

Problem Set 1

Engineering Analysis Related to Evaluation of Pump and Treat Technology

- I. Consider the PAH class of compounds as provided in the class handout (EPA Publication).
- Calculate the molar volume for octanol and show your calculation
 - Determine the relationship between S_w and K_{ow} for the PAH class of compounds
 - Evaluate the applicability of Pump and Treat Technology for PAHs as a class of compounds based on your analysis of results of (b) and criteria that you cite and give the reference
 - If you only have chemical information values for S_w , how would you go about using this information to evaluate the potential application of Pump and Treat Engineering Technology for remediation of PAHs? Discuss – be brief and logical.
- II. Consider that the concentration of PAHs in increased in the octanol:water system as a result of additional contamination.
- What is your prediction of the relative change of the value of K_{ow} ?
 - As the concentration of PAHs is increased in the octanol:water system., but not beyond the aqueous solubility, will Pump and Treat Technology become more applicable? Explain.
- III. Consider that the class of PCB compounds, as identified in the class handout, is added to the octanol:water system with PAHs as presented in problems 1. and 2. above.
- What is you prediction of the K_{ow} values for PAHs when PCBs are added? Explain.
 - Would the addition of PCB contaminants change the potential applicability of Pump and Treat Technology for PAHs in this system? Explain.
- IV. What is you prediction with regard to the solubility of benzo(b)flouranthene and toluene in octanol? Which chemical would be predicted to have greater solubility in octanol? Explain your answer and your reasoning.