PROTECT

AIQ

FORESIGHT

PROTECT WITH **AIQ**

POWERING A **SUSTAINABLE** TOMORROW

www.aiqintelligence.ae

THE CHALLENGE

Electrical Submersible Pumps (ESP's) are one of the most widely employed artificial lift techniques, driving over 60% of global oil production and powering more than 90% of offshore oil wells.

The oil and gas industry faces a significant challenge in detecting and addressing abnormal ESP performance before it leads to costly failures. Therefore, more real-time surveillance system are applied to monitor ESP performance and generate alarms beforehand.

1

ESP failures results in significant production losses due to the lengthy replacement process, caused by logistical and planning challenges making it a critical issue in maintaining operational continuity.

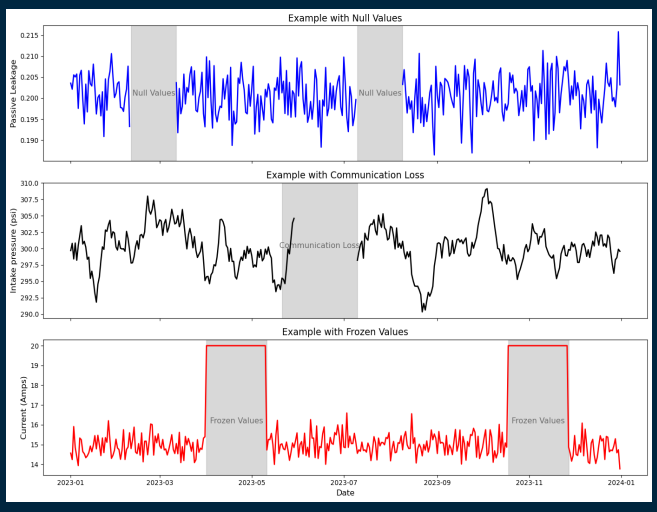
2

Currently, major Oil operators employ a variety of solutions to monitor and control the parameters of ESP wells and ensure operational efficiency. However, despite these efforts, a significant gap remains: in most cases, a robust failure prediction solution is not integrated into the monitoring systems.

3

Predicting which wells may experience ESP failures is essential for proactive intervention. Accurate probability estimates of failure allow for informed decision-making, enabling preventive actions that can reduce downtime and enhance production efficiency.

Several data-related challenges must be addressed to achieve accurate and reliable predictions. The scarcity of failure data and data quality issues further complicate the modeling process and the development of robust predictive algorithms.



THE SOLUTION

ENHANCING ESP RELIABILITY:
PREDICTING FAILURES THROUGH PHYSICS-DRIVEN ML

Foresight is a cloud based solution that integrates machine learning techniques with traditional physics and statistical analysis to accurately predict failure probabilities.

The predictive model operates on an assembly that considers a Real-Time data acquisition system, core predictive model algorithms, and automated engineering workflows. This ensemble is designed to process both real-time and historical data, supplemented with surface parameters to accurately forecast ESP failures while providing probabilities of occurrence.

Foresight aims to extend ESP lifespans, prevent unplanned downtimes, and optimize well operations.

DATA COLLECTION
Real-time ESP signals (Pressures, Temperatures, Current, Voltage)

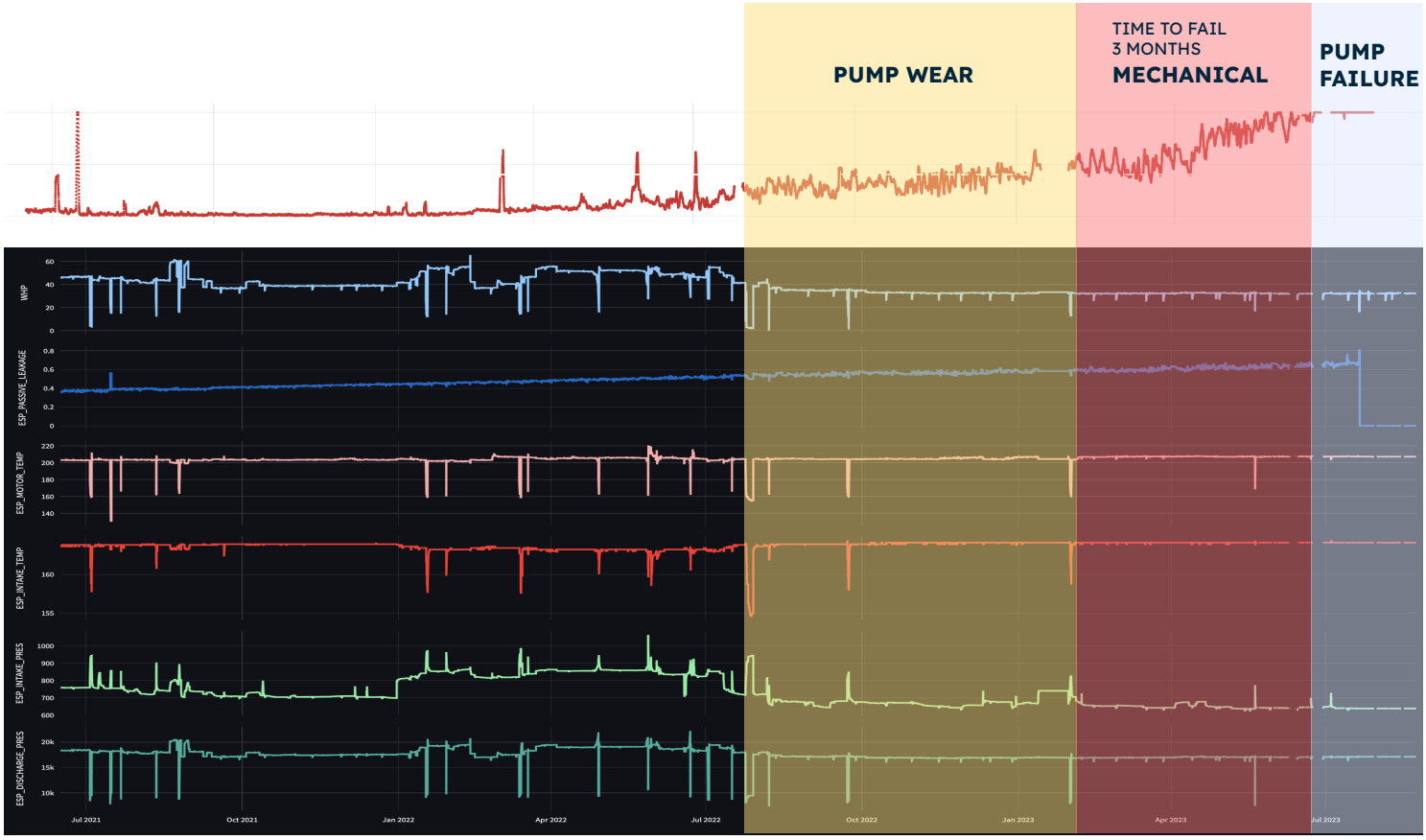
DETECTION
- Detect abnormal events
- Detect shutdowns

PROGNOSIS
- Generate alerts
- Feedback from operators

DATA QC
- Remove outliers
- Fill gaps

ANALYSIS
- Evaluate abnormal events and classify failures

The picture below shows a clear increase in the failure indicator computed by Foresight, which accurately predicted an impending mechanical failure. The failure occurred three months later, validating the predictive analysis.



VALUE & BENEFITS

FORESIGHT

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FORESIGHT's data-driven models are trained using sensor time-series of historical failures and entail advanced data processing, interpolation, quality evaluation and feature engineering.

MAXIMIZE PROFITABILITY BY:

- Reducing production loss due to ESP downtime (minimized differed production)
- Predicting the type of ESP failure ahead of time. Maximize ESP time between trips
- Better plan for the allocation of rigs
- Optimize the level of stock inventory

ENABLE PEOPLE TO:

- Minimize the asset's time spent on non-value-added tasks
- Reduce time to diagnose trip causes
- Nurture a digitalization mindset
- Increase productivity performance by providing more time on business planning and decision-making

DISCLAIMER

This booklet contains numerical data that has been sourced from our esteemed clients. It is important to note that these figures are provided in the context of their respective business operations and have been shared with us for the purpose of this booklet.

Please be aware that client-sourced data can be subject to various factors that may influence its interpretation.

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