



CHALLENGE:

In late 2014, a junior E&P company operating in the Kakwa region of the Montney was eager to find an effective completion technology in response to operational challenges commonly found in the region. Before settling on slick-water frac technology, the company explored and eliminated other fracturing techniques that proved to be too risky and costly with issues that included:

- Difficulty achieving adequate pump rates for limited entry fracs
- Deployment of acid to initiate breakdown would take upwards of 6hrs to bullhead down the well
- Open hole packer system liner collapse could be catastrophic for a well
- Limited opportunity for re-entry with ball seats left in hole post-frac

Other completion techniques were unpredictable and unreliable:

- Fracs monitored very closely but sandoffs still occur
- Leave unstimulated reservoir behind
- No way to monitor downhole pressure to adjust frac program accordingly

After reviewing all conventional downhole stimulation techniques, the client chose to use a coil conveyed fracturing system that best met their requirements which included the ability to reach deep horizontal lengths and set their fracs effectively and cost efficiently.

Project Scope: NCS Multistage Unlimited™ frac-isolation system

Location: Montney Basin
(NE British Columbia, Canada)

String Size: 50.8 mm (2") tapered string

Number of Wells: 4

Total Measured Depth: Deepest well 6,155m (20,190ft)

Date: November 2014-January 2015

"I was thoroughly impressed by the rigorous pre-planning that was done by STEP's engineers and their commitment to the project. Thanks to STEP's deep coiled tubing equipment and operations team, we were able to accomplish what most people in the industry didn't think was possible."

- Production Manager

Before drilling commenced, STEP's technical specialists were approached by the client to maximize its well depths for optimal drilling, completion and production performance.

After a thorough analysis by STEP, a custom-designed 50.8mm (2") 6,300m (20,670ft) coiled tubing string was recommended for the complex completion program to optimize coiled tubing reach. By using STEP's specialty string, the client was able to reach Total Measured Depth (TMD) on all wells, fracturing at a rate over 4m³/min (33 bbl/min), and at pressures up to 78MPa (11.3ksi) – an industry first. The most recent well which was completed at the end of January 2015, had a TMD of 6,155m (20,190ft) with 84 individual slickwater fracs – a Canadian stage count record for NCS Multistage and STEP. STEP's ultra-capacity coiled tubing spread was used to perform the operation and in total 236 NCS Multistage Unlimited™ frac stages were effectively placed between the four wells.



THE STEP WAY:

In conjunction with NCS Multistage's sleeve technology, STEP provided added value to the client's operations:

1. COST SAVINGS

- By using NCS Multistage Unlimited™ sleeves in conjunction with STEP's coiled tubing, the client realized approximately 10-15% cost savings by having a smaller frac crew on location, and by removing wireline services all together. The elimination of bridge plugs and perf guns meant no milling was required, along with fewer fluid pumps to get the job done, all adding to the client's cost savings.

2. INCREASED EFFICIENCIES

- Ability to spot acid with coiled tubing reducing time between fracs (approximately 20 minutes between fracs, compared to three hours between fracs for plug and perf operations).
- Improved efficiencies with two sets of BOPs on the wellhead to optimize well control and reduce downtime should issues arise on surface.
- Extensive post-job analysis of surface and downhole variables to optimize future operations.
- CT provides a deadleg for accurate downhole pressure monitoring while fracturing.
- Having CT already in-hole allows for cleanup should sandoff occur (note: no sandoff has occurred to date).
- Project efficiencies resulted in minimal NPT of 1.64%.

3. INCREASED PRODUCTION

- Early test results indicate increased production rates and flowing pressures (result of more stages and tighter spacing).

4. DECREASED ENVIRONMENTAL IMPACT

- Smaller footprint – no pumpdown trucks, and wireline on location, smaller frac crew, six fluid pumps were required versus 14 or more needed for plug and perf completions.

With the proper string and program design, along with efficient on-lease operations, STEP professionals were able to mitigate typical risks associated with coiled tubing.

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