



## **SPE-Iran Section Technical Workshop**

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### **Evaluation Methods of Gas Shales**

#### **Learning Objectives**

Learning objectives should be clearly defined. Technology or skills that will be developed by course participants should be stated. This should also include why some should attend the course. What will they gain from attending?

Currently the U.S. produces more gas from shales than from conventional sources; this astounding success has caused petroleum companies to aggressively explore for gas shales all around the world since they exist in almost every continent of the planet (U.S. Energy Information Administration, 2011).

Global natural gas consumption is projected to grow from 112 Tcf to 163 Tcf in the next 20 years representing an increase rate of nearly 2% annually; this implies not only enormous investment, but also new challenges and search for geoscientists and petroleum professionals with expertise in this new fields.

Shales are the most abundant sedimentary rocks in sedimentary basins of the earth; but, small portion of them would achieve commercial productivity. This course will train the attendees on the evaluation methods and techniques that can be utilized to delineate productive shales from barren shales. This course will present real practical examples and illustrates the techniques with real cases studies.

#### **Course Content**

1:

1. Gas Shale Definition and Classifications
  - A general introduction to shale properties and gas shale classification
2. Gas Shale Geological Evaluation
  - Shale composition and brittleness, XRD, FTIR, SEM
  - Shale Pore Geometry

- Geochemistry and carbon isotope signatures of productive gas shales
- Case study examples

### 3. Gas Shale Geochemical Evaluation Methods

- Type and quality of organic material in shale
- Total organic carbon (TOC) content evaluation

- Thermal maturity status
- Burial history modelling
- Adsorption isotherm data for gas shale analysis
- Case study examples

### 4. Gas Shale Petrophysical Evaluation Methods

- Well log response for gas shale
- Shale rock property estimation from well logs
- Shale brittleness assessment
- Shale pore pressure evaluation

2:

#### 1. On Hand Work Practical Example

- Original gas in place estimation of a gas shale field
- Gas recovery estimation from a gas shale field
- Brief on technology involved in gas shale completion wells

#### 2. Visit to Core library

- Observation of gas shales core samples with emphasis on: lithology, sedimentary structure and typical shale facies; this will be illustrated with cartoons and photograph of modern shale facies environments
- Observation of porosity, fracture network, net pay, and gross pay in cores.
- Observation of stress structures in cores that could assist well completion design

## Why You Should Attend

Gas Production from CBM and Shale gas reservoirs is profitable at the current gas prices and it is becoming an important new energy source; therefore, the petroleum

professionals need to learn the principles and techniques to exploit this new resource efficiently and economically.

### **Who Should Attend (Target Audience)**

The course is appropriate for Reservoir Engineers and Petroleum Engineers working in Shale Gas and CBM reservoirs. Production Geologists and Geo-scientists with basic knowledge of volumetric assessments involved in CBM and Gas Shale plays.