Advanced Flow Assurance for Oil and Gas Production Training Course

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Munich

5100 € (Per Person)

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Course Introduction / Overview:

Flow assurance is the cornerstone of successful and economical oil and gas production, ensuring the uninterrupted flow of hydrocarbons from the reservoir to the point of sale. This critical discipline addresses the complex challenges posed by multiphase flow, including the formation of hydrates, waxes, asphaltenes, and scale, which can lead to blockages, reduced production, and significant safety risks. This comprehensive training course offered by BIG BEN Training Center provides a deep dive into the fundamental principles and advanced strategies for managing these flow assurance issues. Drawing upon foundational concepts detailed in seminal works like "Multiphase Flow in Pipes" by the esteemed academic James P. Brill, the program covers everything from fluid characterization and multiphase flow dynamics to solids deposition, corrosion management, and integrated system design. Participants will gain a holistic understanding of how to diagnose, prevent, and mitigate flow assurance problems in various production environments, including deepwater and subsea systems. This course is meticulously designed to equip engineers and technical professionals with the practical skills and theoretical knowledge needed to optimize production, enhance asset integrity, and ensure the safe and efficient transport of oil and gas.

Target Audience / This training course is suitable for:

- Production and Operations Engineers.
- Petroleum Engineers.
- Subsea and Pipeline Engineers.
- Process and Facilities Engineers.
- Chemical Engineers.
- Reservoir Engineers.
- Project Managers in the oil and gas sector.
- Research and Development Scientists.
- Asset Integrity Engineers.
- Technical consultants and service providers.

Target Sectors and Industries:

- Oil and Gas Exploration and Production (E&P) Companies.
- Engineering, Procurement, and Construction (EPC) Contractors.
- Pipeline Transportation Companies.
- Oilfield Service and Technology Providers.
- Petrochemical and Refining Industries.
- Independent Energy Companies.
- Governmental bodies and regulatory agencies in the energy sector.

Target Organizations Departments:

- Production Operations.
- Upstream and Midstream Engineering.
- Subsea Engineering and Technology.
- Research and Development (R&D).
- Project Management and Execution.
- Asset Integrity and Management.
- Health, Safety, and Environment (HSE).
- Process and Chemical Engineering.

Course Offerings:

By the end of this course, the participants will have able to:

- Analyze multiphase flow behavior and predict flow regimes in pipelines.
- Develop robust strategies for preventing and mitigating gas hydrate formation.
- Evaluate wax and asphaltene deposition risks and design effective remediation plans.
- Implement comprehensive corrosion and scale management programs.
- Understand the principles of sand management and erosion control.
- Assess and control various types of slugging in production systems.
- Apply transient flow modeling concepts to system design and operations.
- Integrate flow assurance principles into the complete lifecycle of a project.
- Optimize chemical inhibitor selection and injection strategies.
- Troubleshoot common operational flow assurance challenges effectively.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to foster a dynamic and engaging learning environment that bridges theory with practical application. This course utilizes a blended approach, combining expert-led presentations with interactive discussions, real-world case studies, and collaborative group exercises. Participants will not just listen to lectures; they will actively engage with complex flow assurance problems drawn from actual oil and gas field scenarios. The curriculum emphasizes problem-based learning, where attendees work in teams to analyze operational data, diagnose production issues, and propose viable mitigation strategies. This hands-on approach ensures that theoretical concepts are reinforced through practical application. Furthermore, the course incorporates simulation concepts and workshops to provide a deeper understanding of transient multiphase flow phenomena. Our experienced instructors facilitate an open and interactive atmosphere, encouraging participants to share their own experiences and challenges, leading to rich, peer-to-peer learning. The focus is on developing practical, decision-making skills that can be immediately applied in the workplace to enhance production efficiency and asset integrity.

Course Agenda (Course Units):

Unit One: Fundamentals of Flow Assurance and Multiphase Flow

- Introduction to flow assurance in the oil and gas industry.
- Properties of reservoir fluids (PVT analysis).
- Fundamentals of single-phase and multiphase flow.
- Understanding flow patterns and regime maps.
- Pressure drop and temperature profile calculations in pipelines.
- Introduction to steady-state and transient flow modeling.
- Key challenges and risks in hydrocarbon production and transport.

Unit Two: Managing Gas Hydrates

- Thermodynamics and phase behavior of gas hydrates.
- Conditions for hydrate formation and dissociation.
- Predicting hydrate formation using analytical and software tools.
- Hydrate prevention strategies: insulation, dehydration, and heating.
- Chemical inhibition: thermodynamic and low-dosage hydrate inhibitors.
- Remediation techniques for hydrate blockages.
- Case studies of hydrate-related incidents and solutions.

Unit Three: Wax and Asphaltene Deposition and Control

- Characterization of crude oil for wax and asphaltene content.
- Wax appearance temperature (WAT) and deposition mechanisms.
- Predictive modeling for wax deposition in pipelines.
- Prevention and mitigation strategies: chemical inhibitors and pigging.
- Asphaltene precipitation envelope and stability analysis.
- Managing asphaltene-related challenges in production systems.
- Case studies on successful wax and asphaltene management.

Unit Four: Scale, Corrosion, and Erosion Management

- Mechanisms of inorganic scale formation and deposition.
- Scale prediction, prevention, and removal techniques.
- Fundamentals of corrosion in oil and gas production systems.
- Corrosion mechanisms: CO2, H2S, and microbiologically influenced corrosion (MIC).
- Corrosion monitoring and chemical inhibition strategies.
- Sand production, transport, and erosion modeling.
- Implementing an integrated pipeline integrity management program.

Unit Five: Integrated System Design and Advanced Topics

- Controlling and mitigating severe slugging in risers and pipelines.
- The role of flow assurance in field development and system design.
- Integration of flow assurance with production chemistry.
- Special considerations for deepwater, heavy oil, and sour gas systems.
- Application of flow assurance software in design and operations.
- Operability envelopes and developing operational procedures.
- Future trends and emerging technologies in flow assurance.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

As the industry moves towards more complex ultra-deepwater and high-pressure/high-temperature (HPHT) fields, how must traditional flow assurance strategies evolve to manage the compounded risks of multiple, interacting solid deposition and corrosion mechanisms?

What unique qualities does this course offer compared to other courses?

This training course distinguishes itself by offering a holistic and integrated perspective on flow assurance, moving beyond isolated topics to present a complete picture of how different challenges interact within a production system. Unlike programs that focus heavily on software proficiency, our curriculum prioritizes the development of fundamental engineering judgment and problem-solving skills. We emphasize the "why" behind the phenomena, enabling participants to diagnose issues from first principles rather than relying solely on black-box models. The course content is built around a rich collection of real-world case studies, providing invaluable insights into both successful and failed flow assurance strategies from diverse global operations. This practical, experience-driven approach ensures that learning is directly applicable to the operational challenges participants face. Furthermore, the course structure fosters a deep understanding of the entire project lifecycle, from conceptual design and material selection to operational monitoring and late-life management, equipping attendees with the foresight to design robust systems and proactively manage risks throughout the life of an asset.