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Subject: TLP-103C CPI review

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TLP-103C - Review of the CPI Analyses

Anglo Africa Oil & Gas (AAOG) engaged Havoc Partners LLP (Havoc) to provide an independent review of the petrophysical analyses of the recently completed TLP-103C well drilled in the Republic of Congo.

This note is not intended to provide a summary of well results but a summary of and commentary on the analysis of well results completed by independent contractors, the implications of that analysis and potential follow up that may be considered.

Well TLP-103C

The TLP-103C well completed in January 2019, was designed with multiple objectives:

- 1. Assess the currently producing Pointe Indiene reservoir extent (designated R1-R3)
- 2. Appraise the previously discovered hydrocarbon accumulation within the Mengo Fm, and
- 3. Explore the previously untested Djeno Fm, which is a known producing interval in nearby fields.

Results of the drilling program were positive with a number of hydrocarbon bearing zones confirmed by logging. The shallow R1-R3 interval and Mengo Fm were successfully intersected and, given previous Tilapia field drilling, within expectations. The presence of potential reservoir intervals with hydrocarbon shows in the deeper Upper Djeno interval was a positive exploration outcome from the campaign.

Further investigation of the Djeno Fm at Tilapia is clearly warranted, particularly given contribution and performance of the Djeno Fm in nearby fields which, if repeated here, could provide production on a much more significant scale than the other targets. As such and at the instruction of AAOG, Havoc has focused its review specifically on the petrophysical analysis of the Djeno exploration target.

Data acquired and interpretation

Wireline operations during drilling were conducted by Schlumberger (SLB) and a comprehensive suite of data recorded in both the 12 $\frac{1}{2}$ (R1-R3 & Mengo Fm.) and 8 $\frac{1}{2}$ (Djeno Fm.) hole sections. No coring

(side wall or conventional) or fluid samples were collected during operations. Initial interpretation of the wireline data indicated hydrocarbons were present at the R1-R3, Mengo and Djeno levels.

Following the drilling operations, SLB and NUTECH Energy (NUTECH) independently completed proprietary computer processed interpretations (CPI's) of the TLP-103c wireline data suite.

SLB completed its 'ELAN' (Environmental Analysis) CPI which provides a level-by-level Quantitative Formation Evaluation. SLB describes the process as an "Optimized" simultaneous equation solver, with only very general predefined constraints and it provides a general framework for building multiple formation models.

NUTECH completed its 'NULOOK' CPI which it describes as an enhanced petrophysical analysis which utilizes conventional open hole well logs.

The Schlumberger report sets out the following results:

- 1. 10m net pay over 14 m interval (71% Net:Gross)
- 2. Moderate to good reservoir quality Porosity 16%
- 3. $S_w 30\% S_h 70\%$

The Nutech report sets out the following results:

- 1. 14M net pay over 14m interval (100% Net to Gross)
- 2. Excellent reservoir quality porosity 20%
- 3. $S_w 11\% S_h 89\%$

The outputs of these independent CPI analyses are both positive in terms of the Djeno prospectivity but also reveal notable variations in results. While both contractors identified a hydrocarbon bearing interval between 2397-1411mMD, the estimations of net pay in this interval varied (SLB 10m vs Nutech 14m) as did the identification of additional pay through the Djeno section.

Havoc is of the view that variations in results are not only due to differences in the methodology but perhaps just as importantly, differences in the assumptions applied (e.g. water salinity, lithology etc) in each model. Assumptions are required in both methods to derive reservoir properties including, but not limited to, porosity, water saturation (and in turn Hydrocarbon saturations) and ultimately estimations of net hydrocarbon pay. Of particular note are the following aspects of the analysis:

Water salinity provides a clear example where assumptions vary markedly between contractors. As no water samples were collected during operations, a water salinity must be assumed and applied to the model. Salinity is a key parameter as it directly impacts resistivity measurements and by virtue the interpretation of fluid type and relative saturations in the reservoir.

SLB have applied a single salinity of 150,000ppm throughout the well, while NUTECH have used a zoned approach with salinity varying from 166,000ppm in the upper hole section reducing down to 6,000ppm at the base (Djeno section). In comparison sea water has a salinity of 35,000ppm. Clearly there are significant differences at the Djeno level.

Another notable difference can be seen in the lithological/mineralogical assumptions being applied in both models. NUTECH initially treated the entire evaluated section as limestone, while SLB have

included a spectrum of minerals including Quartz, Dolomite, Illite and K-feldspar. Significant differences such as these require resolution (log calibration) as lithology assumptions play a critical role in determination of porosity and will therefore impact estimations of net pay. This is further complicated when considering clay content, and again both contractors have presented vastly different views on this, which is likely to be one of the more significant contributors to the differences seen in net pay estimations.

As highlighted by just two examples, the differences in the final results produced by SLB and NUTECH can, in-part, be attributed to the range of assumptions being applied. In the absence of hard data, and the ability to calibrate log data, the assumptions being applied are considered to fall within an acceptable range of possibilities. What is clear however, is that additional data is required by AAOG to make a confident determination of the ultimate potential of the complete Djeno formation.

XRD of drill cuttings in the Upper Djeno Fm will be undertaken. Any future evaluation program should include the collection of core (side wall or conventional) and fluids samples (water and hydrocarbons MDT/RFT) as well as specialised logs, possibly NMR (porosity) and OBMI (thin bed pay). These additional data will constrain the assumptions described previously and allow definition of the potential Djeno reservoirs identified.

Conclusion

While there are clear differences between the two CPIs, both reports have concluded that reservoir quality is between good and excellent, which supports a commercial decision to implement a plan to seek to produce from the Djeno. It is not possible to resolve the differences between the two prior to re-entering the horizon, but these differences do not necessitate different planning and so will be resolved only on re-entry.

Image 1A) & 1B) Estimations of Net Pay SLB Vs NUTECH. Note difference in porosity and S_w in Reservoir section A.

1A)



1B)



Havoc Partners LLP

Havoc Partners LLP is an independent consultancy comprising 5 geoscientists who collectively have in excess of 100 years of international upstream experience, the vast majority of which has been focused on exploration of the African continent. The Havoc team were the founders and leaders of both Fusion

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