

## Novel cold flow improvers for waxy crudes in deepwater developments

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Production and transportation of waxy crudes can pose a variety of operational challenges including wax deposition, flow problems and gelling. Increasingly operators are seeking to deploy a range of advanced technologies to prevent or mitigate wax flow assurance problems in preference to remedial techniques. This industry trend is most evident in deepwater developments where intervention costs or loss of production infrastructure is prohibitively expensive.

Cold flow improvers, such as wax deposition inhibitors, pour point depressants and rheology modifiers, have been successfully deployed to manage wax flow assurance over many years. However, the new frontier of deepwater oil production has produced additional challenges for additive development, chemical manufacturers and oilfield service companies.

In particular, next generation cold flow improvers will require an extended range of physical property characteristics relating to deepwater deployment, such as polymer stability and pumpability under high pressure and/or low temperature conditions [1]. Also it should be noted that expanding regulatory regimes for the offshore oil industry will increasingly demand lower environmental impact chemistries.

This paper describes an early stage product development project for a proprietary polymer chemistry type, previously subject to IPR restrictions, offering significant promise for wax flow assurance management in offshore/deepwater field applications.

Following a general introduction to the polymer chemistry, and its potential as a cold flow improver for paraffinic crude oils and refined fractions, the paper will present a summary of studies based on laboratory synthesised materials with emphasis on –

- Performance testing
- Physical property characterisation

In summary this polymer type has been shown to demonstrate efficacy both in wax deposition inhibition and pour point depression in a limited selection of waxy crude oils with unique physical property characteristics suited for deepwater deployment.

### References

- [1] D.W. Jennings & M.E. Newberry Baker Hughes Inc.  
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