

Case Study

Casing Running Tool CRTi™

Casing While Drilling (CwD)



The Challenge

Casing while Drilling (CwD) 9-5/8" surface casing on four oil wells ranging from 1300' to 1800' measured depth. The major challenges included:

- High drilling costs.
- Need to increase drilling efficiency.
- Need to improve drilling performance.
- Removing any stuck pipe risks.
- Minimizing fluid losses.
- Maximizing rig and rig crew capabilities for "off-site" works completed where normal drilling operation would not allow.
- Reduction of flat spots in the drilling curve.
- Improvements for future drilling programs.

The Solution

Drill Quip Pty Ltd determined the best method to meet these challenges was to conduct a Level II CwD using the Volant Casing Running Tool (CRTi™) and centralizers during the process. The CwD configuration was designed based on the customer's formation data and expected drilling parameters. Drill Quip chose the Volant CRTi3-7.0 tool over other (hydraulic) casing running tools to drill all four wells due to its robust and compact design, high torque capacity, and simplified mechanical operation. Volant HydroFORM™ Centralizers were selected for centralization based on their high durability and proven track record in casing drilling applications, offering dependable standoff that would enable a reliable cement job. Volant's MLT Rings™ were installed in order to accommodate the increased torsion expected through the casing string and to reduce the risk of damaging the API coupled connections during drilling. The casing drilling bits and floats were supplied from the customer's inventory. Drilling summaries of each well are as follows:

Well #	Time to Reach TD	Measured Depth	Casing Size/ Type	Drilling Fluids Used	RPM (Revolutions per Minute)	GPM (Gallons per Minute)	Stand Pipe Pressure (SPP) @ TD while Drilling	Stand Pipe Pressure (SPP) Off Bottom	Torque Observed On Bottom	Torque Observed Off Bottom	Drag Observed Pumps Off	
											Up-stroke	Down-stroke
Well 1	25 hrs	1,450' RT	9-5/8" K55 36#	Water based PHPA/KCL	90	650	1,100 psi	1,050 psi	4K ft/lbs	1K ft/lbs @ 100 rpm	74K	74K
Well 2	20 hrs	1,304' RT	9-5/8" K55 36#	Water based PHPA/KCL	100	500	980 psi	960 psi	2K ft/lbs @ 100 rpm	1K ft/lbs @ 100 rpm	65K	65K
Well 3	28 hrs	1,815' RT	9-5/8" K55 36#	Water based PHPA/KCL	100	580	1,850 psi**	1,830 psi**	3K ft/lbs @ 100 rpm	1K ft/lbs @ 100 rpm	80K	76K
Well 4	21 hrs	1,314' RT	9-5/8" K55 36#	Water based PHPA/KCL	120	713*	1,660 psi	1,655 psi	2-3K ft/lbs @ 120 rpm	1K ft/lbs @ 100 rpm	72K	66K

*Exceeds Volant's published flow rate limit based on standard maintenance and inspection frequency. At flow rates between 660 GPM and 1,000 GPM Volant advises a thorough inspection of bore condition and erosive material loss of all components in the flow path after every job. Additionally, Volant advises of the risk of severe tool damage and safety risk when operating with compromised solids control of the drilling fluid.

**Due to blocked nozzle.

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The Results

All four wells successfully reached TD using the CRTi3-7.0 and a combination of HydroFORM™ Centralizers and MLT Rings™. The following results were experienced by Drill Quip:

- The Volant CRTi™ provided operational efficiencies in Drilling while Casing while also reducing any stuck pipe issues that may have been encountered on all four wells.
- At Total Depth the hole inclination on all wells was below 0.5°. The equivalent inclination when drilling conventionally is between 1.0° - 2.0°.
- After inspecting the Volant dies on the CRT at completion of all wells, minimal wear was observed.
- Volant HydroFORM™ Centralizers increased efficiencies by reducing drag and friction, particularly in the dog leg of the wellbore.
- Volant MLT Rings™ ensured proper torque values were achieved for all joints and assisted where rotation and reciprocation was required.
- Total Footage Drilled over 4 wells = 5,883'.
- Total Drilling hours over 4 wells = 94 hrs.
- Average Rate of Penetration (ROP) over 4 wells = 63' p/hr.
- Overall saving was approximately \$1 Million (USD) for all four wells compared to conventional drilling and completion methods.



Doing more with less. Drop us a line if you want to know more.

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