



Improving Corrosion & Integrity Assessments with Flow Modeling

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Downhole & Pipeline Flow Modeling

Presented by Ammonite Corrosion Engineering Inc.

Maintaining or increasing production levels are key field development goals for oil and gas producers. Managing the complex hydraulics of aging oil and gas pipelines and gathering systems can be challenging.

With the right tools and process engineering expertise, oil and gas producers can better predict performance and troubleshoot areas in which they can maximize production.

Ammonite partners closely with OEL Projects Ltd. (OEL), our parent company, to provide a very specialized Process Engineering Department. Staff and associate engineers, inspectors and technicians with years of experience in corrosion assessment, flow modeling, and integrity management prepare engineering guidelines and standards; material selection and quality assurance/control; inspection program design, planning and execution; and most other areas of corrosion/integrity management.

OEL has over 30 years experience in chemical treatment and chemical program design for wells and pipelines.

Using either PIPESIM steady state multiphase simulation or OLGA dynamic multiphase simulation modelling, pipelines and pipeline networks may be analysed and flows of fluids, heat transfer and fluid behaviour are obtained.

PIPESIM and **OLGA** are two of Schlumberger software tools used.

Downhole flow modeling of individual wells including deviated production, gas and liquid injection, recirculated fluids, heated fluids and SAGD types, OEL uses Schlumberger PIPESIM Well Performance Modelling.



FLOW MODELING SOFTWARE

PIPESIM Well Performance Modeling Software by Schlumberger

OLGA Dynamic Multi-Phase Flow Simulation by Schlumberger



Ammonite Corrosion Engineering staff and associate engineers, inspectors and technicians have multiple years of experience in corrosion assessment, flow modeling, and integrity management.

Modeling and Assessment Capabilities

- Steady state modeling of hydraulic and thermal conditions.
- Single phase and multiphase modeling of Dry Gas, Wet Gas, Acid Gas, Gas Condensate, Light Oil, Heavy Oil, Water, Emulsion and Steam systems.
- Diagnosis and analysis of flow problems and provision of data for use in integrity and corrosion assessments of pipe and well condition.
- Equation of state calculations. The creation of phase envelopes for system fluids will reveal bubble points which can expose locations to acidic attack when CO₂ and H₂S are released from the liquids phase.
- Calculations of liquid and gas shear stresses on the pipe wall in fast moving systems. This helps to determine if inhibitor treatments will have sufficient contact with the metal surface.
- In multiphase operations; determination of flow regime and areas of liquid holdup to help predict potential corrosion areas.
- Assessment of temperature profile and potential degradation mechanisms that may result.
- Assessment of erosion potential if there are fast moving fluids, or if solids are present.
- Flow type determination and hydrate prediction.



Pipeline Flow Analysis

Through our parent company, OEL Projects Ltd., we can analyze pipeline flow regimes (steady state and transient) to determine flow types including liquid hold-ups (stagnant regions), slugging, dispersed flow and others. Knowledge of flow types assists in selecting corrosion inhibitors and determining pigging schedules.