

DSI Booster Tool optimizes drilling hydraulics for a Major Latin American Operator, boosting drilling efficiency and hole cleaning performance



Challenge

A major Latin America operator faced several operational challenges that impacted drilling performance and efficiency. These included premature wear of downhole tools caused by excessive flow rates up to 1150 gpm, exceeding directional drilling and LWD equipment mass flow capacity, borehole well damage due to excessive hydraulic power around the bit, suboptimal flow rates that hindered effective hole cleaning, and standpipe pressures (SPP) approaching the rig's operational limits. A solution was required to balance the hydraulic performance, enhance operational efficiency, and maintain the integrity of the wellbore and equipment

Solution

To address challenges, the DSI 6 3/4-in. Booster Tool was used to split the flow and effectively redistributed. The plan involved maintaining a total flow rate of 1300 GPM, with 944 GPM directed to the bit to minimize the premature wear on BHA components and 356 GPM bypassed by the Booster Tool to increase the annular velocity. This configuration was designed to improve drilling hydraulics, reduce SPP, and enhance hole cleaning efficiency.

Execution

After the in-house DSI Split Flow team thoroughly evaluated their hydraulic data and the customer's request, they conducted a feasibility study using proprietary hydraulic modeling software. The analysis identified the optimal nozzle configuration for the 6 3/4-in. Booster Tool to achieve the required flow split.

The tool was added to the 8-in. drilling BHA and activated by using a 2 3/16-in. activation ball. The desired flow split was precisely achieved, as modeled during the planning phase, and was confirmed by the reduced MWD turbine RPM (actual split percentage was 28.1%, only 0.7% above

planned). The Tool remained active for 65 circulating hours, improving drilling performance in the 12.25-in. section, from 1500m to 2700m, and demonstrated its effectiveness by optimizing the operation.

The Booster Tool provided multiple benefits:

- Optimized drilling hydraulics
- Better ECD management
- Reduction in SPP while drilling
- Better hole cleaning by boosting annular velocity
- Significantly less erosion/wear and tear on the BHA components
- Lower hydraulic power around the bit & the BHA, resulting in less damage to the soft friable formations

Flow Rate Distribution%



Conclusion & Recommendation

Deploying the DSI Booster Tool provided a practical and effective solution to overcome the customer's challenges. By successfully executing the operation, the Tool enhanced the performance and efficiency, while preserving formation integrity in challenging drilling environments.

