INTRODUCTION

Objectives/Scope

The gas feeding onshore gas processing plants at Ras Laffan in Qatar is extracted offshore from the North Field, one of the largest non-associated natural gas fields in the world. To assure uninterrupted gas flow from offshore to onshore during the winter season, characterised by low sea-laden temperature, it is critical to ensure reliable operations to fulfill our delivery commitment to our customers by preventing the risk of hydrate formation in the gas pipelines.

Two major projects - the Flow Assurance Project (FAP) and Flow Assurance Expansion Project (FAXP) - were developed and commissioned by QatarGas to supply Monomethylene Glycol (MEG) to the major gas producers offshore platforms within the North Field. The project ensures injection of MEG during the winter season to mitigate hydrate formation and potential blockage of gas pipelines and eliminate the injection of Kinetic Hydrate Inhibitors (KHI).

The intent of this paper is to present the criticality and importance of these two flow assurance projects, robustness of the infrastructure built to ensure reliable supply of MEG, and the challenges overcome during the planning and the execution phases of the projects.

PROJECT SCOPE

Eliminate use of KHI as primary hydrate inhibitor for wet gas pipelines, which results in KHI being injected into Yamama Sulayl onshore waste water disposal reservoirs.

FAP Onshore

- Offshore Storage, Pumping and Loading Facilities
- Pipeline to pump high pressure MEG to offshore
- Pipeline from Berth 25 to Load and Unload MEG from and to storage tank
- Track loading facilities to supply MEG for onshore slug catchers
- Project completed and handed over to operations

FAP Offshore

- 6" Pipeline from onshore to all QG-South and QG-North platforms
- New injection facilities for high pressure MEG on all 8 QG-South and 3 QG2-North Well-Head Platforms (WHPs)
- Conversion of KHI tanks on QG34-North & Qatar Shell Gas to Liquids (Q3GLTL) WHPs

FAXP

- Expansion of FAP 6" pipeline to QG34-North and Q3GTL WHPs
- New 8" pipeline from onshore to form a loop or back-up pipeline
- Hydraulic Actuated Valves (subsea) to switch between pipeline networks

Leak Detection System (LDS):

- ATOS LDS reads pipeline instrumentation from the Distributed Control System (Flow Transmitters, Pressure Transmitters, Temperature Transmitters, Valve Status, Pump Status)
- Based on proprietary algorithms, it analyses the data, operating conditions and changes to establish whether a leak is present, and if so, its approximate location

Complexities

- 3 Operators
- 7 Owners: RLL(R), RL3, AKG, QG-North and Q3GTL
- Complex sharing allocations applicable to project sub-scopes (Driven by the high number of shareholders, subsystems, FAP Buy-in)
- 39 offshore crossings and associated crossing agreements
- Topside brownfield modification works on 6 WHPs (3 QG & 2 Q3GTL)
- 5 subsea Hydraulic Actuated Valves (HAVs) and associated topside kit
- Beach pull in congested area and tie-in to FAP marine
- 3 Regulator(s) considerations (GP-RLC, Ministry of Municipality and Environment and Ministry of Transport and Communication)
- 3 Operators’ specifications that FAPX needs to comply with (scope driven)

WHP Broadband Modifications 16 withfeed platforms
- 8" Pipeline: PL-1 (89KM)
- 6" Pipeline: PL-2 (31KM) PL-3 (89KM)
- Crossings: 61
- Subsea Skids: 22
- Hydraulic Actuated Valves: 5
- Umbilicals: 3 (8.5KM)

CONCLUSIONS

The two flow assurance projects were commissioned and completed, and an integrated performance test was completed to demonstrate that the design intent was met. The purpose of the project, execution models and tactics deployed during the execution will be presented and results will be shared.