**OVERVIEW**

Biota assessed a problem well by identifying the source of water production in a new section’s appraisal well. Biota applied its high resolution, non-invasive and efficient technology combined with data science and reservoir engineering capabilities. This solution confirmed that the fracture grew past the frac barrier to access a water bearing zone.

**PROCESS**

Biota produced a DNA baseline from collected drill cuttings above, in and below the target zone. Once the well was on production, Biota collected and analyzed fluids samples for 90 days to assess drainage patterns.

**CHALLENGE**

The operator had various theories as to why an appraisal well was producing significantly more water than expected raising questions on how to approach the remaining development. Biota was asked to figure out the reason for the abnormal water production.

![Effective Drainage Height Over First 90 days of Production](chart)

**CASE STUDY**

**Powder River**

**Primary Production Target Intervals**

**Potential Frac Barrier**

**Water Producing Layers**

**DNA Contribution**

Days: 27, 34, 42, 49, 56, 62, 69

<table>
<thead>
<tr>
<th>Effective Drainage Height Over First 90 days of Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days-27</td>
</tr>
<tr>
<td>Water Producing Layers</td>
</tr>
<tr>
<td>Potential Frac Barrier</td>
</tr>
<tr>
<td>Primary Production Target Intervals</td>
</tr>
</tbody>
</table>
RESULTS AND VALUE

- Biota conducted the project non-invasively, safely, and accurately with rigorous quality control processes and integrated analysis into other reservoir engineering workflows.

- The team developed a high-definition DNA baseline pin-pointing predominant DNA sequences for each 10’ interval in the vertical section and 50’ interval along the lateral.

- Biota was able to determine the formation contribution within these intervals based on production samples collected at the separator.

- The analysis revealed that the likely source of water is due to fracture growth beyond the frac barrier which allows access to the water zone just above the frac zone. The reference graphic shows that the fractures grew past the potential frac barrier, and they did not degrade during the first 3 months of production.

- This analysis provided clarity with confidence; providing a robust and definitive cause for poor performance and the team is now devising a plan to prevent access to water zones for future wells.

POTENTIAL NEXT STEPS

- Continue to take production samples and assess production contribution for each interval to further optimize development.