

## OIL AND GAS PRODUCTION PERFORMANCE PREDICTION ANALYSIS

### General:

Discipline: Reservoir, Completion, Production, Facilities

Level: Basic/Intermediate

Duration: 5 days

Instructor: Jairo Balcacer

### Purpose:

Learn an analytical approach used to quantify and optimize the flow of oil and gas production from the reservoir up to the delivery point or storage tanks. This analysis is considering the produced fluids through all the components of the system reservoir, wellbore, tubing, surface lines and additional equipment, which will generate a pressure drop across each element; the total pressure drop then defines the performance of the well. The understanding of the individual performance of those elements is the only way to improve or optimize the performance of the whole system, this is, optimized total pressure drop. Analytical models are used to predict the performance of a segment of the system, using measured or inferred parameters. Examples with MS-Excel spreadsheets will be used to illustrate the individual performance of the elements, and if possible, the use of a software to account for the variations of a single parameter in the performance of the system, this is a sensitivity analysis.

### Designed for:

This course is focused to instruct any team member involved in the optimization of the well productivity by teaching an analytical approach to achieve this goal. Completion engineers, production engineers, facilities engineers.

### You Will Learn:

- Well inflow and outflow analysis concepts
- Definition of the elements in Nodal Analysis
- Different analytical solutions to represent the inflow performance of the reservoir-well system
- Effect of each production system component on well performance
- Vertical and horizontal flow correlations
- Choke performance
- Integrated production system analysis
- Production rate decline curves
- Optimization of well performance using analytical techniques

## Course Content:

### Production System Overview

- Reservoir inflow performance: fluid flow and permeability
- Reservoir inflow performance
  - Productivity index
  - IPR Relationship
- Lift performance: Flow regimes and Pressure gradient correlations
- Production System performance: Surface control by chokes
- Integrated approach of the Production system analysis

### Production System Overview

- IPR determination:
  - Vogel's Method
  - Standing's method
  - Fetkovich's method
- IPR and Skin effect
- IPR add Flow Efficiency: Standing's Type Curves

### Lift Performance

- Variable affecting pressure loss in pipe
- Vertical flow correlations
- Horizontal flow correlations
- Pressure traverse curves
- Heading in flow wells

### Flowing Well Performance

- Surface chokes description
- Choke performance relationship
- Integrating Inflow, lift and Surface performance
- Applications of integrated system production analysis

### Production Rate Decline Curves

- Decline types
- Decline curve graphical representation
- Constant percentage decline curve applications
- Production Data Collection, analysis and smoothing
- Incorporating changes in operating practices
- Estimating gas well reserves

### Optimizing Well Performance: Analysis and design, an Overview

## Software applications:

- MS Excel spreadsheets
- Prosper

**Text and Consulting books:**

- “Production Optimization Using Nodal Analysis”; H. Dale Begg; OGCI Publications
- “Petroleum Production Systems”; M.J. Economides, et al, Prentice Hall Petroleum Engineering Series

