

PROBLEM

An upstream E&P company needed to improve the stability of a multi-phase pump on an unmanned platform in order to meet production rate targets.

PROJECT

The customer deployed SparkPredict® AI software, which uses industrial process data and machine learning models to predict equipment failures.

RESULTS

The E&P company has already prevented pump failure, increasing production by hundreds of thousands of dollars for each day of downtime avoided.



PROBLEM

An independent upstream oil and gas E&P company with a current capacity of roughly 150 BOE/D across production platforms and FPSOs was looking to improve their offshore production. Specifically, they have committed to tripling production while reducing production costs by \$5 per barrel, all by 2025.

Achieving this goal requires using data and analytics to make maintenance decisions that improve the availability of offshore production assets. Having invested significantly in digitization with the Cognite Data Fusion platform, the E&P company has a well-established ecosystem of enterprise data, but struggled to get true ROI and value from this investment without the proper application of artificial intelligence.

SOLUTION

In 2019, the E&P company commissioned SparkCognition™, a leading AI company, to develop and deploy their SparkPredict® AI-based predictive analytics solution for an unmanned platform. This platform pumps crude slurry 16km over to processing facilities, has a capacity of up to 10K BPD, and represents a valuable opportunity to improve availability. A significant amount of unplanned downtime is driven by problems with a critical multi-phase pump on this platform which can trip for several reasons, including issues with the seal and filter systems. Because the platform is unmanned, downtime is high impact: Repairs can take days or even weeks, and require permitting and the costly transport of resources out to the platform. By improving predictive analytics on this pump and performing maintenance before failure becomes imminent, the E&P company stands to gain up to \$500K of production for each day of downtime avoided.

By leveraging over 300 values of pre-processed data from the Cognite data platform, SparkCognition developed and deployed a normal behavior model of the pump into the SparkPredict software environment. This model measures and raises alerts for nuanced deviations from what is considered “normal” subsystem behavior. It then provides evidence and context to accelerate root cause analysis and enable tactical decision-making.

The project has since expanded to include individual models for the seal, seawater lift, and lube oil subsystems on the platform. Because the E&P company’s SMEs were highly involved in validating the data tags and model, SparkCognition was able to deploy high-performance models that detected 75% of known historical failures with two to 12 days advance warning. Now in deployment, these models are learning from new process data and SME input, and continue to improve over time.

VALUE

Over the six months it has been deployed, the SparkPredict AI software is being used daily in the remote operations center and has greatly improved maintenance decisions and uptime. Already in production, SparkPredict has alerted operators to a potential MPP trip caused by a failing seal. Previous seal failures with similar signatures had resulted in up to 23 days of unexpected downtime, costing over \$10M in lost production. For this alert, SparkPredict identified an unexpected deviation in a pressure differential variable in the filter system. Based on the feature importance and evidence, SMEs were able to use this alert to pinpoint the area of interest and deduce that the filter system was clogging at an accelerated rate. The E&P company expects to realize over \$5M in value from this alert.