

# HOW ROCK PHYSICS HELPED TO IMPROVE DRILLING SUCCESS

**Client:** An independent oil and gas E&P company.

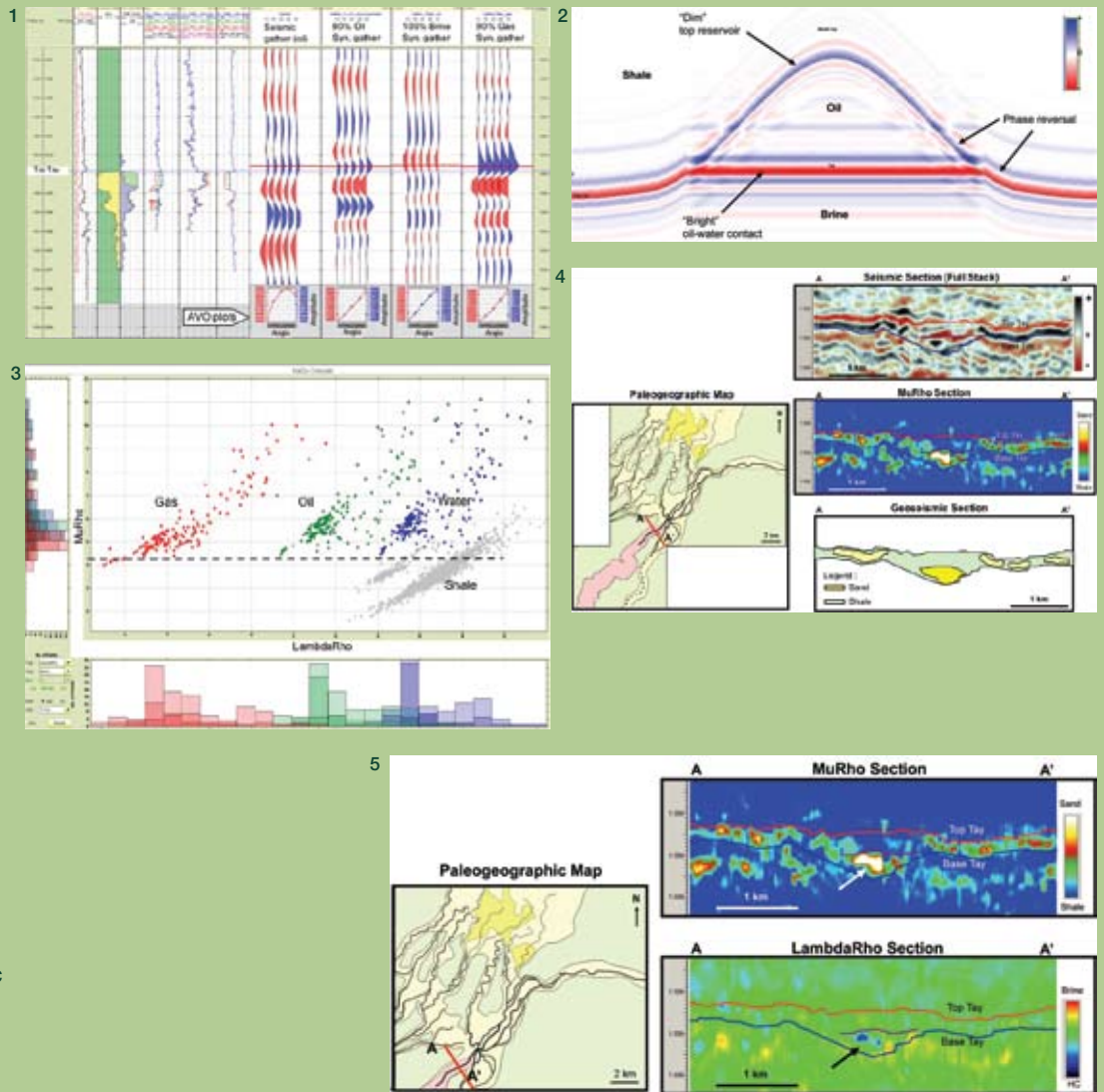
**Project:** Identification of drilling targets for a North Sea explorer.

**Ikon solution:** Modelling and interpretation of seismic data to determine possible presence of hydrocarbons.

**Background:** Four years and over 200mm bbl discovered together, with 5 fields under production and development.

**Ikon achievements:**

- Identification of a channel reservoir with possible hydrocarbons.
- We determined that a nearby well, that had already been penetrated, had the same sequence as the one that we were investigating. This was used to model the expected seismic response, with varying fluids.
- Based on this modelling exercise, we then established that a hydrocarbon response would very likely give a characteristic seismic response on the far offsets of seismic data.
- We investigated the real seismic data in the form of sub-stacks.
- The response matched what we had modelled and therefore predicted.
- Further modelling and analysis determined an attribute that reveals both the compressibility and the rigidity of rock, and therefore enables a reliable prediction of hydrocarbon or water-bearing sand.
- This prediction was tested with 13 wells, in 11 of which oil was discovered.
- A successful field development led to a production rate of over 25,000 bbl/day of production.



1. 1D forward seismic modelling of the various fluid scenarios
2. 2D forward seismic model demonstrating phase reversal at fluid contact
3. A LambdaRho and MuRho crossplot showing good separation between water, oil and gas sands
4. Seismic section and MuRho section and a geoseismic section of the inferred geological model, this indicates sand presence (see picture 5)
5. LambdaRho and MuRho sections derived from inversion of the seismic data, high MuRho values are indicative of sands (white and warm colours), low LambdaRho values indicate possible hydrocarbons (blue colours)