



BOOSTING EFFICIENCY AND REDUCING COSTS IN THE DJ BASIN

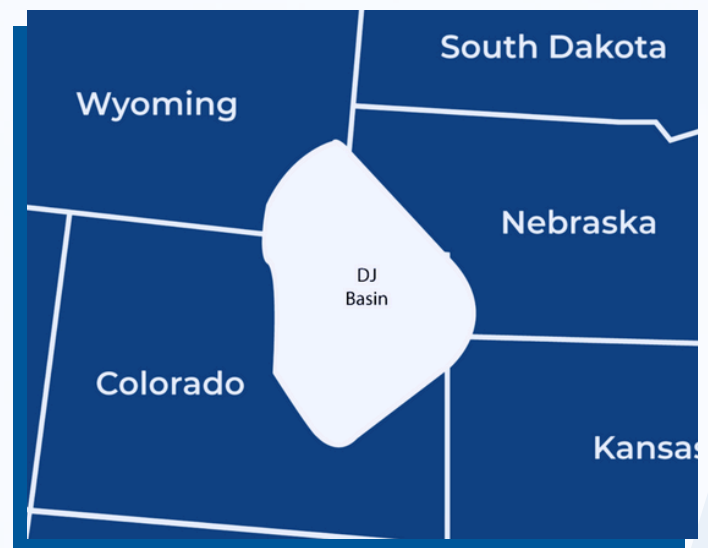
OVERVIEW

The BL Vintage Pad project, located in the Denver-Julesburg (DJ) Basin, consisted of seven Buckley wells and two Barr Lake wells.

The initiative aimed to optimize drilling performance, reduce cost per foot, improve lateral efficiency, and consistently hit geological targets.

With well depths nearing 23,000 measured feet and average well costs around \$2 million, the pad served as a testing ground for strategic improvements in rig selection, wellsite coordination, solids control, and power sourcing.

By analyzing drilling KPIs, non-productive time (NPT), and cost variances, the team identified key inefficiencies and implemented best practices to improve future well operations and maximize financial returns across the basin.



CHALLENGE

Operational hurdles on the wells significantly impacted both efficiency and cost. Key issues included:

1. High Non-Productive Time (NPT):

A total of 171 NPT hours (9% of total time) were recorded, with the worst-performing well reaching 24% NPT due to drilling rig equipment failures, including traction motor breakdowns.

2. Increased Mud Weight and Costs:

Common DJ Basin formation issues led to increased mud weights, requiring an additional 298 tons of barite—significantly raising material costs.

3. Vibration and Well Flow

Complications:

Drilling vibrations reduced rate of penetration (ROP), while near-total-depth well flow conditions increased fluid consumption and treatment frequency.

4. Unexpected Power Cost Inefficiencies:

The original well plan called for a highline power rig with diesel engine backup. Due to scheduling conflicts, a rig with Compressed Natural Gas (CNG) backup was used. This change introduced a recurring \$30,000/month cost due to on-site CNG trailer rentals for backup power, demonstrating how scheduling-driven rig selection can introduce significant variability in cost.



APPROACH

To mitigate these challenges, the team implemented several targeted strategies:

Power Optimization:

Conducted cost comparisons between highline/CNG hybrid rigs and alternative power systems to identify opportunities to reduce monthly operational power costs.

Solids Control Enhancements:

Recommended the addition of a second centrifuge to manage increased solids from anticipated well flows near total depth.

Managed Pressure Drilling (MPD):

Considered MPD to manage mud weight and wellbore pressure, aiming to reduce barite and additive usage.

Drilling Vibration Mitigation:

Adopted the use of longer gauge bits and high-frequency torsional oscillation tools to reduce vibration and improve ROP.

Improved Cementing Performance:

Engineering planning and precise on-site execution, supported by strong project management, resulted in superior cement jobs. Cement contractor Halliburton followed planned pump schedules, accounted for Equivalent Circulating Density (ECD) adjustments, and increased spacer volume, producing high-quality bond logs.

RESULTS

The nine-well program delivered measurable success:

Lateral Efficiency:

All nine wells achieved 100% completable lateral lengths, with the Buckley wells reaching a peak lateral utilization of 91%.

Drilling Time Reduction:

Average drilling time dropped to just over five days per well, with "clean time" (operations free of unplanned issues) accounting for 91% of total operations.

Cementing Quality:

Bond logs confirmed excellent wellbore integrity, validating the effectiveness of the cementing strategy.

Power Cost Savings Identified:

Analysis showed that using a rig that did not require on-site CNG trailers could reduce power costs by over \$30,000 per month.

These findings contributed to the creation of a replicable playbook of best practices, ensuring future wells in the DJ Basin are executed with greater cost efficiency, reduced operational risk, and optimized performance.

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