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Advanced Technology for Natural Gas Liquids (NGL) Recovery Using Residue Gas Split

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Abstract : The competitive scenario of the oil and gas market is a challenge for today's plant designers to achieve designs that meet client expectations with shrinking budgets, safety requirements, and operating flexibility. Natural Gas Liquids have three main industrial uses. They can be used as fuels, or as petrochemical feedstock or as refinery blends that can be further processed and sold as straight run cuts, such as naphtha, kerosene and gas oil. NGL extraction is not a chemical reaction. It involves the separation of heavier hydrocarbons from the main gas stream through pressure as temperature reduction, which depending upon the degree of NGL extraction may involve cryogenic process. Previous technologies i.e. short cycle dry desiccant absorption, Joule-Thompson or Low temperature refrigeration, lean oil absorption have been giving results of only 40 to 45% ethane recoveries, which were unsatisfying depending upon the current scenario of down turn market. Here new technology has been suggested for boosting up the recoveries of ethane+ up to 95% and up to 99% for propane+ components. Cryogenic plants provide reboiling to demethanizers by using part of inlet feed gas, or inlet feed split. If the two stream temperatures are not similar, there is lost work in the mixing operation unless the designer has access to some proprietary design. The concept introduced in this process consists of reboiling the demethanizer with the residue gas, or residue gas split. The innovation of this process is that it does not use the typical inlet gas feed split type of flow arrangement to reboil the demethanizer or deethanizer column, but instead uses an open heat pump scheme to that effect. The residue gas compressor provides the heat pump effect. The heat pump stream is then further cooled and entered in the top section of the column as a cold reflux. Because of the nature of this design, this process offers the opportunity to operate at full ethane rejection or recovery. The scheme is also very adaptable to revamp existing facilities. This advancement can be proven not only in enhancing the results but also provides operational flexibility, optimize heat exchange, introduces equipment cost reduction, opens a future for the innovative designs while keeping execution costs low.

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