

A Simulation Study for Potential Natural Gas Liquids Recovery Processes under Various Upstream Conditions

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Abstract : Representatives and commercially viable natural gas liquids (NGLs) recovery processes were studied under various feed conditions that are classified as lean and rich. The conventional turbo- expander process scheme (ISS) was taken as a base case. The performance of this scheme was compared against with the gas sub-cooled process (GSP), cold residue-gas (CRR) and recycle split-vapor (RSV), enhanced NGL recovery process (IPSI-1) and enhanced NGL recovery process with internal refrigeration (IPSI-2). The development made for the GSP, CRR and RSV are at the top section of the demethanizer column whereas the IPSI-1 and IPSI-2 improvement focus in the lower section. HYSYS process flowsheet was initially developed for all the processes including the ISS under a common criteria that could help to demonstrate the performance comparison. Accordingly, a number of simulation runs were made for the selected eight types of feed. Results show that the reboiler duty requirement using rich feeds for GSP, CRR and RSV is quite high compared to IPSI-1 and IPSI-2. The latter shows relatively lower duty due to the presence of self-refrigeration system that allows the inlet feed to be used for achieving cooling without the need to use propane refrigerant. The energy consumption for lean feed is much lower than that of the rich feed in all process schemes.

Keywords : composition, lean, rich, duty

Conference Title : ICCET 2017 : International Conference on Chemical Engineering and Technology

Conference Location : New York, United States

Conference Dates : June 04-05, 2017