



FLOW ASSURANCE & WATER HANDLING

Flow Assurance: Formation of Gas Hydrates Creation, Paraffin (Wax) and Asphaltenes Deposition

ABOUT THE COURSE

Flow assurance is the discipline concerned with the economic and reliable production and transportation of oil, gas, and formation water from the reservoir to the delivery point throughout the entire life of a field, under all operating and environmental conditions.

Operational challenges such as deposition, system blockages can disrupt production, resulting in unplanned shutdowns and increased operating costs. These issues may arise from the formation of gas hydrates creation, paraffin (wax) and asphaltenes deposition.

An effective flow assurance strategy must consider both fluid properties and operating conditions. It requires a multidisciplinary approach involving production, maintenance, engineering, laboratory analysis, and health, safety, and environmental (HSE) functions, with a strong focus on prevention as well as remediation.

DESIGNED FOR

This course is particularly tailored for petroleum production engineers, laboratory personnel, field operators, system designers, and anyone seeking practical experience in this field, including researchers or managers who want to understand technical issues that support effective decision-making.

COURSE OBJECTIVES

Upon successful completion of the course, participants will be able to:

- Develop a comprehensive understanding of gas hydrates creation, paraffin (wax) and asphaltenes deposition challenges associated with fluid production, gathering, treatment, and transportation
- Identify existing and potential threats to uninterrupted fluid flow
- Design cost-effective, efficient, and reliable mitigation strategies that maintain production targets and extend equipment service life while complying with environmental regulations
- Define industry-relevant KPIs for hydrate formation, paraffin (wax) and asphaltene deposition, organized so they can be measured, trended, and acted upon in flow-assurance programs

COURSE CONTENT

Day 1 - Flow Assurance & Gas Hydrates

- **Introduction to Flow Assurance**

This session provides an overview of flow assurance, addressing the impact of organic and inorganic deposition,

- **Gas Hydrates**

The session begins with the fundamentals of gas hydrates, including their composition, formation conditions, and prediction methods. Participants will learn prevention strategies, such as: *physical methods*: water removal, temperature maintenance, pressure control; and *chemical methods*: thermodynamic inhibitors (e.g., methanol, MEG), with practical exercises for calculating required dosages, as well as kinetic inhibitors and anti-agglomerants. Relevant case studies will be included.

Day 2 –Asphaltene Deposition

Participants will explore the characteristics, molecular structure, and physical-chemical properties of asphaltenes. The session will cover laboratory methods for determining asphaltene content, phase behavior and asphaltenes stability, as well as techniques for predicting their deposition. Emphasis will be placed on key precipitation factors and the design of effective prevention and remediation strategies. Several case studies will be presented. The day concludes with the development of Key Performance Indicators (KPIs) to evaluate the effectiveness of asphaltene mitigation efforts.

Day 3 - Wax (Paraffin) Deposition

This lecture focuses on the mechanisms and conditions that drive wax precipitation and the operational challenges it causes. Participants will become familiar with diagnostic tests, monitoring strategies, and remediation techniques, along with modeling approaches used to predict deposition. Case studies will highlight real-world examples. The session will close with the formulation of KPIs for evaluating paraffin control strategies.

Course Delivery Method

The course will consist of lectures supported by worked examples, and case studies. In addition, participants are encouraged to bring their own examples for in-class discussion and analysis.

Instructor

Snežana Šević holds a B.Sc., M.Sc. and Ph.D. from the Faculty of Technology, University of Novi Sad, and has 40 years of experience in the oil and gas industry. Her areas of expertise include diagnosing issues arising from produced fluid properties; conducting risk analyses and recommending flow assurance management programs

during fluid production, gathering, treatment, and transportation; modeling of flow assurance issues, simulation, and optimization of process systems.

She has worked with PM Lucas d.o.o., NIS-Gazprom Neft, and Qimica Apollo – Mexico. She has been involved in over 50 projects across Serbia, Mexico, Kazakhstan, and Russia. Dr. Šević has authored over 30 scientific and technical papers, a book titled *The Impact of Formation Water on Oil and Gas Production and Transportation*, and has supervised several undergraduate, master's, and doctoral theses. In 2018–2019, she was selected as a Distinguished Lecturer by SPE and was part of the SPE E-Mentoring Program for five years.

