Merging Lab and Field Data at Dunbar

From: “The Interpretation of Reservoir Pressure Data in the Dunbar Field (UKCS)”, Bigno, et.al., SPE 51363
Dunbar Field and Compartmentalization

- Dunbar Field discovered in 1973, production initiated 1994
Baffles

- Inter - goes between flow units
- Intra - goes within flow units
Lateral and Vertical Barriers Inferred from RSA

D08 SrRSA lies off trend, suggesting barrier to lateral connectivity between this well and West Flank 'Main'.

Ness A / Lower Brent vertical permeability barriers

Poor lateral connectivity inferred in Lower Brent. Supported by oil sample geochemistry.

Fig. 10 — West Flank SrRSA results showing inferred vertical and lateral permeability barriers.
These are the Main Reservoir Uncertainties and Their Impact on Dunbar Field Development

<table>
<thead>
<tr>
<th>Uncertainty</th>
<th>Impact on Development</th>
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<tr>
<td>Identification of the different compartments</td>
<td>Assessment of hydrocarbons in place</td>
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<tr>
<td>Hydrocarbon filling history of compartments and extent of communication of geological time</td>
<td>Determination of hydrocarbons in place and fluid contacts</td>
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<td>Dynamic communication between and within compartments over the field production life</td>
<td>Assessment of possible development schemes (secondary, tertiary recovery, well drilling policy (planning and spacing))</td>
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<td>Extent of volumes of rock of poor characteristics</td>
<td>Well drilling and production policy (location, geometry, and production constraints)</td>
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<tr>
<td>Nature of fluid</td>
<td>Well drilling policy (location and geometry)</td>
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RFT Data and Reservoir Characterization

Fig. 7 - Evidence of a Vertical Hydrocarbon Movement in the Tight Zones from Formation Pressures.

...and implication of this reservoir description to material balance calculations

Fig. 8 - Graphical solution to the material balance equation for the West Flank Statfjord North reservoir.
\[
\frac{N_P}{N} = \frac{B_o - B_{oi}}{B_o}
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