Cairo. Egypt. November 7-8, 2022

MENAPS 2022

MIDDLE EAST AND NORTH AFRICA PERFORATING SYMPOSIUM

Productivity Enhancement By Perforating Combining Flowing & Dynamic Underbalance First Time Using E-Coil

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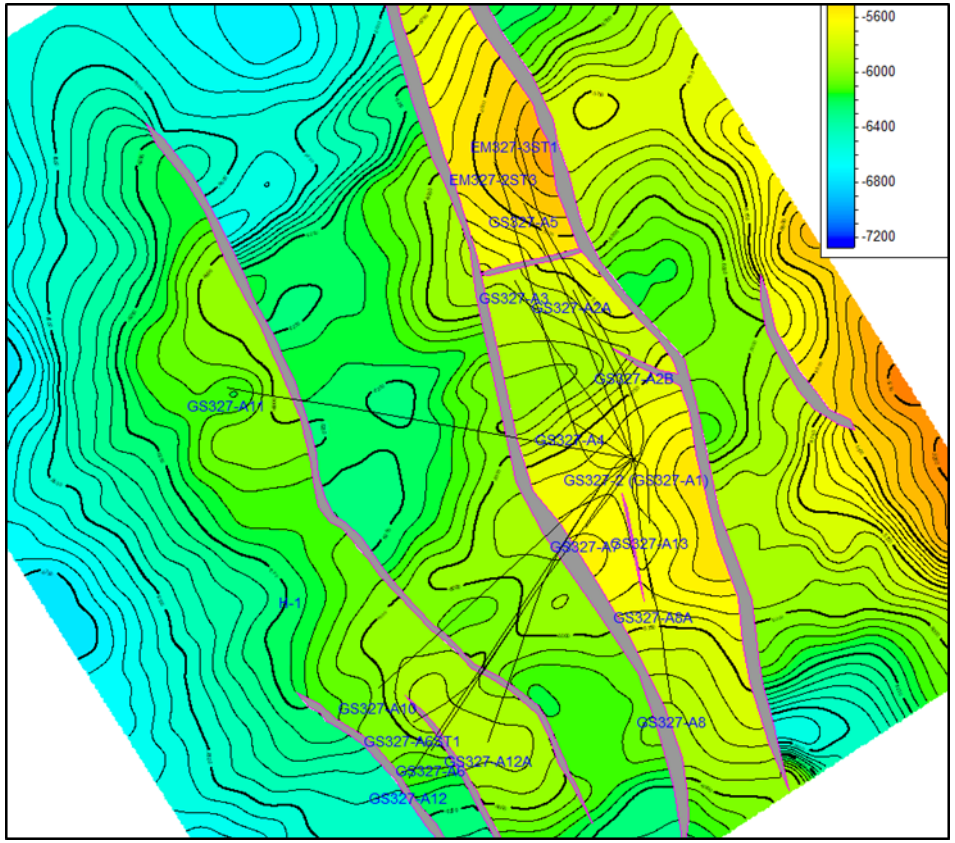
Field Overview

Discovered 1987

Started production 1988

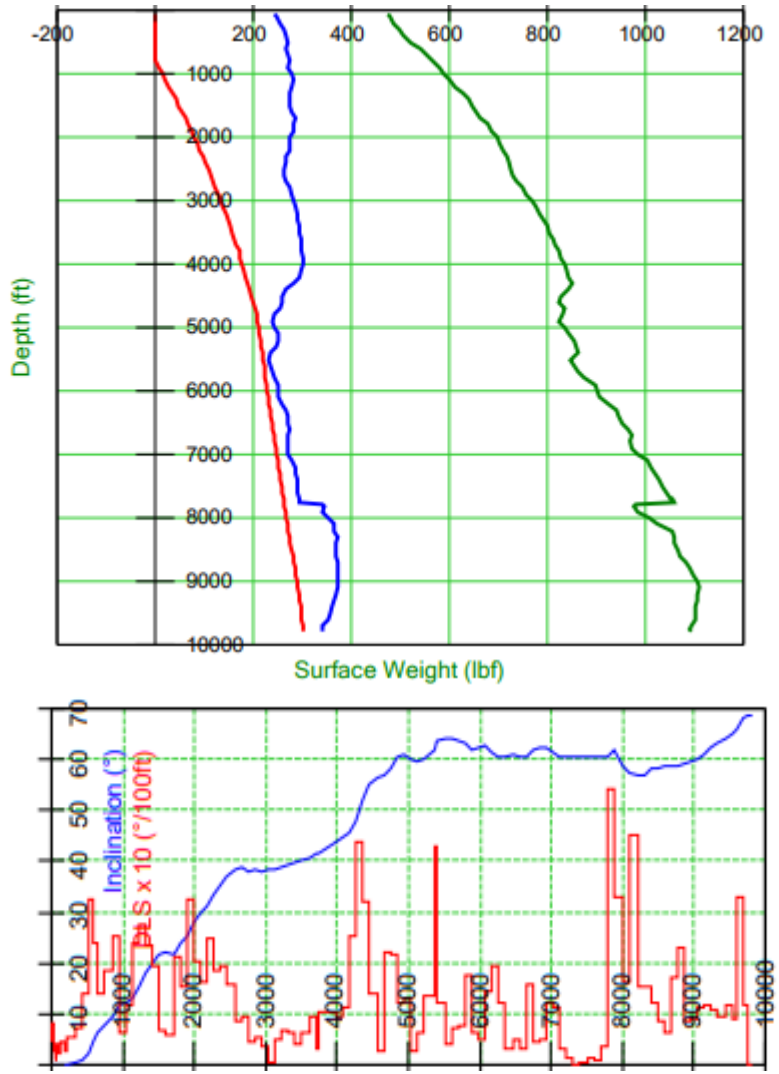
Exploring Nearby compartments 2006-2011

Well Trajectories getting complicated



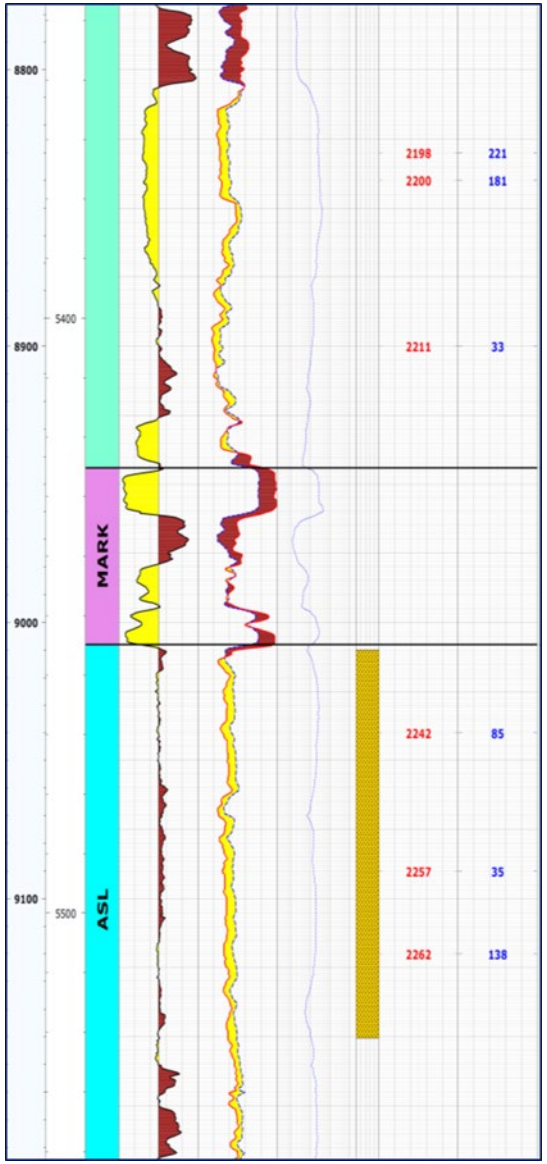
Deployment Challenges

- Complex Trajectories
- Cable Compression.
- Heavy Crude “17 API”
- Sour Environment
- Organic Deposits
- Inorganic Scale Deposits
- High Profile Wells.



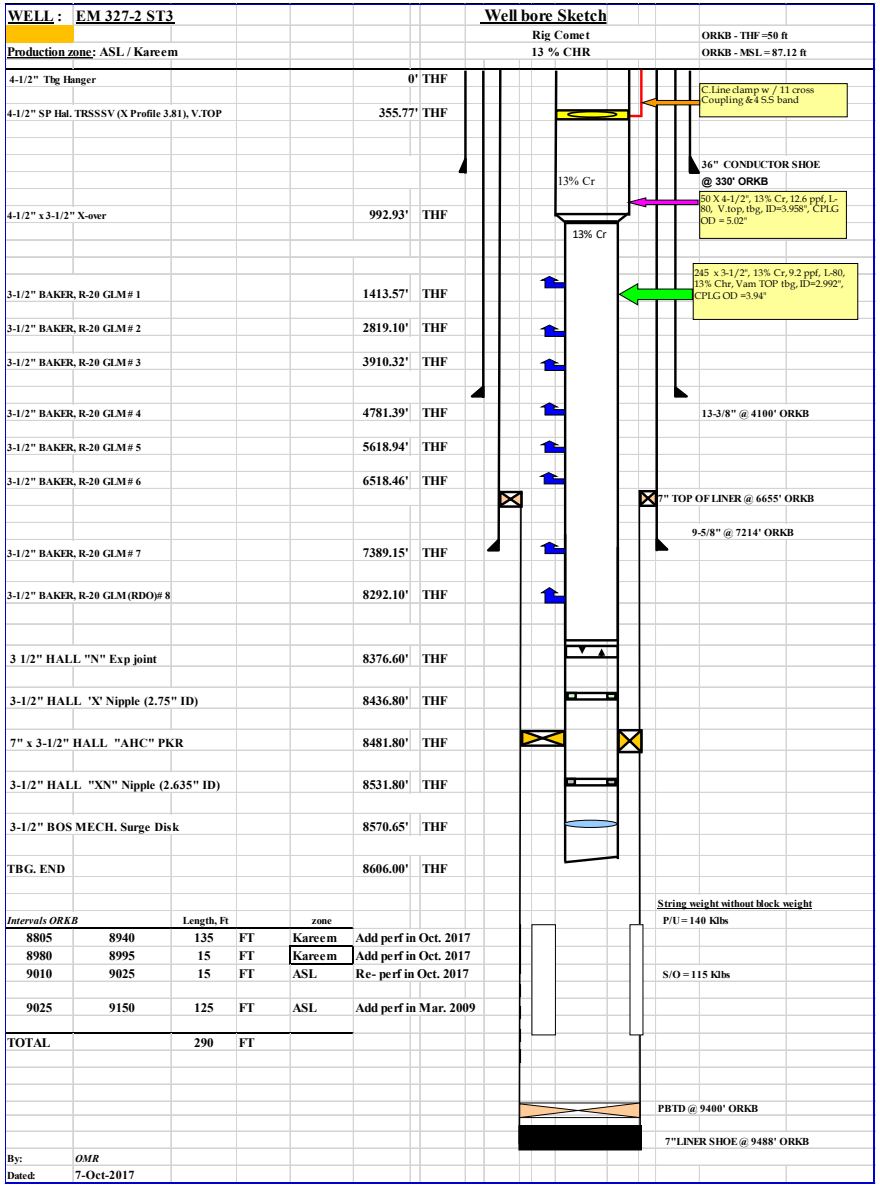
E-Coil Deployment 2017

- E-Coil was introduced in 2017 to intervene high profile wells.
- Logging & Perforation Scope
- Post Campaign Results questioned perforation efficiency of some zones.

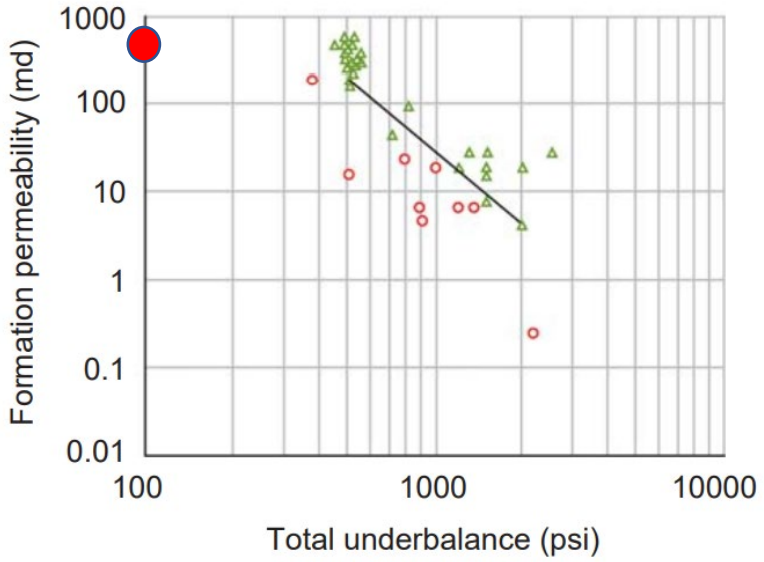


E-Coil Deployment 2017

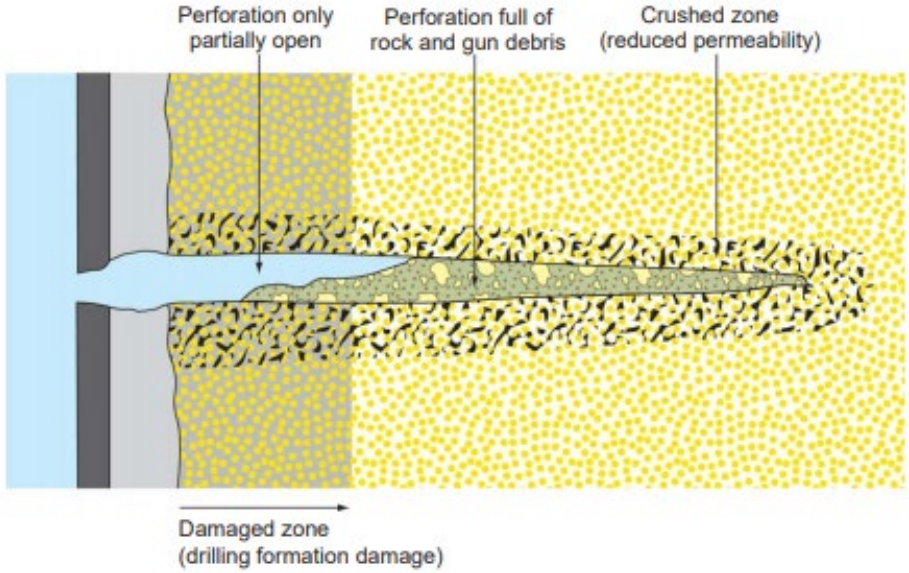
- Balanced perforation with Diesel.
- Underbalanced Perforation using gas lift (50 PSI)
  - Presence of Coiled tubing reduced the flow area and due to the high friction of crude drawdown during perforation was minimal.
  - Shallow injection of gas due to high pressure drop.



Back to Basics “Perforation Underbalance”



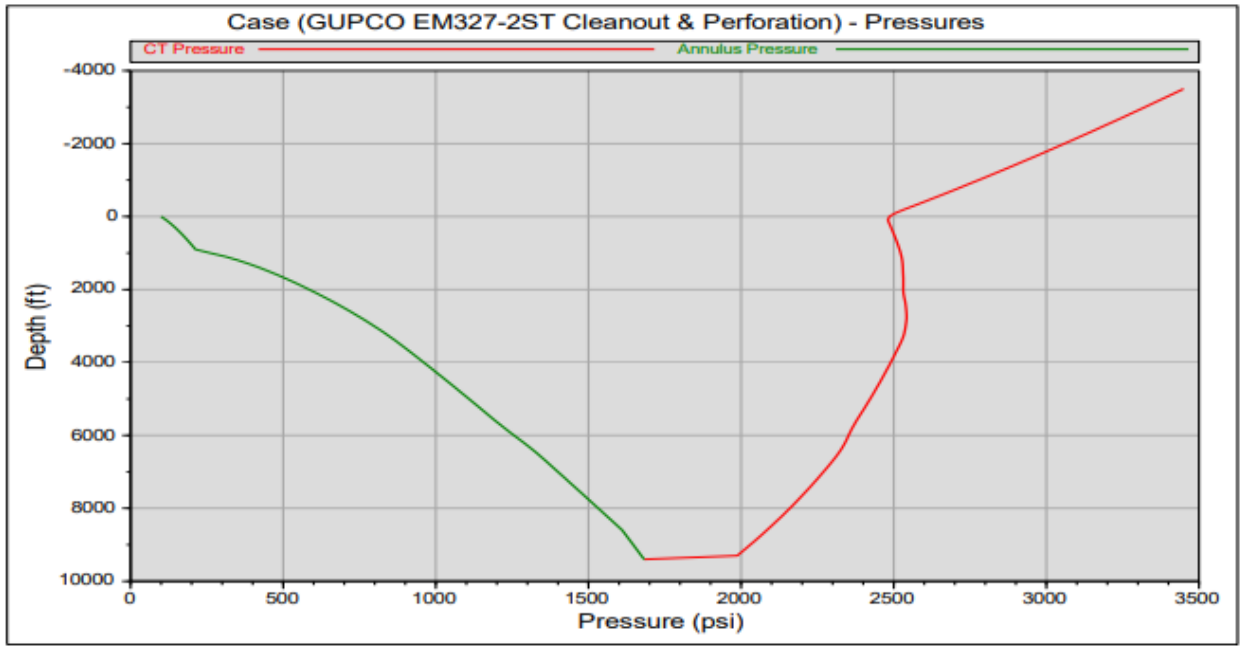
*King et al



* Courtesy Jonathan Bellarby

E-Coil PLTs showed wells are flowing with presence of Coiled tubing at 50 PSI drawdown which can be balanced or slight underbalanced with Proposed perforations.

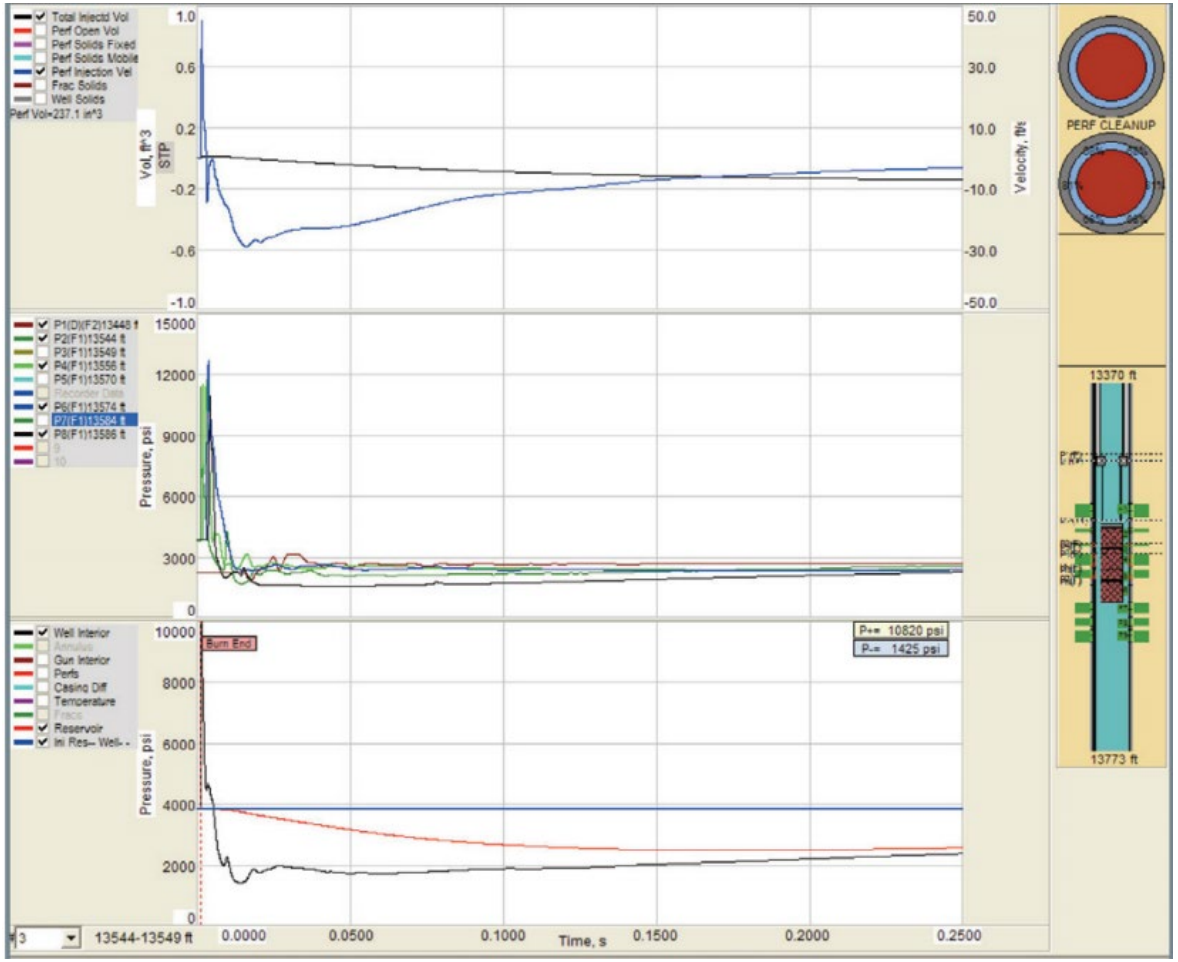
Nitrogen Pumping while perforation



Using the Emergency flow release sub allowed pumping Nitrogen to be pumped while perforation , maximum of 500 SCF / Min.

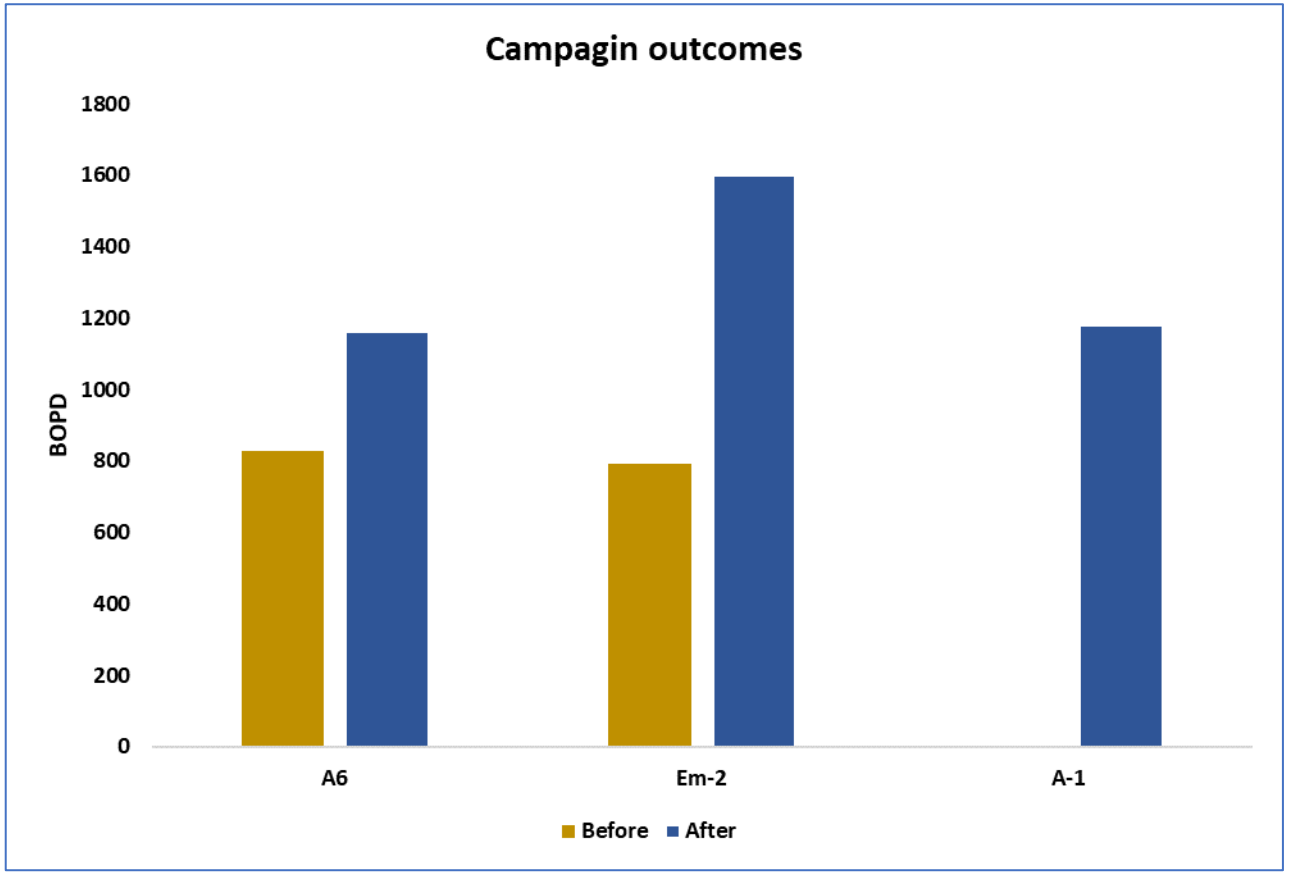
Shock Model confirmed operation is safe and flow release would not shear upon perforation

Flowing + Dynamic Underbalance



* Courtesy Halliburton Surgepro.

Campaign Outcomes



Total of **2300 BOPD** gain achieved Applying the new perforation Technique

Acknowledgement

Dragon Oil

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G U P C O

HALLIBURTON

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Q&A

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