Gaia Earth Group
Total Energies

De-risking formation evaluation and minimising emissions using cable protection – a case study

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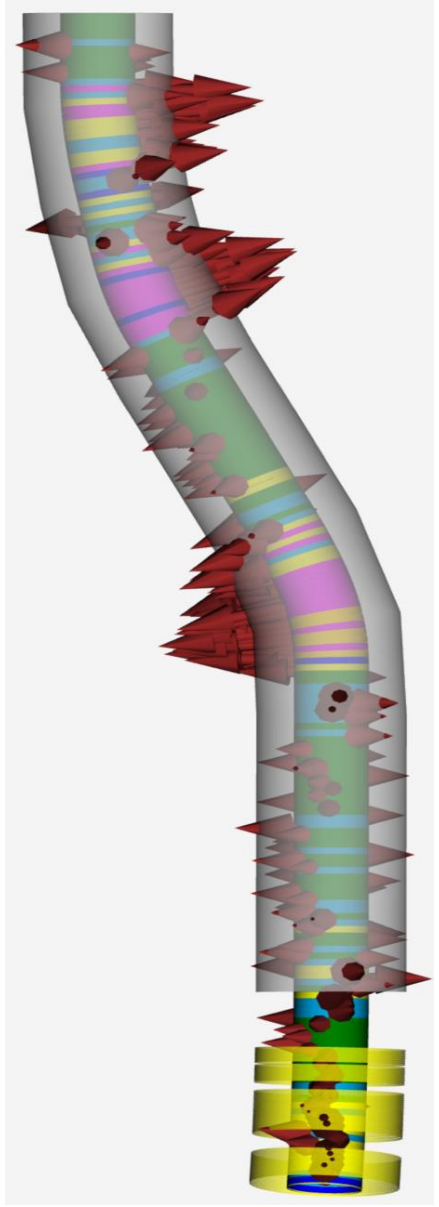
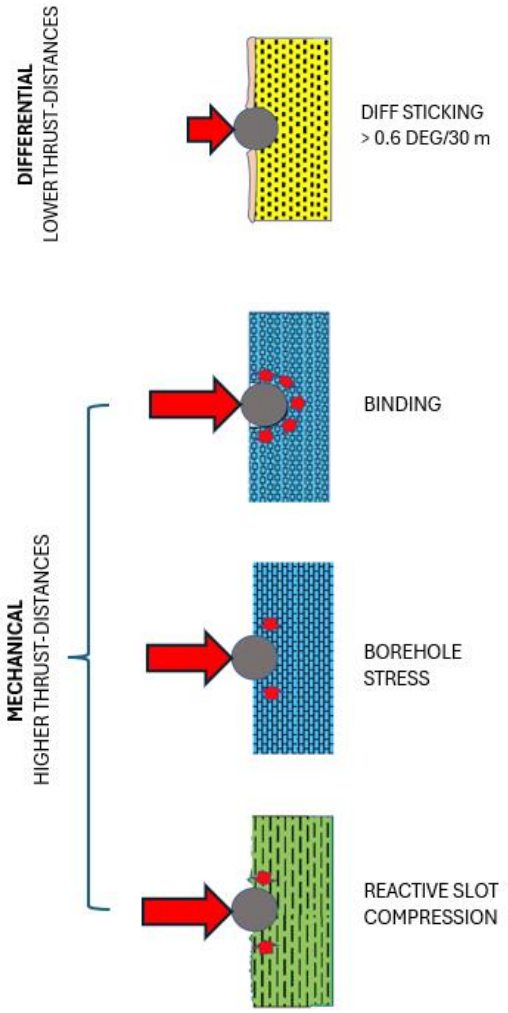
Well Introduction

- Near-vertical 8.5” open hole section
- Multiple sands exposed
- Extensive wireline program
- Cable sticking not considered a significant risk
- Cable sticking encountered after multiple wireline runs
- The Gaia Cable Protection System (GCPS) was deployed as an alternative to pipe-conveyed logging
- Significant savings in rig time, reducing cost and emissions.
- All well objectives delivered.



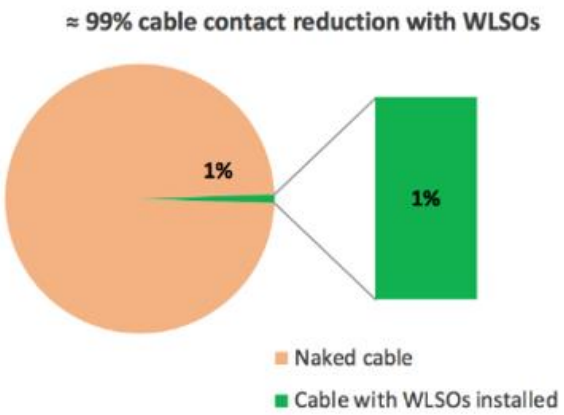
Why Do Cables Get Stuck?

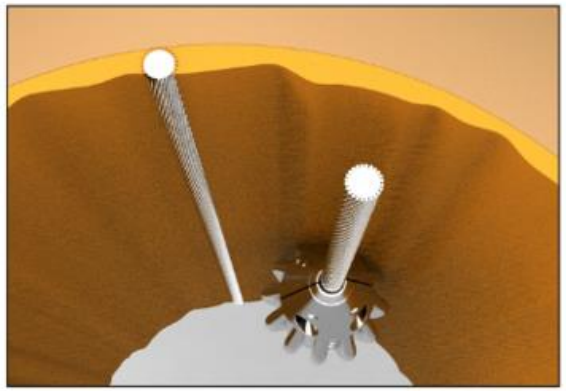
- Wireline cable cuts a slot in mud-cake/formation
- In mud cake, differential sticking may result
- Keyseating arises from slot-cutting in formation, from a combination of formation swelling, mechanical binding, borehole stress
- Keyseating combined with differential sticking increases the risk
- Risk factors: Long open hole sections
  Directional work over weaker formations
  Permeable/overbalanced formations
  Loss zones or open fractures
  Multi-run wireline jobs & long station times
  Hole extensions – degradation over time



Gaia Cable Protection System [GCPS]

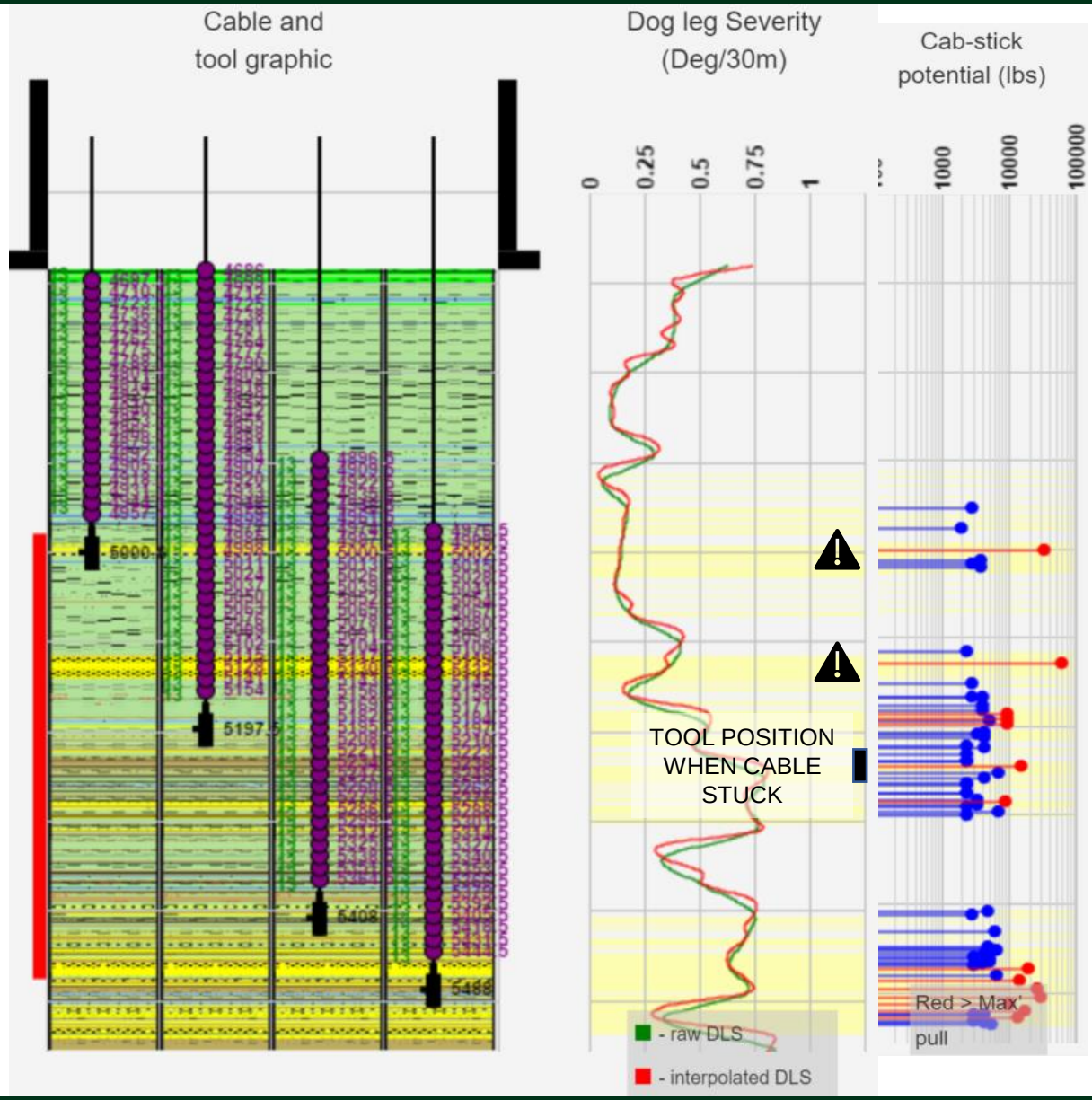
- The well was modelled using Wire-pro™ software – part of GCPS
- The well is benchmarked against a global database to assess the risk
- Wireline Standoffs [WLSOs] were mobilised by helicopter
- WLSOs suspend the cable above sticky zones
- WLSOs were installed on the cable for the 7 remaining wireline runs





Open Hole Section – Fluid Sampling

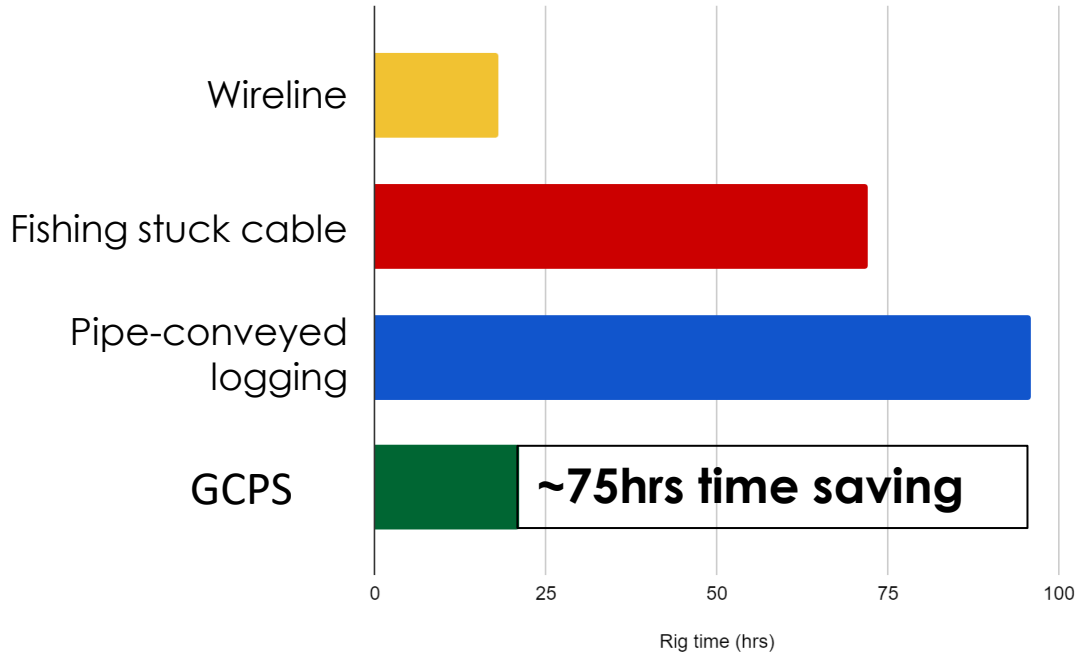
- Differential cable sticking across sands
- 2 key sands above the tool when cable stuck
- Additional extensive sands below the tool
- 270,000 lbs gross sticking potential in open hole
- WLSO array designed to cover all risk zones at all sample stations
- Fluid sampling: 37 WLSOs, spaced 13m apart
- <3 hours rig time for installation and removal
- No cable sticking for the remainder of the job



Wireline Data Delivered

- GCPS technology delivers cost-effective wireline deployment, compared to alternative conveyance methods.
- All objectives met.
  Full suite of data and samples recovered – including 4 coring runs.
- Reduced risk of stuck wireline cable
- Reduced rig time, cost, and CO_2 emissions

Estimated rig time (hrs) for one sampling run



Estimated savings with GCPS:

£625k*

~168 tons CO_2e**

* Based on £200k/day spread rate at time of logging
** Based on estimated 54T CO_2e per day for the rig

Thank you!