



Benefits of HWO for Live Well Intervention

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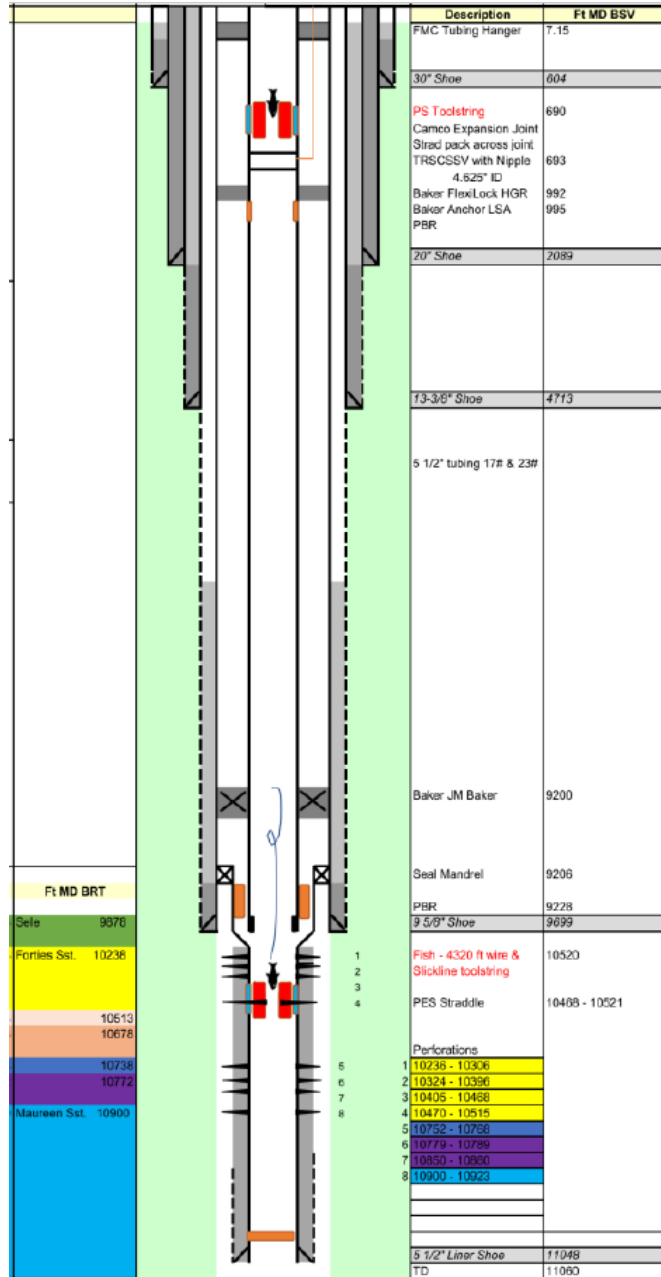
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- Benefits of HWO when applied within live well intervention
- HWO and Snubbing
- UKCS live well fishing project
- Further applications of HWO in well intervention



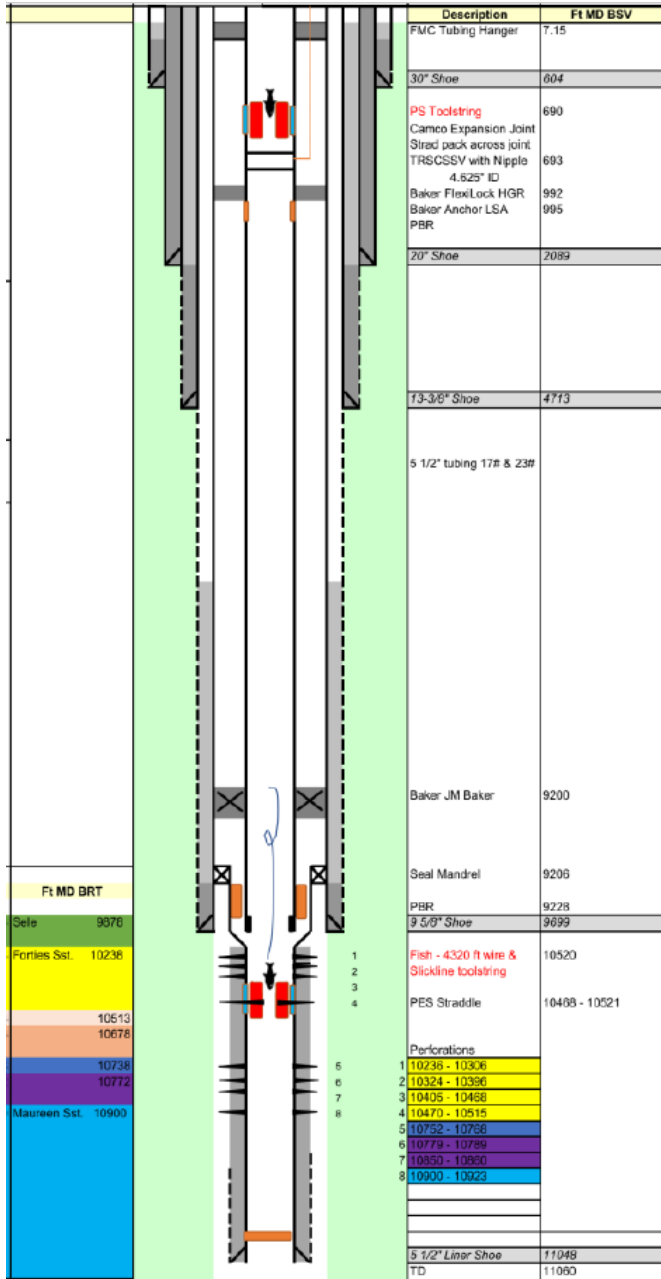
- Hydraulic Work Over (HWO) has the ability to pull existing completions and re-complete the wellbore in overbalanced/dead well conditions
- Snubbing has the ability run/recover tubulars in underbalanced/live well conditions.
- Innovations in equipment design prove HWO to be hugely beneficial for many well intervention scopes





Well Background

- Well shut in since 2002
- Well situated close to reservoir crest
- Good production potential



Previous work

- Previous intervention attempts on wireline to retrieve the upper straddle and recover the fish from the well had proven unsuccessful
- Wireline tool string engaged in the straddle along with a cutter bar
- A re-visit to the well on wireline saw the cutter bar recovered
- Tool string release possibly hampered by junk

Well Status – Prior to HWO operations

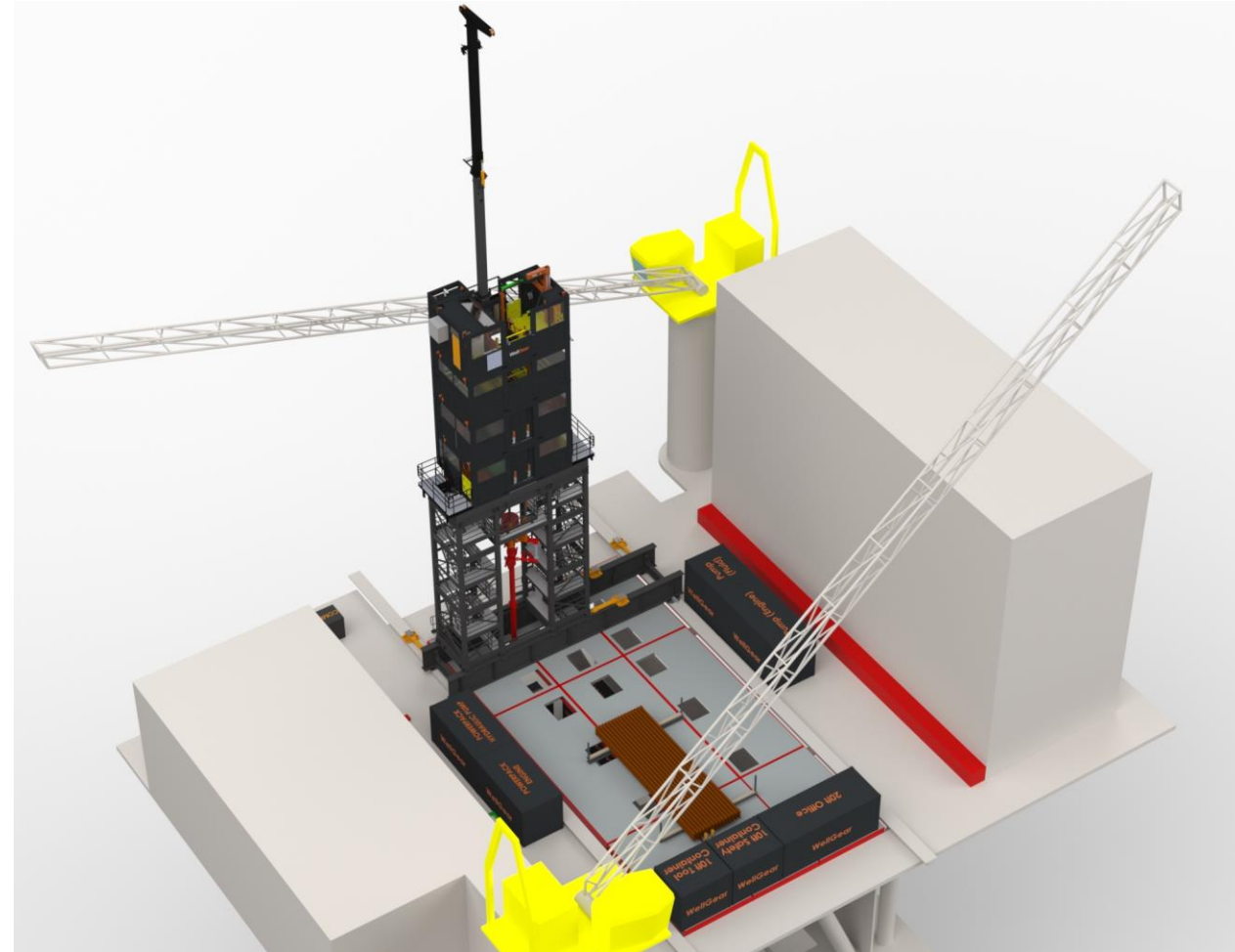
- Shut in (DHSV closed)
- Several obstructions in the well
- Potential tubing to annulus communication

Plan

- Rig Up 7-1/16" PCE and HWU above the tree
- Tool string & straddle recovery
- Leak detection / Camera investigation

Contingency

- Swap 7-1/16" PCE for 13-5/8" workover stack
- Recover and re-run a new tie-back completion



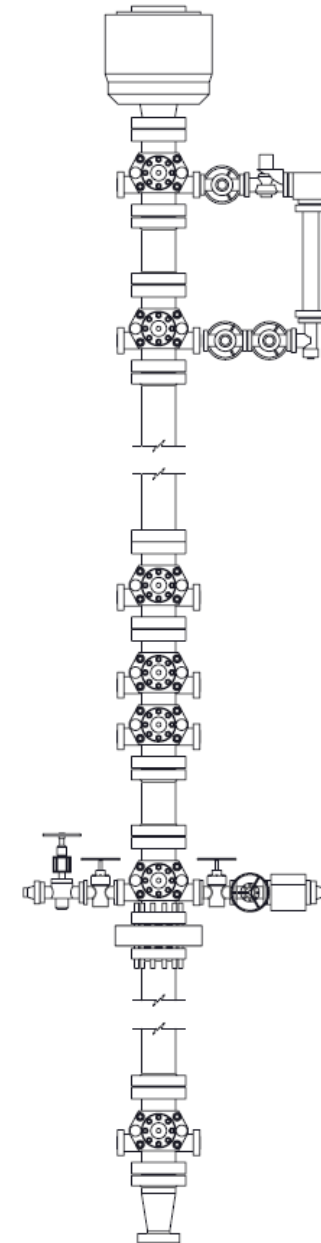
Well Planning

- Integrated planning amongst service providers and the operator
- Harbour Energy, Reservoir Group, EV and Halliburton
- Collaboration was key to ensuring compatibility of equipment and contingency options were available



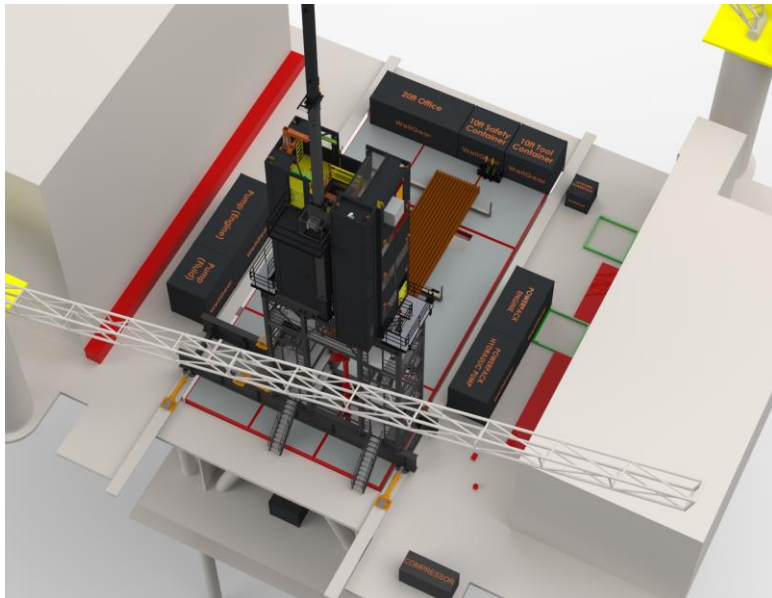
PCE

- SITHP at 832psi
- 7-1/16" snubbing BOP stack rigged up
- BOP stack up and fishing tools were designed together
- BOP stack supported by custom built tension table



Rig Up

- WellGear 460k HWU rigged up to accommodate the 7-1/16" stack
- 7-1/16" stack make up driven by lubricator height required for recovering fish
- 7-1/16" stack could be swapped out for a 13-5/8" workover stack without rigging down the HWU



Execution

- Wireline tool string and straddle recovered in 4 parts
- Methodological approach to operations
- Camera runs utilised to assess and plan



Objectives Met

- 14 trips in/out of hole
- Shallow obstructions were removed from the well
- Well integrity proven



Fishing

- Large lift/snub capabilities
- Ability to rotate



Velocity strings

- Ability to reach greater depths
- Jointed pipe preferable for future abandonment operations
- Avoid excessively heavy boat lifts



Extended reach drilling

- Conventional sidetrack
- Through tubing sidetrack

Underbalanced perforations

- Can be performed on an underbalanced well
- BHA assemblies can be deployed in a single run

Completion

- Milling cement
- Setting packers

Well Control

- Well kill



Thanks to Harbour Energy for supporting this presentation

Questions