Add Photo

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WEA2017

Filters or Settling?

Cost Savings by Addressing the Cause – Not the Problem (and Other Benefits)

Hazen

Delaware County, Ohio

- Ohio Facts
  - Fastest Growing County
  - Healthiest County
  - Wealthiest County (>$92,000 MHI)
  - AAA bond rating (1st in OH since 1990s)
- Delaware County Facts
  - Highly Educated (>60% Bachelors Degree)
  - 2nd Happiest County in U.S.
  - Fastest growing county in Ohio

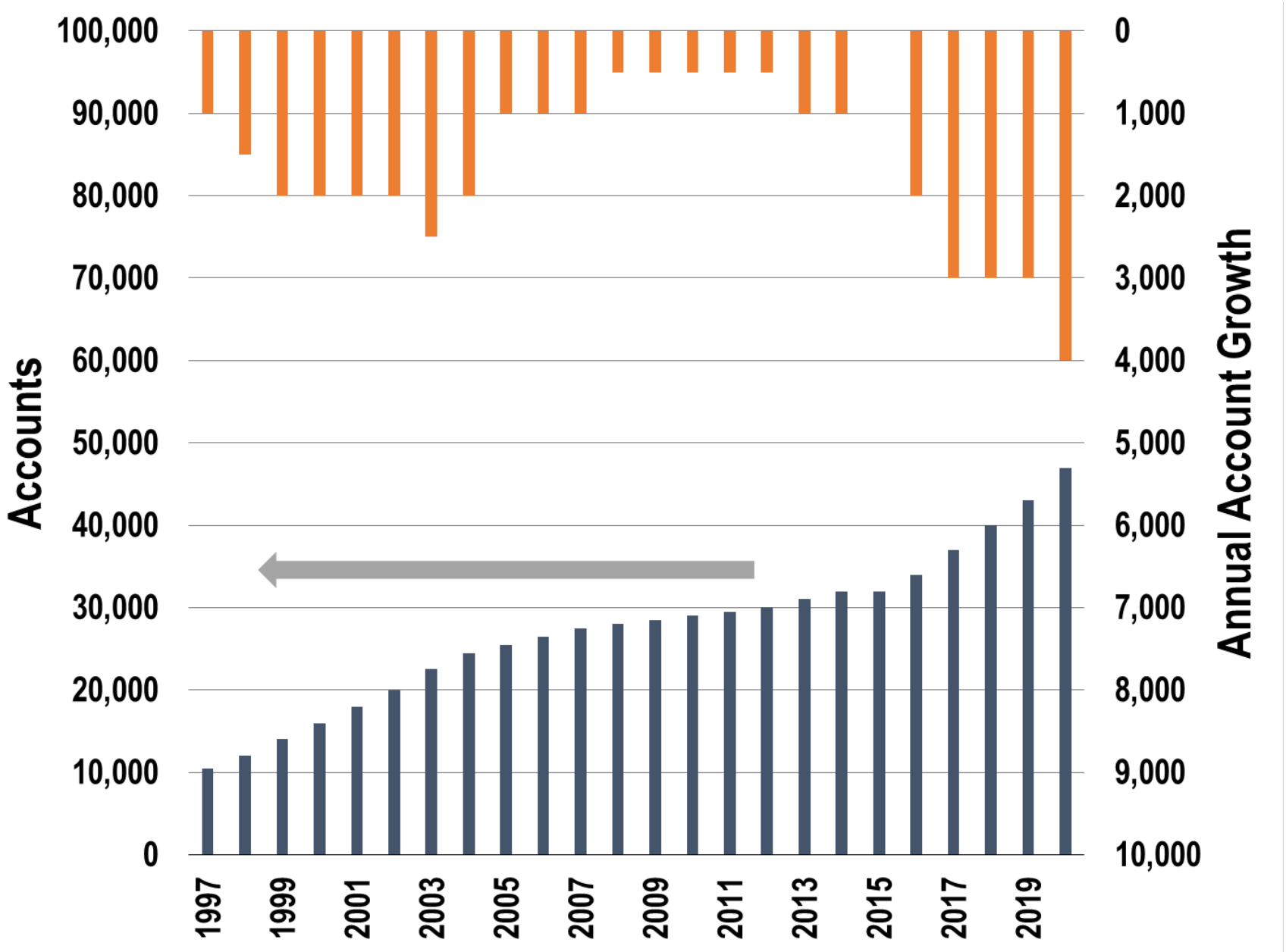
DELAWARE COUNTY 1808

Delaware County Regional Sewer District

- DCRSD
  - $22 million annual budget
  - 80 employees
  - ~33,000 customers
  - $32 /month flat fee
- Annual totals
  - 5 billion gallons treated
  - 12,000 WT biosolids generated
  - 0 overflows

Fastest growing sewer district in Ohio….

Development growth based system



Significant Account Growth due to Development

DCRSD Treatment and Collection System

- Major water reclamation facilities
  - Alum Creek
  - Olentangy Environmental Control Center
  - Lower Scioto
- Three beneficial reuse facilities
- Three small package facilities
- Collection system
  - 500 miles
  - 24 pump stations
  - 10,000 manholes

DCRSD

Alum Creek Reservoir

Olentangy River

Hoover Reservoir

O’Shaughnessy Reservoir

Treated effluent discharged to **four** watersheds:

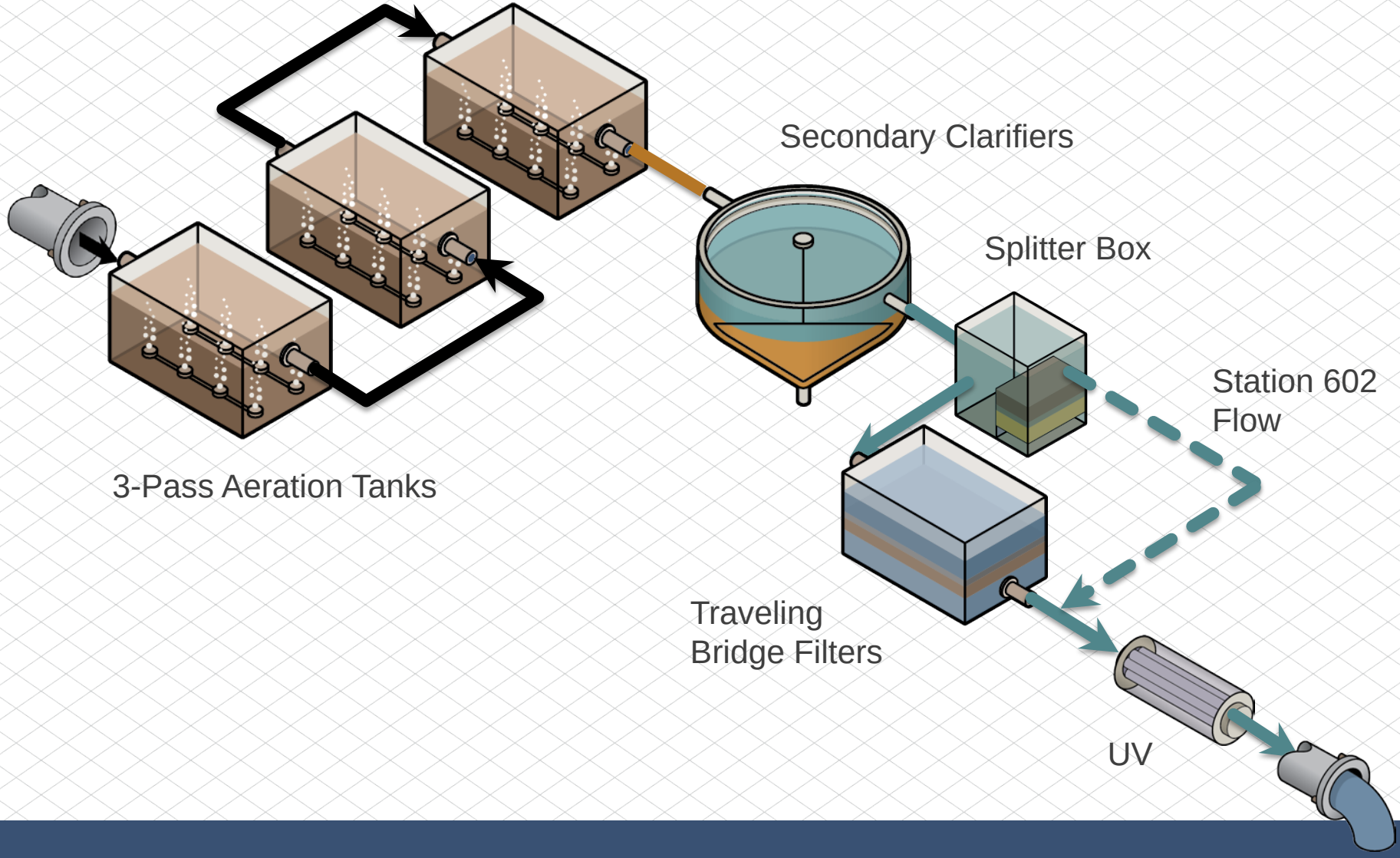
- Drinking water supply
- Scenic rivers
- Recreational water bodies

Alum Creek Water Reclamation Facility

- 10 mgd (largest facility)
- Liquid treatment
  - Screening
  - 3-pass aeration tanks
  - Final clarifiers
  - Traveling bridge filters
  - UV disinfection
- Solids treatment
  - Aerobic digestion
  - Belt filter press

Alum Creek WRF

Process Configuration



ACWRF DRAFT Permit (4PK00003*ED)

March 1, 2015 – January 31, 2019

Part I, B. - BYPASS MONITORING LIMITATIONS AND MONITORING REQUIREMENTS

1. Bypass Monitoring. During the period beginning on the effective date of this permit and lasting until the expiration date, the permittee shall monitor the treatment plant's bypass when discharging, at Station Number 4PK00003602, and report to the Ohio EPA in accordance with the following table. See Part II, OTHER REQUIREMENTS, for location of sampling.

Table - Bypass Monitoring - 602 - Final

6. Discharge through this station is prohibited. The Director may take enforcement action for violations of this prohibition unless the three conditions specified at 40 CFR 122.41(m) and in Part III, Item 11.C.1 of this permit are met.

Part I, C - Schedule of Compliance

1. Bypass Elimination

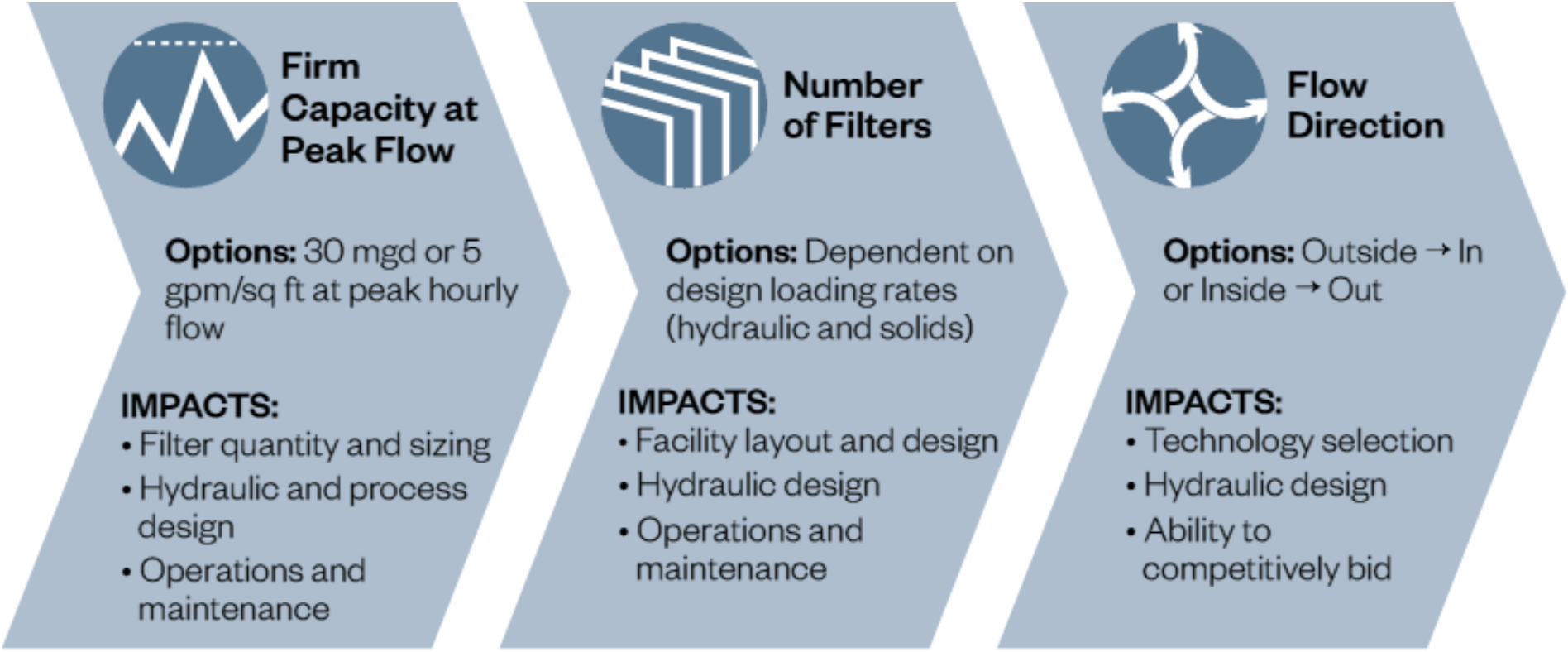
The Alum Creek WRF includes a bypass which re-routes a portion of wastewater flow at influent flow rates below the average plant design flow rate of 10 MGD. Bypassed flow does not receive the following treatment: tertiary filters. Treatment plant bypasses are not authorized by this permit, including Part I.C., Schedule of Compliance.

ACWRF Tertiary Filters

- 8 filter cells
  - Shallow dual media
  - Traveling bridge backwash
- Permit
  - Monthly: 12 mg/l
  - Weekly: 18 mg/l
- Performance
  - Average: < 5 mg/l
  - 99th Percent < 8 mg/l

Significant annual O&M costs to maintain operation

“Synthetic Media” Filter Considerations



“Synthetic Media” Filter Technology

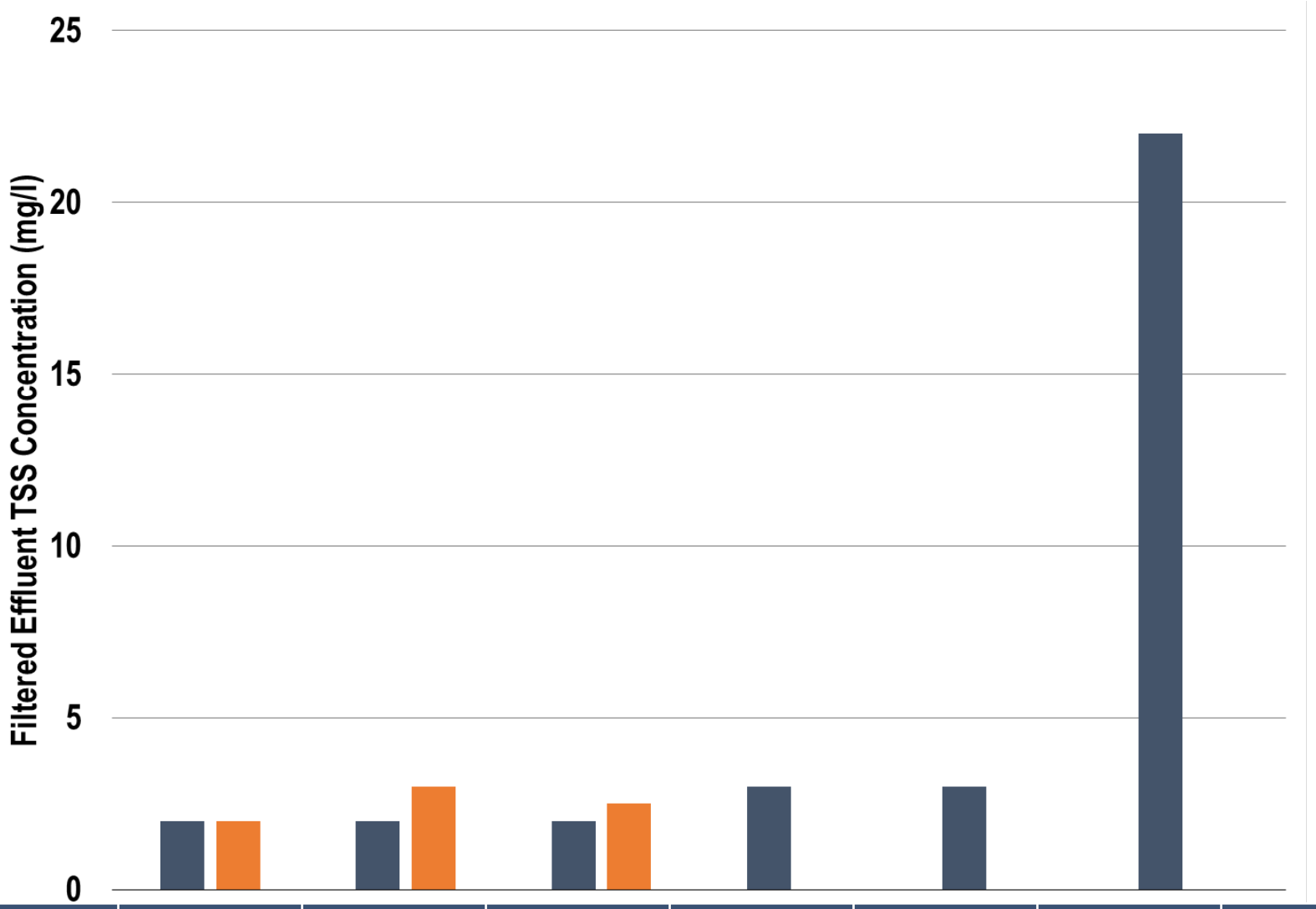
- Flow direction
- Design loading rates (no. of filters)
- 10-State Standards
- Competition

Recommended pilot testing of two manufacturers

Pilot Study Objectives

- Establish design criteria
- Test “peak” solids loading rates (SLR)
- Target TSS < 5 mg/l

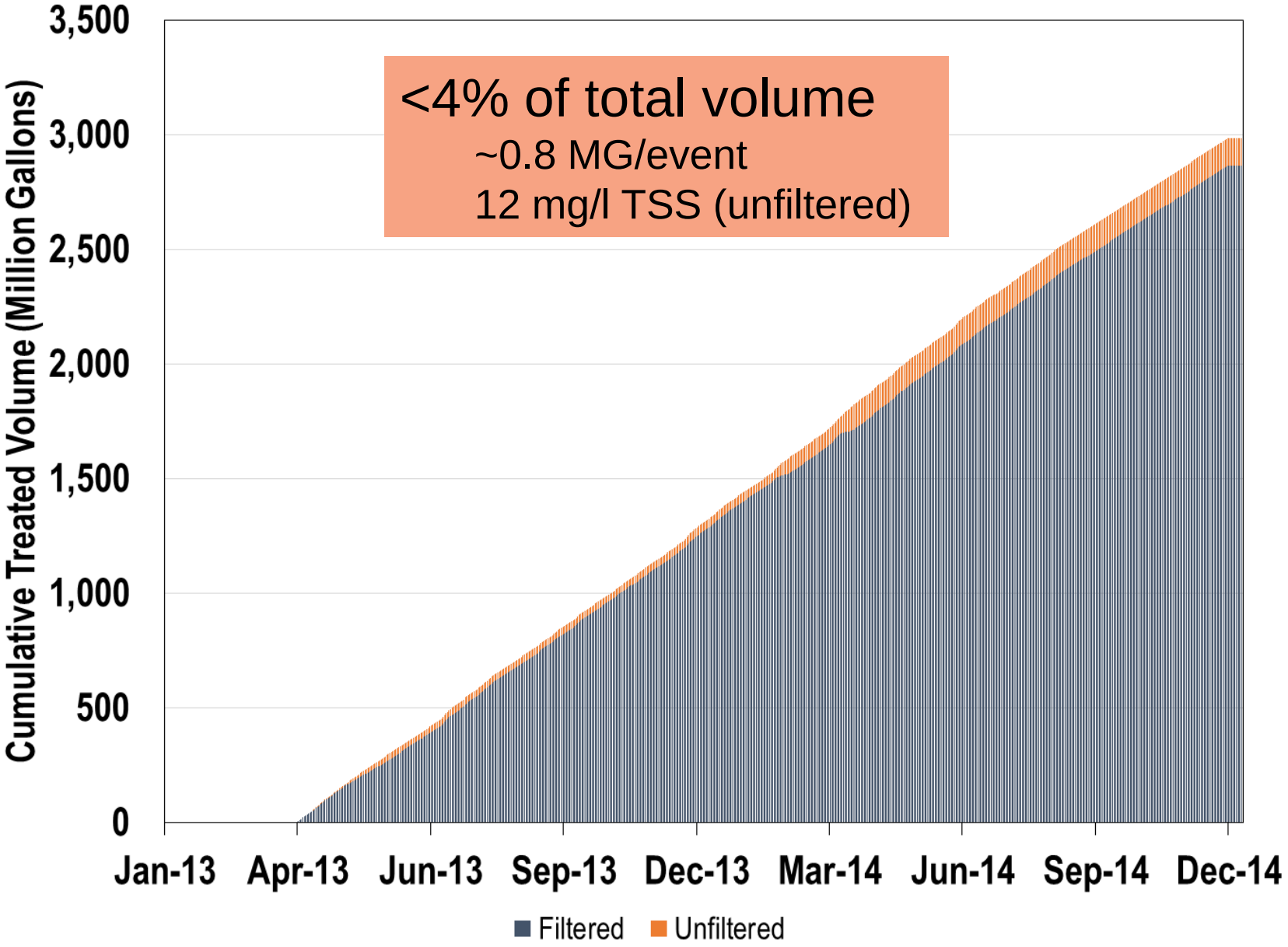
Condition	HLR (gpm / sq ft)	TSS Conc. (mg/l)	SLR (lb / day – sq ft)
Avg Annual	2	6	0.1
Intermediate	6	10	0.7
Peak Hour	6	20	1.4
Upset #1	6.5	30	2.3
Upset #2	6.5	75	5.9
Upset #3	6.5	100	7.8



Test	1	2	3	4	5	6	Units
HLR	2.0	6.0	6.2	6.5	6.5	6.5	gpm/SF
SLR	0.4	0.7	1.6	2.3	5.9	7.8	ppd/SF
TSS	6	10	20	30	75	100	mg/l

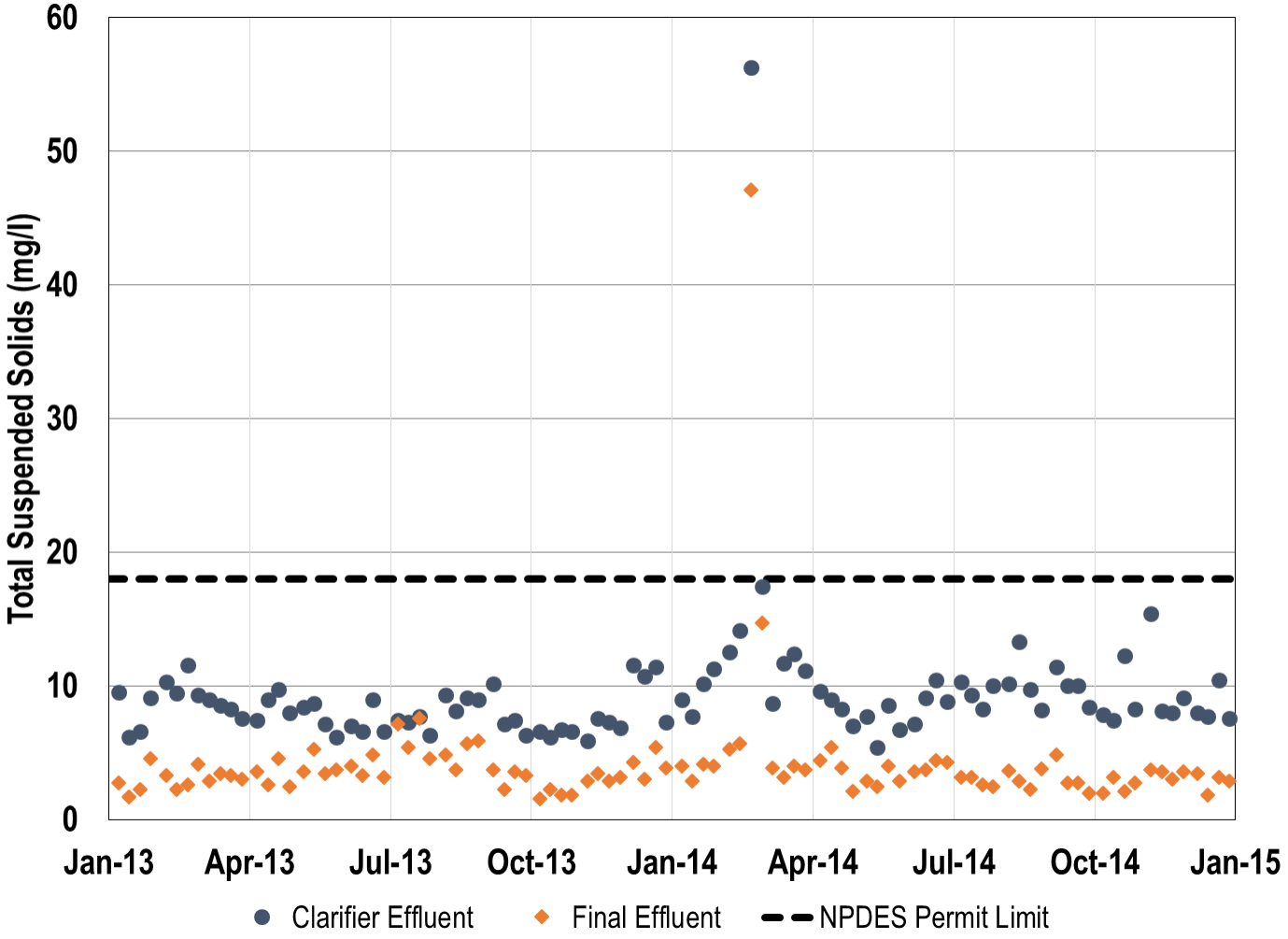
Compliance Schedule Options

Status Quo	Permitted Capacity Alternative	Peak Flow Capacity Alternative
0 filters retrofitted	2 or 3 filters retrofitted	3 or 4 filters retrofitted
Existing	11.5 mgd firm capacity	23.0 mgd firm capacity
Existing	23.0 mgd installed	34.5 mgd installed
High O&M costs	$3 – 5 million capital	$5 – 7 million capital



Historical Station 602 Operation

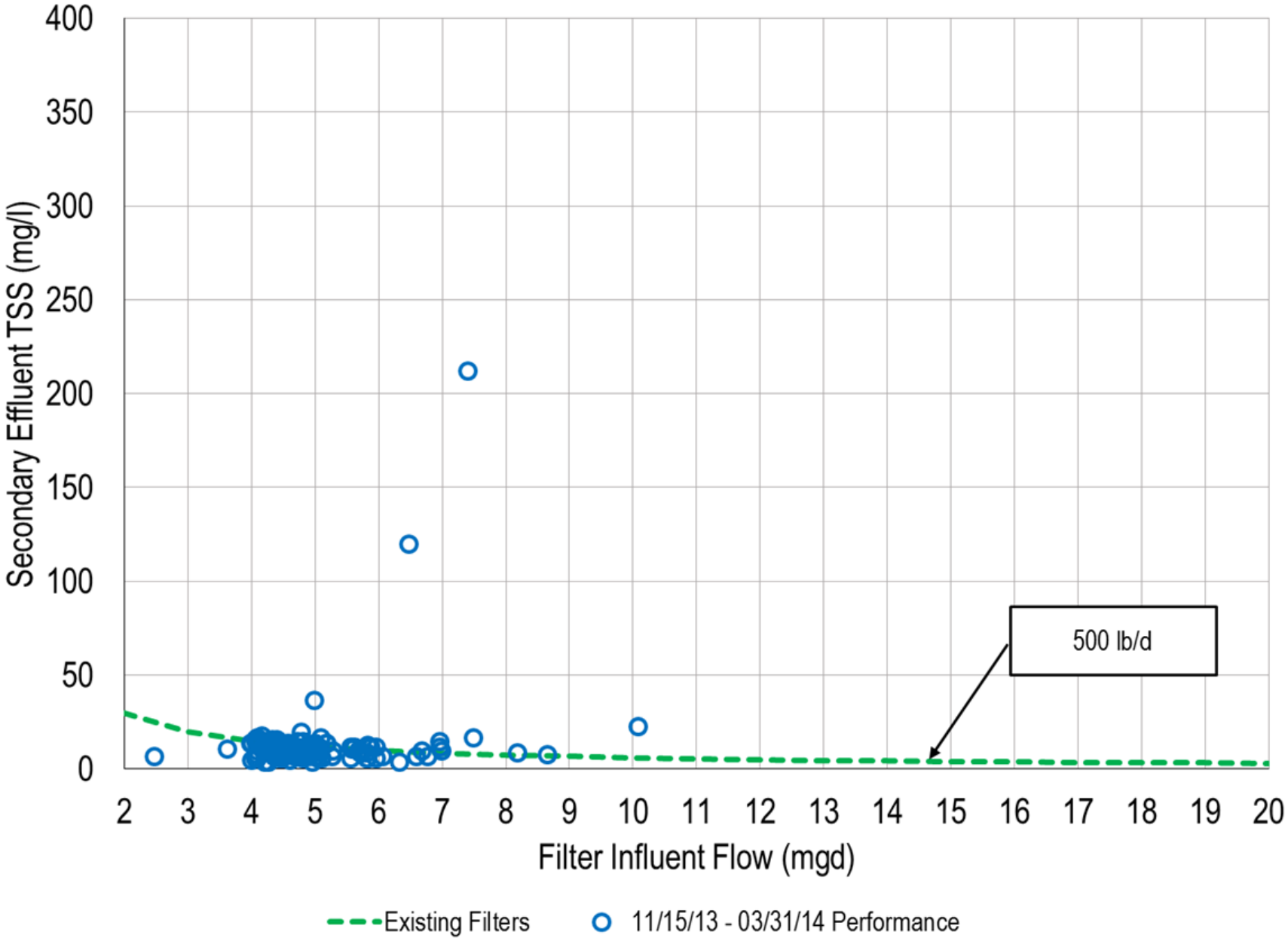
TSS Weekly Analysis



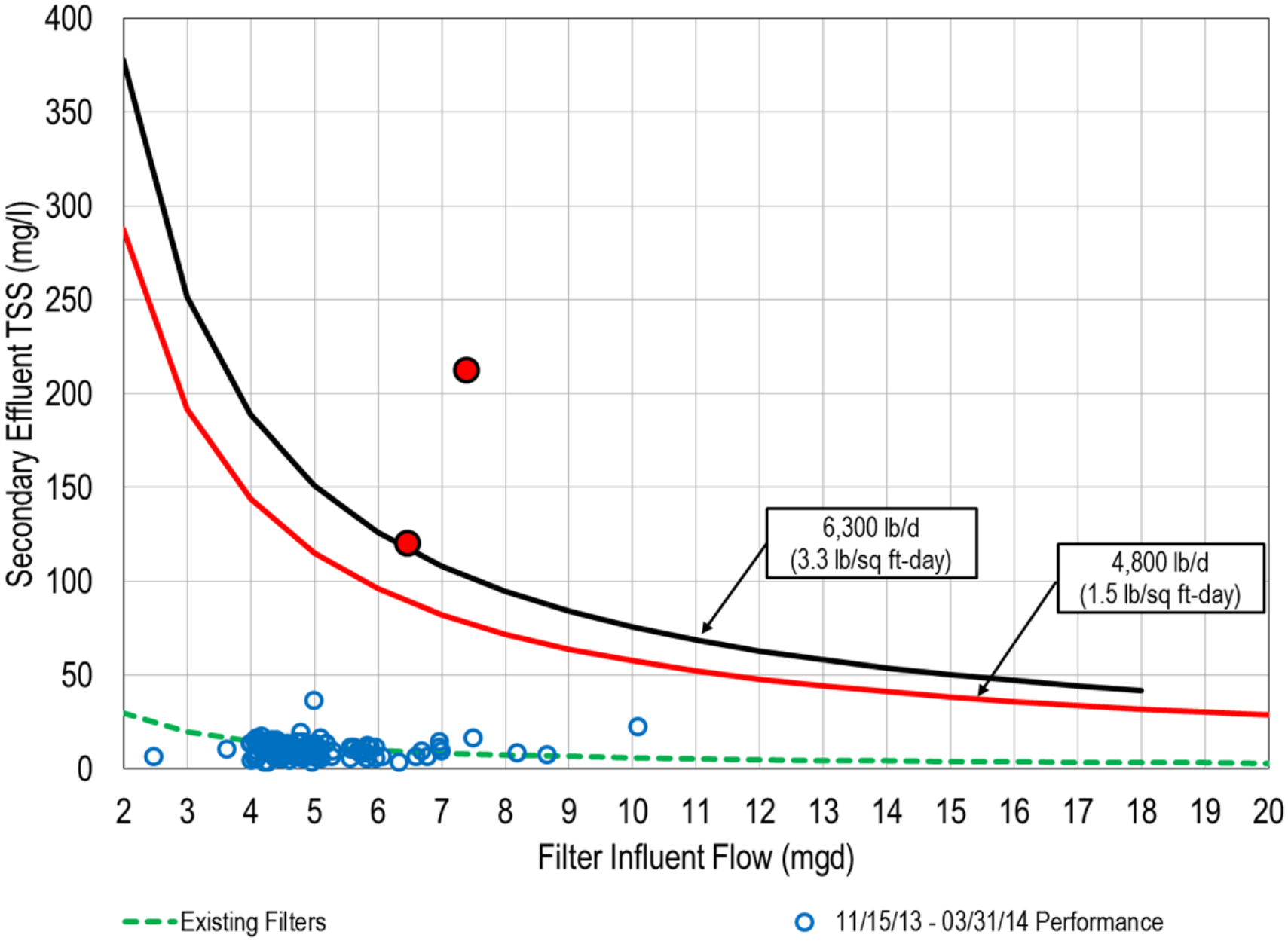
Two days of secondary clarifier TSS excursion initiated a compliance schedule to upgrade the existing filters.

Feb 19th and 20th

Effluent flow averaged 6.8 mgd with 165 mg/l TSS

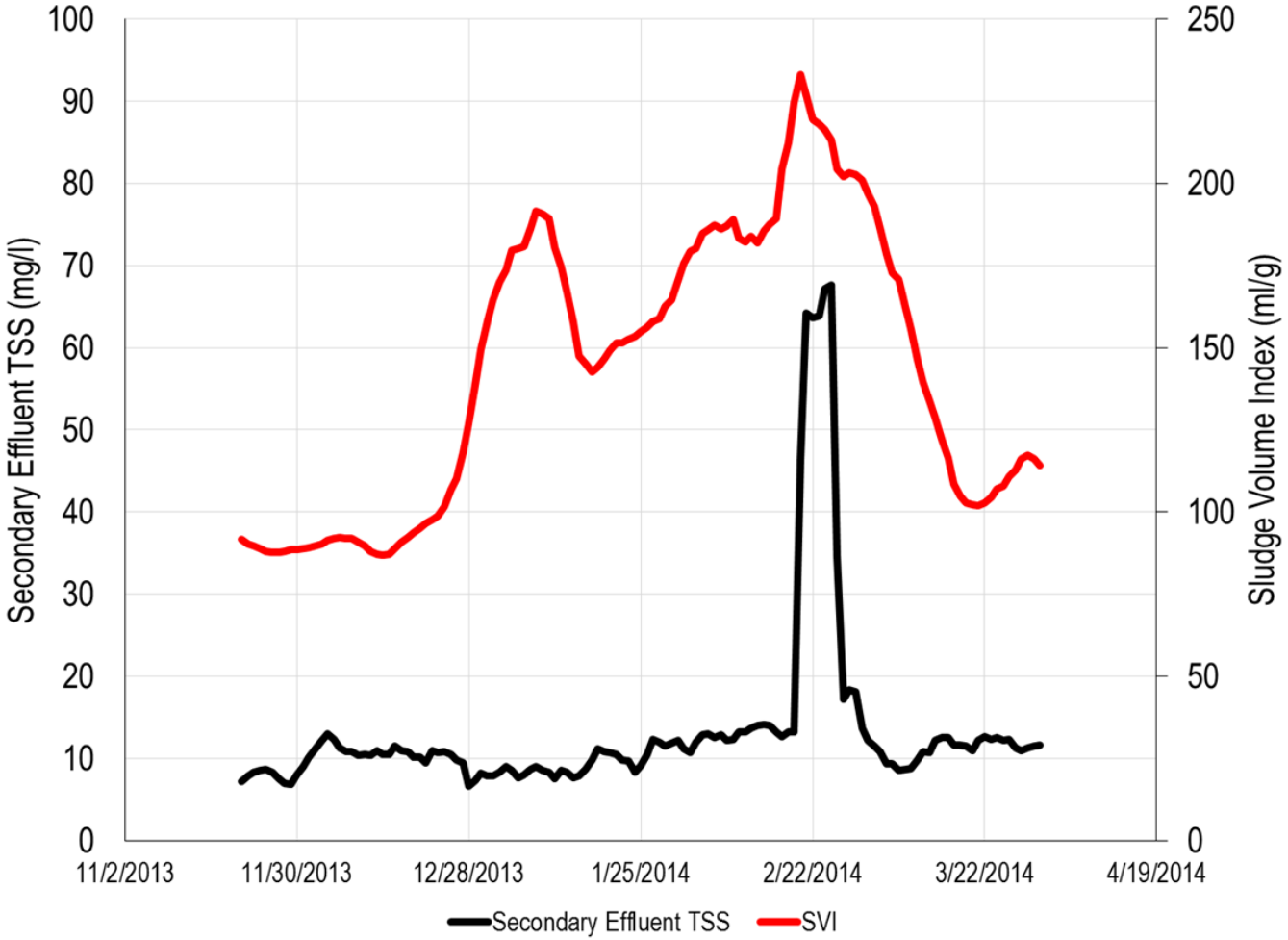


Secondary Clarifier Effluent Load to Existing Filters



Secondary Clarifier Excursion Exceeds Retrofitted Filter SLR Capacity

ACWRF Secondary Clarifier Performance



Deterioration in SVI started in December.

Stopped dewatering for two week period over holidays.

Started filling aerobic digesters for storage.

RAS/MLSS solids ratio <2 (i.e. thin, fluffy RAS)

Overload aeration capacity in aerobic digesters

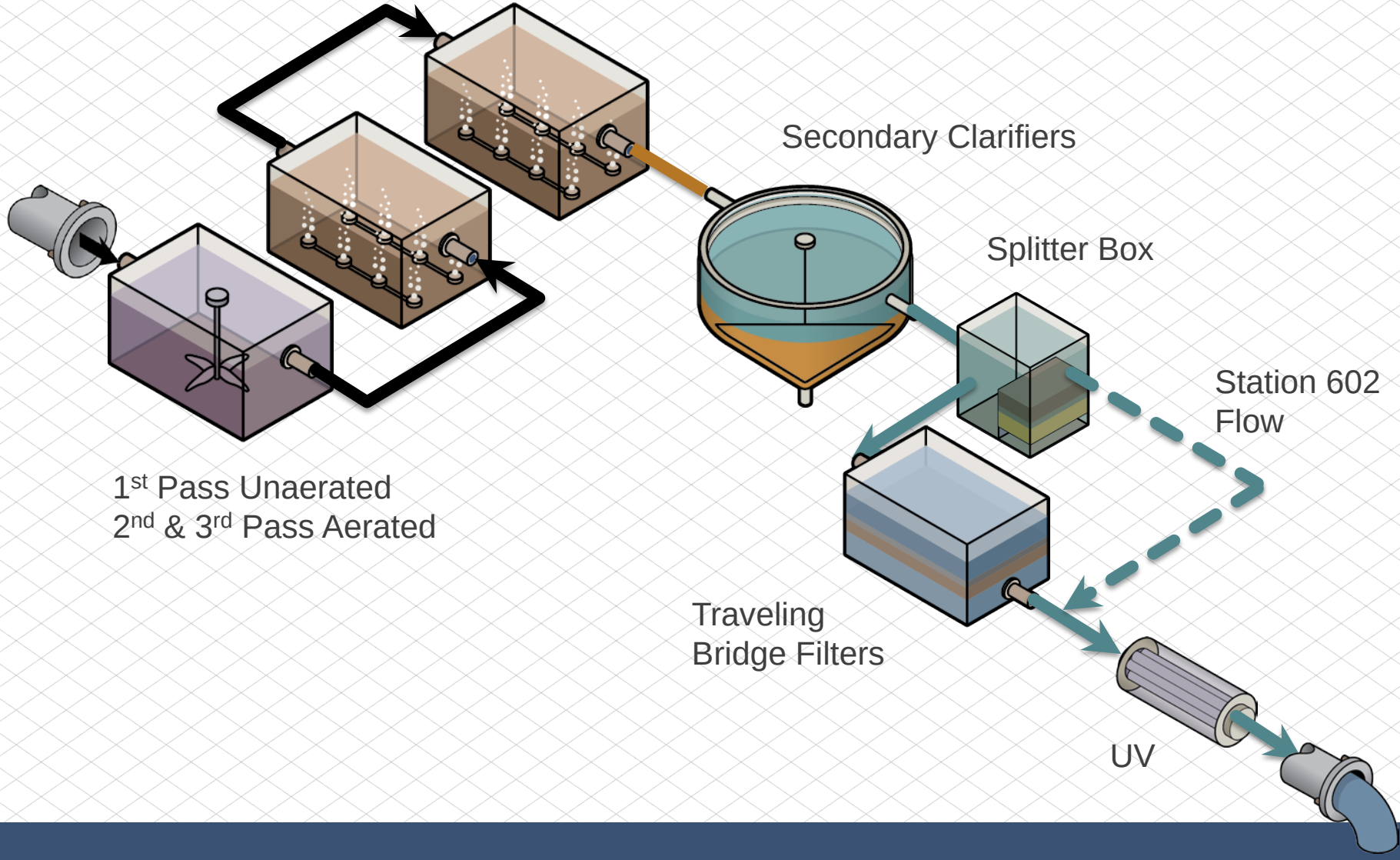
ACWRF Operational Recommendations

Maintain SVI

• 1st pass unaerated	Minimize low DO conditions
• Reduce air to 3rd pass	Reduce floc shearing
• Aerobic digestion	Maintain DO > 1 mg/l
• Diligent during cold temperatures	“Filament incubator” in digesters

Alum Creek WRF

Process Configuration



OEPA NPDES Permit Negotiations

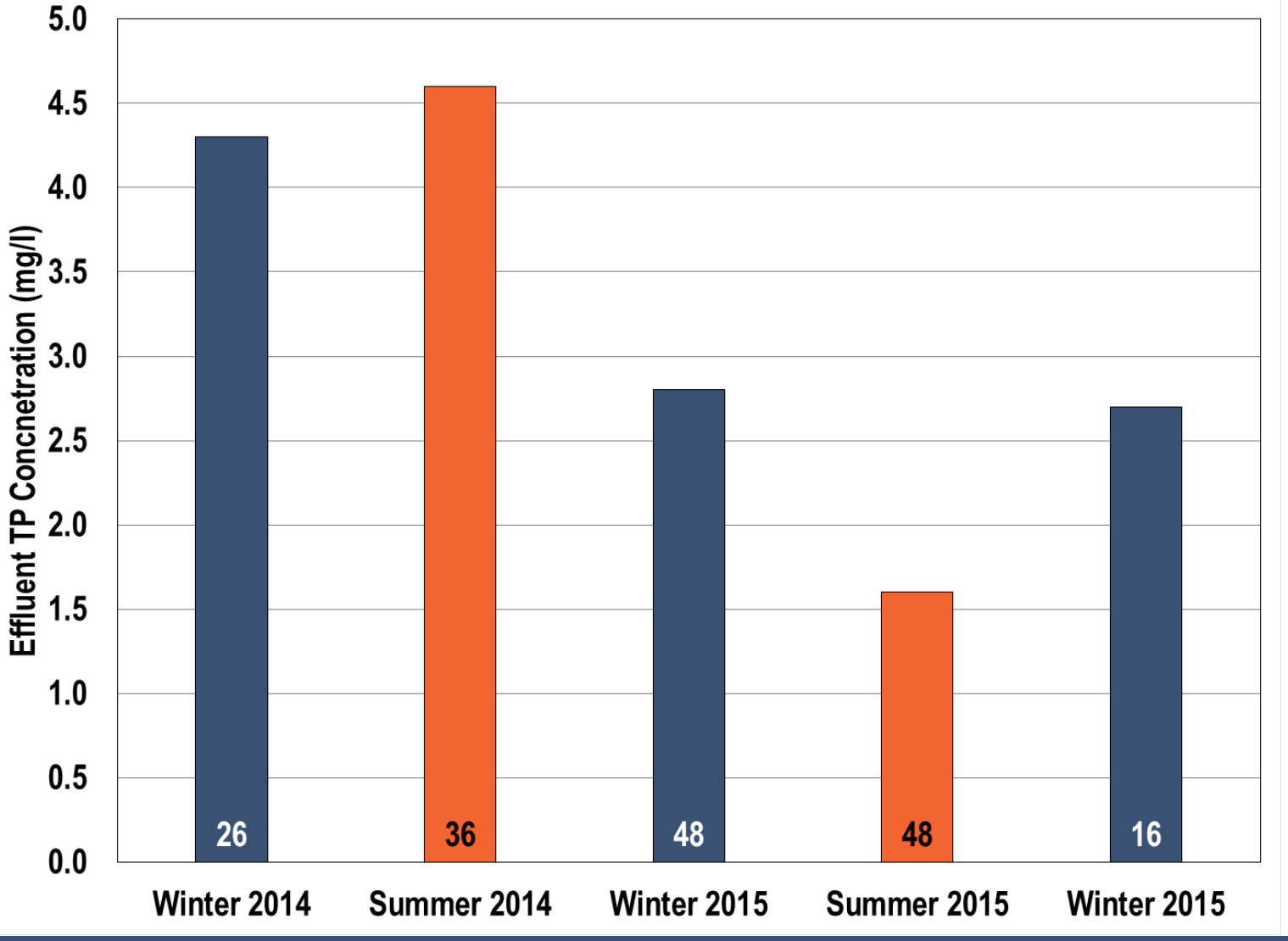
- Multiple meetings on compliance schedule
- Resolution
  - Implement process improvements
  - Remove compliance schedule for filter upgrades
  - Monitor station 602 and submit SCE characteristics
  - One year duration

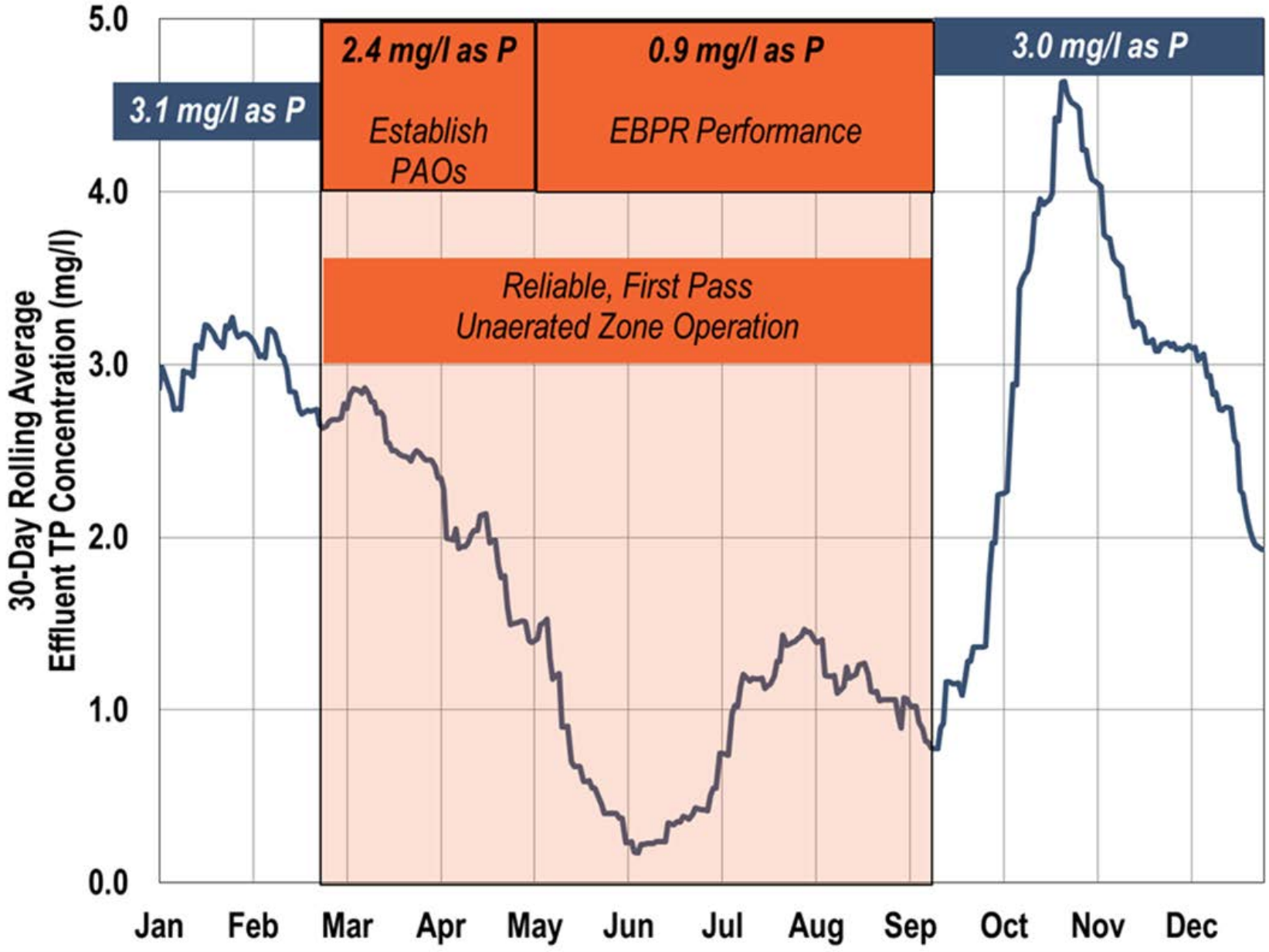
Compliance schedule potentially required *$7.0M+ investment…*

Proposed process upgrades under ***$2.5M investment…***

There is another benefit…

ACWRF TP Removal Evaluation





Detailed analysis of TP Removal Performance

ACWRF Process Improvement Upgrades

Maintain integrity of unaerated zone	→	Replace existing submersible mixers
Minimize floc shearing in 3rd pass	→	Improve air distribution to individual passes
Reduce electrical usage associated with aeration controls	→	Inlet throttling and automatic DO control

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