PERFORM AIQ

AIQ

POWERING A **SUSTAINABLE** TOMORROW

ROBOWELL

PERFORM WITH **AIQ**

THE CHALLENGE

The Oil and Gas industry faces several critical challenges that must be addressed to achieve optimal performance and efficiency in the day-to-day operations:

- Instability of wells and facilities, significantly impacting production and leading to costly downtime
- Reactive and manual operational optimization in response to dynamically changing field conditions.
- Diversity of wells, each with unique characteristics and equipment, further complicates this non-automated process.

01

Leveraging real-time data from various sensors and monitoring systems is crucial for effective decision-making and performance improvement. By utilizing this data, it is now possible to proactively manage well operations, ensuring not only stable production but also the achievement of production targets. This innovative approach keeps well operations within defined parameters, significantly enhancing overall efficiency and reducing costs, making it a cornerstone of modern, cost-effective well management.

02

Currently, the most widely used technique to manage the effectiveness of oil well production requires continuous supervision of each well by operations personnel, who must make frequent adjustments to the available control variables.

03

This supervision helps stabilize the production rate but can be extremely time and resource-consuming, especially when considering different types of wells with varying characteristics, designs, equipment, and lifting methods.

The presented plots illustrate the impact of implementing a controller on well operations, focusing on both well head pressure and production rates over time
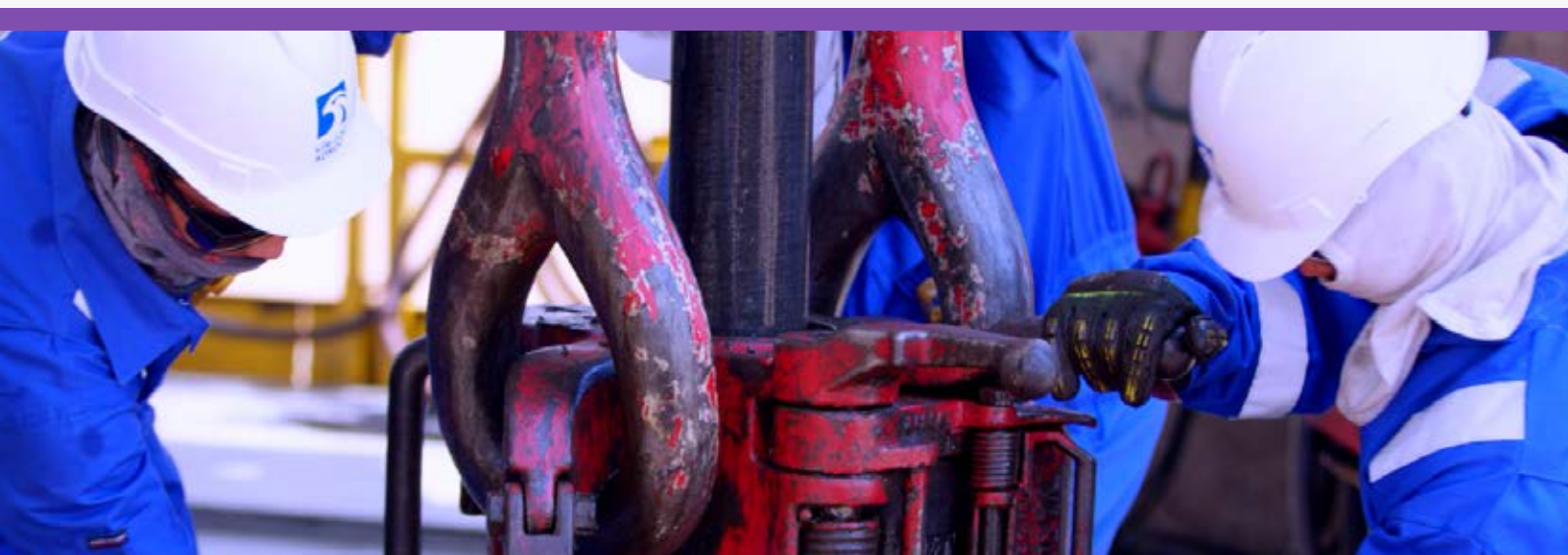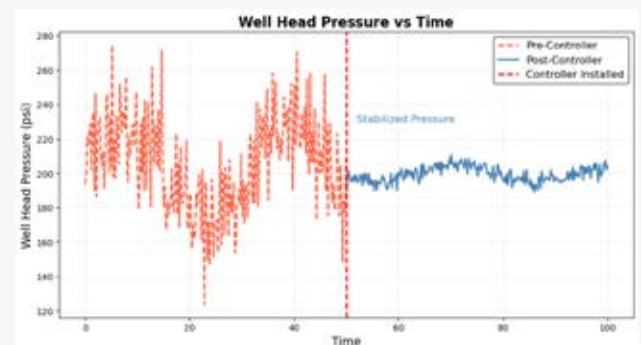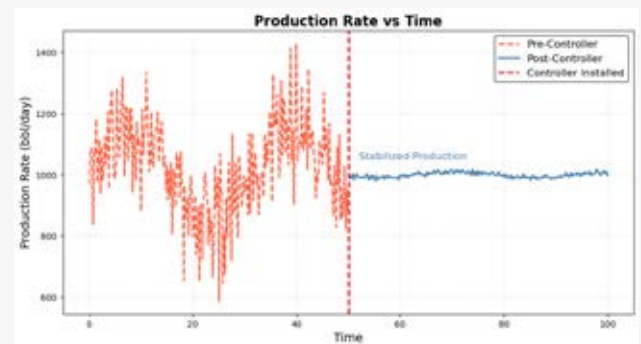
THE SOLUTION

AIQ's **ROBO**WELL is designed to assist in the stabilization of well production in the most economically efficient manner possible

The application is set up to eliminate the need for the operations personnel to constantly monitor and adjust the well-operating variables

ROBOWELL is able to maintain stable operating conditions and optimize well production while considering the objectives to minimize gas lift consumption and operating constraints such as minimum bottom hole pressure, maximum flow line pressure, and maximum annulus pressure (MAASP), among other factors

COMPONENTS

From a location and operation standpoint, **ROBO**WELL is divided into two main components:

THE CLOUD

THE CONTROL
NETWORK IN THE FIELD

The component in the field is tasked with executing the operation's work processes, which will adjust and control the well operation

The component in the Cloud contains a user-friendly interface to monitor parameters and assess the field component's operation, as well as the engineering work processes required to keep data and physics-based models up to date. A set of alarms are included to alert office and operator users on the actions to be taken to maintain the models

MODELS

FIELD

DYNAMIC LINEAR MODELS
(Runs every minute)
Reproduces dynamic response of the well when each variable changes

INFERENTIAL MODELS
(Runs every minute)
Estimates parameters in real time
(i.e. virtual meters)

OFFICE

ML VIRTUAL METER MODELS
(Runs every minute)
Machine Learning models or algorithms that estimate production rates of oil, gas, or other fluids without the need for physical flow meters

EXPERT SYSTEM MODELS
(Runs every 15 minutes)
Knowledge-based systems or decision support systems, are tools used to assist in complex decision-making processes

WELL MODELS
(Runs hourly)
Mathematical and computational representations of the well.

These models are used to simulate and analyze various aspects of well performance, and production. Work Process running every 15 Min for well model updates.

ROBO**WELL**

PERFORM WITH **AIQ**

> Significantly improves the economic and operational efficiency of the oil production process, & increases the overall asset net-present value

ROBOWELL's main business driver is to provide clear use cases for instrumentation and control technologies, augmented by using the latest data-driven and Machine Learning algorithms and software. The system's ultimate goal is to facilitate and/or achieve the real-time production optimization of wells to enhance well performance, adherence to reservoir guidelines, and faster response times to operational issues.

ROBOWELL helps maintain well operation within its safe operating envelope, minimizing the occurrence of trips due to operational upsets.

INNOVATION
- First application of Advanced Process Control (APC) technology for gas lift wells anywhere in the world
- Physics and AI framework to embed the APC scheme

EFFICIENCY MAXIMIZATION
- Keeps wells flowing at a target rate, regardless of backpressure changes
- Simplifies well management workload by production operators
- Up to 5% production increase from existing wells

PEOPLE ENABLEMENT
- Minimizes the asset's time spent on non-value-added tasks
- Nurtures the organizational mindset towards digitalization
- Facilitates tight-knit collaboration and knowledge-sharing among cross-functional teams

PROFITABILITY MAXIMIZATION
- Optimize gas lift requirements (up to 30% optimization in gas lift consumption)
- Maintains well operations within the desired operating envelope