

OLI CLIENTS HAVE AN EDGE ON THEIR COMPETITION

ScaleChem can help:

- **AVOID PRODUCTION FLOW PROBLEMS** and reduce operating costs through predictive mineral scale analysis.
- **PROVIDE READY ACCESS TO COMPLEX STUDIES** involving almost any scaling scenario in the well or near the well bore facility.
- **ANTICIPATE THE RISK** of brine incompatibility problems.



- **UNDERSTAND THE IMPACT** of water, oil and gas composition, and of downhole conditions on your scaling problems.
- **DESIGN AND TEST TREATMENT OPTIONS** and corrective process modifications through simulations on your PC to avoid risking your production facilities.
- **SAVE TIME AND MONEY** by using calculated fluid properties to predict unwanted production conditions, thereby avoiding expensive or dangerous operations
- **IMPROVE OPERATIONS & BOOST PRODUCTION**

Combine ScaleChem results with OLI's Corrosion Analyzer to simulate, analyze, & develop treatment strategies that optimally minimize both scale and corrosion

ABOUT OLI

OLI Systems, Inc. is the world's leading provider of electrolyte simulation software. This USA-based company has served the chemical process, energy production, and scientific research industries for over 39 years.

OLI brings a unique blend of pioneering research and industrial commercialization to technology development.

OLI's technology is available through a series of products that includes:

Corrosion Analyzer™	OLI Pro + ESP™
Stream Analyzer™	ScaleChem™
Alliance Engine	

ACCESSING OLI ScaleChem and PIPESIM

Interested clients will need a license to PIPESIM and a license to ScaleChem. The link between these products will be complete with PIPESIM 2011 and ScaleChem V4.3. Both releases are scheduled for 3rd quarter, 2011.

For OLI clients, please ask for the ScaleChem software with the PIPESIM link. For Schlumberger clients, please request PIPESIM 2011.

ScaleChem is used worldwide by oil and gas producers and oilfield chemical companies. ScaleChem is available for either stand-alone PCs or your company's network.

You can begin your investigation of this technology today! We welcome your inquiries. You may contact OLI Systems at the contact information listed below, and work with specialists in OLI electrolyte simulation.

OLI SYSTEMS, INC.

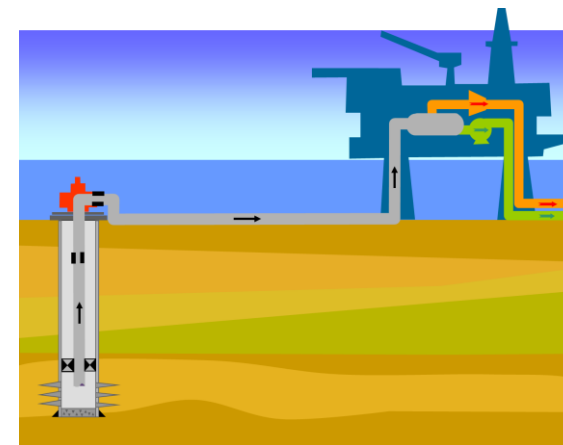
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*This brochure was prepared by AQSIm,
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Multiphase flow simulation Plus Complex water chemistry



OLI ScaleChem → PIPESIM

YOUR ANSWER FOR

SCALE

FLOW ASSURANCE

WORKFLOWS IN

MULTIPHASE FLOW

SIMULATION



PIPESIM: Multiphase flow simulation

PIPESIM is Schlumberger's state-of-the-art multiphase flow simulation software. PIPESIM assesses the impact of flow assurance issues on oilfield production system design and operation.

Individual PIPESIM modules offer a wide range of analyses, including well modeling, nodal analysis, field planning, artificial lift optimization and pipeline and process facilities modeling.

However, until now, the inherent complexities of water chemistry have been a barrier to including scale prediction within PIPESIM – as well as within other flow simulation models.

OLI ScaleChem → PIPESIM

OLI now brings state-of-the-art scale prediction models to PIPESIM.

Communicating through the PIPESIM PVT file, OLI's ScaleChem program creates the necessary file for chemistry input to PIPESIM. The result is a better understanding of pipeline scaling behavior and the ability to quantify risks in performing flow assurance studies.

Using the OLI Engine, PIPESIM can calculate:

Phase Envelope

Scale appearance lines (total & by species)

Profile Plots

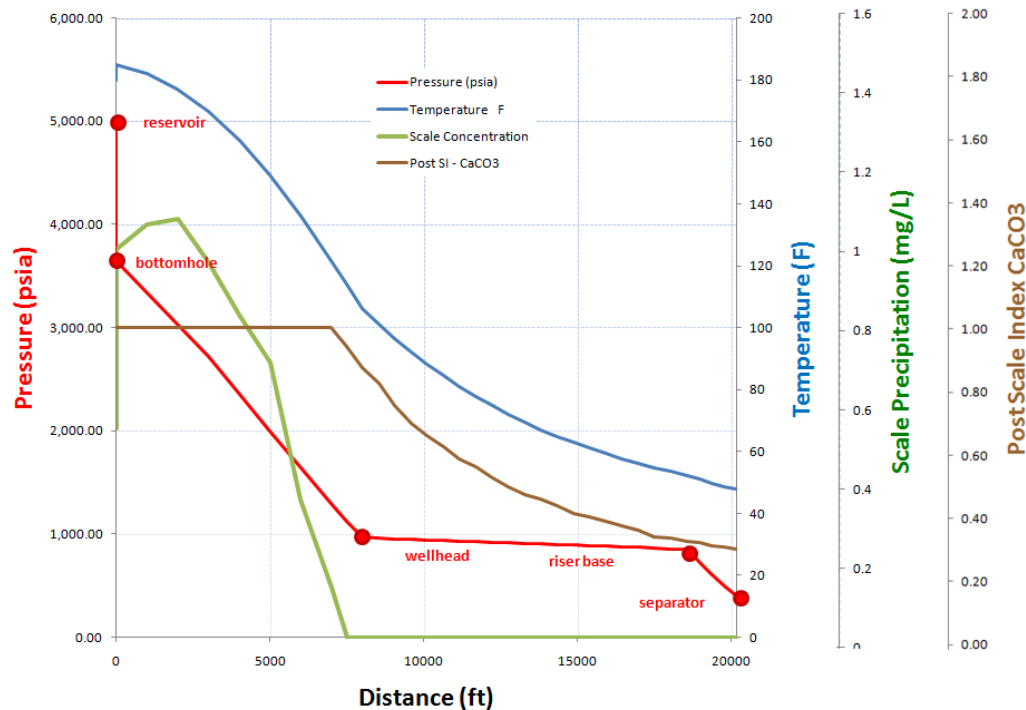
Total scale mass fraction (e.g. ppm, mg/L)
Scale species mass fraction
Scale species pre- and post- scale index

System Plots

Maximum scale mass fraction/branch
Maximum pre- and post- scale index/branch

A fluid's scaling behavior depends on prevailing pressures and temperatures. Electrolyte thermodynamics can produce accurate prediction of the occurrence, location and severity of scaling.

Pressure - Temperature Profile



The graph is PIPESIM output that shows a pressure-temperature profile for a case study.

In addition to regular PIPESIM output, the OLI Engine link now provides scale index and scale concentration information for all possible scales that can develop along the pipeline.

ScaleChem can evaluate for 8 standard solids as well as 54 additional solids which may be present in pipeline configurations.

OLI ScaleChem → PIPESIM : FLOW MODELING AND CHEMISTRY MODELING

WHY OLI?

Electrolyte systems often behave in complex and counter-intuitive ways. The wrong answer can be worse than no answer at all! Electrolyte chemistry is complex and challenging, particularly in multicomponent systems operating over broad ranges of conditions. Simplified aqueous modeling or computational approximations can prove inadequate and, in some cases, misleading results.



OLI brings 39+ years of experience in electrolyte thermodynamics and complex water chemistry analysis. OLI's ScaleChem software was co-developed with Shell to model mineral scale prediction in upstream situations. Chemistry abilities include simple equilibrium calculations as well as mixing waters and saturation with solids. Coupled with PIPESIM, this prediction is now extended to scale prediction in pipeline behavior.

Multiphase fluid flow modeling has developed significantly over the past 60 years from simplified correlations through empirical equations based on measured data, finally to complex mechanistic models which predict pressure drop, holdup, thermal effects and slug formation. Coupled with these rigorous models comes the problem of flow assurance: the formation of solids such as hydrates, waxes, asphaltenes and scale pose a significant problem in reducing the cross-sectional area available for flow.



With all reservoirs producing water at some stage, the problem arises of how to model the multitude of dissolved and suspended inorganic solids carried into the wellbore. The answer lies in ScaleChem where rigorous solid deposition models predict the formation of various inorganic solids up the wellbore, and into the pipeline.

