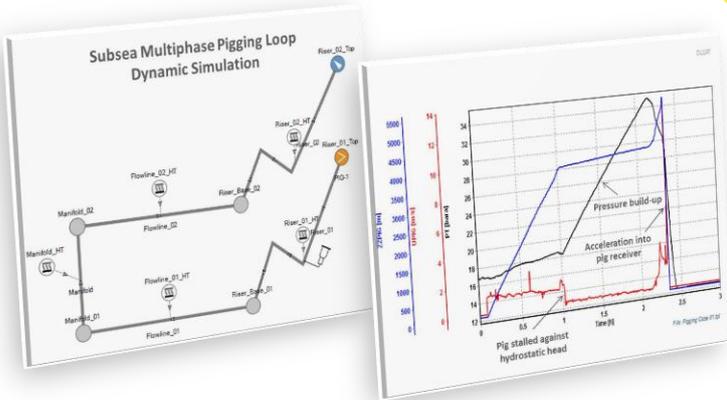


## Flow Assurance Consultancy



### Flow assurance

Flow assurance is a wide-ranging multidisciplinary subject that requires a broad range of skills, incorporating interfaces between subsurface, wells, subsea and pipeline engineering, production technology and process engineering.

### Flow assurance capabilities

Crondall Energy models and analyses challenging hydrocarbon production in wells and pipeline systems, to define line size, insulation requirements, ancillary equipment and operating envelopes by assessing:

- **Subsea Heat Transfer** using bespoke models for subsea wellhead cooling loops, cool-down of subsea pipelines, heat transfer in wells and subsea component temperature distributions.
- **Multiphase Flow Modelling** including estimates of gas and liquid production rates, arrival temperatures and pressures and liquid loading in wells and flowlines.
- **System Blockages** due to wax, hydrates and other deposits. Crondall Energy can support inhibitor studies, evaluate the practical effects of production chemicals, and run pigging studies.

- **Fast Transients** due to rapid closure of valves on long pipeline systems. Crondall Energy can support and provide studies to determine overpressures and valve performance.
- **Practical Considerations** that are identified in any system design or modification, and in the interpretation of data.

### Life Cycle

We have the flow assurance skills to support all aspects of a field development's life cycle, from early appraisal through to final cleaning and decommissioning.

### Software

Our key analytic capabilities include multiphase flow modelling software OLGA and PIPESIM. This is supported by fluid phase and hydrate modelling packages PVTsim and Multiflash. Bespoke hydraulic and heat transfer analysis is performed using standard engineering tools such as Excel and Mathcad.

### Benefit

Crondall Energy regards flow assurance as an integrated system engineering discipline. We work with clients' reservoir engineers, production chemists, well designers, project engineers and operations teams to achieve a deeper understanding of their problems and to develop optimized solutions.

**"Integrated flow assurance is essential in the development of a successful, operable, subsea production system"**

FPSO ■ FLNG ■ FSO ■ SUBSEA