E+03	0.00000E+00
0.600E+03	0.19966E+04
0.650E+03	0.61984E+04
0.700E+03	0.10532E+05
0.750E+03	0.13238E+05
0.800E+03	0.14200E+05
0.850E+03	0.13698E+05
0.900E+03	0.12131E+05
0.950E+03	0.99812E+04
0.100E+04	0.77751E+04
0.105E+04	0.56294E+04
0.110E+04	0.38163E+04
0.115E+04	0.24694E+04
0.120E+04	0.13018E+04
0.125E+04	0.11940E+04
0.130E+04	0.10960E+04
0.135E+04	0.99850E+03
0.140E+04	0.90099E+03
0.145E+04	0.80348E+03

VTRNSPThplnll2.doc

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

```
AT TIME = 0.5063E+03  CONC = -.2230E+04
AT TIME = 0.5723E+03  CONC = 0.1183E+03
AT TIME = 0.6273E+03  CONC = 0.4911E+04
AT TIME = 0.6731E+03  CONC = 0.9126E+04
AT TIME = 0.7113E+03  CONC = 0.1192E+05
AT TIME = 0.7431E+03  CONC = 0.1347E+05
AT TIME = 0.7697E+03  CONC = 0.1420E+05
AT TIME = 0.7918E+03  CONC = 0.1443E+05
AT TIME = 0.8102E+03  CONC = 0.1438E+05
AT TIME = 0.8255E+03  CONC = 0.1420E+05
AT TIME = 0.8280E+03  CONC = 0.1416E+05
AT TIME = 0.8305E+03  CONC = 0.1411E+05
AT TIME = 0.8330E+03  CONC = 0.1407E+05
AT TIME = 0.8355E+03  CONC = 0.1402E+05
AT TIME = 0.8380E+03  CONC = 0.1396E+05
AT TIME = 0.8405E+03  CONC = 0.1391E+05
AT TIME = 0.8430E+03  CONC = 0.1385E+05
AT TIME = 0.8455E+03  CONC = 0.1379E+05
AT TIME = 0.8480E+03  CONC = 0.1372E+05
AT TIME = 0.8505E+03  CONC = 0.1366E+05
AT TIME = 0.8530E+03  CONC = 0.1359E+05
AT TIME = 0.8555E+03  CONC = 0.1352E+05
AT TIME = 0.8580E+03  CONC = 0.1345E+05
AT TIME = 0.8605E+03  CONC = 0.1337E+05
AT TIME = 0.8630E+03  CONC = 0.1329E+05
AT TIME = 0.8655E+03  CONC = 0.1321E+05
AT TIME = 0.8680E+03  CONC = 0.1313E+05
AT TIME = 0.8705E+03  CONC = 0.1305E+05
AT TIME = 0.8730E+03  CONC = 0.1296E+05
AT TIME = 0.8755E+03  CONC = 0.1288E+05
AT TIME = 0.8909E+03  CONC = 0.1231E+05
AT TIME = 0.9093E+03  CONC = 0.1156E+05
AT TIME = 0.9314E+03  CONC = 0.1060E+05
AT TIME = 0.9579E+03  CONC = 0.9410E+04
AT TIME = 0.9898E+03  CONC = 0.7979E+04
AT TIME = 0.1028E+04  CONC = 0.6349E+04
AT TIME = 0.1074E+04  CONC = 0.4610E+04
AT TIME = 0.1129E+04  CONC = 0.2909E+04
AT TIME = 0.1195E+04  CONC = 0.1429E+04
AT TIME = 0.1927E+04  CONC = -.9005E+01
```

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED
SERIAL NUMBER TIME DEPTH CONCENTRATION
CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed Lea County Pit 350'to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - poor liner - 100K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model

UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	107.00	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	107.	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent, EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
--- ---

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
--- --- ---

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	107.	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.490E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+06	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

TIME	CONCENTRATION
0.300E+04	0.00000E+00
0.305E+04	0.00000E+00
0.310E+04	0.00000E+00
0.315E+04	0.00000E+00
0.320E+04	0.00000E+00
0.325E+04	0.00000E+00
0.330E+04	0.00000E+00
0.335E+04	0.00000E+00
0.340E+04	0.64835E+01
0.345E+04	0.16762E+03
0.350E+04	0.30217E+03
0.355E+04	0.43646E+03
0.360E+04	0.57074E+03
0.365E+04	0.70503E+03
0.370E+04	0.83932E+03
0.375E+04	0.95922E+03
0.380E+04	0.10846E+04
0.385E+04	0.12055E+04
0.390E+04	0.13264E+04
0.395E+04	0.14473E+04

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

```
AT TIME = 0.2997E+04  CONC = -.3659E+03
AT TIME = 0.3387E+04  CONC = 0.2872E+03
AT TIME = 0.3713E+04  CONC = 0.1168E+04
AT TIME = 0.3984E+04  CONC = 0.1828E+04
AT TIME = 0.4210E+04  CONC = 0.2212E+04
AT TIME = 0.4399E+04  CONC = 0.2392E+04
AT TIME = 0.4556E+04  CONC = 0.2448E+04
AT TIME = 0.4687E+04  CONC = 0.2436E+04
AT TIME = 0.4796E+04  CONC = 0.2391E+04
AT TIME = 0.4886E+04  CONC = 0.2333E+04
AT TIME = 0.4889E+04  CONC = 0.2331E+04
AT TIME = 0.4891E+04  CONC = 0.2329E+04
AT TIME = 0.4894E+04  CONC = 0.2327E+04
AT TIME = 0.4896E+04  CONC = 0.2325E+04
AT TIME = 0.4899E+04  CONC = 0.2324E+04
AT TIME = 0.4901E+04  CONC = 0.2322E+04
AT TIME = 0.4904E+04  CONC = 0.2320E+04
AT TIME = 0.4906E+04  CONC = 0.2318E+04
AT TIME = 0.4909E+04  CONC = 0.2316E+04
AT TIME = 0.4911E+04  CONC = 0.2314E+04
AT TIME = 0.4914E+04  CONC = 0.2312E+04
AT TIME = 0.4916E+04  CONC = 0.2310E+04
AT TIME = 0.4919E+04  CONC = 0.2308E+04
AT TIME = 0.4921E+04  CONC = 0.2306E+04
AT TIME = 0.4924E+04  CONC = 0.2304E+04
AT TIME = 0.4926E+04  CONC = 0.2302E+04
AT TIME = 0.4929E+04  CONC = 0.2300E+04
AT TIME = 0.4931E+04  CONC = 0.2298E+04
AT TIME = 0.4934E+04  CONC = 0.2296E+04
AT TIME = 0.4936E+04  CONC = 0.2294E+04
AT TIME = 0.5027E+04  CONC = 0.2212E+04
AT TIME = 0.5136E+04  CONC = 0.2099E+04
AT TIME = 0.5267E+04  CONC = 0.1946E+04
AT TIME = 0.5424E+04  CONC = 0.1749E+04
AT TIME = 0.5612E+04  CONC = 0.1505E+04
AT TIME = 0.5839E+04  CONC = 0.1218E+04
AT TIME = 0.6110E+04  CONC = 0.9041E+03
AT TIME = 0.6435E+04  CONC = 0.5889E+03
AT TIME = 0.6826E+04  CONC = 0.3074E+03
AT TIME = 0.1110E+05  CONC = -.4986E+01
```

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed Lea County Pit 350'to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - good liner - 100K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	107.00	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	107.	-999.	0.100E-08	-999.

PAGE 0310

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	107.	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.230E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+06	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

TIME	CONCENTRATION
0.700E+04	0.00000E+00
0.705E+04	0.00000E+00
0.710E+04	0.00000E+00
0.715E+04	0.00000E+00
0.720E+04	0.26801E+02
0.725E+04	0.57453E+02
0.730E+04	0.87650E+02
0.735E+04	0.11785E+03
0.740E+04	0.14804E+03
0.745E+04	0.17824E+03
0.750E+04	0.20843E+03
0.755E+04	0.23863E+03
0.760E+04	0.26883E+03
0.765E+04	0.29902E+03
0.770E+04	0.32922E+03
0.775E+04	0.35941E+03
0.780E+04	0.38961E+03
0.785E+04	0.41530E+03
0.790E+04	0.44595E+03
0.795E+04	0.47281E+03

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

```
AT TIME = 0.6330E+04  CONC = -.1694E+03
AT TIME = 0.7155E+04  CONC = 0.1515E+03
AT TIME = 0.7842E+04  CONC = 0.5697E+03
AT TIME = 0.8415E+04  CONC = 0.8786E+03
AT TIME = 0.8893E+04  CONC = 0.1055E+04
AT TIME = 0.9291E+04  CONC = 0.1136E+04
AT TIME = 0.9622E+04  CONC = 0.1160E+04
AT TIME = 0.9899E+04  CONC = 0.1152E+04
AT TIME = 0.1013E+05  CONC = 0.1129E+04
AT TIME = 0.1032E+05  CONC = 0.1100E+04
AT TIME = 0.1032E+05  CONC = 0.1100E+04
AT TIME = 0.1033E+05  CONC = 0.1099E+04
AT TIME = 0.1033E+05  CONC = 0.1099E+04
AT TIME = 0.1033E+05  CONC = 0.1098E+04
AT TIME = 0.1033E+05  CONC = 0.1098E+04
AT TIME = 0.1034E+05  CONC = 0.1097E+04
AT TIME = 0.1034E+05  CONC = 0.1097E+04
AT TIME = 0.1034E+05  CONC = 0.1096E+04
AT TIME = 0.1034E+05  CONC = 0.1096E+04
AT TIME = 0.1035E+05  CONC = 0.1096E+04
AT TIME = 0.1035E+05  CONC = 0.1095E+04
AT TIME = 0.1035E+05  CONC = 0.1095E+04
AT TIME = 0.1035E+05  CONC = 0.1094E+04
AT TIME = 0.1036E+05  CONC = 0.1094E+04
AT TIME = 0.1036E+05  CONC = 0.1093E+04
AT TIME = 0.1036E+05  CONC = 0.1093E+04
AT TIME = 0.1036E+05  CONC = 0.1093E+04
AT TIME = 0.1037E+05  CONC = 0.1092E+04
AT TIME = 0.1037E+05  CONC = 0.1092E+04
AT TIME = 0.1037E+05  CONC = 0.1091E+04
AT TIME = 0.1056E+05  CONC = 0.1053E+04
AT TIME = 0.1079E+05  CONC = 0.1001E+04
AT TIME = 0.1107E+05  CONC = 0.9291E+03
AT TIME = 0.1140E+05  CONC = 0.8362E+03
AT TIME = 0.1180E+05  CONC = 0.7205E+03
AT TIME = 0.1228E+05  CONC = 0.5844E+03
AT TIME = 0.1285E+05  CONC = 0.4347E+03
AT TIME = 0.1354E+05  CONC = 0.2841E+03
AT TIME = 0.1436E+05  CONC = 0.1492E+03
AT TIME = 0.2337E+05  CONC = -.2293E+01
```

1 UNSATURATED ZONE TRANSPORT RESULTS

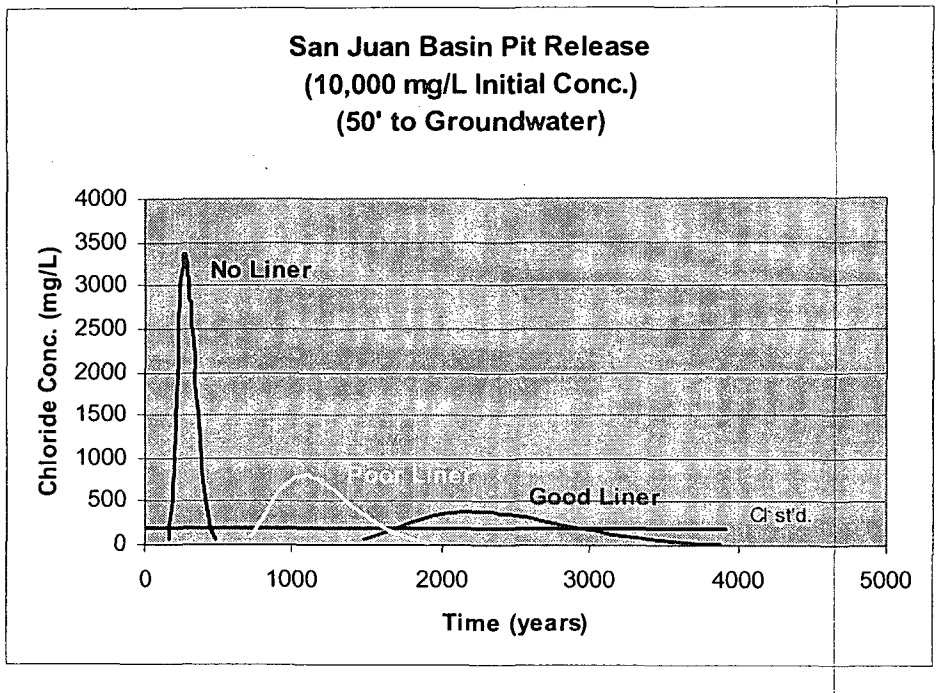
NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION CONCENTRATION

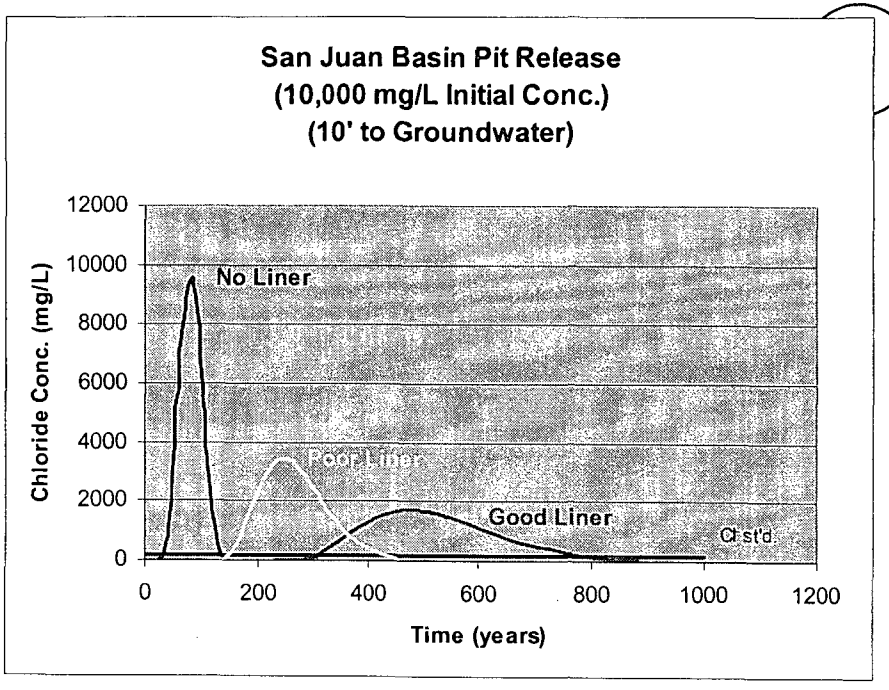
Pit Release Modeling for the Permian and San Juan Basins

MULTIMED Output Files for the San Juan Basin

(varying depth to groundwater)

Modeling Results





U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed San Juan Basin Pit; 10'to GW, Ksat of 1e-3 cm/sec

50 year ave. - 2' sandy loam cover - no liner - 10K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model

UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	3.05	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	3.05	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
--- ---

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
--- --- ---

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	3.05	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.134E-01	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

TIME	CONCENTRATION
0.000E+00	0.00000E+00
0.100E+02	0.00000E+00
0.200E+02	0.00000E+00
0.300E+02	0.48568E-02
0.400E+02	0.94173E+02
0.500E+02	0.12173E+04
0.600E+02	0.37669E+04
0.700E+02	0.64777E+04
0.800E+02	0.83620E+04
0.900E+02	0.92683E+04
0.100E+03	0.85717E+04
0.110E+03	0.61338E+04
0.120E+03	0.34357E+04
0.130E+03	0.15385E+04
0.140E+03	0.51931E+03
0.150E+03	0.95541E+02
0.160E+03	0.96899E+01
0.170E+03	0.44514E+01
0.180E+03	0.51220E+01
0.190E+03	0.61151E+01

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME =	0.1803E+02	CONC = -.3122E+01
AT TIME =	0.2581E+02	CONC = 0.1676E+02
AT TIME =	0.3229E+02	CONC = 0.9598E+02
AT TIME =	0.3769E+02	CONC = 0.6144E+03
AT TIME =	0.4219E+02	CONC = 0.1512E+04
AT TIME =	0.4594E+02	CONC = 0.2521E+04
AT TIME =	0.4906E+02	CONC = 0.3463E+04
AT TIME =	0.5167E+02	CONC = 0.4268E+04
AT TIME =	0.5384E+02	CONC = 0.4927E+04
AT TIME =	0.5565E+02	CONC = 0.5458E+04
AT TIME =	0.5815E+02	CONC = 0.6149E+04
AT TIME =	0.6065E+02	CONC = 0.6780E+04
AT TIME =	0.6315E+02	CONC = 0.7345E+04
AT TIME =	0.6565E+02	CONC = 0.7845E+04
AT TIME =	0.6815E+02	CONC = 0.8273E+04
AT TIME =	0.7065E+02	CONC = 0.8626E+04
AT TIME =	0.7315E+02	CONC = 0.8920E+04
AT TIME =	0.7565E+02	CONC = 0.9171E+04
AT TIME =	0.7815E+02	CONC = 0.9377E+04
AT TIME =	0.8065E+02	CONC = 0.9513E+04
AT TIME =	0.8315E+02	CONC = 0.9543E+04
AT TIME =	0.8565E+02	CONC = 0.9435E+04
AT TIME =	0.8815E+02	CONC = 0.9172E+04
AT TIME =	0.9065E+02	CONC = 0.8754E+04
AT TIME =	0.9315E+02	CONC = 0.8202E+04
AT TIME =	0.9565E+02	CONC = 0.7545E+04
AT TIME =	0.9815E+02	CONC = 0.6819E+04
AT TIME =	0.1006E+03	CONC = 0.6059E+04
AT TIME =	0.1031E+03	CONC = 0.5298E+04
AT TIME =	0.1056E+03	CONC = 0.4561E+04
AT TIME =	0.1075E+03	CONC = 0.4054E+04
AT TIME =	0.1096E+03	CONC = 0.3485E+04
AT TIME =	0.1122E+03	CONC = 0.2865E+04
AT TIME =	0.1154E+03	CONC = 0.2218E+04
AT TIME =	0.1191E+03	CONC = 0.1582E+04
AT TIME =	0.1236E+03	CONC = 0.1003E+04
AT TIME =	0.1290E+03	CONC = 0.5304E+03
AT TIME =	0.1355E+03	CONC = 0.1998E+03
AT TIME =	0.1433E+03	CONC = 0.1884E+02
AT TIME =	0.1900E+03	CONC = 0.2298E+02

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION
CONCENTRATION			

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed San Juan Basin Pit; 10' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - poor liner - 10K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	3.05	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	3.05	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	3.05	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.310E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

TIME	CONCENTRATION
0.150E+03	0.91509E+02
0.170E+03	0.55652E+03
0.190E+03	0.13922E+04
0.210E+03	0.22994E+04
0.230E+03	0.30943E+04
0.250E+03	0.34042E+04
0.270E+03	0.32956E+04
0.290E+03	0.28951E+04
0.310E+03	0.23610E+04
0.330E+03	0.18218E+04
0.350E+03	0.12888E+04
0.370E+03	0.85927E+03
0.390E+03	0.55889E+03
0.410E+03	0.35691E+03
0.430E+03	0.19466E+03
0.450E+03	0.74168E+02
0.470E+03	0.38786E+02
0.490E+03	0.18387E+02
0.510E+03	0.25313E+01
0.530E+03	0.00000E+00

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME =	0.7793E+02	CONC = -.3117E+01
AT TIME =	0.1115E+03	CONC = 0.1796E+02
AT TIME =	0.1395E+03	CONC = 0.8849E+02
AT TIME =	0.1629E+03	CONC = 0.5982E+03
AT TIME =	0.1823E+03	CONC = 0.1471E+04
AT TIME =	0.1985E+03	CONC = 0.2295E+04
AT TIME =	0.2120E+03	CONC = 0.2878E+04
AT TIME =	0.2233E+03	CONC = 0.3223E+04
AT TIME =	0.2327E+03	CONC = 0.3395E+04
AT TIME =	0.2405E+03	CONC = 0.3460E+04
AT TIME =	0.2430E+03	CONC = 0.3466E+04
AT TIME =	0.2455E+03	CONC = 0.3465E+04
AT TIME =	0.2480E+03	CONC = 0.3458E+04
AT TIME =	0.2505E+03	CONC = 0.3445E+04
AT TIME =	0.2530E+03	CONC = 0.3427E+04
AT TIME =	0.2555E+03	CONC = 0.3402E+04
AT TIME =	0.2580E+03	CONC = 0.3373E+04
AT TIME =	0.2605E+03	CONC = 0.3338E+04
AT TIME =	0.2630E+03	CONC = 0.3299E+04
AT TIME =	0.2655E+03	CONC = 0.3256E+04
AT TIME =	0.2680E+03	CONC = 0.3209E+04
AT TIME =	0.2705E+03	CONC = 0.3158E+04
AT TIME =	0.2730E+03	CONC = 0.3104E+04
AT TIME =	0.2755E+03	CONC = 0.3047E+04
AT TIME =	0.2780E+03	CONC = 0.2987E+04
AT TIME =	0.2805E+03	CONC = 0.2925E+04
AT TIME =	0.2830E+03	CONC = 0.2862E+04
AT TIME =	0.2855E+03	CONC = 0.2796E+04
AT TIME =	0.2880E+03	CONC = 0.2729E+04
AT TIME =	0.2905E+03	CONC = 0.2660E+04
AT TIME =	0.2983E+03	CONC = 0.2441E+04
AT TIME =	0.3077E+03	CONC = 0.2175E+04
AT TIME =	0.3189E+03	CONC = 0.1861E+04
AT TIME =	0.3324E+03	CONC = 0.1510E+04
AT TIME =	0.3487E+03	CONC = 0.1140E+04
AT TIME =	0.3681E+03	CONC = 0.7787E+03
AT TIME =	0.3914E+03	CONC = 0.4607E+03
AT TIME =	0.4194E+03	CONC = 0.2165E+03
AT TIME =	0.4531E+03	CONC = 0.6234E+02
AT TIME =	0.5621E+03	CONC = -.1808E+02

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed San Juan Basin Pit; 10' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - good liner - 10K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	3.05	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	3.05	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	3.05	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.150E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

TIME	CONCENTRATION
0.250E+03	0.10035E+02
0.270E+03	0.34780E+02
0.290E+03	0.52760E+02
0.310E+03	0.15298E+03
0.330E+03	0.33954E+03
0.350E+03	0.42629E+03
0.370E+03	0.70170E+03
0.390E+03	0.82222E+03
0.410E+03	0.10569E+04
0.430E+03	0.11451E+04
0.450E+03	0.12410E+04
0.470E+03	0.12965E+04
0.490E+03	0.13045E+04
0.510E+03	0.12772E+04
0.530E+03	0.12214E+04
0.550E+03	0.11427E+04
0.570E+03	0.10436E+04
0.590E+03	0.94064E+03
0.610E+03	0.82421E+03
0.630E+03	0.72001E+03

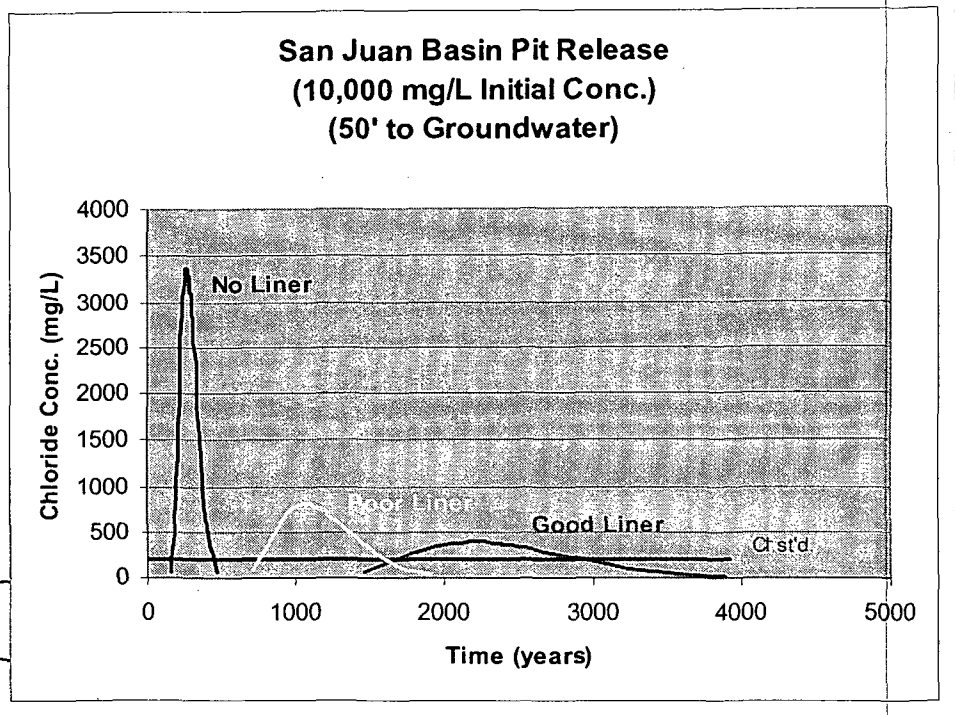
CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

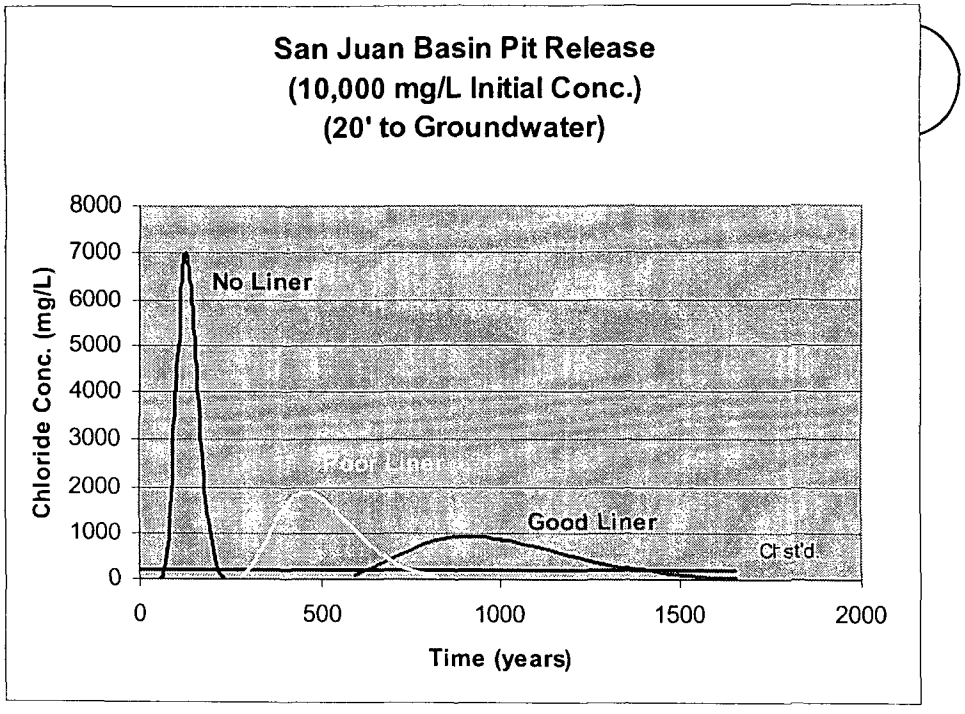
```
AT TIME = 0.1611E+03  CONC = -.3797E+01
AT TIME = 0.2305E+03  CONC = 0.1179E+02
AT TIME = 0.2884E+03  CONC = 0.8086E+02
AT TIME = 0.3366E+03  CONC = 0.5269E+03
AT TIME = 0.3768E+03  CONC = 0.1053E+04
AT TIME = 0.4103E+03  CONC = 0.1427E+04
AT TIME = 0.4382E+03  CONC = 0.1628E+04
AT TIME = 0.4615E+03  CONC = 0.1708E+04
AT TIME = 0.4809E+03  CONC = 0.1717E+04
AT TIME = 0.4970E+03  CONC = 0.1691E+04
AT TIME = 0.4995E+03  CONC = 0.1684E+04
AT TIME = 0.5020E+03  CONC = 0.1677E+04
AT TIME = 0.5045E+03  CONC = 0.1669E+04
AT TIME = 0.5070E+03  CONC = 0.1660E+04
AT TIME = 0.5095E+03  CONC = 0.1651E+04
AT TIME = 0.5120E+03  CONC = 0.1642E+04
AT TIME = 0.5145E+03  CONC = 0.1632E+04
AT TIME = 0.5170E+03  CONC = 0.1622E+04
AT TIME = 0.5195E+03  CONC = 0.1611E+04
AT TIME = 0.5220E+03  CONC = 0.1599E+04
AT TIME = 0.5245E+03  CONC = 0.1587E+04
AT TIME = 0.5270E+03  CONC = 0.1575E+04
AT TIME = 0.5295E+03  CONC = 0.1562E+04
AT TIME = 0.5320E+03  CONC = 0.1549E+04
AT TIME = 0.5345E+03  CONC = 0.1536E+04
AT TIME = 0.5370E+03  CONC = 0.1522E+04
AT TIME = 0.5395E+03  CONC = 0.1508E+04
AT TIME = 0.5420E+03  CONC = 0.1494E+04
AT TIME = 0.5445E+03  CONC = 0.1479E+04
AT TIME = 0.5470E+03  CONC = 0.1464E+04
AT TIME = 0.5632E+03  CONC = 0.1362E+04
AT TIME = 0.5825E+03  CONC = 0.1232E+04
AT TIME = 0.6058E+03  CONC = 0.1072E+04
AT TIME = 0.6337E+03  CONC = 0.8863E+03
AT TIME = 0.6672E+03  CONC = 0.6830E+03
AT TIME = 0.7074E+03  CONC = 0.4782E+03
AT TIME = 0.7556E+03  CONC = 0.2923E+03
AT TIME = 0.8135E+03  CONC = 0.1451E+03
AT TIME = 0.8830E+03  CONC = 0.4840E+02
AT TIME = 0.1095E+04  CONC = -.1052E+02
```

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

Modeling Results





U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed San Juan Basin Pit; 20'to GW, Ksat of 1e-3 cm/sec

50 year ave. - 2' sandy loam cover - no liner - 10K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	6.10	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	6.10	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	6.10	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.134E-01	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.100E+02	0.00000E+00
0.200E+02	0.00000E+00
0.300E+02	0.00000E+00
0.400E+02	0.39646E-16
0.500E+02	0.50458E+00
0.600E+02	0.69488E+01
0.700E+02	0.54003E+02
0.800E+02	0.33253E+03
0.900E+02	0.10893E+04
0.100E+03	0.23075E+04
0.110E+03	0.38518E+04
0.120E+03	0.53990E+04
0.130E+03	0.65177E+04
0.140E+03	0.68502E+04
0.150E+03	0.63816E+04
0.160E+03	0.53750E+04
0.170E+03	0.41665E+04
0.180E+03	0.30062E+04
0.190E+03	0.20044E+04
0.200E+03	0.12578E+04

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

```
AT TIME = 0.3994E+02  CONC = 0.3239E+01
AT TIME = 0.5436E+02  CONC = 0.1204E+02
AT TIME = 0.6638E+02  CONC = 0.9583E+02
AT TIME = 0.7639E+02  CONC = 0.6402E+03
AT TIME = 0.8474E+02  CONC = 0.1551E+04
AT TIME = 0.9170E+02  CONC = 0.2534E+04
AT TIME = 0.9749E+02  CONC = 0.3445E+04
AT TIME = 0.1023E+03  CONC = 0.4241E+04
AT TIME = 0.1063E+03  CONC = 0.4901E+04
AT TIME = 0.1097E+03  CONC = 0.5424E+04
AT TIME = 0.1122E+03  CONC = 0.5784E+04
AT TIME = 0.1147E+03  CONC = 0.6109E+04
AT TIME = 0.1172E+03  CONC = 0.6390E+04
AT TIME = 0.1197E+03  CONC = 0.6623E+04
AT TIME = 0.1222E+03  CONC = 0.6801E+04
AT TIME = 0.1247E+03  CONC = 0.6923E+04
AT TIME = 0.1272E+03  CONC = 0.6987E+04
AT TIME = 0.1297E+03  CONC = 0.6994E+04
AT TIME = 0.1322E+03  CONC = 0.6947E+04
AT TIME = 0.1347E+03  CONC = 0.6849E+04
AT TIME = 0.1372E+03  CONC = 0.6705E+04
AT TIME = 0.1397E+03  CONC = 0.6519E+04
AT TIME = 0.1422E+03  CONC = 0.6298E+04
AT TIME = 0.1447E+03  CONC = 0.6048E+04
AT TIME = 0.1472E+03  CONC = 0.5773E+04
AT TIME = 0.1497E+03  CONC = 0.5481E+04
AT TIME = 0.1522E+03  CONC = 0.5176E+04
AT TIME = 0.1547E+03  CONC = 0.4863E+04
AT TIME = 0.1572E+03  CONC = 0.4546E+04
AT TIME = 0.1597E+03  CONC = 0.4230E+04
AT TIME = 0.1631E+03  CONC = 0.3813E+04
AT TIME = 0.1671E+03  CONC = 0.3331E+04
AT TIME = 0.1719E+03  CONC = 0.2790E+04
AT TIME = 0.1777E+03  CONC = 0.2210E+04
AT TIME = 0.1847E+03  CONC = 0.1619E+04
AT TIME = 0.1930E+03  CONC = 0.1062E+04
AT TIME = 0.2030E+03  CONC = 0.5882E+03
AT TIME = 0.2150E+03  CONC = 0.2379E+03
AT TIME = 0.2295E+03  CONC = 0.2963E+02
AT TIME = 0.2932E+03  CONC = -.1434E+02
```

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed San Juan Basin Pit; 20' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - poor liner - 10K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model

UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	6.10	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	6.10	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
--- ---

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
--- --- ---

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	6.10	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.310E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

TIME	CONCENTRATION
0.300E+03	0.34588E+02
0.320E+03	0.34677E+03
0.340E+03	0.50371E+03
0.360E+03	0.89830E+03
0.380E+03	0.10999E+04
0.400E+03	0.14320E+04
0.420E+03	0.16034E+04
0.440E+03	0.17147E+04
0.460E+03	0.17731E+04
0.480E+03	0.17648E+04
0.500E+03	0.17038E+04
0.520E+03	0.15962E+04
0.540E+03	0.14553E+04
0.560E+03	0.12874E+04
0.580E+03	0.11173E+04
0.600E+03	0.95606E+03
0.620E+03	0.82280E+03
0.640E+03	0.67200E+03
0.660E+03	0.52383E+03
0.680E+03	0.43839E+03

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME = 0.1725E+03	CONC = 0.4130E+01	
AT TIME = 0.2349E+03	CONC = -.5408E+00	
AT TIME = 0.2868E+03	CONC = 0.8498E+02	
AT TIME = 0.3301E+03	CONC = 0.5809E+03	
AT TIME = 0.3661E+03	CONC = 0.1144E+04	
AT TIME = 0.3962E+03	CONC = 0.1545E+04	
AT TIME = 0.4212E+03	CONC = 0.1767E+04	
AT TIME = 0.4421E+03	CONC = 0.1862E+04	
AT TIME = 0.4595E+03	CONC = 0.1880E+04	
AT TIME = 0.4740E+03	CONC = 0.1859E+04	
AT TIME = 0.4765E+03	CONC = 0.1852E+04	
AT TIME = 0.4790E+03	CONC = 0.1845E+04	
AT TIME = 0.4815E+03	CONC = 0.1836E+04	
AT TIME = 0.4840E+03	CONC = 0.1827E+04	
AT TIME = 0.4865E+03	CONC = 0.1817E+04	
AT TIME = 0.4890E+03	CONC = 0.1807E+04	
AT TIME = 0.4915E+03	CONC = 0.1795E+04	
AT TIME = 0.4940E+03	CONC = 0.1784E+04	
AT TIME = 0.4965E+03	CONC = 0.1771E+04	
AT TIME = 0.4990E+03	CONC = 0.1758E+04	
AT TIME = 0.5015E+03	CONC = 0.1744E+04	
AT TIME = 0.5040E+03	CONC = 0.1730E+04	
AT TIME = 0.5065E+03	CONC = 0.1715E+04	
AT TIME = 0.5090E+03	CONC = 0.1700E+04	
AT TIME = 0.5115E+03	CONC = 0.1684E+04	
AT TIME = 0.5140E+03	CONC = 0.1668E+04	
AT TIME = 0.5165E+03	CONC = 0.1651E+04	
AT TIME = 0.5190E+03	CONC = 0.1634E+04	
AT TIME = 0.5215E+03	CONC = 0.1617E+04	
AT TIME = 0.5240E+03	CONC = 0.1599E+04	
AT TIME = 0.5385E+03	CONC = 0.1490E+04	
AT TIME = 0.5559E+03	CONC = 0.1351E+04	
AT TIME = 0.5767E+03	CONC = 0.1181E+04	
AT TIME = 0.6018E+03	CONC = 0.9804E+03	
AT TIME = 0.6318E+03	CONC = 0.7601E+03	
AT TIME = 0.6679E+03	CONC = 0.5360E+03	
AT TIME = 0.7112E+03	CONC = 0.3299E+03	
AT TIME = 0.7631E+03	CONC = 0.1639E+03	
AT TIME = 0.8254E+03	CONC = 0.5273E+02	
AT TIME = 0.1059E+04	CONC = -.1313E+02	

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED

SERIAL NUMBER	TIME	DEPTH	CONCENTRATION

CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed San Juan Basin Pit; 20' to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - good liner - 10K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1

UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	6.10	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	6.10	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	6.10	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.150E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

TIME	CONCENTRATION
0.500E+03	0.00000E+00
0.520E+03	0.00000E+00
0.540E+03	0.00000E+00
0.560E+03	0.00000E+00
0.580E+03	0.00000E+00
0.600E+03	0.27438E+00
0.620E+03	0.56548E+02
0.640E+03	0.11710E+03
0.660E+03	0.16851E+03
0.680E+03	0.21872E+03
0.700E+03	0.24836E+03
0.720E+03	0.32541E+03
0.740E+03	0.38562E+03
0.760E+03	0.43256E+03
0.780E+03	0.46742E+03
0.800E+03	0.52067E+03
0.820E+03	0.56122E+03
0.840E+03	0.57708E+03
0.860E+03	0.60754E+03
0.880E+03	0.62111E+03

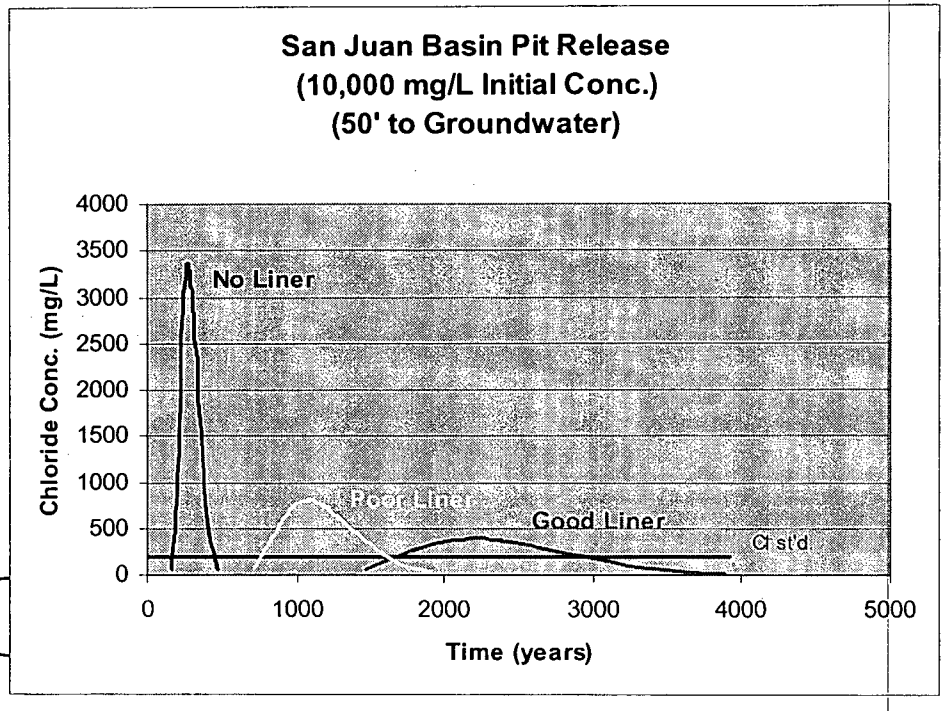
CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

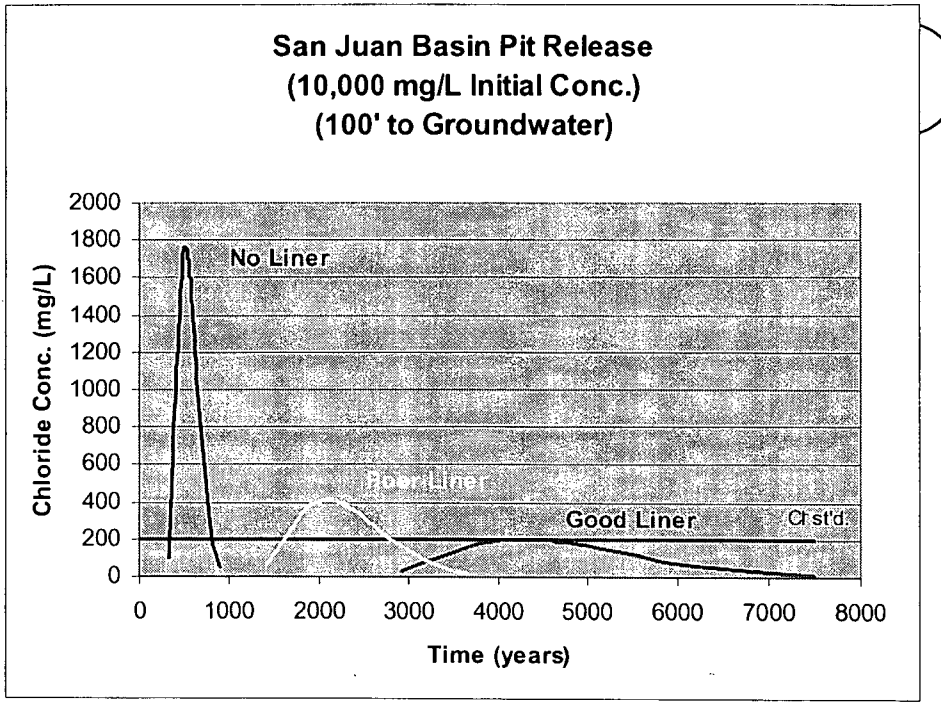
```
AT TIME = 0.3566E+03  CONC = 0.9202E+01
AT TIME = 0.4853E+03  CONC = -.1147E+02
AT TIME = 0.5927E+03  CONC = 0.8419E+02
AT TIME = 0.6821E+03  CONC = 0.3768E+03
AT TIME = 0.7566E+03  CONC = 0.6494E+03
AT TIME = 0.8187E+03  CONC = 0.8176E+03
AT TIME = 0.8705E+03  CONC = 0.8954E+03
AT TIME = 0.9136E+03  CONC = 0.9163E+03
AT TIME = 0.9495E+03  CONC = 0.9067E+03
AT TIME = 0.9795E+03  CONC = 0.8830E+03
AT TIME = 0.9820E+03  CONC = 0.8804E+03
AT TIME = 0.9845E+03  CONC = 0.8778E+03
AT TIME = 0.9870E+03  CONC = 0.8751E+03
AT TIME = 0.9895E+03  CONC = 0.8724E+03
AT TIME = 0.9920E+03  CONC = 0.8695E+03
AT TIME = 0.9945E+03  CONC = 0.8666E+03
AT TIME = 0.9970E+03  CONC = 0.8636E+03
AT TIME = 0.9995E+03  CONC = 0.8605E+03
AT TIME = 0.1002E+04  CONC = 0.8574E+03
AT TIME = 0.1004E+04  CONC = 0.8542E+03
AT TIME = 0.1007E+04  CONC = 0.8510E+03
AT TIME = 0.1009E+04  CONC = 0.8476E+03
AT TIME = 0.1012E+04  CONC = 0.8443E+03
AT TIME = 0.1014E+04  CONC = 0.8408E+03
AT TIME = 0.1017E+04  CONC = 0.8373E+03
AT TIME = 0.1019E+04  CONC = 0.8338E+03
AT TIME = 0.1022E+04  CONC = 0.8301E+03
AT TIME = 0.1024E+04  CONC = 0.8265E+03
AT TIME = 0.1027E+04  CONC = 0.8227E+03
AT TIME = 0.1029E+04  CONC = 0.8190E+03
AT TIME = 0.1059E+04  CONC = 0.7701E+03
AT TIME = 0.1095E+04  CONC = 0.7051E+03
AT TIME = 0.1138E+04  CONC = 0.6225E+03
AT TIME = 0.1190E+04  CONC = 0.5230E+03
AT TIME = 0.1252E+04  CONC = 0.4108E+03
AT TIME = 0.1327E+04  CONC = 0.2941E+03
AT TIME = 0.1416E+04  CONC = 0.1846E+03
AT TIME = 0.1524E+04  CONC = 0.9467E+02
AT TIME = 0.1652E+04  CONC = 0.3302E+02
AT TIME = 0.2122E+04  CONC = -.7102E+01
```

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

Modeling Results





U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed San Juan Basin Pit; 100'to GW, Ksat of 1e-3 cm/sec

50 year ave. - 2' sandy loam cover - no liner - 10K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model

UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	30.40	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	30.4	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent, EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

I	- Stehfest terms or number of increments		18
ITEL	- Points in Lagrangian interpolation		3
IGPTS	- Number of Gauss points		104
IIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
--- ---

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
--- --- ---

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	30.4	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.134E-01	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

TIME	CONCENTRATION
0.300E+03	0.00000E+00
0.310E+03	0.00000E+00
0.320E+03	0.00000E+00
0.330E+03	0.52829E-11
0.340E+03	0.18857E+02
0.350E+03	0.15539E+03
0.360E+03	0.31265E+03
0.370E+03	0.44575E+03
0.380E+03	0.49829E+03
0.390E+03	0.58804E+03
0.400E+03	0.78736E+03
0.410E+03	0.96883E+03
0.420E+03	0.10182E+04
0.430E+03	0.11242E+04
0.440E+03	0.12895E+04
0.450E+03	0.13670E+04
0.460E+03	0.14261E+04
0.470E+03	0.15320E+04
0.480E+03	0.15659E+04
0.490E+03	0.16102E+04

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME = 0.2087E+03	CONC = 0.2232E+02	
AT TIME = 0.2740E+03	CONC = -.2650E+02	
AT TIME = 0.3284E+03	CONC = 0.9793E+02	
AT TIME = 0.3737E+03	CONC = 0.6009E+03	
AT TIME = 0.4115E+03	CONC = 0.1122E+04	
AT TIME = 0.4430E+03	CONC = 0.1480E+04	
AT TIME = 0.4693E+03	CONC = 0.1673E+04	
AT TIME = 0.4911E+03	CONC = 0.1753E+04	
AT TIME = 0.5093E+03	CONC = 0.1766E+04	
AT TIME = 0.5245E+03	CONC = 0.1745E+04	
AT TIME = 0.5270E+03	CONC = 0.1739E+04	
AT TIME = 0.5295E+03	CONC = 0.1732E+04	
AT TIME = 0.5320E+03	CONC = 0.1724E+04	
AT TIME = 0.5345E+03	CONC = 0.1716E+04	
AT TIME = 0.5370E+03	CONC = 0.1708E+04	
AT TIME = 0.5395E+03	CONC = 0.1699E+04	
AT TIME = 0.5420E+03	CONC = 0.1689E+04	
AT TIME = 0.5445E+03	CONC = 0.1679E+04	
AT TIME = 0.5470E+03	CONC = 0.1668E+04	
AT TIME = 0.5495E+03	CONC = 0.1656E+04	
AT TIME = 0.5520E+03	CONC = 0.1645E+04	
AT TIME = 0.5545E+03	CONC = 0.1632E+04	
AT TIME = 0.5570E+03	CONC = 0.1620E+04	
AT TIME = 0.5595E+03	CONC = 0.1607E+04	
AT TIME = 0.5620E+03	CONC = 0.1593E+04	
AT TIME = 0.5645E+03	CONC = 0.1579E+04	
AT TIME = 0.5670E+03	CONC = 0.1565E+04	
AT TIME = 0.5695E+03	CONC = 0.1550E+04	
AT TIME = 0.5720E+03	CONC = 0.1535E+04	
AT TIME = 0.5745E+03	CONC = 0.1520E+04	
AT TIME = 0.5897E+03	CONC = 0.1422E+04	
AT TIME = 0.6079E+03	CONC = 0.1296E+04	
AT TIME = 0.6298E+03	CONC = 0.1139E+04	
AT TIME = 0.6560E+03	CONC = 0.9530E+03	
AT TIME = 0.6875E+03	CONC = 0.7460E+03	
AT TIME = 0.7253E+03	CONC = 0.5322E+03	
AT TIME = 0.7706E+03	CONC = 0.3321E+03	
AT TIME = 0.8250E+03	CONC = 0.1674E+03	
AT TIME = 0.8903E+03	CONC = 0.5429E+02	
AT TIME = 0.1176E+04	CONC = -.1274E+02	

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed San Juan Basin Pit; 100'to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - poor liner - 10K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model

UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	30.40	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	30.4	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
--- ---

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

1

DATA FOR LAYER 1
--- --- ---

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	30.4	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.310E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.150E+04	0.65267E+02
0.152E+04	0.79825E+02
0.154E+04	0.94381E+02
0.156E+04	0.10894E+03
0.158E+04	0.12349E+03
0.160E+04	0.13805E+03
0.162E+04	0.14517E+03
0.164E+04	0.16481E+03
0.166E+04	0.18040E+03
0.168E+04	0.19469E+03
0.170E+04	0.20885E+03
0.172E+04	0.22299E+03
0.174E+04	0.23713E+03
0.176E+04	0.25127E+03
0.178E+04	0.25766E+03
0.180E+04	0.27070E+03
0.182E+04	0.28149E+03
0.184E+04	0.29108E+03
0.186E+04	0.30078E+03
0.188E+04	0.31035E+03

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME =	0.8963E+03	CONC = 0.1025E+02
AT TIME =	0.1177E+04	CONC = -.1260E+02
AT TIME =	0.1410E+04	CONC = 0.6013E+02
AT TIME =	0.1605E+04	CONC = 0.2028E+03
AT TIME =	0.1767E+04	CONC = 0.3184E+03
AT TIME =	0.1902E+04	CONC = 0.3835E+03
AT TIME =	0.2015E+04	CONC = 0.4102E+03
AT TIME =	0.2109E+04	CONC = 0.4140E+03
AT TIME =	0.2187E+04	CONC = 0.4063E+03
AT TIME =	0.2253E+04	CONC = 0.3936E+03
AT TIME =	0.2255E+04	CONC = 0.3930E+03
AT TIME =	0.2258E+04	CONC = 0.3924E+03
AT TIME =	0.2260E+04	CONC = 0.3918E+03
AT TIME =	0.2263E+04	CONC = 0.3912E+03
AT TIME =	0.2265E+04	CONC = 0.3906E+03
AT TIME =	0.2268E+04	CONC = 0.3900E+03
AT TIME =	0.2270E+04	CONC = 0.3894E+03
AT TIME =	0.2273E+04	CONC = 0.3888E+03
AT TIME =	0.2275E+04	CONC = 0.3881E+03
AT TIME =	0.2278E+04	CONC = 0.3875E+03
AT TIME =	0.2280E+04	CONC = 0.3868E+03
AT TIME =	0.2283E+04	CONC = 0.3862E+03
AT TIME =	0.2285E+04	CONC = 0.3855E+03
AT TIME =	0.2288E+04	CONC = 0.3849E+03
AT TIME =	0.2290E+04	CONC = 0.3842E+03
AT TIME =	0.2293E+04	CONC = 0.3835E+03
AT TIME =	0.2295E+04	CONC = 0.3828E+03
AT TIME =	0.2298E+04	CONC = 0.3821E+03
AT TIME =	0.2300E+04	CONC = 0.3815E+03
AT TIME =	0.2303E+04	CONC = 0.3808E+03
AT TIME =	0.2368E+04	CONC = 0.3608E+03
AT TIME =	0.2446E+04	CONC = 0.3333E+03
AT TIME =	0.2540E+04	CONC = 0.2975E+03
AT TIME =	0.2653E+04	CONC = 0.2532E+03
AT TIME =	0.2788E+04	CONC = 0.2019E+03
AT TIME =	0.2950E+04	CONC = 0.1473E+03
AT TIME =	0.3145E+04	CONC = 0.9460E+02
AT TIME =	0.3378E+04	CONC = 0.4996E+02
AT TIME =	0.3659E+04	CONC = 0.1822E+02
AT TIME =	0.4846E+04	CONC = -.3597E+01

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed San Juan Basin Pit; 100'to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - good liner - 10K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	30.40	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	30.4	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	30.4	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.150E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.420E+04	0.12764E+03
0.422E+04	0.12771E+03
0.424E+04	0.12778E+03
0.426E+04	0.12784E+03
0.428E+04	0.12791E+03
0.430E+04	0.12798E+03
0.432E+04	0.12804E+03
0.434E+04	0.12811E+03
0.436E+04	0.12815E+03
0.438E+04	0.12768E+03
0.440E+04	0.12717E+03
0.442E+04	0.12673E+03
0.444E+04	0.12631E+03
0.446E+04	0.12589E+03
0.448E+04	0.12546E+03
0.450E+04	0.12504E+03
0.452E+04	0.12473E+03
0.454E+04	0.12398E+03
0.456E+04	0.12304E+03
0.458E+04	0.12226E+03

VTRNSPTdpllfg.doc

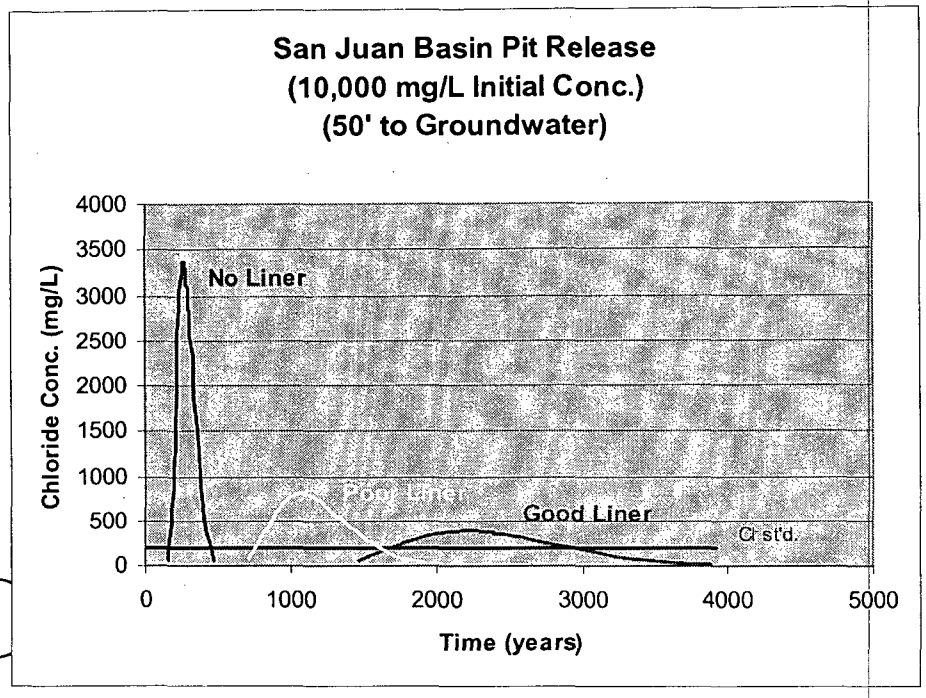
CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

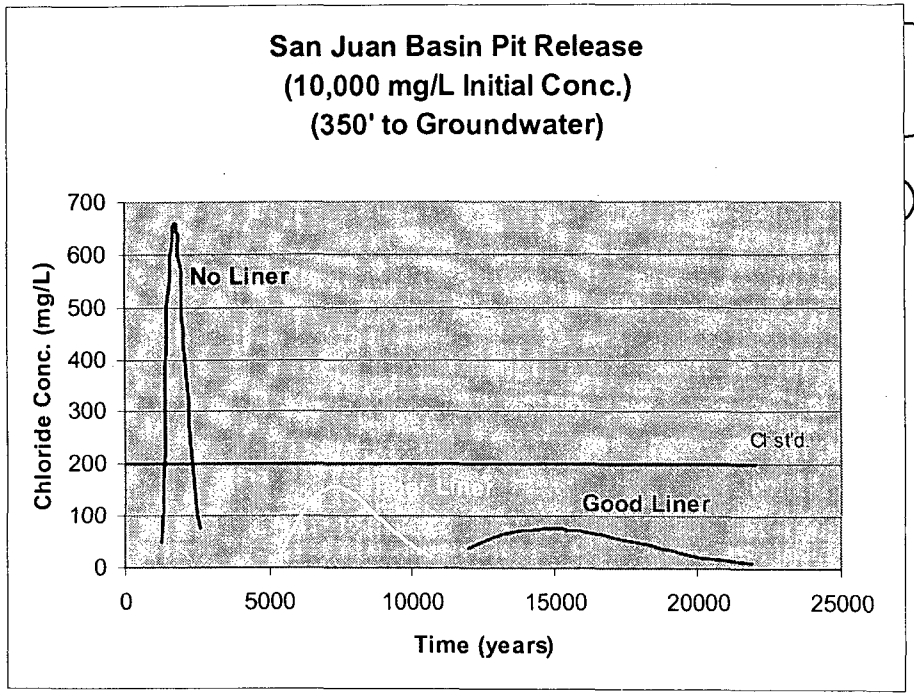
AT TIME =	0.1850E+04	CONC = 0.5017E+01
AT TIME =	0.2429E+04	CONC = -.6034E+01
AT TIME =	0.2911E+04	CONC = 0.3293E+02
AT TIME =	0.3313E+04	CONC = 0.1032E+03
AT TIME =	0.3648E+04	CONC = 0.1580E+03
AT TIME =	0.3927E+04	CONC = 0.1880E+03
AT TIME =	0.4159E+04	CONC = 0.1995E+03
AT TIME =	0.4353E+04	CONC = 0.2004E+03
AT TIME =	0.4514E+04	CONC = 0.1959E+03
AT TIME =	0.4649E+04	CONC = 0.1893E+03
AT TIME =	0.4652E+04	CONC = 0.1891E+03
AT TIME =	0.4654E+04	CONC = 0.1890E+03
AT TIME =	0.4657E+04	CONC = 0.1888E+03
AT TIME =	0.4659E+04	CONC = 0.1887E+03
AT TIME =	0.4662E+04	CONC = 0.1885E+03
AT TIME =	0.4664E+04	CONC = 0.1884E+03
AT TIME =	0.4667E+04	CONC = 0.1882E+03
AT TIME =	0.4669E+04	CONC = 0.1881E+03
AT TIME =	0.4672E+04	CONC = 0.1879E+03
AT TIME =	0.4674E+04	CONC = 0.1878E+03
AT TIME =	0.4677E+04	CONC = 0.1876E+03
AT TIME =	0.4679E+04	CONC = 0.1875E+03
AT TIME =	0.4682E+04	CONC = 0.1873E+03
AT TIME =	0.4684E+04	CONC = 0.1872E+03
AT TIME =	0.4687E+04	CONC = 0.1870E+03
AT TIME =	0.4689E+04	CONC = 0.1869E+03
AT TIME =	0.4692E+04	CONC = 0.1867E+03
AT TIME =	0.4694E+04	CONC = 0.1865E+03
AT TIME =	0.4697E+04	CONC = 0.1864E+03
AT TIME =	0.4699E+04	CONC = 0.1862E+03
AT TIME =	0.4834E+04	CONC = 0.1769E+03
AT TIME =	0.4995E+04	CONC = 0.1638E+03
AT TIME =	0.5189E+04	CONC = 0.1466E+03
AT TIME =	0.5422E+04	CONC = 0.1251E+03
AT TIME =	0.5701E+04	CONC = 0.1001E+03
AT TIME =	0.6036E+04	CONC = 0.7329E+02
AT TIME =	0.6437E+04	CONC = 0.4729E+02
AT TIME =	0.6920E+04	CONC = 0.2516E+02
AT TIME =	0.7498E+04	CONC = 0.9327E+01
AT TIME =	0.9936E+04	CONC = -.1779E+01

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED
SERIAL NUMBER TIME DEPTH CONCENTRATION
CONCENTRATION

Modeling Results





U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed San Juan Basin Pit; 350'to GW, Ksat of 1e-3 cm/sec

50 year ave. - 2' sandy loam cover - no liner - 10K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model

UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	107.00	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	107.	-999.	0.100E-08	-999.

PAGE 0400

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	107.	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.134E-01	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.100E+04	0.00000E+00
0.102E+04	0.00000E+00
0.104E+04	0.00000E+00
0.106E+04	0.00000E+00
0.108E+04	0.00000E+00
0.110E+04	0.00000E+00
0.112E+04	0.00000E+00
0.114E+04	0.00000E+00
0.116E+04	0.00000E+00
0.118E+04	0.00000E+00
0.120E+04	0.00000E+00
0.122E+04	0.00000E+00
0.124E+04	0.00000E+00
0.126E+04	0.91087E-04
0.128E+04	0.32822E+02
0.130E+04	0.81926E+02
0.132E+04	0.12186E+03
0.134E+04	0.16039E+03
0.136E+04	0.19877E+03
0.138E+04	0.23166E+03

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

```
AT TIME = 0.1112E+04  CONC = -.1032E+03
AT TIME = 0.1256E+04  CONC = 0.5022E+02
AT TIME = 0.1377E+04  CONC = 0.2835E+03
AT TIME = 0.1478E+04  CONC = 0.4679E+03
AT TIME = 0.1562E+04  CONC = 0.5801E+03
AT TIME = 0.1631E+04  CONC = 0.6364E+03
AT TIME = 0.1690E+04  CONC = 0.6575E+03
AT TIME = 0.1738E+04  CONC = 0.6588E+03
AT TIME = 0.1779E+04  CONC = 0.6499E+03
AT TIME = 0.1812E+04  CONC = 0.6365E+03
AT TIME = 0.1815E+04  CONC = 0.6353E+03
AT TIME = 0.1817E+04  CONC = 0.6341E+03
AT TIME = 0.1820E+04  CONC = 0.6329E+03
AT TIME = 0.1822E+04  CONC = 0.6316E+03
AT TIME = 0.1825E+04  CONC = 0.6303E+03
AT TIME = 0.1827E+04  CONC = 0.6290E+03
AT TIME = 0.1830E+04  CONC = 0.6277E+03
AT TIME = 0.1832E+04  CONC = 0.6263E+03
AT TIME = 0.1835E+04  CONC = 0.6250E+03
AT TIME = 0.1837E+04  CONC = 0.6236E+03
AT TIME = 0.1840E+04  CONC = 0.6221E+03
AT TIME = 0.1842E+04  CONC = 0.6207E+03
AT TIME = 0.1845E+04  CONC = 0.6192E+03
AT TIME = 0.1847E+04  CONC = 0.6177E+03
AT TIME = 0.1850E+04  CONC = 0.6162E+03
AT TIME = 0.1852E+04  CONC = 0.6147E+03
AT TIME = 0.1855E+04  CONC = 0.6131E+03
AT TIME = 0.1857E+04  CONC = 0.6115E+03
AT TIME = 0.1860E+04  CONC = 0.6099E+03
AT TIME = 0.1862E+04  CONC = 0.6083E+03
AT TIME = 0.1896E+04  CONC = 0.5848E+03
AT TIME = 0.1936E+04  CONC = 0.5528E+03
AT TIME = 0.1985E+04  CONC = 0.5106E+03
AT TIME = 0.2043E+04  CONC = 0.4568E+03
AT TIME = 0.2113E+04  CONC = 0.3910E+03
AT TIME = 0.2197E+04  CONC = 0.3146E+03
AT TIME = 0.2298E+04  CONC = 0.2317E+03
AT TIME = 0.2418E+04  CONC = 0.1493E+03
AT TIME = 0.2563E+04  CONC = 0.7638E+02
AT TIME = 0.4155E+04  CONC = -.9883E+00
```

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

Run options
--- -------

Proposed San Juan Basin Pit; 350'to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - poor liner - 10K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model

UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	107.00	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	107.	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
------- ------

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
---- --- -----

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	107.	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.310E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

TIME	CONCENTRATION
0.630E+04	0.99424E+02
0.635E+04	0.10290E+03
0.640E+04	0.10625E+03
0.645E+04	0.10960E+03
0.650E+04	0.11294E+03
0.655E+04	0.11629E+03
0.660E+04	0.11964E+03
0.665E+04	0.12193E+03
0.670E+04	0.12391E+03
0.675E+04	0.12576E+03
0.680E+04	0.12762E+03
0.685E+04	0.12947E+03
0.690E+04	0.13133E+03
0.695E+04	0.13231E+03
0.700E+04	0.13300E+03
0.705E+04	0.13365E+03
0.710E+04	0.13430E+03
0.715E+04	0.13496E+03
0.720E+04	0.13494E+03
0.725E+04	0.13469E+03

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

```
AT TIME = 0.4711E+04  CONC = -.2292E+02
AT TIME = 0.5325E+04  CONC = 0.1971E+02
AT TIME = 0.5837E+04  CONC = 0.7585E+02
AT TIME = 0.6263E+04  CONC = 0.1175E+03
AT TIME = 0.6619E+04  CONC = 0.1415E+03
AT TIME = 0.6915E+04  CONC = 0.1525E+03
AT TIME = 0.7162E+04  CONC = 0.1558E+03
AT TIME = 0.7367E+04  CONC = 0.1548E+03
AT TIME = 0.7539E+04  CONC = 0.1518E+03
AT TIME = 0.7682E+04  CONC = 0.1480E+03
AT TIME = 0.7684E+04  CONC = 0.1479E+03
AT TIME = 0.7687E+04  CONC = 0.1478E+03
AT TIME = 0.7689E+04  CONC = 0.1477E+03
AT TIME = 0.7692E+04  CONC = 0.1477E+03
AT TIME = 0.7694E+04  CONC = 0.1476E+03
AT TIME = 0.7697E+04  CONC = 0.1475E+03
AT TIME = 0.7699E+04  CONC = 0.1474E+03
AT TIME = 0.7702E+04  CONC = 0.1474E+03
AT TIME = 0.7704E+04  CONC = 0.1473E+03
AT TIME = 0.7707E+04  CONC = 0.1472E+03
AT TIME = 0.7709E+04  CONC = 0.1471E+03
AT TIME = 0.7712E+04  CONC = 0.1470E+03
AT TIME = 0.7714E+04  CONC = 0.1470E+03
AT TIME = 0.7717E+04  CONC = 0.1469E+03
AT TIME = 0.7719E+04  CONC = 0.1468E+03
AT TIME = 0.7722E+04  CONC = 0.1467E+03
AT TIME = 0.7724E+04  CONC = 0.1466E+03
AT TIME = 0.7727E+04  CONC = 0.1466E+03
AT TIME = 0.7729E+04  CONC = 0.1465E+03
AT TIME = 0.7732E+04  CONC = 0.1464E+03
AT TIME = 0.7874E+04  CONC = 0.1413E+03
AT TIME = 0.8046E+04  CONC = 0.1341E+03
AT TIME = 0.8251E+04  CONC = 0.1245E+03
AT TIME = 0.8498E+04  CONC = 0.1120E+03
AT TIME = 0.8794E+04  CONC = 0.9647E+02
AT TIME = 0.9150E+04  CONC = 0.7820E+02
AT TIME = 0.9576E+04  CONC = 0.5813E+02
AT TIME = 0.1009E+05  CONC = 0.3796E+02
AT TIME = 0.1070E+05  CONC = 0.1990E+02
AT TIME = 0.1741E+05  CONC = -.3311E+00
```

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

1
Run options
--- -------

Proposed San Juan Basin Pit; 350'to GW, Ksat of 1e-3 cm/sec

50 year ave. - loam cover - good liner - 10K
Chemical simulated is DEFAULT CHEMICAL

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration input by user
Run was transient
Reject runs if Y coordinate outside plume
Do not reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	107.00	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	0.100E-10	0.100E+05
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.700	-999.	0.000E+00	-999.
Depth of the unsaturated zone	m	CONSTANT	107.	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	0.000E+00	1.00
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	1.00	5.00

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	1

N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN
--- ---

Stehfest numerical inversion algorithm
Nondecaying pulse source
Computer generated times for computing concentrations

DATA FOR LAYER 1
--- --- ---

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	107.	-999.	0.100E-08	-999.
Longitudinal dispersivity of layer	m	DERIVED	1.00	-999.	0.100E-02	0.100E+05
Percent organic matter	--	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	0.000E+00	0.100E+11

Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Reference temperature	C	CONSTANT	20.0	-999.	0.000E+00	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	0.000E+00	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000E+00	-999.	0.000E+00	10.0
Reference temperature for air diffusion	C	CONSTANT	20.0	-999.	0.000E+00	100.
Molecular weight	g/M	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Mole fraction of solute	--	CONSTANT	0.000E+00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000E+00	-999.	0.000E+00	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000E+00	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000E+00	0.000E+00	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00
Not currently used		CONSTANT	-999.	-999.	0.000E+00	1.00

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	STD DEV	LIMITS MIN	MAX
Infiltration rate	m/yr	CONSTANT	0.150E-02	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	167.	-999.	0.100E-01	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Recharge rate	m/yr	CONSTANT	0.000E+00	-999.	0.000E+00	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000E+00	-999.	0.000E+00	-999.
Initial concentration at landfill	mg/l	CONSTANT	0.100E+05	-999.	0.000E+00	-999.
Length scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000E+00	0.000E+00	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	STD DEV	LIMITS MIN	MAX
Particle diameter	cm	CONSTANT	0.500E-01	-999.	0.100E-08	100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	21.0	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	DERIVED	0.100	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.100E-02	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	DERIVED	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	CONSTANT	20.0	-999.	0.000E+00	100.
pH	--	CONSTANT	7.00	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000E+00	-999.	0.100E-05	1.00
Well distance from site	m	CONSTANT	1.00	-999.	1.00	-999.
Angle off center	degree	CONSTANT	0.000E+00	-999.	0.000E+00	360.
Well vertical distance	m	CONSTANT	0.000E+00	-999.	0.000E+00	1.00

1

TIME	CONCENTRATION
0.140E+05	0.47923E+02
0.140E+05	0.48252E+02
0.141E+05	0.48581E+02
0.141E+05	0.48909E+02
0.142E+05	0.49173E+02
0.142E+05	0.49303E+02
0.143E+05	0.49413E+02
0.143E+05	0.49523E+02
0.144E+05	0.49633E+02
0.144E+05	0.49742E+02
0.145E+05	0.49852E+02
0.145E+05	0.49962E+02
0.146E+05	0.50072E+02
0.146E+05	0.50182E+02
0.147E+05	0.50283E+02
0.147E+05	0.50228E+02
0.148E+05	0.50176E+02
0.148E+05	0.50124E+02
0.149E+05	0.50072E+02
0.149E+05	0.50021E+02

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME = 0.9667E+04	CONC = -.1100E+02	
AT TIME = 0.1093E+05	CONC = 0.1024E+02	
AT TIME = 0.1198E+05	CONC = 0.3764E+02	
AT TIME = 0.1285E+05	CONC = 0.5778E+02	
AT TIME = 0.1358E+05	CONC = 0.6926E+02	
AT TIME = 0.1419E+05	CONC = 0.7448E+02	
AT TIME = 0.1470E+05	CONC = 0.7594E+02	
AT TIME = 0.1512E+05	CONC = 0.7537E+02	
AT TIME = 0.1547E+05	CONC = 0.7383E+02	
AT TIME = 0.1576E+05	CONC = 0.7192E+02	
AT TIME = 0.1577E+05	CONC = 0.7190E+02	
AT TIME = 0.1577E+05	CONC = 0.7188E+02	
AT TIME = 0.1577E+05	CONC = 0.7187E+02	
AT TIME = 0.1577E+05	CONC = 0.7185E+02	
AT TIME = 0.1578E+05	CONC = 0.7183E+02	
AT TIME = 0.1578E+05	CONC = 0.7181E+02	
AT TIME = 0.1578E+05	CONC = 0.7179E+02	
AT TIME = 0.1578E+05	CONC = 0.7177E+02	
AT TIME = 0.1579E+05	CONC = 0.7175E+02	
AT TIME = 0.1579E+05	CONC = 0.7174E+02	
AT TIME = 0.1579E+05	CONC = 0.7172E+02	
AT TIME = 0.1579E+05	CONC = 0.7170E+02	
AT TIME = 0.1580E+05	CONC = 0.7168E+02	
AT TIME = 0.1580E+05	CONC = 0.7166E+02	
AT TIME = 0.1580E+05	CONC = 0.7164E+02	
AT TIME = 0.1580E+05	CONC = 0.7162E+02	
AT TIME = 0.1581E+05	CONC = 0.7160E+02	
AT TIME = 0.1581E+05	CONC = 0.7158E+02	
AT TIME = 0.1581E+05	CONC = 0.7157E+02	
AT TIME = 0.1581E+05	CONC = 0.7155E+02	
AT TIME = 0.1611E+05	CONC = 0.6909E+02	
AT TIME = 0.1646E+05	CONC = 0.6565E+02	
AT TIME = 0.1688E+05	CONC = 0.6099E+02	
AT TIME = 0.1739E+05	CONC = 0.5491E+02	
AT TIME = 0.1799E+05	CONC = 0.4734E+02	
AT TIME = 0.1872E+05	CONC = 0.3842E+02	
AT TIME = 0.1960E+05	CONC = 0.2860E+02	
AT TIME = 0.2065E+05	CONC = 0.1871E+02	
AT TIME = 0.2191E+05	CONC = 0.9849E+01	
AT TIME = 0.3566E+05	CONC = -.1742E+00	

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION CONCENTRATION