

The Integration of Managed Pressure Drilling (MPD) and Automated Well Control Technology

Bryan Wade Atchison, Safe Influx; Chad West, Weatherford

Paper number: SPE-206385-MS

This paper was prepared for presentation at the 2021 IADC/SPE Managed Pressure Drilling & Underbalanced Operations Conference & Exhibition held virtually on 14-16 September 2021.

The copy of the paper is available on OnePetro. <https://doi.org/10.2118/206385-MS>
You can access the article if you purchase or spend a download.

Abstract

Digitalisation and automation can account for massive efficiencies in wells operations. Managed Pressure Drilling (MPD) and Automated Well Control are examples of "smart" technologies that can mitigate risks and costs associated with drilling wells. The Automated Well Control system was developed to monitor the well, identify an influx, take control of the rig equipment, and shut in the well. MPD provides annular pressure control, real-time information of the well parameters and conditions downhole and very accurate and immediate influx detection. However, if a high intensity influx is taken that exceeds the pre-planned operational limits of the MPD package, then secondary well control is required. Therefore, a combination of Automated Well Control and MPD has been developed to deliver both pressure control and well control in a safe, efficient and less error-prone manner. On an MPD operation, the Automated Well Control system shuts-in the well as soon as it is required to do so. With Automated Well Control in MPD mode, the MPD system decides when to shut in and the Automated Well Control technology will immediately space out, stop the mud pumps and top-drive, and shut in the well using the pre-selected blowout preventer. This interface between the two systems mitigates drilling hazards using automation. The sensitivity of MPD, combined with Automated Well Control technology enables fast identification, decision making and reaction to well control events. Consequently, this fully integrated solution improves safety and operational efficiency.

The MPD and Automated Well Control systems were integrated into a test rig and several tests were efficiently performed. The tool enabled immediate action in the event of influxes, providing a valuable solution for the industry. This paper briefly describes MPD and Automated Well Control and summarises the interface between the two technologies, detailing how the integrated system works on a rig.

Copyright 2021, IADC/SPE Managed Pressure Drilling & Underbalanced Operations Conference & Exhibition