

Analytical Solutions to the Problem of Natural Attenuation

by

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Abstract

In this paper, one-dimensional fate and transport equation is considered and its analytical solutions discussed. Asymptotic formulas are derived for large time approximation and various limiting cases of parameters. These formulas describe natural attenuation of the concentration of chemicals with time. Constant and pulse-type sources are given a consideration first. More general configuration of a source is built out of the basic pulse type source using superposition principle. The sumtotal concentration is described as the result of addition of each component contribution corresponding to the pulse source. Remedial investigation of groundwater contamination frequently involves monitoring of natural attenuation. A certain procedure is suggested to make the process of monitoring more effective. In the end, a graphical analysis of the solution is conducted. This paper is the first one in the series of natural attenuation related papers that the authors plan to write in the future.