

NORTH AUSTRALIAN CENTRE FOR OIL AND GAS



Course on Gas Hydrates and Flow Assurance, 24 – 26 November 2015

Course Description

Gas hydrates are ice-like compounds formed as a result of combination of water and suitable sized molecules under low temperature and high pressure conditions. The necessary conditions for their formation could exist in offshore and some onshore pipelines. The formation of gas hydrates could cause in serious economical, operational and safety concerns.

Various topics in gas hydrates will be covered, including; hydrate formation conditions, inhibitor design strategies, the application of thermodynamic and low dosage hydrate inhibitors, and, hydrate blockage removal techniques. Particular emphasis is placed on predicting gas hydrate formation conditions for different production scenarios and the design of appropriate hydrate prevention strategies. The

importance of laboratory techniques and protocols for evaluating the performance of thermodynamic and low dosage hydrate inhibitors (LDHIs) will be discussed. The participants are encouraged to bring and discuss their specific case studies.

Key Learning Areas

- Learn about how and why hydrates can form and how to evaluate the risk
- Understand the methods for avoiding hydrate formation and how best to screen and select mitigation options
- Find out how to model various scenarios
- Discuss practical solutions to hydrate problems that can arise.

Course Content and Main Topics

- Conditions necessary for hydrate formation
- Hydrate dissociation versus hydrate formation
- Hydrate phase boundary for gas and oil systems in the presence of condensed water
- Hydrates in low water content systems, dehydration requirement for avoiding gas hydrates, water dew point and its effect on hydrate stability zone
- Using inhibitor in low water content gases
- Evaluating gas hydrate risks in various scenarios, including drilling, well intervention, cleaning, testing, start-ups, normal operations, shut-downs
- Options available to avoid gas hydrate problems
- Types of inhibitors, their advantages and disadvantages covering Low Dosage Hydrate Inhibitors (LDHI), Kinetics Hydrate Inhibitors (KHIS)
- Conventional and new testing techniques for kinetic hydrate inhibitors
- Addressing challenges associated with KHI application, KHIS and shut-in conditions, KHI in produced water re-injection, KHI in MEG regeneration
- KHI removal, recovery and reuse
- New techniques for improving reliability of hydrate prevention strategies
- Hydrate safety margin monitoring
- Detecting early signs of hydrate formation
- Under-inhibited systems, transportability of hydrate slurry
- Techniques for removing hydrate blockages, risks involved and how to minimise them
- Tutorials, case studies and exercises

Computer Software

A one month license for Heriot-Watt University/Hydract hydrate prediction software (HydraFLASH) will be provided to the participants for simulating various scenarios and going over the course materials, exercises and tutorials during/after the course.

Guest Presenter

The course will be delivered by Professor Bahman Tohidi, Centre for Gas Hydrate Research, Institute of Petroleum Engineering, Heriot-Watt University, Edinburgh, UK.

Professor Tohidi graduated with a PhD in Petroleum Engineering from Heriot-Watt University in 1995. He started his employment at Heriot-Watt University in January 1994 working in both Hydrate and Reservoir Fluids research projects. He is a consultant to major oil and service companies. Bahman is Managing Director of Hydrafact Limited a Heriot-Watt spin-out Company formed in 2006 with Flow Assurance and PVT as its main area of activity.

His research interests include gas hydrates, flow assurance, PVT, phase behaviour and properties of reservoir fluids. Currently, he leads Hydrate and Phase Equilibria Research Group at the Institute of Petroleum Engineering, Heriot-Watt University. He is the Director of Centre for Gas Hydrate Research and the Centre for Flow Assurance Research (C-FAR) at Institute of Petroleum Engineering, with several projects on various aspects of gas hydrates and flow assurance, and phase behaviour and properties of reservoir fluids.



FOR FURTHER INFORMATION CONTACT

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