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CO₂ EOR/EGR and CCS/CCUS Projects: Well Engineering: Nodal Analysis and PROSPER Modeling (for Wells with High CO₂ Content Fluids)

2-Day Hands-on Training Workshop

- **Section 1 — Introduction**
- **Section 2 — Nodal Analysis and PROSPER Modeling (for wells with high CO₂ content fluids)**
 - **Systems approach to the optimization of oil and gas wells**
 - Evaluating the complete system
 - **Objectives of Nodal Analysis**
 - **Inflow vs Outflow**
 - Parameters needed
 - Impact of changing pressure and temperature on vertical flow
 - **Using PROSPER to model a well**
 - Overall Workflow
 - Settings in System Summary
 - Settings in Preferences
- **Section 3 — Fluid Modeling and PVT**
 - **Effect of Density and Viscosity on Tubing Flow**
 - **Effect of PVT on the Inflow Performance**
 - **PVT and Hydrocarbon Fluid Models**
 - Black Oil Data and PVT Matching
 - Gas Data
 - Equation-of-State (EOS)
 - Retrograde Condensate
 - CO₂

- **Section 4 — Well Model Input**
 - PROSPER Choices under System Summary
 - Deviation Survey
 - Surface Equipment
 - Downhole Equipment
 - Pipe diameter and length
 - Pipe restrictions
 - Geothermal Gradient
 - Temperature with depth and Heat transfer coefficient
- **Section 5 — Vertical Lift Performance (VLP)**
 - 3 components in pressure drop/increase in tubing
 - Flow Regimes and Multi-Phase Flow Terminology
 - Choice of vertical lift correlations
- **Section 6 — Inflow Performance Relationship (IPR)**
 - Darcy equation
 - Choice of PROSPER inflow models
 - Calculating Skin
 - IPR adjustments
- **Section 7 — Shrinkage Factor**
 - Stock tank fluids vs separator fluids
- **Section 8 — Well Test Matching**
 - Matching models to well test data
 - Well matching
 - IPR matching
- **Section 9 — Enthalpy Balance Heat Transfer**
 - PROSPER inputs
- **Section 10 — Artificial lift/ESP Production Wells in CO₂ EOR Projects**
 - ESPs
 - Gas Lift

- Section 11 — CO₂ Injection Wells in CO₂ EOR/EGR and CCS/CCUS Projects
 - PROSPER settings
 - EOS and Comparison to NIST Data
 - Well Setup
 - Running Cases and Sensitivities
 - Snohvit (Norway) CCS project case study
 - Section 12 — Introduction to integrating reservoir simulation models
 - Section 13 — Class Problems
 - Company specific problems
 - Section 14 — Q/A Session
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Note: This practical hands-on training workshop has been custom designed for production engineers, well engineers, and flow assurance engineers working on wells with high CO₂ content fluids in CO₂ EOR/EGR and CCS/CCUS projects. It can be customized further to meet the specific needs of a client and can be conducted online/virtually or in-person at the client's office(s), around the world, whenever mutually convenient, but it will be the client's responsibility to provide the workshop attendees (students), and the instructor(s), access to the PROSPER software during the duration of the workshop.