**Assignment 1 CE 523**

**Gas-liquid processes** (due February 4, 2011)

1. The pilot plant data in Example 6.1 in the AWWA handbook are actually based on an air:water ratio of 1000:1, but calculations are performed, incorrectly, on a 100:1 ratio.
2. What would the effect be on the KLa value if calculated on 1000:1 ratio?
3. What is the minimum permissible value for the air:water ratio?
4. Occasional levels of TCA in the source water to the plant in Example 6.2 spike up to 0.5 mg/L. Would the design be able to handle this or, if not, what changes in the design would you propose?
5. Adapt the GAC adsorption design in Example 6.3 on the basis that it might be possible that the higher TCA levels encountered in Q 2 might persist over extended periods.
6. What would the effect be on the bubble aeration stripping design in Example 6.4 if the radon levels have to be reduced to 100 pCi?
7. The surface aeration system in Example 6.6 is considered for doing the same as in Q4, reducing radon from 6000 pCi to 100 pCi. What is the easiest way to redesign the aeration system?
8. The spray aeration system in Example 6.7 is less than 30% effective in removing H2S. What possibilities would you consider to get the efficiency to about 60%?

No need to redo all the calculations. Check which parameters are critical for certain values (rough sensitivity analysis) and see if there could be downstream effects in the calculations. Show only those calculations that are necessary to change the designs in the six examples or to be able to answers pertinent questions asked. You are welcome to work as a group(s), but make sure that everybody participates. “Passengers” endanger their own success with the course if not fully participating. Don’t subdivide the work! Please ask if any doubts. Make assumptions as necessary.