

Aker BP Lowers Operating Costs And Increases Productivity With Its Digital Transformation Initiatives

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BY SEBASTIAN WINTER
WITH MALAVIKA TOHANI



OPERATIONAL EXCELLENCE

BP Lowers Operating Costs And Increases Productivity With Its Digital Transformation Initiatives

This report is one in a series which explores case studies around the adoption of operational excellence technologies and asset performance management solutions at prominent industrial firms. Many oil and gas asset operators rely on paper printouts for their jobs, which can lead to lost work time, delays to maintenance and therefore increase the incidence of asset failure. Aker BP, a Norwegian-oil and gas exploration firm, undertook a digital transformation initiative vis-à-vis its operations to increase productivity and lower costs. This initiative included a well surveillance system to detect early signs of well failure and provide alerts; a smart monitoring system that combines physics-based modelling and domain knowledge to optimize produced water disposal; an analytics-based method for calibrating multiphase flow meters (MPFMs); and a 3D model of its oilfields to reduce time spent on manual inspections and locating equipment. These initiatives are estimated to reduce Aker BP's operating expenses by 15%, saving \$22.5 million annually.

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ORGANIZATIONS MENTIONED

Aker BP, Cognite, Expert Analytics, Microsoft PowerBI.

Digital Twin And Asset Monitoring Platform Help Aker BP Achieve Asset Reliability And Safe Operations Digitization Initiatives

This report is one in a series which explores case studies around the adoption of operational excellence technologies and asset performance management solutions at prominent industrial firms. Many oil and gas asset operators rely on paper printouts for their jobs, leading to lost work time and potential asset failure. Aker BP, a Norwegian oil and gas exploration firm, undertook a digital transformation initiative to increase productivity and lower costs. Verdantix had the opportunity to gain an insight into this transition when Aker BP was nominated and became a winner at our 2020 Operational Excellence Innovation Awards.

Aker BP Integrates Worker And Asset Data To Create A Centralized Platform For Data-Driven Insights

Many oil and gas asset operators still rely on pen and paper for essential operations; hence Aker BP, with its digital transformation initiative, provides a timely case study for digitization within the industry. As part of its larger digital transformation drive, Aker BP established a new digital lab, staffed with its own developers and domain experts as well as partners that include Cognite, to digitize certain aspects of its operations. This initiative leveraged:

- **A well surveillance system to detect early signs of well failure and provide alerts.**
For 10-years Aker BP's Valhall oil field suffered annual production losses due to chalk influx events. Aker BP worked with Cognite, a Norwegian-headquartered industrial software provider, to integrate data from well sensors into Cognite Data Fusion, the data management platform. Cognite developed a digital twin of the Turbulent Flux Virtual Flow Meter (VFM) to simulate the fluid flow within the well and spot any changes or anomalies in real-time. The model pulls in live data to ensure that the simulation automatically calibrates with changes that occur in real-time. This enables petroleum engineers and field operators to plan with real-time data, reducing mistakes and increasing the speed of decision-making.
- **A smart monitoring system that combines physics and domain knowledge to optimize produced water disposal.**
To comply with environmental regulations, Aker BP needs to keep its level of oil contamination in produced water disposal within set limits. If levels are too high, it slows production levels to reduce the contamination. Aker BP used the Cognite Data Fusion platform with support from data sciences services firm Expert Analytics to implement a smart monitoring solution that visualizes all requisite data for troubleshooting water contamination. Virtual sensors were applied for assets without sensors to improve data collection. The system displays a near real-time visualization of data on a Grafana dashboard to inform engineers. The next step of the project is to develop an automated recommendation system that is trained to predict oil-in-water concentrations and identify the worst actors for oil contamination.
- **An analytics-based method for calibrating MPFMs to reduce production losses.**
Multiphase flow meters (MPFMs) play an important role in optimizing production flows. These meters require calibration on a monthly basis, a process which has a knock-on effect on the production rate, leading to losses. Aker BP wanted to decrease the time spent on calibration and worked with Cognite to assess the pre-MPFM calibration processes, using time-series data to pinpoint the most effective methods. These insights then formed the basis for two optimized calibration methods, leading to a

reduction in deferrals and associated losses.

- **A dashboard and 3D model of assets to reduce work time for inspections and equipment locations.** The large and complex nature of oil and gas offshore fields means that field workers can lose time looking for equipment and making inspections. The Valhall oil field, for instance, extends over an area of 81 sq km. To address this challenge, Aker BP worked with Cognite to create a 3D image of its three oilfields -- Ivar Aasen, Skarv, and Valhall. Field workers can view the model within Cognite's Asset Data Insight and Operation support to facilitate easier location of equipment. Additionally, Aker BP used PowerBI to visualize the data from Cognite Data Fusion about the process shutdown (PSD) valve performance, enabling more efficient inspection planning as well as reducing the need for manual inspections.

The Realization of Aker BP's Digitization Agenda Is Expected To Save \$22.5 Million In Operating Costs Annually

Aker BP leveraged technology from Cognite, a digital twin software provider, to improve well surveillance and monitoring, optimize produced water disposal, reduce time spent on flow meter calibration, and enable workers to locate required equipment more efficiently. This centralization of data and additional digital transformation initiatives are expected to deliver benefits such as:

- **Reduction in operating expenses by 15%, saving \$22.5 million annually.** Aker BP's digitization initiatives are expected to reduce the firm's operating expenses by 15–20% per year. Better access to information on risks via dashboards, monitoring information that reduces downtime, and algorithm-based models to reduce production losses are estimated to deliver savings of \$22.5 million. The realization of Aker BP's digitization agenda will also reduce lost work time and optimize worker activities.
- **Decrease in time spent performing manual testing by up to 80% annually.** Aker BP's engineers and maintenance workers spend a large portion of their time testing and checking equipment. The implementation of a process shutdown valve dashboard is expected to reduce manual tests by up to 80%, the number of maintenance checks by two-thirds, and the duration of an average maintenance session by 50%.



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