



INTERNATIONAL SCHOOL FOR GEOSCIENCE RESOURCES (IS-Geo)
KOREA INSTITUTE OF GEOSCIENCE AND MINERAL RESOURCES (KIGAM)

PUBLIC CUSTOMIZED TRAINING COURSE ON How to Evaluate Unconventional Resource Plays and How to Find Sweet Spot

The **International School for Geoscience Resources** of KIGAM presents an intensive training course on **How to Evaluate Unconventional Resource Plays and How to Find Sweet Spot**. The course will take place at the Mirinae room of International School for Geoscience Resources of KIGAM in Daejeon (Korea) in **March 9 to 12, 2015** and will include the following topics.

| Topics | Date | Instructor |
|--|----------|-----------------------------------|
| Day 1. Shale Reservoir Evaluation: Overview Topic 1. History of unconventional plays Topic 2. Definition of unconventional plays Topic 3. Characteristics of micro-pore systems | March 9 | Byongcheon Yang (GTRC, Canada) |
| Day 2. Shales: Geology and Petrography Topic 1. Geological characteristics Topic 2. Importance of Sequence Stratigraphy Topic 3. Petrographic features in shale plays | March 10 | Byongcheon Yang (GTRC, Canada) |
| Day 3. Geochemistry and Geomechanics Topic 1. Self-contained petroleum system Topic 2. Maturity and porosity relationship Topic 3. Fracture and stress characteristics | March 11 | Byongcheon Yang (GTRC, Canada) |
| Day 4. Petrophysics and Engineering Topic 1. Shale log characteristics Topic 2. Basic concepts of hydraulic fracturing Topic 3. Production and well design | March 12 | Byongcheon Yang (GTRC, Canada) |

※ The working language is Korean.



COURSE INFORMATION

- **Agenda**

- This course mainly covers shale reservoir evaluation. It includes geology, petrography, geochemistry, petrophysics, geomechanics and engineering. Several examples of technical evaluations are presented and compared. Basic concepts of completion and stimulation are reviewed.

- **Course Covered**

- Geological characteristics in shale reservoir
- What is shale oil?
- How to evaluate geochemical features?
- Geomechanical and petrophysical characteristics
- What are the fluid and proppant tests?
- What is hydraulic fracturing?

- **Course Requirements: Prerequisite**

- Knowledge of geology and sequence stratigraphy
- Understanding of micro-pore systems and basic concepts of geochemistry
- Basic level of petrophysical and geomechanical knowledge

- **Who should Attend?**

- The main purpose of this course is to provide evaluation training of shale reservoir to geologists, petrophysics and engineers, who are interested in learning the techniques for characterizing shale reservoirs and the parameters.

- **Summary of topic contents and learning objectives**

As with the knowledge of reservoir properties, the following contents can be accomplished by the end of the course:

- know what the important shale reservoir properties are
- understand what makes a good shale reservoir with respect to productivity
- have an understanding of the variability in shale reservoirs
- identify shale reservoirs from open-hole logs and determine OGIP and OOIP
- identify the issues in hydraulic fracturing of shale reservoirs

- **Day 1. Shale Reservoir Evaluation: Overview**

This session basically covers general overview in shale reservoir evaluation that includes geology, petrology, geochemistry, geomechanics, petrophysics and engineering.

- 10:00-11:00: Introduction to self-contained petroleum system
- 11:10-12:10: Shale gas system
- 13:30-14:30: Maturity and HC generation
- 14:40-15:40: Evaluation processes
- 15:50-16:50: Routine Core Analysis
- 17:00-18:00: What is shale oil?

- **Day 2. Geology and Petrography**

Shale geology is very important to understand time and spatial distribution in shale rocks that are not homogeneous. Micro-pore structures in shales can be researched under the microscopes, so that petrographic context is essential to study shale rocks.

- 10:00-11:00: Heterogeneous characteristics in shales
- 11:10-12:10: Where organic-rich mud is deposited?
- 13:30-14:30: TOC preservation potential
- 14:40-15:40: When organic-rich muds are deposited
- 15:50-16:50: Pore systems in shales
- 17:00-18:00: Importance of natural fracture system in shale reservoir

- **Day 3. Geochemistry and Geomechanics**



Due to the fact that organic pores are very important in shale reservoirs, understanding of geochemistry is essential to evaluate shale system. Since physical properties, including rock brittleness in shales, play an important role in hydraulic fracturing design, this session will help to understand mechanical features in shales.

- 10:00-11:00: Variability of organic matter (kerogen type)
- 11:10-12:10: Maturity change
- 13:30-14:30: Rock Eval Pyrolysis I
- 14:40-15:40: Rock Eval Pyrolysis II
- 15:50-16:50: Importance of Stress
- 17:00-18:00: Rock mechanical properties in shales

- **Day 4. Petrophysics and Engineering**

The session will cover petrophysical characteristics in shale reservoirs during which log responses in shales and gas and oil in place are presented. In addition, various case examples in shale-gas production will be covered.

- 10:00-11:00: Rock Brittleness (Static vs. Dynamic)
- 11:10-12:10: Conventional vs. unconventional characteristics in well logs
- 13:30-14:30: Petrophysical characteristics in shale reservoir
- 14:40-15:40: Fluid and proppant tests
- 15:50-16:50: Basic concept of hydraulic fracturing
- 17:00-18:00: Post frac evaluation and production trends

About the instructor – *Dr. Byongcheon Yang*



ByongCheon Yang is currently working in Global Technology and Research Centre, Calgary (Korea National Oil Corporation) as an unconventional technical advisor, who is responsible for interpreting seismic and well-log profiles, reconstructing depositional environments and evaluating petroleum system.

He is a member of the following associations:

- | | |
|--|--------------|
| ● The Geological Society of Korea | 1998-present |
| ● The Korean Society of Oceanography | 1998-present |
| ● SEPM (Society for Sedimentary Geology) | 2004-present |