Play Fairway Analysis for Unconventional Petroleum Systems
Available to EGI Corporate Associate Members

**Overview**

The term unconventional petroleum system can be used to describe anything from tar sands to “shale” plays to gas hydrates. This course will focus on exploration, delineation, and risk assessment of the unconventional systems commonly termed “shale plays”. In many cases, shale play is a misnomer used to describe petroleum systems characterized by short distance migration (feet to miles) and tight reservoirs (< 1 millidarcy) that require advanced drilling and completion techniques to produce economic volumes of petroleum.

The course will cover regional and basin scale evaluation of source, seal, trap, and reservoir quality in these plays, using industry standard techniques modified for the unique characteristics of the unconventional petroleum system.

Attendees are encouraged to bring their own masked data, maps, or interpretations for collaborative review and discussion on the final afternoon. We will use this time to discuss ongoing or emerging plays and how they may relate to known shale systems in North America.

*Figure 1. Individual maps of petroleum system elements are combined to define the unconventional petroleum system fairway.*

Instructor:
David Thul, M.Sc.
Manager of Petroleum Systems & Geochemistry

**Course Structure**
Lectures, discussion, sample exercises, Q & A

**Participants**
10 – 25 persons

**Duration**
3 days

**Location**
EGI’s Salt Lake offices or CA location

EMAIL:
ContactEGI@egi.utah.edu
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COURSE OBJECTIVES

Over three days, we will cover principles of basin analysis, structural styles, stratigraphic sequences and petroleum systems. The objective is to provide participants with a diverse toolkit that will allow them to effectively delineate shale prospects on the basin scale. Participants will work through a real regional evaluation during the course to apply concepts taught in lecture.

TARGET AUDIENCE

This course is designed for petroleum geologists with little exposure to exploration in unconventional systems or those new to regional exploration endeavors in “shale” systems. The instruction provides a systematic approach to fairway delineation that can be applied by inexperienced and experienced unconventional explorationists alike.

COURSE OUTLINE:

1. Shale Systems through the Conventional Lens – Lecture & Discussion
2. Introduction to Shale Play Styles – Lecture & Discussion
3. Mega-Regional Controls on Shale Systems – Discussion & Example
4. Delineating the Source Rock – Lecture & Exercise
5. Understanding Charge Timing – Lecture & Example
6. Quick Look Log Evaluation Techniques – Example & Exercise
7. Delineating the Reservoir – Lecture & Exercise
8. Role of Structure – Lecture & Example
9. Combining Source, Reservoir, and Structure to Map the Fairway – Lecture & Exercise
10. Risk Assessment – Lecture & Exercise
11. Considerations for OOIP or OGIP Calculations
12. Review, Discussion and Play Specific Q & A

Figure 2. Different plays have different mineralogy that affects the drilling target, reservoir size, completion style, and EUR.

Figure 3. Niobrara C, Fort Hays Limestone and Codell Sandstone outcrop north of Fort Collins, CO (photo courtesy of T. Anderson, EGI).
David Thul, M.Sc.
Manager of Petroleum Systems & Geochemistry

David is a petroleum geochemist and geologist with experience in unconventional petroleum exploration across North America. He has worked with a range of clients from two-man exploration and production companies to some of the largest unconventional petroleum producers in the United States. His work experience covers 10 sedimentary basins in North America with particular expertise in Cretaceous source rocks of the Rocky Mountain Region and Gulf Coast as well as Paleozoic source rocks of the Rocky Mountain Region and Canada. As Manager of Petroleum Geochemistry David’s experience will be applied globally across a wide range of EGI projects.

As a petroleum geoscientist, David’s focus is to evaluate and understand source rock maturity in the context of a basin’s stratigraphic and tectonic evolution. David’s geochemical specialty is Rock-Eval® and SRA™ pyrolysis and he also has experience interpreting biomarker, vitrinite reflectance, and gas isotope data. David has worked extensively in 1-D and 3-D basin modeling to predict hydrocarbon charge and phase.

David earned a B.A. in Geology from the University of Colorado at Boulder and a M.Sc. in Geology from the Colorado School of Mines. At CU, his focus was on numerical modeling of earth systems. David’s M.Sc. thesis research at CSM was on the maturity of the Niobrara Formation in the Denver Basin. While at Mines he managed the Source Rock Analyzer Lab and collaborated on multiple projects across the Rocky Mountains.

David is currently working towards a Ph.D. in Geology at the Colorado School of Mines. His dissertation project, a characterization of the geochemistry of the Uinta Basin petroleum systems with emphasis on the Green River unconventional play, is funded by the Green River Research Consortium.

At EGI, David is developing a research program focused on optimizing the search for, and production of petroleum. His research interests pertain to the generation, expulsion, and migration of petroleum. Leading EGI’s Petroleum Geochemistry group, David will lead fundamental research about the process of petroleum evolution (e.g. quantifying the effect of organic matter on petroleum fluid retention and migration within source rocks) as well as applied research (e.g. defining the geochemical prerequisites for successful unconventional petroleum systems) through the combination of high-resolution geochemical measurements, basin scale datasets, and integrated information about structure, stratigraphy, and basin history.

David is the lead geochemist on major EGI International projects in South America, Central Eurasia and China. In the coming year, he will be developing EGI’s role in the shale systems of Australia. His experience in North American shale systems will guide geochemical assessments in each of these regions, ensuring their resources can be accurately compared to in-production analog systems.