TETRA TECH RPS ENERGY | TRAINING

N475: Surface Flow Assurance for Large Scale Pad Development in Unconventional Plays

Format and Duration
Classroom - 5 Days

Instructor(s): Cem Sarica and Eduardo Pereyra

Summary

Flow assurance addresses prediction, prevention and remediation of any phenomenon that hinders the fluid flow through oil and gas production and transportation systems. Understanding of flow assurance is of vital importance for the design and operation of the surface facilities.

This course provides a basic introductory and practical understanding of flow assurance issues encountered in the production, transportation and processing of oil and gas, in turn, enabling participants to better design and operate production systems potentially resulting in more efficient and cost effective operations.

Learning Outcomes

Participants will learn to:

1. Identify most commonly encountered flow assurance problems in surface operations such as slugging (regular and severe), emulsions and foams, paraffin precipitation, deposition and gelation, sand, erosion, corrosion, scales, hydrates, and asphaltenes precipitation and deposition.
2. Determine mitigation and remediation techniques of the above mentioned flow assurance problems in surface operations.
3. Analyze a given system to find optimum operating conditions.

Training Method

A classroom course that will make the participants familiar with the basics of flow assurance issues using practical examples and field applications. Design practical examples will be hands-on using a commercial software. Students will be working on a capstone design project, and will present and discuss their findings.

Who Should Attend

Facilities Engineers, Production Engineers, Flow Assurance Engineers, Operations Engineers, System Engineers, Process Engineers, Reservoir Engineers, Petroleum Engineers, Technical Consultants, etc.

Course Content

The course will help participants understand the surface flow assurance problems and learn about the state-of-the-art solution methods and practices. The course will start with a description of the basics of flow assurance and continue with descriptions of each of the specific flow assurance issues covering the prediction, mitigation and remediation aspects. Practical hands on in class problem solving exercises will be performed. Students will work on a Capstone Design Project utilizing a commercial simulator.

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1. Introduction to Flow Assurance (1 hour)
2. Networks (1 hour)
    - Well to Well and Pad to Pad Interactions
    - Bottleneck Identification and Solution
3. Fluid Flow Basics (3 hours)
    - Single-phase flow in pipes
    - Multiphase flow in pipes (Gas-Oil and Gas-Oil-Water)
4. Slugging (3 hours)
    - Basics of Slugging
    - Slugging Prediction: Natural, Severe and Pigging
    - Slug Prevention and Mitigation: Slug Catchers, Types and Design
5. Surface Facilities (2 hours)
    - Introduction to Oil and Gas Field Processing
    - Separators
    - Water Handling
6. Emulsions and Foams (2 hours)
    - Dispersions and Emulsions: Formation, Prevention and Remediation
    - Foams: Formation, Prevention and Remediation
7. Hydrates (2 hours)
    - Basics of Hydrates: Definition and Formation Conditions
    - Control and Remediation
8. Paraffins (3 hours)
    - Basics of Paraffins: Definition
    - Paraffin Problems: Precipitation, Deposition, Gellation, and Settling
    - Control and Remediation
9. Asphaltenes (2 hours)
    - Basics of Asphaltenes: Definition
    - Asphaltene Related Problems: Precipitation, and Deposition
    - Control and Remediation
10. Scales (2 hours)
    - Produced Water Chemistry and Scale Types
    - Location and Common Scaling Scenarios
    - Remediation and Mitigation
11. Sand (1 hour)
    - Surface Sand Problems
    - Remediation and Mitigation
12. Corrosion and Erosion (2 hours)
    - Corrosion: Mechanism and Influencing Factors, Fundamentals of Corrosion Prevention
    - Erosion
    - Effect of Multiphase Flow over Erosion and Corrosion

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13. Software Introduction (4 hours)
    - Basic training for the software
    - Training will continue through the execution of the design project
14. Capstone Design Project (12 hours)
    - Example Project(s) Involving Multi well and Multi Pad Systems will be Studied
    - Presentation and Discussions of the Project Results among Participants
    - Instructor's Solution