



A Novel, Field-proven Reservoir Triggered Polymer for Enhancing the Economics of Mobility Control Floods

EXCELCEOR TECHNOLOGY

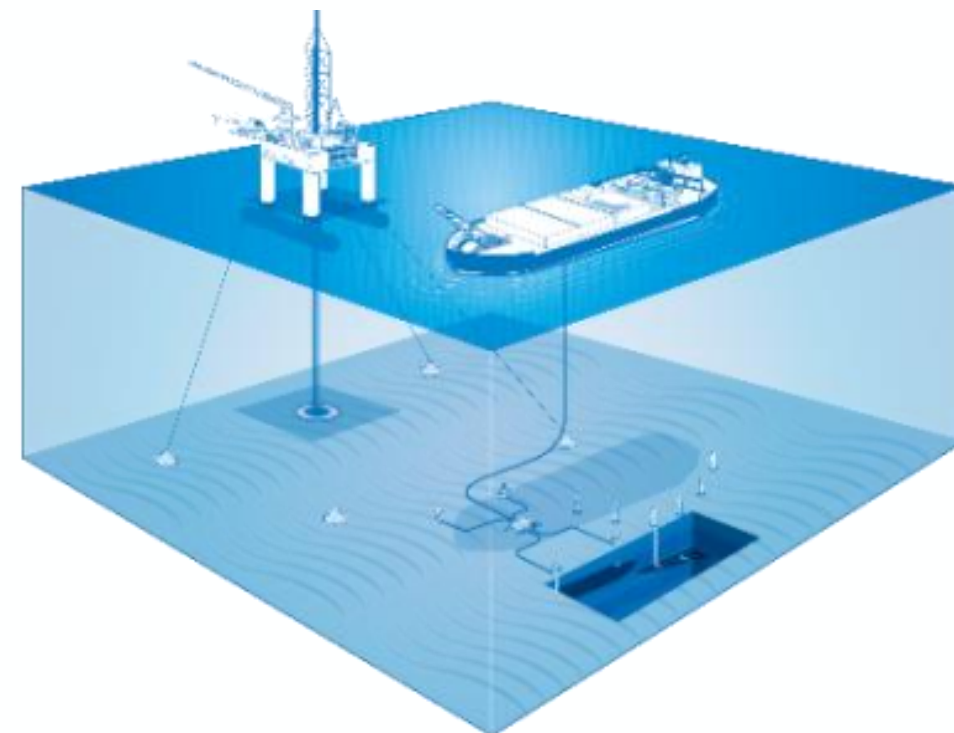
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- Polymer flooding is an established technology (HPAM) to improve mobility ratio and sweep efficiency
- Limited use offshore due to challenges

CHALLENGES

- Limited injectivity – lower oil production
- Shear degradation – 30-70% higher polymer dosage
- Severe conditions and regulations

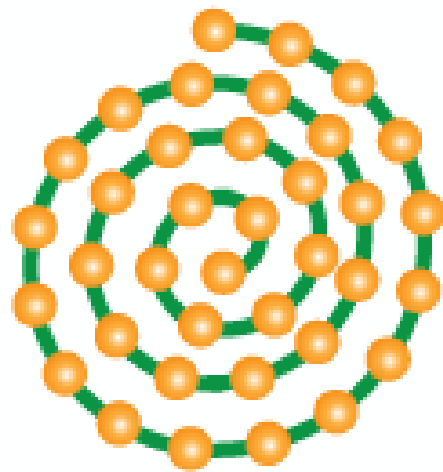


GOALS

- Maintain injectivity with water-like viscosity
- Shear protection to reduce polymer consumption
- Formulated for North Sea conditions and regulations

Developed Reservoir-Triggered Polymer Addresses These Challenges

- Develop enhanced polymer technology through collaboration
- Injects like water, then builds viscosity in reservoir
- Excelceor delivers HPAM into the reservoir intact



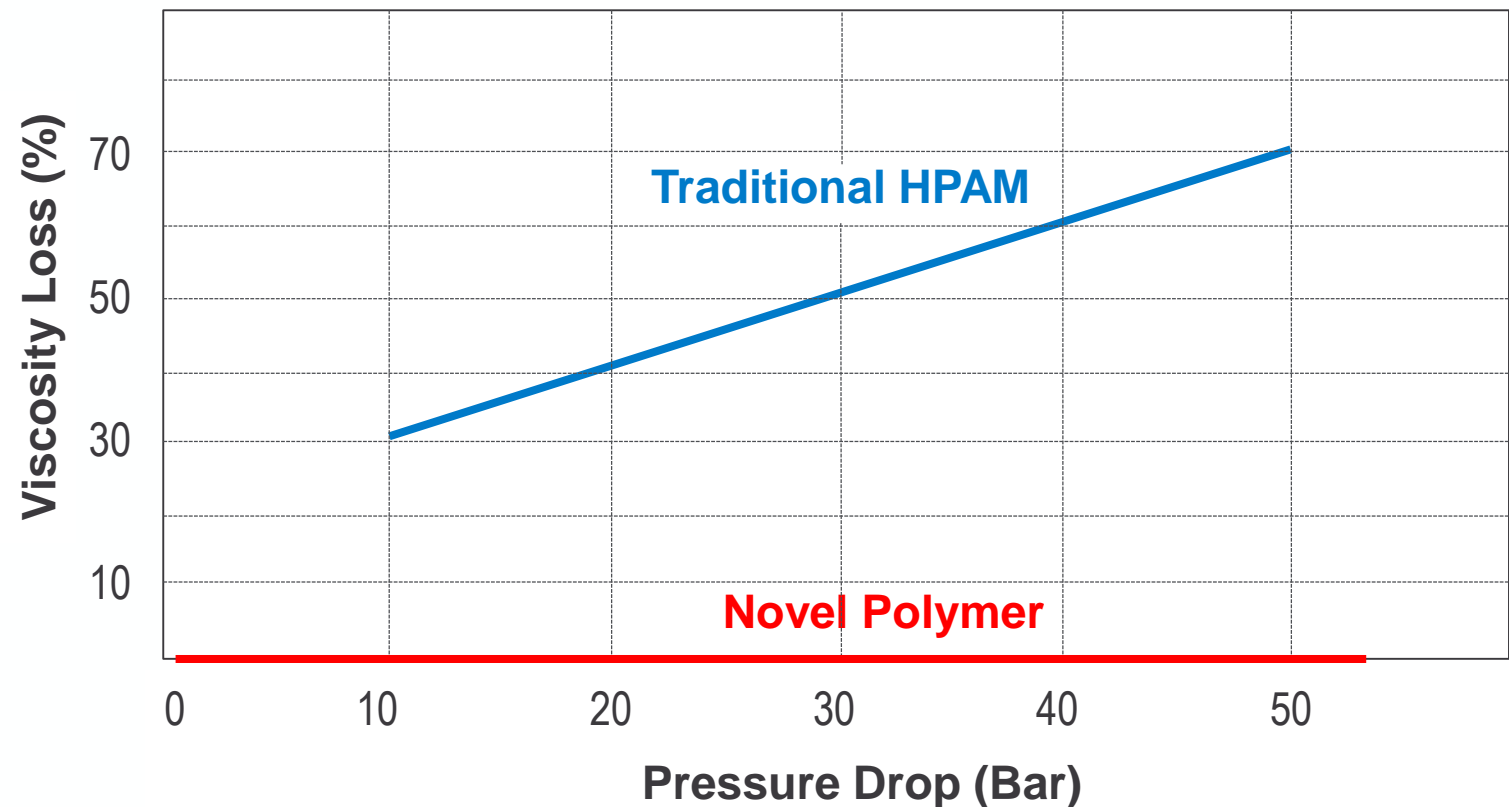
- Shear protected package
- Water-like viscosity



- Reservoir-triggered polymer
- Viscosity builds to target

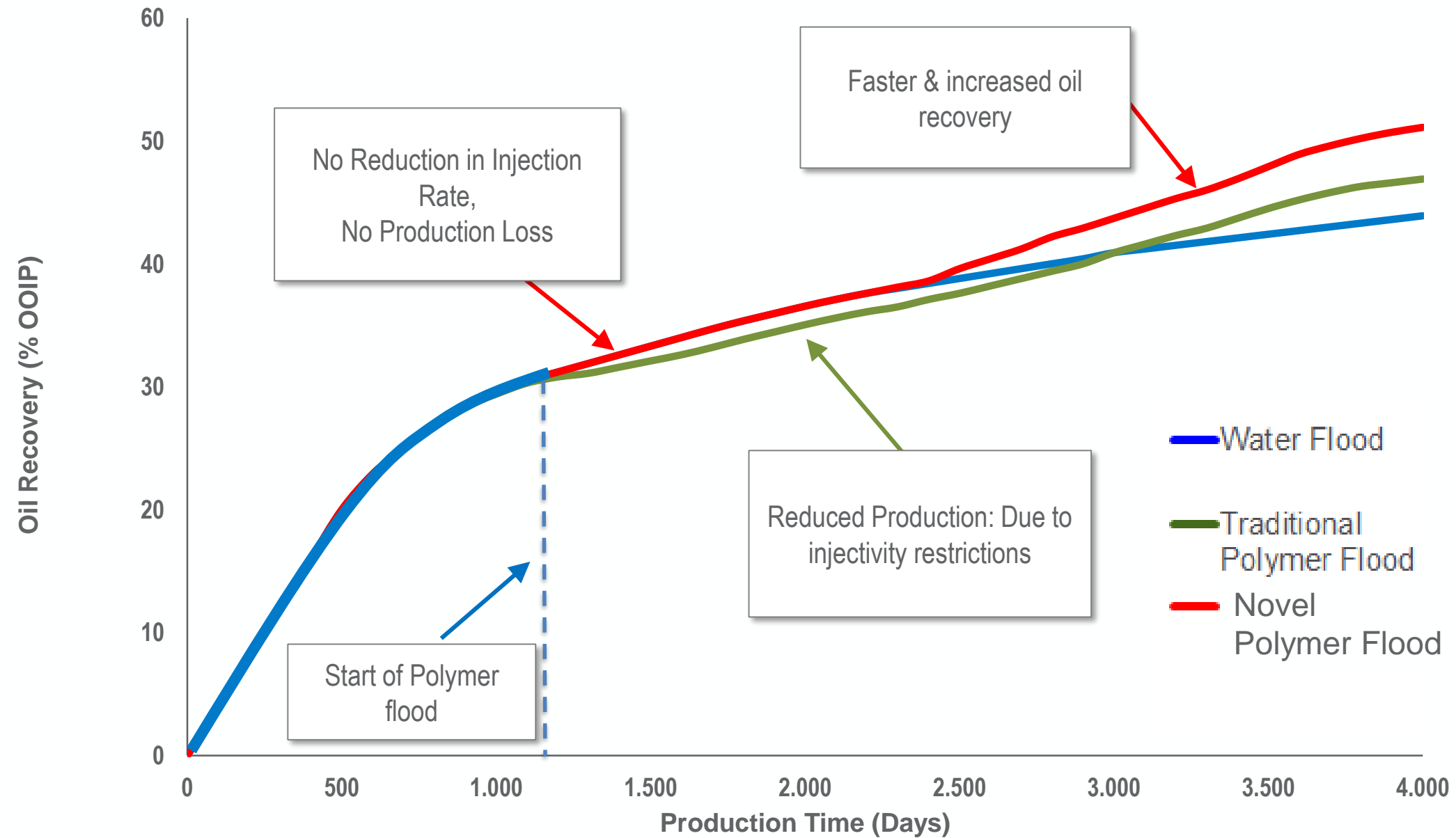
Pilot Shear Resistance Trial, 2016

- HPAM shear through chokes results in 30% to 70% loss in viscosity*
- Field trial was run at 1/30th scale to represent chokes used in the North Sea
- Pressure drop was controlled using flow rate and choke opening
- Viscosity results indicate ***this novel polymer shows no shear degradation at all***

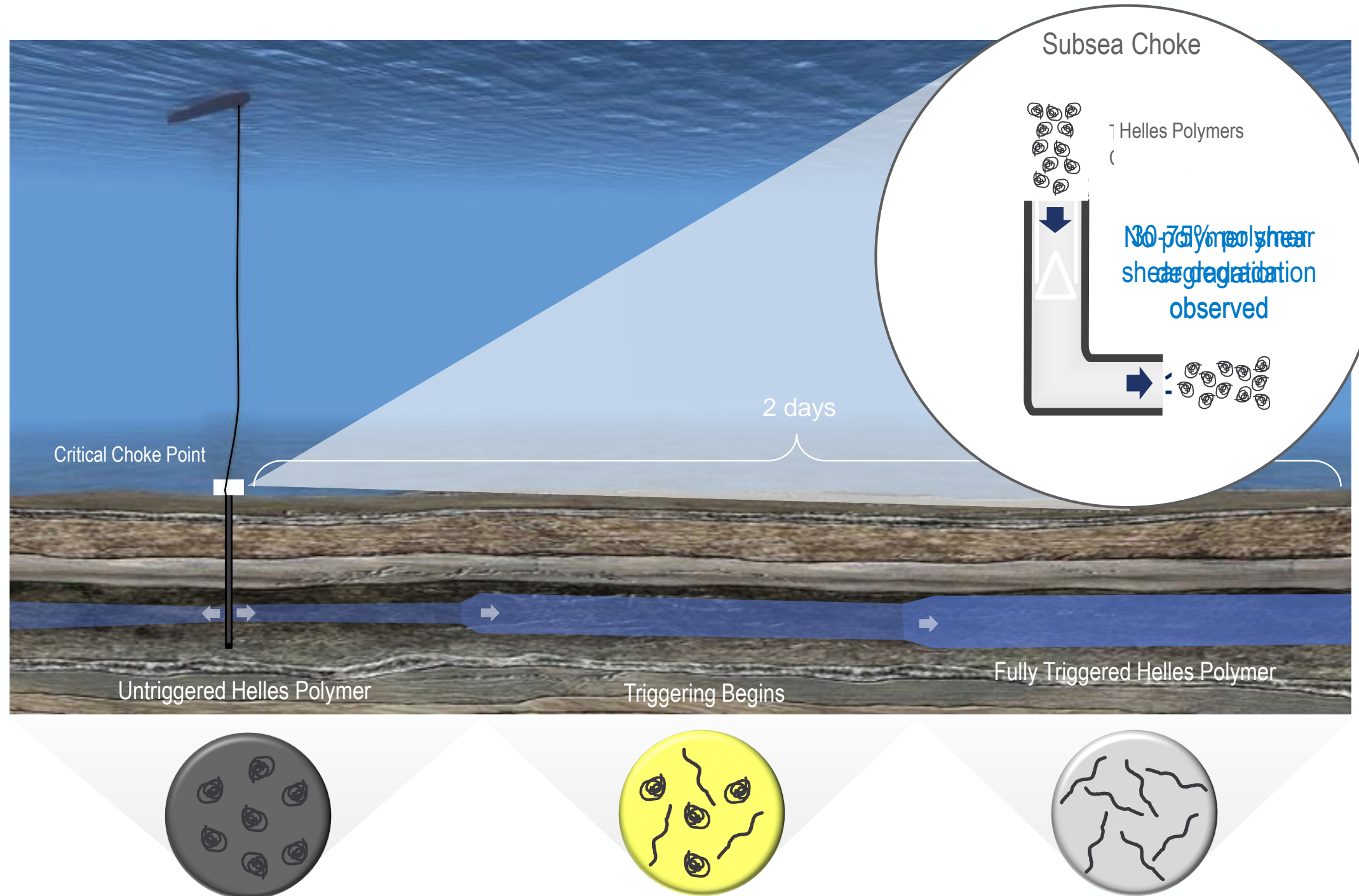


* Morel, D, Vert, M, Jouenne, S, Nahas, E. *Polymer Injection in Deep Offshore Field: The Dalia Angola Case* SPE 116672 (2008) Maerker, J.M. *Shear Degradation of Partially Hydrolyzed Polyacrylamide Solutions*. SPE 5101 (1975)

Numerical Simulation and Forecast



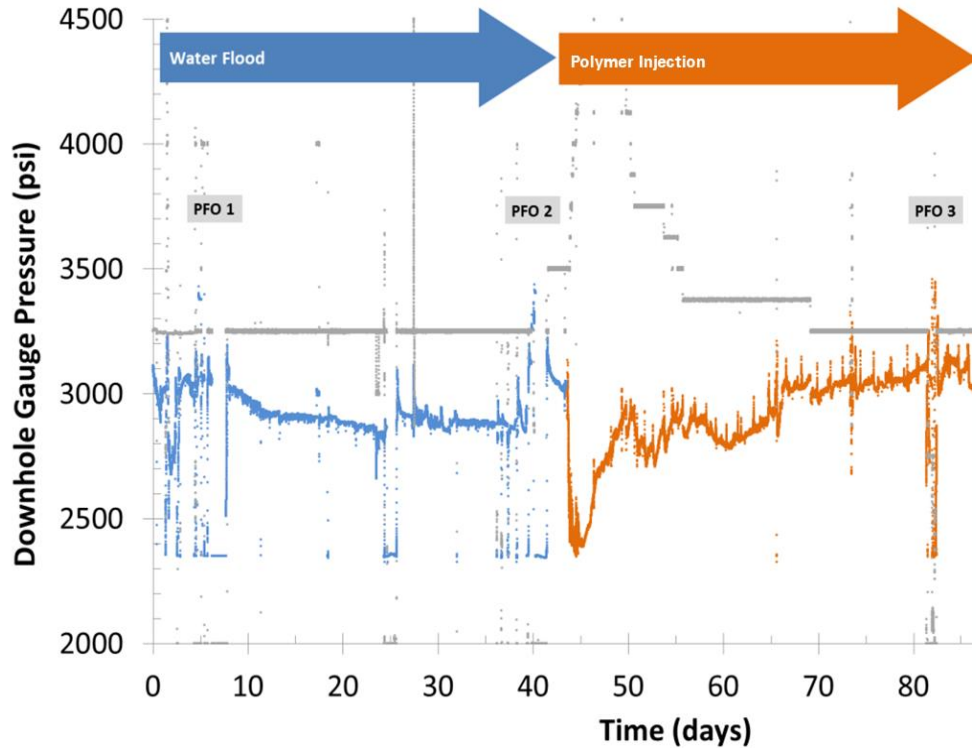
Field Implementation Concept



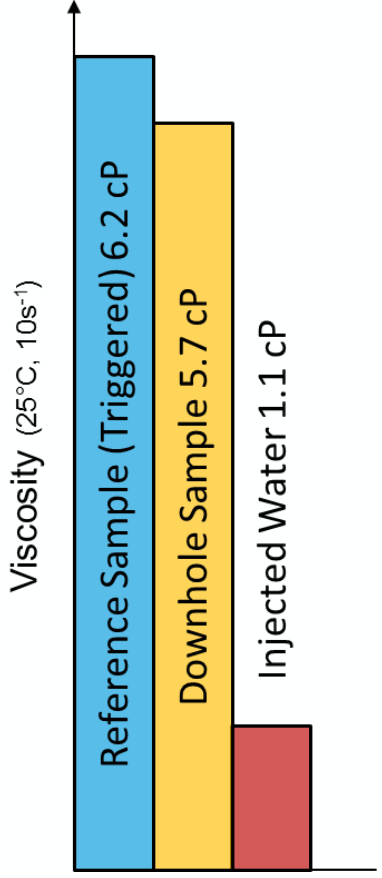
Texas Field Trial- All KPIs Met or Exceeded



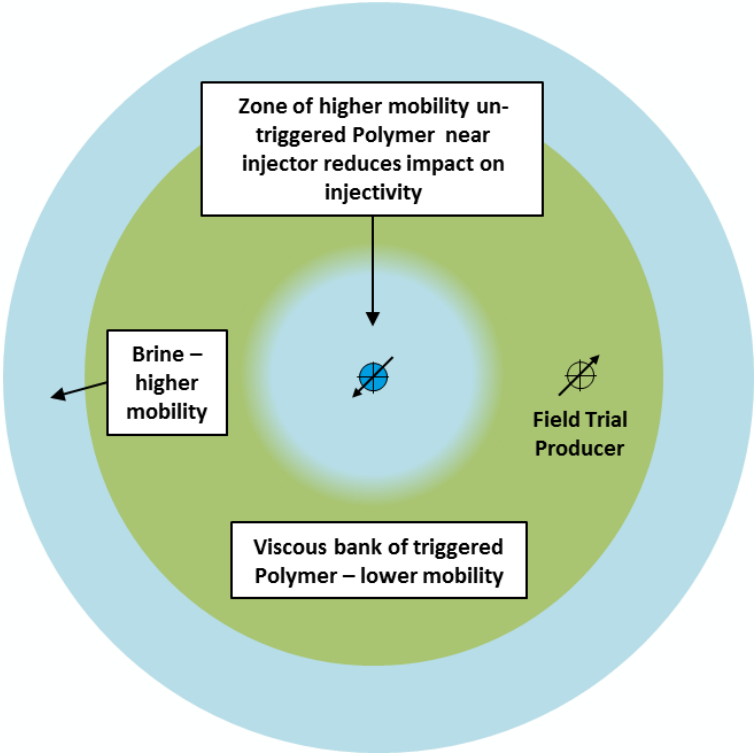
1. Injection with a viscosity similar to water



2. Shear stability during injection



3. Triggering deep in the reservoir to achieve the target viscosity

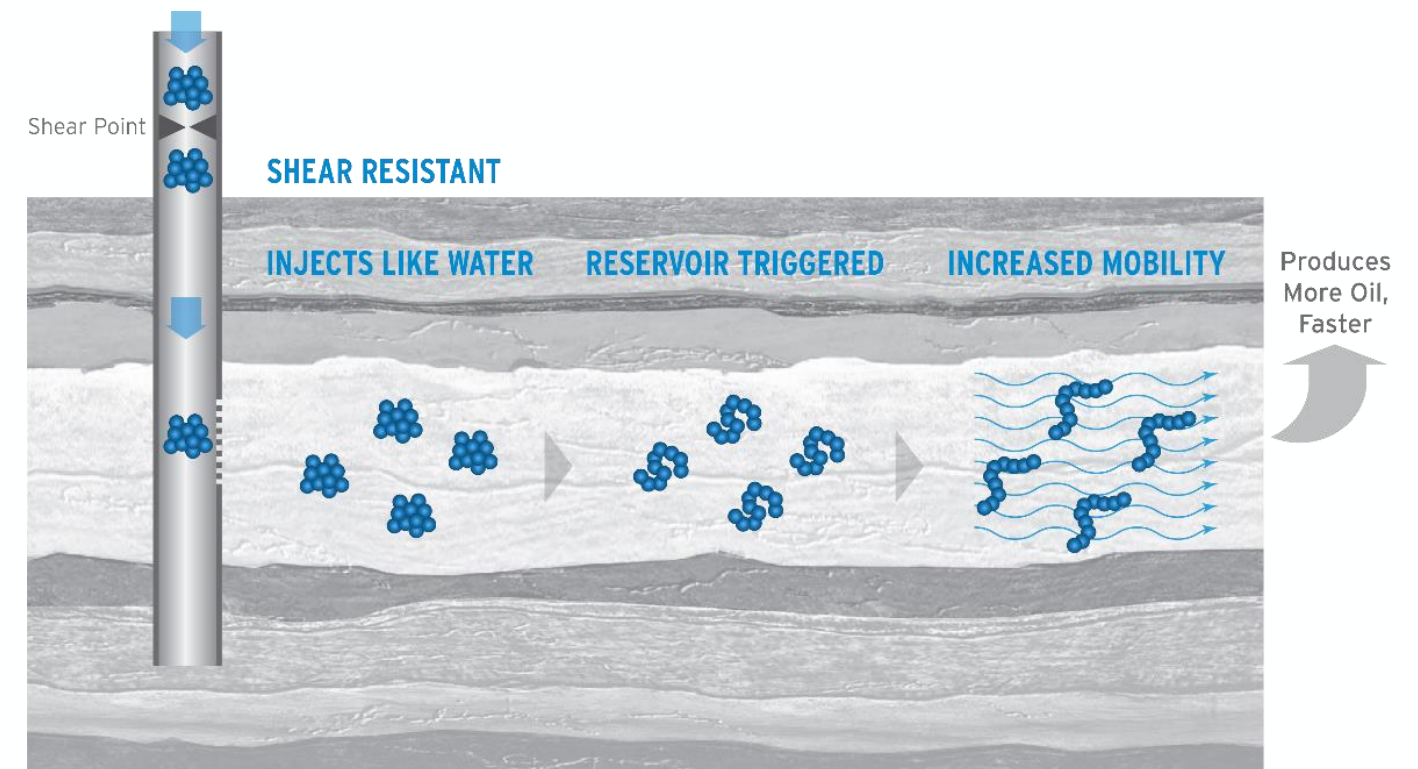


SPE-188528-MS Successful Field Trial of a Shear-Resistant, High-Injectivity, Reservoir-Triggered Polymer (ADIPEC 2017)



Closing Remarks: Deliver HPAM to the Reservoir Intact

- More oil, faster with reduced chemical usage for offshore EOR
- Enhanced polymer technology developed through five-year collaboration to address offshore challenges
- Successful laboratory and scale pilot trials prove benefits over HPAM:
 - Maintain injectivity with water-like viscosity
 - Shear protection to reduce polymer consumption
 - Triggers to achieve target viscosity in expected time



Questions?



THANKS!