

**TECHNICAL PAPER**

# CoMic™ - Impacts of Solids on the Availability of Corrosion Inhibitor

**BACKGROUND** Surfactant-type corrosion inhibitors are designed to adsorb to the internal surface of pipelines, forming a passive hydrocarbon layer to prevent access of corrosive liquid to the pipe surface. When dosed at a high enough concentration, the surfaces in the system will become saturated and inhibitor will accumulate in the production fluids forming aggregates known as corrosion inhibitor micelles. These form at the Critical Micelle Concentration (CMC). Solids originating from formation residues, corrosion by-products and scale formation can all provide secondary binding sites for corrosion inhibitor, leading to decreased availability and implications for system protection.

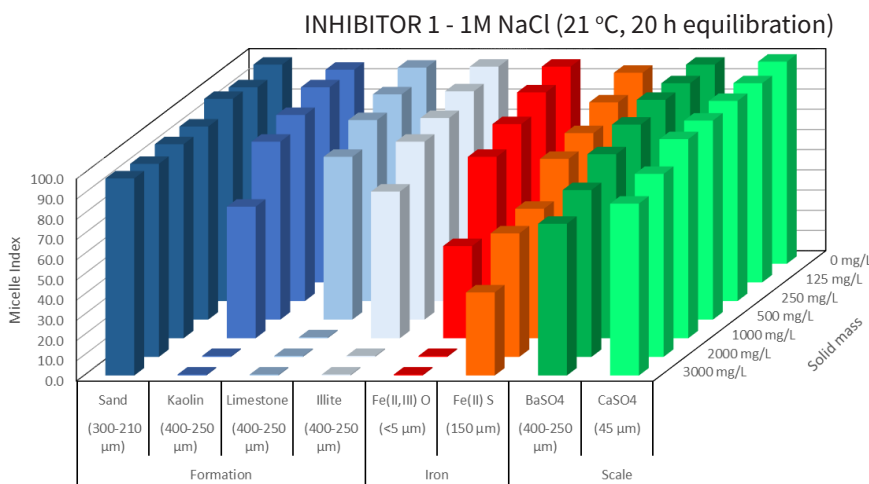
LUX Assure's CoMic™ technology detects micelles in the water phase of an oilfield sample to provide information on inhibitor availability. It was used here to determine the effect of solids on inhibitor.

**TESTING**

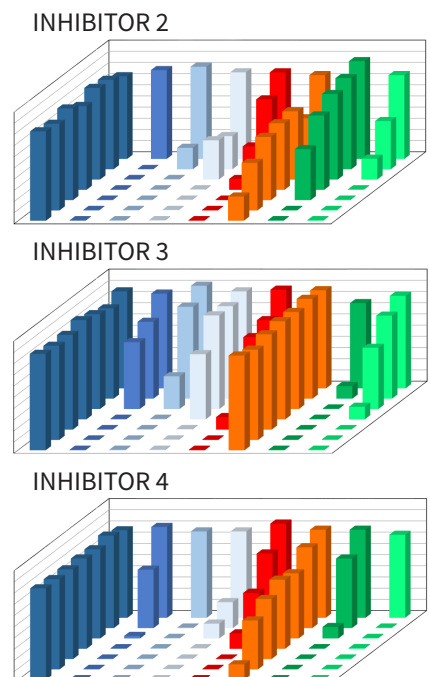
The CMCs of four formulated corrosion inhibitors were determined to be below 100 ppm. 100 ppm corrosion inhibitor solutions in 1 M NaCl were prepared and a 20 mL sample of each inhibitor solution was transferred to a vial charged with a known mass of the test solid, sealed and gently agitated at hourly intervals for 5 h. The solutions were allowed to equilibrate for a further 15 h before analysis with CoMic™. Tested solids were selected based on a range of solids likely to be observed in the field.

**RESULTS**

All chemicals showed varying losses of surfactant chemicals to the solids tested. Losses were inhibitor and solids dependent, with inhibitor 1 showing the least loss.



\*A micelle index value above 50 indicates that micelle aggregation was occurring.



**CONCLUSIONS** The testing shows that solids in systems can act as a sink for corrosion inhibitor, reducing availability and presenting a possible corrosion risk. Optimal chemical management of a system should consider this impact. CoMic™ can provide a useful laboratory or field tool to assist asset integrity managers and production chemists.