CE 5364 Groundwater Transport Phenomena Exercise Set 5

Exercises

1. (Problem 11-1, pg. 594)

A contaminated site has been surveyed and a contaminated region 100 $ft. \times 150 ft. \times 15 ft.$ was delineated. The average concentration of total petroleum hydrocarbons (TPH) in soil is 10,000 $\frac{mg}{Kg}$

Determine:

- (a) The total mass of contaminants at the site in kilograms. Assume the soil has a specific gravity, $SG_{soil} \approx 2.0$
- (b) Estimate total volume of petroleum hydrocarbons released assuming 50
- (c) Estimate the residual saturation of the hydrocarbon-soil system. Assume soil porosity is, n=0.35

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- 2. (Problem 11-2, pg. 594) A sampling program at a Supermanfund site indicated the following DNAPL zones:
 - A pool of free phase DNAPL in a stratigraphic depression in an unfractured clay. The pool is $200 \ ft^2$ in area and $5 \ ft$ thick.
 - A zone of residual DNAPL extending directly underneath an old disposal pit 100 ft^2 in area. The residual zone extends through the 5 ft thick unsaturated zone and 15 ft through the saturated zone until it reaches the DNAPL pool.

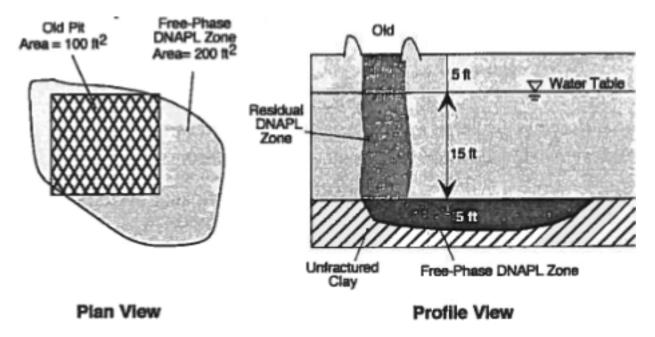


Figure 1: Schematic of Contamination Scenario

Table 1: Supporting Data

Item	Value
Residual saturation in the unsaturated zone:	0.10
Residual saturation in the saturated zone:	0.35
Saturation in the free-phase zone:	0.70
Average porosity in water zone:	0.30

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Determine:

- (a) The total volume of DNAPL at the site
- (b) The recoverable volume using ordinary pumping.

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3. (Problem 11-4, pg. 595)

Gasoline is found in a monitoring well with SG=0.80. A total depth of 6 ft of gasoline is found in the well.

Determine:

(a) Estimated thickness of free-phase LNAPL in the formation.

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