

Old School vs New School: Understanding the Unique Advantage of STEP-conneCT in a Head-to-Head Comparison

Improving efficiencies and reducing costs has become increasingly important for energy producers. With the aid of STEP-conneCT, a real-time data acquisition tool used during well completion operations, operators have a clear visual of downhole conditions which allows for instant, strategic decision-making to improve treatment plans.

Challenge

An operator with a large completion program in the Duvernay wanted to gain a precise understanding of whether using downhole real-time data and analytics – specifically using STEP-conneCT conveyed by e-coil - would provide material efficiencies which would necessitate a change to their traditional completion practices.

Solution

STEP recognized the opportunity to analyze the efficacy of real-time data acquisition technology in a direct, head-to-head comparison of conventional milling techniques versus the more advanced completion practices using STEP-conneCT and e-coil. The operator's six well pad proved to be an excellent testing ground; elements of each well were identical including the reservoir, wellbore depth, and type of plugs, allowing for a true comparison of each completion method. Three wells were selected as candidates for conventional milling techniques and three wells utilized STEP-conneCT and e-coil technology. When evaluating the performance of each intervention, success was measured based on time in-hole and the average cost to mill each well. The client's over-all completions costs (burn rate) were not considered in the final comparison.

Conventional milling consists of collecting surface measurement data; operators measure data such as well pressure, surface fluids, and surface weight to indicate what the conditions are like downhole. Often with this method, decision-making is delayed due to the fact surface fluids, surface weight and well pressure data must be cycled from the wellbore to the surface to be evaluated. Therefore, surface data is an estimate of wellbore conditions which can lead to uncertainty and inaccurate treatment plans.

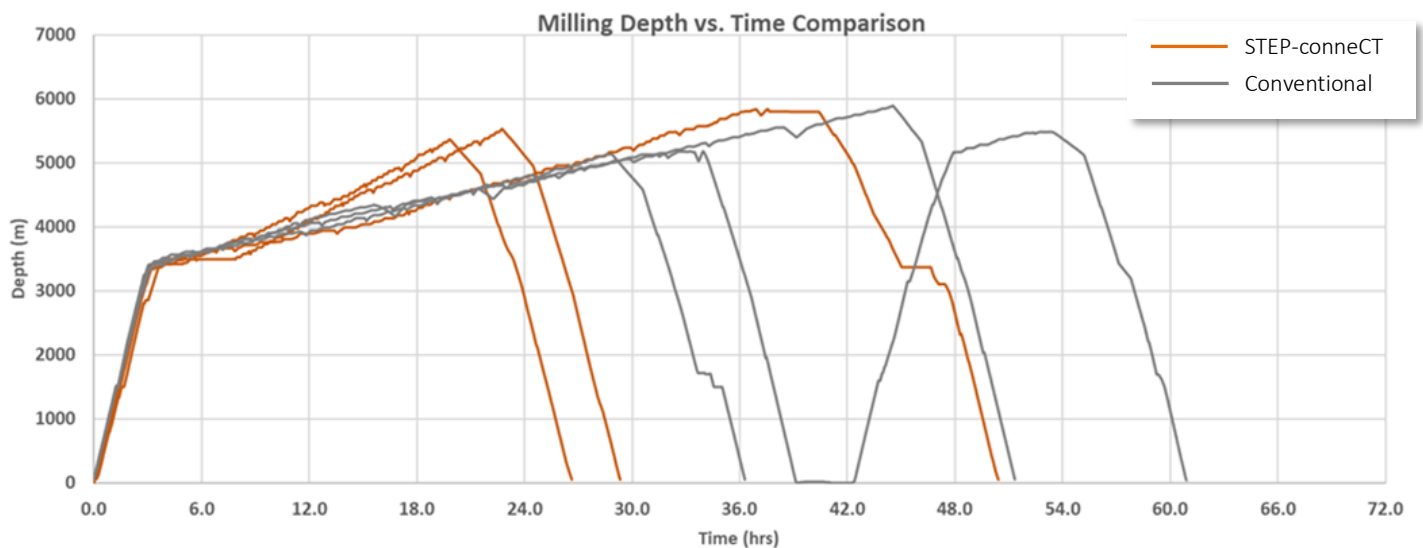
By using the STEP-conneCT tool conveyed by e-coil technology, data is acquired at the bottom hole assembly (BHA) and relayed to the surface in real-time. Operators can evaluate data such as weight-on-bit, bottom-hole pressure, motor performance and BHA pressure. Data acquired downhole has greater accuracy which eliminates wellbore uncertainty and allows for decisions to optimize treatment plans in real-time.

Results

The wells utilizing STEP-conneCT and e-coil technology resulted in an average of 14 fewer hours spent in-hole per well. This time savings can be attributed to the fact that the operator had an extensive understanding of the wellbore conditions, which resulted in optimized milling performance and the elimination of unnecessary wiper trips on each well. This technology allowed for less stoppage time; when milling in tight spots the operator was able to keep the

milling assembly in its peak operating range and minimize stalling events, which is often problematic during conventional milling operations.

A reduction of time spent in-hole of 14 hours per well, represented 42 fewer hours on location when compared to conventional methods. As well, the total pad-to-production time was reduced, ultimately decreasing the client’s cumulative burn rate. Although there are no guaranteed price reductions for either methods, this study found that the material benefit of reducing the amount of time spent in-hole, and preventing unnecessary wiper trips, provided the client with optimal efficiencies. The results gained from using STEP-conneCT and e-coil off-set the additional cost of required equipment, and ultimately saved the client money when compared to conventional milling techniques.



An analysis of each well shows in-well time for coiled tubing operations while using STEP-conneCT in comparison to the conventional wells. The chart confirms the wells used in the case study are all similar in depth.

Head-to-Head Comparison

Milling Summary:

	Number of Stages	Avg. Treatment time (min)	Avg. Transit Time (min)	Number of Wiper Trips	Avg. Wiper Trip Time (hrs)	Number of Tool Trips	Avg. Plugs Per Mill	Number of Stalls
Conventional Milling	122	17.3	24.8	5	1.20	1	61	11
STEP-conneCT and E-Coil	125	14.0	16.7	1	0.67	0	125	25

Cost Summary:

	Well	Hours In-Hole	Average Hours In-Hole Per Well	Milling Cost Savings % vs. Pad Average *	Milling Cost vs Conventional Milling Average %
Conventional Milling	#4	36.60	49.8	-4.39%	-
	#5	51.70		-2.09%	
	#6	61.10		10.25%	
STEP-conneCT and E-Coil	#1	50.70	35.8	30.91%	-2.49%
	#2	29.60		-18.42%	
	#3	27.10		-16.27%	

*Pad average milling cost was used as the baseline to show milling cost deviation per well **