

Fluid Mapping While Drilling for Optimal Well Landing Decision – A Case Study From Malaysia

Presented for the DEVEX 2023

Presented by Marcus Turner SLB on behalf of:

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20-21 June 2023

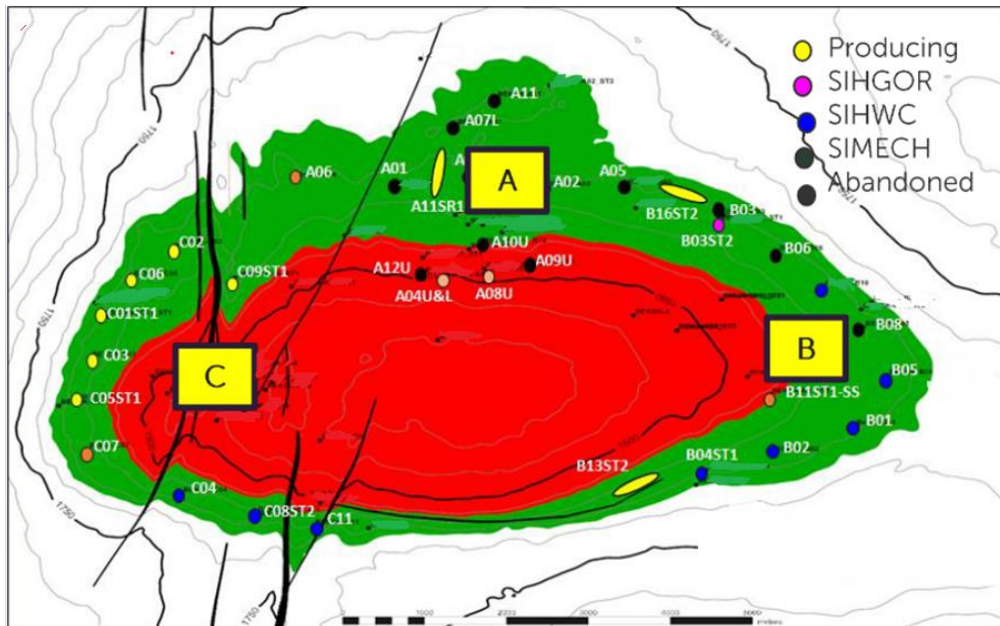


Outline

- Pre-job planning
- Methodology and workflow
- Field overview
- Case studies
- Results
- Best practices
- Conclusion



Field Overview



Uncertainty in current GOC and OWC

Low resistivity contrast between oil ($> 11\text{ohmm}$) and water ($\leq 10\text{ohmm}$)

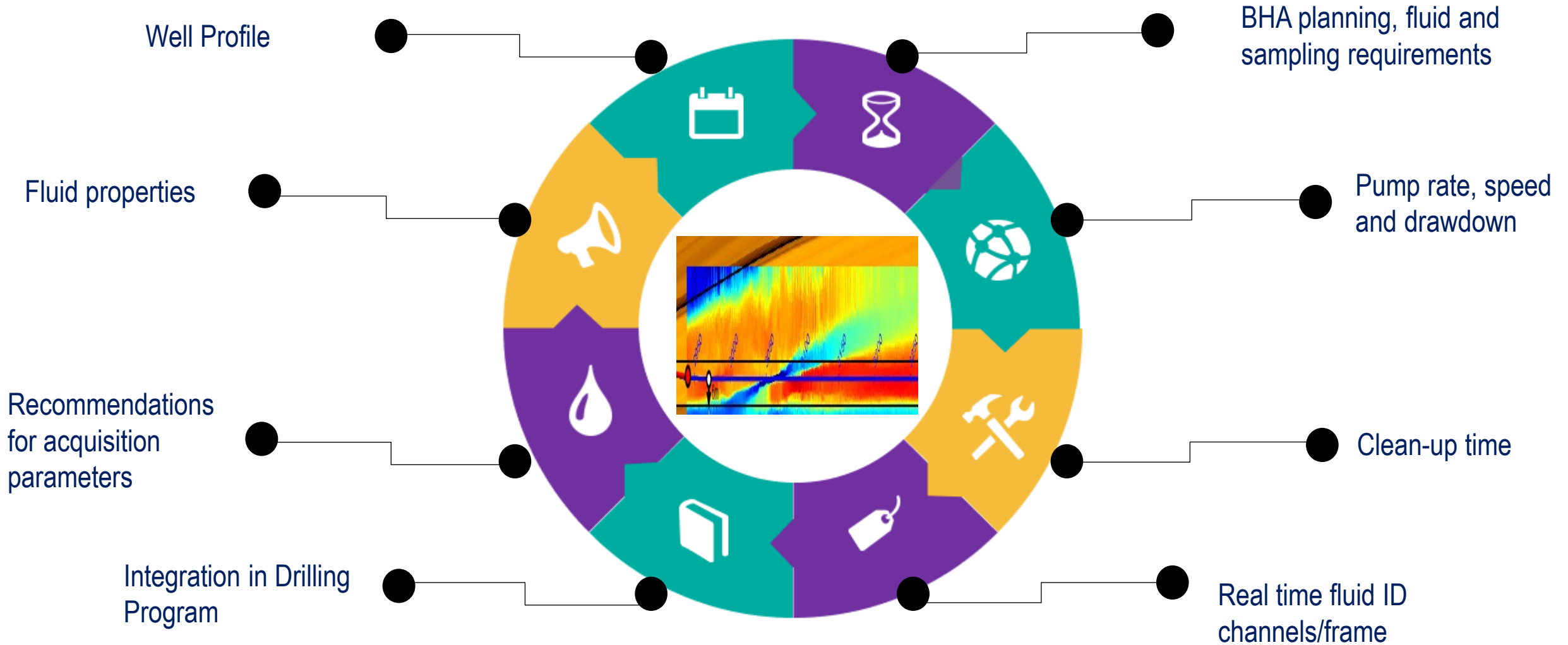
Uncertainty in structural dipping

Uncertainty in transition/swept/depleted zone producibility

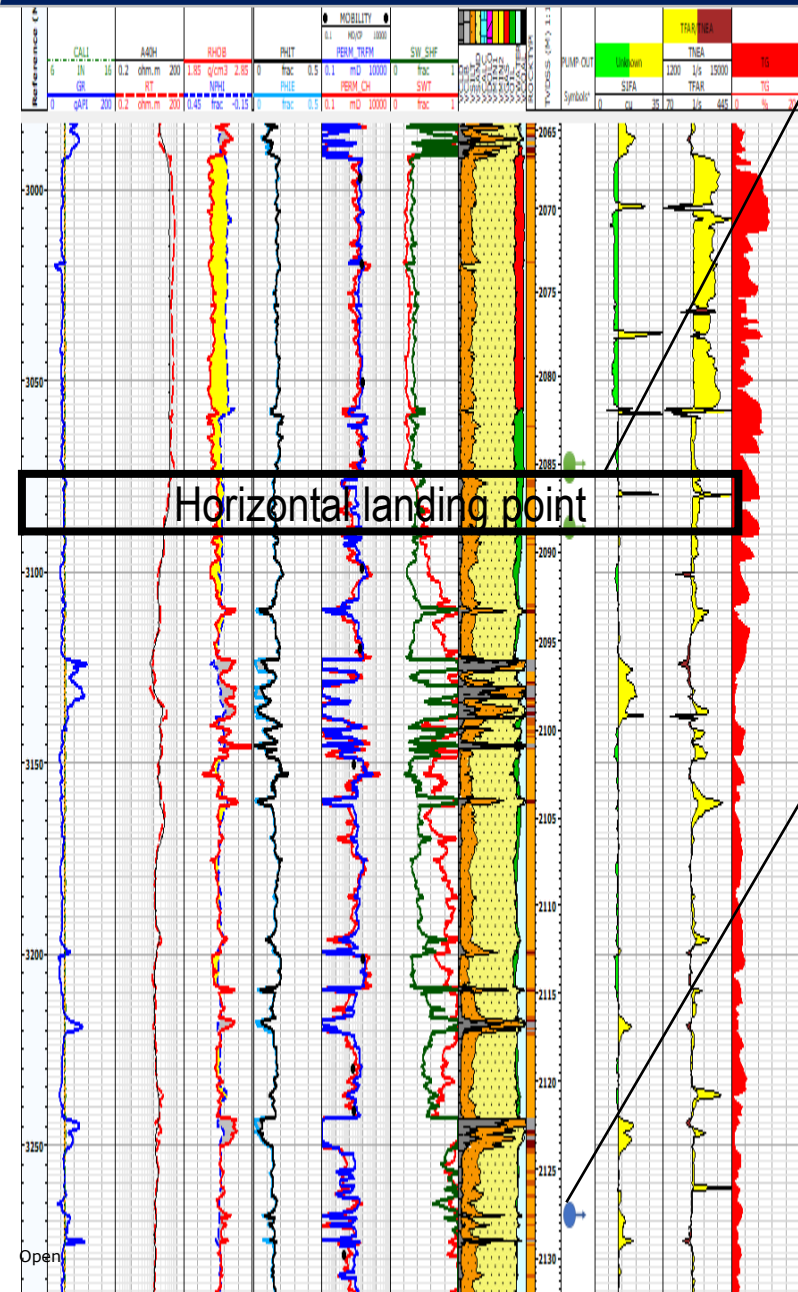
Uncertainty in reservoir compartmentalization

Uncertainty in well placement due to thin oil rim

Pre-Job Planning

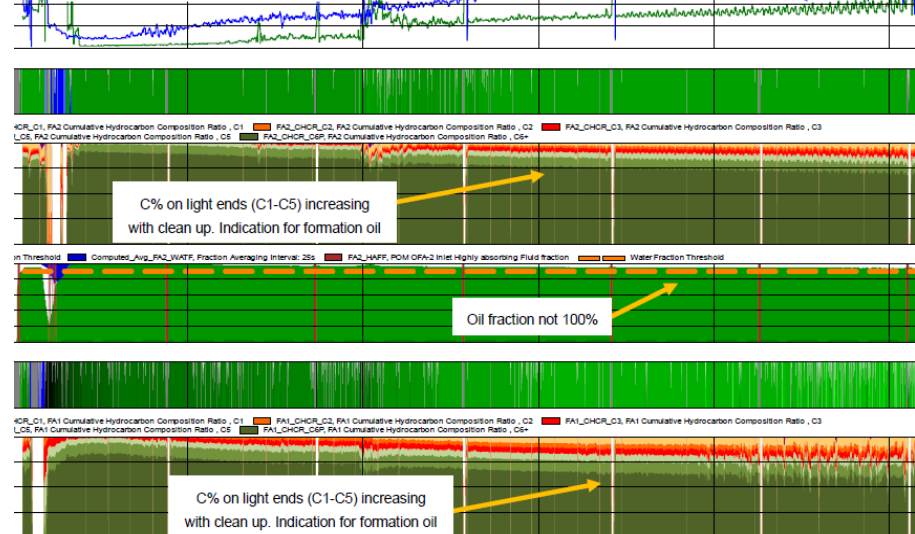


Case Study One

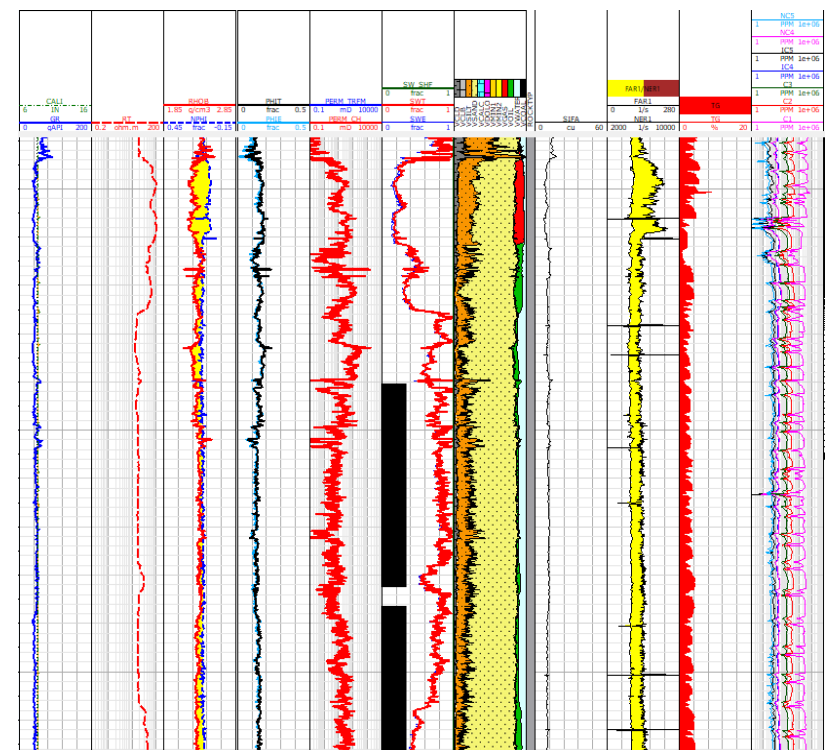
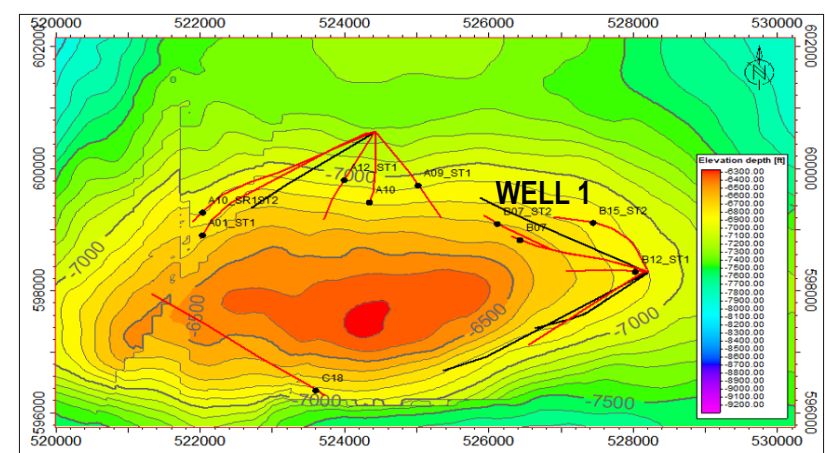
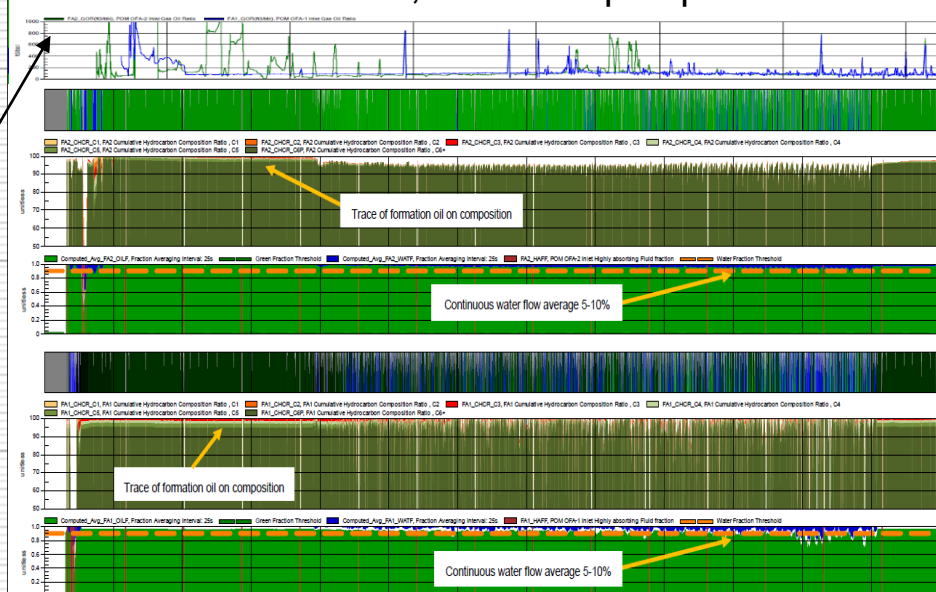


38 liters PO volume, 10-15 cc/s pump rate

Scattering of GOR due to pumping below saturation pressure (breaking gas)



57 liters PO volume, 5-10 cc/s pump rate

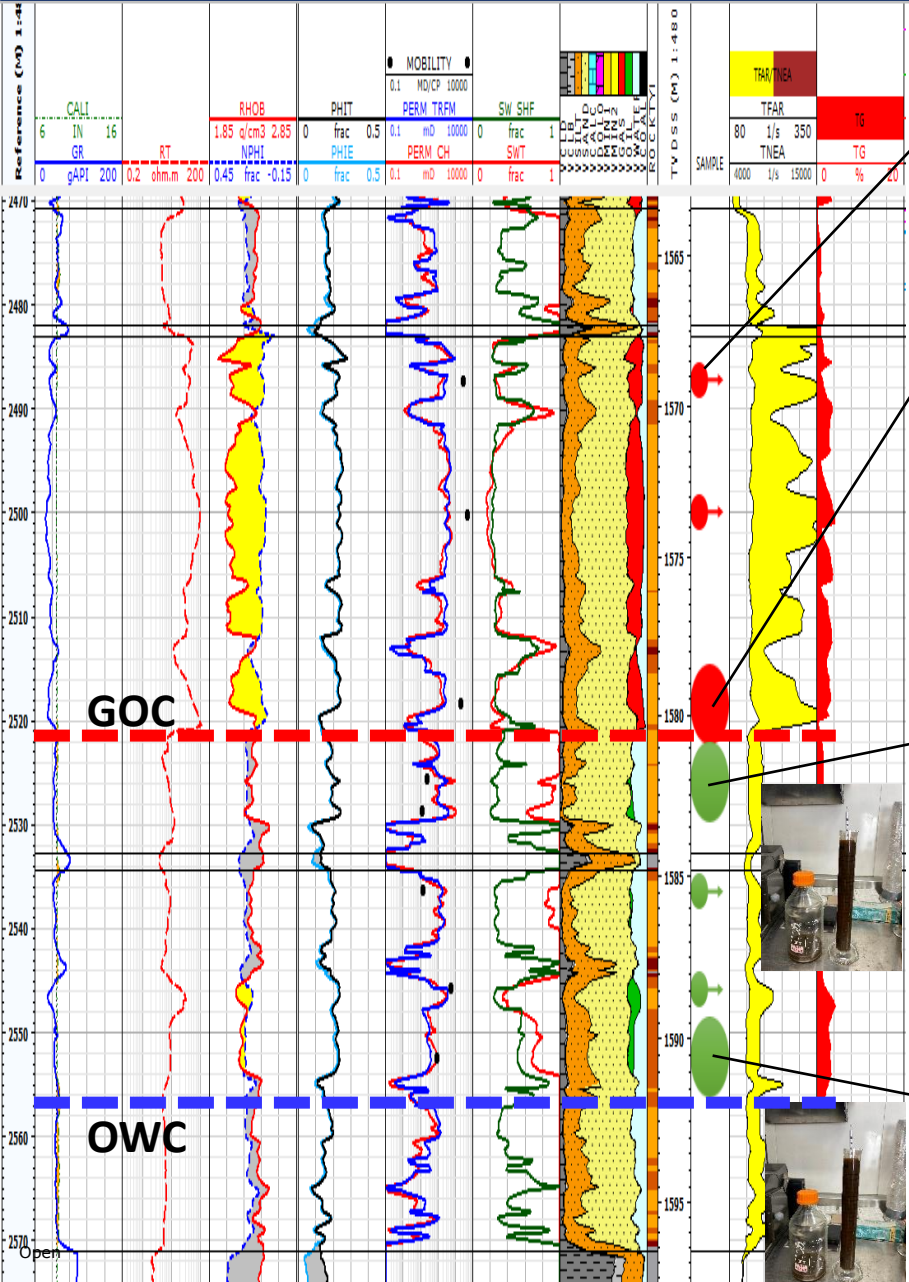


Well 1

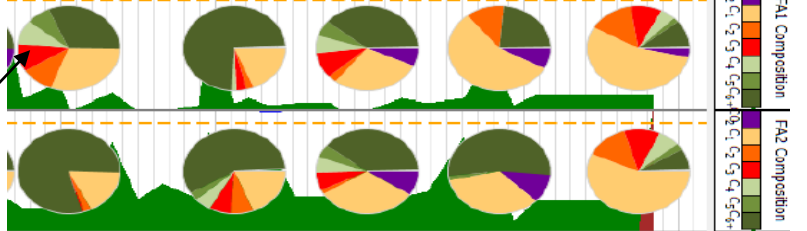
MRT #1
 THP = 500 psi
 Qo = 535 bbls/d
 Qg = 3.2 MMscf/d
 BSW = 60%

25th Sep, 0730 27th Sep, 1110

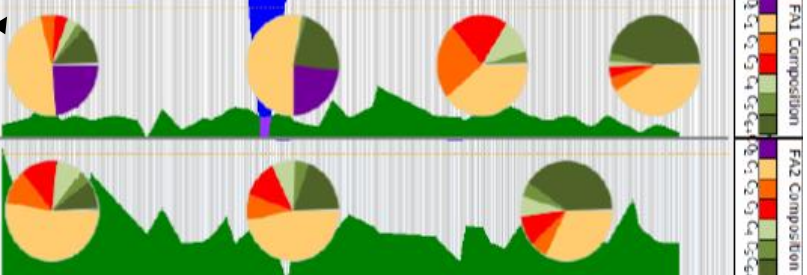
Case Study Two



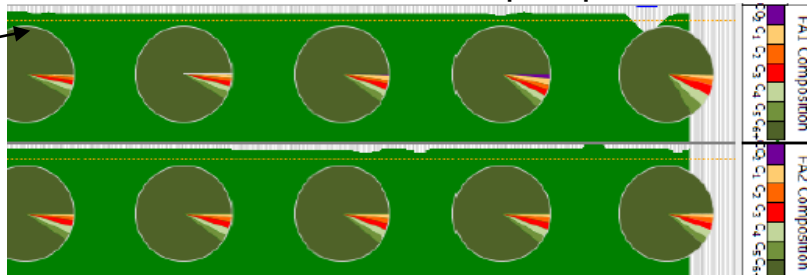
81 liters PO volume, 20-30 cc/s pump rate



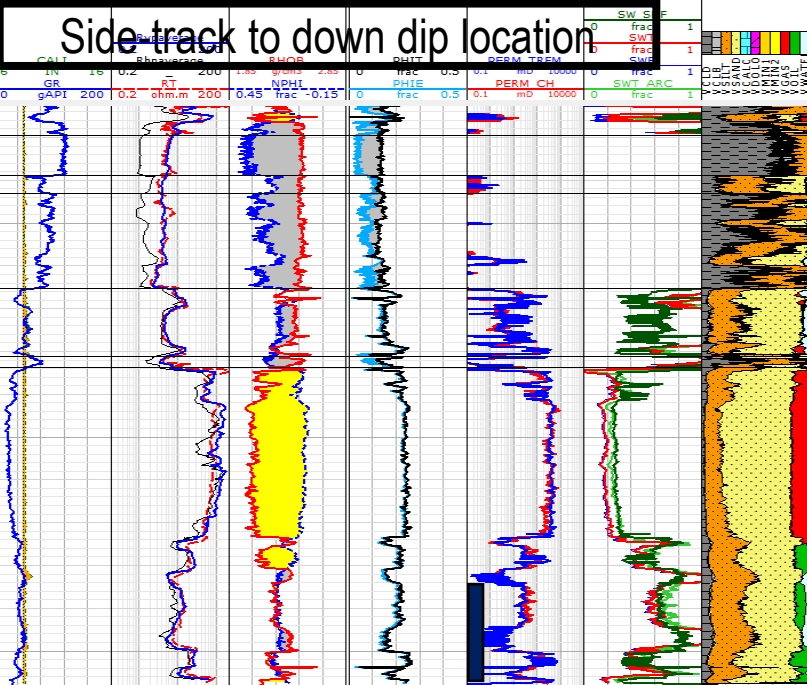
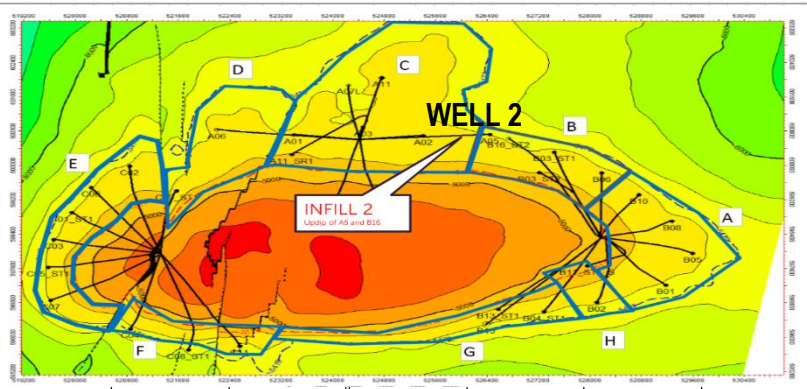
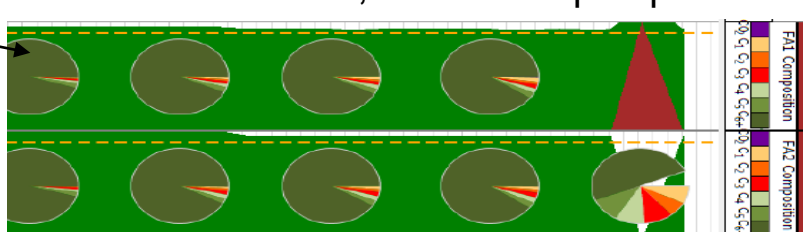
174 liters PO volume, 40 cc/s pump rate



58 liters PO volume, 10 cc/s pump rate

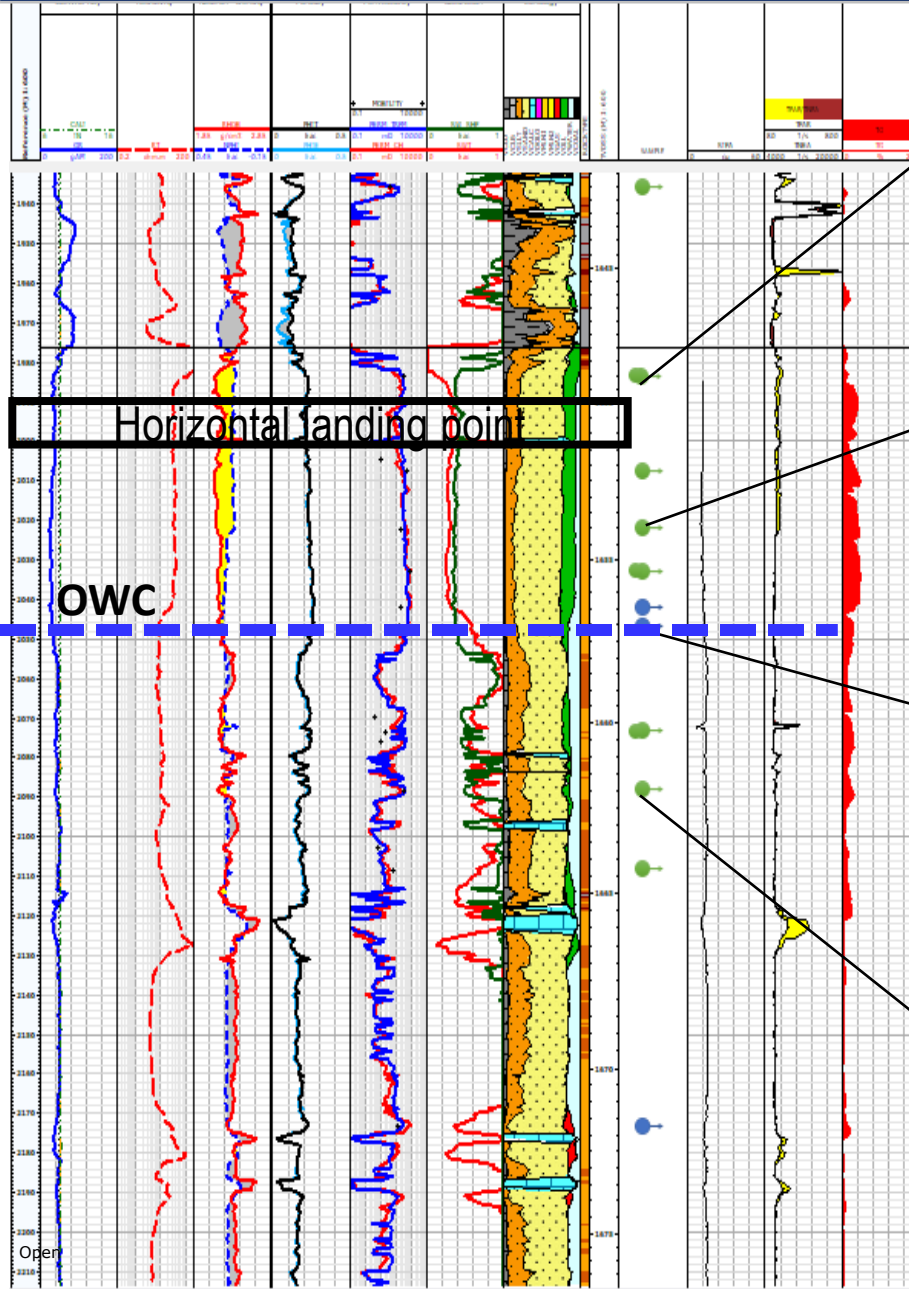


45 liters PO volume, 10-20 cc/s pump rate

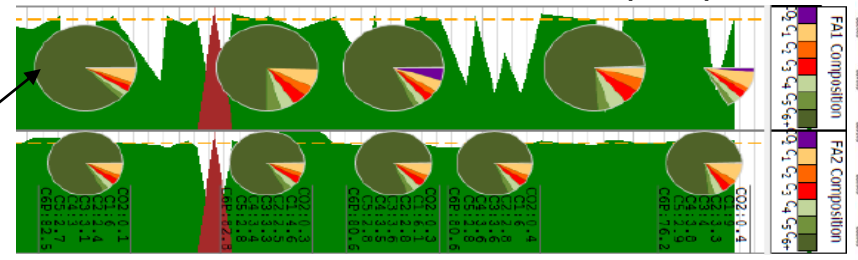


	Choke Size /64	THP psig	Gas Q MMscf/d	Oil Q bbls/d	Water Q bbls/d	GOR MScf/STB	WC %
MRT#1	36/64	391	0.53	535	77	0.99	12%
MRT#2	44/64	282	0.58	637	73	0.91	10%
MRT#3	48/64	226	0.61	626	83	0.98	11%
MRT#4	44/64	429	1.50	1596	140	0.94	8%

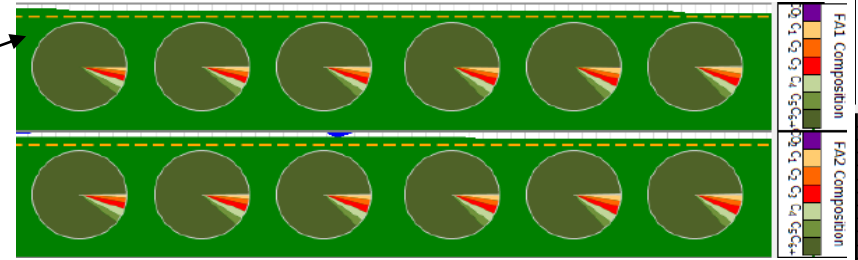
Case Study Three



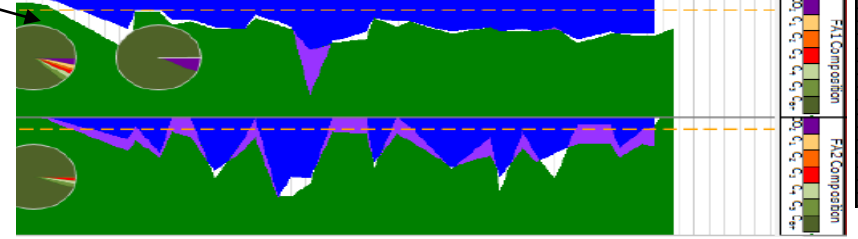
127 liters PO volume, 20-30 cc/s pump rate



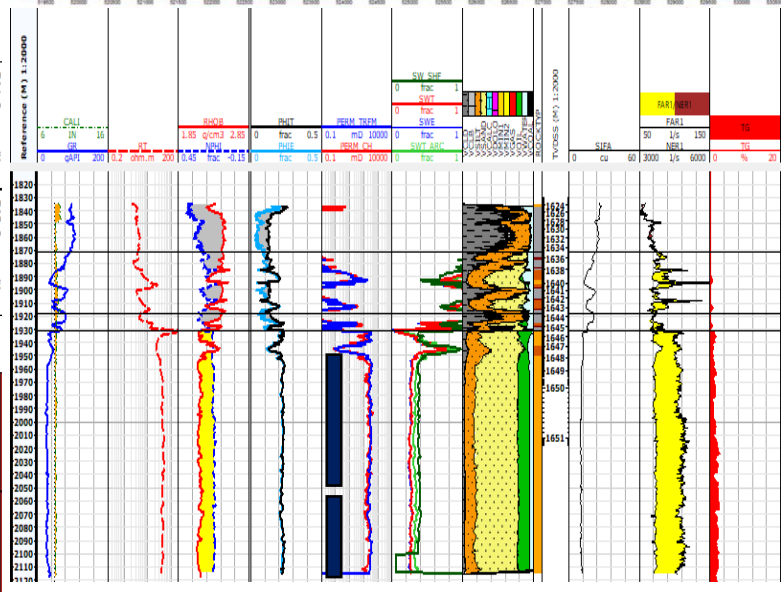
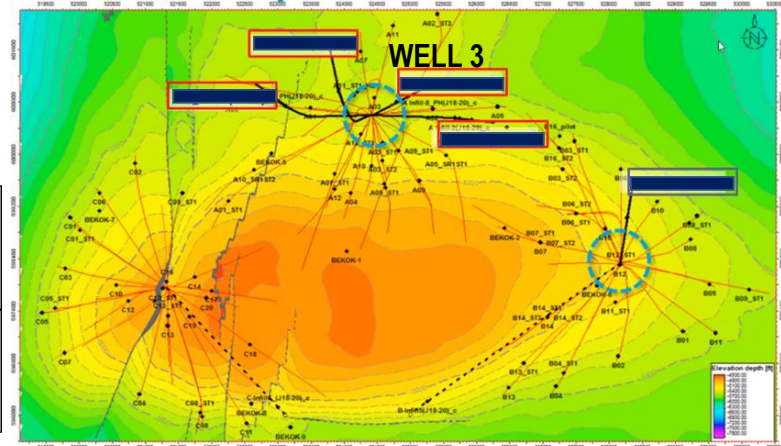
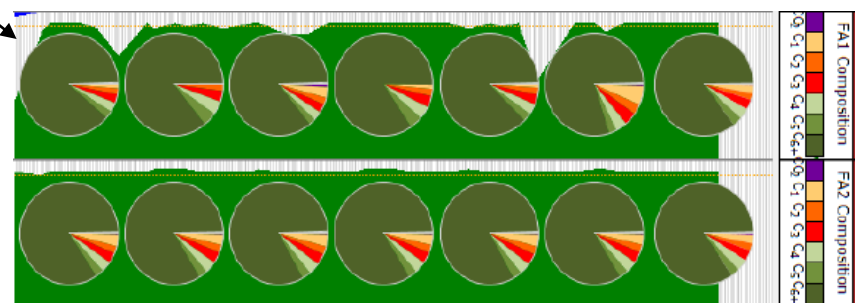
66 liters PO volume, 10-20 cc/s pump rate



63.6 liters PO volume, 15-20 cc/s pump rate



38.5 liters PO volume, 5 cc/s pump rate



MRT	Choke size	Oil rate (bopd)	Gas rate (MMscf/d)	BSW	FTHP (psia)
1	72/64"	3041	3.5	2%	413
2	56/64"	2423	2.19	1%	428
3	44/64"	1865	1.59	1%	488
4	50/64"	2122	2.17	1%	491

Conclusion

- Strategic data acquisition and fluid characterization plan play a critical role in brown field reserves monetization
- In mature field environment where current fluid contact movement is uncertain with long transition zone and reservoir sweep is non-uniform, drilling a pilot hole to acquire data to determine horizontal landing point is highly recommended
- Uncertainty in hydrocarbon fluid type can best be addressed through real time monitoring of fluid clean-up, contamination monitoring and acquiring physical samples to be opened at surface
- Integration of seismic attributes, 3D simulation model and optimized well placement for the best drainage area will maximize the reserves addition in a mature field development

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THANK YOU FOR LISTENING
Time for Questions

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