# 3 Day "Generation of Production Type Curves for Unconventional Reservoirs"

## Course Description:

This 3-day course is designed to provide participants with the skill of using both analytical and empirical methods to forecast production profiles and EURs in unconventional (ultra-low permeability) reservoirs, with a focus on Production Type Well curve generation. The methods reviewed are all endorsed by the SPEE's recent Monograph-4. Each method will be reviewed. Excel based Software will be used to demonstrate the advantages and limitations of using each method.

This course is suitable for all reservoir, exploitation, A&D and production engineers who are involved in the exploitation and prediction of hydrocarbon production and EUR estimation.

R&A's Excel based Production Forecasting software will be integrated into the class problems, and each attendee will receive a 90 day free licence.

## Course Content:

1. **Production Type Well Curve Generation**
   - Definition of Production Type Well Curves
   - Definition of a Resource play & a Geological Subset Area (GSA)
   - How to Select Analog Wells and its Selection Criteria
   - Normalization of Production for Production Type Well Curve Generation
   - Initial Production (IPs) and Their Relationship with EUR
   - Type Curve Generation Workflow
   - Type Curve Generation for Multiple Wells Program
   - Type Well Curve(s) for Two Phase Producing Reservoirs
   - Practical Examples (class problems)


2. **Production Data Analysis (PDA) of Horizontal Well Completed with Multi-Stage Fracturing in Tight/Shale Reservoirs for Type Curve(s) Generation**
   - Introduction of Multi-Stage Fracturing Methods in Tight/Shale Reservoirs
   - General Fluid Flow Regimes and Their Identification
   - Impacts on Flow Regimes of Reservoir Parameters
   - Wattenbarger Model (2-Linear flow model)
   - The Concept of $A*SQRT(k)$
   - Correction Factors ($f_{CP}$ & $f_{CR}$)
   - Stimulated Reservoir Volume, SRV Model (3-Linear model)
   - Enhanced Fracture Region, or EFR model
   - Flowing Material Balance for OGIP/OOIP
   - Practical Examples (class problems)

3. **Production Performance & EUR Forecast of Tight/Shale Reservoirs Using Empirical Methods for Type Curve(s) Generation**
   - Traditional Decline Analysis (*Arps'* Decline)
   - Hyperbolic Decline Plus
   - Power-Law Exponential Decline Method
   - Stretched Exponential Production Decline, *or* SEPD Method
   - Yu Modified Stretched Exponential Production Decline, Or YM-SEPD

- Duong's Decline Method for Fractured Reservoir
- Modified Duong's Method
- Logistic Growth Model, or LGM Method
- Condensate Production Forecast in Liquid Rich Gas Reservoirs
- Solution Gas Production Forecast in Oil Gas Reservoirs
- Workflow for Reconciling EURs
- Practical Examples (class problems)