



PROVISION OF

**Chemically Enhanced
Production &
Flow Assurance**

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Capabilities



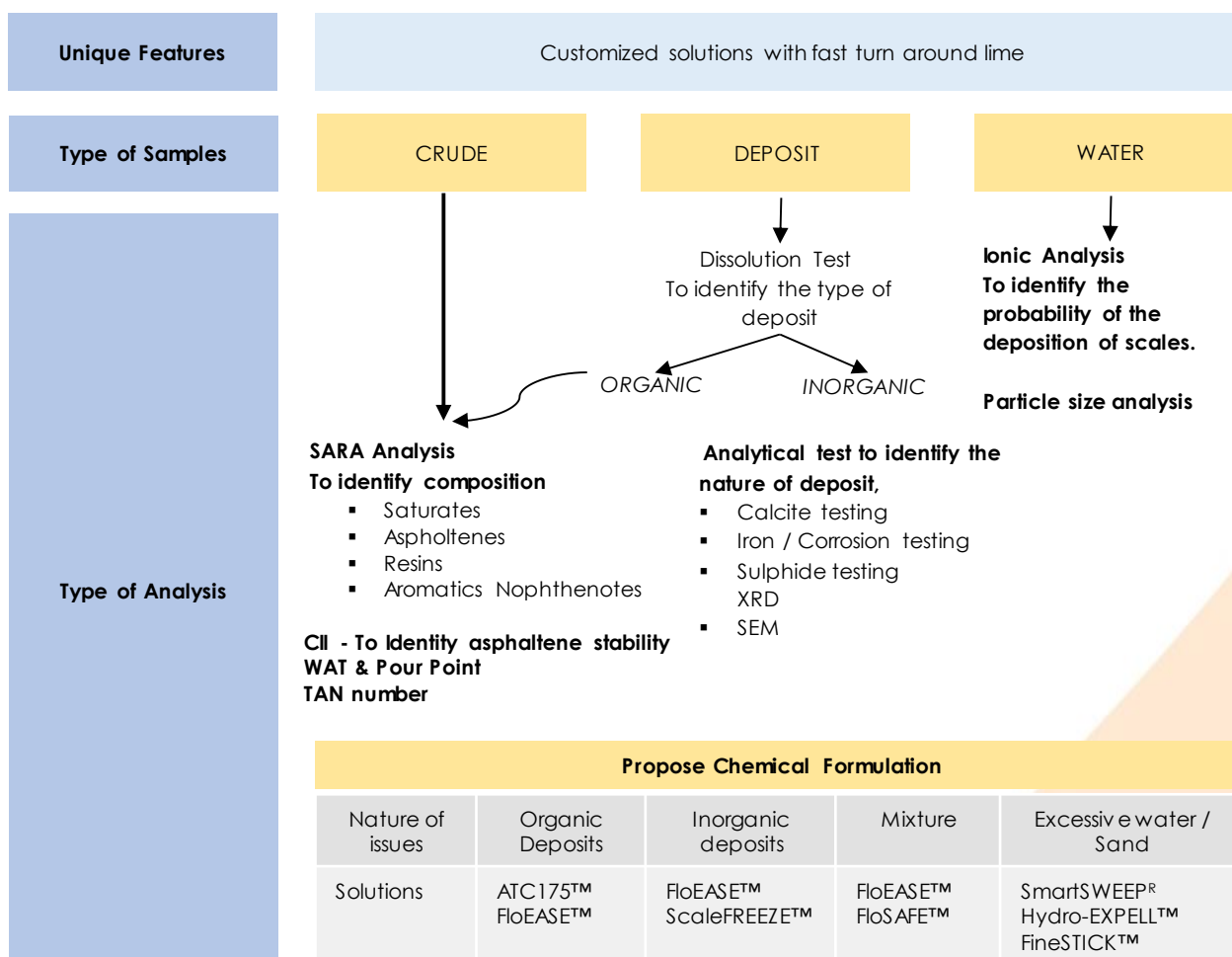
- Specialty chemical formulation and low-cost blending of chemical and supply
- Project Management and consulting services
- Flow assurance/ production enhancement studies

Products



- Flow Improver/production enhancer for oilwell (FloEASE™)
- Specialty chemical to remove complex scale/ dirt in wellbore, tubing and pipelines (FloSAFE™)
- Scale Squeeze Inhibition (ScaleFREEZE™)
- Reservoir fluid diverter to improve the sweep efficiency of water injection (SmartSWEEP®)
- Specialty chemical water shut off (WSO) and profile modification (HydroEXPELL™)
- Specially chemicals for fluidization/separation of tough sludge, rag and muck (QuickFLO™)
- Coagulation /Micro Filtration for surface separation and fine migration control for downhole (FineSTICK™)
- Thermo-chemical system for wellbore damage and blockage remediation of paraffinic deposits / blockages (ATC175®)
- Specialty surfactant package for wellbore clean-up prior and post completion (RL-WBCU)

Customized Solutions



FloEASE™ series

(Specially chemical for well stimulation and production enhancement)

Specialty micro-emulsion to remediate near-wellbore damage related to depositions, in-situ emulsion, wettability, water blocks

One-step stimulation formulation capable of dissolving inorganic materials and simultaneously dissolve / disperse organic deposits present and does not induce/create sludge. It changes the wettability characteristics of the formation rock towards water wetting and deeper penetration into rock matrix with controlled reaction kinetics. The formulation also remediate water blocks near well-bore and unleash the potentials of inflow.



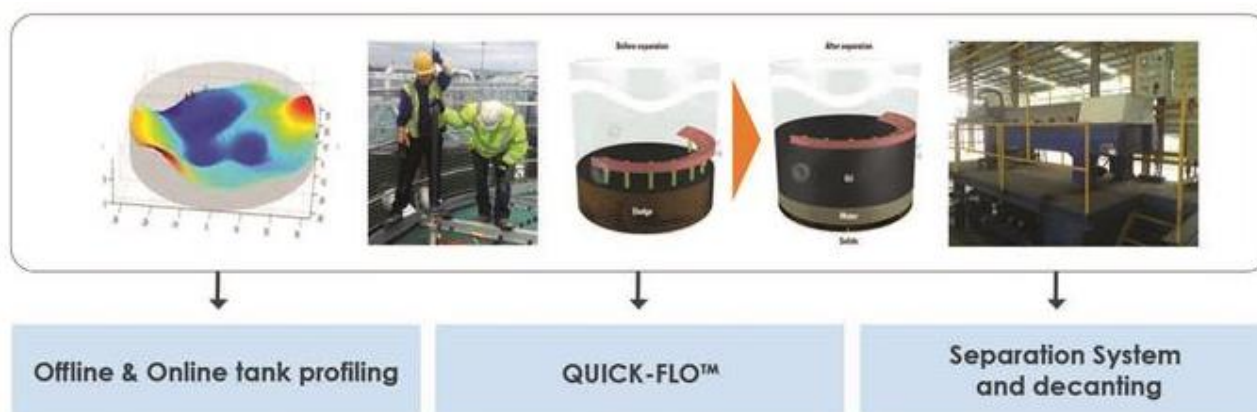
- Can be squeezed into formation via surface pumping for near well bore matrix stimulation and for tubing cleaning
- Lesser volume of chemicals and their transportation to site due to better reaction kinetics
- Stable single fluid with storage life of more than one year to make it cost effective and safe for handling.
- HPHT stable emulsion with particle size of less than 200 nm that allows faster reaction and penetration
- Minimal risk of pressure induced precipitation and deposition
- Easily miscible with organic solvent, brine and common post-flush fluid
- Non damaging to formation

Cleaning Medium	Organic Deposits	Inorganic Scale
Acid	By-passed	Dissolves
Solvent	Partly dissolves	By-passed
FloEASE™ series	Dissolves/disperses	Dissolves/disperses

QUICK-FLO™

(Specialty formulation to separate sludge, rag, muck and emulsion)

- Specialty sludge removal and separation chemical system to separate tough rags, muck and emulsions.
- Can be applied to clean FPSO tanks, refinery tanks and vessels
- The formulation has ability to slowly penetrate, dissolve and disperse sticky components of sludge thereby weakening the mechanical structure of the sludge solids at moderate temperature
- The weakened sludge gets dissolved /dispersed in the presence of cheap solvents like thin crude oil/ diesel and the mechanical force of re-circulating fluid jetting in the form of viscous fluid for further treatment and decanting.

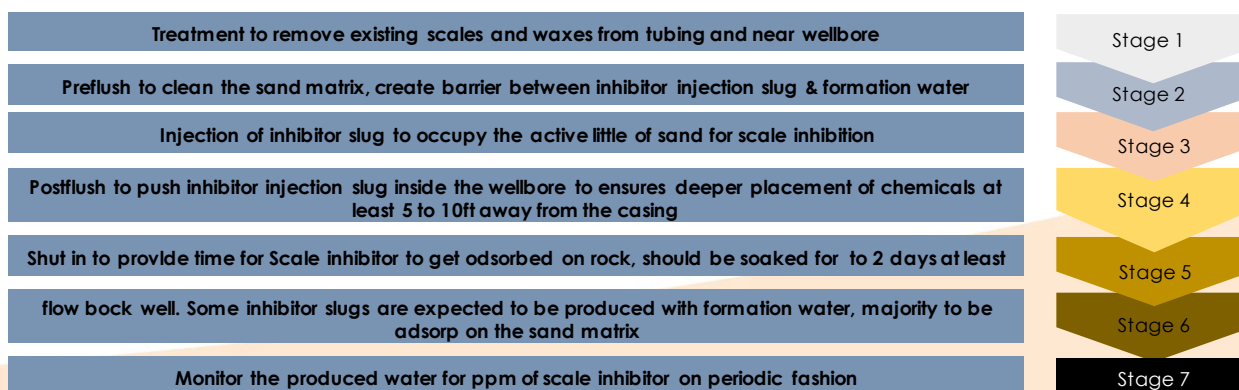
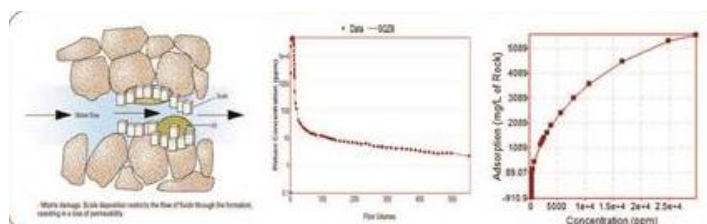


ScaleFREEZE™

(Downhole scale squeeze inhibition)

Specialty formulation to inhibit scale formation downhole and near wellbore

- Specially designed to inhibit CoCO_3 and CoSO_4 scales at low dosage owing to its threshold effect.
- Inhibit at as low as 1 ppm.
- Effective especially for Calcium and Barium scales.
- Avoid scale formation downhole and also behave as versatile topside system protection



HydroEXPELL™

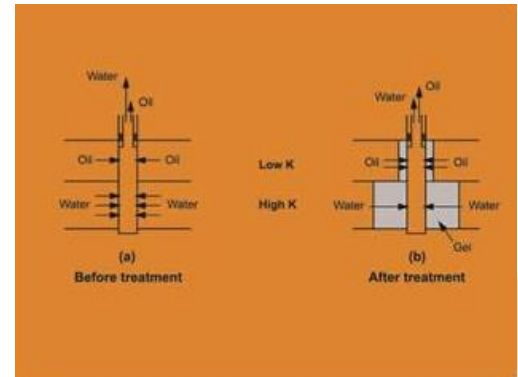
(Specialty polymer formulation for water shut-off and RPM)

Features

- Specialty surfactant package formulation that can be effective to reduce water coning problems.
- Customised to meet the individual well's down-hole environment.
- RPM solutions is capable of treatment of near wellbore in temperature regimes up to 150°C
- Can be used to alter oil-wet to water-wet properties of the reservoir rock and increase the capillary number.

Application

- As the solution is injected, it tends to flow into higher permeability water zone.
- It changes the wettability towards water wet and selectively reduces water flow without hindering oil production.
- It is capable of decreasing the WOR ratio significantly
- Increase the contact angle of residual oil to formation.
- Can be used as RPM for Producer well , Conformance control for Injector wells



SmartSWEEP®

(Reservoir fluid diverter to Improve the sweep efficiency of water injection program)

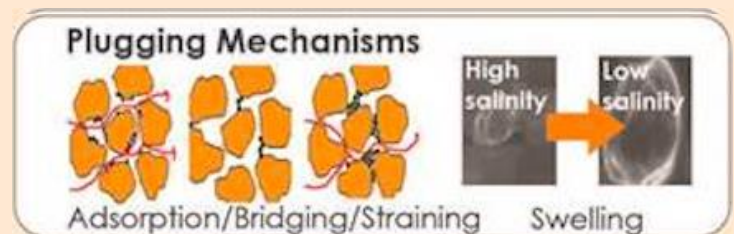
Pain - Low oil recovery versus spending

- Poor sweep efficiency in heterogenous reservoir on water flooding
- High water production and early water breakthrough
- Costly materials



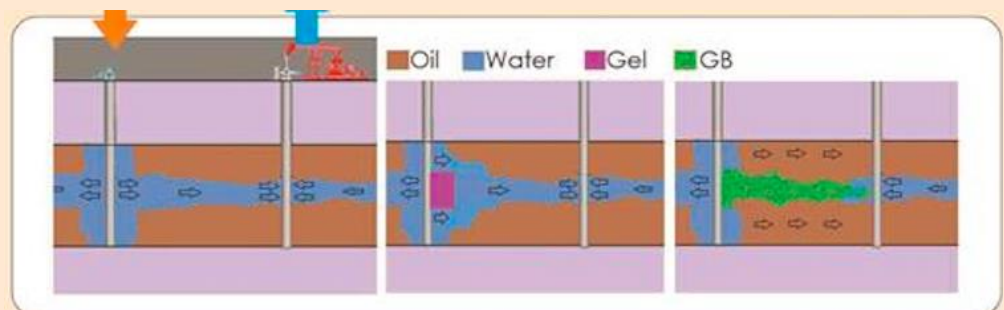
Limitation - Limitation of current technique (polymer flooding)

- Polymer flooding posed temperature limit
- High cost



SmartSWEEP® - Grafted bentonite

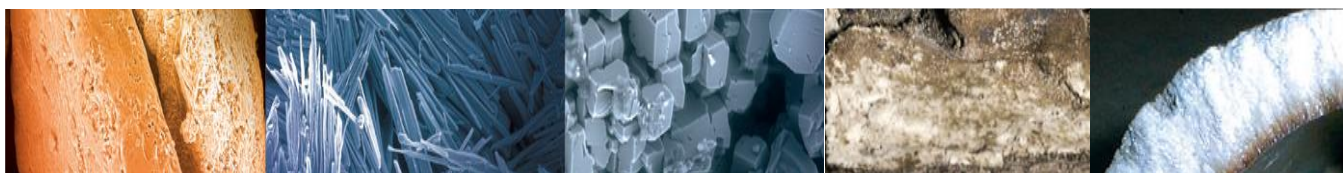
- Environmental friendly
- Cheap natural product
- Thermally stable (> 200 deg C)
- Proven in core test result



FLO-SAFE™ Series

(Specialty chemicals to remove complex scale along with organics in pipelines, wellbore and tubing)

Customized One-step formulation capable of dissolving inorganic deposition and simultaneously dissolve / disperse organic deposits. This customized formulation has the ability to scavenge H₂S and mitigate the risk of H₂S. This chemical technology specifically can address the need to disintegrate, dissolve, and disperse, fluidize and dislodge the complex gamult of deposits/precipitates.



Features

- One-step formulation capable of dissolving inorganic and simultaneously dissolve / disperse organics present.
- Very effective in dissolution of calcium carbonate, calcium sulfate and porous corrosion products
- Formulation has the ability to scavenge H₂S and mitigate the risk of H₂S both downhole and surface application.
- Designed to have optimal detergency, surfactancy, dispersability and solvency to address almost all kind of dirt in a wellbore providing improved cleaning efficiency.
- Helps to provide quick and effective cleanout of oil-based mud (OBM) or Water Based Mud (WBM).

Application

- Can be used for wellbore clean-up, mud cake removal, water wetting, pipeline descaling.
- Can be used as effective wellbore dirt removal post drilling or work-over.
- It is environmentally friendly.
- Highly compatible with wide range of solution pH and very effective in dissolution of iron, copper and brass and provides control of contaminating metal ions
- Non-hazardous and non-damaging to metals and formation even at elevated temperatures, helps to prevent streaking.
- Effective chelating agent for iron products, mineral scale, thermo-plastic, copper and brass.

ATC175®

(Thermo-chemical system for wellbore damage and blockage remediation of paraffinic deposits/blockages)

ATC17® is a thermo-chemical system which consists of two chemicals custom designed to generate in-situ heat which can be customised produce temperature of 75 to 175°C and ester for dissolution/dispersions of micro/macro-crystalline wax & asphaltenes.

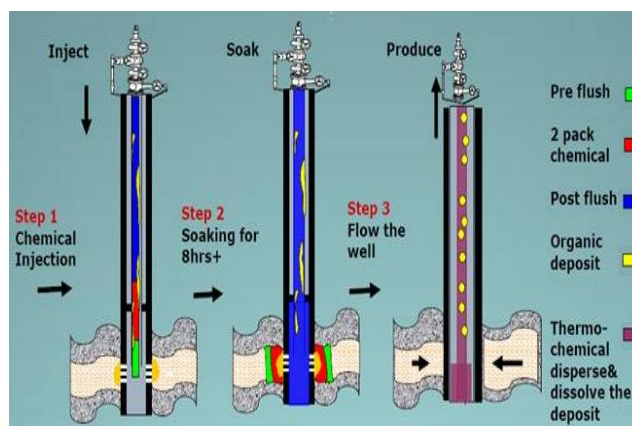
ATC17® is effective tool for enhancing production of well impaired by organic deposition, relief of well tubing from blockages and also removing totally plugged or near plugged pipelines. The chemical solution is totally compatible with formation hydrocarbon, well completion system and refinery products. It behaves as an excellent demulsifier with prescribed dosage and very cost effective

General Features:

- Heat can be generated where it is required.
- Effective removal of organic deposits in and around well bore, production tubing and cleaning of well head, flow line and associated equipments.
- Cleaning of borehole, production tubing and flow line in one go; short soaking time.
- Restoring rock wettability to water wet.
- Fast implementation and quick results.

Application:

- Enhancement of oil production from waxy field or heavy oil.
- Removal of skin and clearing of deposits in the production tubulars leads to increase in rate of production.
- Increase in production sustain for longer periods of time.
- Deep penetrating effect. Can remove water blocks deep around well bore.
- Remediation of blocked oilwell tubing, pipelines, flowlines
- Hydrate blockage relief.



FineSTICK™ series

(Specialty chemical solution for fine consolidation and migration control for surface and downhole treatment)

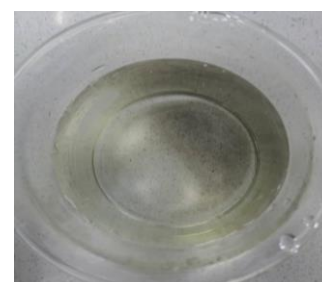
FineSTICK™ is used to address fines migration challenges associated with siliceous rock. In particular, it is used for fines encountered in crude oil production or generated as a result of hydraulic fracturing or sandstone acidizing or excessive water production. Such treatment can result in a significant increase in the productivity and stabilization of the well, typically for a long period of time. FineSTICK™ can also reduce maintenance costs and effectively used for fine separation from cyclonic effect desanders or flowing pipelines.

Application

- FineSTICK™ targets fines originating from non-clay minerals such as quartz, mica, amorphous silica and feldspar but also mitigates fines migration from clays. It is easily dispersible in water and in various brines.

Mechanism

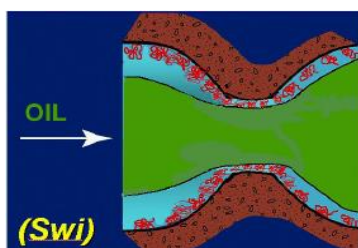
- Change of wetting behaviour from oil-wet to water-wet
- Surface charge
- Cross-linking and binding of clay/sand fines
- Reactive groups in the FineSTICK™ selectively reacts with with surface Si-OH groups of silica and formation surfaces.
- Neutralise zeta potential at surface to attract the fines together for easier surface separation.



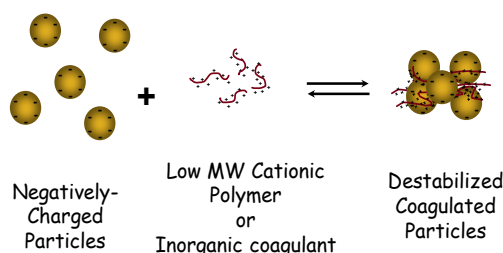
BEFORE



AFTER



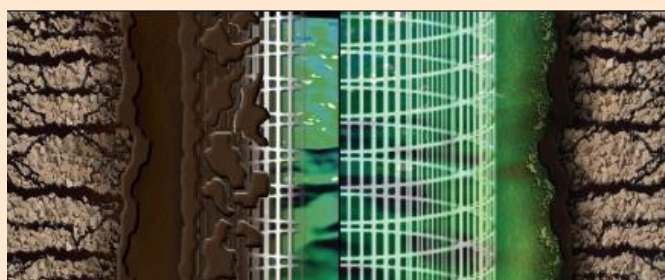
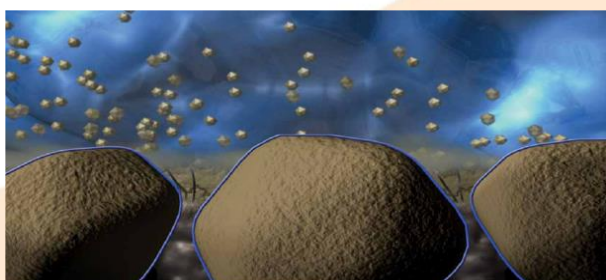
Thin polymer layer on rock to cement the clayish sand surface.



RL-WBCU series

(Specialty surfactant package for wellbore clean-up prior and post completion)

RL-WBCU is a versatile solution that can be customised to the type of mud or mud filtrate that can be potentially damaging if not effectively removed from near wellbore. It is a unique product with sub 100 nm particle size of the emulsion, which makes the product appearance as single-phase clear solution.. It is effective in casing cleaning, polar solid dispersion and residual oil removal and leave formation and casing surfaces water wet.



Features

- Specialty non-ionic surfactant package formulation.
- Helps to provide quick and effective cleanout of oil-based mud (OBM) or Water Based Mud (WBM).
- The product also helps to reduce the interfacial tension which can resulted in increase in oil recovery.
- It is environmentally friendly and biodegradable.

Application

- Can be used as effective wellbore dirt removal post drilling or work-over.
- It changes the wettability towards water wet and promote oil production.
- It helps leave the pipe and formation in a water-wet condition.
- It is applicable over a wide temperature range.
- Can be used to effective treat completion skin at screen and near wellbore

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