

**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 dispersivities are 1 *m*, 0.1 *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.