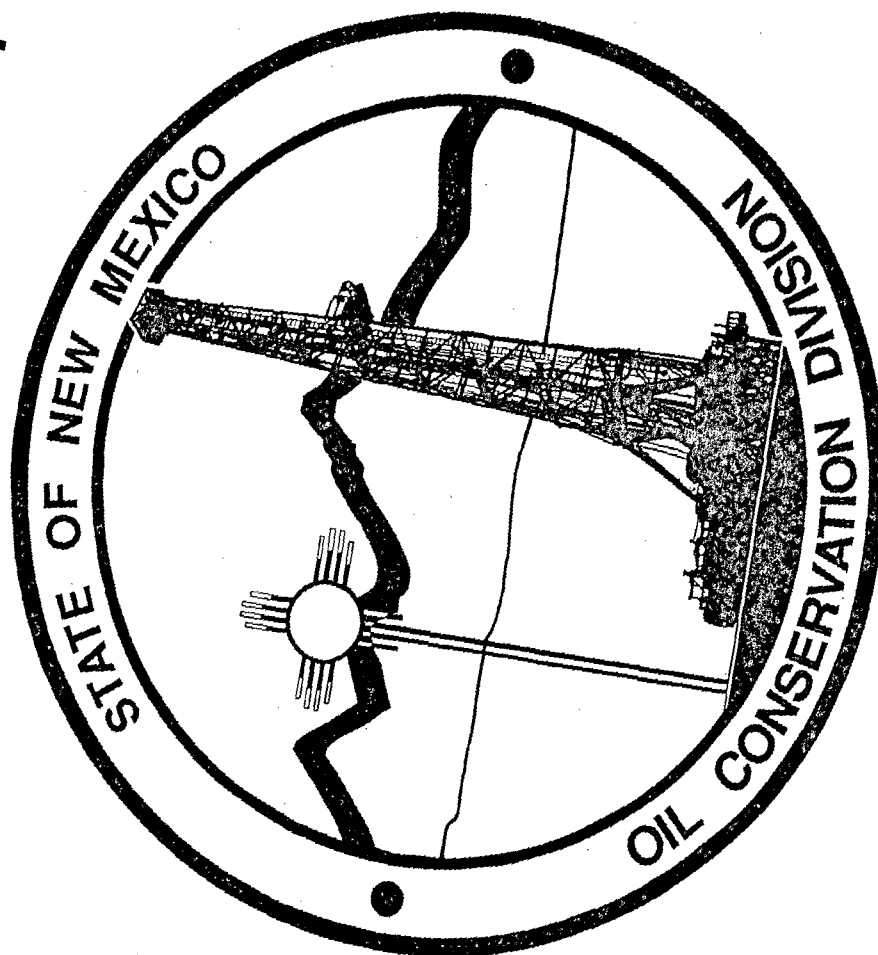


CASE NO. 14015
OCD EXHIBIT 7



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, 1 bbls/d (80% ev)

50 year ave. - 2' sandy loam cover - no liner - 5K - 10'x10' - 100' from pit
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

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		LIMITS	
			MEAN	STD DEV	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		LIMITS	
			MEAN	STD DEV	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

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 - Steepest 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		LIMITS	
			MEAN	STD DEV	MIN	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		LIMITS	
			MEAN	STD DEV	MIN	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

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS	LIMITS
			MEAN STD DEV	MIN MAX
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.	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-02 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.	0.000E+00 1.00
Not currently used		CONSTANT	-999.	0.000E+00 1.00

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS	LIMITS
			MEAN STD DEV	MIN MAX
Infiltration rate	m/yr	CONSTANT	1.25 -999.	0.100E-09 0.100E+11
Area of waste disposal unit	m^2	CONSTANT	9.20 -999.	0.100E-01 -999.
Duration of pulse	yr	CONSTANT	50.0 -999.	0.100E-03 -999.
Spread of contaminant source	m	DERIVED	-999.	0.100E-03 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+04 -999.	0.000E+00 -999.
Length scale of facility	m	DERIVED	-999.	0.100E-03 0.100E+11
Width scale of facility	m	DERIVED	-999.	0.100E-03 0.100E+11
Near field dilution		DERIVED	1.00 0.000E+00	0.000E+00 1.00

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS	LIMITS
			MEAN STD DEV	MIN MAX
Particle diameter	cm	CONSTANT	0.500E-01 -999.	0.100E-03 100.

Aquifer porosity	--	CONSTANT	0.300	-999.	0.100E-08	0.100E+00
Bulk density	g/cc	CONSTANT	1.70	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	145.	-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	300.	-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	30.3	-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
0.200E+02	0.58393E+02
0.400E+02	0.27810E+03
0.600E+02	0.33369E+03
0.800E+02	0.14367E+03
0.100E+03	0.24721E+02
0.120E+03	0.36579E+01
0.140E+03	0.46545E+00
0.160E+03	0.00000E+00
0.180E+03	0.00000E+00
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

CONCENTRATION AT BOTTOM OF VADOSE ZONE

RUN NO. 1

AT TIME = 0.1166E+01	CONC = 0.5953E+01
AT TIME = 0.1544E+01	CONC = 0.2053E+01
AT TIME = 0.1859E+01	CONC = 0.4724E+02
AT TIME = 0.2122E+01	CONC = 0.3300E+03
AT TIME = 0.2341E+01	CONC = 0.7843E+03
AT TIME = 0.2523E+01	CONC = 0.1280E+04
AT TIME = 0.2675E+01	CONC = 0.1737E+04
AT TIME = 0.2802E+01	CONC = 0.2128E+04
AT TIME = 0.2907E+01	CONC = 0.2449E+04
AT TIME = 0.2995E+01	CONC = 0.2708E+04
AT TIME = 0.5495E+01	CONC = 0.5023E+04
AT TIME = 0.7995E+01	CONC = 0.4985E+04
AT TIME = 0.1050E+02	CONC = 0.5001E+04
AT TIME = 0.1300E+02	CONC = 0.5004E+04
AT TIME = 0.1550E+02	CONC = 0.5002E+04
AT TIME = 0.1800E+02	CONC = 0.5000E+04
AT TIME = 0.2050E+02	CONC = 0.5000E+04
AT TIME = 0.2300E+02	CONC = 0.4999E+04
AT TIME = 0.2550E+02	CONC = 0.5000E+04
AT TIME = 0.2800E+02	CONC = 0.5000E+04
AT TIME = 0.3050E+02	CONC = 0.5000E+04
AT TIME = 0.3300E+02	CONC = 0.5000E+04
AT TIME = 0.3550E+02	CONC = 0.5000E+04
AT TIME = 0.3800E+02	CONC = 0.5000E+04
AT TIME = 0.4050E+02	CONC = 0.5000E+04
AT TIME = 0.4300E+02	CONC = 0.5000E+04
AT TIME = 0.4550E+02	CONC = 0.5000E+04
AT TIME = 0.4800E+02	CONC = 0.5000E+04
AT TIME = 0.5050E+02	CONC = 0.5000E+04
AT TIME = 0.5300E+02	CONC = 0.2293E+04
AT TIME = 0.5308E+02	CONC = 0.2045E+04
AT TIME = 0.5319E+02	CONC = 0.1766E+04
AT TIME = 0.5332E+02	CONC = 0.1460E+04
AT TIME = 0.5347E+02	CONC = 0.1138E+04
AT TIME = 0.5365E+02	CONC = 0.8188E+03
AT TIME = 0.5387E+02	CONC = 0.5240E+03
AT TIME = 0.5413E+02	CONC = 0.2794E+03
AT TIME = 0.5445E+02	CONC = 0.1050E+03
AT TIME = 0.5482E+02	CONC = 0.7299E+01
AT TIME = 0.3800E+03	CONC = -.7095E-01

1

UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED

SERIAL NUMBER

TIME

DEPTH

CONCENTRATION

CONCENTRATION

iplnli4i.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, 1 bbls/d (80% ev)

50 year ave. - 2' sandy loam cover - no liner - 5K - 30'x30' - 100' from pit
Chemical simulated is DEFAULT CHEMICAL

Option Chosen

Run was

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

Saturated and unsaturated zone models

DETERMIN

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			LIMITS	
			MEAN	STD DEV	MIN	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			LIMITS	
			MEAN	STD DEV	MIN	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

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		LIMITS	
			MEAN	STD DEV	MIN	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		LIMITS	
			MEAN	STD DEV	MIN	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	cm ² /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

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	1.25	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m ²	CONSTANT	83.6	-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+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

AQUIFER SPECIFIC VARIABLES

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

Parameter	Units	Value	Exponent
Aquifer porosity	--	0.300	-999.
Bulk density	g/cc	1.70	-999.
Aquifer thickness	m	145.	-999.
Source thickness (mixing zone depth)	m	0.100	-999.
Conductivity (hydraulic)	m/yr	300.	-999.
Gradient (hydraulic)	m/yr	0.100E-02	-999.
Groundwater seepage velocity	m/yr	-999.	-999.
Retardation coefficient	--	1.00	-999.
Longitudinal dispersivity	m	-999.	-999.
Transverse dispersivity	m	-999.	-999.
Vertical dispersivity	m	-999.	-999.
Temperature of aquifer	C	20.0	-999.
pH	--	7.00	-999.
Organic carbon content (fraction)	--	0.000E+00	-999.
Well distance from site	m	30.3	-999.
Angle off center	degree	0.000E+00	-999.
Well vertical distance	m	0.000E+00	-999.

TIME	CONCENTRATION
0.000E+00	0.00000E+00
0.200E+02	0.16966E+03
0.400E+02	0.81851E+03
0.600E+02	0.98423E+03
0.800E+02	0.42709E+03
0.100E+03	0.73889E+02
0.120E+03	0.10958E+02
0.140E+03	0.14000E+01
0.160E+03	0.00000E+00
0.180E+03	0.00000E+00
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

CONCENTRATION AT BOTTOM OF VADOSE ZONE

RUN NO. 1

AT TIME = 0.1166E+01	CONC = 0.5953E+01
AT TIME = 0.1544E+01	CONC = 0.2053E+01
AT TIME = 0.1859E+01	CONC = 0.4724E+02
AT TIME = 0.2122E+01	CONC = 0.3300E+03
AT TIME = 0.2341E+01	CONC = 0.7843E+03
AT TIME = 0.2523E+01	CONC = 0.1280E+04
AT TIME = 0.2675E+01	CONC = 0.1737E+04
AT TIME = 0.2802E+01	CONC = 0.2128E+04
AT TIME = 0.2907E+01	CONC = 0.2449E+04
AT TIME = 0.2995E+01	CONC = 0.2708E+04
AT TIME = 0.5495E+01	CONC = 0.5023E+04
AT TIME = 0.7995E+01	CONC = 0.4985E+04
AT TIME = 0.1050E+02	CONC = 0.5001E+04
AT TIME = 0.1300E+02	CONC = 0.5004E+04
AT TIME = 0.1550E+02	CONC = 0.5002E+04
AT TIME = 0.1800E+02	CONC = 0.5000E+04
AT TIME = 0.2050E+02	CONC = 0.5000E+04
AT TIME = 0.2300E+02	CONC = 0.4999E+04
AT TIME = 0.2550E+02	CONC = 0.5000E+04
AT TIME = 0.2800E+02	CONC = 0.5000E+04
AT TIME = 0.3050E+02	CONC = 0.5000E+04
AT TIME = 0.3300E+02	CONC = 0.5000E+04
AT TIME = 0.3550E+02	CONC = 0.5000E+04
AT TIME = 0.3800E+02	CONC = 0.5000E+04
AT TIME = 0.4050E+02	CONC = 0.5000E+04
AT TIME = 0.4300E+02	CONC = 0.5000E+04
AT TIME = 0.4550E+02	CONC = 0.5000E+04
AT TIME = 0.4800E+02	CONC = 0.5000E+04
AT TIME = 0.5050E+02	CONC = 0.5000E+04
AT TIME = 0.5300E+02	CONC = 0.2293E+04
AT TIME = 0.5308E+02	CONC = 0.2045E+04
AT TIME = 0.5319E+02	CONC = 0.1766E+04
AT TIME = 0.5332E+02	CONC = 0.1460E+04
AT TIME = 0.5347E+02	CONC = 0.1138E+04
AT TIME = 0.5365E+02	CONC = 0.8188E+03
AT TIME = 0.5387E+02	CONC = 0.5240E+03
AT TIME = 0.5413E+02	CONC = 0.2794E+03
AT TIME = 0.5445E+02	CONC = 0.1050E+03
AT TIME = 0.5482E+02	CONC = 0.7299E+01
AT TIME = 0.3800E+03	CONC = -.7095E-01

1

UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED
SERIAL NUMBER
CONCENTRATION

TIME

DEPTH

CONCENTRATION

plnli4f.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, 1 bbls/d (80% ev)

50 year ave. - 2' sandy loam cover - no liner - 5K - 10'x10' pit
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		LIMITS	
			MEAN	STD DEV	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		LIMITS	
			MEAN	STD DEV	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

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
ISQL	- 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		LIMITS	
			MEAN	STD DEV	MIN	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		LIMITS	
			MEAN	STD DEV	MIN	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

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS	LIMITS
			MEAN STD DEV	MIN MAX
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.	0.000E+00 0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000E+00 -999.	0.000E+00 -999.
Air diffusion coefficient	cm ² /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.	0.000E+00 1.00
Not currently used		CONSTANT	-999.	0.000E+00 1.00

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS	LIMITS
			MEAN STD DEV	MIN MAX
Infiltration rate	m/yr	CONSTANT	1.25 -999.	0.100E-09 0.100E+11
Area of waste disposal unit	m ²	CONSTANT	9.20 -999.	0.100E-01 -999.
Duration of pulse	yr	CONSTANT	50.0 -999.	0.100E-08 -999.
Spread of contaminant source	m	DERIVED	-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+04 -999.	0.000E+00 -999.
Length scale of facility	m	DERIVED	-999.	0.100E-08 0.100E+11
Width scale of facility	m	DERIVED	-999.	0.100E-08 0.100E+11
Near field dilution		DERIVED	1.00 0.000E+00	0.000E+00 1.00

AQUIFER SPECIFIC VARIABLES

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

Parameter	Units	Value	Units	Value	Units	Value
Aquifer porosity	--	0.300	CONSTANT	-999.	0.100E-08	0.100E+09
Bulk density	g/cc	1.70	CONSTANT	-999.	0.100E-01	5.00
Aquifer thickness	m	0.131E+04	CONSTANT	-999.	0.100E-08	0.100E+06
Source thickness (mixing zone depth)	m	0.100	DERIVED	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	30.0	CONSTANT	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)	m/yr	0.100E-02	CONSTANT	-999.	0.100E-07	-999.
Groundwater seepage velocity	m/yr	-999.	DERIVED	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	1.00	DERIVED	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	-999.	FUNCTION OF X	-999.	0.100E-02	0.100E+05
Transverse dispersivity	m	-999.	FUNCTION OF X	-999.	-999.	-999.
Vertical dispersivity	m	-999.	FUNCTION OF X	-999.	0.100E-02	0.100E+05
Temperature of aquifer	C	20.0	CONSTANT	-999.	0.000E+00	100.
pH	--	7.00	CONSTANT	-999.	0.300	14.0
Organic carbon content (fraction)	m	0.000E+00	CONSTANT	-999.	0.100E-05	1.00
Well distance from site	degree	1.00	CONSTANT	-999.	1.00	-999.
Angle off center	m	0.000E+00	CONSTANT	-999.	0.000E+00	360.
Well vertical distance	m	0.000E+00	CONSTANT	-999.	0.000E+00	1.00

TIME CONCENTRATION

TIME	CONCENTRATION
0.100E+01	0.00000E+00
0.200E+01	0.00000E+00
0.300E+01	0.00000E+00
0.400E+01	0.28833E-01
0.500E+01	0.26779E+01
0.600E+01	0.30497E+02
0.700E+01	0.12978E+03
0.800E+01	0.34418E+03
0.900E+01	0.68923E+03
0.100E+02	0.11334E+04
0.110E+02	0.16207E+04
0.120E+02	0.20973E+04
0.130E+02	0.25392E+04
0.140E+02	0.29215E+04
0.150E+02	0.32431E+04
0.160E+02	0.35069E+04
0.170E+02	0.37193E+04
0.180E+02	0.38880E+04
0.190E+02	0.40204E+04
0.200E+02	0.41235E+04

CONCENTRATION AT BOTTOM OF VADOSE ZONE

RUN NO. 1

AT TIME = 0.1166E+01	CONC = 0.5953E+01
AT TIME = 0.1544E+01	CONC = 0.2053E+01
AT TIME = 0.1859E+01	CONC = 0.4724E+02
AT TIME = 0.2122E+01	CONC = 0.3300E+03
AT TIME = 0.2341E+01	CONC = 0.7843E+03
AT TIME = 0.2523E+01	CONC = 0.1280E+04
AT TIME = 0.2675E+01	CONC = 0.1737E+04
AT TIME = 0.2802E+01	CONC = 0.2128E+04
AT TIME = 0.2907E+01	CONC = 0.2449E+04
AT TIME = 0.2995E+01	CONC = 0.2708E+04
AT TIME = 0.5495E+01	CONC = 0.5023E+04
AT TIME = 0.7995E+01	CONC = 0.4985E+04
AT TIME = 0.1050E+02	CONC = 0.5001E+04
AT TIME = 0.1300E+02	CONC = 0.5004E+04
AT TIME = 0.1550E+02	CONC = 0.5002E+04
AT TIME = 0.1800E+02	CONC = 0.5000E+04
AT TIME = 0.2050E+02	CONC = 0.5000E+04
AT TIME = 0.2300E+02	CONC = 0.4999E+04
AT TIME = 0.2550E+02	CONC = 0.5000E+04
AT TIME = 0.2800E+02	CONC = 0.5000E+04
AT TIME = 0.3050E+02	CONC = 0.5000E+04
AT TIME = 0.3300E+02	CONC = 0.5000E+04
AT TIME = 0.3550E+02	CONC = 0.5000E+04
AT TIME = 0.3800E+02	CONC = 0.5000E+04
AT TIME = 0.4050E+02	CONC = 0.5000E+04
AT TIME = 0.4300E+02	CONC = 0.5000E+04
AT TIME = 0.4550E+02	CONC = 0.5000E+04
AT TIME = 0.4800E+02	CONC = 0.5000E+04
AT TIME = 0.5050E+02	CONC = 0.5000E+04
AT TIME = 0.5300E+02	CONC = 0.2293E+04
AT TIME = 0.5308E+02	CONC = 0.2045E+04
AT TIME = 0.5319E+02	CONC = 0.1766E+04
AT TIME = 0.5332E+02	CONC = 0.1460E+04
AT TIME = 0.5347E+02	CONC = 0.1138E+04
AT TIME = 0.5365E+02	CONC = 0.8188E+03
AT TIME = 0.5387E+02	CONC = 0.5240E+03
AT TIME = 0.5413E+02	CONC = 0.2794E+03
AT TIME = 0.5445E+02	CONC = 0.1050E+03
AT TIME = 0.5482E+02	CONC = 0.7299E+01
AT TIME = 0.6885E+02	CONC = 0.8967E-01

1

UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED

SERIAL NUMBER
CONCENTRATION

TIME

DEPTH

CONCENTRATION

plnli4c.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, 1 bbls/d (80%)

50 year ave. - 2' sandy loam cover - no liner - 5K - 30'x30' pit
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			LIMITS	
			MEAN	STD DEV	MIN	MAX	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			LIMITS	
			MEAN	STD DEV	MIN	MAX	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	

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		LIMITS	
			MEAN	STD DEV	MIN	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		LIMITS	
			MEAN	STD DEV	MIN	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

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS	LIMITS
			MEAN STD DEV	MIN MAX
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	cm ² /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

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS	LIMITS
			MEAN STD DEV	MIN MAX
Infiltration rate	m/yr	CONSTANT	0.140 -999.	0.100E-09 0.100E+11
Area of waste disposal unit	m ²	CONSTANT	83.6 -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+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

AQUIFER SPECIFIC VARIABLES

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

Parameter	Units	Value	Exponent
Aquifer porosity	--	0.300	-999.
Bulk density	g/cc	1.70	-999.
Aquifer thickness	m	145.	-999.
Source thickness (mixing zone depth)	m	0.100	-999.
Conductivity (hydraulic)	m/yr	300.	-999.
Gradient (hydraulic)	m/yr	0.100E-02	-999.
Groundwater seepage velocity	m/yr	-999.	-999.
Retardation coefficient	--	1.00	-999.
Longitudinal dispersivity	m	-999.	-999.
Transverse dispersivity	m	-999.	-999.
Vertical dispersivity	m	-999.	-999.
Temperature of aquifer	C	20.0	-999.
pH	--	7.00	-999.
Organic carbon content (fraction)		0.000E+00	-999.
Well distance from site	m	1.00	-999.
Angle off center	degree	0.000E+00	-999.
Well vertical distance	m	0.000E+00	-999.

TIME	CONCENTRATION
0.100E+01	0.00000E+00
0.110E+02	0.00000E+00
0.210E+02	0.73717E+03
0.310E+02	0.38849E+04
0.410E+02	0.48947E+04
0.510E+02	0.49497E+04
0.610E+02	0.49127E+04
0.710E+02	0.40752E+04
0.810E+02	0.11283E+04
0.910E+02	0.42362E+02
0.101E+03	0.18562E+01
0.111E+03	0.81369E+00
0.121E+03	0.00000E+00
0.131E+03	0.00000E+00
0.141E+03	0.00000E+00
0.151E+03	0.00000E+00
0.161E+03	0.00000E+00
0.171E+03	0.00000E+00
0.181E+03	0.00000E+00
0.191E+03	0.00000E+00

CONCENTRATION AT BOTTOM OF VADOSE ZONE

RUN NO. 1

AT TIME = 0.1010E+02	CONC = 0.5953E+01
AT TIME = 0.1337E+02	CONC = 0.2053E+01
AT TIME = 0.1610E+02	CONC = 0.4724E+02
AT TIME = 0.1838E+02	CONC = 0.3299E+03
AT TIME = 0.2027E+02	CONC = 0.7843E+03
AT TIME = 0.2185E+02	CONC = 0.1280E+04
AT TIME = 0.2317E+02	CONC = 0.1737E+04
AT TIME = 0.2426E+02	CONC = 0.2128E+04
AT TIME = 0.2518E+02	CONC = 0.2449E+04
AT TIME = 0.2594E+02	CONC = 0.2708E+04
AT TIME = 0.2844E+02	CONC = 0.3467E+04
AT TIME = 0.3094E+02	CONC = 0.4055E+04
AT TIME = 0.3344E+02	CONC = 0.4467E+04
AT TIME = 0.3594E+02	CONC = 0.4734E+04
AT TIME = 0.3844E+02	CONC = 0.4892E+04
AT TIME = 0.4094E+02	CONC = 0.4976E+04
AT TIME = 0.4344E+02	CONC = 0.5013E+04
AT TIME = 0.4594E+02	CONC = 0.5024E+04
AT TIME = 0.4844E+02	CONC = 0.5022E+04
AT TIME = 0.5094E+02	CONC = 0.5013E+04
AT TIME = 0.5344E+02	CONC = 0.5004E+04
AT TIME = 0.5594E+02	CONC = 0.4995E+04
AT TIME = 0.5844E+02	CONC = 0.4993E+04
AT TIME = 0.6094E+02	CONC = 0.4974E+04
AT TIME = 0.6344E+02	CONC = 0.4982E+04
AT TIME = 0.6594E+02	CONC = 0.4946E+04
AT TIME = 0.6844E+02	CONC = 0.4642E+04
AT TIME = 0.7094E+02	CONC = 0.4002E+04
AT TIME = 0.7344E+02	CONC = 0.3154E+04
AT TIME = 0.7594E+02	CONC = 0.2283E+04
AT TIME = 0.7670E+02	CONC = 0.2036E+04
AT TIME = 0.7761E+02	CONC = 0.1757E+04
AT TIME = 0.7871E+02	CONC = 0.1453E+04
AT TIME = 0.8003E+02	CONC = 0.1132E+04
AT TIME = 0.8161E+02	CONC = 0.8142E+03
AT TIME = 0.8350E+02	CONC = 0.5210E+03
AT TIME = 0.8578E+02	CONC = 0.2778E+03
AT TIME = 0.8851E+02	CONC = 0.1048E+03
AT TIME = 0.9178E+02	CONC = 0.8803E+01
AT TIME = 0.1910E+03	CONC = -.1661E+01

1

UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED

SERIAL NUMBER
CONCENTRATION

TIME

DEPTH

CONCENTRATION

1
dpInli4g.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, 1 bbls/d (80% ev)

50 year ave. - 2' sandy loam cover - no liner - 5K - 10'x10' - 200' from pit
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
NVEFLAYR - 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		LIMITS	
			MEAN	STD DEV	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		LIMITS	
			MEAN	STD DEV	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

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		LIMITS	
			MEAN	STD DEV	MIN	MAX
Thickness of layer	m	CONSTANT	15.2	-999.	0.100E+03	-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		LIMITS	
			MEAN	STD DEV	MIN	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

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN STD DEV	LIMITS MIN MAX
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	cm ² /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-03 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

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN STD DEV	LIMITS MIN MAX
Infiltration rate	m/yr	CONSTANT	1.25 -999.	0.100E-09 0.100E+11
Area of waste disposal unit	m ²	CONSTANT	9.20 -999.	0.100E-01 -999.
Duration of pulse	yr	CONSTANT	50.0 -999.	0.100E-03 -999.
Spread of contaminant source	m	DERIVED	-999. -999.	0.100E-03 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+04 -999.	0.000E+00 -999.
Length scale of facility	m	DERIVED	-999. -999.	0.100E-03 0.100E+11
Width scale of facility	m	DERIVED	-999. -999.	0.100E-03 0.100E+11
Near field dilution		DERIVED	1.00 0.000E+00	0.000E+00 1.00

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	145.	-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	300.	-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	60.6	-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
----	-----
0.200E+02	0.56384E+00
0.400E+02	0.39994E+02
0.600E+02	0.10519E+03
0.800E+02	0.13098E+03
0.100E+03	0.84139E+02
0.120E+03	0.38768E+02
0.140E+03	0.15855E+02
0.160E+03	0.61880E+01
0.180E+03	0.23463E+01
0.200E+03	0.85096E+00
0.220E+03	0.25668E+00
0.240E+03	0.23671E-01
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	0.00000E+00

1

dplnli4d.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, 1 bbls/d (80% ev)

50 year ave. - 2' sandy loam cover - no liner - 5K - 30'x30' - 200' from pit
Chemical simulated is DEFAULT CHEMICAL

Option Chosen

Run was

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

Saturated and unsaturated zone models

DETERMIN

UNSATURATED ZONE FLOW MODEL PARAMETERS

(input parameter description and value)

NP - Total number of nodal points

NMAT - Number of different porous materials

KPROP - Van Genuchten or Brooks and Corey

IMSHGN - Spatial discretization option

NVFLAYR - Number of layers in flow model

240

1

1

1

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			LIMITS	
			MEAN	STD DEV		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			LIMITS	
			MEAN	STD DEV		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

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	STD DEV	LIMITS MIN	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	STD DEV	LIMITS MIN	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	cm ² /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

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	STD DEV	LIMITS MIN	MAX
Infiltration rate	m/yr	CONSTANT	0.140	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m ²	CONSTANT	83.6	-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+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

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	145.	-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	300.	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)	m/yr	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	60.6	-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
----	-----
0.200E+02	0.00000E+00
0.400E+02	0.25200E+01
0.600E+02	0.95803E+02
0.800E+02	0.27545E+03
0.100E+03	0.36050E+03
0.120E+03	0.24909E+03
0.140E+03	0.11480E+03
0.160E+03	0.45415E+02
0.180E+03	0.17069E+02
0.200E+03	0.63077E+01
0.220E+03	0.23068E+01
0.240E+03	0.77507E+00
0.260E+03	0.17328E+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	0.00000E+00

CONCENTRATION AT BOTTOM OF VADOSE ZONE

RUN NO. 1

AT TIME = 0.1010E+02	CONC = 0.5953E+01
AT TIME = 0.1337E+02	CONC = 0.2053E+01
AT TIME = 0.1610E+02	CONC = 0.4724E+02
AT TIME = 0.1838E+02	CONC = 0.3299E+03
AT TIME = 0.2027E+02	CONC = 0.7843E+03
AT TIME = 0.2185E+02	CONC = 0.1280E+04
AT TIME = 0.2317E+02	CONC = 0.1737E+04
AT TIME = 0.2426E+02	CONC = 0.2128E+04
AT TIME = 0.2518E+02	CONC = 0.2449E+04
AT TIME = 0.2594E+02	CONC = 0.2708E+04
AT TIME = 0.2844E+02	CONC = 0.3467E+04
AT TIME = 0.3094E+02	CONC = 0.4055E+04
AT TIME = 0.3344E+02	CONC = 0.4467E+04
AT TIME = 0.3594E+02	CONC = 0.4734E+04
AT TIME = 0.3844E+02	CONC = 0.4892E+04
AT TIME = 0.4094E+02	CONC = 0.4976E+04
AT TIME = 0.4344E+02	CONC = 0.5013E+04
AT TIME = 0.4594E+02	CONC = 0.5024E+04
AT TIME = 0.4844E+02	CONC = 0.5022E+04
AT TIME = 0.5094E+02	CONC = 0.5013E+04
AT TIME = 0.5344E+02	CONC = 0.5004E+04
AT TIME = 0.5594E+02	CONC = 0.4995E+04
AT TIME = 0.5844E+02	CONC = 0.4993E+04
AT TIME = 0.6094E+02	CONC = 0.4974E+04
AT TIME = 0.6344E+02	CONC = 0.4982E+04
AT TIME = 0.6594E+02	CONC = 0.4946E+04
AT TIME = 0.6844E+02	CONC = 0.4642E+04
AT TIME = 0.7094E+02	CONC = 0.4002E+04
AT TIME = 0.7344E+02	CONC = 0.3154E+04
AT TIME = 0.7594E+02	CONC = 0.2283E+04
AT TIME = 0.7670E+02	CONC = 0.2036E+04
AT TIME = 0.7761E+02	CONC = 0.1757E+04
AT TIME = 0.7871E+02	CONC = 0.1453E+04
AT TIME = 0.8003E+02	CONC = 0.1132E+04
AT TIME = 0.8161E+02	CONC = 0.8142E+03
AT TIME = 0.8350E+02	CONC = 0.5210E+03
AT TIME = 0.8578E+02	CONC = 0.2778E+03
AT TIME = 0.8851E+02	CONC = 0.1048E+03
AT TIME = 0.9178E+02	CONC = 0.8803E+01
AT TIME = 0.4000E+03	CONC = 0.4276E-01

1

UNSATURATED ZONE TRANSPORT RESULTS

NORMALIZED
SERIAL NUMBER
CONCENTRATION

TIME

DEPTH

CONCENTRATION

