Talk on HyReQ: A High Crude Oil Recovery Process for Offshore Production

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A technical talk was organised by the Chemical Engineering Technical Division (CETD) entitled "HyReQ: A High Crude Oil Recovery Process for Offshore Production" on 14 May 2011. The intent of HyReQ process is to enhance the recovery of natural gas liquids (NGLs) by minimiing the amount of propane (C3) and lighter molecular weight components (C4+) in the stabilised crude stream and thus enabling larger quantities of C4+ components to be absorbed into the crude stream, whilst maintaining the vapor pressure specifications, i.e. true vapor pressure (TVP)/ Reid vapor pressure (RVP) of the stabilised crude.

The speaker- Engr. Ooi Boon Lee started the talk by addressing the current global situation of depleting crude oil reserves, escalating crude oil prices, couple with an increasing environmental awareness and legislation on the management of CO_2 emission requirement have led the operating companies to investigate and implement strategies to enhance crude oil recovery. Among these strategies are maximising the recovery of NGLs and minimising flaring. The HyReQ process is a patent-pending technology, and has a potential to increase yield of stabilised liquid from an oil and gas processing facility, with results between 5% to 30% more than that achievable using the commonly-used conventional multistage separation process. The process is configured such that C4+ components extracted from the gas stream are absorbed into the crude stream, whilst C3 and light components in the stabilised crude product stream is minimised or eliminated. Figure 1 shows a simplified process flow diagram of HyReQ.

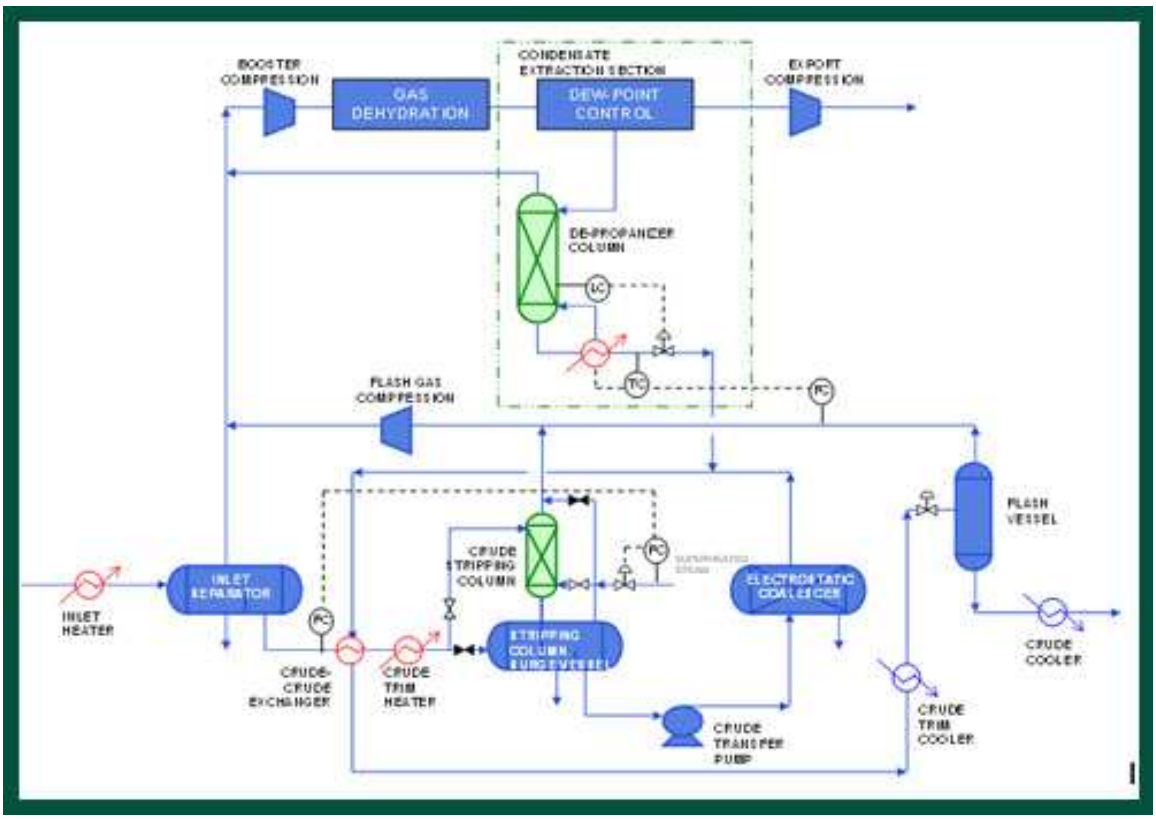

Figure 1: Process flow diagram of HyReQ

In principle, the HyReQ process functions in three main steps:

1. Crude oil is stripped off from propane and lighter components in the **Crude Stripping Section**
2. Butanes and heavier components (C4+) are extracted from the gas stream in the **Condensate Recovery Section**
3. In the **Crude and Condensate Mixing and Stabilisation Section**, the crude stream and condensate streams are comingled under conditions that ensure the liquid product stream to meet the vapor pressure specifications.

One of the innovations in this technology is that, the process configuration and controls ensure that the amount of C4+ components in the stabilised product stream is maximised, while the amount of C3- components is minimised. This is irrespective of the amount or proportion of crude and condensate being produced.

The speaker pinpointed that such crude oil recovery process is suitable for a wide range of oil and gas processing facilities where crude or condensate is stabilised for storage or pipelined under pressure. In addition, HyReQ process can be useful particularly for the following conditions:

(a) Difficult crudes, e.g. waxy crudes, crudes with high asphaltene content, high salt content and with scaling and foaming tendencies, etc.
(b) Facilities for which is not techno-economically viable for pipeline produced gas to be sent to a centralised gas processing plant with liquefied petroleum gas (LPG) recovery facilities, or to install an LPG recovery plant with associated LPG storage and offloading facilities.
(c) Facilities where gas is re-injected or flared, marginal field developments and developments in remote locations.
(d) Fixed facilities and floating facilities, e.g. *floating production, storage and offloading (*FPSOs), as the columns are configured to minimise height and thus mitigate motion effects.

Finally, Engr. Ooi concluded his talk by sharing his knowledgeable experiences with the participants about the current development of oil recovery technology.