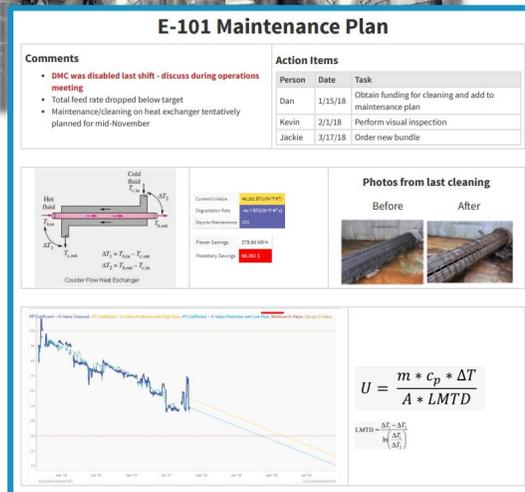




Use Cases - Preventive Maintenance and Asset Monitoring

Heat Exchanger Predictive Maintenance



CHALLENGE

- Optimize heat exchanger maintenance schedule
 - Heat exchangers foul over time resulting in reduced efficiency
 - Maintenance events should be driven by economics



SOLUTION

- Create a predictive model based on operating conditions
- Compare present cycle with previous cycles to determine root cause of accelerated fouling



RESULTS

- Engineering solution results in long term improvements
 - Reduced production loss, savings of ~\$10,000/year
 - Planned maintenance reduces impact on operations

Induced-Draft Fan Predictive Maintenance



CHALLENGE

- Preventing unplanned downtime is crucial to profitability
 - Scheduling routine maintenance can miss potential failure and can be unnecessary and expensive
 - Difficult to visualize maintenance trends of the fan vibration due to dust scale build-up



SOLUTION

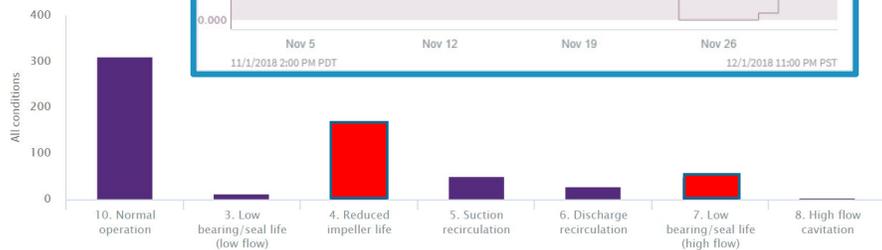
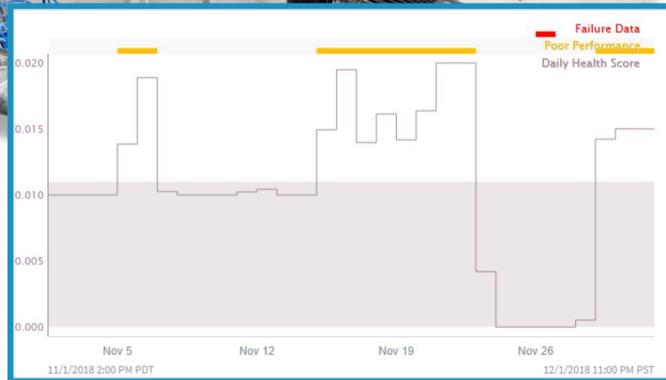
- Create a forecast model to plan maintenance of the induced-draft (ID) fan before the vibration exceeds a critical limit



RESULTS

- Reduce unnecessary maintenance of the ID fans
- Reduce likelihood of unplanned outage, saving ~\$20k/hour of downtime

Pump Health Monitoring



CHALLENGE

- Inability to detect and anticipate pump performance issues can lead to prolonged shutdown, loss of revenue, and environmental/safety threats



SOLUTION

- Identify leading and lagging indicators of pump health
- Continuously monitor multiple pump health variables to detect poor performance and take corrective action



RESULTS

- Enables proactive engineering assessments
- Helps to identify risks and prioritize maintenance activities
- Reduces likelihood of pump failure, saving costs due to lost production and engineer time