Freedom
to experiment
accelerated PNS development

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It's all for nothing if you don't have freedom.

Freedom!!
From Nabateans to Aramcons

Why Rome and China moved ahead, and some current day oil companies are maybe ....
The value of our Freedom to experiment

- Finding costs oil: US$ 0.03 / bbl
Acknowledgements

- SPWLA and AFES & LPS: AML Distinguished Lecture Programme
- Schlumberger-Geoservices
Overview

• Intro & acknowledgements
• Value: finding costs only US$ 0.03 /bbl
• Background: early 1990’s PNS technology & Nigerian setting
• New PNS tools
• Experiment; take the freedom to do so; collaborate
• Results: expansion of operating envelope; PNS works through two strings!!
• Question & Q&A
hods of contrasting salinity, measuring residual oil saturation and monitoring the success of enhanced recovery methods.

The slim tool size eliminates the need to kill the well and pull tubing, minimizing the associated risks and lost production. The interpretation is more reliable because the effect of invasion by the kill fluids is eliminated, reducing the need for special monitoring wells.

Two tool sizes are available for inelastic-capture and sigma measurements—a 1\(\frac{1}{16}\)-in. version for logging below 2\(\frac{3}{8}\)-in. tubing and a 2\(\frac{1}{2}\)-in. tool for operations below 3\(\frac{1}{2}\)-in. and larger tubing. The larger tool has special detector shielding that permits its use not only in static but also in flowing
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Nigerian setting

- Tools as offered: no use
- Need to log through two tubulars
- Tool capability as stated: much more than needed
- Don't need (precise) saturation, only need yes/no flooded
  \[\rightarrow\text{worthwhile to 'gamble' on being able to see through two strings}\]
Figure 2: Clear contact in a dual completion.

The OWC was clearly seen through a 2³/₈-in tubing with another 2³/₈-in tubing in 7-in casing, 9⁵/₈-in hole while logging RST-A.
Figure 3: The contact in Figure 2 was confirmed by production performance. Water production is highest in the south-eastern wells. This is shown by an increase in BS&W from wells 18, 4, 17 to 15. The two wells (11 and 31) that logged this interval captured this trend.
Conclusions

• Sometimes even the best researchers and tool developers are too pessimistic about the potential of their babies
• Freedom to experiment was crucial for the fast expansion of the PNS operating envelope
• Similar freedom likely to be useful in other challenging situations
Question for you/us

Do our engineers today still need/have similar freedom to experiment??
Thank you!!