



Surfactants Bringing Chemical IOR



TO THE NEXT GENERATION



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Our Company





Oil Chem Technologies

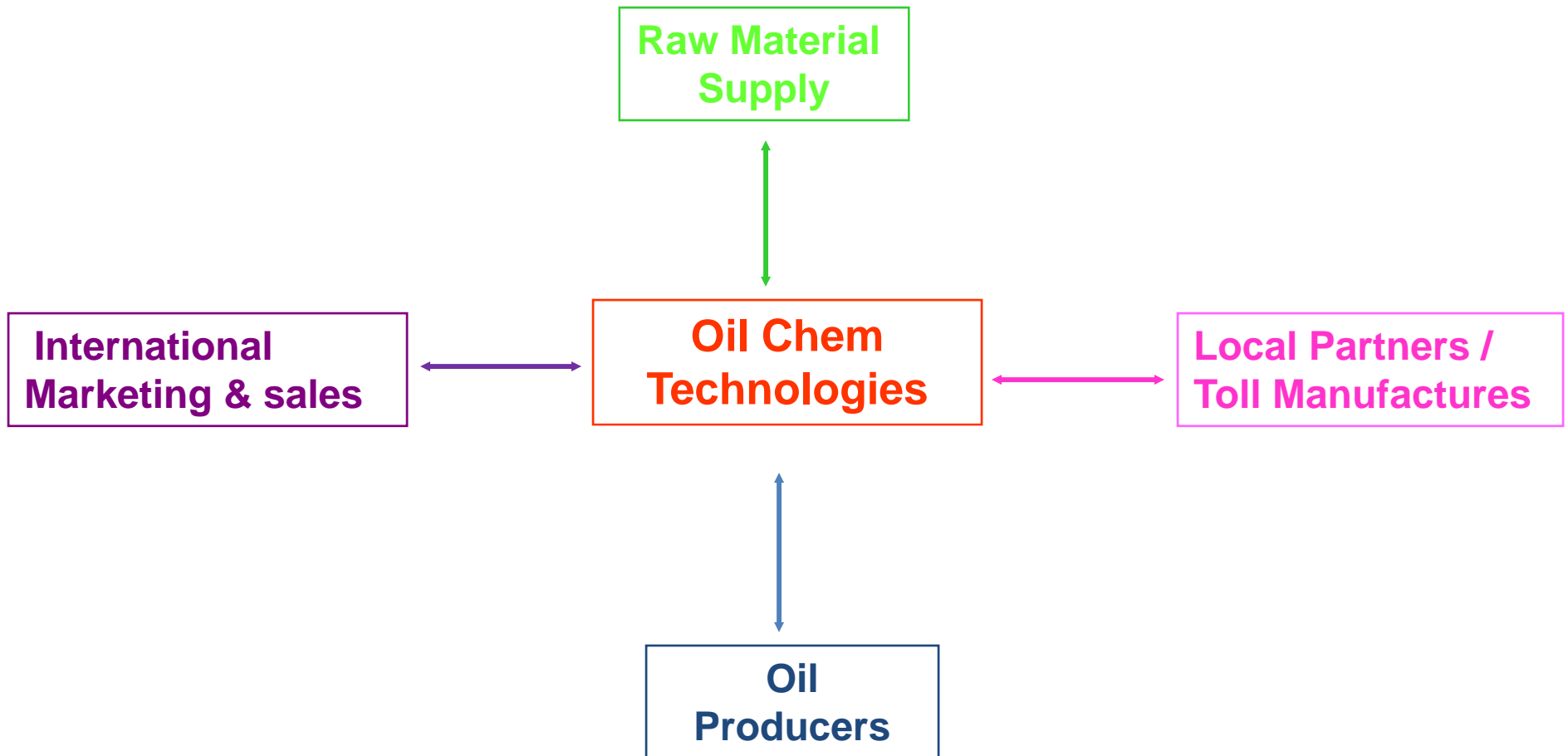


No. 38 Overall in 2009

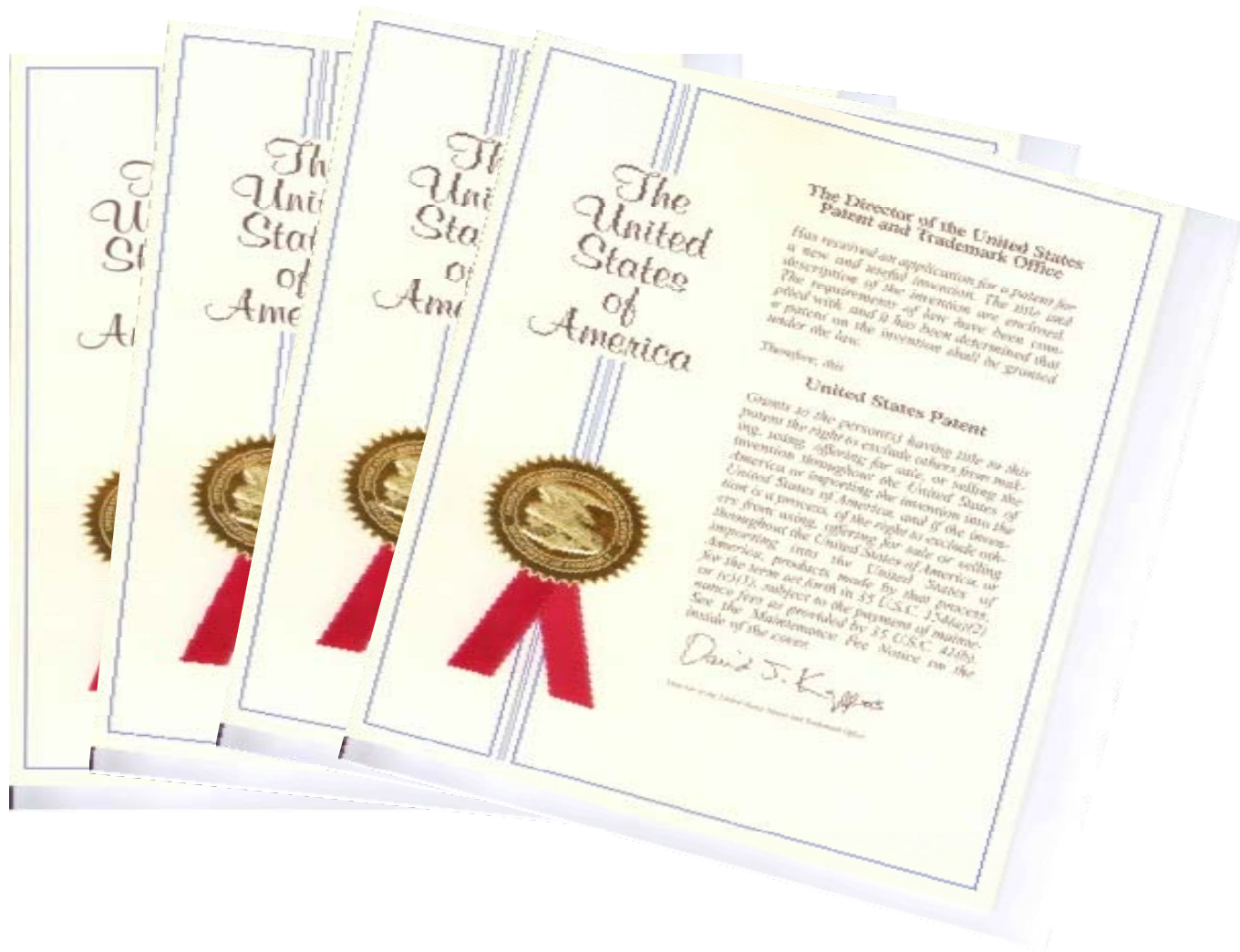


No. 2 in Energy Area

Oil Chem Network – Global Business Strategy



Patented Products & Processes for IOR



State-of-the-art Patented Technology for EOR

Description	Patent No.
New Anionic Surfactants for Large Quantity	6,043,391
Anionic ASP Composition	6,022,834
Sulfonated Phenolic Resins for Low Adsorb	6,736,211
Viscoelastic Surfactants for EOR	7,373,977
Alcohol Ether Sulfonates for Hi Temp/Hi TDS	7,427,588
Organic Alkali for Hard Waters	11/811,786
Amphoteric Surfactants for High Temp/Hi TDS	7,556,098
High MW Anionic Surfactants	11/895,497
Internal Olefin Ether Sulfonates for Hi Temp/Hi TDS	12/009,429



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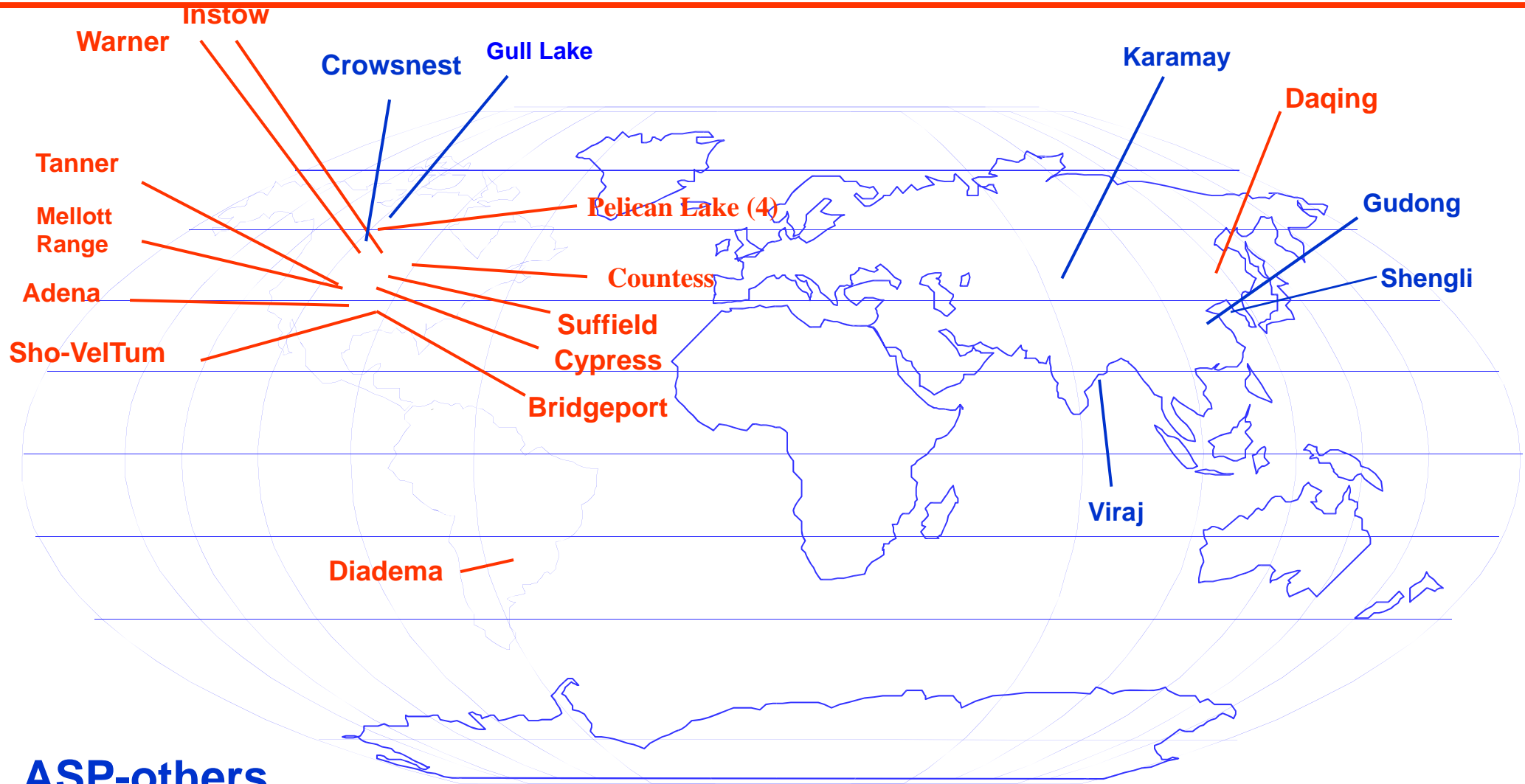


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Field Experience



ASP, SP Field Flood Since 1995

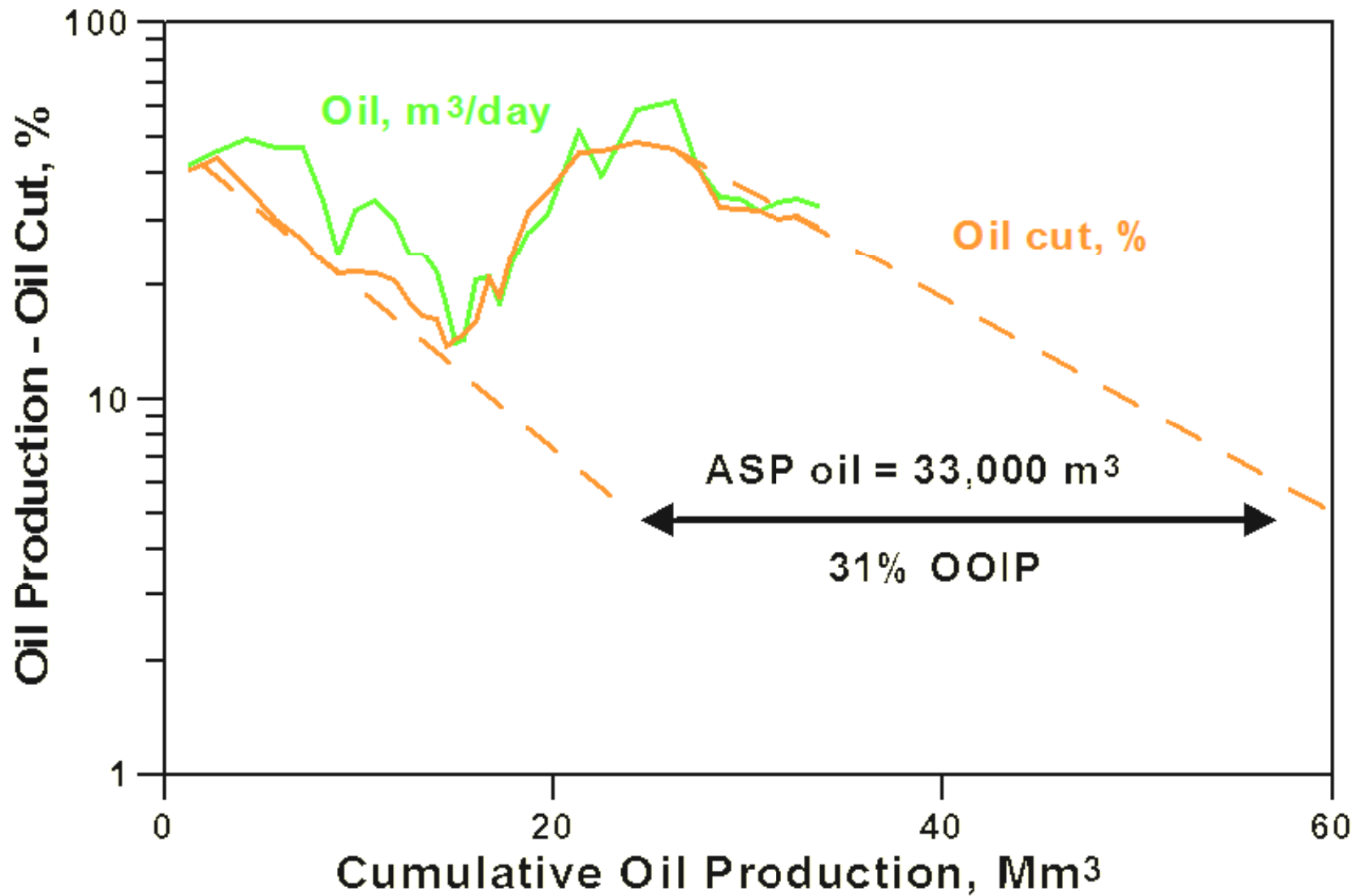


ASP-others

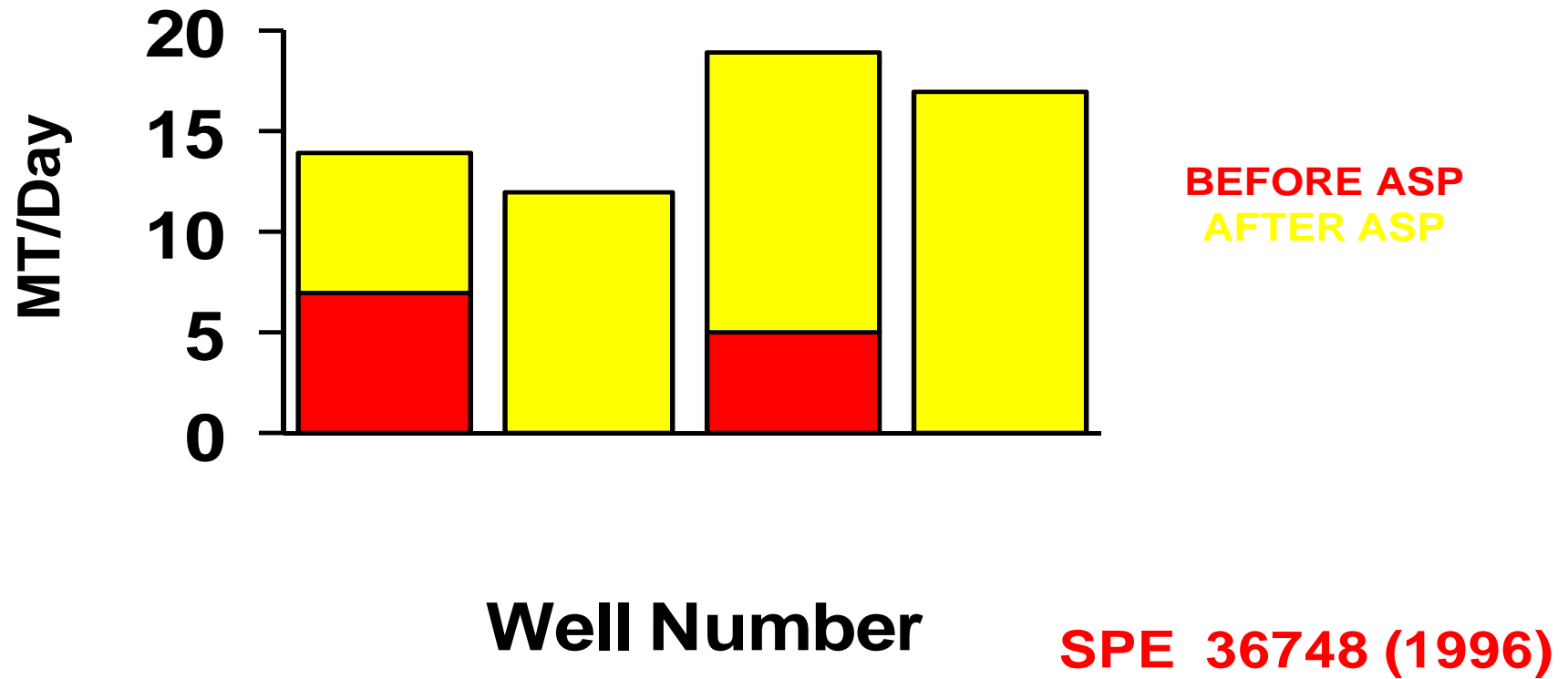
ASP, SP- Oil Chem

Surtek. Chemical Enhanced Oil Recovery

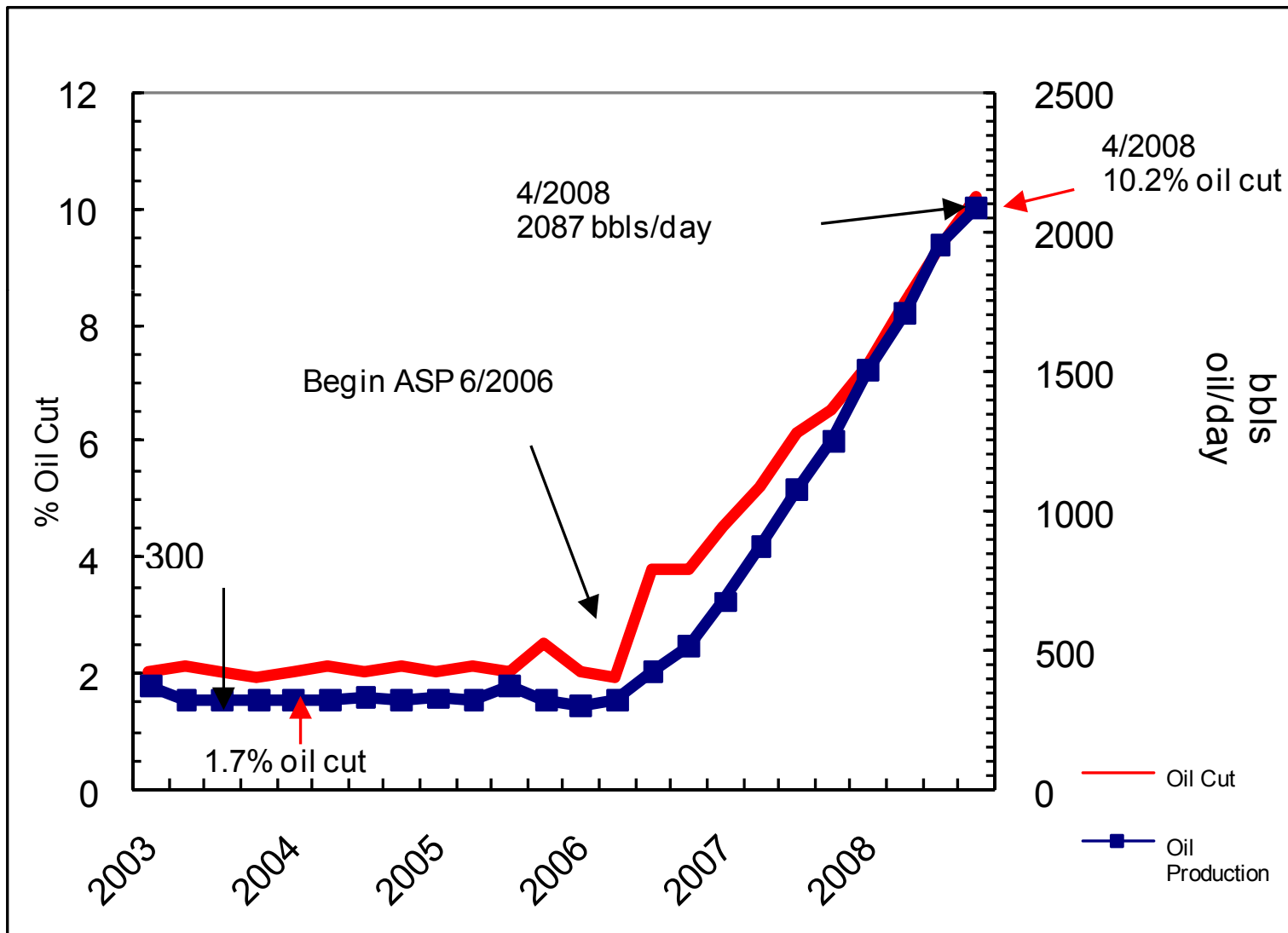
Daqing ASP Pilot Production



ASP PROJECT USING ORS-41™ IN DAQING, CHINA

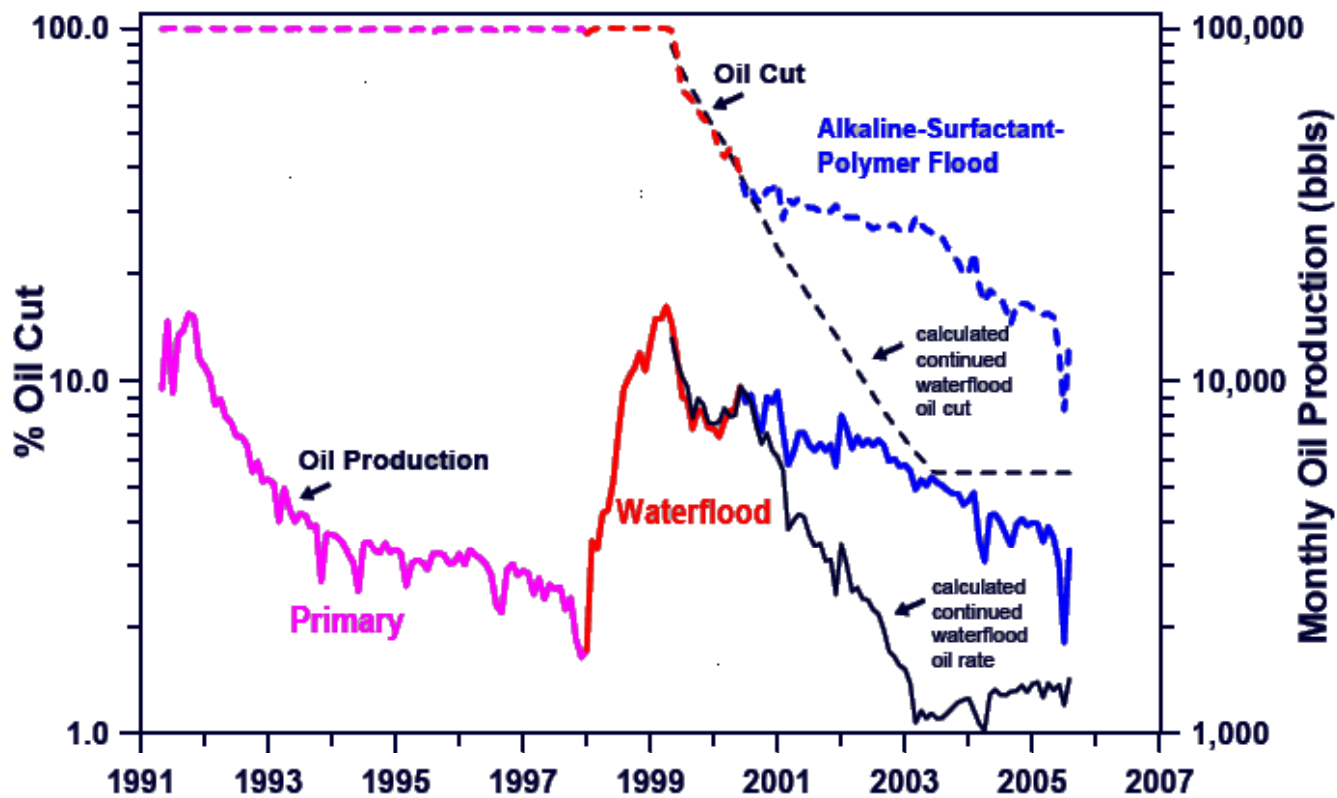


Husky Taber ASP Project



Tanner, Wyoming ASP Project

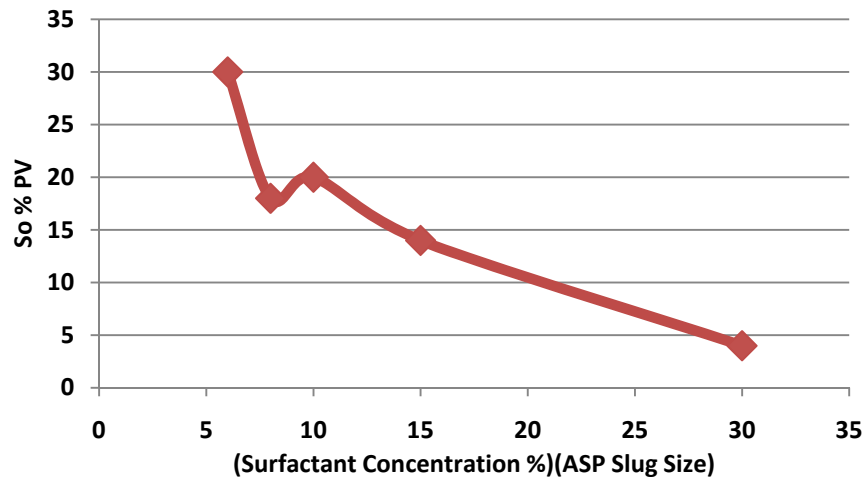
Tanner, Wyoming Alkaline-Surfactant-Polymer Flood



SPE 100004

Sho-Vel-Tum Field ASP Project

- On production > 40 yrs, extensive water flood, produced 4 bbl/day
- ASP started on 2/98, using Na₂CO₃ and ORS-62
- Total incremental oil > 10,444 bbl in 1.3 years



SPE 84904

North America SP Project

- Heavy oil field
- Under polymer flood
- Added 0.1% surfactant with polymer
- ~ 3 months later, the water cut reduced from 97% to 58%

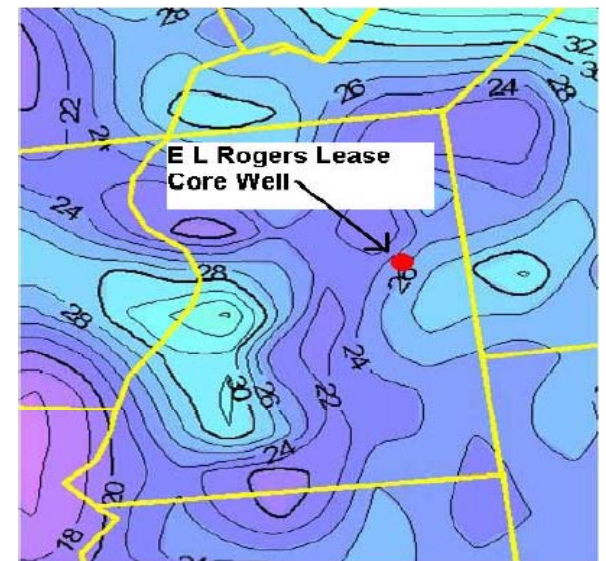


Big Sinking, Kentucky

Chemical injected: 0.8% NaOH + 0.1% ORS-162HF

Problems overcome:

- IFT lowered from 23.6 to 0.001 mN/m
- Poor water injectivity
- High water cuts
- 220% increase in injectivity



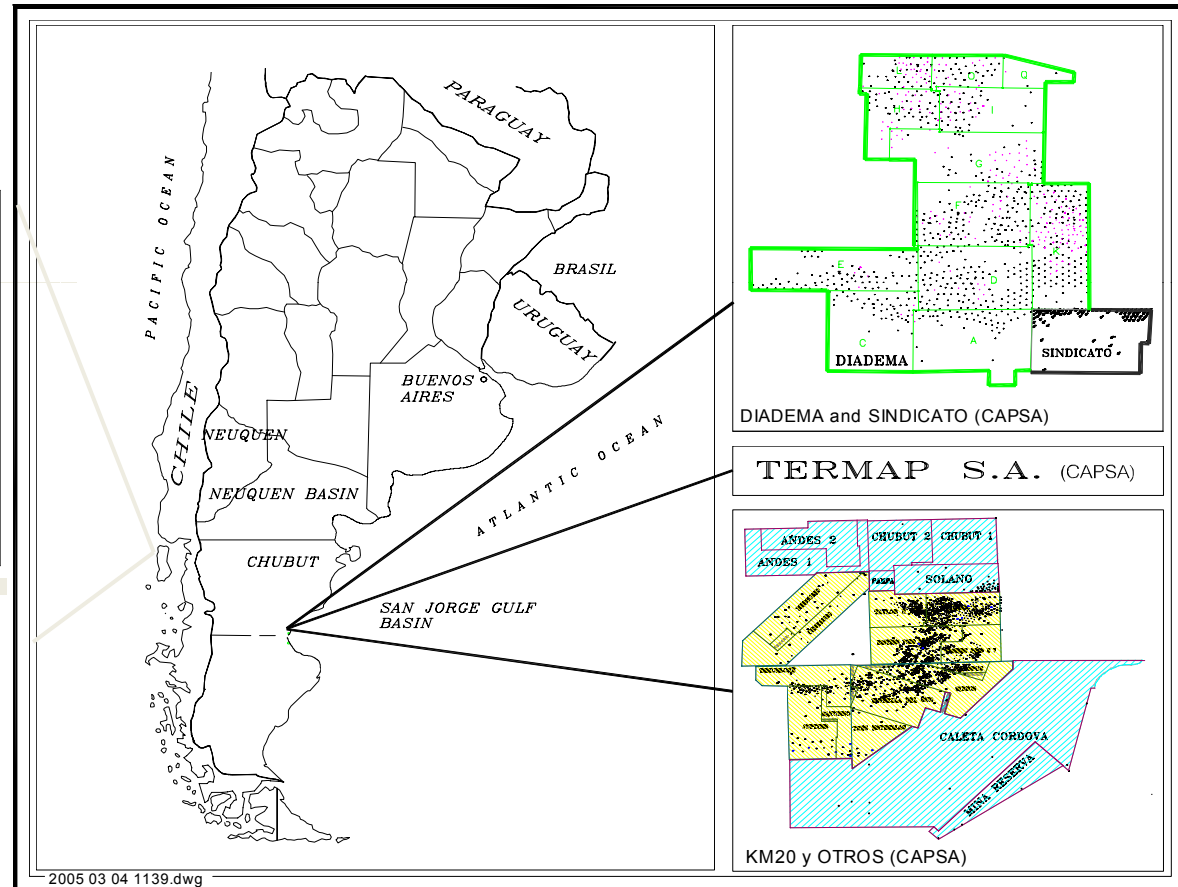
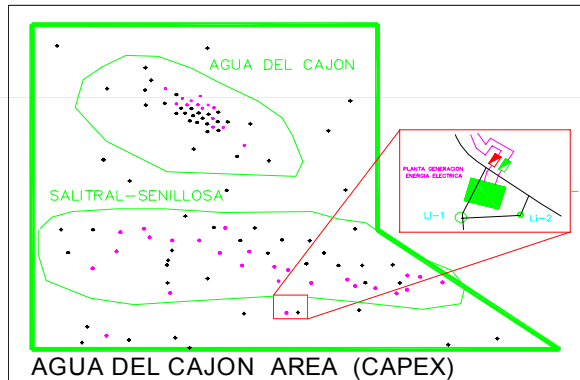
SPE 89384

Surfactant Flood For Low Perm Formation

- BHT ~ 56C
- Produced brine is used to re-inject
- TDS ~ 195,000 ppm, Ca,Mg ~2500 ppm, sour, high Fe contain
- Had trouble injecting water
- Using 0.1% SS-780 since 2003 in 2 fields – successfully increased the oil production

Note: Producer is not revealed due to customer confidentiality

South America SP Project



Offshore AS Project

- Sea water is softened on the platform
- Single well test successfully performed using SS 6-72LV injected with NaOH



SPE 100943, 109033



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Product Lines



Oil Chem IOR Product Lines

New Generation of IOR Surfactants:
GreenSurf™ - Bio-Based low adsorption
surfactant

Visco-elastic Smart
Surfactant to provide low
IFT and viscosity

ORS Series - Pioneer ASP
surfactants. > 60 Millions
pounds at $\leq 0.2\%$ successfully
implemented



NanoSurf 969 – 100% “Green”
based micro emulsion for gas
shale

“Cold” Heavy Oil Recovery –
No steam or solvent is
needed

“Green” aromatic solvent
replacement

ORS Surfactants for ASP

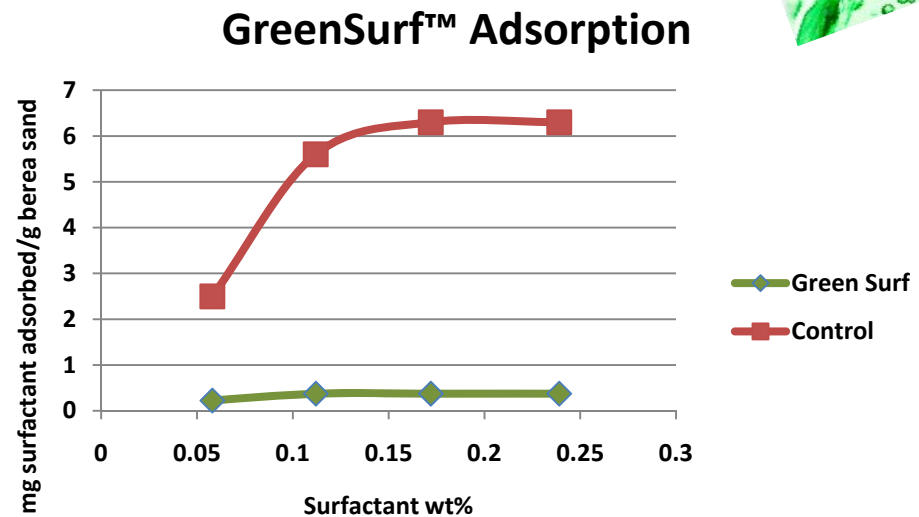
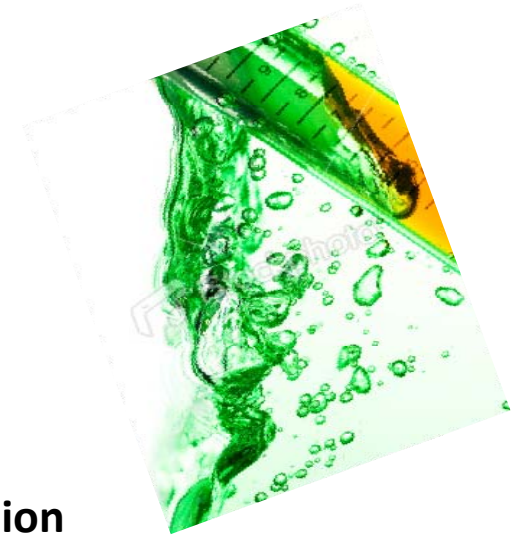


- > 60 million pounds were injected since 1995 with total success
- Low concentration required
- No co-surfactant, solvent, salt optimization required
- Field proven success



GreenSurf™ for SP and ASP

- State-of-the-Art, Bio-based surfactants
- Tolerant to high TDS, Ca, Mg
- High temperature stable
- Low adsorption



“Cold” Heavy Oil Recovery

Heavy oil recovery by modifying the apparent viscosity of the oil with small amount of the surfactant

No steam or solvent is required

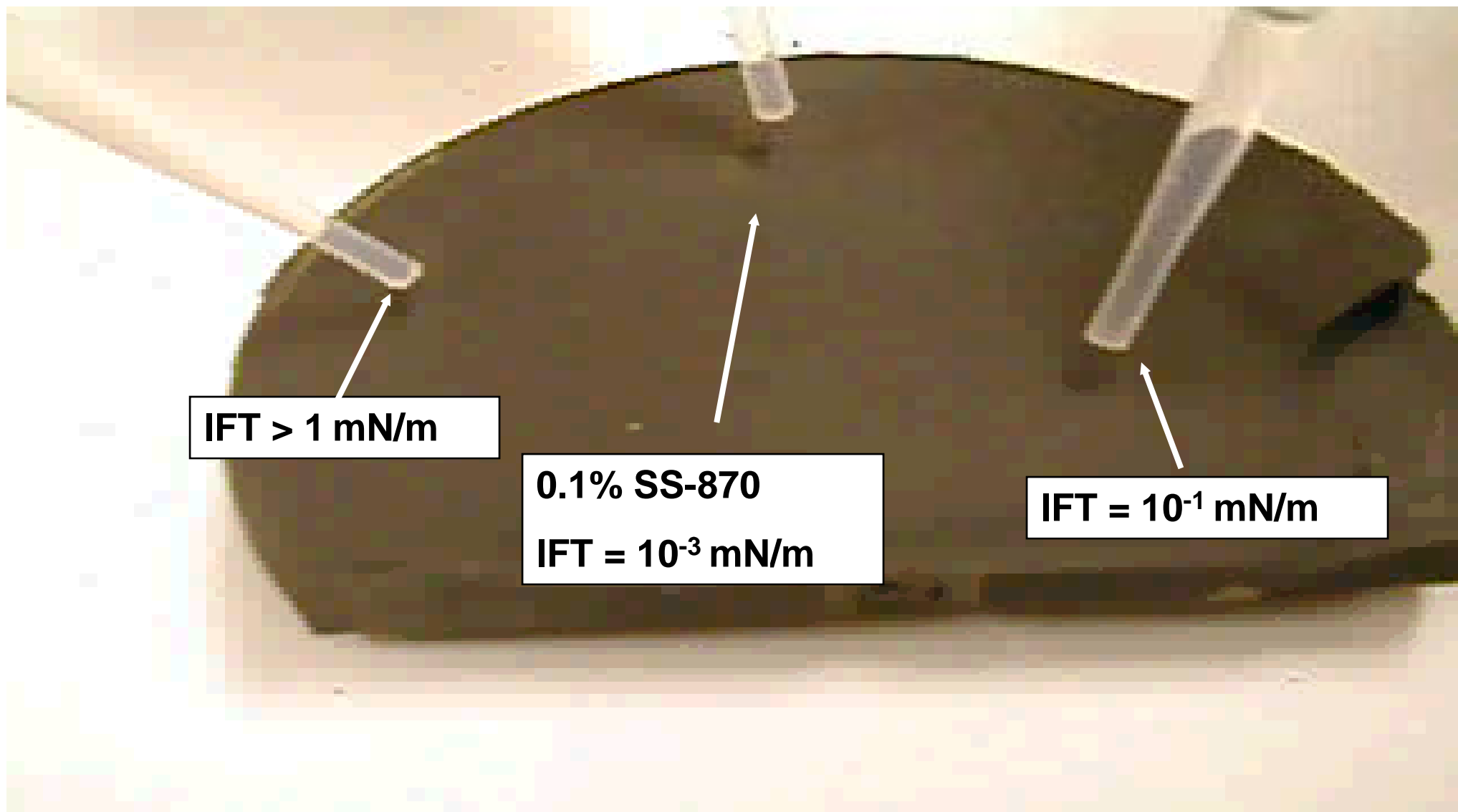
Heavy Oil in Brine – Control



Heavy Oil Recovery – 0.1% Surfactant @ Ambient Temperature



Wettability Alteration



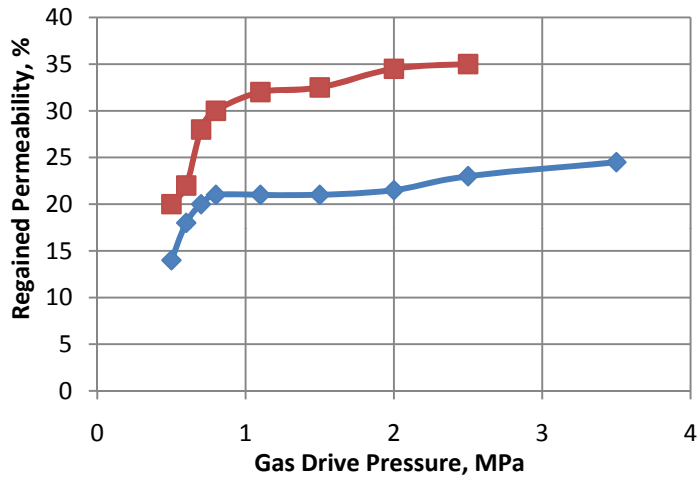
NanoSurf 969 – Micro Emulsion for Unconventional Gas Reservoir

- 100% “Green” – environmental friendly
- Reduce Phase trapping
- Improve water recovery
- Increase gas regained permeability
- Low pour point <- 20°F

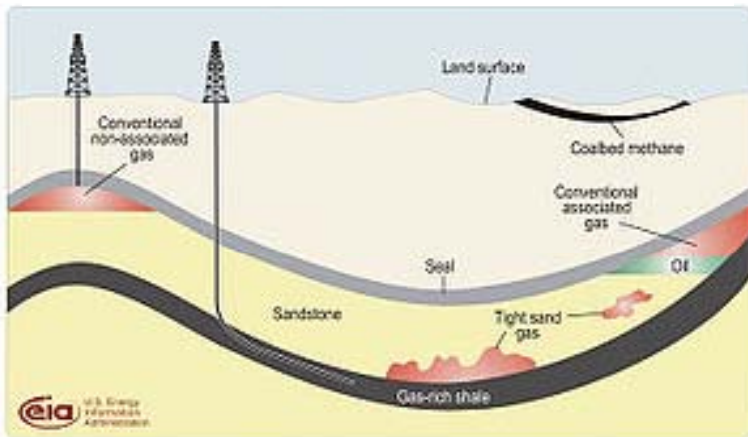
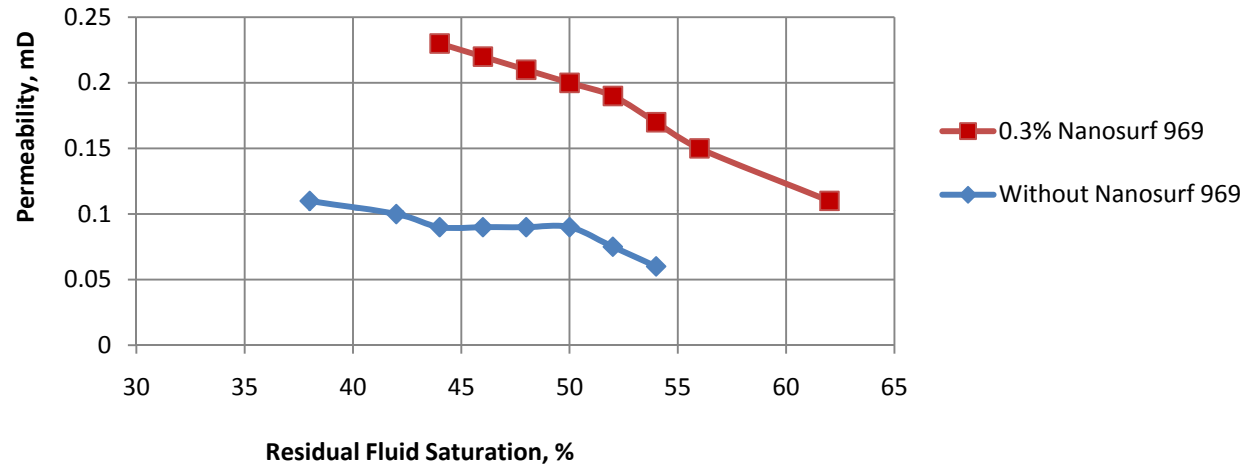


Nanosurf 969 for Shale Gas Recovery

Regained Permeability Increase

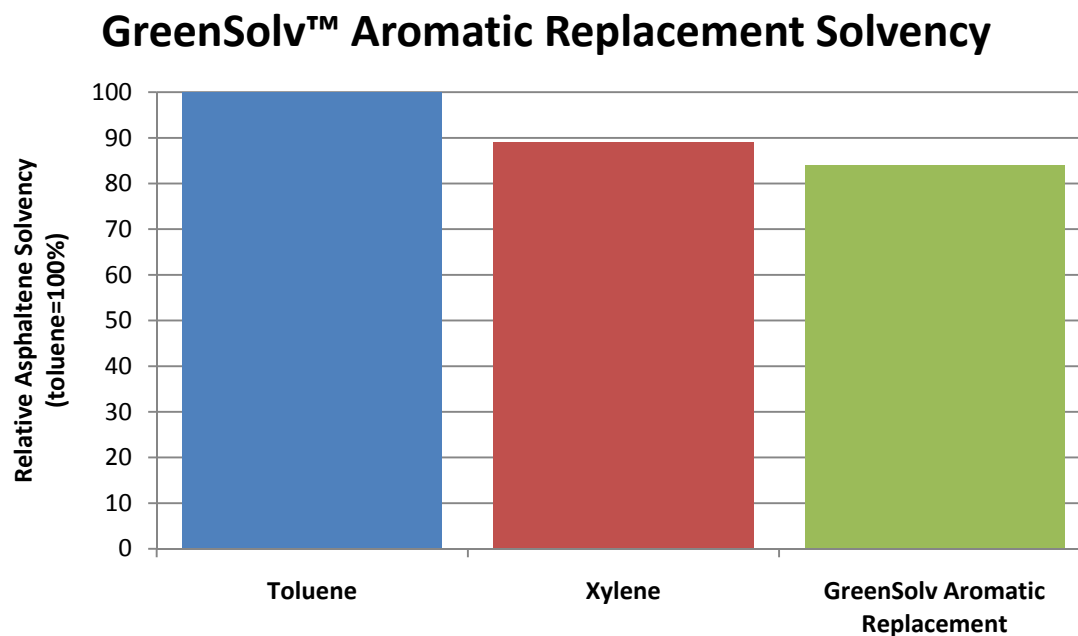


Relative Permeability vs Residual Fluid Saturation



“Green” Aromatic Solvent Replacement

- GreenSolv Wellbore Cleaner
- GreenSolv Rig Wash
- GreenSolv Aromatic Replacement





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Services Available



Services Available

- Complimentary surfactant screening/optimization
- Complimentary chemical EOR surfactant consultation
- Custom surfactant design
- Local manufacturing available
- Field experiences to share

