Natural Gas Processing Plant

Pranav Santhosh

TKM College of Engineering Kollam

Background & Description:

The end natural gas used by the consumers mainly consist of methane. The raw natural gas or associated gas contains hydrocarbon mixtures like methane, ethane, propane, butane, and pentane. In addition to this, it will also contain water content and acid gases like CO_2 and H_2S. Here the composition of associated gas is given, which contains about 69% mole fraction of methane. It will then undergo removal of excess water in order to reduce load to gas dehydration unit and also to avoid corrosion. It is then followed by acid gases removal using scrubbers. The presence of acid gases like H_2S and CO_2 could lead to corrosion. The third step is to dehydrate by a dehydrator, to avoid corrosion and gas hydrate formation. Formation of mercury amalgam in the downstream of LNG is a serious issue so mercury removal should be done. To improve the gas quality and for lowering the heating value we then remove nitrogen. The final step is to separate the NGL. The final NG will contain about 82% methane. The process flowsheet is given below.

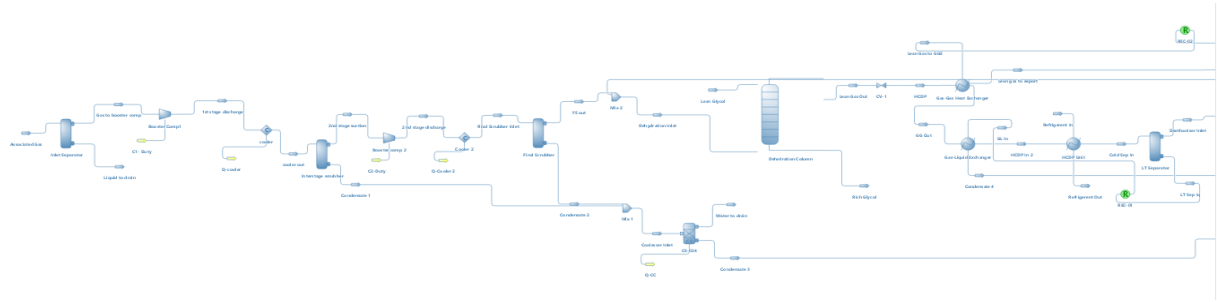

Fig 1- Flowchart part 1

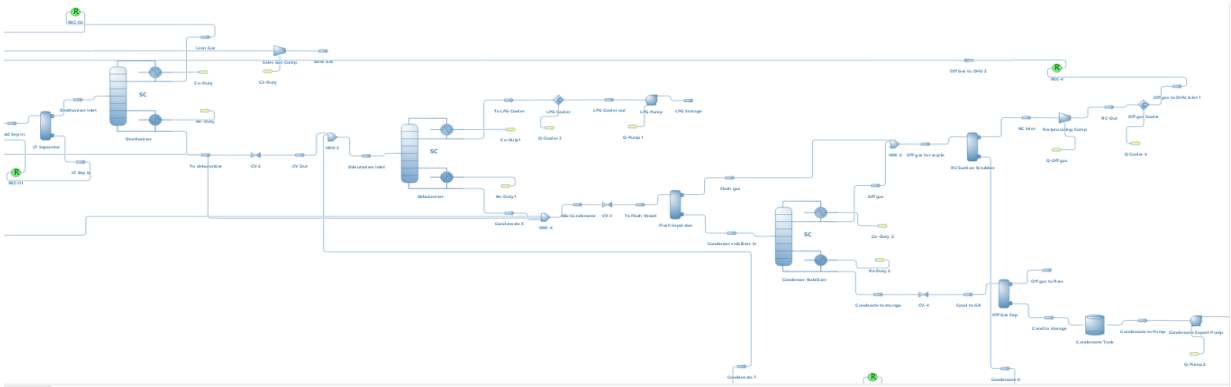

Fig 2- Flowchart part 2

Results:

RESULT OF MAIN STREAMS					
Object	**Sales Gas**	**LPG Storage**	**Condensate to export**	**Associated Gas**	
Temperature	34.3112	30.6787	25.75	35	**C**
Pressure	40	15	5	5	**bar**
Mass Flow	74640.4	11628	1595.8	116487	**kg/h**
Molar Flow	4056.28	235.625	22.1521	5000	**kmol/h**
Volumetric Flow	2405.3	22.8829	2.5807	25159.1	**m3/h**
Molar Fraction (Vapor Phase) / Methane	0.820335	5.02714E-12	1.98324E-23	0.69	
Molar Fraction (Overall Liquid Phase) / Methane	NaN	3.66597E-13	1.8059E-25	NaN	
Molar Fraction (Vapor Phase) / Propane	0.0001	0.782831	2.61378E-08	0.05	
Molar Fraction (Overall Liquid Phase) / Propane	NaN	0.624654	3.64436E-09	NaN	

Table 1- Main stream wise results

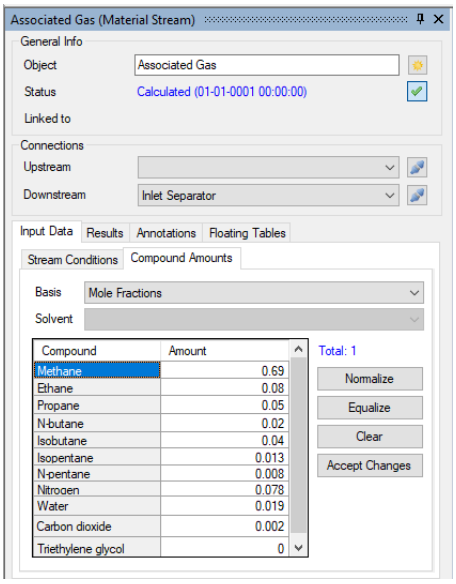

Fig 2- Stream composition (associated gas)

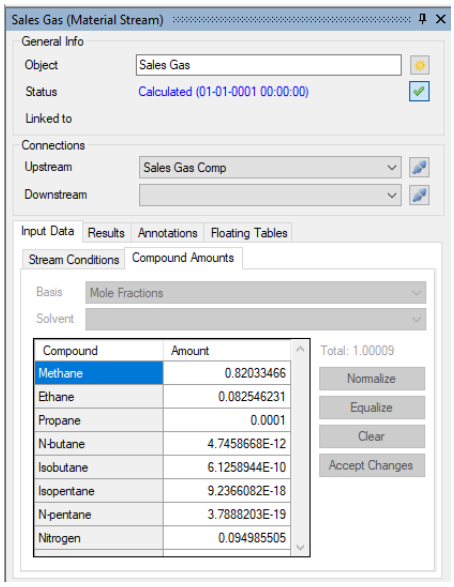

Fig 3- Stream composition (Sales gas/ NG)

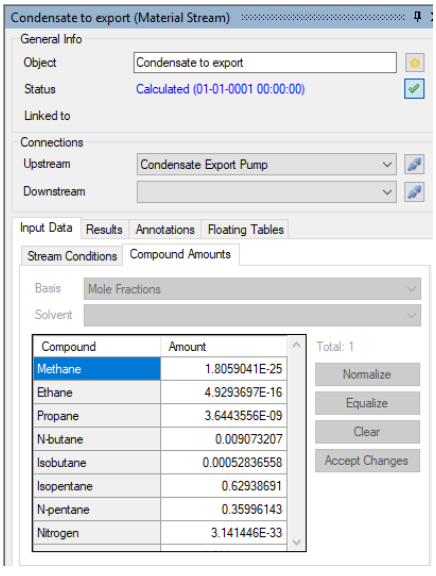

Fig 4- Stream composition (condensate to export)

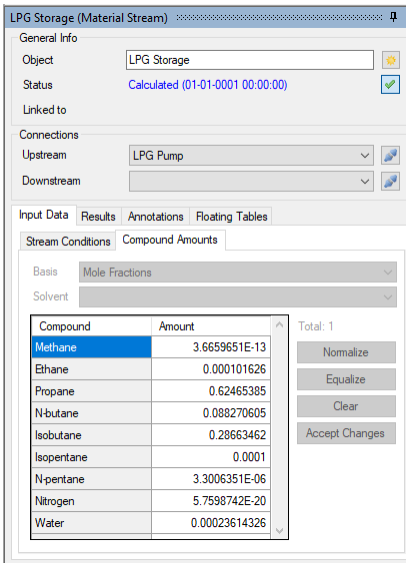

Fig 5- Stream composition (LPG storage)