

**10/27/08**

**ChE 433**  
**Pre-Lab For Multiple Effect Evaporation Experiments**

**(Due at the training session (11/6 at 2:00 pm))**

1. Draw a Process Flow Diagram (PFD) of the equipment and explain clearly how and where you will collect the data needed to accomplish Objectives 2(a), 2(b), and 3
2. List the safety hazards in this experiment.

**CHE 433**  
**MULTIPLE-EFFECT EVAPORATOR ANALYSIS**

**OBJECTIVES:**

1. Learn to safely operate the double-effect evaporator set located in the Unit Operation Laboratory. You will run the system co-currently.
2. Using low concentration sea water feed (tap water), collect the data required to determine the following overall performance parameters after steady state is reached.
  - a) Capacity (maximum rate at which salt-free water can be produced using 15 psig steam).
  - b) Steam economy (pounds of water evaporated per pound of steam from the feed header).
3. Experimentally determine the overall heat transfer coefficient in each effect and compare them with values predicted from theory.

**PROCEDURES:**

1. For safety, carefully follow the prescribed start-up and shut-down procedures. Ask if you have any questions. Wear safety glasses.
2. Limit feed steam pressure to 15 psig for safety and operate the condenser at maximum vacuum. Set the "product" withdrawal rate at 0 ml/min.
3. Develop a data collection form upon which all laboratory data will be recorded. Collect redundant data, if possible, to check mass and energy balances.
4. Be sure to keep condensate from building up inside the steam coils to prevent capacity loss.
5. Be sure the evaporator set is at steady state before final data is collected.