Recovery of Various Heavier Hydrocarbon(Propane,Iso-Butane,N-Butane) From Natural Gas Liquid(NGL) by Continuous Cryogenic Pressure Columns Successively.

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Background and Description: Natural Gases are Gases which comes from our Nature. It is a Non-renewable of Energy.

Natural gas liquids (NGLs) are hydrocarbons—in the same family of molecules as **natural gas** and crude oil, composed exclusively of carbon and hydrogen. Ethane, propane, butane, isobutane, and pentane are all NGLs. There are many uses for NGLs, spanning nearly all sectors of the economy.

Natural Gas – **Natural gas** is a hydrocarbon gas. It consists primarily of methane but may also include other alkanes, carbon dioxide, nitrogen, and hydrogen sulfide. **Natural Gas Liquids** – **Natural gas liquids** are condensable hydrocarbons that are often associated with **natural gas** or crude oil.

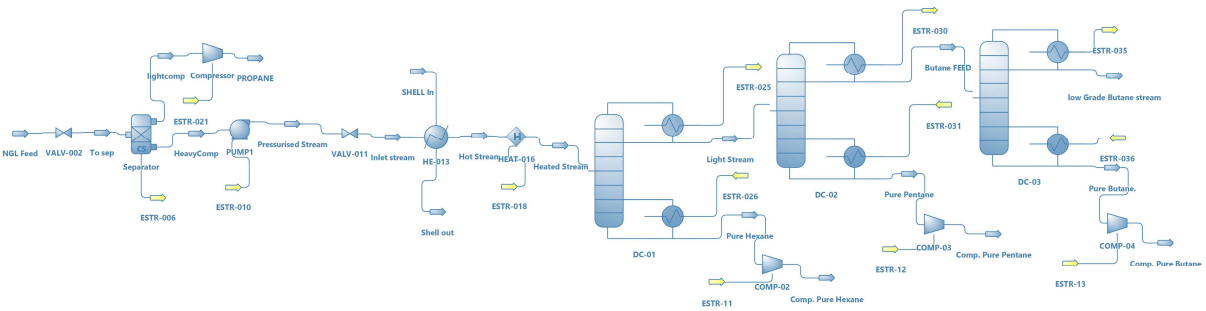
Process:

The recovery of valuable heavier hydrocarbons from natural gas is accomplished in a series of distillation columns. The first column is a cryogenic pressure column in which the methane is taken overhead and the ethane and heavier hydrocarbons are produced as a bottoms product called “natural gas liquid” (**NGL**).

Here, firstly we take NGL stream for the further process. We perform some process before going to Separator like for controlling purpose we use Valve. After the Separator operation, two stream is formed one is light vapour stream In which propane is taken out, another one is heavy material stream. Heavy material stream is going for further operations.

After some small operation, it goes to Column 1 in which Separation occur then their stream is also goes to another Columns like Column 2 and Column 3 for Separation by Distillation process. Then products comes from Column 1, Column 2 and Column3 are compressed by Compressor and stored.

Flowsheet:



Results: Master property table for whole process-

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Master Property Table										
Object	low Grade Butane stream	PROPANE	NGL Feed	Light Stream	Heated Stream	Comp. Pure Pentane	Comp. Pure Hexane	Comp. Pure Butane	Butane FEED	
Temperature	-5.18764	33.1928	15	20.435	34.2127	77.984	15.0861	2.28323	54.9431	C
Pressure	1.01325	6	3.8	1.01325	20.7	1.01325	1.01325	1.01325	5	bar
Molar Flow	998.878	858.808	1857.69	998.878	998.878	0.0998878	0.0998878	0.0998878	998.878	kmol/h
Volumetric Flow	96.7428	3248.44	200	119.375	121.662	2.79993	0.0129337	2.17928	114.708	m3/h
Molar Fraction (Mixture) / Ethane	0	0.021631	0.01	0	0	0	0	0	0	
Molar Fraction (Mixture) / Propane	0	0.930132	0.43	0	0	0	0	0	0	
Molar Fraction (Mixture) / Isobutane	0.36842	0.00302834	0.07	0.12758	0.12758	3.05702E-09	1.12214E-09	0.034579	0.252483	
Molar Fraction (Mixture) / N-butane	0.63158	0.00519143	0.12	0.218709	0.218709	3.17587E-08	1.90736E-08	0.965421	0.432829	
Molar Fraction (Mixture) / Isopentane	1.45919E-07	0.00540774	0.05	0.0883391	0.0883392	1.75783E-06	1.80597E-06	1.4592E-07	0.174825	
Molar Fraction (Mixture) / N-pentane	1.45919E-07	0.0043262	0.04	0.0706713	0.0706714	0.999998	9.29888E-06	1.4592E-07	0.139862	
Molar Fraction (Mixture) / N-hexane	1.45919E-07	0.0302834	0.28	0.494701	0.4947	1.97898E-07	0.999989	1.4592E-07	1.97903E-07	

References- Advanced Distillation Technologies_ Design, Control and Applications-Wiley (2013), **Dryden's Outlines of Chemical Technology** for the 21st Century: Rao and M Gopala and Shreves **Chemical Process Industries** Handbook 5th Edition. Also from spoken tutorials from fossee project IIT Bombay.