

Enhancing Safety in Drilling Operations: The Synergy of SWIM Measurements, Simulations and Engineering

This case study highlights the collaboration between AkerBP, a leading oil and gas company, and 4Subsea, a provider of advanced digital monitoring solutions and analytics, to address and overcome a critical washout incident during the drilling of a development well. Engineering expertise was instrumental in interpreting the collected data, conducting detailed simulations, and formulating precise mitigating actions.

This proactive response included the suspension of drilling operations to allow for the comprehensive assessment and implementation of solutions such as gravel dumping and the installation of Wellhead Load Relief systems (WLRs). The combined efforts of engineering innovation and digital monitoring exemplified in this case study not only ensured the safe continuation and completion of drilling operations but also highlighted the strategic value of real-time monitoring and predictive analytics in managing complex drilling challenges. data from SMS sensors to DataReservoir.io™. Time series data for storage, distribution and analysis are delivered via DataReservoir.io™, allowing for safe and seamless data access and sharing.

THE QUICK OVERVIEW

WHO: Aker BP

WHAT: Assess structural impact on the well, verify effectiveness of initiated actions, and provide AkerBP with operating guidelines and fatigue predictions to ensure safe resumption of drilling activities.

WHERE: Aker BP drilling operations

HOW: Emulated the well's in-situ conditions and created a framework to ensure both safety and efficiency. This included gravel dumping and installation of Wellhead Load Reliefs (WLRs).

WHY: Ensuring safe continuation of drilling operations.

“The swift and professional response of a team of experts from 4Subsea gave us a clear picture of the actual condition on the wellhead after the incident, allowing us to come up with an effective plan of mitigation actions and giving us confidence that after the implementation of the mitigations we could finish the drilling campaign and deliver the well to the asset in a safe manner. This was a serious incident, without data and expert competence there was a real risk of having to re-spud the well, implying in significant additional time and costs.”

Rafael Rossi, Senior Subsea Engineer, Aker BP

CLIENT OVERVIEW

AkerBP stands as a forefront player in the exploration and development of oil and gas resources on the Norwegian Continental Shelf. Known for its commitment to innovation, safety, and environmental stewardship, AkerBP seeks to leverage cutting-edge technology and strategic partnerships to optimize its operations and production efficiency.

CHALLENGES

Three days into the drilling of a development well, AkerBP encountered an unexpected washout incident that posed significant risks. The Blowout Preventer (BOP) exhibited alarming movements, and the erosion of soil support in the upper soil layers led to the exposure of critical points on the conductor to intense loads. This resulted in a rapid accumulation of fatigue, threatening the well's structural integrity and safety.

OBJECTIVE

The primary goals were to assess the structural impact on the well caused by the drilling operations and subsequent washout, verify the effectiveness of initiated actions to mitigate the washout around the conductor, and provide AkerBP with operating guidelines and fatigue predictions to ensure the safe resumption of drilling activities.

SOLUTION

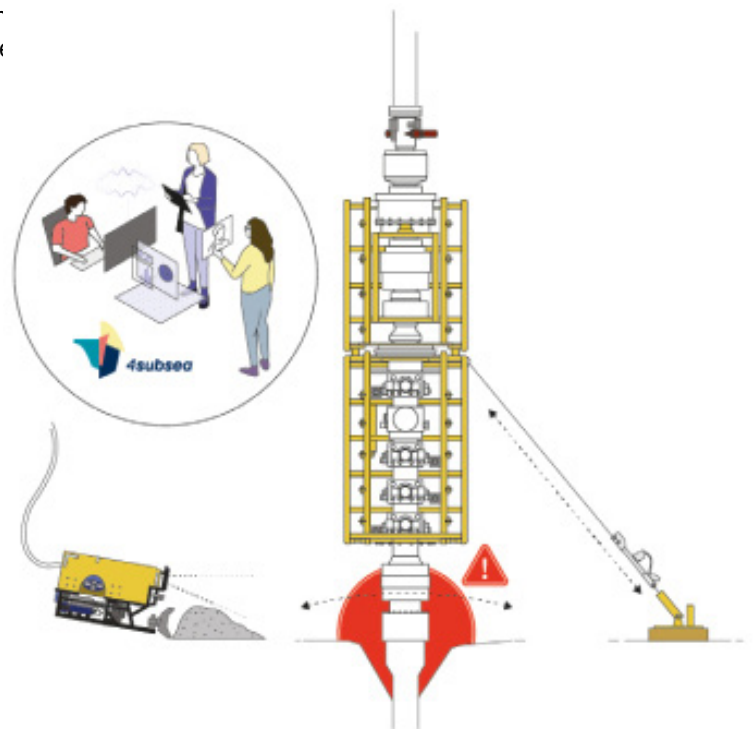
An elite team from 4Subsea was dedicated to collaborating closely with AkerBP to evaluate the situation and devise effective mitigation strategies. By integrating SWIM™ measurements with detailed local analyses, expert engineers at 4Subsea were able to emulate the well's in-situ conditions accurately. This approach provided critical insights into the well's structural integrity and assessed the effectiveness of potential remedial strategies. Utilizing this detailed simulation, we created a 'window of operations'— a precise framework that guides the execution of drilling activities under current conditions, ensuring both safety and efficiency. These included measures such as gravel dumping and the installation of Wellhead Load Reliefs (WLRs) to stabilize the affected area. The continuous monitoring and simulation efforts facilitated the development of precise operating guidelines and fatigue predictions, crucial for the safe continuation of drilling operations.

RESULTS

Thanks to the strategic collaboration between 4Subsea and AkerBP engineers, as well as the innovative use of SWIM™ measurements and simulations, AkerBP successfully navigated the challenges presented by the washout incident. AkerBP was able to safely complete the drilling operations, demonstrating resilience and the capacity to maintain operational integrity under adverse conditions.

CONCLUSION

This case exemplifies the importance of swift, informed response to unforeseen challenges in drilling operations. The collaboration between AkerBP and 4Subsea showcases how advanced digital monitoring and simulation technologies can play a pivotal role in ensuring the safety, efficiency, and success of drilling and well intervention operations.



4Subsea provides technology and services that optimize energy production from subsea oil & gas fields and offshore wind farms. By combining domain expertise with data analytics, we extend asset lifetimes, lower costs, and improve project designs.

Founded in 2007, 4Subsea serves major energy operators and leading subsea equipment suppliers. Headquartered in Asker, Norway, we have offices in Bergen, Kristiansand, Stavanger, Rio de Janeiro, and Aberdeen. Part of the Subsea 7 Group.

Contact +47 66 98 27 00 | contact@4subsea.com | www.4subsea.com