DATAGRATION

TECHNICAL DATASHEET

Electric Submersible Pump (ESP) Performance Monitoring

Key Benefits

1. **For the Executive:** Maximize profitability by increasing ESP performance efficiency, increasing run time between failures, and avoiding production losses due to downtime.
2. **For the Engineer:** Provides continuous screening and analysis enabling the asset-level engineer to conduct detailed studies of efficient and reliable well improvement opportunities and to pinpoint precise well problems.
3. **For the Field Operator:** Allow field operations to extend the mean time between failures (MTBF) by calculating efficiencies from surface input of power to downhole conditions and ultimate surface production of fluids.
4. **For the Enterprise:** Advisory system available to all users in the enterprise through an intuitive SaaS application.

Key Features

1. Improved risk identification based on data analytics using historical data.
2. Through data integration processes, PetroVisor improves the availability, quality, and consistency of data contained in several databases with varying levels of quality.
3. Analytical and physics-based algorithms are estimating derating factor to identify abnormal operating status and estimate efficiency of ESP components.
4. Problem detection is providing an interactive monitoring system that assists with operating ESP wells with prescriptive recommendations and estimates the likelihood of potential problems.

Clients currently monitor performance using internal knowledge and experience gathered over time in ESP operations but they lack anomaly detection, modeling mechanisms, and predictive failure analysis. Given the widespread use of ESPs, failures causing downtime or inefficient ESP performance have a significant financial impact on well profitability due to delays of oil production and expensive replacement costs.

With PetroVisor's ESP Performance Monitoring, you can close the data-flow loop and optimize ESP operations by using data-driven models to spot anomalies earlier and provide prescriptive actions. From both the self-optimizing stance of a single well and the asset (reservoir & facilities) management perspective, the ESP dashboards address the overall optimization towards asset strategic KPIs and restrictions. Overcome the time constraints of manual business processes for identifying acceptable workover candidates and re-screen possibilities in hours rather than months (current).

A Simplified Approach to ESP Performance Monitoring

Corporate-Wide Business Intelligence & Visualizations

Analyze and evaluate your data thoroughly. PetroVisor provides visual data exploration by condensing massive amounts of artificial lift data from any data source into useful dashboards and reports, with fully integrated, built-in business intelligence from Microsoft Power BI.

Fully Optimized / ML Ready

PetroVisor analyzes current and predicted data, such as well performance modeling, fluid characteristics, fluid dynamics, and PVT analysis. The app anticipates production challenges allowing the user to plan the best lift strategy for each well, independent of lift type.

Failure Notifications & Automated Alerts

Avoid substantial production challenges and mechanical failures by early detection of emerging problems that might otherwise go undiscovered for long periods of time. Create proactive measures to mitigate production losses by evaluating potential failures downhole or in surface assets.

Reduce Time Reviewing Wells

Automation capabilities reduce the time and effort of manual well review by providing a smart advisory solution with ranked well candidates that are underperforming and need further investigation.

Integrate Engineering with Performance Goals

Amplify your current investment in technology. PetroVisor, which is endlessly scalable and developed on an open architectural approach, can be integrated with any technology from any engineering application. By integrating all business data, users obtain company-wide data clarity, simplicity, and accountability to reach measurable goals.

Improve Decision Making

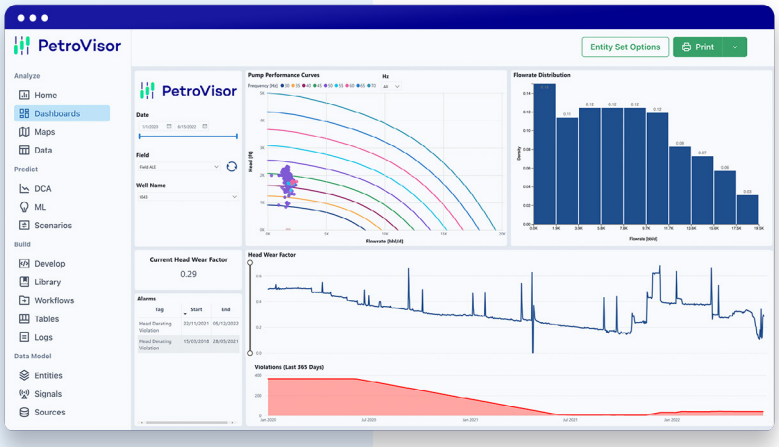
Evaluate theoretical versus actual lift performance, connect surface and subsurface related components, and detect root causes of issues as well as potential problems. Streamline and amplify the decision-making process by ranking opportunities for lift improvements and identification of problematic wells.

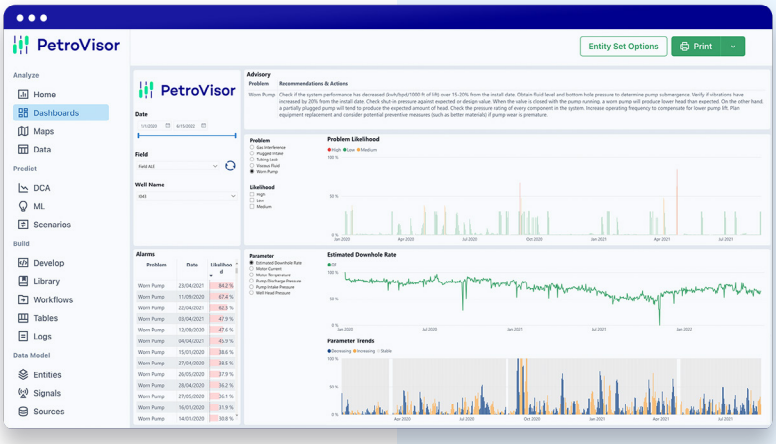
How to use PetroVisor's ESP Performance Monitoring Dashboards?

Cover the entire value chain of ESP analytics

Reduce Time Spent Diagnosing Well Performance

- Integrate parameters and variables from reservoir to surface, calculate KPIs, and perform field measurements in built-in ML for event detection and classification
- With PetroVisor's continuous data ingestion and QC, determine the type and likelihood of ESP failures and maximize ESP uptime





Automated Problem Detection

- Create an automated advisory process that captures knowledge from various technical disciplines, manages constraints and limits, and provides a ranked list of well status and identification of undesirable events
- Run predictive problem detection and maintenance; recommend corrective action based on knowledge and failure prediction (Failure Prediction Index)

Maximize Production

- Quickly discover unwanted daily production events that cause underperformance and lost production, translating to cost savings and increased revenue
- Ensure the safety of operations, minimize well downtime, and optimize production performance by automating and centralizing collaboration and managing performance opportunities

Anomaly Detection

- Perform anomaly detection using ML, predict multiphase rates, and manage production deferments and loss
- Recommend optimum well and equipment operating envelope
- Monitor cumulative violations and trends overtime

Learn More

Learn more about how ESP Performance Monitoring from PetroVisor's Artificial Lift Optimization App predicts the likelihood of underperformance and ESP failures and maximizes profitability by reading our Use Cases and Whitepapers.