Precision DRILLING

RIG SELECTION ANALYSIS

NORTH AMERICA
CASE STUDY

Optimizing Rig Selection for Efficient Operations: A Case Study in the Clearwater Heavy Oil Resource Play

INTRODUCTION

The Clearwater heavy oil resource play in northern Alberta has seen rapid growth in the last five years with a significant increase in development wells.

The area is developed using multilateral wells without stimulation. Clearwater presents compelling economics and a quick return on investment. Well licensing and drilling skyrocketed since 2021 as operators moved to take advantage of rising oil prices. Consolidation in the Clearwater continues while exploration to expand the play from its base at Marten Hills and Nipisi accelerates.

Given the dynamics in the Clearwater area, drilling rig performance comes to the forefront of rig choice thus becoming the prime objective for early oil delivery.

SYNOPSIS

Precision Drilling in Clearwater and surrounding plays has allowed us to get a clear understanding of the dynamics for selecting the right rig in the area. Two key areas to achieving the objective are directionally drilling multi-laterals in the low compressive strengths of the producing formations while managing the flat time productivity of the rig.

Operators today need rigs that are versatile in drilling 1-6 well pads with laterals on each well. While drilling productivity through these softer formations is high, the demands of a flawless rig with the ultimate adherence to flat times become more important.

Our study has shown that smaller rig footprints are preferred to manage pads with existing wellheads that make the locations tighter to maneuver rig walks. To further the rig of choice, operators typically compare key performance indicators for a Super Single rig to a Heavy Tele Double rig. Some of the suggested key performance indicators are- location move time, pad walk times, Slip-to-slip times, tripping and casing rates, and pipe pickup and laydown times.

ANALYSIS

Our study of KPIs comparing the two rig types, points toward the Super Single being the rig of choice based on the flat time performance and its commercial viability.

Analyzed below are typical Clearwater drilling operations on a pad consisting of 1 to 6 wells with each well hosting an average of 6 laterals with lateral lengths off 2,600 meters.

The average time to drill a well with assigned laterals is 14 days with target depths of 3,500 meters. An intermediate casing is typically set at between 800 meters to 1,000 meters with the laterals diverging below the shoe. The analysis also uses 5 walks per pad and a single trip in the lateral section for a BHA change.

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The table below shows the flat-time KPI comparisons for Super Single versus Heavy Tele Double rigs with drilling ranges of 1 well to 6 wells. Both types of rigs have walking systems and similar drilling hardware required for the Clearwater.

KPI's	Super Single *1-6 Wells*	Super Single Advantage *1-6 Wells*	Heavy Tele Double *1-6 Wells*
Location Move	1.1 days	1.3 days	2.4 days
Walk to Spud	0 to 1.7 days	0 to 0.2 days	0 to 1.9 days
Slip to Slip (drilling)	1.8 to 11 days	0.7 to 3.8 days	2.5 to 14.8 days
Tripping Rate	1.3 to 8 days	-0.1 to -0.7 days	1.2 to 7.3 days
Int Casing Rate	0.1 to 0.6 days	0 days	0.1 to 0.6 days
Lay Down Pipe	0 days	0.1 days	0.1 days
Total days saved using Super Single		**2 to 4.6 days**	
Commercial Viability Comparison			
Average Rig Rate Per Day	$20,000	-$2,500	$17,500
Average Spread Rate Per Day	$90,000	-$2500	$87,500
Total Savings using Super Single		**$180,000 to $414,000**	

The analysis shown above shows a clear advantage when using a Super Single rig type to drill in the Clearwater area. In addition to cost savings, the Super Single rig is a safer option through drilling, tripping, and casing operations given the mechanized pipe handling system that does not require floor hands and a derrickman when compared to a Heavy Tele Double.

In conclusion, our analysis is supported by the current rig selection spread as of Apr 2024 where Clearwater operators selected 61% of Super Single, 34% Heavy Tele Double, and 5% Triples for their drilling campaigns.

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