

LNAPL Dissolution Calculator Example

Example Description

Site Description

Gasoline was released to a shallow aquifer.

The shallow aquifer has a hydraulic conductivity of **1000 m/d** and a hydraulic gradient magnitude of **0.005**.

The LNAPL lens that forms has an average thickness of **0.5 m** and a diameter of **10 m**.

We want to calculate concentration changes about every **5 minutes (0.0035 days)** for the **1,000 L** release over about **1 month (0.08 years)**.

A well immediately downgradient of the release will be used to monitor concentrations of **benzene and toluene** in the groundwater flowing through the lens to see how the concentrations of benzene and toluene in the downgradient well will change over time.

The molecular weights, solubilities, volume fractions in the gasoline, and the pure compound densities for benzene, toluene, and the lumped other LNAPL constituents in the gasoline data are as follows:

Constituent	MW g/mol	Solubility (mg/L)	Vol Fract y _i	Density (g/cm ³)
Benzene	78.1	1770	0.890	0.8700
Toluene	92.1	530	0.100	0.7400
Other LNAPL components	100	10	0.010	0.7800

Inputs and Outputs in Toolbox

Hydraulic Conductivity (m/day)
1000

Hydraulic Gradient (m/m)
0.005

Width of LNAPL Lens (m)
10

Average Thickness of LNAPL Lens (m)
0.5

Time Step (days)
.0035

LNAPL Body Volume (Liters)
1000

Length of Simulation (years)
.08

Click Calculate to Update Plot

Calculate

Note: If the calculated solution appears to be unstable try reducing the model time step.

LNAPL Constituents	Volume fraction	Molecular weight (g/mol)	Solubility (mg/L)	Density (g/cm ³)
benzene	0.89	78.1	1770	0.87
toluene	0.1	92.1	530	0.74
other	0.01	100	10	0.78

1 to 5 of 5 entries
5 constituents. Double click to edit

Output and Interpretation

The concentrations of each of the LNAPL constituents over time in the downgradient well are as shown in the graph.

