A Bespoke Collaborative Solution to Remove Flow Target

16-November-2022

Nicolas Wibbelmann – LWI Project Leader, TotalEnergies UK

Blair McCombie – Operations Director, Oilenco

Andy Jessiman – Senior Account Manager, Welltec UK

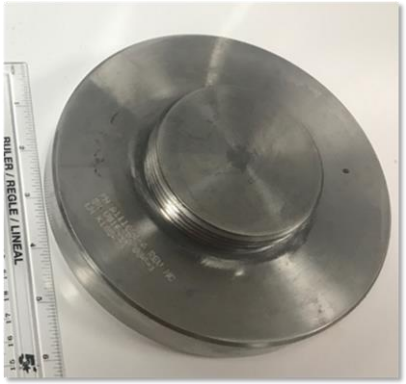
Welltec®

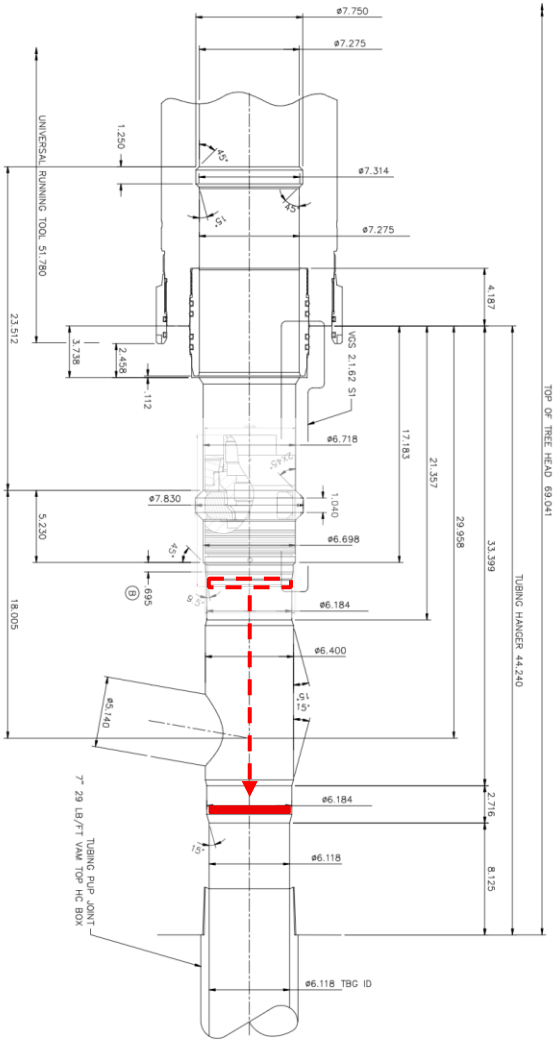
Agenda

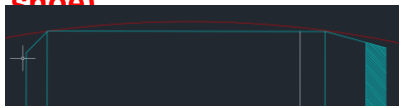
01	OBJECTIVE	Fish Flow Target from Janice J13
02	CHALLENGE	Oilenco Solution
03	TESTING	History
04	OPERATION	Well Miller CVF

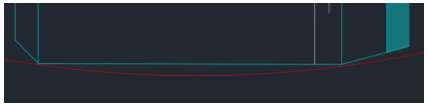
Background

- 30/17a Janice ~278km ESE of Aberdeen
  - 9x production & 4x injection wells
- P&A of 9x wells using Ocean Valiant semi-sub in 2017-2018
- P&A of remaining 4x wells using Stena Spey semi-sub in 2022
  - **30/17a-J13 first re-entered in 2017**
    - **Flow target detached from underside of TH crown plug during recovery (30x jars to free crown plug)**
    - **6.184” TH restriction above 6.135” OD flow target (17-4 PH Stainless Steel with Stellite coating)**
    - **Suspended after 34x slickline (LIBs, Peak magnets, various grabs, cameras) and 5x drillpipe runs (Innovar magnets, Latch Jack, mule shoe)**

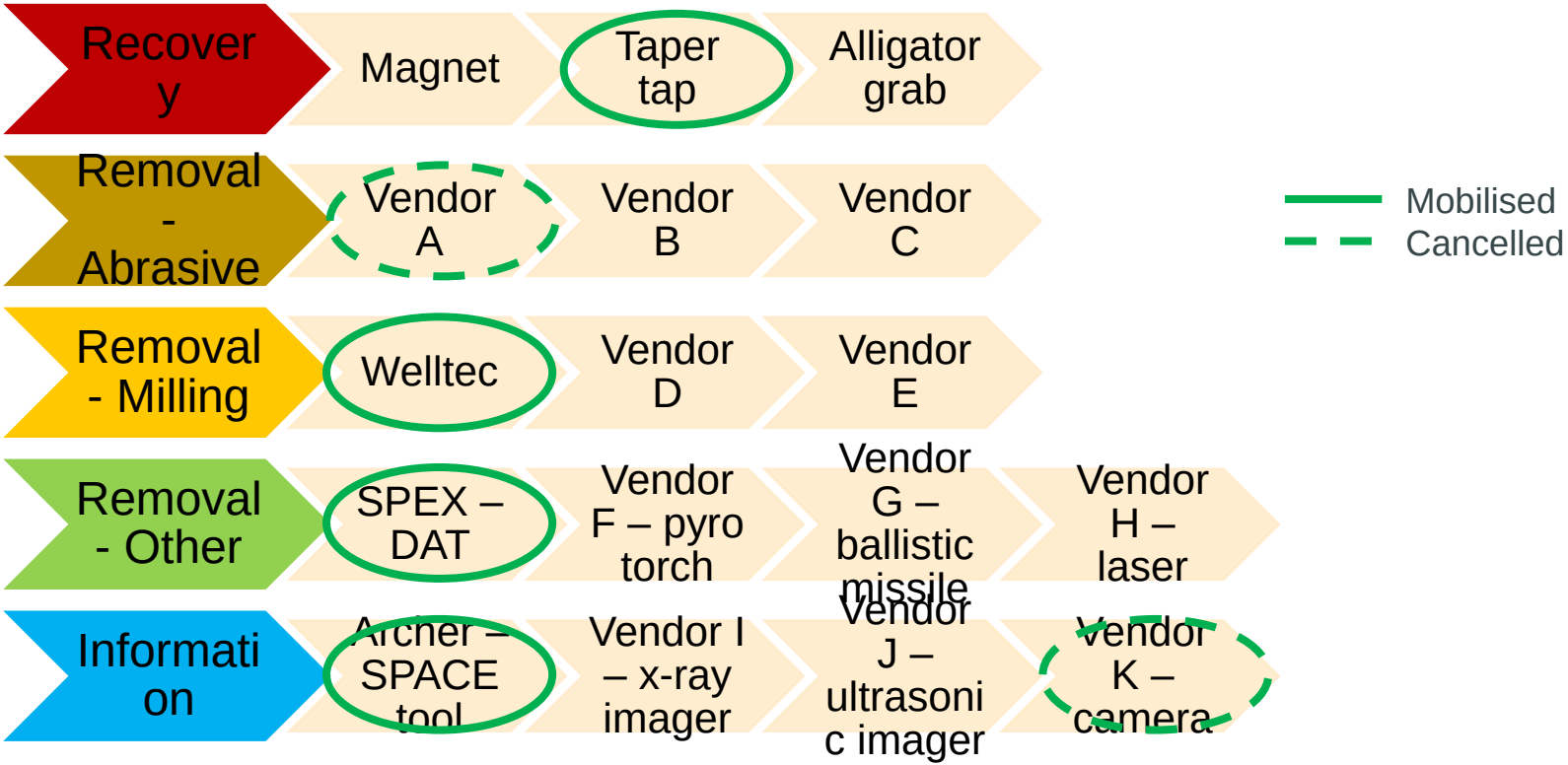






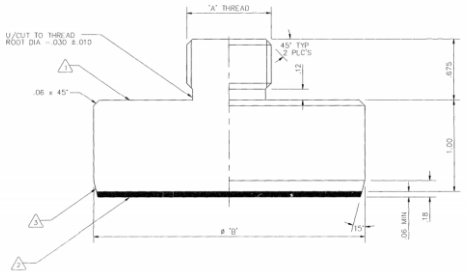


Vendor Proposals



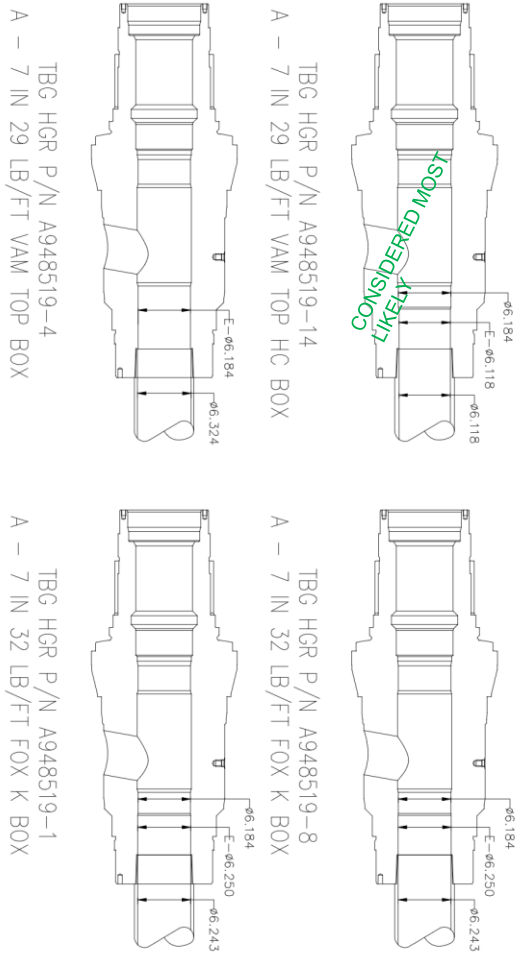
Accounting for Uncertainty

- Depth – 4x potential TH P/Ns identified
  - Restriction within TH or 7” x 5-1/2” XO
- Thickness – 2x potential flow target P/Ns identified
  - Most likely 1.235” based on documentation, although 1. 735” could not be ruled out
- Orientation – final LIB suggested thread down
- Inclination – held pressure from above



00:30	01:00	0.50	WOCS flushed 25 ltrs of HT-2 fluid through TCT line and observed increase to 2,300 psi at TCT and choke indicating pressure build up against fish (indicating fish below production outlet). Bled off pressure. Closed AAV, XOV and PMV and applied 500 psi down TCT line.

- 2,300psi equivalent to 31t – flow target now wedged in TH?
- Up to 14° to horizontal possible while holding the above pressure



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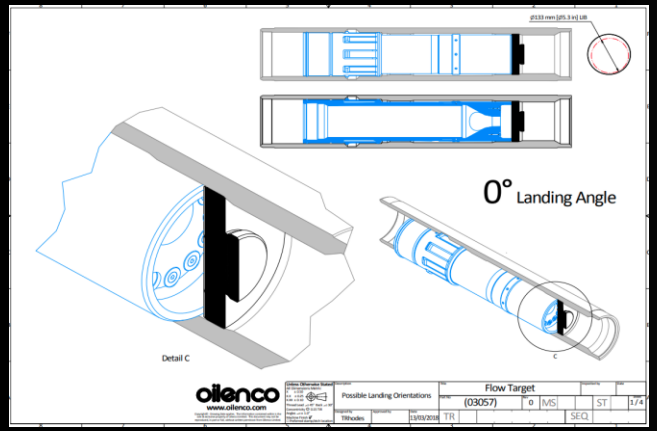
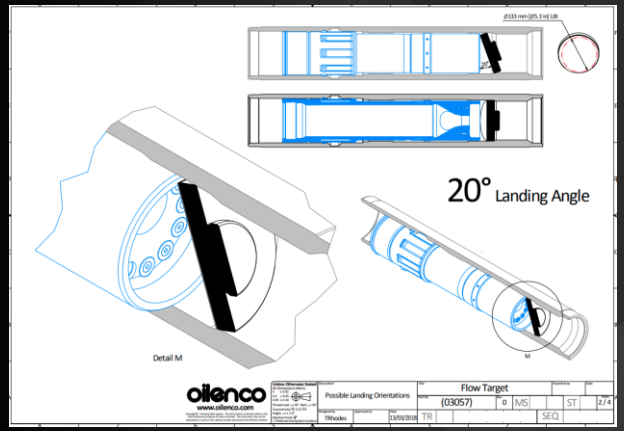
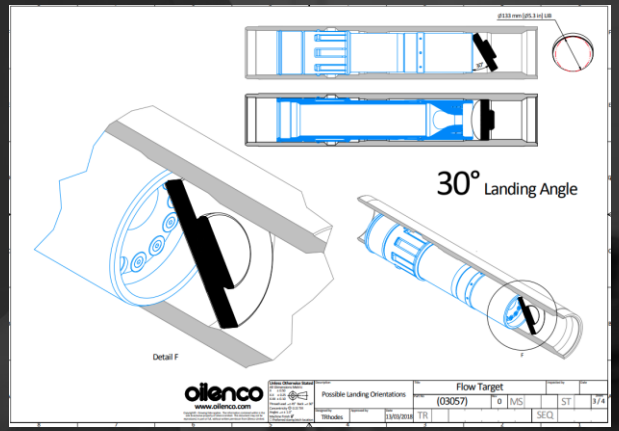
The Challenge

- Unknown orientation of the flow target and knowing the Flow target has the ability to rotate.







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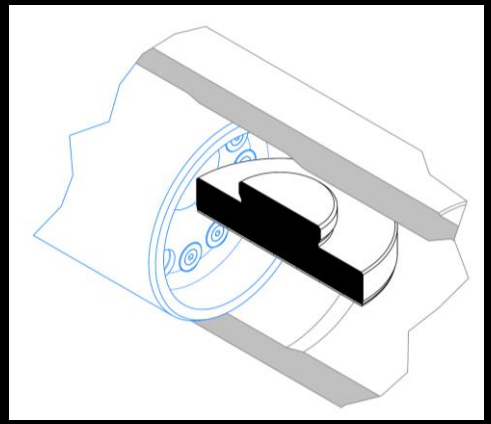

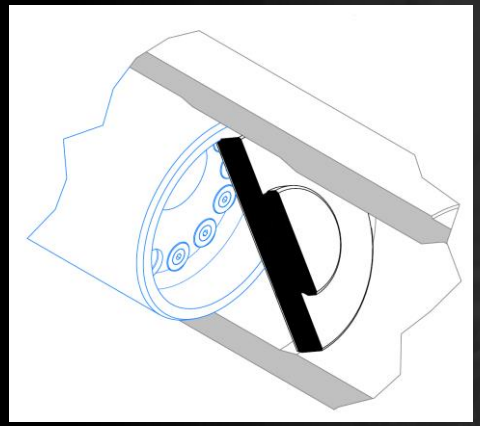

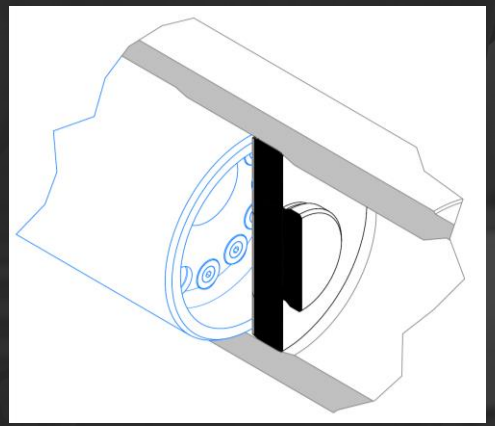

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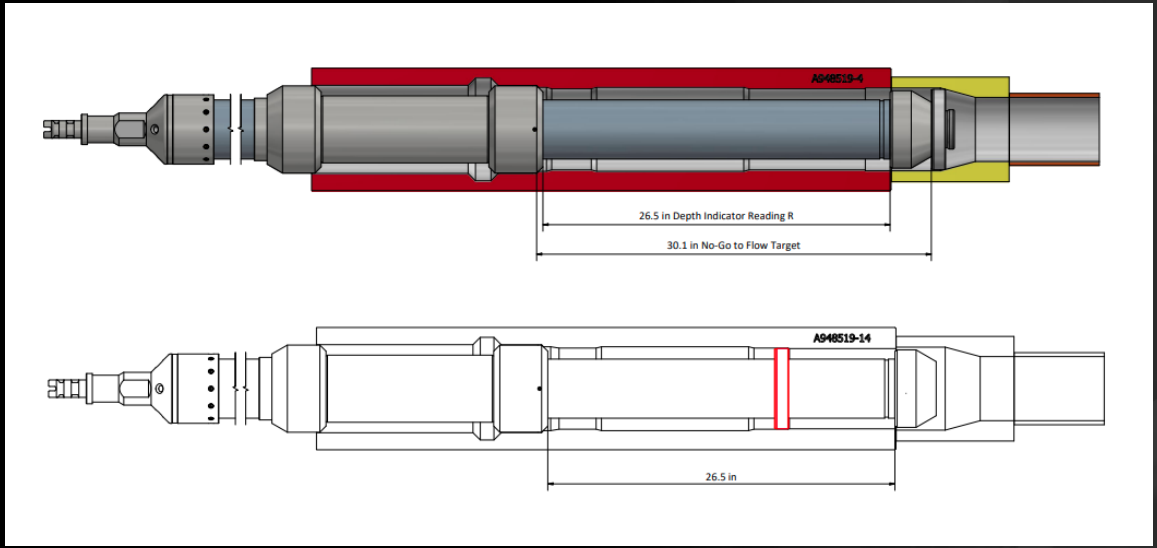
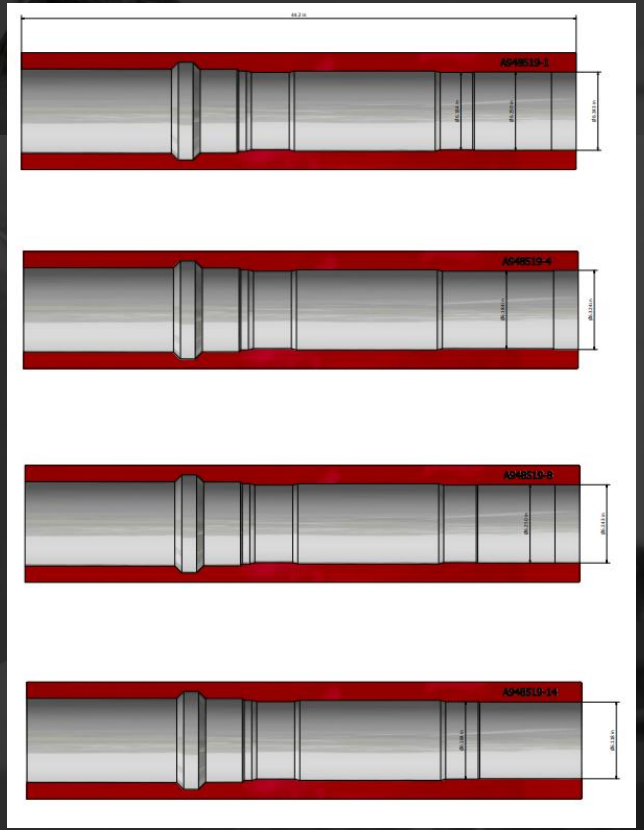
The Challenge

- Uncertainty over hanger type and model.





- Requires means of confirming Hanger Model
- Require depth correlation to known Flow Target depth

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The Concept

- Create a solution that;
- Reduced the restriction caused by the flow target
- Allowance for Various Flow target positions
- Design adaptable to suit TH Profile once confirmed
- Maximised access to the wellbore
- Allowed our client to use industry standard plugging and cutter options

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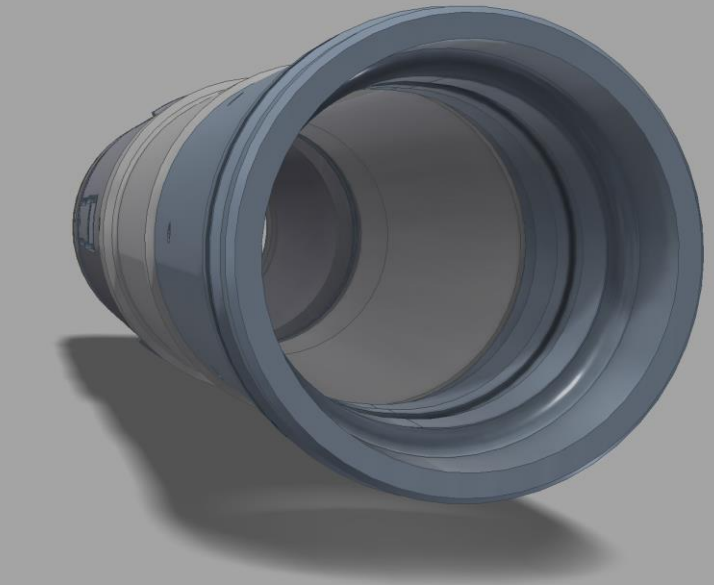
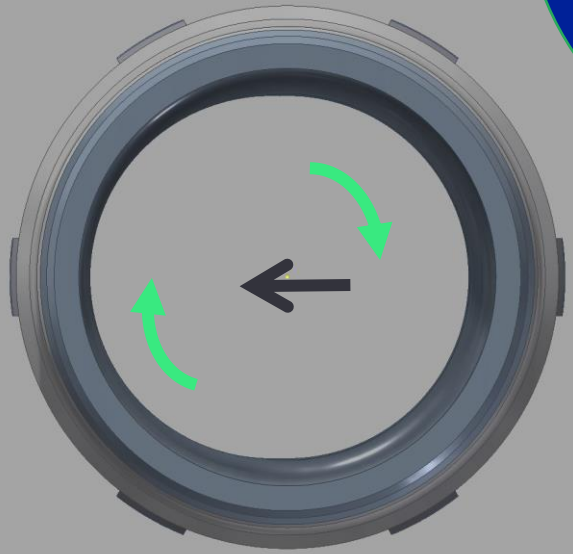
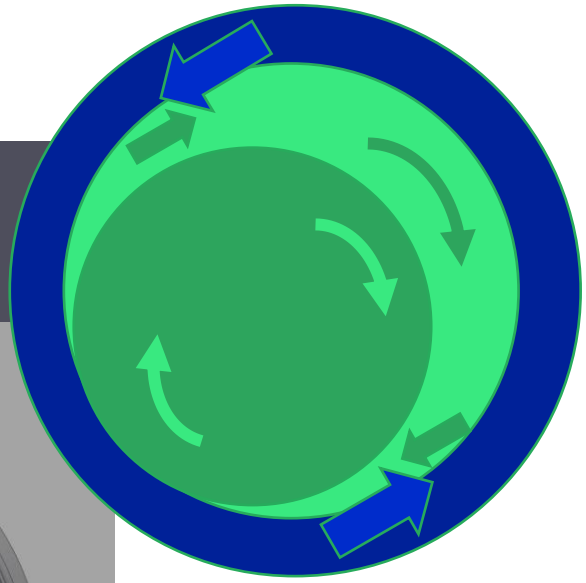
The Solution

- Design a unique ‘offset’ milling solution to drill a large hole through the flow target using Welltec milling technology.







Eccentricity of milling prevents the flow target from spinning,
(The hanger offers a counter-active reaction)

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2018 WELLTEC TRIALS - JUNE

June – Weatherford Test Rig

1. Vertical test – Well Tractor – Miller with Oilenco offset sleeve

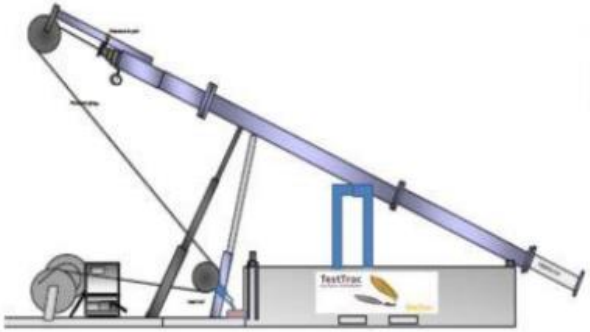
- 575kg WoB incl. 300kg Well Tractor force and 275kg tool weight
- 6 hours milling time @2.5A
- 34mm progress made through the Flow Target with the pilot bit

2018 WELLTEC TRIALS - JULY

July – Welltec TestTrac

2a. Horizontal test at Welltec UK – Part One – Continuation of first test in simplified horizontal set-up

Same actual bit and Flow Target



2018 WELLTEC TRIALS - JULY

July – Welltec TestTrac

2b. Horizontal test at Welltec UK – Part Two

Decision made to continue the test using the 4.4” core section only, just to prove our ability to mill a 4.4” hole in the replica flow target

- Began milling again w/ light WoB initially to avoid stalling 100kg @2.75A
- Increased WoB to 280kg, current increased to 5.5A before dropping slowly
- WoB increased to 400kg, current still dropping, good milling indicated, 3.11A
- Full WoB of approx 650kg maintained on 4.4” core bit as current remained low with little progress
- Finally called a halt to milling after 2hrs to check progress. V. little wear on mill bit and only 7mm progress through the Flow Target.
- Testing paused for re-evaluation

2018 WELLTEC TRIALS - OCTOBER

October – Welltec TestTrac

3. Horizontal test at Welltec using core style pilot bit and same 4.4” main core section using Well Tractor – Miller combination

4. Continuation of the above, completing 4.4” core mill

Main coupon recovered successfully, pilot coupon not recovered

Milling time approx 11.5hrs

- Reconsidered our Milling approach due to difficulty controlling WoB w/ Well Tractor when close to surface on semi-sub in Winter (!)

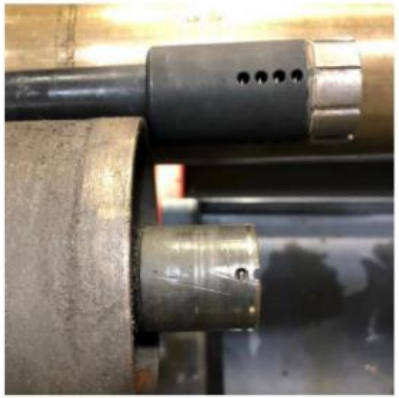
- 2-stage bit usually requires different WoB for pilot and outer core sections

- Because original milling Stroker required to be set up pre-run with constant WoB, further testing reqd to optimise single Wob suitable for both pilot and core. Both compromised.

2019 WELLTEC TRIALS

January

1. Horizontal test at Welltec – Well Stroker – Miller
Pilot mill almost successful, MMC worn out just before breach



March 6th

2. Reduced WoB setting, little progress

March 26th

3. Increase WoB, little progress

April 1st

4. Optimized WoB setting, successfully milled Flow Target in 8 hours, both pilot and main core coupons were successfully recovered

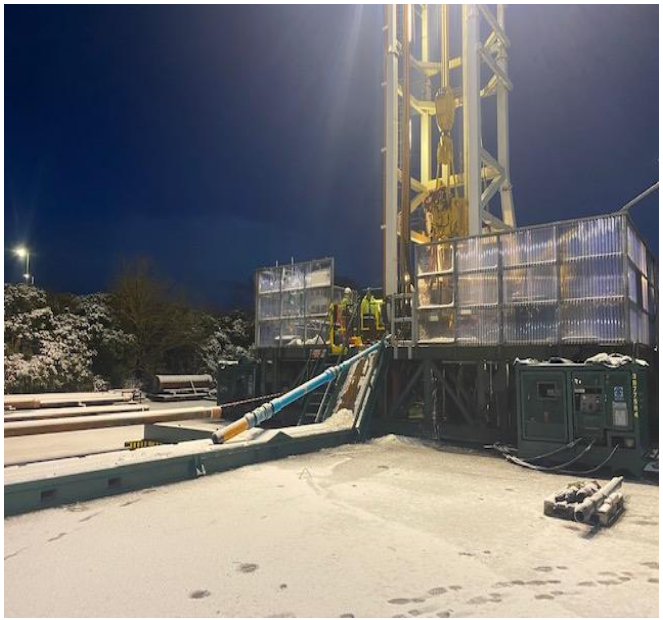
Recommended to Total to complete testing with a single continuous milling test with a newly redressed mill bit

Total shelved Janice P&A plans and the testing was halted

VERTICAL MILLING TRIAL – EXPRO FRANKS TEST FACILITY

Series of tests at Expro Franks Test Facility

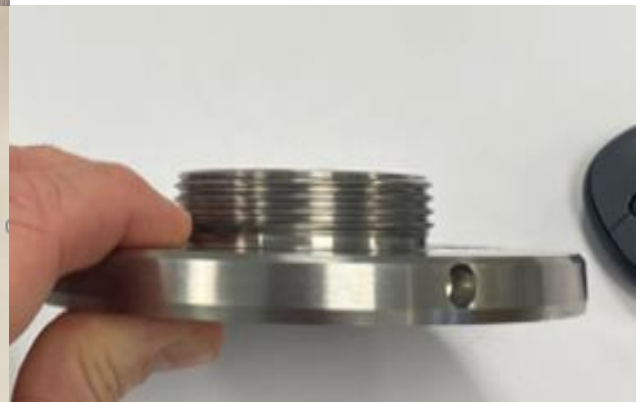
Testing in November 2021



SPEX Ablation Tool

- Successful SPEX Ablation Entry & Exit Hole
- Entry to the well for Well Kill Operations

SRO2 Milling Stroker aka Well Miller CVF



- Milling operations of FT in flat position successful
- Weight on bit varied 1,000-1,300 lbs
- Pilot Mill breach after 3.5hrs
- Main core mill breach after 9hrs

Flow Target angled

- Flow Target set at 14 deg angle to understand how mill will react.
- Unable to apply expected weight on bit without stall.
- Milling halted after 10 hrs consisting of 3hrs effective milling time, multiple stalls & restarts.
- Positive results in that milling at angle is achievable with more time.

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Operation – June 2022

- Stena Spey

Well Miller® CVF removes stellite-coated flow target from semi-submersible rig

Background

- International Oil Company (IOC) faced issues with a subsea Xmas tree in the North Sea
- Access blocked by the detached underside – flow target lying upside-down
- Flow target made from stainless steal coated in a stellite layer, therefore incredibly resistant
- The ID through the Xmas tree made it impossible to fish - only solution was to mill
- Operation to be carried out from a semi-submersible rig, milling at shallow depth
- A Well Tractor alone would be ill-suited to provide the fine levels of control and required weight on bit
- Testing led to a two-stage bit requiring variable WoB entailing Well Stroker SRO2.0 and Well Miller CVF platform

Tools applied: Well Miller® CVF – Continuous Variable Force, Well Cutter® 238

Operation

- Slickline set a specially designed sleeve above the flow target to ensure Well Miller would engage off centre
- This ensured the mill bit didn't just rotate the flow target which was free to move
- Successfully milled with good indications but coupon not recovered
- Slickline unable to run conduit sleeve
- Ran LIBs/drifts to confirm presence of flow target
- Re-ran Well Miller CVF
- Good indications of milling and this time we did recover the full coupon

Well data: Well type: Oil producer / Depth: Seabed (682m) Max pressure: 100 bar, Temp: 5°C

Achievements

- Utilizing the controlled force, accurate piston reading and steady WoB, the Well Miller CVF created a 4.4" hole through the flow target
- SRO2 function provided data on Stroker section extension
- E-line rig-up changeover took matter of hours in comparison to full shifts with coiled tubing option
- Milling time ~10hrs
- Milled coupon recovered to surface, facilitating subsequent runs for P&A prep, deep-set plug and Well Cutter 238 to cut the 4-1/2" completion
- "...a great achievement in milling [the flow target] and gaining access"

Questions?