



MPD-Ready® Rigs in Wyoming Reduce Oil-Based Mud (OBM) Losses

Reduced OBM losses by

50%

Challenge

- Drilling conditions in Wyoming, including total loss of circulation

Solution

- Providing MPD-Ready® rig to mitigate production section losses

Results

- Using MPD, three-string casing designs regularly performed better than four-string designs
- Eliminated costs of capital equipment for casing tubulars
- Reduced OBM costs by 50 percent overall

Managed Pressure Drilling (MPD) technology on Nabors rigs was introduced in the Green River Basin (GRB) of Wyoming, U.S. with narrow drilling windows and several complexities. Typical conventional drilling challenges in this field included full loss of returns, well control situations, stuck pipe, excessive torque and drag, expensive sidetracks and not running casing to bottom. A chief concern plaguing the particular area was total loss of circulation.

Not only can MPD provide the benefit of eliminating a casing string by using lower mud densities and maintaining constant equivalent mud weight (EMW), both statically and dynamically, but MPD-Ready® rigs have an advantage of mitigating losses during drilling by utilizing the additional capabilities made available through integration.

Originally, the MPD-Ready® rig was employed only on the production section of the wells in order to effectively mitigate production section losses while controlling unexpected overpressure formations; however, it was later deployed on intermediate sections as well. Because of the new casing design and implementation of the integrated MPD, a learning curve for all parties was set in motion, tuning each well's aspects for optimization moving forward. Target mud curve densities have since lowered and the MPD-Ready® rig is being utilized for a multitude of drilling operations.

The strategy utilized mud densities that were consistently hydrostatically underbalanced but maintained constant bottom hole pressure (CBHP) with MPD in order to remain overbalanced. Because of the narrow pore pressure and fracture pressure margin, wells were originally drilled with a four-string casing design as it was not possible to continue drilling deeper conventionally.

With the use of MPD, three-string casing designs are now regularly performed for each well with success. This has resulted in eliminating costs of capital equipment for casing tubulars, intermediary bottom hole assembly (BHA), OBM costs and drilling time. It also reduced risk while drilling due to dynamic control of downhole pressure conditions.

Refinement of well engineering and additional execution of MPD in the intermediate section yielded an average 65 percent reduction of OBM losses in the intermediate section and 50 percent reduction of OBM losses overall.

For additional information on this topic, please read the 2018 AADE Fluids Conference paper, "[AADE-18-FTCE-130-Keith.](#)"