



Association of the
Chemical Profession
of Alberta

Two-Day ACPA Short Course in Flow Assurance Chemistry

Tuesday and Wednesday, October 2 and 3, 2012

8:00 am to 4:30 pm

Blackfoot Inn

5940 Blackfoot Trail S.E. Calgary, Alberta

Day 1: Wax Issues

1. *Types of Oils*
2. *Characterization Protocols*
3. *Petroleum Chemistry*
4. *Wax Analysis*
5. *Definition of Flow Assurance*
6. *Overview of Organic Solids*
7. *Phase Behavior*
8. *Flow Assurance of Waxy Crudes*

Day 2: Asphaltene Issues

1. *Asphaltene Analysis*
2. *Deposit Analysis*
3. *Flow Assurance of Asphaltene Crudes*

Registration fees (includes continental breakfasts, lunches and coffee breaks):

Early-bird registration (received by **September 14, 2012**)

- Full two-day course – \$650 for ACPA members, \$750 for non-members
- One day only – \$350 for ACPA members, \$400 for non-members

Regular registration (received after September 14 and before **September 28, 2012**)

- Full two-day course – \$750 for ACPA members, \$850 for non-members
- One day only – \$400 for ACPA members, \$450 for non-members

To register, please visit the News and Events page on the ACPA web site at www.pchem.ca.



ACPA Short Course in Flow Assurance Chemistry

The depletion of conventional crude oil resources has caused a shift towards heavy oil and offshore production. Large pressure and temperature drops in production systems increase the risk of organic solids precipitation and deposition. Commingling of incompatible fluids (e.g. diluents with heavy oils) and gas lift may also destabilize the system.

Flow assurance chemistry addresses a variety of fluid property related issues that impact the flow of oil, gas and water through production systems. Flow assurance challenges mainly focus on the prevention and control of solid deposits which could potentially block the flow path and consequently decrease production. The solids of concern generally are hydrates, wax and asphaltenes. Sometimes scale and sand are also included. The lost production and costs associated with the organic deposits may lead to premature abandonment of otherwise recoverable reserves.

This short course will focus on flow assurance related to asphaltenes and wax. Two parts will be presented and discussed:

- The chemistry of oil and deposits will be covered as a prerequisite to understanding flow assurance, with an emphasis on major analytical methods. Advantages and disadvantages of the different methods will be highlighted. Screening methods for inhibitors and their limitations will also be discussed.
- The precipitation and deposition of waxes, asphaltenes, and hydrates (time permitting) will be discussed, along with the corresponding techniques for deposit prevention and remediation. Experimental procedures for measuring the severity of organic solids precipitation and deposition will be presented and modeling approaches for their prediction will be reviewed. The chemistry associated with flow assurance of heavy oils will be presented.



Biographies of the Authors

— *Abdel M. Kharrat, PhD, PChem*

Abdel Kharrat studied at the Université de Bordeaux in France where he earned his doctorate in Chemistry.

In 1994 he joined Alberta Research Council as a Senior Research Scientist. He spent almost nine years there, seven of them as the leader of a group of scientists and technologists working on the development of remediation techniques and analytical methods for petroleum hydrocarbons and other chemicals.

Abdel then joined Schlumberger in September 2003. Abdel has been working in the area of flow assurance chemistry since. Abdel has published numerous papers, client reports, internal reports and patents and patents applications.

— *Kamran Akbarzadeh, PhD, PEng*

Kamran Akbarzadeh studied at the Shiraz University in Iran where he earned his PhD in Chemical Engineering.

In 2004 he joined the Alberta Research Council as a Research Scientist. He spent almost one year as an investigator of the mechanism of fouling in upgrading facilities, Mechanism of Naphthenic Acid Corrosion in Heavy Oil and Bitumen Processes, and Oil Compatibility and Stability.

Kamran joined Schlumberger in May 2005 and has worked in the area of flow assurance engineering ever since.

Kamran has authored numerous papers, client reports, internal reports and patents and patents applications.