Subject: MULTIMED files
Date: Fri, 19 Nov 1999 19:02:00 -0700
From: Edward Hansen <edward_hansen@nmenv.state.nm.us>
To: david.ellerbroek@mw.com

David,
I have attached 7 files: 3 input, 3 output, and a "special" output file for the bottom of the vadose zone [(trivtrsv.txt - triassic vadose transport vertical)(this is the critical output)(the input file for this run is tria.in and the output is tria.out)]. The vadose zone file (vtrnspt.out) is written over every time a run is made - I save it as trivtrsv.txt).
The other runs are for 2500' lateral (trih.in and trih.out; tril.in and tril.out). The difference between these two runs is the aquifer thickness - just so you can see how I "over-loaded" the model - but conservative numbers are 1340y or 1470y for detection of 0.000025 mg/L (the SWB's detection cutoff).
Give me a call on Monday at 505-827-2328.

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Proposed HazWaste   Landfill -- Groundwater Monitoring Waiver     Request
600' of 5E-8


GENERAL DATA

***  CHEMICAL NAME FORMAT(80A1) (EDB) 1 ppm
DEFAULT CHEMICAL

***    ISOURC                                ROUTE       NT        IYCHK    PALPH       APPTY
***OPTION   OPTAIR  RUN                MONTE     ISTEAD     IOPEN      IZCHK      LANDF    C
    2    0    0     DETERMINISTIC     500    1    0   20    1    0    1 90.0     0    1


***   XST


*** TIME STEPPING PARAMETERS FOR SATURATED ZONE MODEL
  400.00    425.00    450.00    475.00    500.00    525.00    550.00    575.00    600.
  650.00    675.00    700.00    725.00    750.00    775.00    800.00    825.00    850.

END GENERAL

CHEMICAL SPECIFIC VARIABLE DATA
ARRAY VALUES
***       CHEMICAL SPECIFIC VARIABLES

***            VARIABLE NAME                    UNITS                 DISTRIBUTION   PARAMET
***                                                                                    MEAN
 ********************************************************************************************
 1 Solid phase decay coeff (1/yr)                                          -1        -999.
 2 Diss phase decay coeff (1/yr)                                           -1        -999.
 3 Overall chem dcy coeff (1/yr)                                           -1        -999.
 4 Acid cataly hydrol rte(1/M-yr)                                           0       0.000E+00
 5 Neutral hydrol rate cons(1/yr)                                           0       0.000E+00
 6 Base cataly hydrol rte(1/M-yr)                                           0       0.000E+00
 7 Reference temperature (C)                                                0        20.0
 8 Normalized distrib coeff(ml/g)                                           0       0.000E+00
 9 Distribution coefficient                                                -2        -999.
10 Biodegrad coef(sat zone)(1/yr)                                           0       0.000E+00
11 Air diffusion coeff (cm2/s)                                              0       0.000E+00
12 Ref temp for air diffusion (C)                                                    20.0
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- WHAT IS THE PRIMARY FACTOR CAUSING CONTAMINANT CONCENTRATION ATTENUATION?
- SEE DIFFERENCE IN REGULATORY LANGUAGE. "LIQUID MIGRATION" VS. "HAZ. CONSTITUENT MIGRATION"

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 13 Molecular weight (g/mole)                                    0       0.000E+00
 14 Mole fraction of solute                                      0       0.000E+00
 15 Solute vapor pressure (mm Hg)                                0       0.000E+00
 16 Henry's law cons (atm-m^3/M)                                 0       0.000E+00
 17 Not in use                                                   0       -999.
 18 Not in use                                                   0       -999.
 19 Not in use                                                   0       -999.
END ARRAY

END CHEMICAL SPECIFIC VARIABLE DATA


SOURCE SPECIFIC VARIABLE DATA
ARRAY VALUES
***         SOURCE SPECIFIC VARIABLES

***            VARIABLE NAME                    UNITS              DISTRIBUTION   PARAMET
***                                                                                 MEAN
 ********************************************************************************************
 1 Infiltration rate (m/yr)                                      0       0.150E-01
 2 Area of waste disp unit (m^2)                                 0        9.00
 3 Duration of pulse (yr)                                        0       0.100E+04
 4 Spread of contaminant srce (m)                               -1       -999.
 5 Recharge rate (m/yr)                                          0       0.000E+00
 6 Source decay constant (1/yr)                                  0       0.000E+00
 7 Init conc at landfill (mg/l)                                  0        1.00
 8 Length scale of facility (m)                                 -1       -999.
 9 Width scale of facility (m)                                  -1       -999.
END ARRAY

END SOURCE SPECIFIC VARIABLE DATA


VFL   UNSATURATED FLOW MODEL PARAMETERS


CONTROL PARAMETERS
***     DUMMY      NMAT       KPROP      DUMMY     NVFLAY
          0          1          1          1          1


END CONTROL PARAMETERS
SATURATED MATERIAL PROPERTY PARAMETERS
ARRAY VALUES
***    SATURATED MATERIAL    VARIABLES

***            VARIABLE NAME                    UNITS              DISTRIBUTION   PARAMET
***                                                                                 MEAN
 ********************************************************************************************
 1 Sat hydraulic conduct (cm/hr)                                 0       0.170E-03
 2 Unsaturated zone porosity                                     0       0.500E-01
 3 Air entry pressure head (m)                                   0       0.100
 4 Depth of the unsat zone (m)                                   0        183.
END ARRAY

END MATERIAL  1
END
SOIL MOISTURE PARAMETERS
***    FUNCTIONAL COEFFICIENTS
ARRAY VALUES
***    FUNCTIONAL COEFFICIE VARIABLES

***            VARIABLE NAME                    UNITS              DISTRIBUTION   PARAMET
```

```
***                                                                          MEAN
 ********************************************************************************
 1 Residual water content                                          0      0.500E-01
 2 Brooks and Corey exponent, EN                                   0      0.000E+00
 3 ALFA van Genuchten coefficient                                  0      0.500E-02
 4 BETA Van Genuchten coefficient                                  0       1.09
END ARRAY

END MATERIAL  1
END
END UNSATURATED FLOW



VTP    UNSATURATED TRANSPORT MODEL
CONTROL PARAMETERS
***    NLAY      DUMMY      IADU      ISOL         N      NTEL     NGPTS       NIT      D
          1         20         1         1        18         3       104         2
***  WTFUN
     1.200


END CONTROL PARAMETERS
TRANSPORT PARAMETER
ARRAY VALUES
***   UNSATURATED TRANSPOR VARIABLES

***            VARIABLE NAME                    UNITS              DISTRIBUTION   PARAMET
***                                                                              MEAN
 ********************************************************************************
 1 Thickness of layer (m)                                          0       183.
 2 Longit disper of layer (m)                                     -1       1.00
 3 Percent organic matter                                          0      0.000E+00
 4 Bulk dens of soil layer (g/cc)                                  0       1.83
 5 Biological decay coeff (1/yr)                                   0      0.000E+00
END ARRAY

END LAYER  1
END UNSATURATED TRANSPORT PARAMETERS
END TRANSPORT MODEL
AQUIFER SPECIFIC VARIABLE DATA
ARRAY VALUES
***       AQUIFER SPECIFIC VARIABLES

***            VARIABLE NAME                    UNITS              DISTRIBUTION   PARAMET
***                                                                              MEAN
 ********************************************************************************
 1 Particle diameter (cm)                                          0      0.500E-01
 2 Aquifer porosity                                                0      0.300
 3 Bulk density (g/cc)                                             0       1.70
 4 Aquifer thickness (m)                                           0       30.0
 5 Mixing zone depth (m)                                          -1      0.100
 6 Hydraulic conductivity (m/yr)                                   0       30.0
 7 Hydraulic Gradient                                              0      0.100E-01
 8 Grndwater seep velocity (m/yr)                                 -2      -999.
 9 Retardation coefficient                                        -1       1.00
10 Longitudinal dispersivity (m)                                  10      -999.
11 Transverse dispersivity (m)                                    10      -999.
12 Vertical dispersivity (m)                                      10      -999.
13 Temperature of aquifer (C)                                     0       20.0
14 pH                                                             0       7.00
15 Organic carbon content (fract)                                 0      0.000E+00
16 Receptor distance from site(m)                                 0       1.00
17 Angle off center (degree)                                      0      0.000E+00
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18 Z-dist from watertable (fract)                    0       0.000E+00
END ARRAY

END AQUIFER SPECIFIC VARIABLE DATA


END ALL DATA
```

1

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

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 HazWaste Landfill -- Groundwater Monitoring Waiver Request

600' of 5E-8
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	183.00	1

DATA FOR MATERIAL 1
VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	P MEA
Saturated hydraulic conductivity	cm/hr	CONSTANT	0.170
Unsaturated zone porosity	--	CONSTANT	0.500
Air entry pressure head	m	CONSTANT	0.100
Depth of the unsaturated zone	m	CONSTANT	183.

DATA FOR MATERIAL 1
VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	P MEA
Residual water content	--	CONSTANT	0.500
Brook and Corey exponent,EN	--	CONSTANT	0.000
ALFA coefficient	1/cm	CONSTANT	0.500
Van Genuchten exponent, ENN	--	CONSTANT	1.09

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	F MEA
Thickness of layer	m	CONSTANT	183.
Longitudinal dispersivity of layer	m	DERIVED	1.00
Percent organic matter	--	CONSTANT	0.000
Bulk density of soil for layer	g/cc	CONSTANT	1.83
Biological decay coefficient	1/yr	CONSTANT	0.000

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	F MEA
Solid phase decay coefficient	1/yr	DERIVED	-999.
Dissolved phase decay coefficient	1/yr	DERIVED	-999.
Overall chemical decay coefficient	1/yr	DERIVED	-999.
Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000
Reference temperature	C	CONSTANT	20.0
Normalized distribution coefficient	ml/g	CONSTANT	0.000
Distribution coefficient	--	DERIVED	-999.
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000
Air diffusion coefficient	cm2/s	CONSTANT	0.000
Reference temperature for air diffusion	C	CONSTANT	20.0
Molecular weight	g/M	CONSTANT	0.000
Mole fraction of solute	--	CONSTANT	0.000
Vapor pressure of solute	mm Hg	CONSTANT	0.000
Henry's law constant	atm-m^3/M	CONSTANT	0.000
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000
Not currently used		CONSTANT	-999.
Not currently used		CONSTANT	-999.

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	F MEA

Infiltration rate	m/yr	CONSTANT	0.150
Area of waste disposal unit	m^2	CONSTANT	9.00
Duration of pulse	yr	CONSTANT	0.100
Spread of contaminant source	m	DERIVED	-999.
Recharge rate	m/yr	CONSTANT	0.000
Source decay constant	1/yr	CONSTANT	0.000
Initial concentration at landfill	mg/l	CONSTANT	1.00
Length scale of facility	m	DERIVED	-999.
Width scale of facility	m	DERIVED	-999.
Near field dilution		DERIVED	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	F MEA
Particle diameter	cm	CONSTANT	0.500
Aquifer porosity	--	CONSTANT	0.300
Bulk density	g/cc	CONSTANT	1.70
Aquifer thickness	m	CONSTANT	30.0
Source thickness (mixing zone depth)	m	DERIVED	0.100
Conductivity (hydraulic)	m/yr	CONSTANT	30.0
Gradient (hydraulic)		CONSTANT	0.100
Groundwater seepage velocity	m/yr	DERIVED	-999.
Retardation coefficient	--	DERIVED	1.00
Longitudinal dispersivity	m	FUNCTION OF X	-999.
Transverse dispersivity	m	FUNCTION OF X	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.
Temperature of aquifer	C	CONSTANT	20.0
pH	--	CONSTANT	7.00
Organic carbon content (fraction)		CONSTANT	0.000
Well distance from site	m	CONSTANT	1.00
Angle off center	degree	CONSTANT	0.000
Well vertical distance	m	CONSTANT	0.000

1

TIME	CONCENTRATION
0.400E+03	0.00000E+00
0.425E+03	0.00000E+00
0.450E+03	0.00000E+00
0.475E+03	0.00000E+00
0.500E+03	0.29172E-02
0.525E+03	0.62531E-01
0.550E+03	0.13452E+00
0.575E+03	0.20796E+00
0.600E+03	0.28092E+00
0.625E+03	0.34728E+00
0.650E+03	0.41070E+00
0.675E+03	0.46474E+00
0.700E+03	0.51253E+00
0.725E+03	0.55072E+00
0.750E+03	0.58252E+00
0.775E+03	0.60635E+00
0.800E+03	0.62487E+00
0.825E+03	0.63765E+00
0.850E+03	0.64659E+00
0.875E+03	0.65183E+00

CONCENTRATION AT BOTTOM OF VADOSE ZONE
RUN NO. 1

AT TIME =	0.4296E+03	CONC =	-.4790E-01
AT TIME =	0.4669E+03	CONC =	-.4826E-02
AT TIME =	0.4980E+03	CONC =	0.7495E-01
AT TIME =	0.5239E+03	CONC =	0.1658E+00
AT TIME =	0.5455E+03	CONC =	0.2526E+00
AT TIME =	0.5634E+03	CONC =	0.3291E+00
AT TIME =	0.5784E+03	CONC =	0.3938E+00
AT TIME =	0.5909E+03	CONC =	0.4473E+00
AT TIME =	0.6013E+03	CONC =	0.4912E+00
AT TIME =	0.6100E+03	CONC =	0.5270E+00
AT TIME =	0.6600E+03	CONC =	0.7124E+00
AT TIME =	0.7100E+03	CONC =	0.8521E+00
AT TIME =	0.7600E+03	CONC =	0.9451E+00
AT TIME =	0.8100E+03	CONC =	0.9992E+00
AT TIME =	0.8600E+03	CONC =	0.1025E+01
AT TIME =	0.9100E+03	CONC =	0.1033E+01
AT TIME =	0.9600E+03	CONC =	0.1031E+01
AT TIME =	0.1010E+04	CONC =	0.1025E+01
AT TIME =	0.1060E+04	CONC =	0.1016E+01
AT TIME =	0.1110E+04	CONC =	0.1008E+01
AT TIME =	0.1160E+04	CONC =	0.1001E+01
AT TIME =	0.1210E+04	CONC =	0.1000E+01
AT TIME =	0.1260E+04	CONC =	0.9935E+00
AT TIME =	0.1310E+04	CONC =	0.9734E+00
AT TIME =	0.1360E+04	CONC =	0.9989E+00
AT TIME =	0.1410E+04	CONC =	0.1039E+01
AT TIME =	0.1460E+04	CONC =	0.1009E+01
AT TIME =	0.1510E+04	CONC =	0.8780E+00
AT TIME =	0.1560E+04	CONC =	0.6796E+00
AT TIME =	0.1610E+04	CONC =	0.4680E+00
AT TIME =	0.1619E+04	CONC =	0.4333E+00
AT TIME =	0.1629E+04	CONC =	0.3930E+00
AT TIME =	0.1642E+04	CONC =	0.3469E+00
AT TIME =	0.1657E+04	CONC =	0.2951E+00
AT TIME =	0.1675E+04	CONC =	0.2384E+00
AT TIME =	0.1696E+04	CONC =	0.1787E+00
AT TIME =	0.1722E+04	CONC =	0.1189E+00
AT TIME =	0.1753E+04	CONC =	0.6324E-01
AT TIME =	0.1790E+04	CONC =	0.1672E-01
AT TIME =	0.2662E+04	CONC =	0.4868E-02

1 UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED SERIAL NUMBER	TIME	DEPTH	CONCENTRATION	CONCENTRATION

2500' of 1E-5 - Lateral transport to East.

GENERAL DATA

*** CHEMICAL NAME FORMAT(80A1)
DEFAULT CHEMICAL

*** ISOURC				ROUTE		NT		IYCHK		PALPH		APPTY
***OPTION	OPTAIR	RUN	MONTE	ISTEAD		IOPEN		IZCHK		LANDF		C
2	0	0 DETERMINISTIC	500	1	0	20	1	0	1	90.0	0	1

*** XST

*** TIME STEPPING PARAMETERS FOR SATURATED ZONE MODEL

1200.00	1210.00	1220.00	1230.00	1240.00	1250.00	1260.00	1270.00	1280.
1300.00	1310.00	1320.00	1330.00	1340.00	1350.00	1360.00	1370.00	1380.

END GENERAL

CHEMICAL SPECIFIC VARIABLE DATA
ARRAY VALUES
*** CHEMICAL SPECIFIC VARIABLES

***	VARIABLE NAME	UNITS	DISTRIBUTION	PARAMET MEAN
1	Solid phase decay coeff (1/yr)		-1	-999.
2	Diss phase decay coeff (1/yr)		-1	-999.
3	Overall chem dcy coeff (1/yr)		-1	-999.
4	Acid cataly hydrol rte(1/M-yr)		0	0.000E+00
5	Neutral hydrol rate cons(1/yr)		0	0.000E+00
6	Base cataly hydrol rte(1/M-yr)		0	0.000E+00
7	Reference temperature (C)		0	20.0
8	Normalized distrib coeff(ml/g)		0	0.000E+00
9	Distribution coefficient		-2	-999.
10	Biodegrad coef(sat zone)(1/yr)		0	0.000E+00
11	Air diffusion coeff (cm2/s)		0	0.000E+00
12	Ref temp for air diffusion (C)		0	20.0
13	Molecular weight (g/mole)		0	0.000E+00
14	Mole fraction of solute		0	0.000E+00
15	Solute vapor pressure (mm Hg)		0	0.000E+00
16	Henry's law cons (atm-m^3/M)		0	0.000E+00
17	Not in use		0	-999.
18	Not in use		0	-999.
19	Not in use		0	-999.

END ARRAY

END CHEMICAL SPECIFIC VARIABLE DATA

SOURCE SPECIFIC VARIABLE DATA
ARRAY VALUES
*** SOURCE SPECIFIC VARIABLES

***	VARIABLE NAME	UNITS	DISTRIBUTION	PARAMET MEAN
1	Infiltration rate (m/yr)		0	3.15
2	Area of waste disp unit (m^2)		0	9.00
3	Duration of pulse (yr)		0	0.100E+04
4	Spread of contaminant srce (m)		-1	-999.

```
 5 Recharge rate (m/yr)                                          0       0.000E+00
 6 Source decay constant (1/yr)                                  0       0.000E+00
 7 Init conc at landfill (mg/l)                                  0        1.00
 8 Length scale of facility (m)                                 -1       -999.
 9 Width scale of facility (m)                                  -1       -999.
END ARRAY

END SOURCE SPECIFIC VARIABLE DATA


VFL   UNSATURATED FLOW MODEL PARAMETERS


CONTROL PARAMETERS
***     DUMMY      NMAT       KPROP      DUMMY     NVFLAY
          0         1          1          1          1


END CONTROL PARAMETERS
SATURATED MATERIAL PROPERTY PARAMETERS
ARRAY VALUES
***    SATURATED MATERIAL    VARIABLES

***             VARIABLE NAME                    UNITS                 DISTRIBUTION    PARAMET
***                                                                                      MEAN
 ********************************************************************************************
 1 Sat hydraulic conduct (cm/hr)                                       0       0.360E-01
 2 Unsaturated zone porosity                                           0       0.300
 3 Air entry pressure head (m)                                         0       0.100
 4 Depth of the unsat zone (m)                                         0        1.00
END ARRAY

END MATERIAL  1
END
SOIL MOISTURE PARAMETERS
***    FUNCTIONAL COEFFICIENTS
ARRAY VALUES
***    FUNCTIONAL COEFFICIE VARIABLES

***             VARIABLE NAME                    UNITS                 DISTRIBUTION    PARAMET
***                                                                                      MEAN
 ********************************************************************************************
 1 Residual water content                                              0       0.500E-01
 2 Brooks and Corey exponent, EN                                       0       0.000E+00
 3 ALFA van Genuchten coefficient                                      0       0.500E-02
 4 BETA Van Genuchten coefficient                                      0        1.09
END ARRAY

END MATERIAL  1
END
END UNSATURATED FLOW


VTP    UNSATURATED TRANSPORT MODEL
CONTROL PARAMETERS
***    NLAY      DUMMY      IADU       ISOL          N       NTEL      NGPTS        NIT      D
          1         20          1          1         18          3        104          2
***   WTFUN
      1.200


END CONTROL PARAMETERS
```

```
TRANSPORT PARAMETER
ARRAY VALUES
***    UNSATURATED TRANSPOR VARIABLES

***            VARIABLE NAME                    UNITS                DISTRIBUTION    PARAMET
***                                                                                    MEAN
 ********************************************************************************************
 1 Thickness of layer (m)                                                    0        1.00
 2 Longit disper of layer (m)                                               -1        1.00
 3 Percent organic matter                                                    0       0.000E+00
 4 Bulk dens of soil layer (g/cc)                                            0        1.70
 5 Biological decay coeff (1/yr)                                             0       0.000E+00
END ARRAY

END LAYER  1
END UNSATURATED TRANSPORT PARAMETERS
END TRANSPORT MODEL
AQUIFER SPECIFIC VARIABLE DATA
ARRAY VALUES
***        AQUIFER SPECIFIC VARIABLES

***            VARIABLE NAME                    UNITS                DISTRIBUTION    PARAMET
***                                                                                    MEAN
 ********************************************************************************************
 1 Particle diameter (cm)                                                    0       0.500E-01
 2 Aquifer porosity                                                          0       0.300
 3 Bulk density (g/cc)                                                       0        1.70
 4 Aquifer thickness (m)                                                     0        3.00
 5 Mixing zone depth (m)                                                    -1       0.100
 6 Hydraulic conductivity (m/yr)                                             0        3.15
 7 Hydraulic Gradient                                                        0       0.100E-01
 8 Grndwater seep velocity (m/yr)                                           -2       -999.
 9 Retardation coefficient                                                  -1        1.00
10 Longitudinal dispersivity (m)                                            10       -999.
11 Transverse dispersivity (m)                                              10       -999.
12 Vertical dispersivity (m)                                                10       -999.
13 Temperature of aquifer (C)                                               0        20.0
14 pH                                                                       0        7.00
15 Organic carbon content (fract)                                           0       0.000E+00
16 Receptor distance from site(m)                                           0        762.
17 Angle off center (degree)                                                0       0.000E+00
18 Z-dist from watertable (fract)                                           0       0.000E+00
END ARRAY

END AQUIFER SPECIFIC VARIABLE DATA


END ALL DATA
```

1

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

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 HazWaste Landfill -- Groundwater Monitoring Waiver Request

2500' of 1E-5
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 1.00 1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	P MEA
Saturated hydraulic conductivity	cm/hr	CONSTANT	0.360
Unsaturated zone porosity	--	CONSTANT	0.300
Air entry pressure head	m	CONSTANT	0.100
Depth of the unsaturated zone	m	CONSTANT	1.00

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	P MEA
Residual water content	--	CONSTANT	0.500
Brook and Corey exponent,EN	--	CONSTANT	0.000
ALFA coefficient	1/cm	CONSTANT	0.500
Van Genuchten exponent, ENN	--	CONSTANT	1.09

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	P MEA

Thickness of layer	m	CONSTANT	1.00
Longitudinal dispersivity of layer	m	DERIVED	1.00
Percent organic matter	--	CONSTANT	0.000
Bulk density of soil for layer	g/cc	CONSTANT	1.70
Biological decay coefficient	1/yr	CONSTANT	0.000

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	P MEA
Solid phase decay coefficient	1/yr	DERIVED	-999.
Dissolved phase decay coefficient	1/yr	DERIVED	-999.
Overall chemical decay coefficient	1/yr	DERIVED	-999.
Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000
Reference temperature	C	CONSTANT	20.0
Normalized distribution coefficient	ml/g	CONSTANT	0.000
Distribution coefficient	--	DERIVED	-999.
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000
Air diffusion coefficient	cm2/s	CONSTANT	0.000
Reference temperature for air diffusion	C	CONSTANT	20.0
Molecular weight	g/M	CONSTANT	0.000
Mole fraction of solute	--	CONSTANT	0.000
Vapor pressure of solute	mm Hg	CONSTANT	0.000
Henry's law constant	atm-m^3/M	CONSTANT	0.000
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000
Not currently used		CONSTANT	-999.
Not currently used		CONSTANT	-999.

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	P MEA
Infiltration rate	m/yr	CONSTANT	3.15
Area of waste disposal unit	m^2	CONSTANT	9.00
Duration of pulse	yr	CONSTANT	0.100
Spread of contaminant source	m	DERIVED	-999.
Recharge rate	m/yr	CONSTANT	0.000
Source decay constant	1/yr	CONSTANT	0.000
Initial concentration at landfill	mg/l	CONSTANT	1.00
Length scale of facility	m	DERIVED	-999.
Width scale of facility	m	DERIVED	-999.
Near field dilution		DERIVED	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	P MEA
Particle diameter	cm	CONSTANT	0.500
Aquifer porosity	--	CONSTANT	0.300
Bulk density	g/cc	CONSTANT	1.70
Aquifer thickness	m	CONSTANT	3.00
Source thickness (mixing zone depth)	m	DERIVED	0.100
Conductivity (hydraulic)	m/yr	CONSTANT	3.15

Gradient (hydraulic)		CONSTANT	0.100
Groundwater seepage velocity	m/yr	DERIVED	-999.
Retardation coefficient	--	DERIVED	1.00
Longitudinal dispersivity	m	FUNCTION OF X	-999.
Transverse dispersivity	m	FUNCTION OF X	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.
Temperature of aquifer	C	CONSTANT	20.0
pH	--	CONSTANT	7.00
Organic carbon content (fraction)		CONSTANT	0.000
Well distance from site	m	CONSTANT	762.
Angle off center	degree	CONSTANT	0.000
Well vertical distance	m	CONSTANT	0.000

1

TIME	CONCENTRATION
0.120E+04	0.52142E-05
0.121E+04	0.59019E-05
0.122E+04	0.66664E-05
0.123E+04	0.75145E-05
0.124E+04	0.84538E-05
0.125E+04	0.94920E-05
0.126E+04	0.10638E-04
0.127E+04	0.11899E-04
0.128E+04	0.13287E-04
0.129E+04	0.14810E-04
0.130E+04	0.16479E-04
0.131E+04	0.18306E-04
0.132E+04	0.20302E-04
0.133E+04	0.22479E-04
0.134E+04	0.24850E-04
0.135E+04	0.27430E-04
0.136E+04	0.30232E-04
0.137E+04	0.33271E-04
0.138E+04	0.36563E-04
0.139E+04	0.40124E-04

*** WARNING *** Near field mixing factor is greater than 1.
Mixing factor = 239.

Proposed HazWaste Landfill -- Groundwater Monitoring Waiver Request
2500' of 1E-5

GENERAL DATA

*** CHEMICAL NAME FORMAT(80A1)
DEFAULT CHEMICAL

***	ISOURC			ROUTE		NT		IYCHK		PALPH		APPTY
***OPTION	OPTAIR	RUN	MONTE		ISTEAD		IOPEN		IZCHK		LANDF	C
2	0	0	DETERMINISTIC	500	1	0	20	1	0	1 90.0	0	1

*** XST

*** TIME STEPPING PARAMETERS FOR SATURATED ZONE MODEL

1400.00	1410.00	1420.00	1430.00	1440.00	1450.00	1460.00	1470.00	1480.
1500.00	1510.00	1520.00	1530.00	1540.00	1550.00	1560.00	1570.00	1580.

END GENERAL

CHEMICAL SPECIFIC VARIABLE DATA
ARRAY VALUES
*** CHEMICAL SPECIFIC VARIABLES

***	VARIABLE NAME	UNITS	DISTRIBUTION	PARAMET MEAN
1	Solid phase decay coeff (1/yr)		-1	-999.
2	Diss phase decay coeff (1/yr)		-1	-999.
3	Overall chem dcy coeff (1/yr)		-1	-999.
4	Acid cataly hydrol rte(1/M-yr)		0	0.000E+00
5	Neutral hydrol rate cons(1/yr)		0	0.000E+00
6	Base cataly hydrol rte(1/M-yr)		0	0.000E+00
7	Reference temperature (C)		0	20.0
8	Normalized distrib coeff(ml/g)		0	0.000E+00
9	Distribution coefficient		-2	-999.
10	Biodegrad coef(sat zone)(1/yr)		0	0.000E+00
11	Air diffusion coeff (cm2/s)		0	0.000E+00
12	Ref temp for air diffusion (C)		0	20.0
13	Molecular weight (g/mole)		0	0.000E+00
14	Mole fraction of solute		0	0.000E+00
15	Solute vapor pressure (mm Hg)		0	0.000E+00
16	Henry's law cons (atm-m^3/M)		0	0.000E+00
17	Not in use		0	-999.
18	Not in use		0	-999.
19	Not in use		0	-999.

END ARRAY

END CHEMICAL SPECIFIC VARIABLE DATA

SOURCE SPECIFIC VARIABLE DATA
ARRAY VALUES
*** SOURCE SPECIFIC VARIABLES

***	VARIABLE NAME	UNITS	DISTRIBUTION	PARAMET MEAN
1	Infiltration rate (m/yr)		0	3.15
2	Area of waste disp unit (m^2)		0	9.00
3	Duration of pulse (yr)		0	0.100E+04
4	Spread of contaminant srce (m)		-1	-999.
5	Recharge rate (m/yr)		0	0.000E+00
6	Source decay constant (1/yr)		0	0.000E+00
7	Init conc at landfill (mg/l)		0	1.00
8	Length scale of facility (m)		-1	-999.
9	Width scale of facility (m)		-1	-999.

END ARRAY

END SOURCE SPECIFIC VARIABLE DATA

VFL UNSATURATED FLOW MODEL PARAMETERS

CONTROL PARAMETERS

*** DUMMY	NMAT	KPROP	DUMMY	NVFLAY
0	1	1	1	1

END CONTROL PARAMETERS
SATURATED MATERIAL PROPERTY PARAMETERS
ARRAY VALUES

```
***    SATURATED MATERIAL   VARIABLES

***            VARIABLE NAME                    UNITS              DISTRIBUTION   PARAMET
***                                                                                MEAN
 ********************************************************************************
 1 Sat hydraulic conduct (cm/hr)                                        0       0.360E-01
 2 Unsaturated zone porosity                                            0       0.300
 3 Air entry pressure head (m)                                          0       0.100
 4 Depth of the unsat zone (m)                                          0        1.00
END ARRAY

END MATERIAL  1
END
SOIL MOISTURE PARAMETERS
***    FUNCTIONAL COEFFICIENTS
ARRAY VALUES
***    FUNCTIONAL COEFFICIE VARIABLES

***            VARIABLE NAME                UNITS                  DISTRIBUTION   PARAMET
***                                                                                MEAN
 ********************************************************************************
 1 Residual water content                                               0       0.500E-01
 2 Brooks and Corey exponent, EN                                        0       0.000E+00
 3 ALFA van Genuchten coefficient                                       0       0.500E-02
 4 BETA Van Genuchten coefficient                                       0        1.09
END ARRAY

END MATERIAL  1
END
END UNSATURATED FLOW



VTP    UNSATURATED TRANSPORT MODEL
CONTROL PARAMETERS
***    NLAY      DUMMY      IADU      ISOL         N      NTEL      NGPTS       NIT      D
         1         20         1         1        18         3        104         2
***  WTFUN
     1.200


END CONTROL PARAMETERS
TRANSPORT PARAMETER
ARRAY VALUES
***    UNSATURATED TRANSPOR VARIABLES

***            VARIABLE NAME                UNITS                  DISTRIBUTION   PARAMET
***                                                                                MEAN
 ********************************************************************************
 1 Thickness of layer (m)                                               0        1.00
 2 Longit disper of layer (m)                                          -1        1.00
 3 Percent organic matter                                               0       0.000E+00
 4 Bulk dens of soil layer (g/cc)                                       0        1.70
 5 Biological decay coeff (1/yr)                                        0       0.000E+00
END ARRAY

END LAYER  1
END UNSATURATED TRANSPORT PARAMETERS
END TRANSPORT MODEL
AQUIFER SPECIFIC VARIABLE DATA
ARRAY VALUES
***        AQUIFER SPECIFIC VARIABLES

***            VARIABLE NAME                UNITS                  DISTRIBUTION   PARAMET
```

***		MEAN
1 Particle diameter (cm)	0	0.500E-01
2 Aquifer porosity	0	0.300
3 Bulk density (g/cc)	0	1.70
4 Aquifer thickness (m)	0	10.0
5 Mixing zone depth (m)	-1	0.100
6 Hydraulic conductivity (m/yr)	0	3.15
7 Hydraulic Gradient	0	0.100E-01
8 Grndwater seep velocity (m/yr)	-2	-999.
9 Retardation coefficient	-1	1.00
10 Longitudinal dispersivity (m)	10	-999.
11 Transverse dispersivity (m)	10	-999.
12 Vertical dispersivity (m)	10	-999.
13 Temperature of aquifer (C)	0	20.0
14 pH	0	7.00
15 Organic carbon content (fract)	0	0.000E+00
16 Receptor distance from site(m)	0	762.
17 Angle off center (degree)	0	0.000E+00
18 Z-dist from watertable (fract)	0	0.000E+00

END ARRAY

END AQUIFER SPECIFIC VARIABLE DATA

END ALL DATA

1

U. S. ENVIRONMENTAL PROTECTION A

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.01, June 1991)

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

Proposed HazWaste Landfill -- Groundwater Monitoring Waiver Request

2500' of 1E-5
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	1.00	1

DATA FOR MATERIAL 1
---- --- --------
VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	F MEA
Saturated hydraulic conductivity	cm/hr	CONSTANT	0.360
Unsaturated zone porosity	--	CONSTANT	0.300
Air entry pressure head	m	CONSTANT	0.100
Depth of the unsaturated zone	m	CONSTANT	1.00

DATA FOR MATERIAL 1
---- --- --------
VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	P MEA
Residual water content	--	CONSTANT	0.500
Brook and Corey exponent,EN	--	CONSTANT	0.000
ALFA coefficient	1/cm	CONSTANT	0.500
Van Genuchten exponent, ENN	--	CONSTANT	1.09

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	P MEA
Thickness of layer	m	CONSTANT	1.00
Longitudinal dispersivity of layer	m	DERIVED	1.00
Percent organic matter	--	CONSTANT	0.000
Bulk density of soil for layer	g/cc	CONSTANT	1.70
Biological decay coefficient	1/yr	CONSTANT	0.000

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	P MEA
Solid phase decay coefficient	1/yr	DERIVED	-999.
Dissolved phase decay coefficient	1/yr	DERIVED	-999.
Overall chemical decay coefficient	1/yr	DERIVED	-999.
Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000
Reference temperature	C	CONSTANT	20.0
Normalized distribution coefficient	ml/g	CONSTANT	0.000

Distribution coefficient	--	DERIVED	-999.
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000
Air diffusion coefficient	cm2/s	CONSTANT	0.000
Reference temperature for air diffusion	C	CONSTANT	20.0
Molecular weight	g/M	CONSTANT	0.000
Mole fraction of solute	--	CONSTANT	0.000
Vapor pressure of solute	mm Hg	CONSTANT	0.000
Henry's law constant	atm-m^3/M	CONSTANT	0.000
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000
Not currently used		CONSTANT	-999.
Not currently used		CONSTANT	-999.

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	P MEA
Infiltration rate	m/yr	CONSTANT	3.15
Area of waste disposal unit	m^2	CONSTANT	9.00
Duration of pulse	yr	CONSTANT	0.100
Spread of contaminant source	m	DERIVED	-999.
Recharge rate	m/yr	CONSTANT	0.000
Source decay constant	1/yr	CONSTANT	0.000
Initial concentration at landfill	mg/l	CONSTANT	1.00
Length scale of facility	m	DERIVED	-999.
Width scale of facility	m	DERIVED	-999.
Near field dilution		DERIVED	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	P MEA
Particle diameter	cm	CONSTANT	0.500
Aquifer porosity	--	CONSTANT	0.300
Bulk density	g/cc	CONSTANT	1.70
Aquifer thickness	m	CONSTANT	10.0
Source thickness (mixing zone depth)	m	DERIVED	0.100
Conductivity (hydraulic)	m/yr	CONSTANT	3.15
Gradient (hydraulic)		CONSTANT	0.100
Groundwater seepage velocity	m/yr	DERIVED	-999.
Retardation coefficient	--	DERIVED	1.00
Longitudinal dispersivity	m	FUNCTION OF X	-999.
Transverse dispersivity	m	FUNCTION OF X	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.
Temperature of aquifer	C	CONSTANT	20.0
pH	--	CONSTANT	7.00
Organic carbon content (fraction)		CONSTANT	0.000
Well distance from site	m	CONSTANT	762.
Angle off center	degree	CONSTANT	0.000
Well vertical distance	m	CONSTANT	0.000

1

TIME	CONCENTRATION
0.140E+04	0.13192E-04
0.141E+04	0.14437E-04
0.142E+04	0.15780E-04
0.143E+04	0.17225E-04
0.144E+04	0.18779E-04

```
0.145E+04 0.20447E-04
0.146E+04 0.22237E-04
0.147E+04 0.24155E-04
0.148E+04 0.26208E-04
0.149E+04 0.28402E-04
0.150E+04 0.30747E-04
0.151E+04 0.33248E-04
0.152E+04 0.35915E-04
0.153E+04 0.38755E-04
0.154E+04 0.41777E-04
0.155E+04 0.44988E-04
0.156E+04 0.48399E-04
0.157E+04 0.52018E-04
0.158E+04 0.55853E-04
0.159E+04 0.59916E-04
*** WARNING *** Near field mixing factor is greater than 1.
Mixing factor =    71.8
```

trivtrsv.txt	**Name:** trivtrsv.txt **Type:** Text File (application/x-unknown-content-type-txtfile) **Encoding:** base64