

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

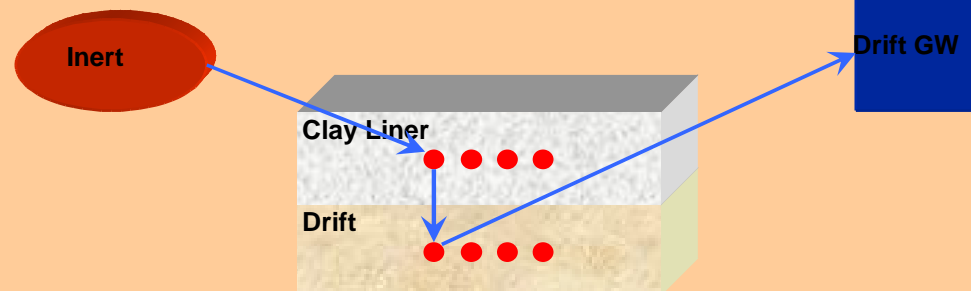
Numerical value

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

800	m
775	m
620000	m2
4.17	m
2585400	m3

General Source Properties

Inert_Source_field_capacity	[-]	0.3
-----------------------------	-----	-----

Source Contaminant Information

Source determinand names		Arsenic	Mercury
Inert_Pore_water_concentration	mg/L	0.06	0.002
Inert_Initial_inventory	kg	46.5372	1.55124
Inert_Input_concentration	mg/L	0.06	0.002

SOIL SOURCE

Source Type

- ☐ Constant source
- ☒ Declining source

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
-----------------------	------------	-------

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	620000	m2
Q_Infiltration	0.001014	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	MRV
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]	38.8		
Q_path [m3/s]	1.014E-03	Travel Distance [m]	1.0	Travel Distance [m]	387.5		
Q_decline [m3/s]	1.014E-03			Mixing Depth [m]	0.0		
				Mixing Width [m]	800.0		
		Q_Dilute [m3/s]	0	Q_Dilute [m3/s]	1.273E-06	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
100000
200000

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
-----------	-----------

Time(years)	Species1 Arsenic	Species2 Mercury
500	3.565E-09	0.000E+00
1000	1.525E-05	6.933E-35
10000	5.472E-06	7.136E-11
100000	0.000E+00	2.269E-07
200000	0.000E+00	4.145E-09

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

Remedial Target Concentrations in mg/L in Inert

Time(years)	Species1 Arsenic	Species2 Mercury
500	8.415E+04	1.000E+40
1000	1.968E+01	2.885E+26
10000	5.483E+01	2.803E+02
100000	1.000E+40	8.814E-02
200000	1.000E+40	4.825E+00

Compared with source concentrations in mg/L

6.000E-02	2.000E-03
-----------	-----------

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

Dilution Factor

1.001E+00 for all species and timeslices

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

Attenuation Factor

Time(years)	Species1 Arsenic	Species2 Mercury
500	1.681E+07	1.000E+40
1000	3.930E+03	2.881E+31
10000	1.095E+04	2.799E+07
100000	1.000E+40	8.803E+03
200000	1.000E+40	4.819E+05

