

N425: Play Analysis for Targeted Prospect Identification

Instructor(s): Mark Thompson or Leon Dzou

Format and Duration

Classroom - 4 Days

Virtual - 8 Sessions

Summary

Play fairway analysis and common risking segment (CRS) mapping are commonly used in the evaluation of frontier basins. However, they can also be successfully applied to more mature basins where moderate-sized accumulations, perhaps in subtle trap configurations, await the attention of the creative explorer. This course will emphasise how understanding the geology can lead to the identification of both high- and low-risk areas and ultimately lead to the discovery of untapped resources. Topics include play definition; construction of gross depositional environment (GDE) maps; play fairway analysis of reservoir, seal, source and charge; risk and uncertainty; risking using CRS; play resource estimates; trap domains.

Learning Outcomes

Participants will learn to:

1. Evaluate 'hero' lines and define the key plays in a basin.
2. Map the understanding of the play elements (presence and effectiveness of reservoir, source and seal) and consider interpretation confidence and alternative models.
3. Integrate risks on all play elements to compile common risk segment maps and calibrate with drilling statistics and well failure/success analyses.
4. Determine play resource and yet to find estimates using various techniques, including creaming curves and field size gap analysis, geochemical volumetrics, and prospect density.
5. Consider the importance of stratigraphic and subtle traps in the exploration of mature basins.

Training Method

This is a "hands-on" classroom or virtual classroom course comprising a mixture of lectures, discussion, case studies, and practical exercises. The course will have a workshop format with the majority of time spent using and interpreting the data under the guidance of an industry expert. Case histories are taken from the UK, Norway, USA, Canada, Indonesia, Brazil, and Vietnam, among others.

Who Should Attend

The course is aimed at exploration geoscientists with experience of seismic interpretation, having a sound understanding of other geoscience disciplines and how they impact petroleum systems and plays. The course will most benefit geoscientists with 1-5 years of experience, or those with little practical knowledge of play fairway analysis. It will also serve as an excellent refresher for more experienced geoscientists.

Course Content

Part 1

- Play definition: play fairway and petroleum system
- Play fairway map, events chart, and play cartoon

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- Importance of the regional foundation (structure, stratigraphic and petroleum systems)
- Workflow overview: Play definition, play elements and interpretation confidence map, common risk segment mapping, resource estimates at play level

Part 2

- Construction of Gross Deposition Environment (GDE) maps from seismic, seismic attributes, isochores and key wells
- Presence of play elements: reservoir, top seal, and source presence and quality
- Effectiveness of play elements Reservoir deliverability, seal capacity, charge access
- Importance of first carrier, lateral versus vertical drained systems, maturity versus organo-facies, effects of early oil and pore pressure on porosity, and charge focus
- Event charts

Part 3

- Risk versus uncertainty, phase risk and composition
- Risking plays using Common Risk Segment mapping - calibration using fields and well failures
- Play resource (yet to find) estimates - creaming curves, field size distributions, areal yield, prospect density, leads and prospect inventories
- Trap domains
- A brief overview of the importance of stratigraphic and subtle traps in the exploration of mature basins

North Slope Alaska Exercise

Applying what we have learned in the course so far to this final exercise. There have been a number of world class discoveries announced in Alaska over the last few years. Subtle trapping controls the majority of the discoveries in the basin and stratigraphic trapping may provide substantial undiscovered volumes.

The database is a good quality regional 2D seismic grid over the NPRA, supplemented with information from outcrop, well data, and fields from the prolific area over the Barrow Arch to the east. Participants will:

- Evaluate a regional line and construct a play fairway cartoon.
- Agree which are the key horizons to map for a regional evaluation and map these around on the available regional grid.
- Construct GDEs for reservoir and source presence.
- Tackle the 3 effective play elements (seal capacity, reservoir quality and charge access).
- Construct CRS (risk) maps and consider resource estimates.
- Participate in a discussion of where the future potential lies, considering key failures and successes in the basin and their implications for future potential.