Lean Oil Absorption System
(LEANOIL)

DESCRIPTION:

The flowsheet describes a typical lean oil recovery system. Light hydrocarbon gas enters the unit under high pressure. Chilled lean oil absorbs some of the methane and essentially all of the heavier compounds. The saturated oil is then heated and demethanized at a lower pressure. The oil is then stripped of light hydrocarbons in a third column and recycled to the absorber.

NOTES:

1. The pseudo-components of the lean oil have been created by entering oil distillation curves in Comp/Distillation_Curves input screens for stream #18, or the oil make-up.
2. The configuration of each tower was set up differently. The ABSORBER had neither condenser nor reboiler. The DEMETHANIZER was a reboiled stripper with external reflux stream. The STRIPPER was a regular distillation tower with both condenser and reboiler.
3. On creation a new recycled flowsheet like this, you should follow these rules:
   a. Build the flowsheet with no recycle loop; use dummy feed and product points instead. Solve the flowsheet unit by unit (the Run/Select Units option). Review the behavior of streams and unit operations (the View menu).
   b. BACKUP YOUR JOB BEFORE GOING ANY FURTHER!!! (You do it with the Ctrl/Backup Job option; in case of failure, you can recover your previous results by Loading the BACKUP case study, copying it to the job name (with overwrite), and re-loading the main case study. (Ctrl / Jobs&Cases / Case Studies menu serves for these purposes.)
   c. Close individual recycle loops by Deleting dummy feed arrows and Moving the dummy product streams into recycle inlets (use Graphics). Verify the behavior of a recycle loop by running units on that loop and viewing the results. Once satisfactory, launch Run Recycles on that loop and view the results.
   d. Ensure whether your loop has appropriate make-up or purge stream. Try to fix one of loop parameters with Controller or Divider (see later in these Notes.)
   e. When all your loops have been successfully closed, BACKUP JOB, then Run/Run All.
   f. Verify the Overall Mass Balance by displaying View/ Convergence screen.
4. A portion of circulating oil is lost to the stripper gas, so a make-up stream #18 has been added. As only the light ends of the lean oil are lost, we also had to provide a purge stream #19, to avoid build-up of heavy oil components in the system. The recycle loop parameters have been fixed twofold. Firstly, the Divider #12 maintains the volumetric flowrate of the lean oil at the absorber inlet at 5,000 BPSD (provided it is more than 5,000 BPSD at the divider inlet.) Secondly, controller #14 adjusts the 'make' flowrate so only 0.01 of 'internal units' (or lbmol/hr) of recycled oil leaves the system as purge.
5. The DEM method was applied to speed up the convergence. However, due to complex recycle nature, the convergence may still be slow. We recommend setting the flowrate of the stream #18 to 10 lbmol/hr and re-running the flowsheet to see how convergence is achieved.