AAPG-Freiberg

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PETROLEUM ENGINEERS AND PETROLEUM GEOLOGIST

„DO WE NEED EACH OTHER ?“

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Key Players in the O&G Upstream Sector

PETROLEUM ENGINEERS
- Drilling Engineers
- Reservoir Engineers
- Production Engineers

GEOScientISTS
- Geophysicists
- Geologists

The field life cycle and typical cumulative cash flow.
Geoscientists: Reservoir Characterization (Static Model)

Seismic

Trap, Faults, Source Rock, Reservoir Rock......

Well Logs

Sandstone, Limestone, Porosity, Fluid Saturation......

Well Cores

Porosity, Permeability,.....

Next? Appraisal Phase
What has this got to do with the PG?
Drilling and Well Design

Do we need each other?
Reservoir Characterization and Management (Dynamic Model)
From Static to Dynamic Reservoir Models

- PVT Analysis
  - Saturated Oil Reservoir
  - Undersaturated Oil Reservoir
  - Gas Condensate Reservoir
  - Dry Gas Reservoir

- Perform Flow Analysis with core samples: relative permeability, capillary pressure effects.

- Evaluate Rate/Pressure Data

Reservoir Characterization

Take Fluid Samples, Measure Rate, Pressure and Temperature
Some Reservoir Engineering Aspects

Production Decline Analysis
Reservoir Engineering: From Static to Dynamic Models

• Characterizing Pore Volume/ Reserve Estimation (OOIP, OGIP)

• Describing/Characterize Flow Mechanisms (Reservoir Dynamics)

• Estimating Quantity of Wells

• Defining the Location of Wells
Methodology of Reservoir Engineering and Reservoir Characterization

**METHOD 1: DIRECT PROBLEM**
- Formation and Geological Classification
- Classify and Identify Flow Mechanism
- Establish Mathematical Model
- Derive Solutions to Model
- Derive Methods of Analysis

**METHOD 2: INDIRECT PROBLEM**
- Repeat Interpretation
- RESULT
  - Parameter Estimation/Reservoir Characterization
  - Identify Reservoir Model by Pressure/Rate Match
  - Data Interpretation
  - Model Analysis and Parameter Estimation
  - Identify Best Method of Analysis
  - Examine Test Data and Eliminate Anomaly Data
  - Acquire Pressure/Rate Data from Test

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**Brownfields**

**Rate/Pressure Transient, Production Decline, Numerical History Match → All in conformity with the Geological Model/Classification**

**Greenfields**

**Dynamic Reservoir Model**
Determine what is required to complete the wells and workover operations.

What has this got to do with PG?
Production Engineers

Decision making

• Choice of Downhole Completion Equipment

• Plan Workover operations

• Investigate and optimize flow from Wellbore
Production Engineers

Decision making /Role of PG

- Wellbore completion:
  - Screens
- Workover operations:
  - Fluid Injection
    - Hydraulic Stimulation
    - Matrix/Fracture Acidizing
- Enhanced Oil Recovery:
  - Chemical Flooding
Integrated Production (Asset) Modeling
Thank You

Any “Other” Questions?