

Volume Estimation - Release History

Approach and Results

- Review inventory records to determine volume(s) and date(s) of release(s)

Advantages

- Relatively simple and statistically accurate if accurate historical data are available

Disadvantages

- Data rarely accurate given numerous potential error sources (e.g., measurement technique, volume changes due to temperature)



Volume Estimation - TPH Concentration in Soil Samples

Approach and Results

- Convert TPH concentrations in soil samples to saturations and integrate these values over the area of contamination

Advantages

- Data are relatively easy to collect; several methods are available for data integration

Disadvantages

- Calculations required are relatively complicated; requires a lot of data to reduce uncertainty associated with calculated volume; results may differ among various methods for data integration; TPH analysis may not be representative of actual petroleum hydrocarbon saturations



Convert TPH Results to Saturation

$$S_o = \text{TPH} \times \frac{(1 - \phi) \rho_{gr} \times 10^{-6} \frac{\text{kg}}{\text{mg}}}{\phi \rho_o}$$

where:

- S_o = total hydrocarbon saturation (dimensionless)
- TPH = total petroleum hydrocarbon concentration in mg/kg
- ρ_{gr} = grain density (typically 2.65 g/cm³)
- ϕ = porosity (dimensionless)
- ρ_o = density of the hydrocarbon, liquid (g/cm³)



Convert TPH Results to Saturation

Free hydrocarbon saturation is:

$$S_{of} = S_o - S_r$$

Where:

S_{of} = free hydrocarbon saturation.

S_r = residual hydrocarbon saturation.

