

Kuwait 4th Flow Measurement Technology Conference

> 3-5 December 2019 Hilton Kuwait Resort



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SAMER EL ISSA

Global Director of Sales & Marketing - Flow Metering Digital Systems



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Plantweb Advisor for Metrology

ADVISOR FOR METROLOGY

Emerson Confidential

The Plantweb Digital Ecosystem: Enabling Top Quartile Performance With the Industry's Broadest Integrated Portfolio of Digital Transformation Solutions



Anatomy of Measurement System Failure



Plantweb Advisor for Metrology



Emerson's Approach Solution Spotlight The Challenge **Plantweb Advisor for Metrology** Unexpected downtime as Remote Monitoring/Unsystems fail and result in lost or manned operations reduces deferred revenue the amount of time personnel have to be at risk Increased system uncertainty resulting in increases in Health Assessment unaccounted for losses dashboards provide confidence to the Non-conformance that may measurement data result in fines and/or legal action Data Reconciliation made Consider It Solved[™] easier with access to verified • Unnecessary travel to detect data When you encounter a Metrology issues resulting in travel costs, challenge, Emerson pulls together its wasted resources and safety System Reliability improved global resources to solve it for you. with access to predictive With Plantweb Advisor for Metrology exposure diagnostics we can deliver actionable information • Scarcity of Metrology experts using cutting-edge technology, helping Contractual obligations met you achieve Top Quartile Performance. with streamlined data validation **Uncertainty** reduced ۲ WW.KUWAIT-MEASUREMENT.COM

Operational Improvement Options



Legacy Model

Operational Improvement Options



Operational Improvement Options



Centralized Expertise:

- On Premise or Customer Intranet
- Self-manage the monitoring of system assets through owned software
- Centrally monitor & diagnose remotely located systems

Plantweb Advisor for Metrology Helps Customers to Centrally Monitor & Dagnose Multi-Location Systems



Plantweb Advisor for Metrology Diagnostic Modules



Remote Monitoring – Health Assessment Dashboards

Health assessment at group (Skid) level – Traffic light

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 location to standardize how I *"I can reduce the time"* manage metering" that resources are in risky locations" WWW.KUWAIT-MEASUREMENT.COM

Alert: Signal to Noise ratio issue on

chord B for Ultrasonic meter on skid

Coriolis Diagnostics Module – Smart Meter Verification



The Challenge

Operators follow a **calendar-based calibration** approach to check the health of their coriolis meters. This all results in:

- Regular downtime as the system may have to be taken offline while the meters are removed
- Transportation risks that may result in meter damage
- Increased Cost from transportation, downtime and re-calibration
- **Confidence** that the meter is operating 'as installed'

"Is the meter working like it should? If not, what's the root cause of the issue?"

Emerson's Approach

Smart Meter Verification is an easy-to-use, automatic diagnostic tool that checks the entire Coriolis meter's performance and integrity – and without ever having to stop your process flow:

- Actionable information reports on a periodic basis showing the health of the meters
- Deferment of periodic recalibration or proving with significant cost savings
- Reduced uncertainty
 between re-calibrations as
 the software alerts the
 customer before issues
 cause mismeasurement
- **Detect meter damage** as a result of erosion, corrosion, coating, freezing and overpressure

Solution Spotlight

On-demand and scheduled reports

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Customizable dashboards



Utrasonic Meter Dagnostics

The Challenge

To demonstrate to their stakeholders that they were operating within agreed measurement uncertainties, the operator recalibrated their five ultrasonic meters every year.

This all resulted in:

- Regular downtime as the system may have to be taken offline while the meters are removed
- Transportation risks that may result in meter damage
- Increased Cost from transportation, downtime and re-calibration - estimated by one operator to be \$30,000 per meter, per year
- **Confidence** that the meter is operating 'as installed'

Emerson's Approach

As their partner in Digital Transformation, Emerson delivered cutting edge condition monitoring software coupled with expert analysis that provided:

- Actionable information reports on a periodic basis showing the health of the meters
- Deferment of their periodic re-calibration saving \$150,000 per year
- Reduced uncertainty between re-calibrations as the software alerts the customer before issues cause mismeasurement
- Detect meter damage or issues

Solution Spotlight

On-demand and scheduled reports



Customizable dashboards



Gas Chromatographs Dagnostics

The Challenge

Gas chromatographs require periodic checks and calibrations to ensure they perform optimally:

- Unnecessary Travel and manual intervention to check the health of devices
- Increased Uncertainty as the GC is a critical component in calculating the custody transfer quantities
- Non-Conformance through failure to meet gas quality requirements

Emerson's Approach

The Gas Chromatograph module provides an automated tool that gives a degree of confidence in the performance of the device:

- Actionable information reports on a periodic basis showing the health of the devices against a stored benchmark
- Reduced uncertainty as the software alerts the customer before issues cause mismeasurement
- Detect damage or issues to the equipment

Solution Spotlight

Customizable dashboards





Plantweb Advisor for Metrology: DP Condition Monitoring

Plantweb Advisor for Metrology DP Condition Monitoring can facilitate a Condition Based, rather than Time Based maintenance strategy.

Benefits

Prognosis can be used to monitor the operation of a DP meter with the intent of identifying uncertainty in the traditional calculate measurement and facilitating a Condition Based, rather than Time Based maintenance strategy.

Routine, scheduled inspection/calibration procedures can be modified such that technicians address known measurement problems immediately on detection – rather than waiting until the problem is discovered during the next scheduled inspection.

In one case study involving a 6" natural gas orifice meter, Prognosis detected a potential contamination issue, on inspection this was confirmed. The associated 3% error could have resulted in costs of over \$450,000 over the course of one year.



Calculation Verification

The Challenge

Verifying flow computer calculations requires specialist manual checks on a regular basis:

- Unnecessary Travel and manual intervention to verify the performance of devices
- Increased Uncertainty as the flow computer is a critical component in calculating the custody transfer quantities
- Non-Conformance through failure to meet audit requirements

Emerson's Approach

The Gas Chromatograph module provides an automated tool that gives a degree of confidence in the performance of the device:

- Actionable information automated reports on a periodic basis showing the performance of the flow computer calculations against a second calculation library
- Reduced uncertainty as the software alerts the customer before issues cause mismeasurement
- Technically defendable data for contract obligations and audits
- Confidence in measurement data

Solution Spotlight

Calculation dashboards

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Supported Calculations

Gas Calculations	Liquid Calculations
GPA 2172	ASTM D1250 / IP 200
ISO 6976	API MPMS 11.1
AGA 5	API 11.2.1
GPA 2145	API 11.2.2
AGA 8	API 11.2.4 / GPA TP 27
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ISA 1932	



Plantweb Advisor for Metrology will reduce the time to detect and correct issues and move customers towards lower exposure

Plantweb Advisor for Metrology: Technology Roadmap



Live System Uncertainty

Live system uncertainty gives real-time visibility to the performance of your system, based on operating conditions and diagnostics.

- Our Contrainty calculated according to GUM and ISO 5168.
- Ogas Ultrasonic Meter system uncertainty in progress.
- Combines the live operating conditions alongside any bias detected by the Condition Based Monitoring and verification components.
- Ocan be linked to the Business System to provide real-time financial exposure.
- OAllows the metrology experts to prioritize issues across multiple sites, driving efficiency in the team.



Data Reconciliation



Plantweb Machine Learning Engine

Advanced Neural Network, capable of proactively identifying potential issues in the measurement system.

- Learns the system specific relationships and patterns 24/7/365
- Performs parameter prediction
- Identifies outliers based on historical data training
- Auto corrects abnormal data based on predicted values
- Patents submitted
- Proof of concept in development



ML Engine Neural Network

Solution Deployment



3rd Party Expert Service:

- Daily / weekly / monthly / annual health assessments
- Recommended actions
- Guaranteed mobilization to site

Centralized Expertise:

- On Premise or Customer Intranet
- Self-manage the monitoring of system assets
- Centrally monitor & diagnose remotelylocated systems

Solution Optimization



- The Plantweb Advisor for Metrology platform aims to improve:
 - Reliability
 - Uncertainty
 - Conformance
- A number of diagnostic tools are provided at the **device level** and **holistic system_level** to provide **actionable information** to the user
- This is an open platform that supports 3rd party devices and can integrate 3rd party diagnostic applications, giving analysis coverage across metering assets. The package is independent of the metering supervisory and can interface with 3rd party flow computers and supervisory systems where required.
- Remote monitoring capabilities and persona-based access allow the right information to get into the right hands at each level of the organization.
- Cybersecurity is a key focus. Working closely with the customer's IT team and the Emerson Security experts to safeguard critical data.



THANK YOU

