



Is Ammonia-Based Aeration Control Worth the Effort?

Susan Guswa, P.E.



COMMITMENT & INTEGRITY DRIVE RESULTS





Westfield Water Recovery Facility Team

- Jeff Gamelli
 - Deputy Superintendent
- Ken Gagnon
 - Chief Operator





Westfield, MA





Westfield Water Recovery Facility





Hach AISE sc ISE Ammonium Probe





ABAC Pilot Test at the Westfield WRF

Water Innovation Grant from



Pilot Test Partners





Project Drivers



\$\$\$



Performance





- What are the Keys for Successful Implementation of ABAC?





Three Dissolved
Oxygen Probes

One Ammonium
Probe





Data Collection

Co-Author, Julia Beni



Field Observations

Lab spreadsheets

Chemical usage spreadsheets

SCADA

On-line analyzers





Power BI

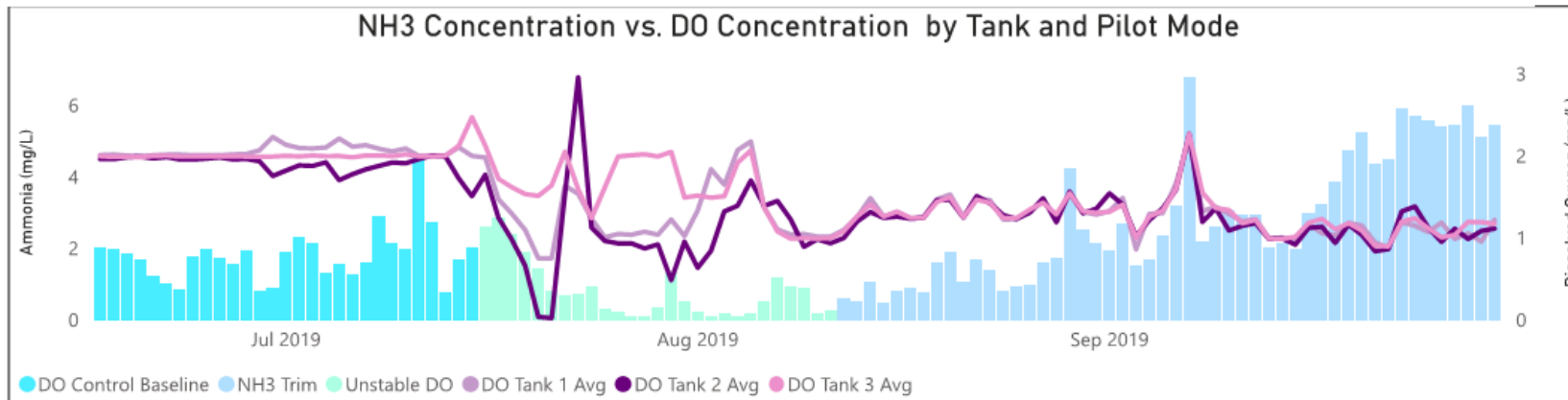
Effluent NH3 (mg/L)	NPDES Limit NH3 (mg/L)	Effluent TP (mg/L)	NPDES Limit TP (mg/L)	Effluent TN (mg/L)
1.22	3.00	0.33	0.46	7.53



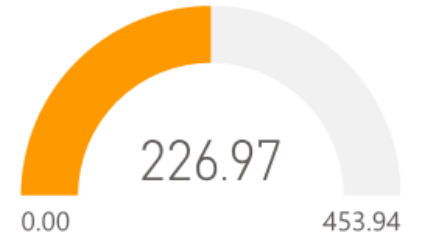
Average Header Pressure by Date



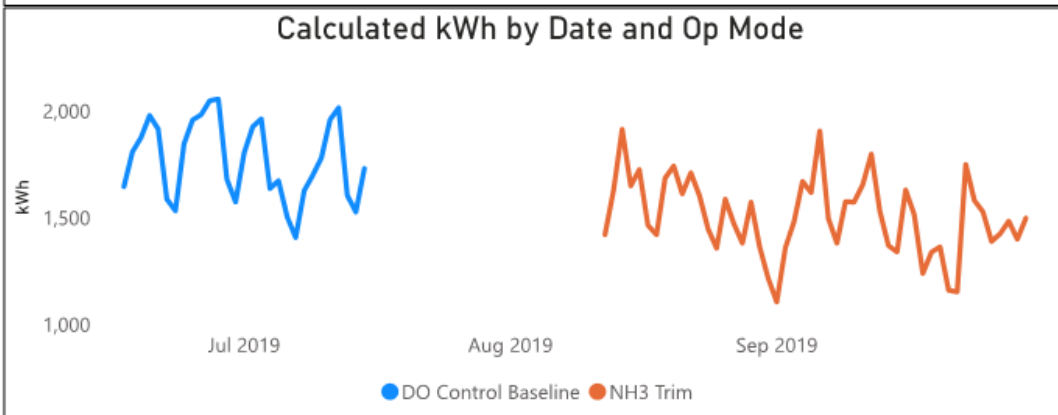
NH3 Concentration vs. DO Concentration by Tank and Pilot Mode



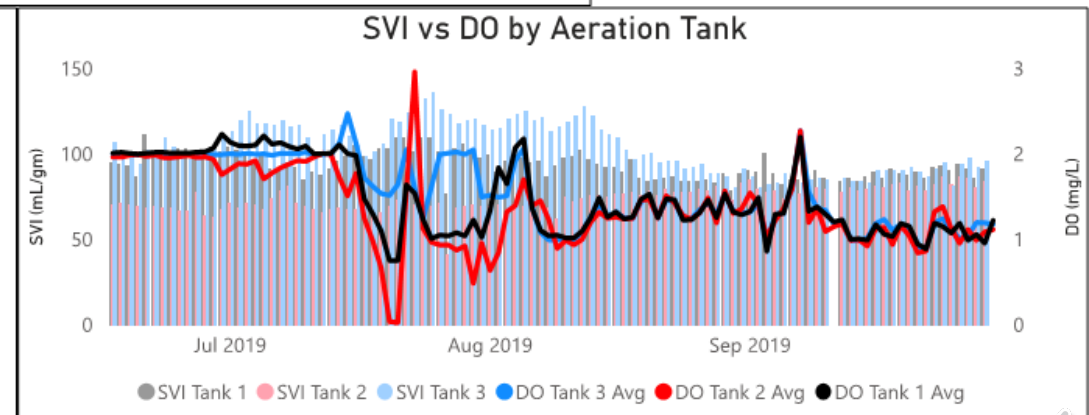
Average Caustic Use (gal)



Calculated kWh by Date and Op Mode

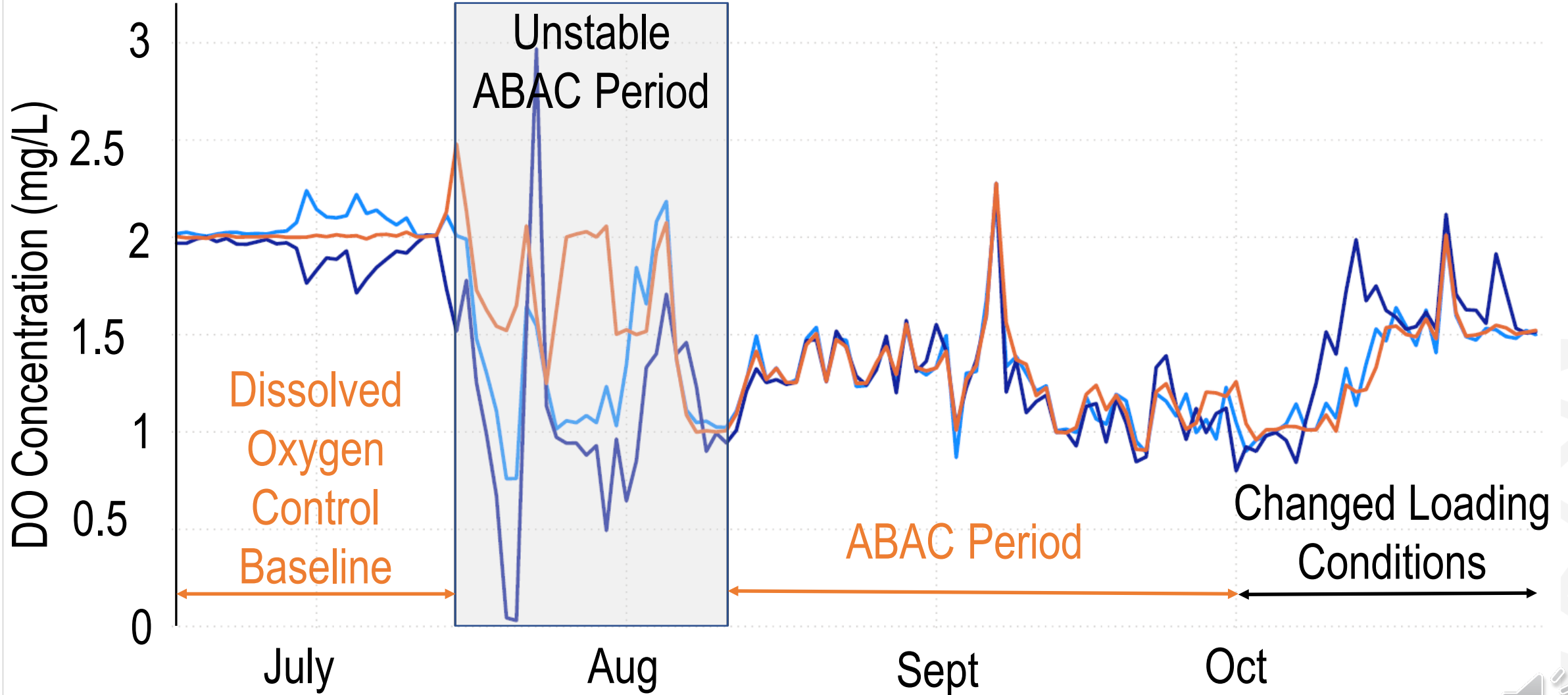


SVI vs DO by Aeration Tank





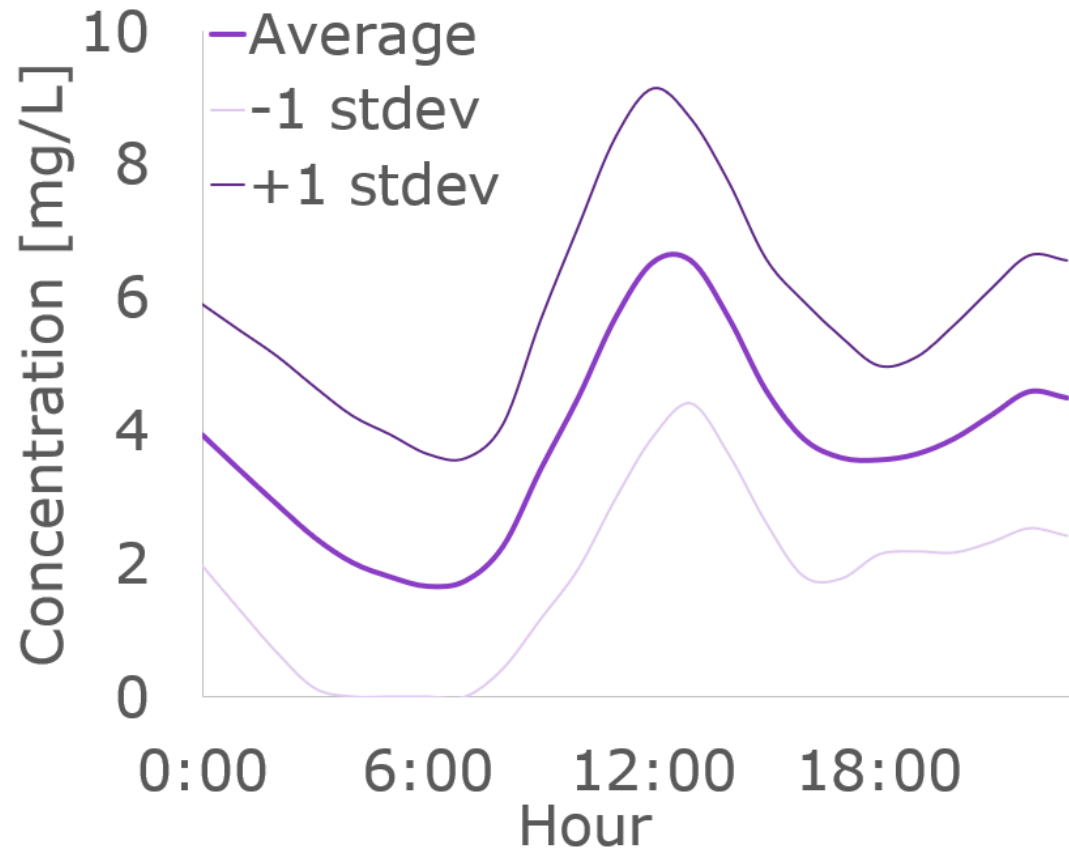
Pilot Test Periods



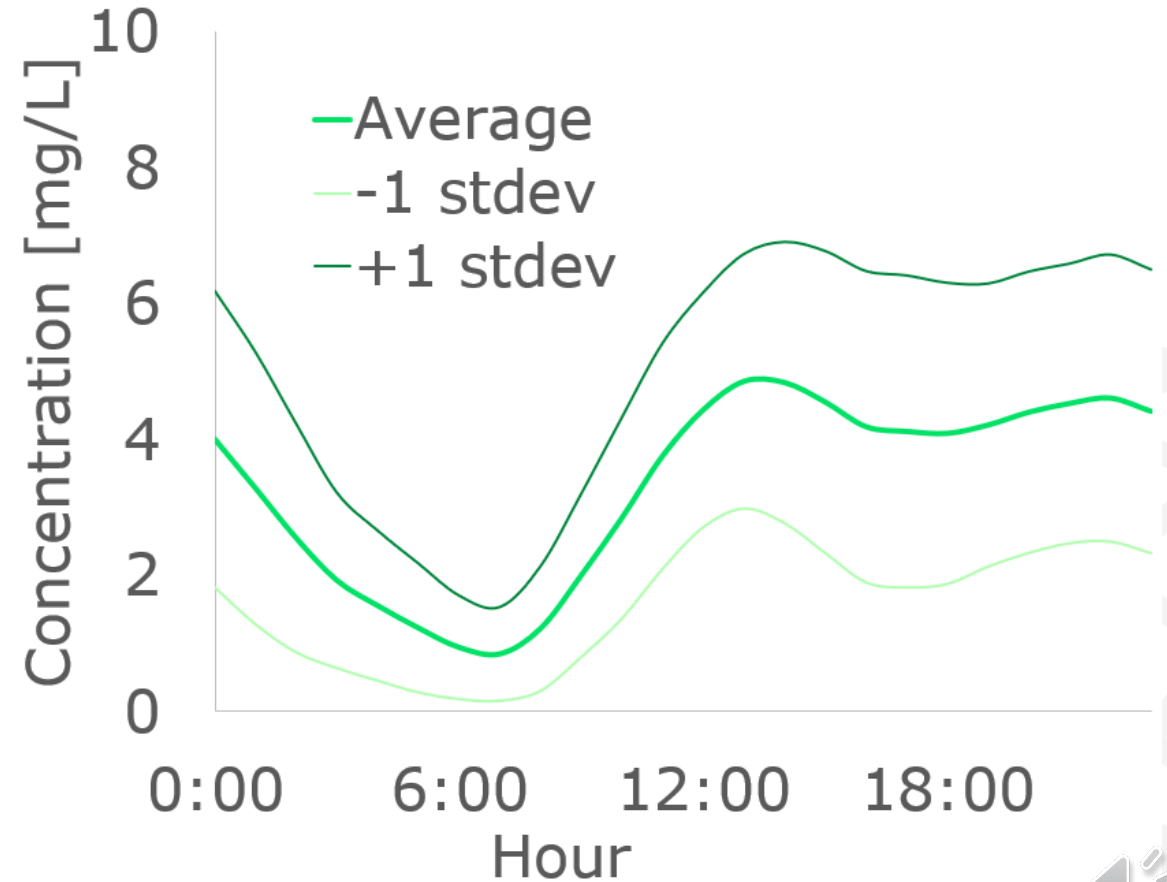


On-Line Analyzers Provided a Window into Loading Changes

September 2019

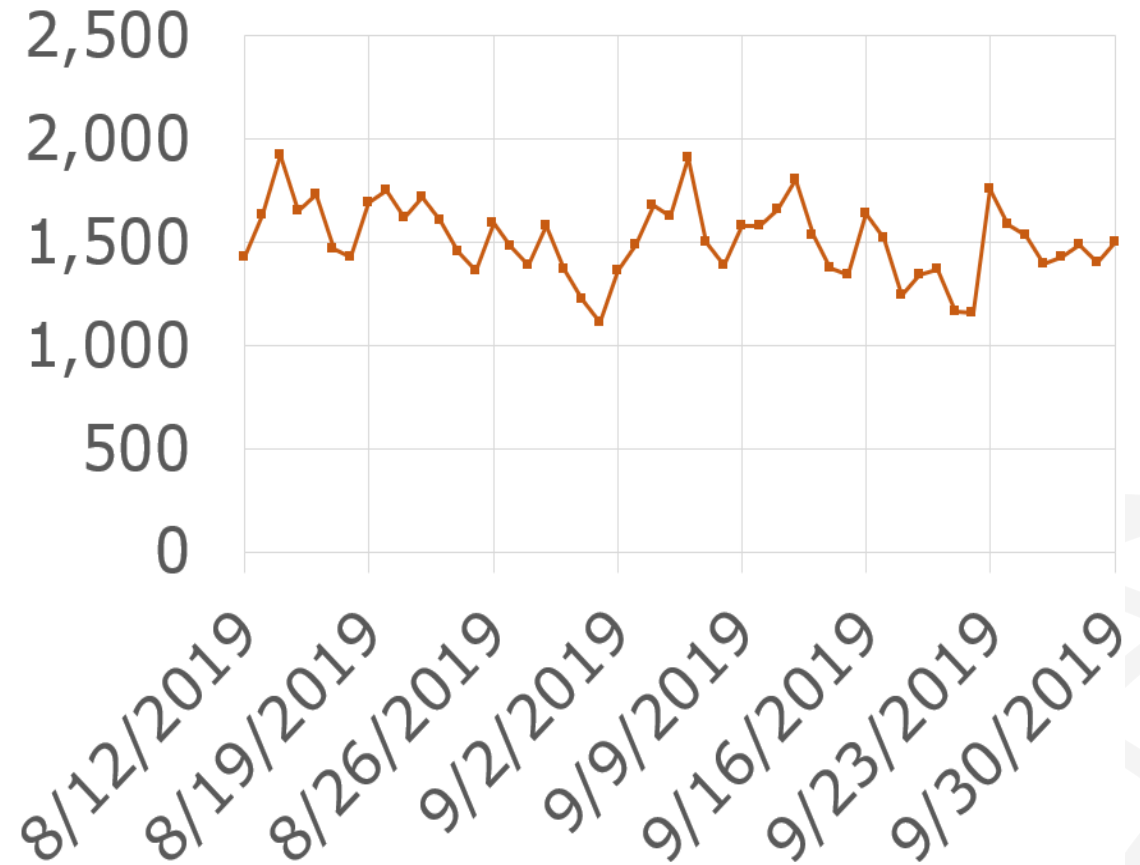
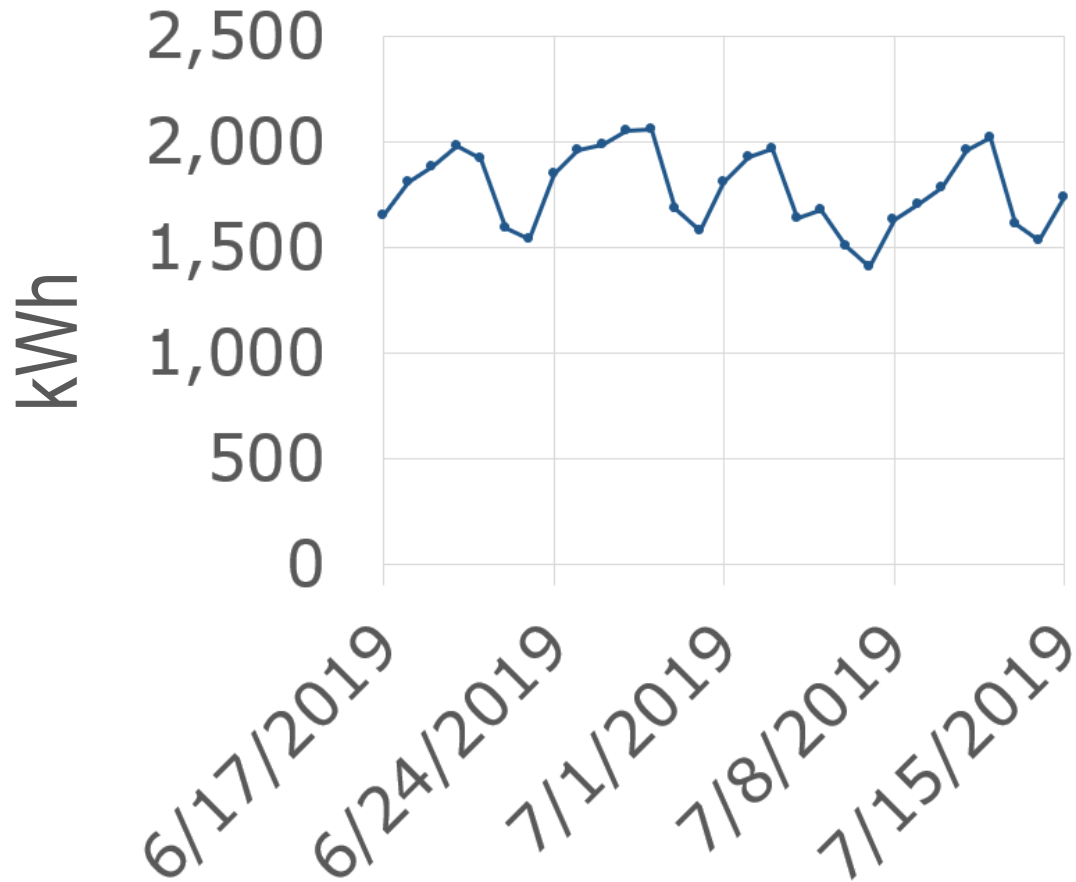


October 2019





15% Blower Energy Use Reduction



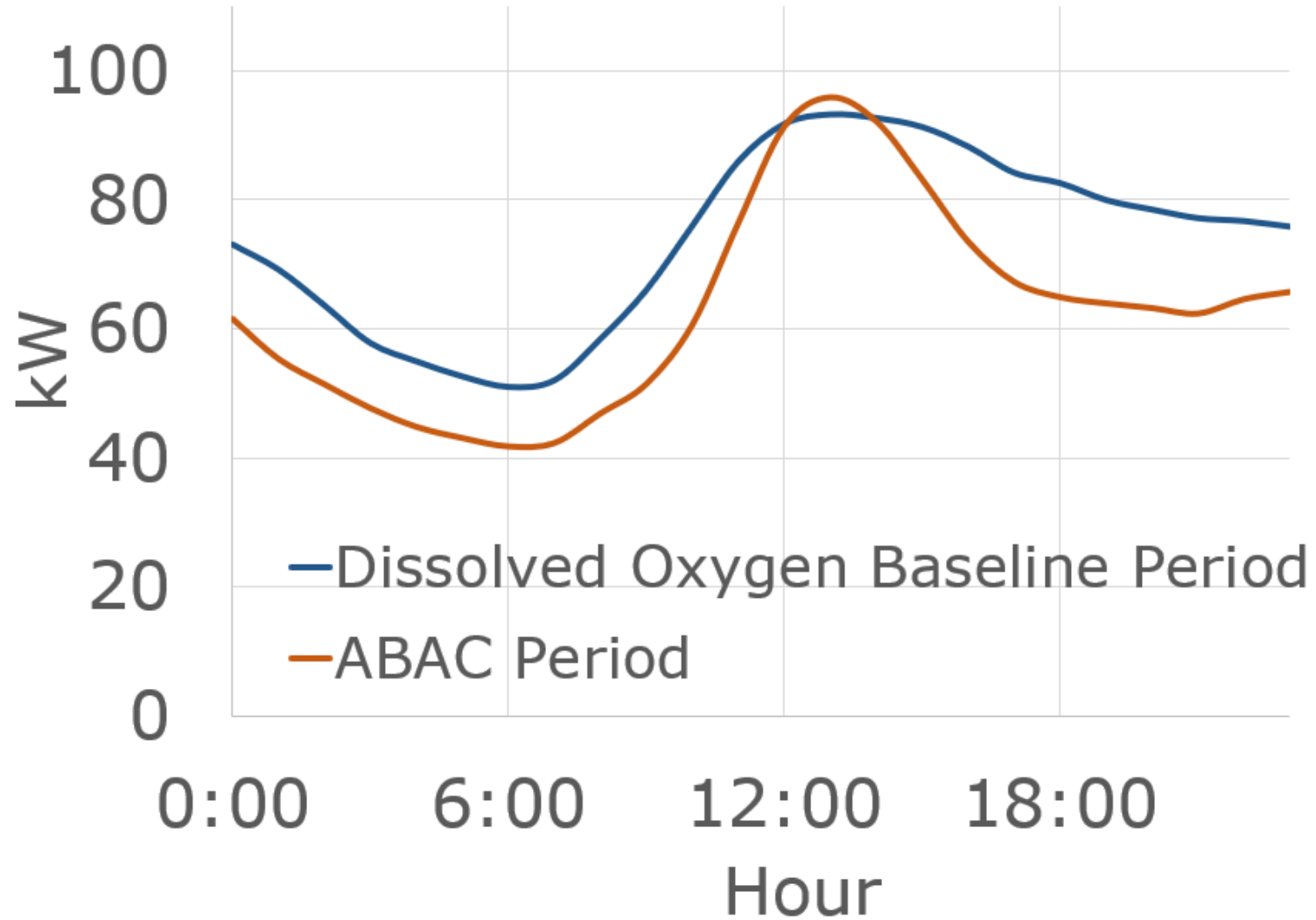
DO Baseline Period: Average daily blower energy = **1780 kWh**

ABAC Pilot Period: Average daily blower energy = **1510 kWh**



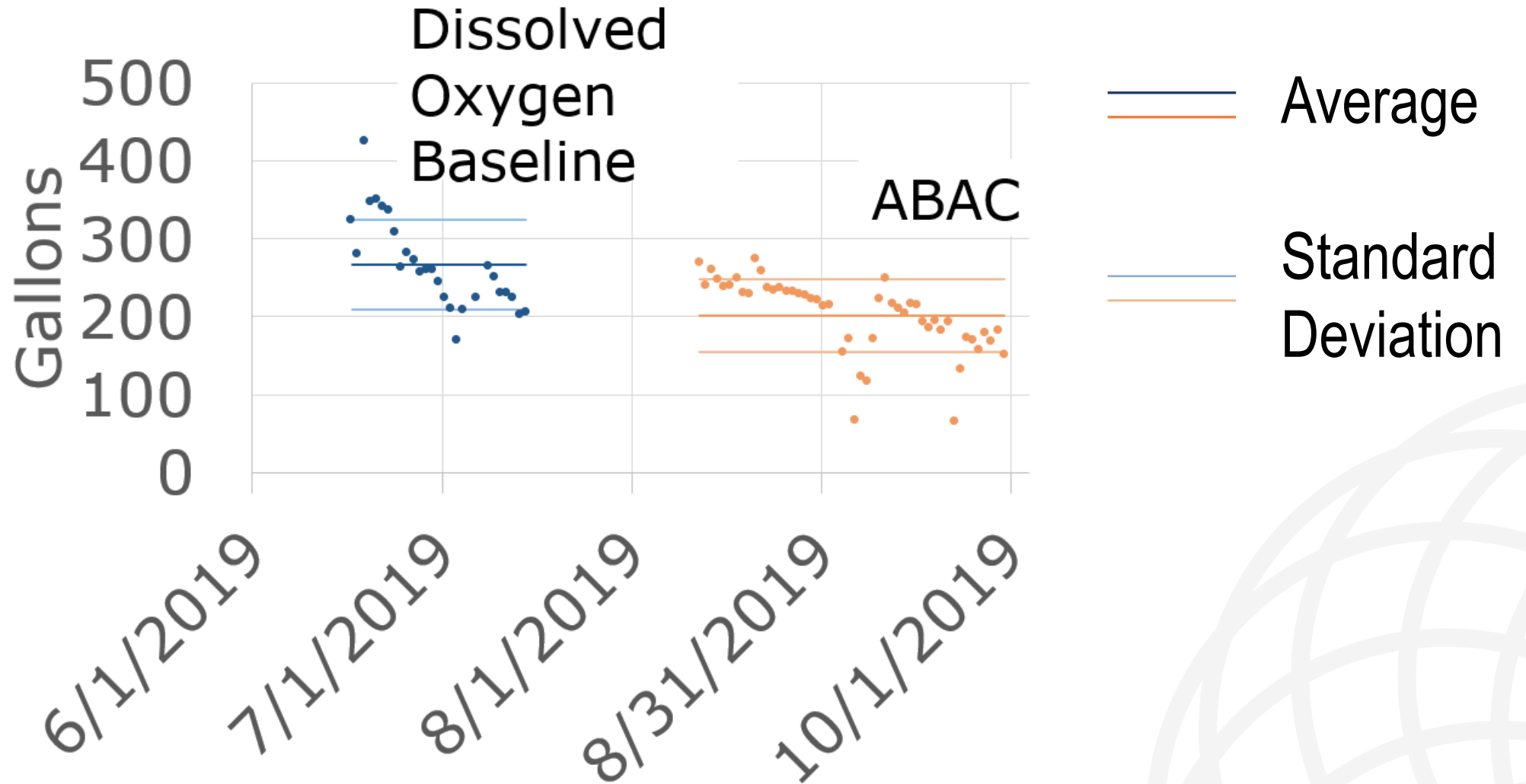


Average Diurnal Blower Energy Use





20% Alkalinity Chemical Savings





Westfield ABAC Pilot Test Results



Favorable ROI:

- 7-Year simple payback
- 3-Year payback with grant



No Degradation in Performance





Keys for Successful Implementation

1. Project Champion
2. Understand the Technology
3. Collect Accurate Data
4. Build on Strong Foundation of Process Fundamentals
5. Define Value





Acknowledgements

City of Westfield

- Jeff Gamelli, Deputy Superintendent (co-author)
- Ken Gagnon, Chief Operator (co-author)
- Dave Billips, DPW Director

Woodard & Curran

- Julia Beni (co-author)
- Scott Medeiros, P.E.
- Miles Walker, P.E.

Hach Company

- Meghan Powers





Thank You!!



Susan Guswa, P.E.

sguswa@woodardcurran.com

(413) 522-0324

