

8.15. Two distillation columns are heat-integrated as shown in the sketch below. The first column has an auxiliary condenser to take any excess vapor that the second column does not need. The second column has an auxiliary reboiler that provides additional heat if required.

Prepare a control concept diagram that includes the following control objectives:

- Base levels are controlled by bottoms flows.
- Reflux drum levels are controlled by distillate flows.
- Reflux flows are flow-controlled.
- The pressure in the first column is controlled by vapor flow rate to the auxiliary condenser. A low pressure override pinches the vapor valve to the second column reboiler.
- The pressure in the second column is controlled by manipulating cooling water to the condenser.
- A temperature in the stripping section of the first column is controlled by manipulating steam to the reboiler.
- A temperature in the stripping section of the second column is controlled by manipulating the vapor to the reboiler of the second column that comes from the first column and by manipulating the steam to the auxiliary reboiler. A

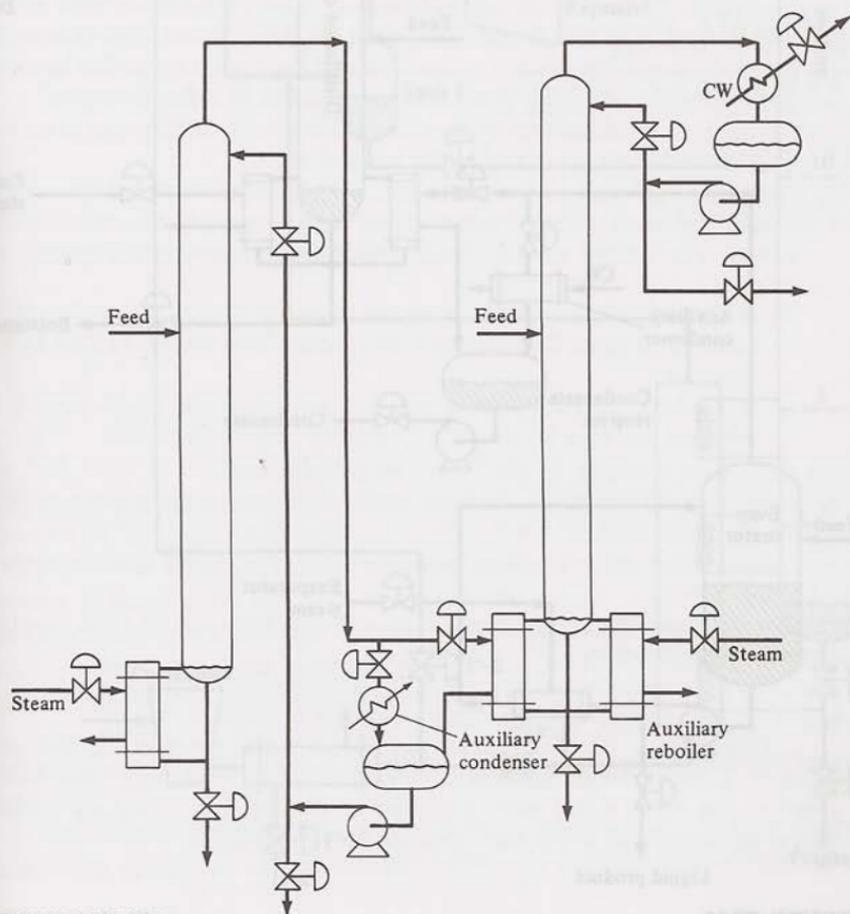


FIGURE P8.15

split-range system is used so that steam to the auxiliary reboiler is only used when insufficient heat is available from the vapor from the first column.

(h) High column pressures in both columns pinch reboiler steam.

The sketch below shows a distillation column that is heat-integrated with an evapo-