

Providing the Capability to Convert Full Polymer Systems to a Flocculated System

CHALLENGE

As the limits of flocculated brines are pushed, operators see the benefits of running polymer-based systems. These systems can provide a variety of benefits such as:

- Improved Inhibition
- Enhanced Lubricity
- Superior Hole Cleaning

However, the outlined benefits do come with additional constraints particularly surrounding solids removal. Polymer systems are notoriously difficult to flocculate and generally use encapsulators to limit the dispersion of clays and drilled solids. These encapsulators, however, provide no benefit in divalent brines such as calcium chloride. As such, polymer systems always run the risk of building up too many drilled solids requiring disposal of the system.

SOLUTION

It was realized that enabling operators with a polymer system, that could be maintained solids-free and/or flipped to a conventional flocculated brine system, would allow a step-change in performance with no additional risk.

The **CLEAR Slide** system was developed to bring these benefits with the option to flip back to a conventional flocculated system. The advanced polymers selected for the system provide minimal interference to the chemistry that enables flocculation.

What this means is that, at low polymer concentration, **CLEAR Slide** can flocculate like a conventional floc brine. This is ideal for areas/intervals where elevated viscosity is not required as it completely removes the risk of dump/dilute as well as the wear caused by erosion on equipment.

For those situations where tight fluid loss or enhanced hole cleaning are required, **CLEAR Slide** rises to the challenge of providing these exact properties. When the interval is completed, the system can be reversed into a flocculated brine with minimal dilution and added cost.

A key example would be to drill a lateral using a conventional flocculated brine until torque/drag limits are reached. **CLEAR Slide** can then be added to reduce the torque/drag enabling longer laterals. Then between laterals, the **CLEAR Slide** system can be converted to a flocculated brine system!

RESULTS

A full polymer **CLEAR Slide** system was used to reduce lost circulation on a previous well. This fluid was processed while the intermediate casing was cemented, BOP's nipped up and pressure tested, then tools ran in the hole for the lateral.

The before and after of that reversal are shown in Table 1. This highlights the ability of the system to flip between a full polymer and flocculated brine system.

Figure 1 highlights how a CLEAR Slide system was able to maintain LGS% below 1.5% without dump/dilute or lost circulation.

Table 1: Before and After Properties of System Reversal

System	Full Polymer	After Treatment
Density [kg/m ³]	1385	1330
Rheo. Temperature [°C]	50	50
600 rpm	30	6
300 rpm	20	4
200 rpm	16	3
100 rpm	11	2
6 rpm	4	1
3 rpm	3	1
Plastic Viscosity [cP]	10	2
Yield Point [Pa]	5	1
API Fluid Loss [ml/30min]	11	>50
Filter Cake Thickness [mm]	0.5	0.5
LGS%	3.7	0.49

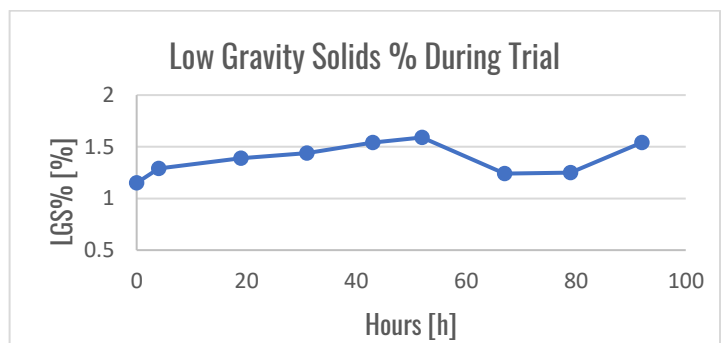


Figure 2: Low Gravity Solids Content in (10-12) Well CLEAR Slide interval