

Source Type

☒ Soil Source

☐ Groundwater Source

Level Number

☐ Level One

☐ Level Two

☒ Level Three

☐ Level Four

☐ Advanced

Parameter Values

☒ Deterministic

☐ Probabilistic

Created: 03/07/2020 16:33:35

by: Gavin Chaplin

Version: 3.00.00 Adv

Site: Cavenham Minor

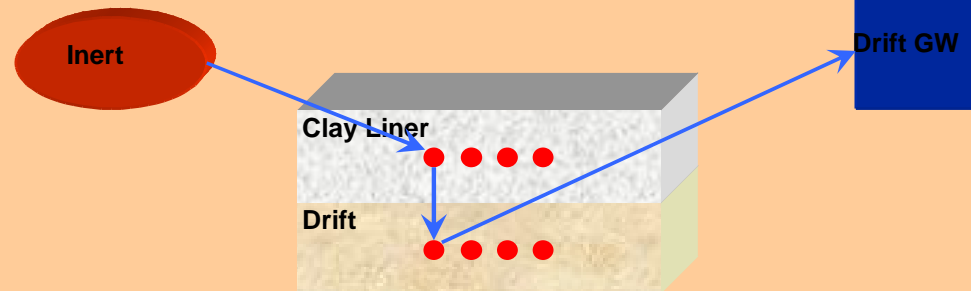
Numerical value

Suggested formula

Probabilistic parameters

Data specified elsewhere

Suggested formula edited



SOURCE CONCENTRATIONS: Inert

Source Data Options

- ☒ Pore water concentrations
- ☐ Leaching test
- ☐ Soil contaminant concentrations

Source Geometry

Inert\_Source\_length  
Inert\_Source\_width  
Inert\_Source\_area  
Inert\_Source\_thickness  
Inert\_Source\_volume

SOIL SOURCE

Source Type

- ☐ Constant source
- ☒ Declining source

515	m
90	m
46350	m2
2.25	m
104287.5	m3

General Source Properties

Inert_Source_field_capacity	[-]	0.3
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Source Contaminant Information

Source determinand names		Arsenic	Mercury
Inert_Pore_water_concentration	mg/L	0.06	0.002
Inert_Initial_inventory	kg	1.877175	0.062573
Inert_Input_concentration	mg/L	0.06	0.002

CONTAMINANT INFORMATION

		Species1	Species2
Source determinand names	2	Arsenic	Mercury

Receptor Target Concentrations

	Name	Values in mg/L
Quality Standard 1	MRV	0.005 0.00001
Quality Standard 2		
Quality Standard 3		
Quality Standard 4		

Generic Contaminant Properties

Contaminants_Organic_Carbon_Water_Partition_Coefficient_Koc	L/kg	
Contaminants_Free_Water_Diffusion_Coefficient	m2/s	

## HYDROGEOLOGICAL UNITS

Hydrogeological Units		Clay Liner	Drift
Hydrogeology_Unit_Thickness	m	1	0.01
Hydrogeology_Log_Hydraulic_Conductivity	log(m/s)	-7	-4.2375
Hydrogeology_Hydraulic_Conductivity	m/s	1E-07	5.79E-05
Hydrogeology_Hydraulic_Gradient	[-]	10	0.00275
Hydrogeology_Porosity	[-]	0.4	0.42
Hydrogeology_Velocity	m/s	2.5E-06	3.79E-07
Hydrogeology_Tortuosity	[-]	10	10

## ATTENUATION PARAMETERS

Hydrogeological Units	Clay Liner	Drift
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### General properties

Attenuation_Dry_bulk_density	kg/m3	2000	1900
Attenuation_Fraction_organic_carbon	[-]	0.05	0.002

### Contaminant specific parameters

#### Arsenic

Attenuation_Partition_Coefficient_Kd_Species_1	L/kg	25	25
Attenuation_Retardation_Species_1	[-]	126	114.0952381
Attenuation_Half_Life_Species_1	days	No Decay	No Decay
Attenuation_Decay_Coefficient_Species_1	1/s	0	0

#### Mercury

Attenuation_Partition_Coefficient_Kd_Species_2	L/kg	450	450
Attenuation_Retardation_Species_2	[-]	2251	2036.714286
Attenuation_Half_Life_Species_2	days	No Decay	No Decay
Attenuation_Decay_Coefficient_Species_2	1/s	0	0

WATER BALANCE

Infiltration through the soil zone source

Source Name: Inert

Effective_Rainfall	86	mm/year
Infiltration_Factor	0.6	[-]
Infiltration_Rate	51.6	mm/year
Infiltration_Area	46350	m2
Q_Infiltration	7.58E-05	m3/s

PATHWAY SUMMARY

Path 1  
Path 1 Type  
Path 1 Name  
Path 1 Process  
Path 1 Standards  
Path 1 Parameter1  
Path 1 Parameter2  
Path 1 Parameter3  
Path 1 Parameter4  
Path 1 Parameter5  
Path 1 Parameter6

Section 1		Section 2		Section 3		Section 4	
Source		Unit		Unit		Receptor	
Inert		Clay Liner: Node 1		Drift: Node 1		Drift GW	
Declining source		ADRD (1D)		ADRD (1D) + Dilution		Monitoring Borehole	
						Target Standard	
Q_managed [m3/s]		0.000E+00	Velocity [m/s]	2.500E-06	Velocity [m/s]	3.790E-07	
Managed time [years]		0.000E+00	Dispersivity [m]	0.1	Dispersivity [m]	25.0	
Q_path [m3/s]		7.579E-05	Travel Distance [m]	1.0	Travel Distance [m]	250.0	
Q_decline [m3/s]		7.579E-05			Mixing Depth [m]	0.0	
					Mixing Width [m]	100.0	
			Q_Dilute [m3/s]	0	Q_Dilute [m3/s]	1.592E-07	Q_dilute [m3/s]
							0.000E+00

## SIMULATION PARAMETERS

### Monte Carlo Analysis with Crystal Ball

Reported Percentile  
Number of simulations

95
10000

- ☐ Stop on calculation error  
☐ Use same sequence of random numbers

**Minimise while running:**

- ☒ Nothing  
☐ All Spreadsheets (faster)  
☐ Microsoft Excel (fastest)

### Named Constants

s_per_year	31557600
s_per_day	86400

### Laplace Transform Solution Parameters

sigma	0
nu	1
nsum	16
omega	11

### Reporting Options

- ☐ Include Remedial Targets and Attenuation Factors on the results sheets in Advanced level.  
☐ Use the array form of the RAM function  
☐ Include a set of timeslices for each contaminant in each pathway

Number of timeslices for breakthrough curves

5

**The timeslices specified on the results sheets are saved below.**

Path1 timeslices in years

TS\_Path1

500
1000
10000
50000
100000



BREAKTHROUGH RESULTS

Site Name: "Cavenham Minor"  
Level 3

Pollutant Linkage: Inert, Clay Liner, Drift, Drift GW

Concentrations in mg/L in Drift GW

Compared with MRV target concentration in mg/L

5.000E-03	1.000E-05
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Time(years)	Species1 Arsenic	Species2 Mercury
500	1.350E-06	6.654E-40
1000	1.372E-04	9.767E-29
10000	7.959E-08	9.118E-09
50000	0.000E+00	4.037E-07
100000	0.000E+00	2.198E-08

Pollutant Linkage: Inert, Clay Liner, Drift, Drift GW

Remedial Target Concentrations in mg/L in Inert

Time(years)	Species1 Arsenic	Species2 Mercury
500	2.222E+02	3.006E+31
1000	2.186E+00	2.048E+20
10000	3.769E+03	2.193E+00
50000	1.000E+40	4.954E-02
100000	1.000E+40	9.098E-01

Compared with source concentrations in mg/L

6.000E-02	2.000E-03
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Pollutant Linkage: Inert, Clay Liner, Drift, Drift GW

Dilution Factor

1.002E+00 for all species and timeslices

Pollutant Linkage: Inert, Clay Liner, Drift, Drift GW

Attenuation Factor

Time(years)	Species1 Arsenic	Species2 Mercury
500	4.436E+04	3.000E+36
1000	4.363E+02	2.043E+25
10000	7.523E+05	2.189E+05
50000	1.000E+40	4.944E+03
100000	1.000E+40	9.079E+04

