CHE 4253
ASSIGNMENT 6

Due Oct 24 (or earlier!!!)

PROBLEM #1(Individual)
Consider a two phase 1000 lb-mole/hr stream with the following composition: Butane 33mol%, Pentane 51Mol%, hexane 16 Mol%, at 15 psia and 130ºF. This is the same mixture used in the previous assignment. It is desired to separate this mixture into two streams. One with 99% butane and another one with NO MORE THAN 1% butane.

   a) Use the Fenske method to determine the number of trays that you will approximately need.
   b) Run the Shortcut column in Pro II. The thermodynamic system is the same found before.
   c) Implement the procedure suggested in class starting from a flash and growing into a column with the desired products.
   d) What would be the advantage or disadvantage of running this column at a larger pressure?
   e) Set up the flash of Hwk 5 and this column in Aspen.

Due Oct 27 (or earlier!!!).

PROBLEM #2(Group) *Graded as Project*
Consider the column of Problem 1.
   a) For a given number of trays optimize the feed tray. You must define what optimum means to you. Remember that the restriction of butane in the bottom of the column is an inequality.
   b) Find a method to obtain the cost of the column (you need to find the cost of equipment as a function of diameter) for different number of trays, and assume a column life of 10 years. Thus the annualized capital cost of the column is its cost divided by 10.
   c) Find the cost of utilities and make sure you know how you minimize it for each number of trays and optimal feed location.
   d) Determine the column diameter and the optimal number of trays. The optimum is the minimum total annualized cost= annualized capital cost + utility cost.
   e) Report the column dimensions.

PROBLEM #3 Group) *Graded as Project*
Consider the column of Problem 1. Your only cooling media is cooling water available at 80 ºF. If this is a problem, then fix the problem.