To: Research and Development Team
From: Thomas Knotts
Date: 5/2/2017
Re: Separation of ethanol and cyclohexane

A waste stream in one of our plants contains a binary mixture of ethanol and cyclohexane. This stream is currently sent to the flare, but the marketing division has recently found a market for the cyclohexane if we could perform the needed separation.

Please design a distillation process that will yield 99% pure cyclohexane with 90% cyclohexane recovery from an equimolar feed mixture. Make sure to report the number of equilibrium and actual stages assuming a Murphree vapor efficiency of 0.71, feed points, and column diameter assuming a saturated liquid feed flow rate of 1000 kg/hr. Assume a reflux ratio of 1.3. Use the ebulliometer in the lab to determine the Wilson or NRTL activity coefficient model parameters needed for the design.