Technical description

Vacuum pump system monitoring

Project data:

DPMV installed a vacuum pumping system using Redivac's technology and was looking for a solution to build a monitoring network to help the system operate more efficiently.

The problem:

The system requires too much electricity to operate and too many resources to maintain: when a vacuum valve failure is detected too late, the vacuum is leaking from the system for a long time, it is difficult to find the problem valve, and it is impossible to predict possible system failures.

The solution:

Installation of a **WaterScope Iot** measuring, data acquisition and wireless data transmission system on the municipal wastewater system: measuring the vacuum in the engine room, measuring the vacuum and control pressure at the pump valves and monitoring valve openings.

The individual components of the monitoring system are installed at locations determined in agreement with the user, on average every 5-10 vacuum valve manholes and the vacuum tank of the machine room. The investment will demonstrate the many benefits of using the system. Continuous monitoring of the measurement results can be tracked on a customized dashboard built with a secure data connection, via computer or mobile phone.

The individual elements of the monitoring system can be coordinated, and the system is capable of sending warning and alarm signals based on relative values. The system automatically generates daily/weekly/monthly reports of the measured data, which can be exported in xlsx or csv format according to the user's needs.

Elements of the system and how it works:

- **WaterScope IoT** data logger with NBIoT network communication
- 2 pressure measurement: 1 valve vacuum, 1 control pressure measurement
- Valve opening detection
- Valve vacuum measurement
- Measurement cycle time 2 minutes, data transmission cycle time 1 hour
- Min. 3 years of battery life
- Dual-key network encrypted data transmission
- Dedicated user database on AWS server
- Automatic alerts and reports

Results

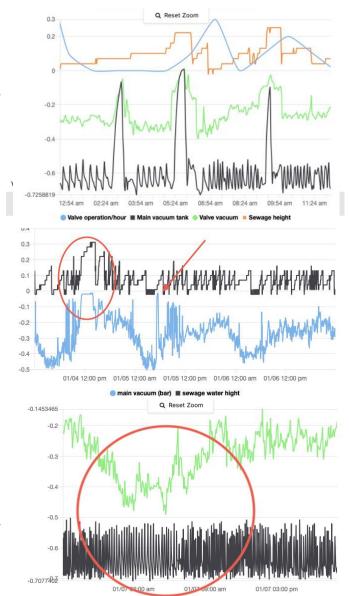Providing the most relevant information to **dispatchers**:

- Immediate valve failure alert, help to find the location with a mobile app:
  - Reduced downtime
  - Faster repairs
  - Less unnecessary operation of vacuum pumps
- Less valve vacuum downtime
- Less valve vacuum tracking, safer operation
- Less time to repair and service valve leaks
  - Hard to detect continuous loss indication

Providing the information most relevant to **operations**:

- Indication of possible mine clearance:
  - Circled indicates a manhole overflow
- If there is sufficient vacuum in the system to operate safely
  - Arrow indicates loss of valve vacuum.

Further recommendation for possible **operating** cost reductions:

- Keeping a lower vacuum in the system during night operation
- E.g. for a school zone, the possibility to follow up after more intensive use during the day and after large changes in demand outside school hours.

Summary

By installing **WaterScope's IoT** monitoring system on an existing wastewater network, both network operators and system engineers can easily access new information, which can be used to achieve significant operational cost savings.

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