PROJECT EXPERIENCE

Flowline Virtual Metering System

Integration of the flowline virtual metering system utilizing the GATE Prho™ engine

An offshore operator was operating dual flowlines with cross-over valves open and requested GATE Energy to develop a virtual meter to allow them to determine the flowrate flowing through each header based on pressure and temperature measurement as well as detect potential of flow instability through the cross-over valves (XOVs) between the two flowlines.

GATE developed a flowline virtual metering system utilizing GATE's proprietary calculation engine GATE Prho™ that, in real time, allows the operator to:

- Create PT Profiles: determines the current pressure and temperature profiles through water-oil-gas multiphase hydrodynamic calculation.
- Understand Flow Distribution: Calculates the production flow split / distribution through XOVs and evaluate the potential instability. This helps the operator to make decisions on topside backpressure as well as opening/closing the XOV valves.

It is important to note, prior to delivering the surveillance tool, GATE conducted an extensive benchmarking study between the tool and the available field data to ensure it is representative of the actual field conditions.

TECHNICAL ACHIEVEMENTS & BENEFITS

- A standalone flowline virtual meter which allows the operator to closely monitor flowrates in each flowline.
- The standalone virtual meter was successfully integrated to the operator's monitoring system leading to real-time virtual metering and flow instability risk screening.
- In future, easy to share with GATE Flow Assurance engineers to further support with thorough analysis, mitigation and remediation efforts if necessary.

LOCATION

Offshore Ghana, West Africa

CHALLENGE

Some of the production flow loops suffered from malfunctioning pressure and temperature gauges.

The topsides flowmeter is located downstream of a comingling point between two risers leading to no means of measuring the flowrates in each flowline.

Dual flowline production through crossover valves (XOVs) may result in flow instability (e.g. slugging or stagnant header).

SOLUTION

GATE developed a flowline virtual metering system utilizing GATE's proprietary calculation engine, GATE Prho™, that in real time, allows the operator to create PT profiles and understand flow distribution.