Remediation of soil and groundwater
Rizlan Bernier-Latmani
Problem set #0: dry/wet density

Problem 1

We are doing a small experiment in the lab. A soil (cylindric volume) has the following properties:

- $\omega = 2\%$
- $m_{wet} = 850\ g$
- $h = 9\ cm$
- $D = 9\ cm$
- $\rho_s = 2.67\ g/cm^3$

What volume of water should be added to the soil to reach a degree of saturation (volume of water/volume of voids) of 90%?

Problem 2

Part 1.

A groundwater is impacted by gasoline and the average dissolved gasoline concentration is 20 mg/L. In situ bioremediation is being considered for the aquifer with the following characteristics: Porosity= 0.35; Organic content= 0.02; **Dry bulk density** of aquifer materials= 1.6 g/cm3; Toluene (C7H8): Koc= 182 L/kg What is the concentration of toluene adsorbed to the solid? How much toluene in present in the solid phase of 1 m3 of aquifer sediment?

Part 2.

A groundwater is impacted by gasoline and the average dissolved gasoline concentration is 20 mg/L. In situ bioremediation is being considered for the aquifer with the following characteristics: Porosity= 0.35; Organic content= 0.02; **Wet bulk density** of aquifer materials= 1.6 g/cm3; Toluene (C7H8): Koc= 182 L/kg What is the concentration of toluene adsorbed to the solid? How much toluene in present in the solid phase 1 m3 of aquifer sediment?