

CE 5364 Groundwater Transport Phenomena
Exercise Set 3

Exercises

1. (Problem 6-9, pg. 589)

Discharge from a point source introduced 10 kg of contaminant to an aquifer. The seepage velocity is $0.1 \frac{ft}{day}$ in the $+x$ direction. The longitudinal and transverse dispersion coefficients are $D_x = 0.01 \frac{ft^2}{day}$, and $D_y = D_z = 0.001 \frac{ft^2}{day}$, respectively.

Determine:

- (a) Sketch the system.
 - (b) The maximum concentration at $x = 100 \text{ ft}$ and $t = 5 \text{ years}$.
 - (c) The concentration at $(x, y, z, t) = (200 \text{ ft}, 5 \text{ ft}, 2 \text{ ft}, 5 \text{ years})$
2. (Problem 6-10, pg. 589)

Using the Domenico and Schwartz (1998) planar source model (pg. 182) to a continuous source that has been leaking contaminant into an aquifer for 15 years. The source had width $Y = 6 \text{ m}$ and depth $Z = 6 \text{ m}$. The source concentration is $10 \frac{mg}{l}$. The seepage velocity is $0.057 \frac{m}{day}$. The longitudinal, transverse, and vertical dispervities are $1 \text{ m}, 0.1 \text{ m}$, and 0.01 m respectively.

Determine:

- (a) Sketch the system.
- (b) The contaminant concentration history at a location $x = 200 \text{ m}$ from the source using 1-year increments for 30 years.