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Abstract

During commissioning of a gas condensate production system and gas processing plant, initial gas demand will be low. Having gas condensate wells operating at such a low gas demand will cause liquid accumulation (Condensate and Aqueous phase) in the flowline. When the commissioning gas demand increases, however, the high gas production rate will entrain the flowline liquid content and may potentially flood the inlet Slug Catcher leading to a trip and damage to the inlet gas facilities. Therefore, flowline liquids accumulating at low flowrates shall be carefully monitored and safely unloaded to achieve a 'FLAWLESS' production start-up.

Refer to Figure 1 below for a typical schematic of wet gas/condensate subsea production systems. The subsea wells are connected to the inlet gas processing facilities through the subsea flowlines with a challenging up-hill topography, and a three phase Separator at the inlet facility to separate the Gas, Condensate and Aqueous phase.

A typical hydrate Management strategy is to inject continuous Mono Ethylene Glycol (MEG) subsea via a MEG pipeline and regenerate the MEG onshore. Subsea Scraper launching facility is provided to clean and inspect the flowlines.

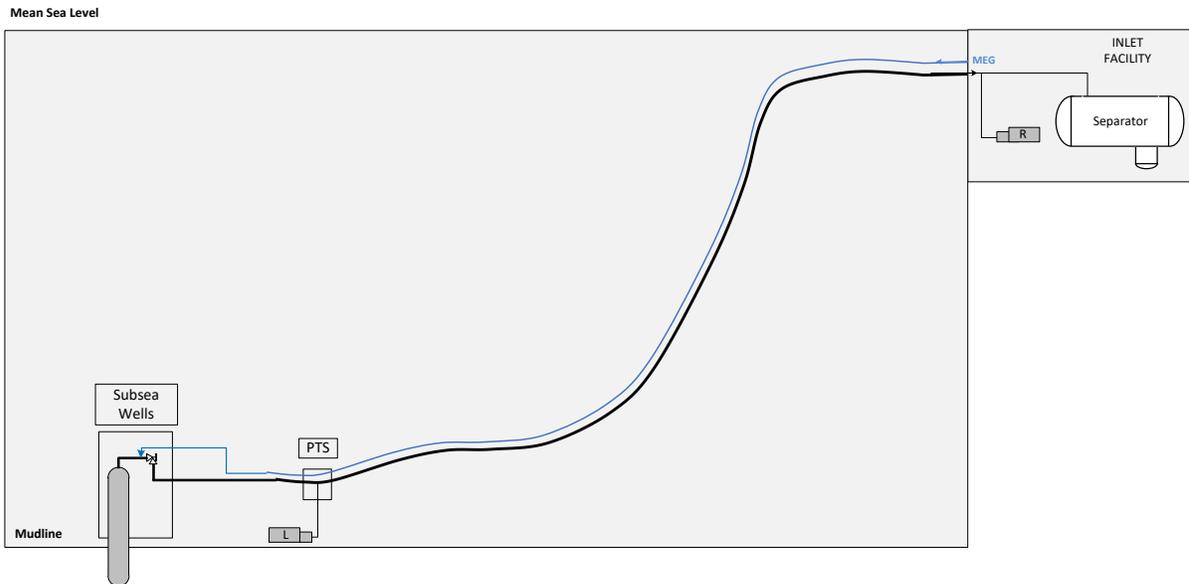


Figure 1: Gas Condensate Production Facilities – Typical Schematic

Refer to Figure 2 for a high-level initial start-up sequence of a typical subsea production system feeding the gas processing facilities.

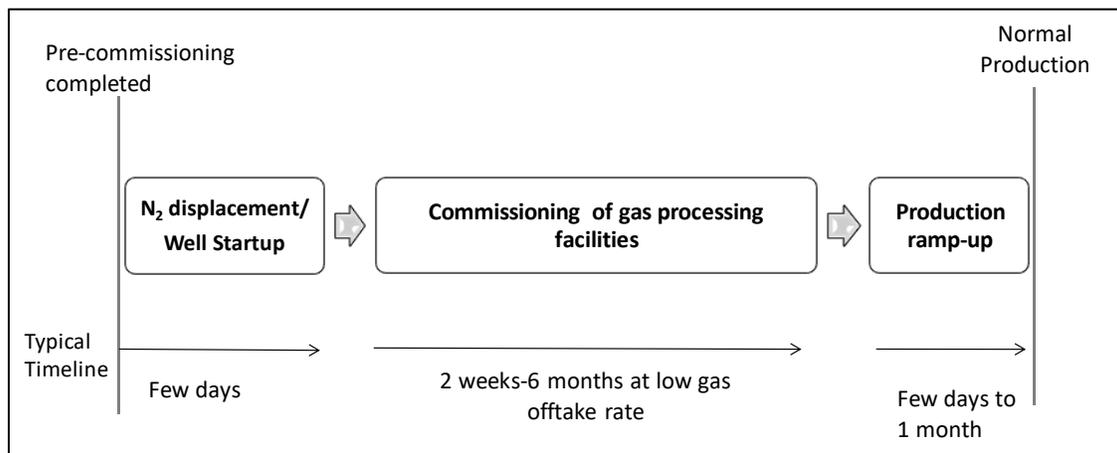


Figure 2: High Level Start-up Sequence

The key challenge for the initial startup of the production system is that the initial gas demand for commissioning the processing facilities is low, and it is below the normal operating envelope of the flowline. The subsea wells will initially produce at low rates to meet the facilities gas demand, while accumulating liquids in the flowline and possibly depleting the lean Mono Ethylene Glycol (MEG) availability. Consequently, due to the continuous low gas production, the following challenges are encountered during initial start-up:

- How to safely unload the flowline liquids when the commissioning gas demand increases drastically;
- Ensure availability of lean MEG to support the gas production; and
- Minimize flaring during commissioning process.

The proposed presentation will discuss the liquid management strategies applicable to the system, the final strategy being implemented during startup, and the successful outcome of a FLAWLESS start-up.