

## MultiScale™



### What is MultiScale

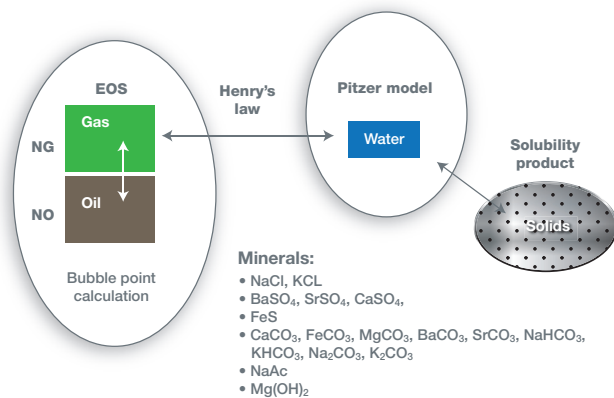
- Water Chemistry and Mineral Scaling prediction program

#### Input

- Water analysis
- Oil/gas analysis
- Pressure/temperature

#### Output

- 3-phase equilibrium, phase compositions of oil, gas and water
- pH, ion concentrations etc.
- Scale potential and amount of salt precipitated
- Phase properties



### Overview

- MultiScale can be used to predict the scaling tendency of the following minerals:
  - NaCl, KCl
  - BaSO<sub>4</sub>, SrSO<sub>4</sub>, CaSO<sub>4</sub> (a, g, h)
  - FeS
  - CaCO<sub>3</sub> (c, a, v), FeCO<sub>3</sub>, BaCO<sub>3</sub>, SrCO<sub>3</sub>, NaHCO<sub>3</sub>, KHCO<sub>3</sub>, Na<sub>2</sub>CO<sub>3</sub> (a, d, m), K<sub>2</sub>CO<sub>2</sub> (h, a)
  - NaAc (t, a)
  - Mg(OH)<sub>2</sub>
- Single point and simplified pH calculations
- Automatic tuning of water; alkalinity, CO<sub>2</sub> and correction for water evaporation
- SR can be chosen (<>1 or in %) and you can select if precipitated salts shall be taken into the next calculation level or not
- Very good handling of water evaporation also for gas/condensate systems with very little water
- Organic acid can be entered as separate acids (Methanoic, Acetic, Propanoic, Butanoic)
- Organic acid distribution in gas and oil phase
- pH predictions have been verified with actual measurements at high temperatures and pressures
- Program parameters are updated with latest available data from reliable sources

## MultiScale™

### User interface

- Excel format on report data
- Loading / storing of ongoing projects
- Integrated manual as web pages as well as in pdf format
- Direct link to external web pages
- Tree view
- Direct access to windows - faster calculations
- 6 waters, 6 oils and 6 gases

### Stream calculations

- Waters, oils and gases are combined to streams
- A stream can contain water and/or oil and/or gas
- Streams can be saved, used later and may be combined with any other stream
- Streams can be used in process simulations  
(see brochure "MultiScale™ Process Simulation Module")

### PVT model

- Similar to standard PVT packages
- 16 components + 9 pseudo components (+ fraction)
- SRK or PR with Peneloux and Huron-Vidal mixing rule
- Accurate volumetric and phase distribution

### Save results for later use

- Water phase, oil phase, gas phase and oil+gas phase are saved as analyses that can be opened in later calculations
- Results are also saved as streams
- Process calculations much easier
- Ongoing project calculations can be saved/ reloaded

### Options

- MEG module for simulation in systems treated with MEG
- H<sub>2</sub>S scavenger module
- Process simulation module
- .dll file for use in other programs

### Specifications:

- Working range: 300°C and 1000 Bar
- Mixing of up to 6 waters, 6 oils and 6 gases
- Stream calculations
- PVT model, similar to standard PVT packages
- Automatic tuning of water; alkalinity, CO<sub>2</sub> and correction for water evaporation
- Prediction of the water chemistry and the scaling tendency for the following minerals:
  - NaCl, KCl
  - BaSO<sub>4</sub>, SrSO<sub>4</sub>, CaSO<sub>4</sub> (a, g, h)
  - FeS
  - CaCO<sub>3</sub> (c, a, v), FeCO<sub>3</sub>, BaCO<sub>3</sub>, SrCO<sub>3</sub>, NaHCO<sub>3</sub>,
  - KHCO<sub>3</sub>, Na<sub>2</sub>CO<sub>3</sub> (a, d, m), K<sub>2</sub>CO<sub>3</sub> (h, a)
  - NaAc (t, a)
  - Mg(OH)<sub>2</sub>

### System requirements:

Windows XP, Vista or W7.

### Contact info, software and courses:

siv.lie@exprogroup.com or petrotech@exprogroup.com  
Phone +47 52 700 700 Web: <http://www.exprogroup.com>

### Other available brochures:

- \* MultiScale™ H<sub>2</sub>S Scavenger Module
- \* MultiScale™ MEG Module
- \* MultiScale™ Process Simulation Module