# WORK PLAN





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ENVIRONMENTAL BUREAU OIL CONSERVATION DIVISION

# BASELINE RISK ASSESSMENT REPORT

TEXAS – NEW MEXICO PIPE LINE COMPANY TNM-98-23 LEA COUNTY, NEW MEXICO



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# **BASELINE RISK ASSESSMENT REPORT**

## TEXAS – NEW MEXICO PIPE LINE COMPANY TNM-98-23 LEA COUNTY, NEW MEXICO

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#### EXECUTIVE SUMMARY

The Texas-New Mexico Pipe Line Company release site designated as TNM-98-23 in Lea County, New Mexico was evaluated according to the United States Environmental Protection Agency (EPA) guidance documents listed in the REFERENCES section. The objective of the assessment was to evaluate the actual or reasonable potential for public and environmental exposure to constituents of concern, to evaluate the potential human health risks from that exposure, and to determine risk-based cleanup levels for constituents which pose an unacceptable risk.

The site is a crude oil pipeline release designated as TNM-98-23 and located approximately 10 miles south of Eunice in Lea County, New Mexico. A Site Location Map showing the location of the site in relation to the surrounding area is presented as FIG. 1. Details of the site are shown on FIG. 2.

The soils on site are sands, silty sands and clayey sands. Ground water was not encountered on site during drilling at depths up to 130 feet. There are no apparent water wells within a one-half mile radius of the site. The drinking water in the vicinity of this site is supplied from ground water. The nearest residence is more than 2 miles from the site.

The soil source area is presented on FIG. 2. Adjacent properties are shown on FIG. 1.

Complete pathways selected for exposure assessment included:

- on-site residents ingestion of soil, dermal contact with soil, and inhalation of volatiles and particulates from soil
- on-site residents ingestion of drinking water (ground water protection)
- on-site workers ingestion of soil, dermal contact with soil, and inhalation of volatiles and particulates from soil
- on-site workers ingestion of drinking water (ground water protection)

For each of the above pathways, constituent concentrations at the point where exposure or contact with the human receptor occurs were estimated using screening level contaminant fate and transport models. The risks resulting from these exposures were estimated using EPA exposure factors in the equations described in EPA RAGS. The estimated risks are presented on Worksheets 4 and 5. When the resulting risks were unacceptable, Site Specific Target Levels (SSTLs) which result in acceptable risks were calculated using these same equations. Detected site concentrations are compared to the SSTLs on Worksheets 6 and 7.

The maximum total carcinogenic risk and maximum total hazard index for each type of pathway is presented below:

	Soil (0-15 feet) Pathways	Ground Water Protection Pathways
Maximum Total Carcinogenic Risk	7.41 x 10 <sup>5</sup>	3.51 x 10 <sup>-8</sup>
Maximum Total Hazard Index	and the second sec	43.3

The most stringent SSTL for each constituent of concern in soil and ground water is compared to the maximum detected site concentrations below.

Constituent	Soil (0-15 feet) SSTL (mg/kg)	Maximum Soll (0-15 feet) Conc (mg/kg)	Vadose Zone Soil SSTL (mg/kg)	Maximum Vadose Zone Soil Conc. (mg/kg)
Benzene	3.95	293	>2,913	293
Ethylbenzene	1,051	876	>3,180	876
Fluorene	19.2	5.0	>233	5.0
Naphthalene	35.9	21.0	>736	21.0
Phenanthrene	8.85	7.0	>268	7.0
Toluene	1,436	1,300	>3,117	1,300
Xylenes	2,033	1,252	>1,443	1,252
ТРН	1.412 Juli	43,800	952	43,800

Analysis of the risk assessment for the site indicates corrective action is required for soil. We recommend an evaluation of remedial alternatives for this site.

#### INTRODUCTION

This report presents the methodology and results of a baseline risk assessment conducted for the Texas-New Mexico Pipe Line Company release site designated as TNM-98-23 in Lea County, New Mexico. The site is located approximately 10 miles south of Eunice in Unit C, Section 22, Township 23 South, Range 37 East. The site is owned by Mr. D. K. Boyd. This risk assessment follows the approach included in the United States Environmental Protection Agency (EPA) guidance documents listed in the References section. These guidance documents were used because they contain the most pertinent information for conducting risk assessments and because they are used and approved by the EPA. These documents are intended to provide guidance only, and considerable professional judgment must be exercised in applying these guidance documents to site-specific risk assessments. Consequently, this risk assessment incorporates several conservative (protective) assumptions in evaluating potential risks at the Texas-New Mexico Pipe Line Company site.

The objective of the assessment was to evaluate the actual or reasonable potential for public and environmental exposure to constituents of concern, to evaluate the potential risk from that exposure, and to determine risk-based cleanup levels for constituents which pose an unacceptable risk.

Conducting the baseline risk assessment requires:

- identification of the constituent(s) of concern and their toxicity
- identification of potential receptors at the site
- identification of exposure scenarios for each receptor
- quantification of exposure, dose and risk to each receptor
- calculation of site specific risk-based cleanup levels for constituents which pose an unacceptable risk

#### CHRONOLOGY OF PREVIOUS SITE ACTIVITIES

A chronological listing of significant events and activities is presented below.

- **11/24/98:** A crude oil pipeline release occurred and was designated TNM-98-23.
- **12/2/98:** A subsurface investigation was performed December 2-3, 1998. Six soil borings (SB-1 through SB-6) were installed to depths ranging from 22 to 72 feet below ground surface utilizing air rotary technology. Soil samples were collected at selected intervals from the ground surface to termination boring depth. The soils were classified in the field, soil samples were field screened, and selected samples from the borings were prepared and shipped to the laboratory for determination of BTEX and TPH concentrations.
- **12/5/98:** Soil boring SB-8 was installed to a depth of 130 feet. No groundwater was encountered.
- **12/31/98:** Excavation activities were conducted December 31, 1998 through January 7, 1999 to remove approximately the top 4 feet of contaminated soil. A total of 2,176 cubic yards of soil was hauled to E.P.I. Landfarm.
- 1/12/99: The excavation was refilled with clean topsoil during January 12-15, 1999.

- **1/20/99:** During January 20-21, 1999, soil boring SB-7 was installed to a depth of 22 feet. Test wells VMP-1 through VMP-4 and VEW-1 were also installed, along with test trenches T-1 through T-6.
- 2/9/99: A Bioventing Pilot Study was conducted February 9-16, 1999.

A description of the procedures and conclusions of the site investigation activities, including the results of laboratory analysis of soil and ground water samples, is presented in the <u>Subsurface Investigation Report</u> (March 1999).

#### CONSTITUENTS OF CONCERN

The following compounds were detected by laboratory analysis and make up the constituents of concern (COCs) for this site: benzene, toluene, ethylbenzene, and xylenes (BTEX); total petroleum hydrocarbons (TPH); naphthalene, fluorene, and phenanthrene.

#### METHODOLOGY TO CALCULATE HAZARD QUOTIENT FOR TPH

Crude oil is a mixture of numerous hydrocarbons, many of which have no published toxicity factors. Therefore, a surrogate approach involving the assignment of conservative toxicity values and chemical property values to mass fraction groups based on their number of carbon atoms and structural similarities was implemented in order to estimate the Hazard Quotient for crude oil as a whole. The surrogate approach consists of the following process:

- 1. Identify groups of compounds based on their number of carbon atoms and structural similarities and measure the mass fraction of each group in the crude oil sample. The results of this "fingerprinting" analysis are presented in APPENDIX A.
- 2. Identify representative toxicity values and chemical property values for groups of compounds identified above.
- 3. Estimate the Hazard Quotient for each mass fraction group using the same equations used for individual compounds.
- 4. Compute the Hazard Quotient for the crude oil as a whole by weighting the results for each group on a mass fraction basis. The following equation is used to compute the weighted Hazard Quotient for TPH:

$$HQ_w = \Sigma (HQ_i \times m_i)$$

where

The results of the implementation of this approach for the crude oil sample obtained at the subject site are presented on each calculation sheet.

If the resulting Hazard Quotient and/or the total Hazard Index for a pathway is over the allowable level of 1.0, then a Site Specific Target Level (SSTL) is calculated using the following method:

- 1. Estimate the SSTL for each mass fraction group using the same equations used for individual compounds and a Target Hazard Quotient (THQ<sub>i</sub>) of 1.0.
- 2. Compute the SSTL for the crude oil as a whole by weighting the results for each group on a mass fraction basis. The following equation is used to compute the weighted SSTL for TPH:

 $SSTL_w = THQ_{TPH} / \Sigma (m_i / SSTL_i)$ 

where

SSTLw	=	the weighted Site Specific Target Level (mg/kg or mg/L)
ТHQ <sub>трн</sub>	=	the Target Hazard Quotient for TPH as a whole (unitless)
m <sub>i</sub>	=	the mass fraction of group 'i' in the product (mg/mg)
SSTLi	=	the SSTL for mass fraction group 'i' (mg/kg or mg/L)

#### EXPOSURE ASSESSMENT

#### SITE CONDITIONS

The TNM-98-23 release site occurs on undeveloped, remote rural ranchland along a crude oil pipeline located in Lea County, New Mexico. The land is slightly rolling to flat with sparse native grasses and bushes and is used for grazing cattle.

The soils on site are sands, silty sands and clayey sands. Ground water was not encountered on site during drilling (at depths up to 130 feet) so ground water data is unavailable.

#### Land Use

It is possible that the site may not remain vacant, but could be used for residential or commercial purposes. The nearest residence is more than 2 miles away. Adjacent land consists of vegetated sand dunes.

#### Water Use

There are no apparent water wells within a one-half mile radius of the site. The drinking water in the vicinity of this site is supplied from ground water.

#### RECEPTORS OF CONCERN

On-site receptors of concern include:

- residents
- workers

The exposure assumptions for the on-site resident are greater in every instance than those for the site visitor, the off-site resident, and the off-site worker. Therefore, the site visitor, the off-site resident, and the off-site worker pathways are not considered in this risk assessment.

#### MEDIA OF CONCERN

#### Soil

Exposure to COCs present in the soils at the site can occur by incidental ingestion of contaminated soil and dermal contact with contaminated soil. Additionally, COCs present in the soil may leach into the ground water.

#### Air

Volatile emissions from residual hydrocarbons in soil at the site could lead to exposure through inhalation. Dispersion and transport of these volatiles in the atmosphere may cause on-site and off-site ambient air concentrations to be impacted. Due to the potential of contaminants to adsorb to particulates, inhalation of contaminated particulates is also possible.

#### **Ground Water**

Assuming that a future resident installed a domestic well on site, exposure to COCs present in the ground water under the site could occur by ingestion of drinking water.

#### COMPLETE EXPOSURE PATHWAYS

Ground water is greater than 15 feet deep, therefore, exposure to volatile emissions from ground water and exposure through dermal contact with ground water are considered incomplete pathways.

Ground water was not encountered on site during drilling, however, to be conservative, it was assumed that a water well would be installed on the site for residential domestic use. Therefore, exposure to contaminants via ingestion of drinking water is considered a complete pathway for on-site residents under future conditions.

Complete pathways selected for exposure assessment included:

- on-site residents ingestion of soil, dermal contact with soil, and inhalation of volatiles and particulates from soil
- on-site residents ingestion of drinking water (ground water protection)
- on-site workers ingestion of soil, dermal contact with soil, and inhalation of volatiles and particulates from soil
- on-site workers ingestion of drinking water (ground water protection)

#### **ESTIMATION OF RECEPTOR POINT CONCENTRATIONS**

The above scenarios require that the contaminant concentrations in soil, ground water, and air at the point where exposure with the human receptor occurs be estimated. Site specific data is available for subsurface soil concentrations at the site. On-site ambient air concentrations, when needed, were estimated using screening level contaminant fate and transport equations. On-site ground water concentrations were estimated using a dilution/attenuation factor (DAF) calculated from the Jury and AT123D models. The DAF predicts the potential migration from soil into ground water for each constituent of concern. A summary of DAF calculations is provided in APPENDIX F. Potential ground water

concentrations were then calculated by multiplying the soil concentration times the respective DAF for each constituent of concern.

The site-specific input parameters used in these calculations are presented in WORKSHEET 2. COC-specific parameters and risk equations are presented in APPENDIX B and APPENDIX C.

The following conservative assumptions were used in these calculations:

For the soil pathways:

- The <u>maximum</u> COC soil concentrations detected between 0 and 15 feet during assessment activities at the site exist homogeneously in the subsurface from the ground surface to a depth of 15 feet throughout the soil source area.
- It was assumed that a residence is constructed in the source area.
- It was assumed that for non-carcinogens a child resident ingested 200 mg of soil per day, 350 days per year for 6 years, for carcinogens an adult resident ingested 124 mg of soil per day, 350 days per year for 30 years, and for both carcinogens and non-carcinogens that an adult resident inhaled 15 m<sup>3</sup> of air per day and had 5800 cm<sup>2</sup> of skin surface area in contact with the soil, 350 days per year for 30 years. These exposure parameters represent the maximum potential (worst-case) exposure assumptions listed in EPA guidelines.

For the ground water protection pathway:

- The maximum COC soil concentrations detected in the source area during assessment activities at the site exist homogeneously throughout the soil source area.
- A new domestic drinking water well was assumed to be installed in the middle of the source area.
- It was assumed that the resident will ingest 2 liters of ground water per day, 350 days per year for 30 years. These exposure parameters represent the maximum potential (worstcase) exposure assumptions listed in EPA guidelines.

#### EXPOSURE FACTORS AND ESTIMATION OF DOSE

The receptor point concentrations are combined with exposure factors to estimate dose using the relationships described in EPA RAGS. Exposure factor assumptions are chosen to reflect EPA guidance and site-specific conditions and represent conservative and reasonable estimates of potential exposure. Exposure factors used in this risk assessment are presented in WORKSHEET 3.

Note that for the residential soil ingestion pathway the age-adjusted ingestion rate is used with the other adult exposure factors for carcinogens and the child ingestion rate is used with the other child exposure factors for toxicants.

#### RISK CHARACTERIZATION

The overall impact to human health due to exposure to chemicals is estimated by combining the estimated dose and the critical toxicity values (slope factor for carcinogens, reference dose for non-carcinogens). A carcinogenic risk value was calculated for benzene and a Hazard Quotient value was calculated for each non-carcinogen considered a constituent of concern. The Hazard Quotients were then summed to calculate the total Hazard Index for each soil pathway. The calculated carcinogenic risk and the Hazard Index values for each pathway are summarized in WORKSHEET 4 for soil (0 to 15 feet) and WORKSHEET 5 for vadose zone soil. The risk calculation equations, exposure factor inputs, and chemical-specific inputs such as toxicity values are presented in APPENDIX B and APPENDIX C.

The maximum total carcinogenic risk and maximum total Hazard Index for each type of pathway is presented below:

	Soil (0-15 feet) Pathways	Ground Water Protection Pathways
Maximum Total Carcinogenic Risk	7.41 x 10 <sup>5</sup>	3.51 x 10 <sup>-8</sup>
Maximum Total Hazard Index	and 15:9 Jack 14	43:3- <sup>Production</sup>

The carcinogenic risk exceeds the acceptable level of 1.0 x 10<sup>-6</sup>. The Hazard Index exceeds the acceptable level of 1.0.

#### RISK-BASED TARGET LEVEL CALCULATIONS

For each complete pathway with estimated risk over the acceptable levels, Site-Specific Target Levels (SSTLs) were calculated for each COC. The same conservative assumptions and input parameters used in the risk calculations were used in the SSTL calculations to ensure those concentration limits will be protective of human health. The SSTL calculations are presented in APPENDIX D and APPENDIX E. The SSTLs for soil are presented in WORKSHEETS 6 and 7.

The most stringent SSTL for each constituent of concern in soil is compared to the maximum detected site concentrations below.

Constituent	Soil (0-15 feet) SSTL (mg/kg)	Maximum Soll (0-15 feet) Conc. (mg/kg)	Vadose Zone Soil SSTL (mg/kg)	Maximum Vadose Zone Soil Conc. (mg/kg)
Benzene	3.95	293	>2,913	293
Ethylbenzene	1,051	876	>3,180	876
Fluorene	19.2	5.0	>233	5.0
Naphthalene	35.9	21.0	>736	21.0
Phenanthrene	8.85	7.0	>268	7.0
Toluene	1,436	1,300	>3,117	1,300
Xylenes	2,033	1,252	>1,443	1,252
ТРН	1.412	43,800	952	43,800

#### UNCERTAINTIES

As in any risk assessment, there is uncertainty in the results obtained. There may be uncertainty in the following components of these assessments:

- Delineation of contaminants in the subsurface.
- Future use of the site and surrounding land use.
- Modeling input parameters.
- Exposure pathway analysis.
- Chemical toxicity values.

Although uncertainty exists, the conservative nature of the risk assessment conducted makes it unlikely that small changes in these components would impact the conclusion for this site.

#### CONCLUSIONS

Analysis of the risk assessment for the site indicates corrective action is required for soil. We recommend an evaluation of remedial alternatives for this site.

#### REFERENCES

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# BASELINE RISK ASSESSMENT

Texas-New Mexico Pipe Line Co. TNM-98-23 Eunice, New Mexico

#### WORKSHEET 3 EXPOSURE INPUT PARAMETERS

		Res Res	ident	at a ta ta
Input Parameters	Units	<b>Adult</b>	Child .	Worker
Body weight	kg	70	15	70
Averaging Time (carcinogens)	years	70		70
Averaging Time (non-carcinogens) - soil	years	30	6	25
Averaging Time (non-carcinogens) - ground water	years	30		25
Exposure Frequency	days/yr	350	350	250
Exposure Frequency, dermal contact w/ soil	days/yr	350		250
Exposure Duration, soil	years	30	6	25
Exposure Duration, ground water	years	30		25
Inhalation Rate	m <sup>3</sup> /day	15		20
Soil Ingestion Rate	mg/day		200	50
Age-adjusted Soil Ingestion Rate	mg-yr/kg-day	124		
Water Ingestion Rate	liters/day	2		1
Skin Surface Area in contact w/ soil	cm <sup>2</sup>	5800		5800
Soil to Skin Adherence Factor	mg/cm <sup>2</sup>	1		1

### **BASELINE RISK ASSESSMENT**

Texas-New Mexico Pipe Line Co. TNM-98-23 Eunice, New Mexico

#### WORKSHEET 4 RISK and HAZARD INDEX CALCULATED FOR EXPOSURE TO SOIL

Risk and H	azard Index for	SOILS 0 to	15 feet
'X' indica	tes pathway is complete:	x	X
Constituent	Soil Concentrations	On-Site Worker	On-Site Resident
OT Concorr	Maximum (mailea)	Inhalation +	Inhalation +
Concern	(mg/kg)	ingestion+Dennal	Ingestion+Dermai
Benzene	2.93e+2	5.34e-5	7.41e-5
	Total Risk:	5.34e-5	7.41e-5 -
Non-Carcinogens		and a conserver where a conservation of the second s	n sa sera tanta (aneral (ana a
Ethylbenzene	8.76e+2	1.79e-2	1.25e-1
Fluorene	5.00e+0	7.90e-4	2.61e-3
Naphthalene	2.10e+1	4.09 <del>e</del> -3	1.17e-2
Phenanthrene	7.00e+0	1.85e-3	2.37e-2
Toluene	1.30e+3	1.05e-1	1.81e-1
Xylene (mixed isomers)	1.25e+3	6.26e-2	6.77e-2
TPH - New Method	4.38e+4	5.77e+0	1:55ë+1
	Hazard Index:	5.96e+0	1.59e+1

Note:

95th UCL = One-sided upper 95th confidence limit of the mean

Maximum Soil Concentrations were used in the calculation of risk and hazard quotients.

\* If \* is present, then the risk to construction worker from ground water should be added to risk from soil.

## **BASELINE RISK ASSESSMENT**

Texas-New Mexico Pipe Line Co. TNM-98-23 Eunice, New Mexico

#### WORKSHEET 5 RISK and HAZARD INDEX CALCULATED FOR SOIL (GROUND WATER PROTECTION)

<b>Risk and Hazar</b>	d Index for SOII	GROU	ND WATE	ER PROTE	CTION
'X' indicat	es pathway is complete:	. <b>X</b>		X	···
Constituent	Soil Concentrations	On- Woi	Site rke <b>r</b>	On- Resi	Site dent
of	Maximum				
Concern	(mg/kg)	Ingestion	Inhalation	Ingestion	Inhalation
Carcinogens					
Benzene	2.93e+2	1.05e-8		3.51e-8	
	Total Risk:	1.05e-8		3.51e-8	
Non-Carcinogens					
Ethylbenzene	8.76e+2	0.00e+0		0.00e+0	
Fluorene	5.00e+0	0.00e+0		0.00e+0	
Naphthalene	2.10e+1	0.00e+0		0.00e+0	
Phenanthrene	7.00e+0	0.00e+0		0.00e+0	
Toluene	1.30e+3	5.68e-5		1.59e-4	
Xylene (mixed isomers)	1.25e+3	8.39e-5		2.35e-4	
TPH - New Method	4.38e+4	1.54e+1		4.33e+1	
	Hazard Index:	1.54e+1		4.33e+1	

Note:

95th UCL = One-sided upper 95th confidence limit of the mean

Maximum Ground Water Concentrations were used in the calculation of risk and hazard quotients.

	TARG	ET LEVEL (	CALCULATI	ONS		
Texas-New Mexico Pipe L TNM-98-23 Eunice, New Mexico	ine Co. SITE-SPI	ECIFIC TARG	SITE CC ET LEVELS ((	NCENTRATI	WORK ONS COMP SUBSURF	SHEET 6 ARED TO ACE SOIL
	's for SUB	SURFACE	soils - 0	to 15 feet B	SS.	
'X' indicates pathw	vay is complete:	x	×	x		
		On-Site	On-Site		S	
Constituent		Worker	Resident	Critical	Concent	rations
of Concern		Inh+Ing+Der (mg/kg)	Inh+Ing+Der (mg/kg)	SSTL (mg/kg)	Maximum (mg/kg)	95th UCL (mg/kg)
Carcinogens						-
Benzene		5.49	3.95		293 Contraction of the second s	N/A
Non-Carcinogens	HQ's					
Ethylbenzene	0.150	>3,180	1,051	1,051	876	N/A
Fluorene	0.010	63.3	19.2 25.0	19.2 36.0	5.00	N/A
Phenanthrene	0.030	113	33.85 8.85		00.7 2.00	A/N
Toluene	0.200	2,466	1,436	1,436	1,300	N/A
Xylene (mixed isomers)	060.0	2,263	2,033	2,033	1,252	N/A
TPH - New Method	0.500	3,796	1,412	# (1 <b>112</b>	43,800	N/A
Hazard Index:	1.00					
Note:						
95th UCL = One-sided upper 95th	confidence limit of t	he mean				
SS1L = Site Specific Target Level	•					
When SSTL is reported to be great	ter than a number, t	hat number is the sat	turated value of the			
respective chemical in a soil wit	th foc=0.020.					

TARGET LEVEL CALCULATIONS

Texas-New Mexico Pipe Line Co. TNM-98-23

Eunice, New Mexico

WORKSHEET 7 SITE CONCENTRATIONS COMPARED TO SITE-SPECIFIC TARGET LEVELS (SSTL'S) FOR SOIL (GWP)

			というに					
'X' indicates pat	hway is complete:	Х		Х		X		
Constituent		-no No	Site rker	On- Resi	Site ident	Critical	Concen	oil trations
of		Ingestion	Inhalation	Ingestion	Inhalation	SSTL	Maximum	95th UCL
Concern		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/kg)	(mg/kg)	(mg/kg)
Carcinogens								
Benzene	-	>2,913		>2,913		>2,913	293	N/A
-				-			·	
Non-Carcinogens	HQ's							
Ethylbenzene	0.010	>3,180		>3,180		>3,180	876	N/A
Fluorene	0.010	>233		>233		>233	5.00	N/A
Naphthalene	0.010	>736		>736		>736	21.0	N/A
Phenanthrene	0.010	>268		>268		>268	7.00	N/A
Toluene	0.010	>3,117		>3,117		>3,117	1,300	N/A
Xylene (mixed isomers)	0.010	>1,443		>1,443		>1,443	1,252	N/A
TPH - New Method	0.940	2,665		952		952	43,800	N/A
Hazard Index:	1.00					uð að að leit a ser þjærði ann fri		
Note:				-				
95th UCL = One-sided upper 95th	confidence limit of t	he mean						
	,							

SSTL = Site Specific Target Level

When SSTL is reported to be greater than a number, that number is the solubility of the respective chemical





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#### Texas-New Mexico Pipe Line Co. TNM-98-23 Eunice, New Mexico

#### TPH MASS FRACTIONS AND RELATIVE CONCENTRATIONS

		Soil Sample	948年月8日98日(1978年9月)) 1月1日日日日日(1978年) 1月1日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日
Constituent			Maximum
of Concern	fingerprint (mg/kg)	Mass Fraction (%)	Concentration (mg/kg)
TPH - New Method	41,162	100.0%	43,800
TPH-Arom-EC>6-8	367	0.89%	391
TPH-Arom-EC>8-10	771	1.87%	820
TPH-Arom-EC>10-12	1,943	4.72%	2,068
TPH-Arom-EC>12-16	2,843	6.91%	3,025
TPH-Arom-EC>16-21	4,099	9.96%	4,362
TPH-Arom-EC>21-35	6,277	15.25%	6,679
TPH-Aliph-EC 5-6	230	0.56%	245
TPH-Aliph-EC>6-8	906	2.20%	964
TPH-Aliph-EC>8-10	2,840	6.90%	3,022
TPH-Aliph-EC>10-12	3,340	8.11%	3,554
TPH-Aliph-EC>12-16	5,744	13.95%	6,112
TPH-Aliph-EC>16-35	11,802	28.67%	12,558

#### Calculation Sheet **GROUND WATER PROTECTION** Worker --- Ingestion of Ground Water Pathway

Texas-New Mexico Pipe Line Co.	BW	IRgw	EF	ED	Dist
TNM-98-23	(kg)	(L/day)	(days/yr)	(years)	(m)
Eunice, New Mexico	70	1.0	250	25	0

For carcinogens:

Risk = Conc<sub>s-v</sub> \* DAF \* 1R<sub>gw</sub> \* EF \* ED \* SF / BW \* 70 \* 365

For non-carcinogens:

HQ = Conc<sub>s-v</sub> \* DAF \* IR<sub>gw</sub> \* EF / RfD \* BW \* 365

Constituent	SF	RfD	Conc <sub>s-v</sub>	DAF	Concgwp	Risk
of Concern	(1/mg/kg-d)	(mg/kg-d)	(mg/kg)		(mg/L)	or HQ
Carcinogens						•
Benzene	2.90e-2		2.93e+2	3.52e-7	1.03e-4	1.05e-8
					Total Risk:	1.05e-8
Non-Carcinogens						
Ethylbenzene		1.00e-1	8.76e+2	0.00e+0	0.00e+0	0.00e+0
Fluorene		4.00e-2	5.00e+0	0.00e+0	0.00 <del>e+</del> 0	0.00e+0
Naphthalene		4.00e-2	2.10e+1	0.00e+0	0.00e+0	0.00e+0
Phenanthrene		4.00e-3	7.00e+0	0.00e+0	0.00e+0	0.00e+0
Toluene		2.00e-1	1.30e+3	8.93e-7	1.16e-3	5.68e-5
Xylene (mixed isomers)		2.00e+0	1.25e+3	1.37e-5	1.72e-2	8.39e-5
TPH - New Method						1.54e+1
				На	zard Index:	1.54e+1
TPH-Arom-EC>6-8		1.00e-1	3.91e+2	1.29e-5	5.04e-3	4.93e-4
TPH-Arom-EC>8-10		4.00e-2	8.20e+2	1.93e-2	1.58e+1	3.87e+0
TPH-Arom-EC>10-12		4 000-2	0.07.0			
		4.006-2	2.07e+3	3.61e-4	7.46e-1	1.83e-1
TPH-Arom-EC>12-16		4.00e-2	2.07e+3 3.03e+3	3.61e-4 0.00e+0	7.46e-1 0.00e+0	1.83e-1 0.00e+0
TPH-Arom-EC>12-16 TPH-Arom-EC>16-21		4.00e-2 4.00e-2 3.00e-2	2.07e+3 3.03e+3 4.36e+3	3.61e-4 0.00e+0 0.00e+0	7.46e-1 0.00e+0 0.00e+0	1.83e-1 0.00e+0 0.00e+0
TPH-Arom-EC>12-16 TPH-Arom-EC>16-21 TPH-Arom-EC>21-35		4.00e-2 4.00e-2 3.00e-2 3.00e-2	2.07e+3 3.03e+3 4.36e+3 6.68e+3	3.61e-4 0.00e+0 0.00e+0 0.00e+0	7.46e-1 0.00e+0 0.00e+0 0.00e+0	1.83e-1 0.00e+0 0.00e+0 0.00e+0
TPH-Arom-EC>12-16 TPH-Arom-EC>16-21 TPH-Arom-EC>21-35 TPH-Aliph-EC 5-6		4.00e-2 3.00e-2 3.00e-2 6.00e-2	2.07e+3 3.03e+3 4.36e+3 6.68e+3 2.45e+2	3.61e-4 0.00e+0 0.00e+0 0.00e+0 7.98e-2	7.46e-1 0.00e+0 0.00e+0 0.00e+0 1.95e+1	1.83e-1 0.00e+0 0.00e+0 0.00e+0 3.18e+0
TPH-Arom-EC>12-16 TPH-Arom-EC>16-21 TPH-Arom-EC>21-35 TPH-Aliph-EC 5-6 TPH-Aliph-EC>6-8		4.00e-2 3.00e-2 3.00e-2 6.00e-2 6.00e-2	2.07e+3 3.03e+3 4.36e+3 6.68e+3 2.45e+2 9.64e+2	3.61e-4 0.00e+0 0.00e+0 0.00e+0 7.98e-2 3.16e-2	7.46e-1 0.00e+0 0.00e+0 0.00e+0 1.95e+1 3.05e+1	1.83e-1 0.00e+0 0.00e+0 0.00e+0 3.18e+0 4.97e+0
TPH-Arom-EC>12-16 TPH-Arom-EC>16-21 TPH-Arom-EC>21-35 TPH-Aliph-EC 5-6 TPH-Aliph-EC>6-8 TPH-Aliph-EC>8-10		4.00e-2 3.00e-2 3.00e-2 6.00e-2 6.00e-2 1.00e-1	2.07e+3 3.03e+3 4.36e+3 6.68e+3 2.45e+2 9.64e+2 3.02e+3	3.61e-4 0.00e+0 0.00e+0 0.00e+0 7.98e-2 3.16e-2 8.80e-3	7.46e-1 0.00e+0 0.00e+0 0.00e+0 1.95e+1 3.05e+1 2.66e+1	1.83e-1 0.00e+0 0.00e+0 3.18e+0 4.97e+0 2.60e+0
TPH-Arom-EC>12-16 TPH-Arom-EC>16-21 TPH-Arom-EC>21-35 TPH-Aliph-EC 5-6 TPH-Aliph-EC>6-8 TPH-Aliph-EC>8-10 TPH-Aliph-EC>10-12		4.00e-2 3.00e-2 3.00e-2 6.00e-2 6.00e-2 1.00e-1 1.00e-1	2.07e+3 3.03e+3 4.36e+3 6.68e+3 2.45e+2 9.64e+2 3.02e+3 3.55e+3	3.61e-4 0.00e+0 0.00e+0 7.98e-2 3.16e-2 8.80e-3 1.73e-3	7.46e-1 0.00e+0 0.00e+0 1.95e+1 3.05e+1 2.66e+1 6.15e+0	1.83e-1 0.00e+0 0.00e+0 3.18e+0 4.97e+0 2.60e+0 6.02e-1
TPH-Arom-EC>12-16 TPH-Arom-EC>16-21 TPH-Arom-EC>21-35 TPH-Aliph-EC 5-6 TPH-Aliph-EC>6-8 TPH-Aliph-EC>8-10 TPH-Aliph-EC>10-12 TPH-Aliph-EC>12-16		4.00e-2 3.00e-2 3.00e-2 6.00e-2 6.00e-2 1.00e-1 1.00e-1 1.00e-1	2.07e+3 3.03e+3 4.36e+3 6.68e+3 2.45e+2 9.64e+2 3.02e+3 3.55e+3 6.11e+3	3.61e-4 0.00e+0 0.00e+0 7.98e-2 3.16e-2 8.80e-3 1.73e-3 5.63e-5	7.46e-1 0.00e+0 0.00e+0 1.95e+1 3.05e+1 2.66e+1 6.15e+0 3.44e-1	1.83e-1 0.00e+0 0.00e+0 3.18e+0 4.97e+0 2.60e+0 6.02e-1 3.37e-2

#### Notes:

Risk = Carcinogenic Risk SF = Slope Factor

BW = Body Weight IR<sub>GW</sub> = Ingestion Rate

HQ = Hazard Quotient RfD = Reference Dose

- - ED = Exposure Duration

Conc(s-v) = Concentration in vadose zone soil DAF = Dilution/Attenuation Factor

EF = Exposure Frequency Conc(gwp) = Conc(s-v) \* DAF

#### Calculation Sheet GROUND WATER PROTECTION Resident -- Ingestion of Ground Water Pathway

Texas-New Mexico Pipe Line Co.	BW	IRgw	EF	ED	Dist
<b>TNM-98-23</b>	(kg)	(Ľ/day)	(days/yr)	(years)	(m)
Eunice, New Mexico	70	2.0	350	30	0

For carcinogens:

 $Risk = Conc_{s-v} * DAF * !R_{gw} * EF * ED * SF / BW * 70 * 365$ 

For non-carcinogens:

HQ = Conc<sub>s-v</sub> \* DAF \* IR<sub>gw</sub> \* EF / RfD \* BW \* 365

Constituent	SF	RfD	Conc <sub>s-v</sub>	DAF	Concawo	Risk
of Concern	(1/mg/kg-d)	(mg/kg-d)	(mg/kg)		(mg/L)	or HQ
Carcinogens						
Benzene	2.90e-2		2.93e+2	3.52e-7	1.03e-4	3.51e-8
					Total Risk:	3.51e-8
Non-Carcinogens						
Ethylbenzene		1.00e-1	8.76e+2	0.00e+0	0.00 <del>e+</del> 0	0.00e+0
Fluorene		4.00e-2	5.00e+0	0.00e+0	0.00e+0	0.00e+0
Naphthalene		4.00e-2	2.10e+1	0.00e+0	0.00e+0	0.00e+0
Phenanthrene		4.00e-3	7.00e+0	0.00e+0	0.00e+0	0.00e+0
Toluene		2.00e-1	1:30e+3	8.93e-7	1.16e-3	1.59e-4
Xylene (mixed isomers)		2.00e+0	1.25e+3	1.37e-5	1.72e-2	2.35e-4
TPH - New Method						4.33e+1
				Haz	ard Index:	4.33e+1
TPH-Arom-EC>6-8		1.00e-1	3.91e+2	1.29e-5	5.04e-3	1.38e-3
TPH-Arom-EC>8-10		4.00e-2	8.20e+2	1.93e-2	1.58e+1	1.08e+1
TPH-Arom-EC>10-12		4.00e-2	2.07e+3	3.61e-4	7.46e-1	5.11e-1
TPH-Arom-EC>12-16		4.00e-2	3.03e+3	0.00e+0	0.00e+0	0.00e+0
TPH-Arom-EC>16-21		3.00e-2	4.36e+3	0.00e+0	0.00e+0	0.00e+0
TPH-Arom-EC>21-35		3.00e-2	6.68e+3	0.00e+0	0.00e+0	0.00e+0
TPH-Aliph-EC 5-6		6.00e-2	2.45e+2	7.98e-2	1.95e+1	8.92e+0
TPH-Aliph-EC>6-8		6.00e-2	9.64e+2	3.16e-2	3.05e+1	1.39e+1
TPH-Aliph-EC>8-10		1.00e-1	3.02e+3	8.80e-3	2.66e+1	7.29e+0
TPH-Aliph-EC>10-12		1.00e-1	3.55e+3	1.73e-3	6.15e+0	1.68e+0
TPH-Aliph-EC>12-16		1.00e-1	6.11e+3	5.63e-5	3.44e-1	9.43e-2
TPH-Aliph-EC>16-35	•	2.00e+0	1.26e+4	0.00e+0	0.00e+0	0.00e+0

Notes:

Risk = Carcinogenic Risk SF = Slope Factor HQ = Hazard Quotient RfD = Reference Dose

BW = Body Weight IR<sub>GW</sub> = Ingestion Rate EF = Exposure Frequency

ED = Exposure Duration

Conc(s-v) = Concentration in vadose zone soil DAF = Dilution/Attenuation Factor Conc(gwp) = Conc(s-v) \* DAF Dist = Distance to off-site receptor

etter State Stat	BW	Vorker -		ED	ST	>	Н	A	í ×	ш	PEF	
	(kg)	(m³/day)	(days/yr)	(years)	(m)	(m/s)	E)	(m <sup>2</sup> )	(3)(CC)	I	(kg/m <sup>3</sup> )	
ico	20	20	250	25	67	4.92	2.0	3358	1.80	0.32	9.954E-11	
Risk =	· (Conc <sub>soll</sub> *	(VF + PE	EF) / DAF	) * IR <sub>air</sub> *	EF * ED *	SF / BW	* 70 * 36			Dist (m)	DAF	
= HQ	(Conc <sub>soli</sub> * (	VF + PEF	=) / DAF)	* IR <sub>air</sub> * E	F * (1/RfD	) / BW * :	365		_	0	1.00	
VF = (	(2 * Dei * E	* Kas * 1	0-3)/(F	<b>Δ * V * S</b>	) * ( A / H	3.14 * al	pha * ED	* 3.15E+7	) <sup>0.5</sup>			1
Conc	SE	Df0	ieu	кч К	Ē	Kae	otuto	ΛE	<u> </u>	_		
(mg/kg)	(1/mg/kg-d)	(mg/kg-d)	(cm <sup>2</sup> /sec)	(B/ <sub>c</sub> uuc)	: 1	(g /cm <sup>3</sup> )	(cm <sup>2</sup> /sec)	(m <sup>3</sup> /kg)	or HQ			
2.93e+2	2.91e-2		2.05e-2	1.58e+0	2.32e-1	1.47e-1	5.22e-4 To	8.71e-5 otal Risk:	5.19e-5 5.19e-5			
8.76e+2		2.86e-1	1.64e-2	2.08e+1	2.67e-1	1.28e-2	3.74e-5	2.28e-5	1.36e-2			
5.00e+0		4.00e-2	1.38e-2	1.38e+2	2.67e-3	1.94e-5	4.74e-8	8.08e-7	1.98e-5			
2.10e+1		4.00e-2	1.30e-2	2.45e+1	5.38e-2	2.20e-3	5.06e-6	8.35e-6	8.58e-4			
7.00e+0		4.00e-3	1.19e-3	2.68e+2	6.63e-3	2.47e-5	5.21e-9	2.68e-7	9.18e-5			
1.30e+3		1.14e-1	1.84e-2	5.74e+0	2.65e-1	4.62e-2	1.50e-4	4.58e-5	1.02e-1			
1.25e+3		2.00e-1	1.63e-2	4.56e+0	2.93e-1	6.42e-2	1.84e-4	5.09e-5	6.23e-2			
4.38e+4									1.62e+0			
3.91e+2		2.86e-1	1.91e-2	4.77e+0	2.74e-1	5.75e-2	1.93 <del>e</del> -4	5.21e-5	1.39e-2			
8.20e+2		5.71e-2	2.20e-2	3.01e+1	4.84e-1	1.61e-2	6.26e-5	2.94e-5	8.27e-2	-		
2.07e+3		5.71e-2	2.20e-2	4.77e+1	1.36e-1	2.85e-3	1.11e-5	1.24e-5	8.78e-2			
3.03e+3		5.71e-2	2.20e-2	9.52e+1	5.16e-2	5.42e-4	2.12e-6	5.40e-6	5.60e-2			
4.36e+3		3.00e-2	2.20e-2	3.01e+2	1.34e-2	4.44e-5	1.73e-7	1.55e-6	4.40e-2			
6.68e+3		3.00e-2	2.20e-2	2.39e+3	6.65e-4	2.786-7	1.09e-9	1.22e-7	5.34e-3			
2.45e+2		5.71e-2	2.20e-2	1.51e+1	3.28e+1	2.17e+0	6.12e-3	4.02e-4	3.37e-1			
9.64e+2		5./1e-2	2.20e-2	7.56e+1	4.85e+1	6.41e-1	2.25e-3	1.96e-4	6.47e-1			
3.02e+3		2.86e-1	2.20e-2	6.01e+2	7.92e+1	1.32e-1	5.03e-4	8.52e-5	1.76e-1			
3.556+3		Z.806-1	Z-206-Z	4.//e+3	1.236+2	2-986-2	1.006-4	3.74e-5	9.10e-2 - 00 0			
6.11e+3 1.26e+4		2.80e-1 2.00e+0	2.20e-2 2.20e-2	9.52e+4 1.20e+7	5.25e+2 4.94e+3	5.52e-3 4.12e-4	2.15e-5 1.61e-6	1.72e-5 4.71e-6	7.22e-2 5.79e-3			
-15 feet)	BW = body we AT = averagin; IR <sub>A</sub> = inhalatio EF = exposure ED = exposure LS = Length of	ight g time on rate frequency duration		V = Velocity DH = Diffusic A = Area of S B = Bulk Soil E = Effective Dei = effective	of Wind of Wind in Height ioll Source Density Porosity e diffusion co	efficient		H' = unitless Kd = organic foc = fraction Kas = H' / K( alpha = De! * PEF = Partic	Henry's Law ( carbon partiti organic carb d f ( E + B / I ulate Emissio	Constant Constant on coefficient * on (as ) ns Factor	foc	

ABS = dermal absorption fraction or HQ<sub>DER</sub> Risk<sub>ber</sub> 0.00E+00 0.00E+00 0.00E+00 0.00E+00 3.82E+00 I.16E-01 .26E+00 2.31E-02 7.09E-04 2.98E-03 9.07E-04 9.12E-02 0.00e+0 2.22E-02 4.29E-01 8.25E-01 1.72E-01 2.02E-01 3.56E-02 2.93E-01 3.47E-01 mg/cm<sup>2</sup>) 1.00 AF SA = skin surface area AF = adherence factor Total Risk: 0.000 0.000 0.100 0.100 0.100 0.100 0.100 0.100 0.100 0.100 0.100 0.100 0.100 ABS 0.100 0.050 0.000 0.000 0.100 0.100 5,800 (cm<sup>2</sup>) SA I = Conc<sub>soil</sub> \* SA \* AF \* ABS \* EF \* ED \* SF / BW \* 70 \* 365 \* CF EF<sub>dermal</sub> (mg/kg-d) (days/yr) RfDd 0.10 0.02 0.20 0.10 0.04 0.03 0.03 0.06 0.06 250 0.04 0.04 2.0 - Ingestion of Soil & Dermal Contact with Soil Conc<sub>soli</sub> \* SA \* AF\* ABS \* EF \* (1/RfD) / BW \* 365 \* CF Concsoit \* IRsoit \* EF \* ED \* SF / BW \* 70 \* 365 \* CF (1/mg/kg-d) EF = exposure frequency ED = exposure duration 0.029 (years) SFd 22 22 IR<sub>soi</sub> = Ingestion rate Conc<sub>soll</sub> \* IR<sub>soll</sub> \* EF \* (1/RfD) / BW \* 365 \* CF (days/yr) 250 Ш Calculation of Risk or HQ<sub>ING</sub> (mg/day) Risking I.48E-06 4.29E-03 3.12E-05 3.07E-03 2.57E-04 3.18E-03 .91E-03 3.70E-02 11E-02 2.00E-03 .86E-03 .48E-02 .74E-02 2.99E-02 8.56E-04 3.06E-04 3.29E-01 .00E-02 2.53E-02 .09E-01 1.48e-6 IRsoil 20 1.00E+06 (mg/kg-d) Total Risk: RfDo (mg/kg) 0.10 0.04 0.04 0.0 0.20 0.03 0.03 0.06 0.06 0.10 0.10 8.0 0.10 0.04 0.04 0.04 0.10 Ч RfD = Reference Dose AT = averaging time BW = body weight (1/mg/kg-d) SFo 0.029 MB (kg) 20 I) HQ<sub>DER</sub> = HQ<sub>ING</sub> = **Risk<sub>DER</sub>** Risking Concsoll 2.93e+2 1.30e+3 4.38e+4 5.00e+0 8.76e+2 7.00e+0 1.25e+3 8.20e+2 2.07e+3 3.03e+3 4.36e+3 6.68e+3 2.45e+2 9.64e+2 3.02e+3 3.55e+3 .26e+4 Worker 2.10e+1 3.91e+2 6.11e+3 (mg/kg) Texas-New Mexico Pipe Line Co. Conc(soil) = Concentration in soil (0-15 feet) Eunice, New Mexico For carcinogens: For non-carcinogens: TNM-98-23 Xylene (mixed isomers) CPH-Arom-EC>21-35 TPH-Arom-EC>12-16 TPH-Arom-EC>10-12 IPH-Arom-EC>16-21 **FPH-Aliph-EC>10-12** TPH-Aliph-EC>12-16 TPH-Aliph-EC>16-35 TPH-Arom-EC>8-10 Risk = Carcinogenic Risk **FPH-Aliph-EC>8-10** Constituent **TPH - New Method** of Concern TPH-Arom-EC>6-8 TPH-Aliph-EC 5-6 TPH-Aliph-EC>6-8 HQ = Hazard Quotient Non-Carcinogens SF = Slope Factor Phenanthrene Ethylbenzene Naphthalene Carcinogens Benzene Fluorene **Foluene** Votes

	Cal Worker	culation of Risk Combined Risk for	Soil a state of the second	
Texas-New Mexico TNM-98- Eunice, New	Pipe Line Co. 23 Mexico			
	If On-Site:	Risk <sub>wkr-Solt</sub> =	Risk <sub>ing</sub> + Risk <sub>Di</sub>	er + Risk <sub>inhal</sub>
	If Off-Site:	Risk <sub>wkr-Soll</sub> =	Risk <sub>inhal</sub>	
Constituent of Concern	Risking or HQ <sub>ING</sub>	Risk <sub>ber</sub> or HQ <sub>ber</sub>	RISKINHAL Or HQINHAL	Riskwr.soll or HQwr.soll
<u>Carcinogens</u> Benzene	1.48E-06	0.00E+00	5.19E-05	5.34E-05
Non-Carcinogens Ethvibenzene	4.29E-03	0.00E+00	1.36E-02	1.79E-02
Fluorene	6.12E-05	7.09E-04	1.98E-05	7.90E-04
Naphthalene	2.57E-04	2.98E-03	8.58E-04	4.09E-03
Phenanthrene	8.56E-04	9.07E-04	9.18E-05	1.85E-03 1.65F 04
I oluene Xylene (mixed isomers)	3.18E-03 3.06E-04	0.00E+00	1.02E-01 6.23E-02	6.26E-02
TPH - New Method	3.29E-01	3.82E+00	1.62E+00	5.77E+00
TPH-Arom-EC>6-8	1.91E-03	2.22E-02	1.39E-02	3.80E-02
TPH-Arom-EC>8-10	1.00E-02	1.16E-01	8.27E-02 0.70E_02	2.09E-01
TPH-Arom-EC>12-16	3.70E-02	4.29E-01	5.60E-02	5.22E-01
TPH-Arom-EC>16-21	7.11E-02	8.25E-01	4.40E-02	9.40E-01
TPH-Arom-EC>21-35	1.09E-01	1.26E+00	5.34E-03	1.38E+00
TPH-Aliph-EC 5-6 TPH-Alinh-EC>6-8	2.00E-03 7 86E-03	2.31E-02 a 17E_02	3.37E-01 6.47E-01	3.62E-01 7.46E-01
TPH-Aliph-EC>8-10	1.48E-02	1.72E-01	1.76E-01	3.63E-01
TPH-Aliph-EC>10-12	1.74E-02	2.02E-01	9.10E-02	3.10E-01
TPH-Aliph-EC>12-16 TPH-Aliph-EC>16-35	2.99E-02 3.07E-03	3.47E-01 3.56E-02	7.22E-02 5.79E-03	4.49E-01 4.45E-02
Notes: Risk = Carcinogenic Risk HO = Hazard Outlient				

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		PEF (ka/m <sup>3</sup> )	9.954E-11	DAF	1.00																									toc
		w i	0.32	Dist (m)	0																									onstant n coefficient n as ) s Factor
		8 (2) (2)	1.80			) <sup>0.5</sup>	Risk	¥	5.97e-5 5.97e-5		1.31e-2	1.90e-5	8.23e-4	8.80e-5	9.80e-2	5.97e-2	1.55e+0	1.34e-2	7.93e-2	8.41e-2	5.36e-2	4.22e-2	5.11e-3	3.23e-1	6.21e-1	1.69e-1	8.72e-2	6.92e-2	5.55e-3	Henry's Law C carbon partitic organic carbo E / (E + B / K late Emission
		A ( <sup>2</sup> E)	3358			* 3.15E+7	VF (m <sup>3</sup> /km)	/8	8.71e-5 otal Risk: <sup>-</sup>		2.28e-5	8.08e-7	8.35e-6	2.68e-7	4.58e-5	5.09e-5		5.21e-5	2.94e-5	1.24e-5	5.40e-6	1.55è-6	1.22e-7	4.02e-4	1.96e-4	8.52e-5	3.74e-5	1.72e-5	4.71e-6	H' = unitless Kd = organic foc = fraction Kas = H' / Kd Alpha = Dei * PEF = Particu
	Soil	HQ	2.0	* 70 * 365	365	pha * ED *	alpha		5.22e-4 To		3.74e-5	4.74e-8	5.06e-6	5.21e-9	1.50e-4	1.84e-4		1.93 <del>e-4</del>	6.26e-5	1.11e-5	2.12e-6	1.73e-7	1.09e-9	6.12e-3	2.25e-3	5.03e-4	1.00e-4	2.15e-5	1.61e-6	
	s from (	<b>&gt;</b>	4.92	SF / BW	) / BW * (	3.14 * alı	Kas (a lcm <sup>3</sup> )	1	1.47e-1		1.28e-2	1.94e-5	2.20e-3	2.47e-5	4.62e-2	6.42e-2		5.75e-2	1.61e-2	2.85e-3	5.42e-4	4.44e-5	2.78e-7	2.17e+0	6.41e-1	1.32e-1	2.58e-2	5.52e-3	4.12e-4	befficient
of Risk	Volatile	E B	67	EF * ED *	:F * (1/Rft	) + ( Y   H	Ŧ	!	2.32e-1		2.67e-1	2.67e-3	5.38e-2	6.63e-3	2.65e-1	2.93e-1		2.74e-1	4.84e-1	1.36e-1	5.16e-2	1.34e-2	6.65e-4	3.28e+1	4.85e+1	7.92e+1	1.23e+2	5.25e+2	4.94e+3	of Wind on Height Soil Source I Density P Porosity /e diffusion c
ulation (	ation of	ED (vears)	30	F) * IR <sub>air</sub> *	+ IR <sub>air</sub> + E	LS * V * D	Kd Kd	10	1.58e+0		2.08e+1	1.38e+2	2.45e+1	2.68e+2	5.74e+0	4.56e+0		4.77e+0	3.01e+1	4.77e+1	9.52e+1	3.01e+2	2.39e+3	1.51e+1	7.56e+1	6.01e+2	4.77e+3	9.52e+4	1.20e+7	V = Velocity DH = Diffusi A = Area of B = Bulk Soi E = Effective Dei = effective
Calo	Inhal	EF	350	EF) / DAI	F) / DAF)	10-3)/(1	Dei Icm <sup>2</sup> (sec)		2.05e-2		1.64e-2	1.38e-2	1.30e-2	1.19e-3	1.84e-2	1.63e-2		1.91e-2	2.20e-2	2.20e-2	2.20e-2	2.20e-2	2.20e-2	2.20e-2	2.20e-2	2.20e-2	2.20e-2	2.20e-2	2.20e-2	g
	Resident	IRair <sup>(m³/day)</sup>	15	* (VF + P	(VF + PE	* Kas *	RfD	In-RuiRuil			2.86e-1	4.00e-2	4.00e-2	4.00e-3	1.14e-1	2.00e-1		2.86e-1	5.71e-2	5.71e-2	5.71e-2	3.00e-2	3.00e-2	5.71e-2	5.71e-2	2.86e-1	2.86e-1	2.86e-1	2.00e+0	reight ng time tion rate re frequency re duration of Source Are
		BW (ka)	02	(Conc <sub>soil</sub>	Conc <sub>soil</sub> *	2 * Dei * [	SF	in Automit	2.91e-2			-			-															BW = body w AT = averagi IR <sub>A</sub> = inhala EF = exposu ED = exposu LS = Length
		Line Co.	8	Risk =	) = QH	VF = (	Conc <sub>soll</sub>	(Au Au	2.93e+2		8.76e+2	5.00e+0	2.10e+1	7.00e+0	1.30e+3	1.25e+3	4.38e+4	3.91e+2	8.20e+2	2.07e+3	3.03e+3	4.36e+3	6.68e+3	2.45e+2	9.64e+2	3.02e+3	3.55e+3	6.11e+3	1.26e+4	-15 feet)
		Texas-New Mexico Pipe I TNM-98-23	Eunice, New Mexic	For carcinogens:	For non-carcinogens:	<b>ت</b> ھينوں، م	Constituent	Carcinotens	Benzene	Non-Carcinogens	Ethylbenzene	Fluorene	Naphthalene	Phenanthrene	Toluene	Xylene (mixed isomers)	TPH - New Method	TPH-Arom-EC>6-8	TPH-Arom-EC>8-10	TPH-Arom-EC>10-12	TPH-Arom-EC>12-16	TPH-Arom-EC>16-21	TPH-Arom-EC>21-35	TPH-Aliph-EC 5-6	TPH-Aliph-EC>6-8	TPH-Aliph-EC>8-10	TPH-Aliph-EC>10-12	TPH-Aliph-EC>12-16	TPH-Aliph-EC>16-35	otes: Conc(soil) = Concentration in soil (0 Risk = Carcinogenic Risk SF = Slope Factor HQ = Hazard Quotient RtD = Reference Dose

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Texas-New Mexico Pipe	Line Co.	BW	CF	IRsoil	<u>ц</u>	ED	EF dermal	SA	AF
TNM-98-23		(kg)	(mg/kg)	(mg/day)	(days/yr)	(years)	(days/yr)	(cm²)	(mg/cm <sup>2</sup> )
Eunice, New Mexi	co	02 ;	1.00E+06	124	350	30	350	5,800	1.00
For carcinogens:	Risk <sub>ing</sub> :	= Conc <sub>soll</sub> <sup>4</sup>	' IR <sub>soil</sub> * El	F * ED * SF	- / BW * :	70 * 365 * C	CF		
	Risk <sub>DER</sub>	= Conc <sub>soll</sub>	* SA * AF	* ABS * E	F * ED *	SF / BW * 7	70 * 365 *	CF	
For non-carcinogens:	HQ <sub>ING</sub> =	Conc <sub>soil</sub> *	R <sub>soil</sub> * EF	* (1/RfD) /	BW * 36	5 * CF			
	HQ <sub>DER</sub> =	Conc <sub>soil</sub> *	SA * AF*	ABS*EF	* (1/RfD)	/ BW * 365	* CF		
Constituent	Conc	SFO	RfDo	Risking	<u>ل</u>	SFd	RfDd	ABS	Riske
of Concern	(mg/kg)	(1/mg/kg-d)	(mg/kg-d)	or HQ <sub>ING</sub>	· · · · ·	(1/mg/kg-d)	(mg/kg-d)	l	or HQ <sub>DER</sub>
arcinogens					<u>. I </u>				
lenzene	2.93e+2	0.029		1.44E-05		0.029		0.000	0.00E+00
		F	otal Risk:	1.44e-5			ĭ	otal Risk:	0.00e+0
lon-Carcinogens									
thylbenzene	8.76e+2		0.10	1.12E-01			0.10	0.000	0.00E+00
luorene	5.00e+0		0.04	1.60E-03	-		0.04	0.100	9.93E-04
laphthalene	2.10e+1		0.04	6.71E-03			0.04	0.100	4.17E-03
thenanthrene	7.00e+0		0.00	2.24E-02			0.02	0.050	1.27E-03
oluene	1.30e+3		0.20	8.31E-02			0.20	0.000	0.00E+00
ylene (mixed isomers)	1.25e+3		2.00	8.00E-03			2.00	0.000	0.00E+00
PH - New Method	4.38e+4			8.61E+00					5.35E+00
PH-Arom-EC>6-8	3.91e+2		0.10	4.99E-02			0.10	0.100	3.10E-02
PH-Arom-EC>8-10	8.20e+2		0.04	2.62E-01			0.04	0.100	1.63E-01
PH-Arom-EC>10-12	2.07e+3		0.04	6.61E-01			0.04	0.100	4.11E-01
PH-Arom-EC>12-16	3.03e+3		0.04	9.67E-01	-		0.04	0.100	6.01E-01
PH-Arom-EC>16-21	4.36e+3		0.03	1.86E+00			0.03	0.100	1.16E+00
PH-Arom-EC>21-35	6.68e+3		0.03	2.85E+00			0.03	0.100	1.77E+00
PH-Aliph-EC 5-6	2.45e+2		0.06	5.22E-02			0.06	0.100	3.24E-02
PH-Aliph-EC>6-8	9.64e+2		0.06	2.05E-01			0.06	0.100	1.28E-01
PH-Aliph-EC>8-10	3.02e+3		0.10	3.86E-01			0.10	0.100	2.40E-01
PH-Aliph-EC>10-12	3.55e+3		0.10	4.54E-01	·		0.10	0.100	2.82E-01
PH-Aliph-EC>12-16 PH-Alinh-EC>16-35	6.11e+3 1.26e+4		0.10 2.00	7.81E-01 8.03E-02			0.10 2.00	0.100	4.86E-01 4.99E-02
onc(soil) = Concentration in soil (0 isk = Carcinogenic Risk	0-15 feet)	RfD = Referenc BW = body weig	e Dose		IR <sub>soi</sub> = Inge EF = expos	estion rate ure frequency		SA = skin st AF = adhere	urface area ance factor

	Cal Resident	culation of Risk Combined Risk fo	Soil		
Texas-New Mexico P TNM-98-2 Eunice, New N	<sup>b</sup> ipe Line Co. 23 Mexico				
	If On-Site:	Risk <sub>res-Solt</sub> =	Risk <sub>II</sub>	vg + Risk <sub>DEr</sub>	R + Risk <sub>inhal</sub>
	If Off-Site:	Risk <sub>res-Soil</sub> =	Risk <sub>ii</sub>	ИНАL	
Constituent of Concern	Riski <sub>NG</sub> or HQ <sub>iNG</sub>	Risk <sub>ber</sub> or HQ <sub>ber</sub>		Risk <sub>inhal</sub> or HQ <sub>inhal</sub>	Riskmssoll or HQ as soll
Carcinogens Benzene	1.44E-05	0.00E+00	<u> </u>	5.97E-05	7.41Ë-05
Non-Carcinogens					
Ethylbenzene	1.12E-01 1.60F-03	0.00E+00 9 93E-04		1.31E-02 1 90E-05	1.25E-01 2.61E-03
Naphthalene	6.71E-03	4.17E-03		8.23E-04	1.17E-02
Phenanthrene	2.24E-02	1.27E-03		8.80E-05	2.37E-02
Toluene	8.31E-02	0.00E+00		9.80E-02	1.81E-01
Xylene (mixed isomers)	8.00E-03 8.61E+00	0.00E+00 5 35E+00		5.97E-02 1 55E+00	6.77E-02 1 55E+01
Dollaam wan - Uli	0.012100	0.306700		1.335700	1.005701
TPH-Arom-EC>6-8 TPH-Arom-EC>8-10	4.99E-02 2.62E-01	3.10E-02 1.63E-01		1.34E-02 7.93E-02	9.43E-02 5.04E-01
TPH-Arom-EC>10-12	6.61E-01	4.11E-01		8.41E-02	1.16E+00
TPH-Arom-EC>12-16	9.67E-01	6.01E-01		5.36E-02	1.62E+00
TPH-Arom-EC>16-21 TPH-Arom EC>21-35	1.86E+00 2 85E+00	1.16E+00 1 77E+00		4.22E-02 5 11E_03	3.06E+00
TPH-Aliph-EC 5-6	5.22E-02	3.24E-02		3.23E-01	4.08E-01
TPH-Aliph-EC>6-8	2.05E-01	1.28E-01		6.21E-01	9.54E-01
TPH-Aliph-EC>8-10	3.86E-01	2.40E-01		1.69E-01	7.96E-01
TPH-Aliph-EC>10-12 TPH-Aliph-EC>10-16	4.54E-01 7 81E-01	2.82E-01 4 86F-01		8.72E-02 6.92E-02	8.24E-01 1 34E+00
TPH-Aliph-EC>16-35	8.03E-02	4.99E-02		5.55E-03	1.36E-01
Notes: Risk = Carcinogenic Risk HQ = Hazard Quotient					

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SSTL Calculation Sheet GROUND WATER PROTECTION Worker -- Ingestion of Ground Water Pathway

Texas-New Mexico Pipe Line Co.	BW	IRgw	EF	ED	
TNM-98-23	(kg)	(L/day)	(days/yr)	(years)	
Eunice, New Mexico	70	1.0	250	25	

foc	Dist
	(m)
0.02	0

 $C_R = MCL$  or TR \* BW \* 70 \* 365 / IR<sub>gw</sub> \* EF \* ED \* SF  $C_R = MCL$  or HQ \* BW \* 365 / IR<sub>gw</sub> \* EF \* (1/RfD)

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For non-carcinogens:

For carcinogens:

 $SSTLgwp = C_R / DAF$ 

Constituent	TR	SF	HQ	RfD	C <sub>R</sub>		DAF	SSTLgwp
of Concern		(1/mg/kg-d)		(mg/kg-d)	(mg/L)	mcl?		(mg/kg)
Carcinogens	<u></u>				· · · · ·	<u></u>		
Benzene	1.00e-6	2.90e-2			5.00e-3	mcl	3.52e-7	1.42e+4
Non-Carcinogens								
Ethylbenzene			0.01	0.10	7.00e-1	mcl	0.00e+0	9.99e+99
Fluorene			0.01	0.04	4.09e-2		0.00e+0	9.99e+99
Naphthaiene			0.01	0.04	4.09e-2		0.00e+0	9.99e+99
Phenanthrene			0.01	0.00	4.09e-3		0.00e+0	9.99e+99
Toluene			0.01	0.20	1.00e+0	mcl	8.93e-7	1.12e+6
Xylene (mixed isomers)			0.01	2.00	1.00e+1	mcl	1.37e-5	7.30e+5
TPH - New Method			0.940					2.67e+3
TPH-Arom-EC>6-8			0.01	0.10	1.02e+1		1.29e-5	1.13e-8
TPH-Arom-EC>8-10			0.02	0.04	4.09e+0		1.93e-2	8.84e-5
TPH-Arom-EC>10-12			0.05	0.04	4.09e+0		3.61e-4	4.17e-6
TPH-Arom-EC>12-16			0.07	0.04	4.09e+0		0.00e+0	9.00e-99
TPH-Arom-EC>16-21			0.10	0.03	3.07e+0		0.00e+0	9.00e-99
TPH-Arom-EC>21-35			0.15	0.03	3.07e+0		0.00e+0	9.00e-99
TPH-Aliph-EC 5-6			0.01	0.06	6.13e+0		7.98e-2	7.27e-5
TPH-Aliph-EC>6-8			0.02	0.06	6.13e+0		3.16e-2	1.13e-4
TPH-Aliph-EC>8-10			0.07	0.10	1.02e+1		8.80e-3	5.94e-5
TPH-Aliph-EC>10-12			0.08	0.10	1.02e+1		1.73e-3	1.37e-5
TPH-Aliph-EC>12-16			0.14	0.10	1.02e+1		5.63e-5	7.69e-7
TPH-Aliph-EC>16-35			0.29	2.00	2.04e+2		0.00e+0	9.00e-99

Notes:

SSTL = Site specific Target Level

TR = Target Risk

SF = Slope Factor HQ = hazard quotient RfD ≈ Reference Dose BW = body weight IR<sub>GW</sub> = Ingestion rate

EF = exposure frequency

ED = exposure duration

foc = fraction organic carbon

DAF = Dilution attenuation factor C(r) = Concentration at receptor

#### SSTL Calculation Sheet **GROUND WATER PROTECTION** Worker -- Ingestion of Ground Water Pathway

Texas-New Mexico Pipe Line Co.	BW	IRgw	EF	ED
TNM-98-23	(kg)	(L/day)	(days/yr)	(years)
Eunice, New Mexico	70	2.0	350	30

foc	Dist
	' (m)
0.020	0

For carcinogens: For non-carcinogens:  $C_R = MCL$  or TR \* BW \* 70 \* 365 / IR<sub>gw</sub> \* EF \* ED \* SF

 $C_{R} = MCL$  or HQ \* BW \* 365 /  $IR_{gw}$  \* EF \* (1/RfD)

 $SSTLgwp = C_R / DAF$ 

Constituent	TR	SF	HQ	RfD	C <sub>R</sub>		DAF	SSTLgwp
of Concern		(1/mg/kg-d)	· <b></b>	(mg/kg-d)	(mg/L)	mcl?		< (mg/kg)
Carcinogens								
Benzene	- 1.00e-6	2.90e-2			5.00e-3	mci 🕔	3.52e-7	1.42e+4
Non-Carcinogens								
Ethylbenzene			0.01	0.10	7.00e-1	mcl	0.00e+0	9.99e+99
Fluorene			0.01	0.04	1.46e-2		0.00e+0	9.99e+99
Naphthalene			0.01	0.04	1.46e-2		0.00e+0	9.99e+99
Phenanthrene			0.01	0.00	1.46e-3		0.00e+0	9.99e+99
Toluene			0.01	0.20	1.00e+0	mcl	8.93e-7	1.12e+6
Xylene (mixed isomers)			0.01	2.00	1.00e+1	mci	1.37e-5	7.30e+5
TPH - New Method			0.940					9.52e+2
TPH-Arom-EC>6-8			0.01	0.10	3.65e+0		1.29e-5	3.15e-8
TPH-Arom-EC>8-10			0.02	0.04	1.46e+0		1.93e-2	2.48e-4
TPH-Arom-EC>10-12			0.05	0.04	1.46e+0		3.61e-4	1.17e-5
TPH-Arom-EC>12-16			0.07	0.04	1.46e+0		0.00e+0	9.00e-99
TPH-Arom-EC>16-21			0.10	0.03	1.10e+0		0.00e+0	9.00e-99
TPH-Arom-EC>21-35			0.15	0.03	1.10e+0		0.00e+0	9.00e-99
TPH-Aliph-EC 5-6			0.01	0.06	2.19e+0		7.98e-2	2.04e-4
TPH-Aliph-EC>6-8			0.02	0.06	2.19e+0		3.16e-2	3.18e-4
TPH-Aliph-EC>8-10			0.07	0.10	3.6 <del>5e+</del> 0		8.80e-3	1.66e-4
TPH-Aliph-EC>10-12			0.08	0.10	3.65e+0		1.73e-3	3.85e-5
TPH-Aliph-EC>12-16			0.14	0.10	3.65e+0		5.63e-5	2.15e-6
TPH-Aliph-EC>16-35			0.29	2.00	7.30e+1		0.00e+0	9.00e-99

SSTL = Site specific Target Level

TR = Target Risk

SF = Slope Factor

HQ = hazard quotient

RfD = Reference Dose

BW = body weight

IR<sub>GW</sub> = Ingestion rate

EF = exposure frequency

ED = exposure duration

foc = fraction organic carbon

DAF = Dilution attenuation factor C(r) = Concentration at receptor

Calculation of Site-Specific Target Levels Worker – Inhalation of Volatiles from Soil

Texas-New Mexico Pipe	Line Co.	BW	lRair	EF	ED	rs	>	Н	A	8	ш	PEF
TNM-98-23		(kg)	(m <sup>3</sup> /day)	(days/yr)	(years)	(E)	(m/s)	Ē	(m²)	( <b>b</b> /cc)	I	(kg/m <sup>3</sup> )
Eunice, New Mexic	00	20	20	250	25	67	4.92	2.0	3358	1.80	0.32	9.954E-11
For carcinogens:	SSTL =	DAF * TR	* BW * 7	0 * 365 /	IR <sub>air</sub> * EF	* ED * SF	: * ( VF +	PEF )				DAF
For non-carcinogens:	SSTL =	= DAF * HG	2 * BW * ;	365 / IR <sub>ali</sub>	* EF * (1)	'RfD) * ( \	/F + PEF	(				1.00
	VF = (	2 * Dei * E	* Kas * 1	0-3 )/(T	Q * V * S	H/A)*(	3.14 * al	oha * ED	* 3.15E+7	) <sup>0.5</sup>		
Constituent	TR	SF	Р	<b>B</b>	Dei	Kd	H	Kas	alpha	VF		SSTL
of Concern	•	(1/mg/kg-d)	I	(mg/kg-d)	(cm <sup>2</sup> /sec)	(cm³/g)		(g /cm³)	(cm <sup>2</sup> /sec)	(m <sup>3</sup> /kg)		(mg/kg)
Carcinogens												
Benzene	1.00e-6	2.91e-2		•	2.05e-2	1.58e+0	2.32e-1	1.47e-1	5.22e-4	8.71e-5		5.65e+0
Non-Carcinogens		·										
Ethylbenzene			0.15	0.29	1.64e-2	2.08e+1	2.67e-1	1:28e-2	3.74e-5	2.28e-5		9.63e+3
Fluorene			0.01	0.04	1.38e-2	1.38e+2	2.67e-3	1.94e-5	4.74e-8	8.08 <del>e</del> -7		2.53e+3
Naphthalene			0.02	0.04	1.30e-2	2.45e+1	5.38e-2	2.20e-3	5.06e-6	8.35e-6		4.89e+2
Phenanthrene			0.03	0.00	1.19e-3	2.68e+2	6.63e-3	2.47e-5	5.21e-9	2.68e-7		2.29e+3
Toluene			0.20	0.11	1.84e-2	5.74e+0	2.65e-1	4.62e-2	1.50e-4	4.58e-5		2.54e+3
Xylene (mixed isomers)			0.09	0.20	1.63e-2	7.20e+0	2.93e-1	4.07e-2	1.17e-4	4.04e-5		2.28è+3
TPH - New Method			0.50									1.35e+4
TPH-Arom-EC>6-8			0.01	0.29	1.91e-2	4.77e+0	2.74e-1	5.75e-2	1.93e-4	5.21e-5		3.18e-7
TPH-Arom-EC>8-10			0,02	0.06	2.20e-2	3.01e+1	4.84e-1	1.61e-2	6.26e-5	2.94e-5		1.89e-6
TPH-Arom-EC>10-12			0.05	0.06	2.20e-2	4.77e+1	1.36e-1	2.85e-3	1.11e-5	1.24e-5		2.00e-6
TPH-Arom-EC>12-16			0.07	0.06	2.20e-2	9.52e+1	5.16e-2	5.42e-4	2.12e-6	5.40e-6		1.28e-6
1 PH-Arom-EC>16-21			0.10 1.10	0.03	2.20e-2	3.01e+2	1.34e-2	4.44e-5	1.73e-7	1.55e-6		1.00e-6
			0 0 0 0 0 0 0	0.00	2.200-2 2.200-2	2.396+3 151e+1	0.00e-4 3 28e+1	2./86-/ 2 17e+0	1.096-9 6 126-3	4 02e-7		7 700-6
TPH-Aliph-EC>6-8			0.02	0.06	2.20e-2	7.56e+1	4.85e+1	6.41e-1	2.25e-3	1.96e-4		1.486-5
TPH-Aliph-EC>8-10			0.07	0.29	2.20e-2	6.01e+2	7.92e+1	1.32e-1	5.03e-4	8.52e-5		4.03e-6
TPH-Aliph-EC>10-12			0.08	0.29	2.20e-2	4.77e+3	1.23e+2	2.58e-2	1.00e-4	3.74e-5		2.08e-6
TPH-Aliph-EC>12-16			0.14	0.29	2.20e-2	9.52e+4	5.25e+2	5.52e-3	2.15e-5	1.72e-5		1.65e-6
TPH-Aliph-EC>16-35			0.29	2.00	2.20e-2	1.20e+7	4.94e+3	4.12e-4	1.61e-6	4.71e-6		1.32e-7
Notes: SSTL = Site specific Target Level		BW ≃ bodv we	ight		V = Velocity o	of Wind			H' = unitless	Henry's Law C	constant	
TR = Target Risk		AT = averaging	g time		DH = Diffusio	n Height			Kd = organic	carbon partitio	on coefficient	* foc
Sr ≖ Siope ractor HO = hazard ouotient		$IR_A = Inhalatic FF = exposure$	on rate Francency	-	A = Area of S P = Ruik Soil	oil Source Daneity			foc = fraction	organic carbo	ç	
RfD = Reference Dose		ED = exposure	duration			Porosity			aipha = Dei *	E/(E+B/K	as )	
		LS = Length of	Source Area	_	Dei = effectiv	e diffusion co	efficient		PEF = Partici	ulate Emission	is Factor	

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**SSTL<sub>DER</sub>** 9.99e+99 9.99e+99 9.99e+99 9.99e+99 2.88e-5 5.29e-7 8.14e-7 7.05e+1 1.41e+2 2.32e+2 5.73e+3 1.88e-5 7.92e-6 2.66e-6 6.70e-6 9.80e-6 2.08e-6 3.92e-6 4.60e-6 5.06e-7 (mg/kg) ABS = dermal absorption fraction mg/cm<sup>2</sup>) ABS 0.000 0.100 1.00 0.100 0.100 0.050 0.100 0.100 0.100 0.100 0.100 0.100 0.100 0.100 0.100 0.000 0.000 0.000 0.100 0.100 ÅF SA = skin surface area 1 AF = adherence factor 1/mg/kg-d) (mg/kg-d) RfDd (cm²) 5,800 0.10 0.03 0.03 0.06 0.06 0.10 2.00 2.00 2.00 0.04 0.10 0.04 0.04 0.04 0.04 0.02 0.20 2.00 SA 5 EF<sub>dermal</sub> Worker -- Ingestion of Soil & Dermal Contact with Soil (days/yr) 2.90e-2 = TR \* BW \* 70 \* 365 \* CF / SA \* AF \* ABS \* EF \* ED \* SF SFd 250 = HQ \* BW \* 365 \* CF / SA \* AF\* ABS \* EF \* (1/RfD) **Calculation of Site-Specific Target Levels** (years) TR \* BW \* 70 \* 365 \* CF / IR<sub>sol</sub> \* EF \* ED \* SF 25 EF = exposure frequency ED = exposure duration Real = Ingestion rate = HQ \* BW \* 365 \* CF / IR<sub>soll</sub> \* EF \* (1/RfD) **SSTL<sub>ING</sub>** 6.65e+4 1.97e+2 3.68e+5 2.49e-6 4.56e-8 3.07e+4 8.18e+2 1.64e+3 3.18e+4 (days/yr) 2.45e+2 2.29e-7 5.77e-7 1.79e-7 7.01e-8 4.36e-8 I.62e-6 3.38e-7 3.97e-7 6.83e-7 (mg/kg) 8.45e-7 250 Ш (mg/kg-d) (mg/day) RfDo IRsoil 0.10 0.04 0.03 0.03 0.06 0.06 0.10 0.10 0.10 0.04 0.04 0.00 0.20 2.00 0.10 0.04 0.04 50 1.00E+06 (mg/kg) 0.15 0.10 0.15 ğ 0.09 0.05 0.02 0.07 0.08 Ч 0.0 0.02 0.03 0.20 0.50 0.01 0.01 0.14 0.29 RfD = Reference Dose I AT = averaging time BW = body weight (1/mg/kg-d) 2.90e-2 SFo BV (kg) 20 IJ SSTLDER **SSTL<sub>DER</sub> SSTL<sub>ING</sub>** SSTLING 1.00e-6 Texas-New Mexico Pipe Line Co. Ř ł Eunice, New Mexico For carcinogens: For non-carcinogens: SSTL = Site specific Target Level TNM-98-23 Kylene (mixed isomers) **ГPH-Arom-EC>12-16** IPH-Arom-EC>21-35 FPH-Arom-EC>10-12 FPH-Aliph-EC>12-16 TPH-Aliph-EC>16-35 **TPH-Aliph-EC>10-12** IPH-Arom-EC>16-2 **IPH-Arom-EC>8-10 TPH-Aliph-EC>8-10** Constituent TPH-Arom-EC>6-8 of Concern TPH - New Method **TPH-Aliph-EC>6-8 TPH-Aliph-EC 5-6** Non-Carcinogens HQ = hazard quotient Q Phenanthrene. SF = Slope Factor Ethylbenzene TR = Target Risk Naphthalene Carcinogens Fluorene Benzene Toluene

	Calculation of Worker -	Site-Specific Target L Combined SSTL for S	Levels Soll	
Texas-New Mexico	Pipe Line Co.			
TNM-98. Eunice, New	-23 Mexico		:	
If On-Site:	SSTL <sub>wkr-SOIL</sub> =		-	:
	•	+ (1/ SS1L <sub>ING</sub> ) +	(1 / SSTL <sub>DER</sub> ) + (1 / S	STL <sub>INHAL</sub> ))
If Off-Site:	SSTL <sub>wkr-soll</sub> =	SSTLINHAL		
Constituent	SSTLING	SSTLDER	SSTLINHAL	SSTLwkr-Soll
of Concern	(mg/kg)	(mg/kg)	(mg/kg)	<u>, (mg/kg)</u> , (
Carcinogens				
Benzene	1.97e+2	9.996+99	5.65e+0	5.49e+U
Non-Carcinogens				
Ethylbenzene	3.07e+4	9.99e+99	9.63e+3	7.33e+3
Fluorene	8.18e+2	7.05e+1	2.53e+3	6.33e+1
Naphthalene	1.64e+3	1.41e+2	4.89e+2	1.03e+2
Phenanthrene	2.45e+2	2.32e+2	2.29e+3	1.13e+2
Toluene	8.18e+4	9.99e+99	2.54e+3	2.47e+3
Xylene (mixed isomers)	3.68e+5	9.99e+99	2.28e+3	2.26e+3
TPH - New Method	6.65e+4	5.73e+3	1.35e+4	3.80e+3
TPH-Arom-EC>6-8	4.36e-8	5.06e-7	3.18e-7	3.57e-8
TPH-Arom-EC>8-10	2.29e-7	2.66e-6	1.89e-6	1.90e-7
TPH-Arom-EC>10-12	5.77e-7	6.70e-6	2.00e-6	4.20e-7
TPH-Arom-EC>12-16	8.45e-7	9.80e-6	1.28e-6	4.83e-7
TPH-Arom-EC>16-21	1.62e-6	1.88e-5	1.00e-6	6.01e-7
TPH-Arom-EC>21-35	2.49e-6	2.88e-5	1.22e-7	1.16e-7
TPH-Aliph-EC 5-6	4.56e-8	5.29e-7	7.70e-6	4.17e-8
TPH-Aliph-EC>6-8	1.79e-7	2.08e-6	1.48e-5	1.63e-7
TPH-Aliph-EC>8-10	3.38e-7	3.92e-6	4.03e-6	2.88e-7
TPH-Aliph-EC>10-12	3.97e-7	4.60e-6	2.08e-6	3.11e-7
TPH-Aliph-EC>12-16	6.83e-7	7.92e-6	1.65e-6	4.55e-7
TPH-Aliph-EC>16-35	7.01e-8	8.14e-7	1.32e-7	4.34e-8
Notes:				

SSTL = Site specific Target Level
Calculation of Site-Specific Target Levels

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Texas-New Mexico Pipe	Line Co.	BW	IRair	EF	ED	rs	>	HO	A	B	ш	PEF
TNM-98-23		(kg)	(m <sup>3</sup> /day)	(days/yr)	(years)	(E)	(m/s)	(ш)	(m²)	(g/cc)	I	(kg/m³)
Eunice, New Mexic		70	15	350	30	67	4.92	2.0	3358	1.80	0.32	9.954E-1
For carcinogens:	SSTL = 1	DAF * TF	* BW *	70 * 365 /	/ IR <sub>air</sub> * EF	* ED * SI	= + ( VF +	PEF )				DAF
For non-carcinogens:	SSTL = 1	DAF * H(	2 * BW *	365 / IR <sub>a</sub>	r * EF * (1	/RfD) * ( )	/F + PEF	) (				1.00
	VF = (2	* Dei * E	* Kas * 1	0-3)/(1	LS * V * D	H/A)*(	3.14 * al	oha * ED	* 3.15E+7	) <sup>0.5</sup>		
Constituent	TR	μ	CH	L P	Dei	Кd	Ţ	Kae	alnha	ΥF		SSTI
of Concern	 : I	(mg/kg-d)	<b>2</b> - 1'	(mg/kg-d)	(cm <sup>2</sup> /sec)	(cm³/g)	: 1	(g /cm <sup>3</sup> )	(cm <sup>2</sup> /sec)	(m <sup>3</sup> /kg)		(mg/kg)
Carcinogens										•		
Benzene	1.00e-6	2.91e-2			2.05e-2	1.58e+0	2.32e-1	1.47e-1	5.22e-4	7.95e-5		4.91e+0
Non-Carcinogens					-							
Ethylbenzene			0.15	0.29	1.64e-2	2.08e+1	2.67e-1	1.28e-2	3.74e-5	2.08e-5		1.01e+4
Fluorene	-		0.01	0.04	1.38e-2	1.38e+2	2.67e-3	1.94e-5	4.74e-8	7.38e-7		2.64e+3
Naphthalene			0.02	0.04	1.30e-2	2.45e+1	5.38e-2	2.20e-3	5.06e-6	7.63e-6		5.11e+2
Phenanthrene			0.03	0.0	1.19e-3	2.68e+2	6.63e-3	2.47e-5	5.21e-9	2.44e-7		2.39e+3
Toluene			0.20	0.11	1.84e-2	5.74e+0	2.65e-1	4.62e-2	1.50e-4	4.18e-5		2.65e+3
Xylene (mixed isomers)			0.09	0.20	1.63e-2	7.20e+0	2.93e-1	4.07e-2	1.17e-4	3.69e-5		2.38e+3
TPH - New Method			0.50									1.41e+4
TPH-Arom-FC>6-8			0.01	0.29	1 91e-2	4.77e+0	2 74e-1	5.75e-2	1.93e-4	4.76e-5		3.05e-7
TPH-Arom-EC>8-10			0.02	0.06	2.20e-2	3.01e+1	4.84e-1	1.61e-2	6.26e-5	2.69e-5		1.81e-6
TPH-Arom-EC>10-12			0.05	0.06	2.20e-2	4.77e+1	1.36e-1	2.85e-3	1.11e-5	1.13e-5		1.92e-6
TPH-Arom-EC>12-16			0.07	0.06	2.20e-2	9.52e+1	5.16e-2	5.42e-4	2.12e-6	4.93e-6		1.22e-6
TPH-Arom-EC>16-21			0.10	0.03	2.20e-2	3.01e+2	1.34e-2	4.44e-5	1.73e-7	1.41e-6		9.63e-7
TPH-Arom-EC>21-35			0.15	0.03	2.20e-2	2.39e+3	6.65e-4	2.78e-7	1.09e-9	1.12e-7		1.17e-7
TPH-Aliph-EC 5-6			0.01	0.06	2.20e-2	1.51e+1	3.28e+1	2.17e+0	6.12e-3	3.67e-4		7.38e-6
TPH-Aliph-EC>6-8			0.02	0.06	2.20e-2	7.56e+1	4.85e+1	6.41e-1	2.25e-3	1.79e-4		1.42e-5
TPH-Aliph-EC>8-10			0.07	0.29	2.20e-2	6.01e+2	7.92e+1	1.32e-1	5.03e-4	7.78e-5		3.86e-6
TPH-Aliph-EC>10-12			0.08	0.29	2.20e-2	4.77e+3	1.23e+2	2.58 <del>e</del> -2	1.00e-4	3.41e-5		1.99e-6
TPH-Aliph-EC>12-16			0.14	0.29	2.20e-2	9.52e+4	5.25e+2	5.52e-3	2.15e-5	1.57e-5		1.58e-6
TPH-Aliph-EC>16-35			0.29	2.00	2.20e-2	1.20e+7	4.94e+3	4.12e-4	1.61e-6	4.30e-6		1.27e-7
Notes: SSTL = Site specific Target Level	6	W = body w	eight		V = Velocity	of Wind			H' = unitless	Henry's Law C	constant	
TR = Target Risk	Υ.	T = averagir	ig time		DH = Diffusi	on Height			Kd = organic	carbon partitic	on coefficient	* foc
Sr = Siope ractor HO = hazard ouotient		( <sub>A</sub> = Innalau F = exposur	on rate e frecuency		A = Area or B = Bulk Soi	soil source I Density			10c = Traction Kas = H' / Ki	i organic caruu d	c	
RID = Reference Dose		D = exposur	e duration		E = Effective	Porosity			alpha = Dei *	E/(E+B/K	(as )	
	ű	S = Length c	of Source Are	B	Dei = effectiv	ve diffusion c	oefficient		PEF = Partic	utate Emission	is Factor	

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Texas-New Mexico Pipe	Line Co.	BW	CF	IRsoil	EF	. <b>G</b> .	EF <sub>dermat</sub>	SA	AF	
TNM-98-23		(kg)	(mg/kg)	(mg/day)	(days/yr)	(years)	(days/yr)	(cm²)	(mg/cm <sup>2</sup> )	
Eunice, New Mexic	50 ·	70	1.00E+06	124	350	30	350	5,800	1.00	
For carcinogens:	SSTL-ING	= TR * B	N * 70 * 3	1/ J2 * 39	R <sub>soil</sub> * EF * E	D * SF				
	SSTL <sub>DER</sub>	= TR * B	: * 07 * W	365 * CF /	SA * AF * AE	3S * EF *	ED * SF			
For non-carcinogens:	<b>SSTL<sub>ING</sub></b>	= HQ * B	W * 365 *	CF / IR <sub>soll</sub>	* EF * (1/RfC	()				
	<b>SSTL<sub>DER</sub></b>	= HQ * B	W * 365 *	· CF / SA *	AF* ABS * E	EF * (1/Rf	6			
Constituent	TR	SFo	НО	RfDo	SSTLING		SFd	RfDd	ABS	SSTLDER
of Concern	I	(1/mg/kg-d)	1	(mg/kg-d)	(mg/kg)		(1/mg/kg-d)	(mg/kg-d)	1	(mg/kg)
Carcinogens						,				
Benzene	1.00e-6	2.90e-2			2.03e+1		2.90e-2		0.000	9.99e+99
Non-Carcinogens										
Ethylbenzene			0.15	0.10	1.17e+3			0.10	0.000	9.99e+99
Fluorene			0.01	0.04	3.13e+1			0.04	0.100	5.03e+1
Naphthalene			0.02	0.04	6.26e+1			0.04	0.100	1.01e+2
Phenanthrene		·	0.03	0.00	9.39e+0			0.02	0.050	1.65e+2
Toluene			0.20	0.20	3.13e+3			0.20	0.000	9.99e+99
Xylene (mixed isomers)			0.09	2.00	1.41e+4			2.00	0.000	9.99e+99
TPH - New Method			0.50		2.54e+3					4.10e+3
TPH-Arom-EC>6-8			0.01	0.10	1.14e-6			0.10	0.100	7.08e-7
TPH-Arom-EC>8-10			0.02	0.04	5.99e-6			0.04	0.100	3.72e-6
TPH-Arom-EC>10-12			0.05	0.04	1.51e-5			0.04	0.100	9.38e-6
TPH-Arom-EC>12-16			0.07	0.04	2.21e-5			0.04	0.100	1.37e-5
TPH-Arom-EC>16-21			0.10	0.03	4.24e-5	_		0.03	0.100	2.64e-5
TPH-Arom-EC>21-35			0.15	0.03	6.50e-5			0.03	0.100	4.04e-5
TPH-Aliph-EC 5-6			0.01	0.06	1.19e-6			0.06	0.100	7.40e-7
TPH-Aliph-EC>6-8			0.02	0.06	4.69e-6			0.06	0.100	2.91e-6
TPH-Aliph-EC>8-10			0.07	0.10	8.82e-6			0.10	0.100	5.48e-6
TPH-Aliph-EC>10-12			80.0 0	0.10	1.04e-5			0.10	0.100	0.406-0 4 440 F
TPH-Aliph-EC>16-35			0.29	2.00 2.00	1.705-0 1.83e-6			2.00	0.100	1.146-6
Notes:						_				
SSTL = Site specific Target Level TR = Target Risk		RfD = Referer BW = body w	ice Dose sight		IR <sub>soit</sub> = Ingestion EF = exposure fr	rate equency		SA = skin sui AF = adherer	face area Ice factor	
SF = Slope Factor		AT = averagin	g time		ED = exposure d	uration		ABS = derma	l absorption fra	tion
HQ = hazard quotient										

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Eunice, New Mexico If On-Site: SST If Off-Site: SST SST SST SST SST SST SST SST SST SST	TLres-Solt = ILres-Solt = SSTL <sub>ING</sub> (mg/kg) 2.03e+1	((1/55			
If On-Site: SST If Off-Site: SST Constituent of Concern Carcinogens Benzene	rLres-soit = res-soit ≡ SSTLinG (mg/kg) 2.03e+1	(1/52			
If Off-Site: SST Constituent of Concern Carcinogens Benzene	<b>ΓLres-SOIL ≍</b> SSTL <sub>ING</sub> (mg/kg) 2.03e+1	(11/58		~	
Constituent of Concern Carcinogens Benzene	SSTL <sub>ING</sub> (mg/kg) 2.03e+1	SSTLIN	57L <sub>ING</sub> ) + (7 141	/ SS1L <sub>DER</sub> ) + (1 /	SSTLINHAL) )
of Concern Carcinogens Benzene	(mg/kg) 2.03e+1			SSTI	TSS T
Carcinogens Benzene	2.03e+1	5 <sup>-</sup>	mg/kg)	(mg/kg)	
Benzene	2.03e+1				
		<b>.</b>	99e+99	4.91e+0	3.95e+0
Non-Carcinogens		<u>.</u>			
Ethylbenzene	1.17e+3		99e+99	1.01e+4	1.05e+3
Fluorene	3.13e+1	<u></u>	03e+1	2.64e+3	1.92e+1
Naphthalene	6.26e+1	-	.01e+2	5.11e+2	3.59e+1
Phenanthrene	9 <sub>.</sub> 39e+0	-	.65e+2	2.39e+3	8.85e+0
Toluene	3.13e+3		99e+99	2.65e+3	1.44e+3
Xylene (mixed isomers)	1.41e+4	6	99e+99	2.38e+3	2.03e+3
TPH - New Method	2.54e+3	4	.10e+3	1.41e+4	1.41e+3
TPH-Arom-EC>6-8	1.14e-6	<u>_</u>	.08e-7	3.05e-7	1.80e-7
TPH-Arom-EC>8-10	5.99e-6	m	.72e-6	1.81e-6	1.01e-6
TPH-Arom-EC>10-12	1.51e-5	<b>о</b>	.38e-6	1.92e-6	1.44e-6
TPH-Arom-EC>12-16	2.21e-5		.37e-5	1.22e-6	1.07e-6
TPH-Arom-EC>16-21	4.24e-5	0	.64e-5	9.63e-7	9.09e-7
TPH-Arom-EC>21-35	6.50e-5	4	.04e-5	1.17e-7	1.16e-7
TPH-Aliph-EC 5-6	1.19e-6	~	.40e-7	7.38e-6	4.30e-7
TPH-Aliph-EC>6-8	4.69e-6	0	.91e-6	1.42e-5	1.60e-6
TPH-Aliph-EC>8-10	8.82e-6	2	.48e-6	3.86e-6	1.80e-6
TPH-Aliph-EC>10-12	1.04e-5	9	.45e-6	1.99e-6	1.33e-6
TPH-Aliph-EC>12-16	1.78e-5	<del>.</del>	.11e-5	1.58e-6	1.28e-6
TPH-Aliph-EC>16-35	1.83e-6	1	.14e-6	1.27e-7	1.07e-7

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Jury Output File Analysis for Example Problem

#### \*\*\* COMMON INPUT PARAMETERS \*\*\*

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#### PARAMETER NAME UNITS VALUE

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Porosity	(cc/cc)	0.25
Bulk Density	(g/cc)	1.8
Water Content	(cc/cc)	0.1
Fractional Organic Carbon	(mg/mg)	1.90E-02
Incorporation Depth	(cm)	1460
Clean Soil Thickness	(cm)	122
Simulation Time	(yrs)	70
Length of Soil Column	(cm)	3970
Infiltration Rate	(cm/day)	5.55E-02
Source Length	(m)	58
Source Width	(m)	67.1
Boundary Layer Thickness	(cm)	5

#### Chemical Specific Input Parameters for Benzene

Parameter Name Units Value	
Total Soil Concentration Diffusion Coeff. in Air Diffusion Coeff. in Water Henrys Constant [ Organic Carbon Part. Coeff. Lumped Chemical Decay Rate	(mg/kg) 1 (cm^2/day 7517 (cm^2/day 0.8467 (mg/L) /(mg/L)] .2490 (cc/g) 83 (1/day) 5.48E-04
Outputs for Benzene	
Time = 1 yrs	
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) 1005 (g/day) 0 (g/day) 0 (g/day) 0
Time = 2 yrs ====================================	
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) 2253 (g/day) 8.67E-49 (g/day) 1.63E-46 (g/day) 0
Time = 3 yrs	
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) 3158 (g/day) 4.02E-33 (g/day) 3.83E-31 (g/day) 3.87E-31
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 5 yrs	(g) 3812 (g/day) 2.58E-25 (g/day) 1.62E-23 (g/day) 1.64E-23
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) 4293 (g/day) 1.18E-20 (g/day) 5.49E-19 (g/day) 5.61E-19

Time = 10 yrs

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Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	5404 1.53E-11 3.06E-10 3.21E-10
Time = 15 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 20 yrs	(g) (g/day) (g/day) (g/day)	5705 9.31E-09 1.18E-07 1.27E-07
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 25 yrs	(g) (g/day) (g/day) (g/day)	5795 1.45E-07 1.34E-06 1.49E-06
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	5822 5.17E-07 3.76E-06 4.28E-06
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 35 yrs	(g) (g/day) (g/day) (g/day)	5831 8.76E-07 5.25E-06 6.12E-06
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 40 yrs	(g) (g/day) (g/day) (g/day)	5834 9.7E-07 4.93E-06 5.9E-06
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	5835 8.22E-07 3.62E-06 4.44E-06

Time = 45 yrs

Cumulative Emissions to Air	(g)	5835
Advective Mass Loading Rate to Groundwater	(g/day)	5.82E-07
Diffusive Mass Loading Rate to Groundwater	(g/day)	2.26E-06
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	2.84E-06
Time = 50 yrs		
Cumulative Emissions to Air	(g)	5835
Advective Mass Loading Rate to Groundwater	(g/day)	3.63E-07
Diffusive Mass Loading Rate to Groundwater	(g/day)	1.26E-06
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	1.62E-06
Time = 55 yrs		
Cumulative Emissions to Air	(g)	5835
Advective Mass Loading Rate to Groundwater	(g/day)	2.06E-07
Diffusive Mass Loading Rate to Groundwater	(g/day)	6.46E-07
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	8.52E-07
Time = 60 yrs ====================================		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 65 yrs	(g) (g/day) (g/day) (g/day)	5835 1.09E-07 3.11E-07 4.2E-07
Cumulative Emissions to Air	(g)	5835
Advective Mass Loading Rate to Groundwater	(g/day)	5.48E-08
Diffusive Mass Loading Rate to Groundwater	(g/day)	1.43E-07
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	1.98E-07
Time = 70 yrs		
Cumulative Emissions to Air	(g)	5835
Advective Mass Loading Rate to Groundwater	(g/day)	2.63E-08
Diffusive Mass Loading Rate to Groundwater	(g/day)	6.32E-08
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	8.95E-08

#### Chemical Specific Input Parameters for Ethylbenzene


Parameter Name Units Value	
Total Soil Concentration Diffusion Coeff. in Air Diffusion Coeff. in Water Henrys Constant [ Organic Carbon Part. Coeff. Lumped Chemical Decay Rate	(mg/kg) 1 (cm^2/day 5702 (cm^2/day 0.5875 (mg/L) /(mg/L)] .2870 (cc/g) 1100 (1/day) 0
Outputs for Ethylbenzene	
Time = 1 yrs ====================================	
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) 0.02314 (g/day) 0 (g/day) 0 (g/day) 0
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 3 yrs	(g) 3.535 (g/day) 0 (g/day) 0 (g/day) 0
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 4 yrs	(g) 23.1 (g/day) 0 (g/day) 0 (g/day) 0
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 5 yrs	(g) 64.67 (g/day) 0 (g/day) 0 (g/day) 0
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) 126.2 (g/day) 0 (g/day) 0 (g/day) 0

Time = 10 yrs

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Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Díffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	605.3 0 0 0
Time = 15 yrs		
_======================================		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	1185 0 0 0
Time = 20 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	1771 6.27E-71 2.22E-68 0
Time = 25 yrs ====================================		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	2339 3.06E-57 6.69E-55 0
Time = 30 yrs		
Cumulative Emissions to Air	( <b>n</b> )	2883
Advective Mass Loading Rate to Groundwater	(g/day)	4.16E-48
Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g/day) (g/day)	6.43E-46 0
Time = 35 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day)	3402 1.41E-41 1.66E-39 1.67E-39
	(grady)	1.07 2-00
{		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	3897 1.12E-36 1.06E-34 1.07E-34

Cumulative Emissions to Air	(g)	4371
Advective Mass Loading Rate to Groundwater	(g/day)	7.29E-33
Diffusive Mass Loading Rate to Groundwater	(g/day)	5.77E-31
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	5.84E-31
Time = 50 yrs ====================================		
Cumulative Emissions to Air	(g)	4825
Advective Mass Loading Rate to Groundwater	(g/day)	8.26E-30
Diffusive Mass Loading Rate to Groundwater	(g/day)	5.59E-28
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	5.67E-28
Time = 55 yrs		
Cumulative Emissions to Air	(g)	5260
Advective Mass Loading Rate to Groundwater	(g/day)	2.61E-27
Diffusive Mass Loading Rate to Groundwater	(g/day)	1.54E-25
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	1.57E-25
Time = 60 yrs		
Cumulative Emissions to Air	(g)	5679
Advective Mass Loading Rate to Groundwater	(g/day)	3.18E-25
Diffusive Mass Loading Rate to Groundwater	(g/day)	1.66E-23
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	1.7E-23
Cumulative Emissions to Air	(g)	6082
Advective Mass Loading Rate to Groundwater	(g/day)	1.86E-23
Diffusive Mass Loading Rate to Groundwater	(g/day)	8.71E-22
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	8.89E-22
Time = 70 yrs		
Cumulative Emissions to Air	(g)	6471
Advective Mass Loading Rate to Groundwater	(g/day)	6.08E-22
Diffusive Mass Loading Rate to Groundwater	(g/day)	2.58E-20
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	2.64E-20

Time = 45 yrs

#### Chemical Specific Input Parameters for Fluorene

Parameter Name	Units Value		
Total Soil Concentration Diffusion Coeff. in Air Diffusion Coeff. in Wa Henrys Constant [ Organic Carbon Part.	on Iter Coeff.	(mg/kg) (cm^2/day (cm^2/day (mg/L) /(n (cc/g)	1 5478 1.149 ng/L)] .2860E-02 7300
Lumped Chemical De	cay Rate	(1/day)	0
Outputs for Fluorene			
Time = 1 yrs			
Cumulative Emissions	to Air	(g)	0
Advective Mass Loadii	ng Rate to Groundwater	(g/day)	0
Diffusive Mass Loading	g Rate to Groundwater	(g/day)	0
Advective & Diffusive	Mass Loading Rate to Groundwater	(g/day)	0
Time = 2 yrs			
Cumulative Emissions	to Air	(g)	0
Advective Mass Loadii	ng Rate to Groundwater	(g/day)	0
Diffusive Mass Loadin Advective & Diffusive	g Rate to Groundwater Mass Loading Rate to Groundwater	(g/day) (g/day)	0 0
Time = 3 yrs	=======================================		
Cumulative Emissions	to Air	(0)	0
Advective Mass Loadi	ng Rate to Groundwater	(9) (0/day)	0
Diffusive Mass Loading	g Rate to Groundwater	(g/day)	Õ
Advective & Diffusive	Mass Loading Rate to Groundwater	(g/day)	0
Time = 4 yrs	======================================		
Cumulative Emissions	to Air	(g)	0
Advective Mass Loadi	ng Rate to Groundwater	(g/day)	0
Diffusive Mass Loading	g Rate to Groundwater	(g/day)	0
Advective & Diffusive	Mass Loading Rate to Groundwater	(g/day)	0
Time = 5 yrs ⊭== <b>==</b> ====	=======================================		
Cumulative Emissions	to Air	(a)	0
Advective Mass Loadi	ng Rate to Groundwater	(g/day)	õ
Diffusive Mass Loadin	g Rate to Groundwater	(g/day)	Ō
Advective & Diffusive	Mass Loading Rate to Groundwater	(g/day)	0

Time = 10 yrs

Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	0 0 0 0	
Time = 15 yrs			
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater	(g) (g/dav)	0	
Diffusive Mass Loading Rate to Groundwater	(g/day)	0	
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0	
Time = 20 yrs			
Ourselative Englaciona to Air			
Advective Mass Loading Rate to Groundwater	(g) (g/dav)	0	
Diffusive Mass Loading Rate to Groundwater	(g/day)	0	
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0	
Time = 25 yrs			
Cumulative Emissions to Air	(g)	0	
Advective Mass Loading Rate to Groundwater	(g/day)	0	
Diffusive Mass Loading Rate to Groundwater	(g/day)	0	
Auvective & Diffusive mass Loading Rate to Groundwater	(g/uay)	U	
Time = 30 yrs			
Cumulative Emissions to Air	(g)	0	
Advective Mass Loading Rate to Groundwater	(g/day)	0	
Diffusive Mass Loading Rate to Groundwater	(g/day)	0	
Advective & Difusive mass Loading Rate to Groundwater	(g/day)	U	
Time = 35 yrs			
****			
Cumulative Emissions to Air	(g)	0	
Advective Mass Loading Rate to Groundwater	(g/day)	0	
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day) (g/day)	0	
Advective & Dimusive muss Loading Mate to Groundwater	(g/day)	0	
Time = 40 yrs			
Cumulative Emissions to Air	(g)	0	
Advective Mass Loading Rate to Groundwater (g/day)			
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day) (g/day)	0	
	(3,, ))		

Cumulative Emissions to Air	(g)	0
Advective Mass Loading Rate to Groundwater	(g/day)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
-		
Time = 50 yrs		
***************************************		
Cumulative Emissions to Air	(n)	0
Advective Mass Loading Bate to Groundwater	(g) (n/dav)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advestive & Diffusive Mass Loading Falls to croundwater	(g/ddy)	U
Time = 55 yrs		
=======================================		
Cumulative Emissions to Air	(a)	0
Advective Mass Loading Rate to Groundwater	(g/dav)	0 0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	õ
	(9, 44)/	Ū
Time = 60 yrs		
Cumulative Emissions to Air	(a)	0
Advective Mass Loading Rate to Groundwater	(g/dav)	Ő
Diffusive Mass Loading Rate to Groundwater	(g/day)	Ő
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
<b>,</b>	(3,))	•
Time = 65 yrs		
=======================================		
Cumulative Emissions to Air	(a)	n
Advective Mass Loading Rate to Groundwater	(g/dav)	ñ
Diffusive Mass Loading Rate to Groundwater	(g/day)	Ő
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 70 yrs		
Cumulative Emissions to Air	(q)	0
Advective Mass Loading Rate to Groundwater	(g/dav)	0
Diffusive Mass Loading Rate to Groundwater	(g/dav)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0

Time = 45 yrs

#### Chemical Specific Input Parameters for Toluene

Parameter Name Units Value		
Total Soil Concentration Diffusion Coeff. in Air Diffusion Coeff. in Water Henrys Constant [ Organic Carbon Part. Coeff. Lumped Chemical Decay Rate	(mg/kg) (cm^2/day (cm^2/day (mg/L) (cc/g) (1/day)	1 6739 0.743 /(mg/L)] .2840 300 0
Outputs for Toluene		
Time = 1 yrs ====================================		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	79.05 0 0 0
Time = 2 yrs ====================================		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	448 0 0 0
Time = 3 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 4 yrs	(g) (g/day) (g/day) (g/day)	932.2 0 0 0
	<i>.</i>	
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	1440 0 0 0
Time - 3 yis ====================================		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	1944 1.67E-66 6.05E-64 0

Time = 10 yrs		
Cumulative Emissions to Air	(g)	4214
Advective Mass Loading Rate to Groundwater	(g/day)	3.19E-34
Diffusive Mass Loading Rate to Groundwater	(g/day)	3.23E-32
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	3.26E-32
Time = 15 vrs		
Cumulative Emissions to Air	(g)	6111
Advective Mass Loading Rate to Groundwater	(g/day)	2E-23
Diffusive Mass Loading Rate to Groundwater	(g/day)	1.13E-21
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	1.15E-21
Time = 20 vrs		
Cumulative Emissions to Air	(g)	7743
Advective Mass Loading Rate to Groundwater	(g/day)	5.22E-18
Diffusive Mass Loading Rate to Groundwater	(g/day)	2.03E-16
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	2.08E-16
Time = 25 vrs		
Cumulative Emissions to Air	(g)	9186
Advective Mass Loading Rate to Groundwater	(g/day)	9.52E-15
Diffusive Mass Loading Rate to Groundwater	(g/day)	2.81E-13
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	2.91E-13
Time = 30 vrs		
Cumulative Emissions to Air	(g)	10480
Advective Mass Loading Rate to Groundwater	(g/day)	1.44E-12
Diffusive Mass Loading Rate to Groundwater	(g/day)	3.44E-11
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	3.58E-11
Time = 35 vrs		
Cumulative Emissions to Air	(g)	11670
Advective Mass Loading Rate to Groundwater	(g/day)	5.27E-11
Diffusive Mass Loading Rate to Groundwater	(g/day)	1.05E-09
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	1.1E-09
Time = 40 vrs		
Cumulative Emissions to Air	(g)	12760
Advective Mass Loading Rate to Groundwater	(g/day)	7.91E-10
Dimusive Mass Loading Rate to Groundwater	(g/day)	1.35E-08
Advective & Dimusive mass Loading Rate to Groundwater	(g/day)	1.43E-08

Time = 10 yrs

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Cumulative Emissions to Air	(g)	13780
Advective Mass Loading Rate to Groundwater	(g/day)	6.54E-09
Diffusive Mass Loading Rate to Groundwater	(g/day)	9.8E-08
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	1.05E-07
Time = 50 yrs		
Cumulative Emissions to Air	(g)	14730
Advective Mass Loading Rate to Groundwater	(g/day)	3.56E-08
Diffusive Mass Loading Rate to Groundwater	(g/day)	4.75E-07
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	5.11E-07
Time = 55 yrs ====================================		
Cumulative Emissions to Air	(g)	15620
Advective Mass Loading Rate to Groundwater	(g/day)	1.43E-07
Diffusive Mass Loading Rate to Groundwater	(g/day)	1.72E-06
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	1.86E-06
Time = 60 yrs		
Cumulative Emissions to Air	(g)	16460
Advective Mass Loading Rate to Groundwater	(g/day)	4.58E-07
Diffusive Mass Loading Rate to Groundwater	(g/day)	5E-06
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	5.46E-06
Time = 65 yrs ====================================		
Cumulative Emissions to Air	(g)	17260
Advective Mass Loading Rate to Groundwater	(g/day)	1.23E-06
Diffusive Mass Loading Rate to Groundwater	(g/day)	1.23E-05
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	1.35E-05
Time = 70 yrs ====================================		
Cumulative Emissions to Air	(g)	18020
Advective Mass Loading Rate to Groundwater	(g/day)	2.87E-06
Diffusive Mass Loading Rate to Groundwater	(g/day)	2.65E-05
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	2.94E-05

Time = 45 yrs

#### Chemical Specific Input Parameters for Xylene

Parameter Name Units Value		
Total Soil Concentration Diffusion Coeff. in Air Diffusion Coeff. in Water	(mg/kg) (cm^2/day (cm^2/day	1 6221 0.6739
Henrys Constant [	(mg/L)	/(mg/L)] .3150
Organic Carbon Part. Coeff.	(cc/g)	240
Lumped Chemical Decay Rate	(1/day)	0
Outputs for Xylene		
Time = 1 yrs		
Cumulative Emissions to Air	(g)	158.7
Advective Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Dinusive mass Loading Nato to Oroundwater	(g/uay)	0
Time = 2 yrs		
Cumulativo Emissions to Air	(a)	700.2
Advective Mass Loading Rate to Groundwater	(g) (g/dav)	709.5 0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 3 yrs		
Cumulative Emissions to Air	(g)	1354
Advective Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day) (g/day)	0
	(g/uuy)	Ū
Time		
Cumulative Emissions to Air	(7)	1007
Advective Mass Loading Rate to Groundwater	(y) (g/dav)	3 6E-65
Diffusive Mass Loading Rate to Groundwater	(g/day)	1.28E-62
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 5 yrs ====================================		
Cumulative Emissions to Air	(g)	2617
Advective Mass Loading Rate to Groundwater	(g/day)	1012-52
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day) (g/dav)	0
<b>~</b>		-

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Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	5310 3.66E-27 2.65E-25 2.69E-25
Time = 15 yrs ====================================		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	7496 1.13E-18 4.76E-17 4.87E-17
Time = 20 yrs ===#=================================		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	9354 2.06E-14 6.11E-13 6.31E-13
Time = 25 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 30 yrs	(g) (g/day) (g/day) (g/day)	10980 7.64E-12 1.74E-10 1.81E-10
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 35 yrs	(g) (g/day) (g/day) (g/day)	12440 4E-10 7.38E-09 7.78E-09
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	13760 6.84E-09 1.06E-07 1.13E-07
Time = 40 yrs ====================================		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	14980 5.8E-08 7.76E-07 8.34E-07

10 yrs

Time =

Time =	45	vrs
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Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	16100 3.08E-07 3.62E-06 3.93E-06
Time = 50 yrs ====================================		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	17150 1.18E-06 1.23E-05 1.35E-05
***************************************		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	18130 3.53E-06 3.34E-05 3.7E-05
Time = 60 yrs		
=======================================		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	19050 8.88E-06 7.65E-05 8.54E-05
Time ≖ 65 yrs		
\FTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	19920 1.94E-05 0.000153 0.000173
Time = 70 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	20750 3.81E-05 0.000278 0.000316

#### AT123D Output File Analysis for Example Problem

Chemicals in the analysis
Benzene
Ethylbenzene
Fluorene
Toluene
Xylene

Number of years simulated: 70

## GENERAL INPUT DATA

NO. OF POINTS IN X-DIRECTION	1
NO. OF POINTS IN Y-DIRECTION	1
NO. OF POINTS IN Z-DIRECTION	10
NO. OF ROOTS: NO. OF SERIES TERMS	1000
NO. OF BEGINNING TIME STEPS	1
NO. OF ENDING TIME STEP	70
NO. OF TIME INTERVALS FOR PRINTED OUT SOLUTION	1
INSTANTANEOUS SOURCE CONTROL = 0 FOR INSTANT SOURCE	1
SOURCE CONDITION CONTROL = 0 FOR STEADY SOURCE	70
INTERMITTENT OUTPUT CONTROL = 0 NO SUCH OUTPUT	1
CASE CONTROL =1 THERMAL, = 2 FOR CHEMICAL, = 3 RAD 2	
	2 90E+01
Y-COORDINATE OF RECEPTOR WELL (METERS)	2.30E+01
$\Delta O(1) EER DEPTH = 0.0 EOR (NEINITE DEER (METERS))$	3.05E+00
AQUITER WIDTH = $0.0$ FOR INFINITE WIDE (METERS)	
BEGIN POINT OF X-SOURCE LOCATION (METERS)	0.000000
END POINT OF X-SOURCE LOCATION (METERS)	5 805+01
	0.000000
END POINT OF Y-SOURCE LOCATION (METERS)	6 71E+01
	0.005+00
END POINT OF Z-SOURCE LOCATION (METERS)	0.002+00
	0.002+00
POROSITY	2.50E-01
HYDRAULIC CONDUCTIVITY (METER/YEAR)	3.15E+01
HYDRAULIC GRADIENT	2.00E-02
LONGITUDINAL DISPERSIVITY (METER)	0.00E+00
LATERAL DISPERSIVITY (METER)	0.00E+00
VERTICAL DISPERSIVITY (METER)	0.00E+00
BULK DENSITY OF THE SOIL (KG/M**3)	1 80E+03
TIME INTERVAL SIZE FOR THE DESIRED SOLUTION (YR)	1 00E+00
DISCHARGE TIME (YR)	7.00F+01
$=$ $\cdot$	

INST. WASTE DISTRIBUTIO	E RELEASE	: (KG) VALID FOR INST CASE ONLY CIENT, KD (M**3/KG)	1.00E+00 1.66E-03
MOLECULAR	DIFFUSIO	N COEFFICIENT (M**2/YR)	3.09E-02
DECAY CON	STANT ( 1/\	YR )	2.00E-01
LIST OF TRA	NSIENT SC	OURCE RELEASE RATE	
.000E+00	.603E-46	.141E-30 .600E-23 .205E-18	
.198E-15	.252E-13	.900E-12 .138E-10 .117E-09	
.649E-09	.260E-08	.815E-08 .210E-07 .465E-07	
.906E-07	.159E-06	.257E-06 .385E-06 .543E-06	
.730E-06	.929E-06	.114E-05 .135E-05 .156E-05	
.175E-05	.192E-05	205E-05 .216E-05 .223E-05	
228E-05	.228E-05	.227E-05 .222E-05 .215E-05	
207E-05	197E-05	186E-05 .174E-05 .162E-05	
150E-05	138E-05	126F-05 115E-05 104E-05	
935E-06	839E-06	750F-06 .667E-06 .592E-06	
524E-06	462E-06	406F-06 356E-06 311E-06	
271E-06	236E-06	205E-06 177E-06 153E-06	
1325-06	1145-06	981E-07 842E-07 722E-07	
617E-07	528E-07	450E-07 384E-07	
		,430 <u>E-07</u>	1 205+01
RETARDED			1.950-01
RETARDED		NAL DISPERSION COEF. (M**2/YR)	9.55E-03
RETARDED		ISPERSION COEFFICIENT (M**2/YR).	9.55E-03
RETARDED	VERTICALI	DISPERSION COEFFICIENT (M**2/YR).	9.55≿-03
time [yr] =	1.00	avg. conc. [mg/l] = .000E+00	
time [yr] =	5.00	avg. conc. [mg/l] = .000E+00	
time [yr] =	10.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	15.0	avg. conc. [mg/l] = .123E-08	
time [yr] =	20.0	avg. conc. [mg/l] = .263E-07	
time [yr] =	25.0	avg. conc. [mg/l] = .139E-06	
time [yr] =	30.0	avg. conc. [mg/l] = .258E-06	
time [yr] =	35.0	avg. conc. [mg/l] = .352E-06	
time [yr] =	40.0	avg. conc. [mg/l] = .316E-06	
time [yr] =	45.0	avg. conc. [mg/l] = .258E-06	
time [yr] =	50.0	avg. conc. [mg/l] = .168E-06	
time [yr] =	55.0	avg. conc. [mg/l] = .106E-06	
time [yr] =	60.0	avg. conc. [mg/l] = .586E-07	
time [yr] =	65.0	avg. conc. [mg/l] = .320E-07	
time [yr] =	70.0	avg. conc. [mg/l] = .152E-07	

INST. WASTE	E RELEASE	(KG) VALID FOR INST CASE ONLY	1.00E+00
DISTRIBUTIC	ON COEFFIC	CIENT, KD (M**3/KG)	2.20E-02
MOLECULAR	DIFFUSIO	N COEFFICIENT (M**2/YR)	2.14E-02
DECAY CON	STANT ( 1/Y	(R )	0.00E+00
LIST OF TRA	NSIENT SO	URCE RELEASE RATE	
000=+00	000F+00	000E+00 000E+00 000E+00	
0005+00	000E+00	000E+00 000E+00 000E+00	
00000+00	0005+00	000E+00 000E+00 000E+00	
.000E+00	.000E+00		
.000E+00	.000E+00		
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .701E-47 .235E-45	
.663E-44	.151E-42	.285E-41 .451E-40 .611E-39	
.715E-38	.733E-37	.664E-36 .537E-35 .391E-34	
.259E-33	.156E-32	.869E-32 .446E-31 .213E-30	
.951E-30	.398E-29	.157E-28 .585E-28 .207E-27	
696E-27	223E-26	686F-26 202E-25 573E-25	
1565-24	412E-24	105E-23 259E-23 619E-23	
1445 22	3265.22	710E.22 155E.21 225E.21	
.1446-22	1245 20		
.66/E-21	.134E-20	.204E-20 .309E-20	4 505 .00
RETARDATIC	JN FACTOR		1.59E+02
RETARDED	SEEPAGE \	/ELOCITY (M/YR)	1.58E-02
RETARDED	LONGITUDI	NAL DISPERSION COEF. (M**2/YR)	5.38E-04
RETARDED	LATERAL D	ISPERSION COEFFICIENT (M**2/YR) .	5.38E-04
RETARDED '	VERTICAL [	DISPERSION COEFFICIENT (M**2/YR).	5.38E-04
time [vr] =	1.00	avg. conc. $[mo/l] = .000E+00$	
	,		
time (ur) =	5.00	$a_{1}a_{2}$ conc $[ma/l] = 0.00E \pm 0.0$	
unie [yi] =	5.00		
	10.0		
time [yr] =	10.0	avg. conc. [mg/I] = .000E+00	
time [yr] =	15.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	20.0	avg. conc. [mg/l] = .000E+00	
time [vr] =	25.0	avg. conc. [mg/l] = 000E+00	
	20.0		
time [ur] =	20.0	ave cone $[ma/l] = 000E\pm00$	
ume [yr] –	30.0	avg. conc. [mg/i] = .000E+00	
time [yr] =	35.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	40.0	avg. conc. [mg/l] ≔000Ë+00	
time (yr) =	45.0	avg. conc. [mg/l] =000E+00	
0.7		÷ : ; ; ;	
time (vr) =	50.0	ave conc $Img/II = 0.00E \pm 0.00E$	
ano (Fil			
time (w) =	55 A	$2\sqrt{a}$ conc $[mg/l] = 000E\pm00$	
une [yi] -	55.0		
At	60.0		
ume [yr] =	0.00	avy. conc. [mg/i] = .000⊑+00	
_			
time [yr] =	65.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	70.0	avg. conc. [mg/l] = .000E+00	

INST. WASTE RELEASE (KG) VALID FOR INST CASE ONLY			1.00E+00
DISTRIBUTION COEFFICIENT, KD (M**3/KG)			
MOLECULAR	DIFFUSION	I COEFFICIENT (M**2/YR)	4.19E-02
DECAY CON	STANT ( 1/Y		0.00E+00
LIST OF TRA	NSIENT SOU		
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.0002+00	.000E+00		
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
000E+00	000E+00	.000E+00 .000E+00 .000E+00	
000E+00	000E+00	000E+00 000E+00	
RETARDATIC	ON FACTOR		1 05E+03
RETARDED	SEEPAGE VI		2 40 = 03
			1.595-04
			1.592-04
RETARDED	VERTICALD	ISPERSION COEFFICIENT (W 2/TR).	1.59E-04
time built	1.00		
ume [yr] ≖	1.00	avg. conc. $[mg/I] = .000E+00$	
	5 00		
time [yr] =	5.00	avg. conc. [mg/I] = .000E+00	
time [yr] =	10.0	avg, conc. [mg/l] = .000E+00	
time [yr] =	15.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	20.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	25.0	avg. conc. [mg/l] = .000E+00	
time [vr] =	30.0	avg. conc. [mg/]] = .000E+00	
time [vr] =	35.0	ava, conc. $[ma/l] = 000E+00$	
	00.0		
time [vr] =	40.0	ava conc $[ma/l] = 000E+00$	
anie [yi] –	40.0		
time [vr] =	45.0	$2\sqrt{a} \cos \left[\frac{ma}{l}\right] = 0.00 E \pm 0.0$	
une [yi] –	45.0		
times from -	50.0		
une [yr] –	50.0	avy. conc. [mg/i] = .000≝+00	
41	<b>55</b> 0		
time [yr] =	55.0	avg. conc. [mg/i] = .000⊵+00	
time [yr] =	60.0	avg. conc. [mg/I] = .000E+00	
		•	
time [yr] =	65.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	70.0	a∨g. conc. [mg/l] = .000E+00	

#### INPUT DATA/RESULTS FOR CHEMICAL: Toluene

INST. WASTE DISTRIBUTIO		(KG) VALID FOR INST CASE ONLY CIENT, KD (M**3/KG)	1.00E+00 6.00E-03
MOLECULAR		N CUEFFICIENT (M <sup>**</sup> 2/YR)	2.71E-02
DECAY CON	STANT ( 1/)	(R )	0.00E+00
LIST OF TRA	NSIENT SC	OURCE RELEASE RATE	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.305E-45	.142E-39 .359E-35 .119E-31	
.902E-29	.226E-26	.241E-24 .131E-22 .420E-21	
.869E-20	.126E-18	.135E-17 .113E-16 .760E-16	
427E-15	205E-14	858E-14 318E-13 106E-12	
323E-12	903E-12	235E-11 571E-11 131E-10	
2845-10	587E-10	116E-00 220E-00 403E-00	
7425 00	10072-10		
.713E-09	122E-00		
.809E-08	.123E-07	.162E-07 .200E-07 .362E-07	
.539E-07	./50E-07	.103E-06 .139E-06 .186E-06	
.246E-06	.322E-06	.417E-06 .535E-06 .680E-06	
.856E-06	.107E-05	.133E-05 .163E-05 .199E-05	
.242E-05	.292E-05	.350E-05 .417E-05 .494E-05	
.582E-05	.683E-05	.797E-05 .927E-05	
RETARDATIO	ON FACTOR	۶	4.42E+01
RETARDED		FLOCITY (M/YR)	5 70E-02
RETARDED		NAL DISPERSION COFE (M**2/YR)	2 45E-03
			2.400 00
			2.450-03
RETARDED		DISPERSION COEFFICIENT (M <sup>m</sup> 2/TR).	2.45E-03
time [yr] =	1.00	avg. conc. [mg/l] = .000E+00	
time [yr] =	5.00	avg. conc. [mg/l] = .000E+00	
time (vr) =	10.0	ava, conc. [mg/]] = .000E+00	
		0 0 0 1	
time (yr) =	15.0	avg. conc. [mg/l] = .000E+00	
		5 1 1 5 1	
time [vr] =	20.0	ava conc. $[mo/l] = .000E+00$	
	20.0		
time [vr] =	25.0	ava conc $[ma/l] = 000E\pm00$	
ane [yi] –	25.0		
	~~ ~		
time [yr] =	30.0	avg. conc. $[mg/I] = .000E+00$	
time [yr] =	35.0	avg. conc. [mg/l] =000E+00	
time [yr] =	40.0	avg. conc. [mg/l] = .000E+00	
time (yr) =	45.0	avg. conc. [mg/l] = .164E-08	
		J 1001	
time [vr] =	50.0	ava conc [ma/l] = 848E-08	
	00.0	arg. conc. [mg/i] .croz co	
time [vr] =	55.0	$a_{1}a_{2}a_{3}a_{4}a_{5}a_{5}a_{5}a_{5}a_{5}a_{5}a_{5}a_{5$	
une [yi] -	55.0		
time front -	60.0	$a_{10} = a_{10} = a$	
une [yr] =	00.0	avy. conc. [mg/i]129E-00	
11 - <b>2</b> -	05.0		
time [yr] =	65.0	avg. conc. $[mg/I] = .392E-06$	
time [yr] =	70.0	avg. conc. [mg/l] = .893E-06	

INST. WASTE	E RELEASE	(KG) VALID FOR INST CASE ONLY	1.00E+00
DISTRIBUTIC	ON COEFFIC	CIENT, KD (M**3/KG)	4.80E-03
MOLECULAR	DIFFUSIO	N COEFFICIENT (M**2/YR)	2.46E-02
DECAY CON	STANT ( 1/\	(R )	0.00E+00
LIST OF TRA	NSIENT SC	OURCE RELEASE RATE	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.263E-41	.221E-35	.607E-31 .171E-27 .981E-25	
.176E-22	.133E-20	.516E-19 .118E-17 .178E-16	
.190E-15	.154E-14	.985E-14 .518E-13 .230E-12	
.889E-12	.303E-11	.926E-11 .258E-10 .662E-10	
.158E-09	.352E-09	.743E-09 .149E-08 .284E-08	
.520E-08	.917E-08	.156E-07 .257E-07 .412E-07	
.643E-07	.979E-07	.146E-06 .213E-06 .304E-06	
.428E-06	.592E-06	.806E-06 .108E-05 .143E-05	
187E-05	242F-05	.310E-05 .393E-05 .493E-05	
613E-05	755E-05	.923E-05 .112E-04 .135E-04	
161F-04	193E-04	227E-04 267E-04 312E-04	
3625-04	4195-04	482E-04 553E-04 631E-04	
717E-04	8125-04	916E-04 103E-03	
			2 565+01
			3,500-101
RETARDED			7.09E-02
RETARDED		NAL DISPERSION COEF. (M <sup>-2</sup> /YR)	2.77E-U3
RETARDED		ISPERSION COEFFICIENT (M**2/YR)	2.77E-03
RETARDED	VERTICALI	DISPERSION COEFFICIENT (M**2/YR).	2.77E-03
time [yr] =	1.00	avg. conc. [mg/l] = .000E+00	
time [yr] =	5.00	avg. conc. [mg/l] = .000E+00	
time [yr] =	10.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	15.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	20.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	25.0	avg, conc. [mg/l] = .000E+00	
		• • • • • •	
time [vr] =	30.0	avg. conc. $[mg/l] = .000E+00$	
time [vr] =	35.0	$a_{VQ}$ conc [mg/l] = 165E-08	
une [yi] -	55,0	avg. conc. [mg/i] = 1100±-00	
time [vr] -	40.0	$a_{10} = 134E_07$	
une [yi] –	40.0	avg. conc. [mg/i] = .134E-07	
time [vel =	45.0		
ume [yr] =	45.0	avg. conc. [mg/i] ≃ .904⊏-07	
	<b>50</b> 0		
time [yr] =	50.0	avg. conc. $[mg/I] = .336E-06$	
time [yr] =	55.0	avg. conc. [mg/l] = .118E-05	
time [yr] =	60.0	avg. conc. [mg/l] = .289E-05	
time [yr] =	65.0	avg. conc. [mg/l] = .710E-05	
time [yr] =	70.0	avg. conc. [mg/l] = .137E-04	

Jury Output File Analysis for Example Problem

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\*\*\* COMMON INPUT PARAMETERS \*\*\*

# PARAMETER NAME UNITS VALUE

Porosity	(cc/cc)	0.25
Bulk Density	(g/cc)	1.8
Water Content	(cc/cc)	0.1
Fractional Organic Carbon	(mg/mg)	1.90E-02
Incorporation Depth	(cm)	1460
Clean Soil Thickness	(cm)	122
Simulation Time	(yrs)	70
Length of Soil Column	(cm)	3970
Infiltration Rate	(cm/day)	5.55E-02
Source Length	(m)	58
Source Width	(m)	67.1
Boundary Layer Thickness	(cm)	5

#### Chemical Specific Input Parameters for Naphthalene

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Parameter Name Units Value	
Total Soil Concentration Diffusion Coeff. in Air Diffusion Coeff. in Water Henrys Constant [ Organic Carbon Part. Coeff. Lumped Chemical Decay Rate	(mg/kg) 1 (cm^2/day 5098 (cm^2/day 0.648 (mg/L) /(mg/L)] 5780E-01 (cc/g) 1300 (1/day) 0
Outputs for Naphthalene	
Time = 1 yrs	
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 2 yrs	(g) 0 (g/day) 0 (g/day) 0 (g/day) 0
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 3 yrs	(g) 2.17E-09 (g/day) 0 (g/day) 0 (g/day) 0
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 4 yrs	(g) 3.27E-07 (g/day) 0 (g/day) 0 (g/day) 0
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) 4.39E-05 (g/day) 0 (g/day) 0 (g/day) 0

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Cumulative Emissions to Air	(g)	0.000883
Advective Mass Loading Rate to Groundwater	(g/day)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 10 yrs		
Cumulative Emissions to Air	(a)	0.4848
Advective Mass Loading Rate to Groundwater	(g/dav)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 15 yrs		
Cumulative Emissions to Air	(a)	4.864
Advective Mass Loading Rate to Groundwater	(g/dav)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 20 yrs		
f=###########################		
Cumulative Emissions to Air	(g)	16.86
Advective Mass Loading Rate to Groundwater	(g/day)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 25 yrs		
Cumulative Emissions to Air	(g)	37.36
Advective Mass Loading Rate to Groundwater	(g/day)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 30 yrs		
Cumulative Emissions to Air	( <b>a</b> )	85 52
Advective Mass Loading Rate to Groundwater	(9) (g(day)	00.00
Diffusive Mass Loading Rate to Groundwater	(g/uay)	0
Advactive & Diffusive Mass Loading Rate to Groundwater	(g/uay)	0
Auveolive & Diffusive mass coduling rate to GroundWater	(g/day)	0

Time = 5 yrs

Time ≂	35 yrs	
Cumulative	Emissions to Air	(g)
Advective M	lass Loading Rate to Groundwater	(g/day)
Diffusive Ma	lass Loading Rate to Groundwater	(g/day)
Advective &	Diffusive Mass Loading Rate to Groundwater	(g/day)
22225222		
Cumulative	Emissions to Air	(g)
Advective M	lass Loading Rate to Groundwater	(g/day)
Diffusive Ma	ass Loading Rate to Groundwater	(g/day)
Advective &	Diffusive Mass Loading Rate to Groundwater	(g/day)
Time =	45 yrs	
Cumulative	Emissions to Air	(g)
Advective M	lass Loading Rate to Groundwater	(g/day)
Diffusive Ma	ass Loading Rate to Groundwater	(g/day)
Advective &	Diffusive Mass Loading Rate to Groundwater	(g/day)
Time ≃	50 yrs	
Cumulative	Emissions to Air	(g)
Advective N	lass Loading Rate to Groundwater	(g/day)
Diffusive Ma	ass Loading Rate to Groundwater	(g/day)
Advective &	Diffusive Mass Loading Rate to Groundwater	(g/day)
Time ≈	55 yrs	
Cumulative	Emissions to Air	(g)
Advective M	lass Loading Rate to Groundwater	(g/day)
Diffusive Ma	ass Loading Rate to Groundwater	(g/day)
Advective &	Diffusive Mass Loading Rate to Groundwater	(g/day)
Time ≃	60 yrs	
Cumulative	Emissions to Air	(g)
Advective M	Aass Loading Rate to Groundwater	(g/day)
Diffusive Ma	ass Loading Rate to Groundwater	(g/day)
Advective &	biffusive Mass Loading Rate to Groundwater	(g/day)

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Time ≖ 65 yrs

Cumulative Emissions to Air	(g)	376.5
Advective Mass Loading Rate to Groundwater	(g/day)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 70 yrs		
Cumulative Emissions to Air	(g)	427.6
Advective Mass Loading Rate to Groundwater	(g/day)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0

#### Chemical Specific Input Parameters for Phenanthrene

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Parameter Name Units Value		
Total Soil Concentration Diffusion Coeff. in Air Diffusion Coeff. in Water Henrys Constant [ Organic Carbon Part. Coeff. Lumped Chemical Decay Rate	(mg/kg) (cm^2/day 0. (cm^2/day 0. (mg/L) /(mg/l (cc/g) 1.40l (1/day)	1 4493 5124 .)] .7110E-02 E+04 0
Outputs for Phenanthrene		
Time = 1 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 2 yrs	(g) (g/day) (g/day) (g/day)	0 0 0
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 3 yrs	(g) (g/day) (g/day) (g/day)	0 0 0 0
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 4 yrs	(g) (g/day) (g/day) (g/day)	0 0 0
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	0 0 0 0

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Cumulative Emissions to Air	(g)	0
Advective Mass Loading Rate to Groundwater	(g/day)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 10 yrs		
Cumulative Emissions to Air	(a)	0
Advective Mass Loading Rate to Groundwater	(g/day)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 15 yrs		
Ourselative Engineera to Ain	(-)	•
Cumulative Emissions to Air	(g) (a(day))	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day) (g/day)	0
Time = 20 yrs		
Cumulative Emissions to Air	(g)	0
Advective Mass Loading Rate to Groundwater	(g/day)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 25 yrs		
Cumulative Emissions to Air	( <b>n</b> )	0
Advective Mass Loading Rate to Groundwater	(g/dav)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	Õ
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 30 yrs		
Cumulative Emissions to Air	(g)	0
Advective Mass Loading Rate to Groundwater	(g/day)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0

Time = 5 yrs

Cumulative Emissions to Air	(g)	0 0 0 0
Advective Mass Loading Rate to Groundw	ater (g/day)	
Diffusive Mass Loading Rate to Groundwa	iter (g/day)	
Advective & Diffusive Mass Loading Rate	to Groundwater (g/day)	
Time = 40 yrs		
Cumulative Emissions to Air	(g)	0
Advective Mass Loading Rate to Groundw	ater (g/day)	0
Diffusive Mass Loading Rate to Groundwa	iter (g/day)	0
Advective & Diffusive Mass Loading Rate	to Groundwater (g/day)	0
Time = 45 yrs		
Cumulativa Emissions to Air		0
Advestive Mass Leading Pate to Groundw	(g)	0
Diffusive Mass Loading Rate to Groundwa	ater (g/day)	0
Advective & Diffusive Mass Loading Rate	to Groundwater (g/day)	0
Advective a Diffusive Mass Educing Nate	(gray)	0
Time = 50 yrs		
Cumulative Emissions to Air	(g)	0
Advective Mass Loading Rate to Groundw	/ater (g/day)	0
Diffusive Mass Loading Rate to Groundwa	ater (g/day)	0
Advective & Diffusive Mass Loading Rate	to Groundwater (g/day)	0
Time = 55 yrs		
Cumulative Emissions to Air	(g)	0
Advective Mass Loading Rate to Groundw	/ater (g/day)	0
Diffusive Mass Loading Rate to Groundwa	ater (g/day)	0
Advective & Diffusive Mass Loading Rate	to Groundwater (g/day)	0
Time		
Ourselation Engineers to Al		<u>^</u>
Cumulative Emissions to Alf	(g)	U
Diffusive Mass Loading Rate to Groundw	ater (g/day)	U
Advective & Diffusive Mass Loading Rate	to Groundwater (g/day)	U
Auveorive & Dimusive ivides Loading Rale	(g/day)	U

Time = 35 yrs

Time = 65 yrs
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Cumulative Emissions to Air	(g)	0
Advective Mass Loading Rate to Groundwater	(g/day)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 70 yrs		
Cumulative Emissions to Air	(g)	0
Advective Mass Loading Rate to Groundwater	(g/day)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0

### Chemical Specific Input Parameters for TPH-AL05-06

Parameter Name Units Value		
Total Soil Concentration Diffusion Coeff. in Air Diffusion Coeff. in Water Henrys Constant [ Organic Carbon Part. Coeff. Lumped Chemical Decay Rate	(mg/kg) (cm^2/day (cm^2/day (mg/L) (cc/g) (1/day)	1 8640 0.864 /(mg/L)] 1410. 794 0
Outputs for TPH-AL05-06		
Time = 1 yrs ====================================		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 2 yrs	(g) (g/day) (g/day) (g/day)	48200 0.000177 2.89 2.89
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 3 yrs	(g) (g/day) (g/day) (g/day)	62160 0.000764 6.338 6.338
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 4 yrs	(g) (g/day) (g/day) (g/day)	69450 0.00112 5.962 5.963
=======================================		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	74100 0.001244 4.651 4.652

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Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	77390 0.001248 3.426 3.427
Time = $10 \text{ yrs}$	(3, , )	0.121
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	85930 0.0009 0.5909 0.5918
Time = 15 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	89860 0.000629 -0.04604 -0.04541
Time = 20 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 25 yrs	(g) (g/day) (g/day) (g/day)	92230 0.000464 -0.2063 -0.2058
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	93860 0.000358 -0.2401 -0.2397
Time = 30 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	95070 0.000287 -0.2357 -0.2354

Time =

5 yrs
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Cumulative Emissions to Air	( <b>a</b> )	96020
Advective Mass Loading Rate to Groundwater	(g/dav)	0.000236
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.2197
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.2195
Time = 40 yrs		
O un la l'a Facta iere te Air	(-)	00700
Cumulative Emissions to Air	(g) (aldau)	96780
Advective Mass Loading Rate to Groundwater	(g/day)	0.000199
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day) (g/day)	-0.2009
Time = 45 yrs		
=======================================		
Cumulative Emissions to Air	(g)	97420
Advective Mass Loading Rate to Groundwater	(g/day)	0.00017
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1831
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1829
Time = 50 yrs		
Cumulative Emissions to Air	(g)	97950
Advective Mass Loading Rate to Groundwater	(g/day)	0.000148
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1666
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1665
Time = 55 yrs		
Cumulative Emissions to Air	(g)	98410
Advective Mass Loading Rate to Groundwater	(g/day)	0.00013
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1519
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1518
Time = 60 yrs		
Cumulative Emissions to Air	(g)	98820
Advective Mass Loading Rate to Groundwater	(a/dav)	0.000116
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.139
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1389
-		

Time = 35 yrs

Time = 65 yrs

Cumulative Emissions to Air	(g)	99170
Advective Mass Loading Rate to Groundwater	(g/day)	0.000104
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1275
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1274
Time = 70 yrs ====================================		
Cumulative Emissions to Air	(g)	99490
Advective Mass Loading Rate to Groundwater	(g/day)	9.35E-05
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1175
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1174

#### Chemical Specific Input Parameters for TPH-AL06-08

Parameter Name Units Value		
Total Soil Concentration Diffusion Coeff. in Air	(mg/kg) (cm^2/day	1 8640
Diffusion Coeff. in Water	(cm^2/day	0.864
Henrys Constant [	(mg/L)	/(mg/L)] 2120.
Lumped Chemical Decay Rate	(00/g) (1/dav)	3980
	()	, i i i i i i i i i i i i i i i i i i i
Outputs for TPH-AL06-08		
Time = 1 yrs ====================================		
Cumulative Emissions to Air	(a)	43310
Advective Mass Loading Rate to Groundwater	(g/day)	4.21E-05
Diffusive Mass Loading Rate to Groundwater	(g/day)	1.29
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	1.29
Time = 2 yrs		
Cumulative Emissions to Air	(g)	57580
Advective Mass Loading Rate to Groundwater	(g/day)	0.000278
Diffusive Mass Loading Rate to Groundwater	(g/day)	4.39
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	4.39
Time = 3 yrs		
Cumulative Emissions to Air	(g)	65320
Advective Mass Loading Rate to Groundwater	(g/day)	0.000489
Diffusive Mass Loading Rate to Groundwater	(g/day)	5.095
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	5.096
Time = 4 yrs		
Cumulative Emissions to Air	(g)	70330
Advective Mass Loading Rate to Groundwater	(g/day)	0.000606
Diffusive Mass Loading Rate to Groundwater	(g/day)	4.559
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	4.56

Time = 5 yrs		
Cumulative Emissions to Air	(a)	73910
Advective Mass Loading Rate to Groundwater	(g/dav)	0.000653
Diffusive Mass Loading Rate to Groundwater	(g/day)	3.727
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	3.727
Time = 10 yrs		
Cumulative Emissions to Air	(g)	83310
Advective Mass Loading Rate to Groundwater	(g/day)	0.000554
Diffusive Mass Loading Rate to Groundwater	(g/day)	1.021
Advective & Diffusive Mass Loading Rate to Groundwater	(g/d <b>ay</b> )	1.022
Time = 15 yrs		
Cumulative Emissions to Air	(a)	87670
Advective Mass Loading Rate to Groundwater	(g/dav)	0.000412
Diffusive Mass Loading Rate to Groundwater	(g/day)	0.1958
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0.1962
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	( )	
Cumulative Emissions to Air	(g)	90310
Advective Mass Loading Rate to Groundwater	(g/day)	0.000313
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.07001
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.06969
Time = 25 yrs		
Cumulative Emissions to Air	(q)	92140
Advective Mass Loading Rate to Groundwater	(g/day)	0.000247
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1601
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1598
Time = 30 yrs		
Cumulative Emissions to Air	(0)	02100
Advective Mass Loading Rate to Groundwater	(9) (q/dav)	0 000201
Diffusive Mass Loading Rate to Groundwater	(g/day) (g/day)	-0 1871
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1869

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Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater	(g) (g/day)	94550 0 000167
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0 1898
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1896
Time = 40 yrs		
Cumulative Emissions to Air	(0)	95410
Advective Mass Loading Rate to Groundwater	(9) (d/dav)	0 000141
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1827
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1825
Time = 45 yrs ====================================		
Cumulative Emissions to Air	( <b>a</b> )	96120
Advective Mass Loading Rate to Groundwater	(g) (g/dav)	0.000122
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.172
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1719
Time = 50 yrs		
=======================================		
Cumulative Emissions to Air	(g)	96720
Advective Mass Loading Rate to Groundwater	(g/day)	0.000106
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1604
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1602
Time = 55 yrs		
Cumulative Emissions to Air	(7)	07240
Advective Mass Loading Rate to Groundwater	(y) (a(day)	97240
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0 1480
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day) (g/day)	-0.1488
Time = 60 yrs		
Cumulative Emissions to Air	(a)	97690
Advective Mass Loading Rate to Groundwater	(g/dav)	8.35E-05
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1382
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1381

35 yrs

Time =

Time = 65 yrs

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Cumulative Emissions to Air	(g)	98090
Advective Mass Loading Rate to Groundwater	(g/day)	7.5E-05
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1283
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1283
Time = 70 yrs		
Cumulative Emissions to Air	(g)	98440
Advective Mass Loading Rate to Groundwater	(g/day)	6.79E-05
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1194
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.1193

#### Chemical Specific Input Parameters for TPH-AL08-10

Parameter Name Units Value	
Total Soil Concentration Diffusion Coeff. in Air Diffusion Coeff. in Water Henrys Constant [ Organic Carbon Part. Coeff. Lumped Chemical Decay Rate	(mg/kg) 1 (cm^2/day 8640 (cm^2/day 0.864 (mg/L) /(mg/L)] 3410. (cc/g) 3.16E+04 (1/day) 0
Outputs for TPH-AL08-10	
Time ≠ 1 yrs ====================================	
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 2 yrs	(g) 28240 (g/day) 1.61E-07 (g/day) 0.01683 (g/day) 0.01683
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 3 yrs	(g) 41540 (g/day) 8.58E-06 (g/day) 0.4583 (g/day) 0.4583
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time ≠ 4 yrs	(g) 49960 (g/day) 3.38E-05 (g/day) 1.233 (g/day) 1.233
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) 55860 (g/day) 6.71E-05 (g/day) 1.857 (g/day) 1.857

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Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	60280 9.96E-05 2.209 2.209
Time = 10 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 15 yrs	(g) (g/day) (g/day) (g/day)	72570 0.000182 1.87 1.87
	(	70570
Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	0.000184 1.078 1.078
Time = 20 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	82280 0.000166 0.5873 0.5875
Time = 25 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	84870 0.000145 0.308 0.3081
Time = 30 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	86810 0.000126 0.1471 0.1472

Time = 5 yrs

Time = 35 yrs		
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Cumulative Emissions to Air	(g)	88330
Advective Mass Loading Rate to Groundwater	(g/day)	0.000111
Diffusive Mass Loading Rate to Groundwater	(g/day)	0.052
Advective & Diffusive Mass Loading Rate to Groundw	vater (g/day)	0.05211
Time = 40 yrs	==	
Cumulative Emissions to Air	(g)	89560
Advective Mass Loading Rate to Groundwater	(g/day)	9.74E-05
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.005314
Advective & Diffusive Mass Loading Rate to Groundw	vater (g/day)	-0.005217
Time = 45 yrs		
	==	
Cumulative Emissions to Air	( <b>a</b> )	90590
Advective Mass Loading Rate to Groundwater	(g/dav)	8.65E-05
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.04029
Advective & Diffusive Mass Loading Rate to Groundw	vater (g/day)	-0.0402
Time = 50 yrs		
	==	
Cumulative Emissions to Air	(g)	91460
Advective Mass Loading Rate to Groundwater	(g/day)	7.74E-05
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.06163
Advective & Diffusive Mass Loading Rate to Groundv	vater (g/day)	-0.06155
Time = 55 yrs		
	==	
Cumulative Emissions to Air	(g)	92210
Advective Mass Loading Rate to Groundwater	(g/dav)	6.97E-05
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.07444
Advective & Diffusive Mass Loading Rate to Groundv	vater (g/day)	-0.07437
Time = 60 vrs		
	==	
Cumulative Emissions to Air		02820
Advective Mass Loading Rate to Groundwater	(8) (veh/n)	82010 6 32F-05
Diffusive Mass Loading Rate to Groundwater	(g/day) (d/day)	-0.08181
Advective & Diffusive Mass Loading Rate to Groundy	vater (g/day)	-0.08175

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Time = 65 yrs

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Cumulative Emissions to Air	(g)	93450
Advective Mass Loading Rate to Groundwater	(g/day)	5.76E-05
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.08566
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.0856
Time = 70 yrs ====================================		
Cumulative Emissions to Air	(g)	93970
Advective Mass Loading Rate to Groundwater	(g/day)	5.27E-05
Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.08719
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	-0.08714

AT123D Output File Analysis for Example Problem

Chemicals in the analysis Naphthalene Phenanthrene TPH-AL05-06 TPH-AL06-08 TPH-AL08-10

Number of years simulated: 70

## GENERAL INPUT DATA

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NO. OF POINTS IN X-DIRECTION	1
NO. OF POINTS IN Y-DIRECTION	1
NO. OF POINTS IN Z-DIRECTION	10
NO. OF ROOTS: NO. OF SERIES TERMS	1000
NO. OF BEGINNING TIME STEPS	1
NO. OF ENDING TIME STEP	70
NO. OF TIME INTERVALS FOR PRINTED OUT SOLUTION	1
INSTANTANEOUS SOURCE CONTROL = 0 FOR INSTANT SOURCE	1
SOURCE CONDITION CONTROL = 0 FOR STEADY SOURCE	70
INTERMITTENT OUTPUT CONTROL = 0 NO SUCH OUTPUT	1
CASE CONTROL =1 THERMAL, = 2 FOR CHEMICAL, = 3 RAD 2	
X-COORDINATE OF RECEPTOR WELL (METERS)	2.90E+01
Y-COORDINATE OF RECEPTOR WELL (METERS)	3.35E+01
AQUIFER DEPTH, = 0.0 FOR INFINITE DEEP (METERS)	3.05E+00
AQUIFER WIDTH, = 0.0 FOR INFINITE WIDE (METERS)	0.00E+00
BEGIN POINT OF X-SOURCE LOCATION (METERS)	0.00E+00
END POINT OF X-SOURCE LOCATION (METERS)	5.80E+01
BEGIN POINT OF Y-SOURCE LOCATION (METERS)	0.00E+00
END POINT OF Y-SOURCE LOCATION (METERS)	6.71E+01
BEGIN POINT OF Z-SOURCE LOCATION (METERS)	0.00E+00
END POINT OF Z-SOURCE LOCATION (METERS)	0.00E+00
POROSITY	2.50E-01
HYDRAULIC CONDUCTIVITY (METER/YEAR)	3.15E+01
HYDRAULIC GRADIENT	2.00E-02
LONGITUDINAL DISPERSIVITY (METER)	0.00E+00
LATERAL DISPERSIVITY (METER)	0.00E+00
VERTICAL DISPERSIVITY (METER)	0.00E+00
BULK DENSITY OF THE SOIL (KG/M**3)	1.80E+03
TIME INTERVAL SIZE FOR THE DESIRED SOLUTION (YR)	1.00E+00
DISCHARGE TIME (YR)	7.00E+01

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INST. WASTE RELEASE (KG) VALID FOR INST CASE ONLY	1.00E+00
DISTRIBUTION COEFFICIENT, KD (M**3/KG)	2.60E-02
MOLECULAR DIFFUSION COEFFICIENT (M**2/YR)	2.37E-02
DECAY CONSTANT ( 1/YR )	0.00E+00
LIST OF TRANSIENT SOURCE RELEASE RATE	
.000E+00 .000E+00 .000E+00 .000E+00 .000E+00	
000E+00 000E+00 000E+00 000E+00 000E+00	
.000E+00 .000E+00 .000E+00 .000E+00 .000E+00	
.000E+00 .000E+00 .000E+00 .000E+00 .000E+00	
.000E+00 .000E+00 .000E+00 .000E+00	
RETARDATION FACTOR	1.88E+02
RETARDED SEEPAGE VELOCITY (M/YR)	1.34E-02
RETARDED LONGITUDINAL DISPERSION COEF. (M**2/YR)	5.03E-04
RETARDED LATERAL DISPERSION COEFFICIENT (M**2/YR) .	5.03E-04
RETARDED VERTICAL DISPERSION COEFFICIENT (M**2/YR).	5.03E-04
time [yr] = 1.00 avg. conc. [mg/l] = .000E+00	
time [yr] = 5.00 avg. conc. [mg/l] = .000E+00	
time [vr] = 10.0 avg. conc. [mg/l] = .000E+00	
time $ vr  = 15.0$ avg. conc. $ mg/l  = 0.00E+0.0$	
time $[vr] = 20.0$ ava conc $[mg/l] = -0.00E+0.0$	
time $[yr] = 25.0$ avg. conc. $[mg/l] = .000E+00$	
time $[yr] = 30.0$ avg. conc. $[mg/l] = .000E+00$	
time [yr] = 35.0 avg. conc. [mg/l] = .000E+00	
time [yr] = 40.0 avg. conc. [mg/l] = .000E+00	
time [yr] = 45.0 avg. conc. [mg/l] = .000E+00	
time [yr] = 50.0 avg. conc. [mg/l] = .000E+00	
time [yr] = 55.0 avg. conc. [mg/l] = .000E+00	
0.1 0 1 0 1	
time [yr] = 60.0 avg. conc. [mg/l] = .000E+00	
time $[vr] = 65.0$ ava. conc. $[mo/l] = 0.00F+0.0$	
time $[vr] = 70.0$ ava. conc. $[ma/l] = 0.00E+0.0$	

INST. WASTE	E RELEASE (	KG) VALID FOR INST CASE ONLY	1.00E+00
DISTRIBUTION COEFFICIENT, KD (M**3/KG)			2.80E-01
MOLECULAF	R DIFFUSION	COEFFICIENT (M**2/YR)	1.87E-02
DECAY CON	STANT ( 1/Y	R)	0.00E+00
LIST OF TRA	NSIENT SOL	JRCE RELEASE RATE	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
000 =+00	.000E+00	.000E+00 .000E+00 .000E+00	
000E+00	000E+00	000E+00 000E+00 000E+00	
000E+00	000E+00	000E+00 000E+00 000E+00	
0005+00	0005+00	000E+00 000E+00 000E+00	
.000E+00	.000E+00	000E+00 000E+00 000E+00	
.000E+00	.000E+00		
.000E+00	.00002+00		
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00	
RETARDATI	ON FACTOR	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	2.02E+03
RETARDED	SEEPAGE VI	ELOCITY (M/YR)	1.25E-03
RETARDED	LONGITUDIN	IAL DISPERSION COEF. (M**2/YR)	3.71E-05
RETARDED	LATERAL DI	SPERSION COEFFICIENT (M**2/YR)	3 71E-05
RETARDED	VERTICAL D	ISPERSION COEFFICIENT (M**2/YR)	3.71E-05
time [vr] =	1 00	avg conc. [mg/] = 000E+00	
time [vr] =	5.00	$a_{1}a_{2}a_{3}a_{2}a_{3}a_{3}a_{3}a_{3}a_{3}a_{3}a_{3}a_{3$	
ume [yi] -	5.00		
time furl -	10.0		
une [yr] =	10.0	avg. conc. [nig/i] = .000E+00	
<i></i>	45.0		
time [yr] =	15.0	avg. conc. $[mg/I] = .000E+00$	
time [yr] =	20.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	25.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	30.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	35.0	avg. conc. [mg/l] = .000E+00	
time [vr] =	40.0	avg. conc. [mg/i] = .000E+00	
time [vr] ≍	45.0	avg conc [mg/l] = 000E+00	
	10.0		
time [vr] =	50.0	ave conc $[mg/l] = -0.00E\pm0.0$	
and [yi] -	00.0		
timo [vr] -	55.0	$a_{\rm M} = 000 {\rm E} {\rm E} {\rm M}^{-1}$	
ume [yi]	55.0	avg. conc. [mg/i] = .000E+00	
time furl -	60.0	$a_{1}a_{2}a_{2}a_{3}a_{2}a_{3}a_{3}a_{3}a_{3}a_{3}a_{3}a_{3}a_{3$	
ume [yr] =	00.0	avg. conc. [mg/i]000E+00	
time [] -	65.0		
une [yr] =	00.0	avg. conc. [mg/i] = .000E+00	
	70.0		
time [yr] =	70.0	avg. conc. [mg/I] = .000E+00	

INST. WASTE RELEASE (KG) VALID FOR INST CASE ONLY	1.00E+00
DISTRIBUTION COEFFICIENT, KD (M**3/KG)	1.59E-02
MOLECULAR DIFFUSION COEFFICIENT (M**2/YR)	3.15E-02
DECAY CONSTANT ( 1/YR )	0.00E+00
LIST OF TRANSIENT SOURCE RELEASE RATE	
.105E+01 .231E+01 .218E+01 .170E+01 .125E+01	
.903E+00 .645E+00 .456E+00 .318E+00 .216E+00	
140E+00 834E-01 406E-01 813E-02 000E+00	
000E+00 000E+00 000E+00 000E+00 000E+00	
000E+00 000E+00 000E+00 000E+00 000E+00	
000E+00 000E+00 000E+00 000E+00 000E+00	
.000E+00 .000E+00 .000E+00 .000E+00 .000E+00	
.000E+00 .000E+00 .000E+00 .000E+00 .000E+00	
.000E+00 .000E+00 .000E+00 .000E+00 .000E+00	
.000E+00 .000E+00 .000E+00 .000E+00	
.000E+00 .000E+00 .000E+00 .000E+00 .000E+00	
.000E+00 .000E+00 .000E+00 .000E+00 .000E+00	
.000E+00 .000E+00 .000E+00 .000E+00	
RETARDATION FACTOR	1.15E+02
RETARDED SEEPAGE VELOCITY (M/YR)	2.19E-02
RETARDED LONGITUDINAL DISPERSION COEF. (M**2/YR)	1.09E-03
RETARDED LATERAL DISPERSION COEFFICIENT (M**2/YR)	1.09E-03
RETARDED VERTICAL DISPERSION COEFFICIENT (M**2/YR).	1.09E-03
time [vr] = 1.00 avg. conc. [mg/l] = .470E-03	
time $[yr] = 5.00$ avg. conc. $[mg/l] = 798F-01$	
time $ vr  = 10.0$ ava conc $ ma/l  = 710E_01$	
time $[yr] = 15.0$ ava conc. $[ma/l] = 569E.01$	
time $  x   = -20.0$	
avg. conc. [mg/l] = .504E-01	
time $[yr] = 25.0$ avg. conc. $[mg/l] = .473E-01$	
time [yr] = 30.0 avg. conc. [mg/l] = .454E-01	
time [yr] = 35.0 avg. conc. [mg/l] = .439E-01	
time [yr] = 40.0 avg. conc. [mg/l] = .428E-01	
time [yr] = 45.0 avg. conc. [mg/l] = .419E-01	
time [vr] = 50.0 ava. conc. [ma/l] = .412E-01	
time [vr] = 55.0 ava. conc. [mg/l] = .406E-01	
time $[yr] = 60.0$ avg. conc. $[mg/l] = 400E-01$	
time $[yr] = 65.0$ avg. conc. $[mg/l] = .396E_01$	
time $[vr] = 70.0$ ava conc $[mg/l] = 391E_{-0.1}$	

INST. WAST	E RELEASE	(KG) VALID FOR INST CASE ONLY	1.00E+00
DISTRIBUTI	ON COEFFIC	CIENT, KD (M**3/KG)	7.96E-02
MOLECULA	R DIFFUSIO	N COEFFICIENT (M**2/YR)	3.15E-02
DECAY CON	ISTANT ( 1/)	(R )	0.00E+00
LIST OF TRA	ANSIENT SO	URCE RELEASE RATE	
.471E+00	.160E+01	.186E+01 .166E+01 .136E+01	
.107E+01	.832E+00	.641E+00 .490E+00 .373E+00	
281E+00	209E+00	152E+00 107E+00 716E-01	
430F-01	200E-01	151E-02 000E+00 000E+00	
000E+00	000E+00	000E+00 000E+00 000E+00	
000E+00	00000000	000E+00 000E+00 000E+00	
000E+00	00000000	000E+00 000E+00 000E+00	
.000E+00	.000=+00	000E+00 .000E+00 .000E+00	
.000E+00	.000E+00		
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00	
RETARDATI	ON FACTOR	?	5.74E+02
RETARDED	SEEPAGE V	/ELOCITY (M/YR)	4.39E-03
RETARDED	LONGITUDI	NAL DISPERSION COEF. (M**2/YR)	2.20E-04
RETARDED	LATERAL D	ISPERSION COEFFICIENT (M**2/YR) .	2.20E-04
RETARDED	VERTICAL [	DISPERSION COEFFICIENT (M**2/YR).	2.20E-04
time [yr] =	1.00	avg. conc. [mg/l] = .421E-04	
time [vr] =	5.00	avg. conc. [mg/l] = 300E-01	
anno [].]	0.00		
time [vr] =	10.0	ava conc $[ma/l] = -316E_01$	
anto Dij	10.0		
time [vr] =	15.0	$ava conc [ma/l] = 257E_01$	
ane [Ai] -	10.0		
timo (vr) –	20.0		
une [yi] –	20.0	avg. conc. [mg/i]203E-01	
time - [] -	05.0		
time [yr] =	29.0	avg. conc. $[mg/I] = .174E-01$	
time [yr] =	30.0	avg. conc. [mg/l] = .155E-01	
time [yr] =	35.0	avg. conc. [mg/l] = .142E-01	
time [yr] =	40.0	avg. conc. [mg/l] = .133E-01	
time [yr] =	45.0	avg. conc. [mg/l] = .125E-01	
time [yr] =	50.0	avg. conc. [mg/l] = .120E-01	
		0 . 0 .	
time [vr] =	55.0	avg. conc. [mg/l] = .116E-01	
time (vr) =	60.0	avg conc. $[mg/l] = 112F-01$	
time [vr] =	65.0	ave conc $\left[ m \alpha / l \right] = -110 E_{-}01$	
anie Dit	50.0		
time [vr] =	70.0	$ava conc [ma/l] = 107E_{-0.1}$	
anio (M) –	10.0	arg. cono. [mgn] tor E-o i	

INST. WASTI	E RELEASE (KG) VA	LID FOR INST CASE ONLY	1.00E+00
DISTRIBUTIO	ON COEFFICIENT, K	D (M**3/KG)	6.32E-01
MOLECULAF	R DIFFUSION COEFF	FICIENT (M**2/YR)	3.15E-02
DECAY CON	ISTANT ( 1/YR )		0.00E+00
LIST OF TRA	NSIENT SOURCE R	ELEASE RATE	
.614E-02	.167E+00 .450E+0	0 .678E+00 .806E+00	
.853E+00	.844E+00 .804E+(	00 .746E+00 .683E+00	
.618E+00	.555E+00 .496E+(	00 .442E+00 .394E+00	
349E+00	310E+00 .274E+0	00 243E+00 214E+00	
189E+00	167E+00 147E+0	00 129E+00 112E+00	
980E-01	851E 01 735E-01	631E-01 537E-01	
.3000-01	277E 04 209E 01		
.455E-01	.377E-01 .300E-01		
.140E-01	.939E-02 .524E-02	2 .149E-02 .000E+00	
.000E+00	.000E+00 .000E+0	00 .000E+00 .000E+00	
.000E+00	.000E+00 .000E+0	00 .000E+00 .000E+00	
.000E+00	.000E+00 .000E+0	00 .000E+00 .000E+00	
.000E+00	.000E+00 .000E+0	00 .000E+00 .000E+00	
.000 <b>E+00</b>	.000E+00 .000E+0	00 .000E+00 .000E+00	
.000E+00	.000E+00 .000E+0	00 .000E+00	
RETARDATI	ON FACTOR		4.55E+03
RETARDED	SEEPAGE VELOCIT	Y (M/YR)	5.54E-04
RETARDED	LONGITUDINAL DIS	PERSION COFE (M**2/YR)	2 77E-05
	LATEDAL DISPERSI		2.77 - 05
DETADDED			2.77 E-00
RETARDED	VERTICAL DISPERS	ION COEFFICIENT (M. 2/TR).	2.77E-00
(1	4.00		
time [yr] =	1.00	avg. conc. $[mg/l] = .694E-07$	
time [yr] =	5.00	avg. conc. [mg/l] = .301E-02	
time [yr] =	10.0	avg. conc. [mg/l] = .743E-02	
time [yr] =	15.0	avg. conc. [mg/l] = .880E-02	
time [vr] =	20.0	avg. conc. [mg/l] =820F-02	
	20.0		
timo [ur] -	25.0	$a_{max} = 751E_{00}$	
une [yi] -	23.0	avg. conc. [mg/i] = .751E-02	
time - Frida			
time [yr] =	30.0	avg. conc. [mg/l] = .664E-02	
time [yr] =	35.0	avg. conc. [mg/l] = .593E-02	
time [yr] =	40.0	avg. conc. [mg/l] = .528E-02	
time (yr] =	45.0	avg. conc. [mg/l] = .481E-02	
		• • • • •	
time (vr) =	50.0	avg conc img/i] = 445E-02	
	00.0		
time [vr] ~	55.0	$a_{1} = 417 = 02$	
une (yi] -	55.0	avg. conc. [mg/i] =+1/E-02	
time e fuml -	60.0		
ume [yr] =	60.0	avg. conc. $[mgn] = .394E-02$	
Aline - 1	05.0		
ume [yr] =	0.00	avg. conc. [mg/l] = .375E-02	
		• ···	
time [yr] =	70.0	avg. conc. [mg/l] = .358E-02	

Jury Output File Analysis for Example Problem

\*\*\* COMMON INPUT PARAMETERS \*\*\*

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# PARAMETER NAME UNITS VALUE

Porosity	(cc/cc)	0.25
Bulk Density	(g/cc)	1.8
Water Content	(cc/cc)	0.1
Fractional Organic Carbon	(mg/mg)	1.90E-02
Incorporation Depth	(cm)	1460
Clean Soil Thickness	(cm)	122
Simulation Time	(yrs)	70
Length of Soil Column	(cm)	3970
Infiltration Rate	(cm/day)	5.55E-02
Source Length	(m)	58
Source Width	(m)	67.1
Boundary Layer Thickness	(cm)	5

#### Chemical Specific Input Parameters for TPH-AR07-08

Parameter Name Units Value		
Total Soil Concentration Diffusion Coeff. in Air Diffusion Coeff. in Water Henrys Constant [ Organic Carbon Part. Coeff. Lumped Chemical Decay Rate	(mg/kg) (cm^2/day (cm^2/day (mg/L) (cc/g) (1/day)	1 7517 0.743 /(mg/L)] .2740 251 0
Outputs for TPH-AR07-08		
Time = 1 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 2 yrs	(g) (g/day) (g/day) (g/day)	162 0 0 0
Cumulative Emissions to Air	(g) (g/davi)	720.3
Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g/day) (g/day) (g/day)	0 0
Time = 3 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	1372 0 0 0
Time = 4 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	2023 8.31E-65 3.05E-62 0

Time = 5 yrs

Cumulative Emissions to Air	(g)	2650
Advective Mass Loading Rate to Groundwater	(g/day)	3.09E-52
Diffusive Mass Loading Rate to Groundwater	(g/day)	7.2E-50
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 10 yrs ====================================		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 15 yrs	(g) (g/day) (g/day) (g/day)	5373 4.82E-27 3.64E-25 3.69E-25
Cumulative Emissions to Air	(g)	7586
Advective Mass Loading Rate to Groundwater	(g/day)	1.31E-18
Diffusive Mass Loading Rate to Groundwater	(g/day)	5.78E-17
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	5.91E-17
Cumulative Emissions to Air	(g)	9468
Advective Mass Loading Rate to Groundwater	(g/day)	2.26E-14
Diffusive Mass Loading Rate to Groundwater	(g/day)	6.98E-13
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	7.2E-13
Time ≕ 25 yrs ====================================		
Cumulative Emissions to Air	(g)	11120
Advective Mass Loading Rate to Groundwater	(g/day)	8.05E-12
Diffusive Mass Loading Rate to Groundwater	(g/day)	1.91E-10
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	1.99E-10
Time		
Cumulative Emissions to Air	(g)	12600
Advective Mass Loading Rate to Groundwater	(g/day)	4.11E-10
Diffusive Mass Loading Rate to Groundwater	(g/day)	7.93E-09
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	8.34E-09

Time =	35 yrs
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Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	13940 6.9E-09 1.12E-07 1.19E-07
Time = 40 yrs ====================================		
Cumulative Emissions to Air	(g) (g/dav)	15180
Diffusive Mass Loading Rate to Groundwater	(g/day) (g/day)	3 / 0E-00 8 00E-07
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	8.66E-07
Time = 45 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater	(g) (g/day)	16330 3.03E-07
Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g/day) (g/day)	3.73E-06 4.04E-06
Time = 50 yrs		
Cumulative Emissions to Air	(g)	17390
Advective Mass Loading Rate to Groundwater	(g/day)	1.15E-06
Diffusive Mass Loading Rate to Groundwater	(g/day)	1.26E-05
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	1.38E-05
Time = 55 yrs		
=0;;;;================================		
Cumulative Emissions to Air	(g)	18390
Advective Mass Loading Rate to Groundwater	(g/day)	3.43E-06
Diffusive Mass Loading Rate to Groundwater	(g/day)	3.4E-05
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	3.74E-05
Time		
Cumulative Emissions to Air	( <b>n</b> )	10340
Advective Mass Loading Rate to Groundwater	(y) (a/dav)	8 58E-06
Diffusive Mass Loading Rate to Groundwater	(g/day) (g/day)	7 73E-05
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	8.59E-05

Time ≈ 65 yrs

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Cumulative Emissions to Air	(g)	20220
Advective Mass Loading Rate to Groundwater	(g/day)	1.87E-05
Diffusive Mass Loading Rate to Groundwater	(g/day)	0.000155
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0.000173
Tìme ≈ 70 yrs		
======================================		
Cumulative Emissions to Air	(g)	21070
Advective Mass Loading Rate to Groundwater	(g/day)	3.64E-05
Diffusive Mass Loading Rate to Groundwater	(g/day)	0.000279
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0.000315

AT123D Output File Analysis for Example Problem

Chemicals in the analysis TPH-AL10-12 TPH-AL12-16 TPH-AL16-35 TPH-AR08-10 TPH-AR10-12

Number of years simulated: 70

### GENERAL INPUT DATA

NO. OF POINTS IN X-DIRECTION		1
NO. OF POINTS IN Y-DIRECTION		1
NO. OF POINTS IN Z-DIRECTION		10
NO. OF ROOTS: NO. OF SERIES TERMS		1000
NO. OF BEGINNING TIME STEPS		1
NO. OF ENDING TIME STEP		70
NO. OF TIME INTERVALS FOR PRINTED OUT SOLUTION		1
INSTANTANEOUS SOURCE CONTROL = 0 FOR INSTANT SOURCE	1	
SOURCE CONDITION CONTROL = 0 FOR STEADY SOURCE		70
INTERMITTENT OUTPUT CONTROL = 0 NO SUCH OUTPUT		1
CASE CONTROL =1 THERMAL, = 2 FOR CHEMICAL, = 3 RAD 2		
X-COORDINATE OF RECEPTOR WELL (METERS)		2.90E+01
Y-COORDINATE OF RECEPTOR WELL (METERS)		3.35E+01
AQUIFER DEPTH, = 0.0 FOR INFINITE DEEP (METERS)		3.05E+00
AQUIFER WIDTH, = 0.0 FOR INFINITE WIDE (METERS)		0.00E+00
BEGIN POINT OF X-SOURCE LOCATION (METERS)		0.00E+00
END POINT OF X-SOURCE LOCATION (METERS)		5.80E+01
BEGIN POINT OF Y-SOURCE LOCATION (METERS)		0.00E+00
END POINT OF Y-SOURCE LOCATION (METERS)		6.71E+01
BEGIN POINT OF Z-SOURCE LOCATION (METERS)		0.00E+00
END POINT OF Z-SOURCE LOCATION (METERS)		0.00E+00
POROSITY		2 50E-01
		3 15 - + 01
		2 00F-02
I ONGITUDINAL DISPERSIVITY (METER)		0.00E+00
LATERAL DISPERSIVITY (METER)		0.00E+00
VERTICAL DISPERSIVITY (METER)		0.00E+00
		0.002.00
BULK DENSITY OF THE SOIL (KG/M**3)		1.80E+03
TIME INTERVAL SIZE FOR THE DESIRED SOLUTION (YR)		1.00E+00
DISCHARGE TIME (YR)		7.00E+01

INPUT DATA/RESULTS FOR CHEMICAL: TPH-AL10-12

INST. WASTE RELEASE (KG) VALID FOR INST CASE ONLY1.00E+00DISTRIBUTION COEFFICIENT, KD (M**3/KG)5.02E+00MOLECULAR DIFFUSION COEFFICIENT(M**2/VP)2 15E 02			
	STANT ( 1/YP )		0.005+00
			0.000-+00
./445-11	.420E-03 .318	9E-03 .200E-02 .920E-02	
.209E-01	.3092-01 .305	9E-01 .705E-01 .975E-01	
.118E+00	.137E+00 .15	55E+00 .170E+00 .184E+00	
.195E+00	.205E+00 .21	3E+00 .219E+00 .224E+00	
.227E+00	.229E+00 .23	30E+00 .230E+00 .229E+00	
.227E+00	.225E+00 .22	22E+00 .219E+00 .215E+00	
.211E+00	.207E+00 .20	03E+00 .198E+00 .194E+00	
.189E+00	.184E+00 .18	30E+00 .175E+00 .170E+00	
.166E+00	.161E+00 .15	56E+00 .152E+00 .148E+00	
.143E+00	.139E+00 .13	35E+00 .131E+00 .127E+00	
.123E+00	.119E+00 .11	16E+00 .112E+00 .108E+00	
.105E+00	.102E+00 .98	36E-01 .955E-01 .925E-01	
.895E-01	.867E-01 .839	9E-01 .812E-01 .786E-01	
.761E-01	.736E-01 .712	2E-01 .689E-01	
RETARDATI	ON FACTOR		3.61E+04
RETARDED	SEEPAGE VELO		6 97E-05
			2 405 06
			3.492-00
RETARDED			3.49E-06
RETARDED	VERTICAL DISP	PERSION COEFFICIENT (MI"2/YR).	3.49E-06
time [yr] =	1.00	avg. conc. [mg/l] = .000E+00	
time [yr] =	5.00	avg. conc. [mg/l] = .314E-05	
time [yr] =	10.0	avg. conc. [mg/l] = .127E-03	
time [yr] =	15.0	avg. conc. [mg/l] = .488E-03	
time [yr] =	20.0	avg. conc. [mg/l] = .823E-03	
time [yr] =	25.0	avg. conc. [mg/l] = .119E-02	
time [yr] =	30.0	avg. conc. [mg/l] = .138E-02	
time [yr] =	35.0	avg. conc. [mg/l] = .157E-02	
time [yr] =	40.0	avg. conc. [mg/l] = .163E-02	
time [yr] =	45.0	avg. conc. [mg/l] = .172E-02	
time [yr] =	50.0	avg. conc. [mg/l] = .171E-02	
time [yr] =	55.0	avg. conc. [mg/l] = .173E-02	
time [yr] =	60.0	avg. conc. [mg/l] = .168E-02	
time [yr] =	65.0	avg. conc. [mg/l] = .167E-02	
time [yr] =	70.0	avg. conc. [mg/l] = .162E-02	

INPUT DATA/RESULTS FOR CHEMICAL: TPH-AL12-16

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	INST. WAST	E RELEASE	E (KG) VALID FOR INST CASE ONLY	1.00E+00
I	DISTRIBUTIC	ON COEFFI	CIENT, KD (M**3/KG)	1.00E+02
	MOLECULAF	R DIFFUSIO	N COEFFICIENT (M**2/YR)	3,15E-02
1	DECAY CON	STANT (1/	YR )	0.00E+00
	LIST OF TRA	NSIENT SC	DURCE RELEASE RATE	
	.000E+00	.652E-26	.331E-17 .716E-13 .279E-10	
	.146E-08	.245E-07	.200E-06 .102E-05 .374E-05	
	.108E-04	.259E-04	.543E-04 .102E-03 .176E-03	
	.282E-03	.428E-03	.619E-03 .860E-03 .115E-02	
	.150E-02	.191E-02	.238E-02 .290E-02 .348E-02	
	.411E-02	.480E-02	.553E-02 .631E-02 .713E-02	
	.799E-02	.889E-02	.981E-02 .108E-01 .117E-01	
	.127E-01	.138E-01	.148E-01 .158E-01 .169E-01	
	.179E-01	.190E-01	.200E-01 .211E-01 .221E-01	
	.231E-01	.242E-01	.252E-01 .262E-01 .272E-01	
	.282E-01	.291E-01	.301E-01 .310E-01 .319E-01	
	.328E-01	.336E-01	.345E-01 .353E-01 .361E-01	
	.369E-01	.376E-01	.384E-01 .391E-01 .398E-01	
	.404E-01	.411E-01	.417E-01 .423E-01	
	RETARDATI	ON FACTO	R	7.21E+05
	RETARDED	SEEPAGE	VELOCITY (M/YR)	3.49E-06
1	RETARDED	LONGITUD	INAL DISPERSION COEF. (M**2/YR)	1.75E-07
	RETARDED		SPERSION COEFFICIENT (M**2/YR)	1.75E-07
	RETARDED	VERTICAL	DISPERSION COFFFICIENT (M**2/YR)	1 75E-07
	time [vr] =	1.00	avo, conc. $[mg/l] = .000E+00$	
	time [vr] =	5.00	avg. conc. [mg/l] = .000E+00	
	[J-1]			
	time [vr] =	10.0	$av_{0} conc [m_{0}/l] = 000E+00$	
	time [vr] =	15.0	avg. conc. [mg/l] = _186E-07	
		1010		
	time [vr] =	20.0	$a_{VQ} = c_{QQ} = c$	
	anto (Jij	20.0	avg. conc. [mg/i] = .200E-00	
	time [vr] =	25.0	$a_{1}a_{2}$ conc [mg/] = 101E 05	
	une Dil -	23.0		
	time furi -	20.0		
	une [yi] –	30.0	avg. conc. [mg/i] = .270⊏-05	
	time but -	25.0		
	une [yr] =	35.0	avg. conc. $[mg/I] = .591E-05$	
	time o [u] -	40.0		
	time [yr] =	40.0	avg. conc. [mg/l] = .101E-04	
	the state			
		15.0		
	une [yr] =	45.0	avg. conc. [mg/l] = .161E-04	
	unie (yr) =	45.0	avg. conc. [mg/l] = .161E-04	
	time [yr] =	45.0 50.0	avg. conc. [mg/l] = .161E-04 avg. conc. [mg/l] = .226E-04	
	time [yr] =	45.0 50.0	avg. conc. [mg/l] = .161E-04 avg. conc. [mg/l] = .226E-04	
	time [yr] = time [yr] = time [yr] =	45.0 50.0 55.0	avg. conc. [mg/l] = .161E-04 avg. conc. [mg/l] = .226E-04 avg. conc. [mg/l] = .307E-04	
	time [yr] = time [yr] = time [yr] =	45.0 50.0 55.0	avg. conc. [mg/l] = .161E-04 avg. conc. [mg/l] = .226E-04 avg. conc. [mg/l] = .307E-04	
	time [yr] = time [yr] = time [yr] = time [yr] =	45.0 50.0 55.0 60.0	avg. conc. [mg/l] = .161E-04 avg. conc. [mg/l] = .226E-04 avg. conc. [mg/l] = .307E-04 avg. conc. [mg/l] = .385E-04	
	time [yr] = time [yr] = time [yr] = time [yr] =	45.0 50.0 55.0 60.0	avg. conc. [mg/l] = .161E-04 avg. conc. [mg/l] = .226E-04 avg. conc. [mg/l] = .307E-04 avg. conc. [mg/l] = .385E-04	
	time [yr] = time [yr] = time [yr] = time [yr] = time [yr] =	45.0 50.0 55.0 60.0 65.0	avg. conc. [mg/l] = .161E-04 avg. conc. [mg/l] = .226E-04 avg. conc. [mg/l] = .307E-04 avg. conc. [mg/l] = .385E-04 avg. conc. [mg/l] = .479E-04	
	time [yr] = time [yr] = time [yr] = time [yr] = time [yr] =	45.0 50.0 55.0 60.0 65.0	avg. conc. [mg/l] = .161E-04 avg. conc. [mg/l] = .226E-04 avg. conc. [mg/l] = .307E-04 avg. conc. [mg/l] = .385E-04 avg. conc. [mg/l] = .479E-04	

INPUT DATA/RESULTS FOR CHEMICAL: TPH-AL16-35

INST. WAST	E RELEASE	(KG) VALID FOR INST CASE ONLY	1.00E+00
DISTRIBUTIO	2.00E+04		
MOLECULAR	R DIFFUSIO	N COEFFICIENT (M**2/YR)	3.15E-02
DECAY CON	STANT (1/	/R )	0.00E+00
LIST OF TRA	NSIENT SC	OURCE RELEASE RATE	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .112E-46 .230E-44	
.271E-42	.206E-40	.108E-38 .404E-37 .114E-35	
246E-34	425E-33	599E-32 702E-31 699E-30	
599E-29	449E-28	297E-27 176E-26 944E-26	
460E-25	2065-24	851E-24 307E-23 117E-20	
2065 22	1265-21	370E-24 100E-20 207E-20	
.390E-22	1055 10		
.1102-20		225E 17 474E 17 000E 17	
.341E-10	.1145-17		
.1/5E-16	.327E-16	.590E-16 .100E-15 .180E-15	
.321E-15	.542E-15	.900E-15 .14/E-14 .23/E-14	
.3/6E-14	.589E-14	.909E-14 .139E-13	
RETARDATIO	ON FACTOR	₹	1.44E+08
RETARDED	SEEPAGE \	/ELOCITY (M/YR)	1.75E-08
RETARDED	LONGITUDI	NAL DISPERSION COEF. (M**2/YR)	8.76E-10
RETARDED	LATERAL D	ISPERSION COEFFICIENT (M**2/YR) .	8.76E-10
RETARDED	VERTICAL I	DISPERSION COEFFICIENT (M**2/YR).	8.76E-10
time [yr] =	1.00	avg. conc. [mg/l] = .000E+00	
time [vr] =	5.00	avg, conc. [mg/l] = .000E+00	
time [vr] =	10.0	$a_{VQ}$ conc [mg/] = 000E+00	
	10.0		
time [vr] =	15.0	$a_{\rm M} = a_{\rm M} = 0.00 E \pm 0.0$	
unie [yi] –	15.0		
time (vel m	20.0		
ume [yr] –	20.0	avg. conc. $[mg/i] = .000\pm000$	
	0 <b>5 0</b>		
time [yr] =	25.0	avg. conc. $[mg/I] = .000E+00$	
time [yr] =	30.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	35.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	40.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	45.0	avg. conc. [mg/l] = .000E+00	
		0 1 0 1	
time [vr] =	50.0	avg conc $[mg/l] = 000E+00$	
time (vr) =	55.0	$a_{10} c_{00} c_{00} [m_0/l] = 000E+00$	
ane Bil.	00.0		
time [vr] =	60.0	ava conc $\left[ m \alpha / l \right] = 000 E \pm 00$	
anie Dil 🚽	55.0	avg. conc. [mg/i] = .000⊑+00	
time furl -	65.0		
anie [Ai] =	03.0	avg. conc. $[mg/l] = .000\pm000$	
Al., 7 7	70.0		
time [yr] =	70.0	avg. conc. [mg/l] = .000E+00	

INPUT DATA/RESULTS FOR CHEMICAL: TPH-AR08-10

INST. WASTE RELEASE (KG) VALID FOR INST CASE ONLY. 1.00E+00 DISTRIBUTION COEFFICIENT, KD (M\*\*3/KG) ..... 3.18E-02 MOLECULAR DIFFUSION COEFFICIENT (M\*\*2/YR) 3.15E-02 DECAY CONSTANT ( 1/YR )..... 0.00E+00 LIST OF TRANSIENT SOURCE RELEASE RATE .255E-18 .693E-09 .888E-06 .305E-04 .248E-03 .986E-03 .261E-02 .538E-02 .936E-02 .145E-01 .206E-01 .276E-01 .351E-01 .430E-01 .510E-01 .591E-01 .671E-01 .749E-01 .824E-01 .895E-01 .962E-01 .102E+00 .108E+00 .114E+00 .118E+00 .123E+00 .127E+00 .130E+00 .133E+00 .136E+00 .138E+00 .140E+00 .141E+00 .142E+00 .143E+00 .144E+00 .144E+00 .144E+00 .144E+00 .144E+00 .144E+00 .143E+00 .142E+00 .141E+00 .140E+00 .139E+00 .138E+00 .136E+00 .135E+00 .134E+00 .132E+00 .130E+00 .129E+00 .127E+00 .125E+00 .124E+00 .122E+00 .120E+00 .118E+00 116E+00 .115E+00 .113E+00 .111E+00 .109E+00 .107E+00 .106E+00 .104E+00 .102E+00 .100E+00 RETARDATION FACTOR ..... 2.30E+02 RETARDED SEEPAGE VELOCITY (M/YR) ..... 1.10E-02 RETARDED LONGITUDINAL DISPERSION COEF. (M\*\*2/YR) ... 5.49E-04 RETARDED LATERAL DISPERSION COEFFICIENT (M\*\*2/YR) . 5.49E-04 RETARDED VERTICAL DISPERSION COEFFICIENT (M\*\*2/YR). 5.49E-04 time [yr] = 1.00 avg. conc. [mg/l] = .000E+00 time [yr] = 5.00 avg. conc. [mg/l] = .442E-06 time [yr] = 10.0 avg. conc. [mg/l] = .157E-03 time [yr] = 15.0 avg. conc. [mg/l] = .126E-02 time [yr] = 20.0 avg. conc. [mg/l] = .302E-02 time [yr] = 25.0 avg. conc. [mg/l] = .568E-02 time [yr] = 30.0 avg. conc. [mg/l] = .783E-02 time [yr] = 35.0 avg. conc. [mg/l] = .105E-01 time [yr] = 40.0 avg. conc. [mg/l] = .122E-01 time [yr] = 45.0 avg. conc. [mg/l] = .143E-01 time [yr] = 50.0 avg. conc. [mg/l] = .154E-01 time [yr] = 55.0avg. conc. [mg/l] = .170E-01 time [yr] = 60.0avg. conc. [mg/l] = .177E-01 time [yr] = 65.0 avg. conc. [mg/l] = .189E-01 time [yr] = 70.0avg. conc. [mg/l] = .193E-01

#### INPUT DATA/RESULTS FOR CHEMICAL: TPH-AR10-12

INST. WASTI	E RELEASE	(KG) VALID FOR INST CASE ONLY	1.00E+00
DISTRIBUTIO	ON COEFFIC	CIENT, KD (M**3/KG)	5.02E-02
MOLECULAR	DIFFUSIO	N COEFFICIENT (M**2/YR)	3.15E-02
DECAY CON	STANT(1/Y	′R )	0.00E+00
LIST OF TRA	NSIENT SO	URCE RELEASE RATE	
.000E+00	.000E+00	.160E-33 .384E-25 .402E-20	
.877E-17	.210E-14	.127E-12 .307E-11 .390E-10	
.310E-09	.174E-08	.748E-08 .260E-07 .764E-07	
.196 <b>E-06</b>	.448E-06	.934E-06 .180E-05 .324E-05	
.552E-05	.894E-05	.139E-04 .207E-04 .300E-04	
.421E-04	.577E-04	.772E-04 .101E-03 .130E-03	
.164E-03	.205E-03	.252E-03 .305E-03 .366E-03	
.435E-03	.511E-03	.595E-03 .688E-03 .789E-03	
.899E-03	.102E-02	.114E-02 .128E-02 .142E-02	
.158E-02	.174E-02	.191E-02 .209E-02 .227E-02	
.246E-02	.267E-02	.287E-02 .309E-02 .331E-02	
354E-02	.377E-02	402E-02 426E-02 451E-02	
.477E-02	.503E-02	530E-02 .557E-02 .585E-02	
612E-02	641E-02	669F-02 698F-02	
RETARDATIC	ON FACTOR		3 625+02
RETARDED	SEEPAGE V		6 95E-02
			2 495 04
		ISPERSION COEF. (W 2/1R)	3.405-04
			3.402-04
RETARDED		DISPERSION COEFFICIENT (MI**2/YR).	3.48⊑-04
time [yr] =	1.00	avg. conc. [mg/l] = .000E+00	
time [yr] =	5.00	avg. conc. [mg/i] = .000E+00	
time [yr] =	10.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	15.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	20.0	avg. conc. [mg/l] = .233E-07	
time [yr] =	25.0	avg. conc. [mg/l] = .395E-06	
time [yr] =	30.0	avg. conc. [mg/l] = .205E-05	
time [yr] =	35.0	avg. conc. [mg/l] = .804E-05	
time [yr] =	40.0	avg. conc. [mg/i] = .192E-04	
time [yr] =	45.0	avg. conc. [mg/i] = .436E-04	
time [yr] =	50.0	avg. conc. [mg/l] = .746E-04	
time [yr] =	55.0	avg. conc. [mg/l] = .129E-03	
time [yr] =	60.0	avg. conc. [mg/l] = .186E-03	
time [yr] =	65.0	avg. conc. [mg/l] = .277E-03	
time [yr] =	70.0	avg. conc. [mg/i] = .361E-03	

#### \*\*\* COMMON INPUT PARAMETERS \*\*\*

PARAMETER NAME	UNITS	VALUE		
Doroeity			(00/00)	0.25
Pulk Density				0.20
Mater Centent			(9/00)	1.0
water Content			(CC/CC)	0.1
Fractional Organic Carbon			(mg/mg)	1.90E-02
Incorporation Depth			(cm)	1460
Clean Soil Thickness			(cm)	122
Simulation Time			(yrs)	70
Length of Soil Column			(cm)	3970
Infiltration Rate			(cm/day)	5.55E-02
Source Length			(m)	58
Source Width			(m)	67.1
Boundary Layer Thickness			(cm)	5

#### Chemical Specific Input Parameters for TPH-AR12-16

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Parameter Name Units Value		
Total Soil Concentration Diffusion Coeff. in Air Diffusion Coeff. in Water Henrys Constant [ Organic Carbon Part. Coeff.	(mg/kg) (cm^2/day (cm^2/day (mg/L) (cc/g)	1 8640 0.864 /(mg/L)] 2.250 5010
Lumped Chemical Decay Rate	(1/day)	0
Outputs for TPH-AR12-16		
Time = 1 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	13.95 0 0 0
Time = 2 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	154 0 0 0
Time = 3 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 4 yrs	(g) (g/day) (g/day) (g/day)	407.5 0 0 0
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	716 0 0 0
Time = 5 yrs ====================================		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	1049 0 0 0

Time = 10 yrs

Cumulative Emissions to Air	(g)	2742
Advective Mass Loading Rate to Groundwater	(g/day)	3.95E-56
Diffusive Mass Loading Rate to Groundwater	(g/day)	9.51E-53
Advective & Diffusive mass Loading Rate to Groundwat	ei (g/day)	U
Time = 15 yrs		
Cumulative Emissions to Air	(q)	4302
Advective Mass Loading Rate to Groundwater	(g/day)	1.25E-38
Diffusive Mass Loading Rate to Groundwater	(g/day)	1.48E-35
Advective & Diffusive Mass Loading Rate to Groundwat	er (g/day)	1.48E-35
Time = 20 yrs		
Cumulative Emissions to Air	(g)	5717
Advective Mass Loading Rate to Groundwater	(g/day)	7.36E-30
Diffusive Mass Loading Rate to Groundwater	(g/day)	5.64E-27
Advective & Diffusive Mass Loading Rate to Groundwat	er (g/day)	5.64E-27
Time = 25 yrs		
Cumulative Emissions to Air	(g)	7013
Advective Mass Loading Rate to Groundwater	(g/day)	1.38E-24
Diffusive Mass Loading Rate to Groundwater	(g/day)	7.76E-22
Advective & Diffusive Mass Loading Rate to Groundwat	er (g/day)	7.77E-22
Time = 30 yrs		
	:	
Cumulative Emissions to Air	(q)	8214
Advective Mass Loading Rate to Groundwater	(g/day)	4.57E-21
Diffusive Mass Loading Rate to Groundwater	(g/day)	2.04E-18
Advective & Diffusive Mass Loading Rate to Groundwat	er (g/day)	2.04E-18
Time = 35 yrs		
*======================================	:	
Cumulative Emissions to Air	(a)	9337
Advective Mass Loading Rate to Groundwater	(g/day)	1.52E-18
Diffusive Mass Loading Rate to Groundwater	(g/day)	5.57E-16
Advective & Diffusive Mass Loading Rate to Groundwat	ter (g/day)	5.58E-16
Time = 40 yrs		
	•	
Cumulative Emissions to Air	(g)	10390
Advective Mass Loading Rate to Groundwater	(g/day)	1.19E-16
Diffusive Mass Loading Rate to Groundwater	(g/day)	3.71E-14
Advective & Diffusive Mass Loading Rate to Groundwat	ter (g/day)	3.73E-14

Time = 45 yrs

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Cumulative Emissions to Air	(g)	11400
Advective Mass Loading Rate to Groundwater	(g/day)	3.55E-15
Diffusive Mass Loading Rate to Groundwater	(g/day)	9.67E-13
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	9.71E-13
Time = 50 yrs ====================================		
Cumulative Emissions to Air	(g)	12350
Advective Mass Loading Rate to Groundwater	(g/day)	5.41E-14
Diffusive Mass Loading Rate to Groundwater	(g/day)	1.31E-11
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	1.31E-11
Cumulative Emissions to Air	(g)	13260
Advective Mass Loading Rate to Groundwater	(g/day)	5.05E-13
Diffusive Mass Loading Rate to Groundwater	(g/day)	1.09E-10
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	1.1E-10
Time		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 65 yrs	(g) (g/day) (g/day) (g/day)	14140 3.26E-12 6.4E-10 6.43E-10
=======================================		
Cumulative Emissions to Air	(g)	14980
Advective Mass Loading Rate to Groundwater	(g/day)	1.58E-11
Diffusive Mass Loading Rate to Groundwater	(g/day)	2.84E-09
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	2.86E-09
Time = 70 yrs		
Cumulative Emissions to Air	(g)	15790
Advective Mass Loading Rate to Groundwater	(g/day)	6.15E-11
Diffusive Mass Loading Rate to Groundwater	(g/day)	1.02E-08
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	1.03E-08

Chemical Specific Input Parameters for TPH-AR16-21

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Parameter Name Units Value	
Total Soil Concentration Diffusion Coeff. in Air Diffusion Coeff. in Water Henrys Constant [ Organic Carbon Part. Coeff. Lumped Chemical Decay Rate	(mg/kg) 1 (cm^2/day 8640 (cm^2/day 0.864 (mg/L) /(mg/L)] .5400 (cc/g) 1.58E+04 (1/day) 0
Outputs for TPH-AR16-21	
Time = 1 yrs ====================================	
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) -4.32E-12 (g/day) 0 (g/day) 0 (g/day) 0
Time = 2 yrs ====================================	
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 3 yrs	(g) 2.72E-08 (g/day) 0 (g/day) 0 (g/day) 0
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) 4.7E-05 (g/day) 0 (g/day) 0 (g/day) 0
Time = 4 yrs	
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) 0.002188 (g/day) 0 (g/day) 0 (g/day) 0
Time = 5 yrs ====================================	
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) 0.02334 (g/day) 0 (g/day) 0 (g/day) 0

Time = 10 yrs

Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	3.638 0 0 0
Time = 15 yrs ====================================		
Cumulative Emissions to Air	(g)	23.96
Advective Mass Loading Rate to Groundwater	(g/day)	0
Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g/day) (g/day)	0 0
Time = 20 yrs		
Cumulative Emissions to Air		67.20
Advective Mass Loading Rate to Groundwater	(9) (g/dav)	07.39
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 25 yrs		
Cumulative Emissions to Air	(0)	132
Advective Mass Loading Rate to Groundwater	(g/day)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	U
Time = 30 yrs		
Cumulative Emissions to Air	(g)	213.5
Advective Mass Loading Rate to Groundwater	(g/day)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time		
Cumulative Emissions to Air	(g)	307.9
Advective Mass Loading Rate to Groundwater	(g/day)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 40 yrs ====================================		
Cumulative Emissions to Air	(g)	411.9
Advective Mass Loading Rate to Groundwater	(g/day)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Dimusive Mass Loading Rate to Groundwater	(g/day)	0

Time = 45 yrs

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Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	523.1 0 0 0
Time = 50 yrs		
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 55 yrs	(g) (g/day) (g/day) (g/day)	639.5 0 0 0
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 60 yrs	(g) (g/day) (g/day) (g/day)	759.6 0 0 0
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 65 yrs	(g) (g/day) (g/day) (g/day)	882.4 0 0 0
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 70 yrs	(g) (g/day) (g/day) (g/day)	1007 0 0 0
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	1133 0 0 0

Chemical Specific Input Parameters for TPH-AR21-35

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Parameter Name Units Value	
Total Soil Concentration Diffusion Coeff. in Air Diffusion Coeff. in Water Henrys Constant [ Organic Carbon Part. Coeff. Lumped Chemical Decay Rate	(mg/kg) 1 (cm^2/day 8640 (cm^2/day 0.864 (mg/L) /(mg/L)] .2830E-01 (cc/g) 1.26E+05 (1/day) 0
Outputs for TPH-AR21-35	
Time = 1 yrs	
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 2 yrs	(g) 0 (g/day) 0 (g/day) 0 (g/day) 0
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) 0 (g/day) 0 (g/day) 0 (g/day) 0
Time = 3 yrs	
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater Time = 4 yrs	(g) 0 (g/day) 0 (g/day) 0 (g/day) 0
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) 0 (g/day) 0 (g/day) 0 (g/day) 0
1 mme = 9 yrs ====================================	
Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) 0 (g/day) 0 (g/day) 0 (g/day) 0

Cumulative Emissions to Air Advective Mass Loading Rate to Groundwater Diffusive Mass Loading Rate to Groundwater Advective & Diffusive Mass Loading Rate to Groundwater	(g) (g/day) (g/day) (g/day)	0 0 0 0
Time = 15 yrs		
Cumulative Emissions to Air	(0)	0
Advective Mass Loading Rate to Groundwater	(g/dav)	õ
Diffusive Mass Loading Rate to Groundwater	(g/day)	0 0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 20 yrs ====================================		
Cumulative Emissions to Air	(g)	0
Advective Mass Loading Rate to Groundwater	(g/day)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 25 yrs ====================================		
Cumulative Emissions to Air	(a)	0
Advective Mass Loading Rate to Groundwater	(g/dav)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	õ
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 30 yrs		
Cumulativa Emissiona to Air	(a)	0
Advective Mass Loading Rate to Groundwater	(9) (g/day)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 35 yrs ====================================		
Cumulative Emissions to Air	(g)	0
Advective Mass Loading Rate to Groundwater	(g/day)	0
Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time = 40 yrs		
Cumulative Emissions to Air	(g)	0
Advective Mass Loading Rate to Groundwater	(g/day)	0
Diffusive Mass Loading Kate to Groundwater	(g/day)	0
Advective & Diffusive Wass Loading Rate to Groundwater	(gruay)	V

Time = 10 yrs
Time = 45 yrs

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	e Emissions to Air	(g) (a/daw)	0
Advective I	viass Loading Rate to Groundwater	(g/day)	0
Dinusive iv	ass Loading Rate to Groundwater	(g/day)	0
Advective	& Dimusive mass Loading Rate to Groundwater	(g/day)	0
Time =	50 yrs		
Cumulative	e Emissions to Air	(g)	0
Advective	Mass Loading Rate to Groundwater	(g/day)	0
Diffusive N	lass Loading Rate to Groundwater	(g/day)	0
Advective	& Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time =	55 yrs		
Cumulative	e Emissions to Air	(g)	0
Advective	Mass Loading Rate to Groundwater	(g/day)	0
Diffusive N	lass Loading Rate to Groundwater	(g/day)	0
Advective	& Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time =	60 yrs		
<b>•</b> • • •			_
Cumulative	Emissions to Air	(g)	0
Advective	Mass Loading Rate to Groundwater	(g/day)	0
	ass Loading Rate to Groundwater	(g/day)	0
Advective	& Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time =	65 yrs		
22226551			
Cumulative Emissions to Air (a)			
Advective	Mass Loading Rate to Groundwater	(g/day)	0
Diffusive N	lass Loading Rate to Groundwater	(g/day)	0
Advective	& Diffusive Mass Loading Rate to Groundwater	(g/day)	0
Time =	70 yrs		
Cumulative	e Emissions to Air	(g)	0
Advective Mass Loading Rate to Groundwater (g/day)			
Diffusive M	lass Loading Rate to Groundwater	(g/day)	0
Advective & Diffusive Mass Loading Rate to Groundwater (g/day)			

AT123D Output File Analysis for Example Problem

Chemicals in the analysis TPH-AR12-16 TPH-AR16-21 TPH-AR21-35

Number of years simulated: 70

## GENERAL INPUT DATA

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NO. OF POINTS IN X-DIRECTION		1
NO. OF POINTS IN Y-DIRECTION		1
NO. OF POINTS IN Z-DIRECTION		10
NO. OF ROOTS: NO. OF SERIES TERMS		1000
NO. OF BEGINNING TIME STEPS		1
NO. OF ENDING TIME STEP		70
NO. OF TIME INTERVALS FOR PRINTED OUT SOLUTION		1
INSTANTANEOUS SOURCE CONTROL = 0 FOR INSTANT SOURCE	1	
SOURCE CONDITION CONTROL = 0 FOR STEADY SOURCE		70
INTERMITTENT OUTPUT CONTROL = 0 NO SUCH OUTPUT		1
CASE CONTROL =1 THERMAL, = 2 FOR CHEMICAL, = 3 RAD 2		
X-COORDINATE OF RECEPTOR WELL (METERS)		2 90E+01
Y-COORDINATE OF RECEPTOR WELL (METERS)		3.35E+01
AQUIEFR DEPTH = 0.0 FOR INFINITE DEEP (METERS)		3 05E+00
AQUIFER WIDTH, = 0.0 FOR INFINITE WIDE (METERS)		0.00E+00
BEGIN POINT OF X-SOURCE LOCATION (METERS)		0.00E+00
END POINT OF X-SOURCE LOCATION (METERS)		5.80E+01
BEGIN POINT OF Y-SOURCE LOCATION (METERS)		0.00E+00
END POINT OF Y-SOURCE LOCATION (METERS)		6.71E+01
BEGIN POINT OF Z-SOURCE LOCATION (METERS)		0.00E+00
END POINT OF Z-SOURCE LOCATION (METERS)		0.00E+00
BOBOSITY		2.505.01
		2.502-01
		2 005-02
		0.005+00
		0.00E+00
		0.00E+00
		0.002100
BULK DENSITY OF THE SOIL (KG/M**3)		1.80E+03
TIME INTERVAL SIZE FOR THE DESIRED SOLUTION (YR)		1.00E+00
DISCHARGE TIME (YR)		7.00E+01

INST. WASTE	E RELEASE (KG) VA	LID FOR INST CASE ONLY	1.00E+00
DISTRIBUTIC	N COEFFICIENT, K	D (M**3/KG)	1.00E-01
MOLECULAR	FICIENT (M**2/YR)	3.15E-02	
DECAY CONS		0.00E+00	
LIST OF TRA	NSIENT SOURCE R	ELEASE RATE	
.000E+00	.000E+00 .000E+0	00 .000E+00 .000E+00	
000E+00	000E+00 000E+	00 000E+00 000E+00	
1405-47	138E-43 279E-40	) 190E-37 5/1E-35	
7500 22	ED2E 24 205E 20		
.700E-00	.595E-51 .205E-28		
.345E-25	448E-24 464E-23	3 .395E-22 .284E-21	
.175E-20	.940E-20 .448E-19	0 .192E-18 .744E-18	
.265E-17	.868E-17 .265E-16	3 .758E-16 .204E-15	
.519E-15	.125E-14 .290E-14	4 .640E-14 .136E-13	
.278E-13	.550E-13 .105E-12	2 .196E-12 .354E-12	
.624E-12	.107E-11 .180E-11	.297E-11 .478E-11	
.757E-11	.118E-10 .180E-10	0.270E-10.401E-10	
.585E-10	.844E-10 .120E-09	0 .169E-09 .235E-09	
323E-09	439E-09 591E-09	789E-09 104E-08	
137E-08	178E-08 230E-08	3 294E-08	
		.2041-00	7 225 .02
			7.220702
RETARDED			3.49E-03
RETARDED	ONGITUDINAL DIS	PERSION COEF. (M**2/YR)	1.75E-04
RETARDEDL	ATERAL DISPERSI	ON COEFFICIENT (M**2/YR) .	1.75E-04
RETARDED \	/ERTICAL DISPERS	ION COEFFICIENT (M**2/YR).	1.75E-04
time [yr] =	1.00	avg. conc. [mg/l] = .000E+00	
time [vr] =	5.00	avg. conc. [mg/l] = .000E+00	
time (vrl =	10.0	$a_{VQ} c_{ODC} [mq/l] = 0.00E+0.0$	
0.00 [31]			
time [vr] =	15.0	$2 \times 2$ 0000 [mg/l] = 00000 + 00	
une [yr] –	15.0	avg. conc. [mg/l] = .000E+00	
6	~~ ~		
time [yr] =	20.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	25.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	30.0	avg. conc. [mg/l] = .000E+00	
time [vr] =	35.0	avg. conc. $[mg/l] = -0.00E+0.0$	
time [vr] =	40.0	$a_{\rm M}$ conc [mg/l] = 000E+00	
une (yr) -	40.0	avg. conc. [mg/i] = .000E+00	
	45.0		
time [yr] =	45.0	avg. conc. $[mg/I] = .000E+00$	
time [yr] =	50.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	55.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	60.0	avg. conc. [mg/l] = .000E+00	
•		•	
time [yr] =	65.0	avg. conc. [mg/l] = .000E+00	
time (vr) =	70.0	avg. conc. [mg/]] = .000E+00	
- 11.1	· -	C server Friduit 10000m.000	

INST. WASTI	E RELEASE (I	KG) VALID FOR INST CASE ONLY	1.00E+00
DISTRIBUTION COEFFICIENT, KD (M**3/KG)			
MOLECULAF	3.15E-02		
DECAY CON	STANT ( 1/YF	ξ)	0.00E+00
LIST OF TRA	NSIENT SOU	IRCE RELEASE RATE	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	,000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	000E+00	000E+00 000E+00 000E+00	
000E+00	000E+00	000E+00 000E+00 000E+00	
000E+00	000E+00		
000E+00	000E+00	000E+00 000E+00 000E+00	
000E+00	0005+00	000E+00 000E+00 000E+00	
0005+00	0000000	0005+00 0005+00 0005+00	
00000000	.000E+00	000000000000000000000000000000000000000	
00000000	.000E+00	0005+00 0005+00 0005+00	
.000E+00	.000E+00		
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00 .000E+00	
.000E+00	.000E+00	.000E+00 .000E+00	
RETARDATIO	ON FACTOR .		2.28E+03
RETARDED	SEEPAGE VE	ELOCITY (M/YR)	1.11E-03
RETARDED	LONGITUDIN	AL DISPERSION COEF. (M**2/YR)	5.54E-05
RETARDED	LATERAL DIS	SPERSION COEFFICIENT (M**2/YR) .	5.54E-05
RETARDED	VERTICAL DI	SPERSION COEFFICIENT (M**2/YR).	5.54E-05
time [yr] =	1.00	avg. conc. [mg/l] = .000E+00	
		• • • •	
time [vr] =	5.00	avg. conc. [mg/l] = .000E+00	
time [vr] =	10.0	avg conc $[mg/l] = 000E+00$	
	10.0		
time [vr] =	15.0	$a_{\text{N}}a_{\text{CODC}}$ [mg/]] = 000E+00	
une [yi] –	10.0		
timo (vrl =	20.0		
une [yi] –	20.0	avg. conc. [mg/i]000E+00	
Alizza de Travell	<u></u>		
time [yr] =	25.0	avg. conc. $[mg/I] = .000E+00$	
time [yr] =	30.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	35.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	40.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	45.0	avg. conc. [mg/l] = .000E+00	
time [yr] =	50.0	avg. conc. [mg/l] = .000E+00	
time [vr] =	55.0	ava. conc. [mg/l] =000E+00	
	<b>70</b> 10		
time [vr] =	60.0	ava conc $Ima/II = 000F+00$	
	4 <b>0.0</b>		
time [vr] =	65.0	ava conc $[ma/l] = 0.00E+0.0$	
and the	<b>VV.V</b>	avg. conc. [mg/] = .000E+00	
time [vr] =	70.0	ava conc $[ma/l] = 000E+00$	
ասօրդ	, 0.0	ard: coup. fuidulcoor .co	

INST. WAST	E RELEASE (KO	G) VALID F	OR INST C	ASE	ONLY	1.00E+00
DISTRIBUTION COEFFICIENT, KD (M**3/KG)				2.52E+00		
MOLECULAF	R DIFFUSION C	OEFFICIE	NT (M	l**2/\	/R)	3.15E-02
DECAY CON	STANT (1/YR)					0.00E+00
LIST OF TRA	<b>NSIENT SOUR</b>	CE RELEA	SE RATE			
.000E+00	.000E+00 .00	00E+00 .	000E+00	.000	E+00	
.000E+00	.000E+00 .00	00E+00 .	000E+00	.000	E+00	
.000E+00	.000E+00 .00	00E+00 .	000E+00	.000	E+00	
000E+00	000E+00 00	00E+00	000E+00	000	E+00	
000E+00	000000000	00E+00	0005+00	000	= 00 E+00	
0005+00	000E+00 00	005+00	0005+00	0000	E+00	
000E+00	000E+00 00	005+00		000.	E+00	
.00000+00	.0000.+00 .00		00000000	.000		
.000E+00	.000E+00 .00		00000000	.000	E+00	
.000E+00	.000E+00 .00	00E+00 .	000E+00	.000	E+00	
.000E+00	.000E+00 .00	00E+00 .	000E+00	.000	E+00	
.000E+00	.000E+00 .00	00E+00 .(	000E+00	.000	E+00	
.000E+00	.000E+00 .00	00E+00 .	000E+00	.000	E+00	
.000E+00	.000E+00 .00	00E+00 .	000E+00	.000	E+00	
.000E+00	.000E+00 .00	00E+00 .	000E+00			
RETARDATI	ON FACTOR					1.81E+04
RETARDED	SEEPAGE VEL	OCITY (M/	YR)			1.39E-04
RETARDED		DISPERS		/M*	*2/YR)	6 95E-06
RETARDED	LATERAL DISP				4**2/VR	6.05E-00
DETADDED				און וא אוד ל	1 2/11). M**0//D)	
RETARDED	VENTIONE DISP	FERSION		. IN I (	WI <b>Z</b> /TR).	0.90E-00
time (ur) -	1.00	~~~~	oono [ma/l]	۱ <u> </u>	0005.00	
time [yr] =	1.00	avg.	conc. [mg/i]	<b>j</b> = .	000E+00	
time a front -	F 00				0005.00	
time [yr] =	5.00	avg.	conc. [mg/l]	= .	000E+00	
time [yr] =	10.0	avg.	conc. [mg/l]	]= .	000E+00	
time [yr] =	15.0	avg.	conc. [mg/l]	]= .	000E+00	
time [yr] =	20.0	avg.	conc. [mg/l]	]= .	000E+00	
		Ū		•		
time [vr] =	25.0	avo	conc. [mg/]]	=	000E+00	
					0002 00	
time [vr] =	30.0	ava	conc [mg/]]	ı _	0005+00	
une [yi] -	30.0	avy.	conc. [mg/i]	]	0000000	
time e fraul -	25.0		<b>-</b>		0005.00	
time [yr] =	35.0	avg.	conc. [mg/i]	. ≖	000E+00	
			_			
time [yr] =	40.0	avg.	conc. [mg/l]	]= .	000E+00	
time [yr] =	45.0	avg.	conc. [mg/l]	]≃ .	000E+00	
time [yr] =	50.0	avg.	conc. [mg/l]	]= .	000E+00	
		•		•		
time [vr] =	55.0	avo.	conc. [mo/l]	1 =	000E+00	
			[g			
time [vr] =	60.0	ava	conc [ma/l]	1 -	0005+00	
and Dil -	00.0	avy.	oono. Inigri	.        .		
time furl -	65.0	040	oono Ima#	1 —	0005+00	
and fail -	00.0	avy.	conc. [mg/l]	1 - 1		
time [] -	70.0		And the P	1	0005.00	
une [yr] =	70.0	avg.	conc. [mg/l]	1= .	.000E+00	