

Automated Maintenance Reporting System for Data-Driven Repair and Replacement Decisions in Ethanol Plant Pumps

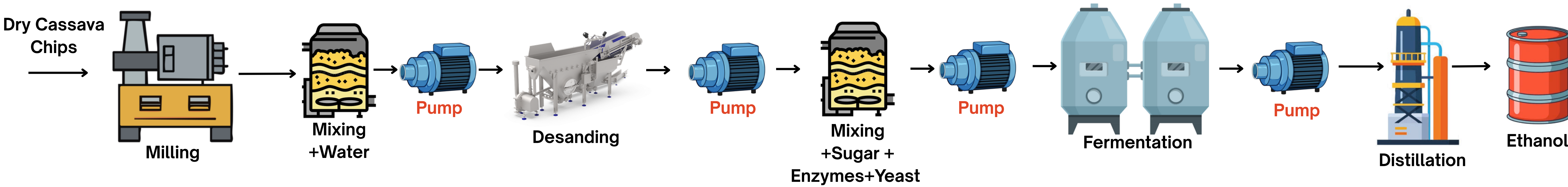
AUTOMATION ENGINEERING PROGRAM

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Introduction

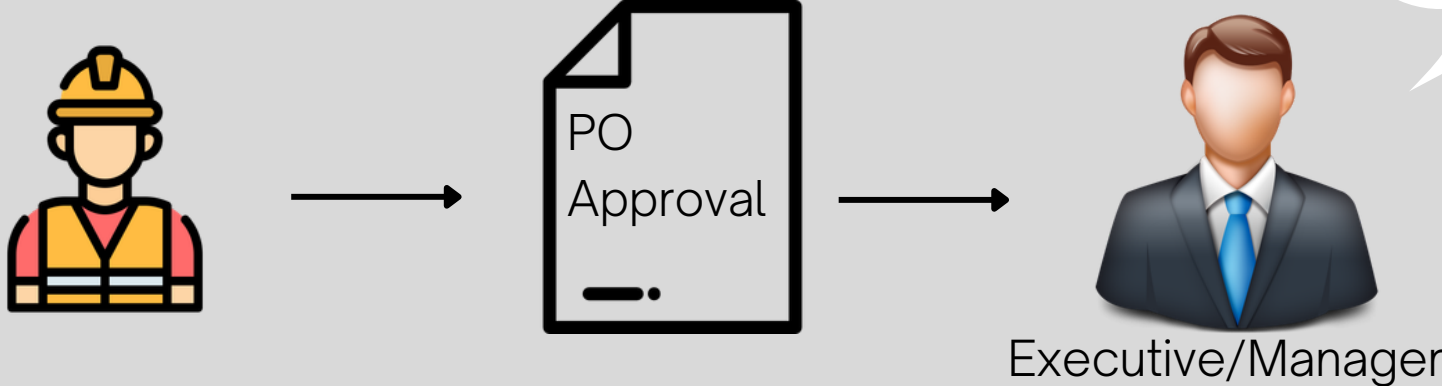
Ethanol production process

117 pumps in total



Maintenance Request Submission Process

Current Process (AS-IS)



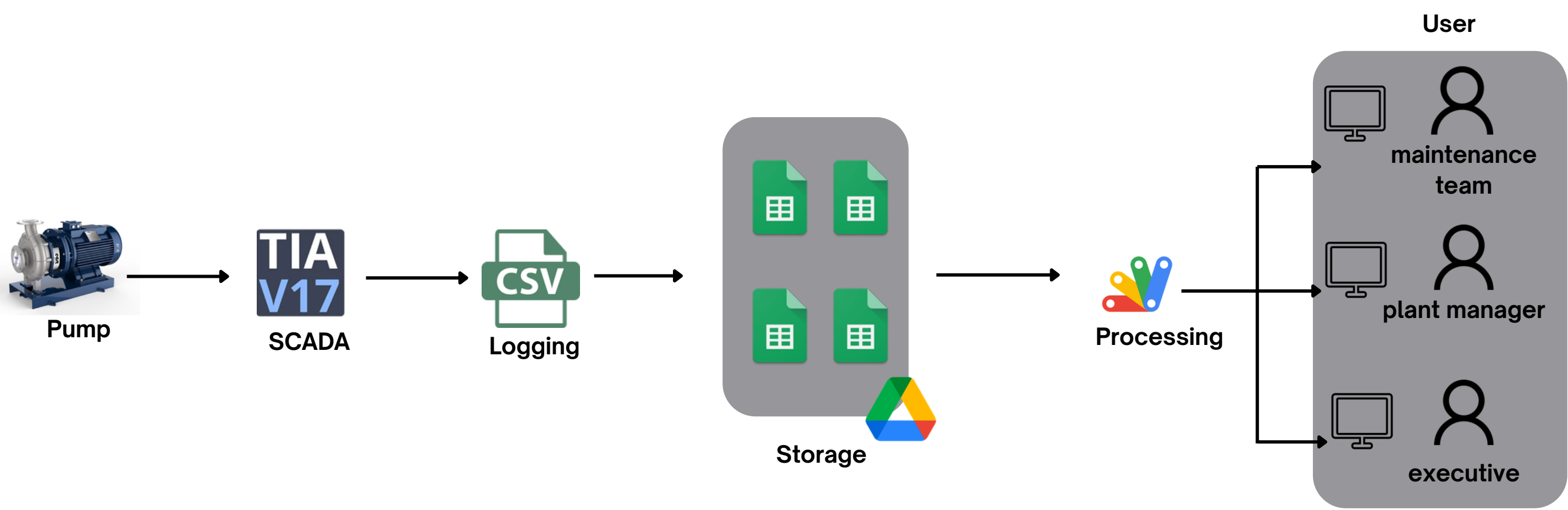
Painpoints

- Manual Excel entry leads to high human error and low data "truthfulness".
- Lack of real-time visibility into Overall Equipment Effectiveness (OEE).
- No clear audit trail to determine if a pump is "worthy" of repair or needs replacement.

Objective

- Automate Reporting:** Transition from manual logs to a direct data pipeline from TIA Portal to a web dashboard.
- Data Integrity:** Establish an automated audit trail to increase the "truthfulness" of repair records.
- Asset Analytics:** Utilize OEE and cost data to drive informed repair vs. replacement decisions.

Methodology

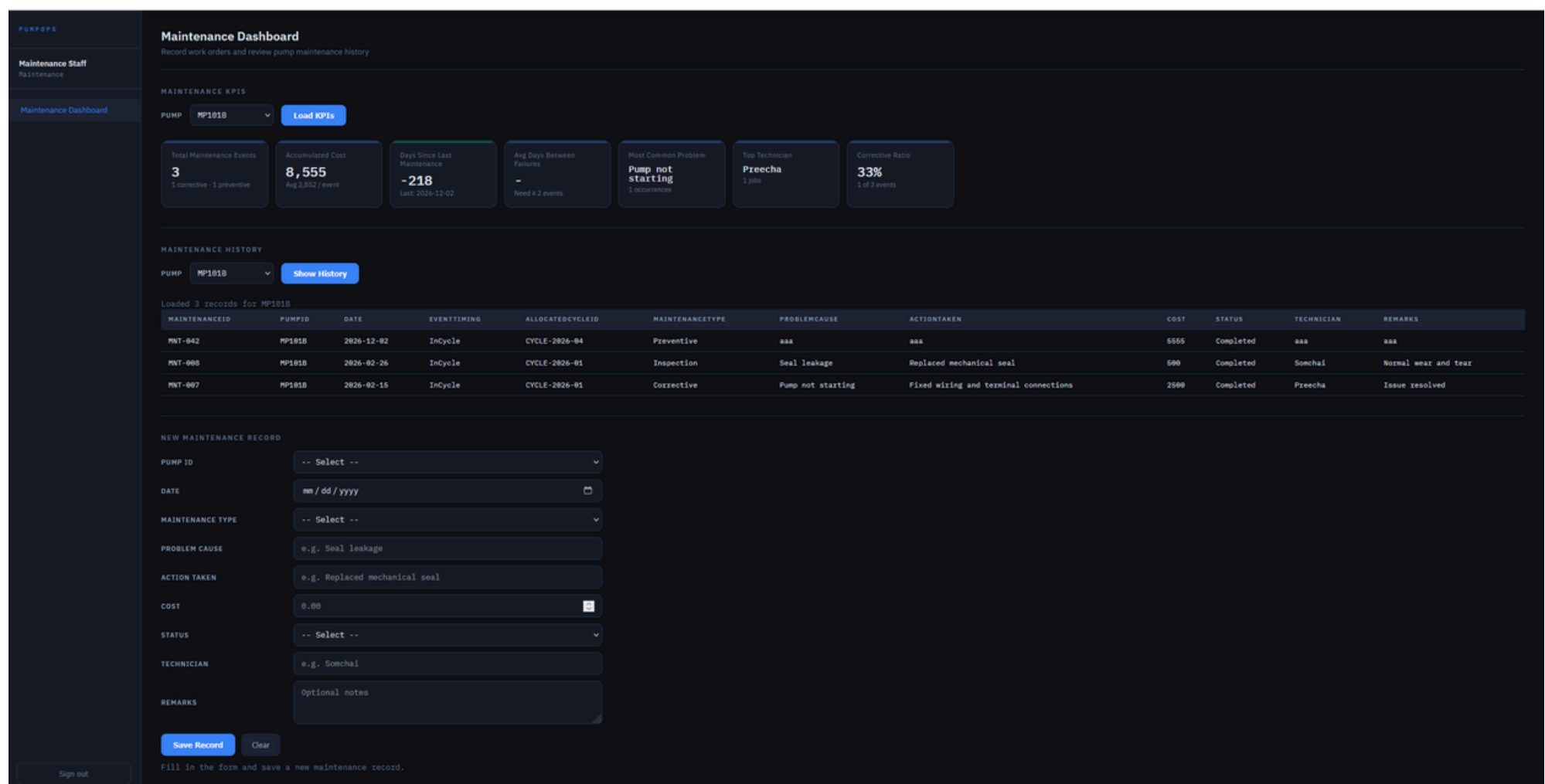


- Data Capture:** Programmed TIA Portal V17 to monitor pump telemetry and auto-export operational CSV logs.
- Cloud Pipeline:** Utilized Google Drive and Sheets as a centralized database to replace manual filing.
- Metric Engine:** Developed Google Apps Script to compute KPIs, focusing on runtime, downtime, and maintenance costs.
- Decision Interface:** Built interactive Looker Studio dashboards and a web app for role-based access for teams and executives.

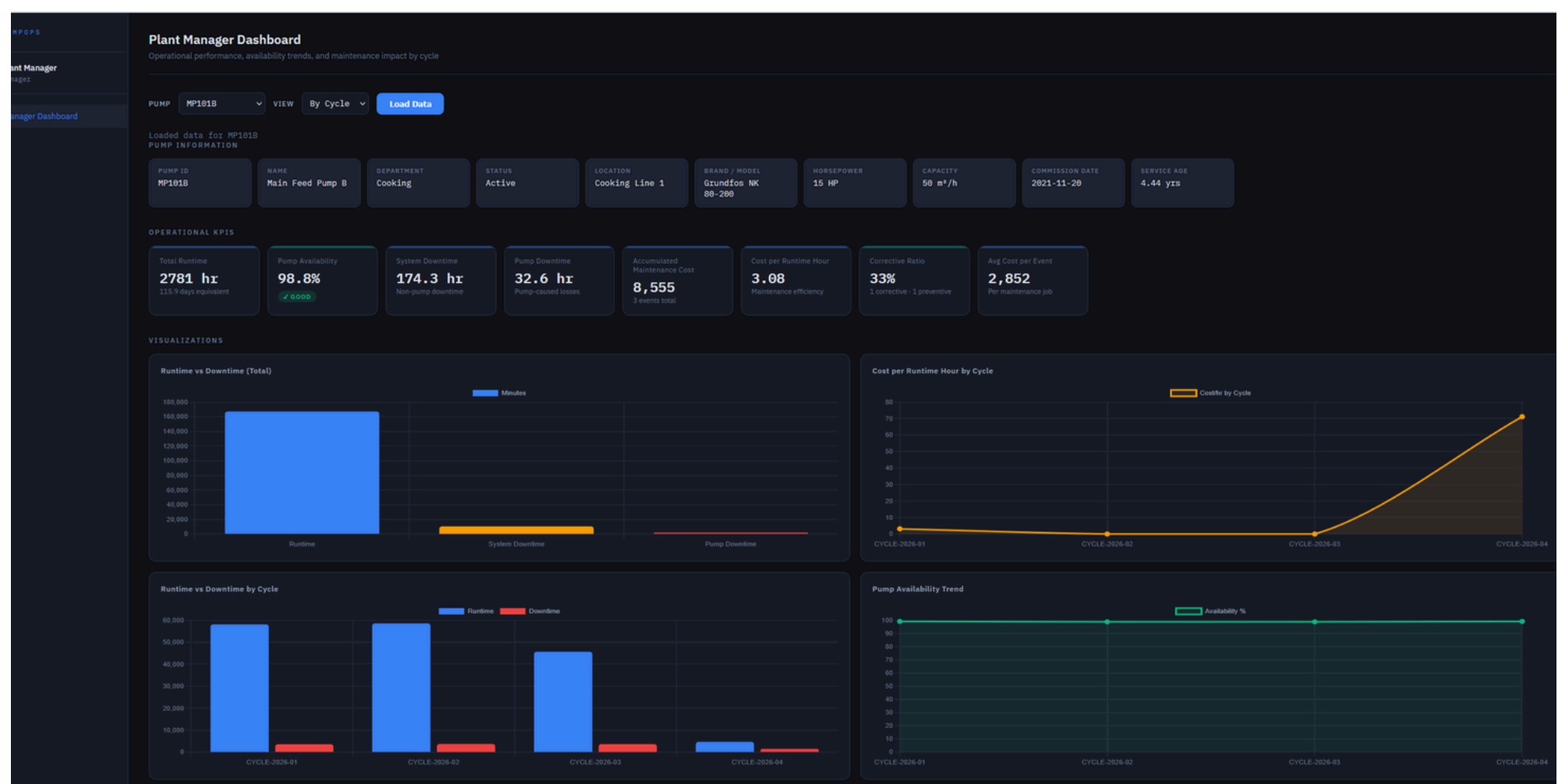
Result

CORE FEATURES

- Automated Reporting**
Automatically generates maintenance reports from SCADA data and historical records.
- Operational Analytics**
Analyzes runtime, downtime, and availability to monitor equipment performance.
- Decision Support**
Tracks maintenance costs and calculates cost per runtime hour.
- Cost Intelligence**
Provides insights to support repair vs replacement decisions.



Maintenance Report Interface



Performance Dashboard (Availability & Cost Trends)