IFP Training

Well Performance: Shale Gas Wells

5 days	UPROD-EN-P
Overview	

LEVEL

Knowledge

PURPOSE

This course provides the practical, comprehensive understanding and skills needed to master well performance on shale gas plays and make significant contributions to field productivity studies and well performance monitoring.

LEARNING OBJECTIVES

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

step by step building PROSPER Modeling of shale gas well,

select the relevant characteristics shale gas system and fluid properties related to well performance modeling,

optimize well performance,

analyze the impact of well completion and equipment on well performance,

analyze the operation process.

WAYS AND MEANS

Use of the software program PROSPER™ (training license provided for the duration of the course).

Short lectures alternating with hands-on sessions.

Course ends with a 2-day integrated case study.

LEARNING ASSESSMENT

Quiz.

PREREQUISITES

Basic knowledge of the use of PROSERT™ software.

Agenda

INTRODUCTION TO PRODUCTION SYSTEM `0.25 d`

Introduction to well performance nodal analysis: inflow x outflow.
Overview of PROSPER™ software workflow:
PROSPER™: building initial well system file.

PVT DATA/PVT MODELING `0.5 d`

Gas PVT properties.
PROSPER™: building PVT model for shale gas well.

SHALE GAS PLAYS PROPERTIES & WELLBORE INTERFACE `0.75 d`

Shale gas systems characterization- dual porosity, stress dependent permeability, gas desorption.
Shale gas completion stimulation (hydraulic fracturing).
Introduction to well performance analysis of unconventional gas reservoirs.

Effect of productivity parameters for horizontal wells (length, wellbore radius, permeability ''anisotropy'', thickness vs. position ''Well Eccentricity'', drainage area, formation damage ''Skin'').
Derivation of analytical solutions.

INFLOW PERFORMANCE/IPR MODELING `1.25 d`
Inflow Performance Relationship (IPR).
Back pressure equation for gas wells.
Transient gas model for horizontal wells completed and stimulated with multiple transverse fractures.
IPRs for horizontal wells:
PROSPER™: IPR modeling exercise.
IPR of horizontal drains: shale gas well exercise:
PROSPER™: fractured horizontal well modeling.

WELLBORE FLOW, OUTFLOW PERFORMANCE/VLP MODELING `1 d`
Fundamentals of multiphase flow: gas-liquid flow, flow regimes (sub vertical, deviated, horizontal wells).
Minimum flow rate/gas well loading (pressure drop through a horizontal well for gas flow, effect of the well geometry TOE up, TOE down).
Pressure gradient and Vertical Lift Performance (VLP) curves.
Tubing head pressure, tubing ID impacts:
PROSPER™: tubing correlations, VLP modeling of shale gas well.
Flow in a choke.

WELL PERFORMANCE `1 d`
Well deliverability nodal analysis: inflow x outflow on shale gas well:
PROSPER™: IPR + VLP well performance modeling, prediction, analysis and diagnosis.
Sensitivity study.
Effect of compaction permeability reduction.
Effect of well geometry.

KNOWLEDGE ASSESSMENT `0.25 d`