



District of Columbia
Water and Sewer Authority

Smart Water at Blue Plains AWTP

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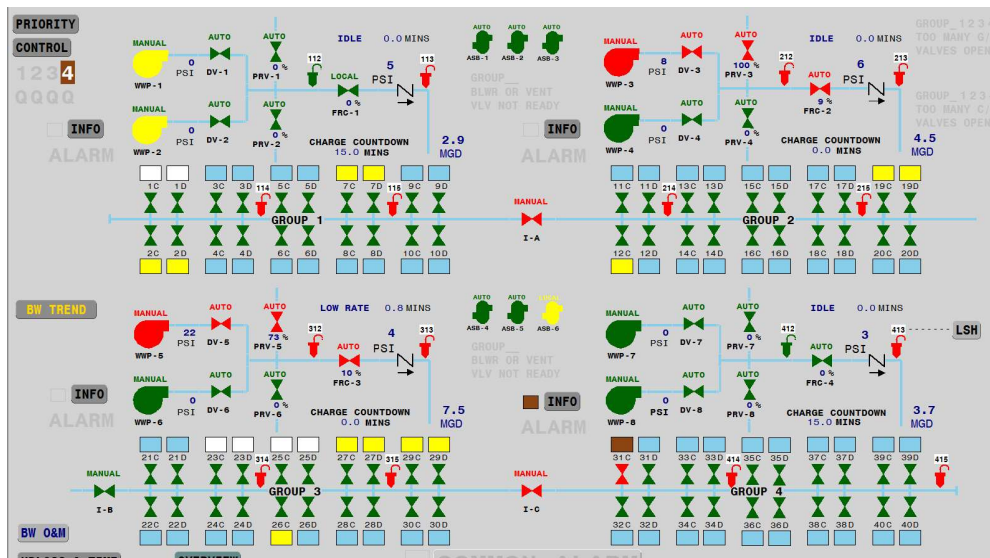
Overview of Blue Plains AWWTP

- 391 mgd average day capacity
- ~160 acres
- Serves DC, plus areas of MD and VA
- Advanced secondary treatment – filtration, N and P removal
- Discharges to Potomac River and Chesapeake Bay



Using Existing Data Multimedia Effluent Filters

Multi Media filters are being used as the last part of waste water treatment to remove small floating particles from the wastewater. Uses Multiple media, under drains, backwash water and air. Backwash process approximately once every 24 hours



Blown filter is described as a structural defect that would let the fluid pass media without being filtered (shortcut) and the media to be released and enter the backwash water during backwash. Caused by rupture of the underdrains



Multimedia Effluent Filters

An opportunity to deploy analytics using historical data going back to 2009. One of the approaches was Matlab with the support of the University of Cincinnati.

1

DATA PREPARATION

- Perform Data Collection
- Identify Data Ranges and Failures
- Define Data Structure
- Perform Initial Analysis
- Perform Data Clean Up

2

Feature extraction

- **Time-domain statistical parameters**
- **Frequency-domain features**
- **Time-Frequency domain**

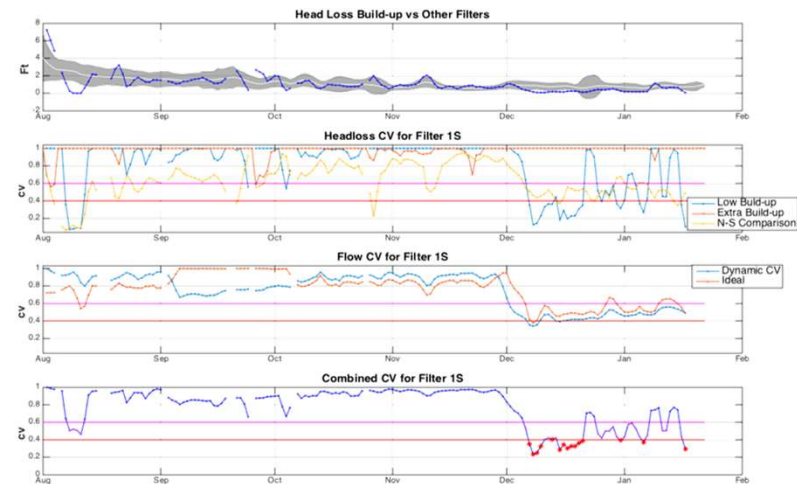
3

Analysis

- Feature Selection
- Failure Signature
- Health Assessment

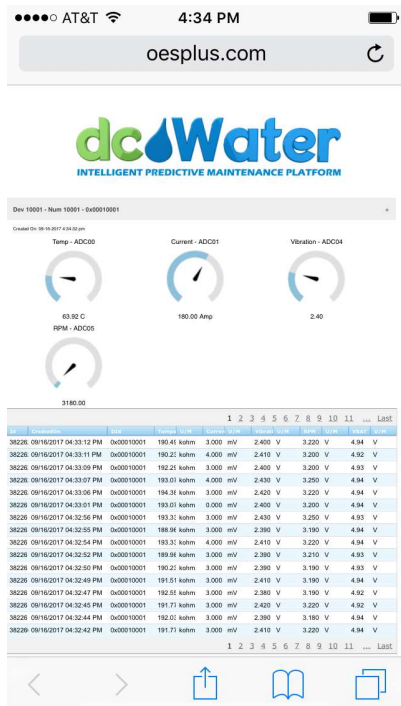
Multimedia Effluent Filters

Filter 1 south that was reported blown on Jan 17th 2016. As the group comparison for head loss shows, the filter had an abrupt change in its behavior from early December causing CV values to drop. Backwash flow CV suggests similar behavior in the same time proximity. Using the final health metric for this filter, the warning and failure alarms would raise by Dec 5th and 6th, one 40 days before the failure was noticed.

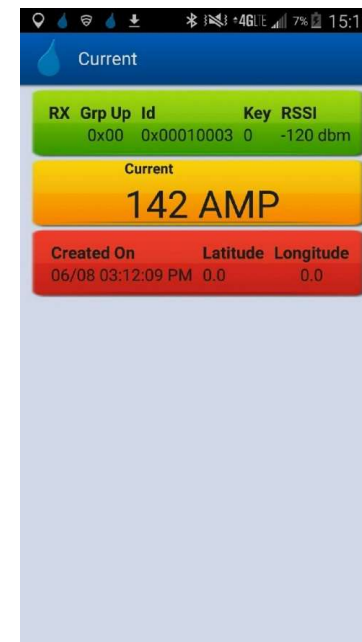


Vertical Assets Applications

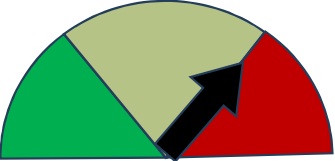
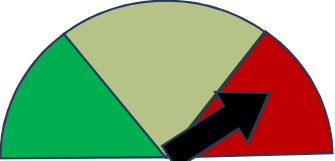
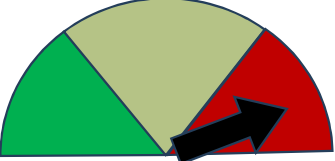
- Asset Health monitoring



- Energy Management



Conclusions and Lessons

Easy		Hard	Algorithms and technical stuff
Easy		Hard	Strategic overview
Easy		Hard	Practical stuff
Easy		Hard	Commitment



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