NPRE HW #5 due 3/3/2011

Problems from text

1. 2.9
2. 2.10
3. 2.13
4. In section 2.4.2 the author mentions a salt water battery as a concentration type cell. Assume the salt side is a saturated water solution at room temperature while the water side used distilled water.
   1. What electrodes and electrolyte membrane would you suggest? Sketch the configuration.
   2. What ion(s) would transport through the membrane?
   3. Write out the corresponding half-cell reactions
   4. Calculate the open circuit voltage.
   5. What will cause the cell to stop operation? Assume finite fuel tanks for the two “fuels”
   6. If this is cell is run in an ocean situation, the temperature would be lower. Using a calculation, show how that changes the open circuit voltage.
   7. What is the ideal efficiency for this cell at room temperature? At 80 0C
   8. Can you suggest another concentration type cell besides this salt water one and the other two given in the book. Seek one that has some advantages over these examples – e.g. improved efficiency, or higher voltage, or unique applications.