Analysis of Chemical Dosage & Backwash Addition at Hyalite/Sourdough Water Treatment Plant

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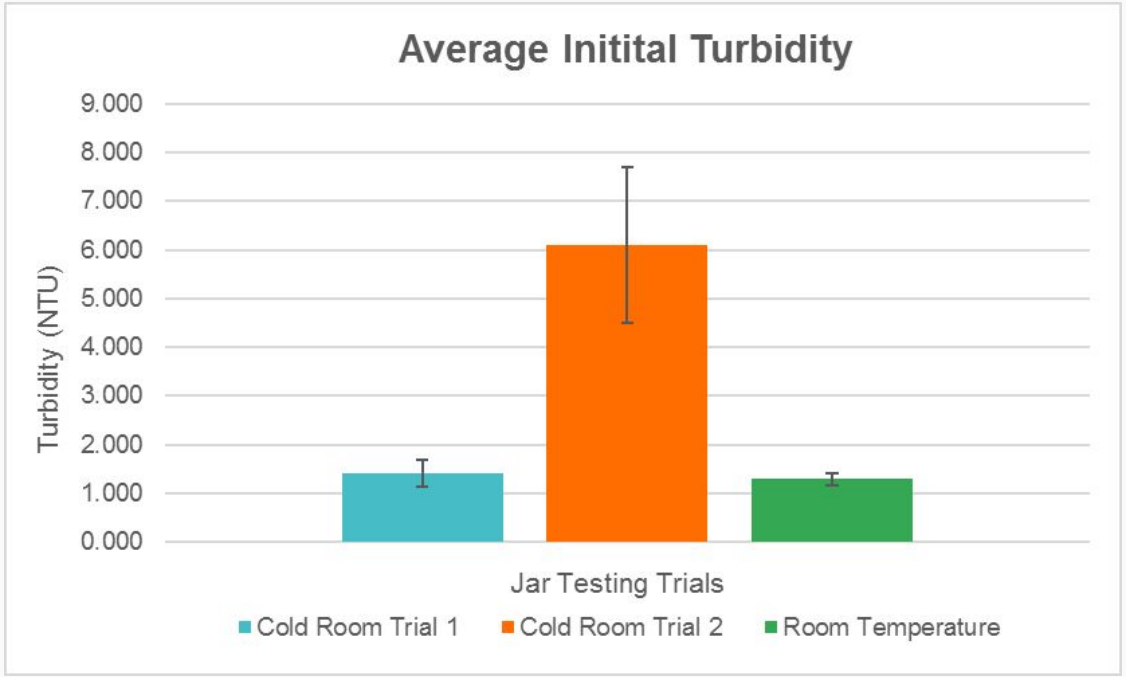
Purpose

- Analyze influence of backwash & ACH dose on turbidity
- Determine optimal polymer dose for sludge settling.

https://www.montana.edu/marketing/about-msu/bozeman/

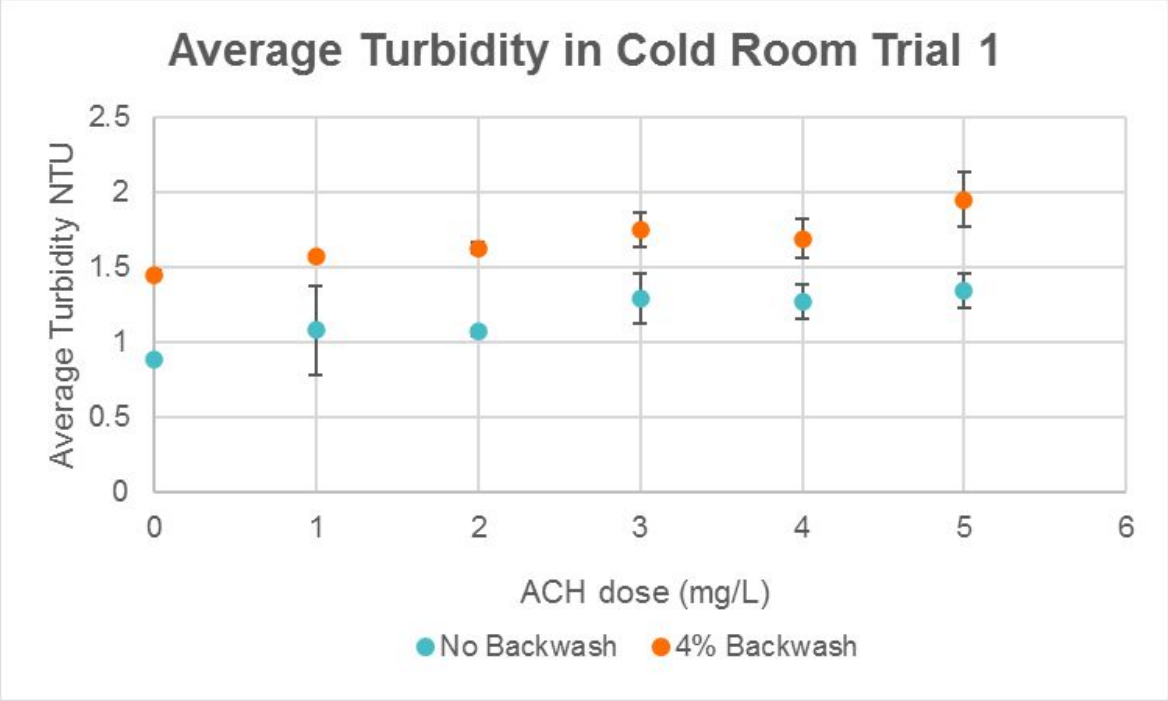
MSU Jar Testing

- Variation in initial turbidites
- Variation in sampling methods



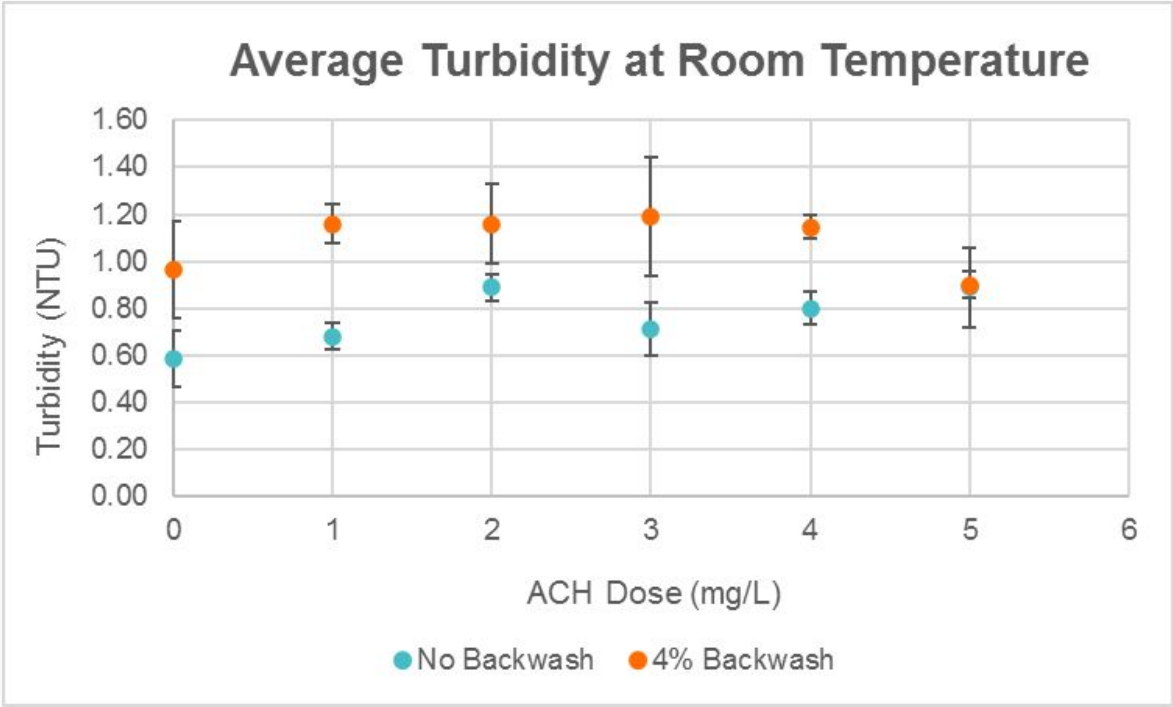
Cold Room Jar Testing- Trial 1

- Average Initial Turbidity 1.41 NTU
- *No Backwash* turbidity consistently lower than *4% Backwash* turbidity
- Samples taken from Sample Valve



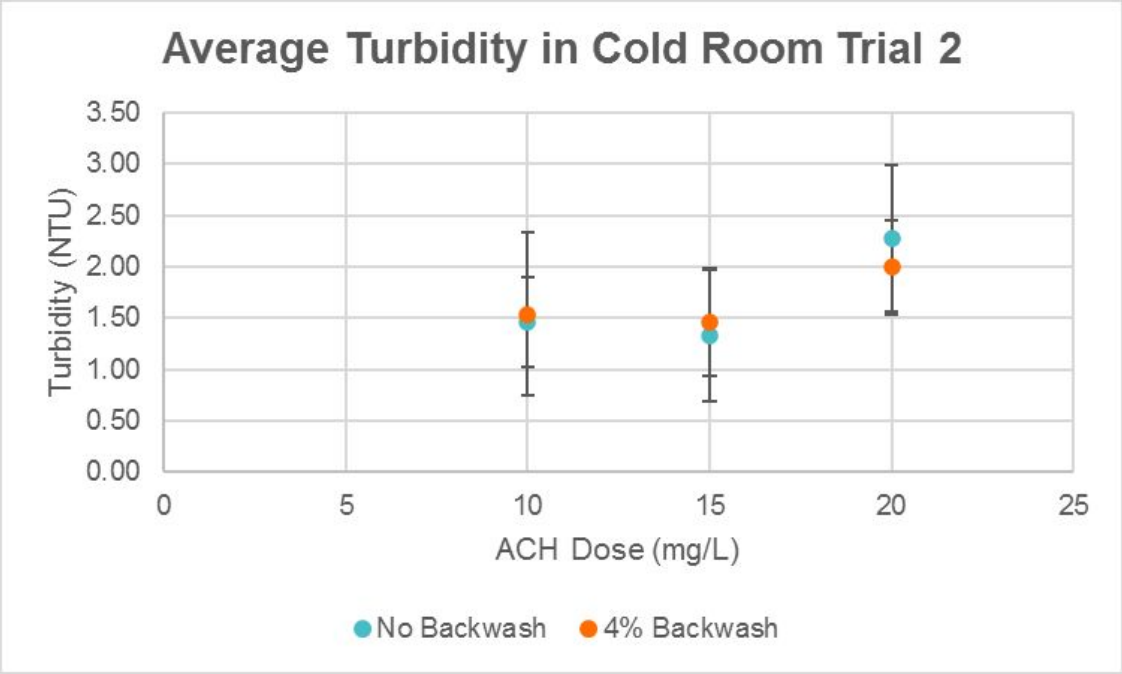
Room Temperature Jar Testing

- Average Initial Turbidity 1.29 NTU
- *No Backwash* turbidity lower than *4% Backwash* turbidity until 5 mg/L ACH
- Samples drawn off surface of jar



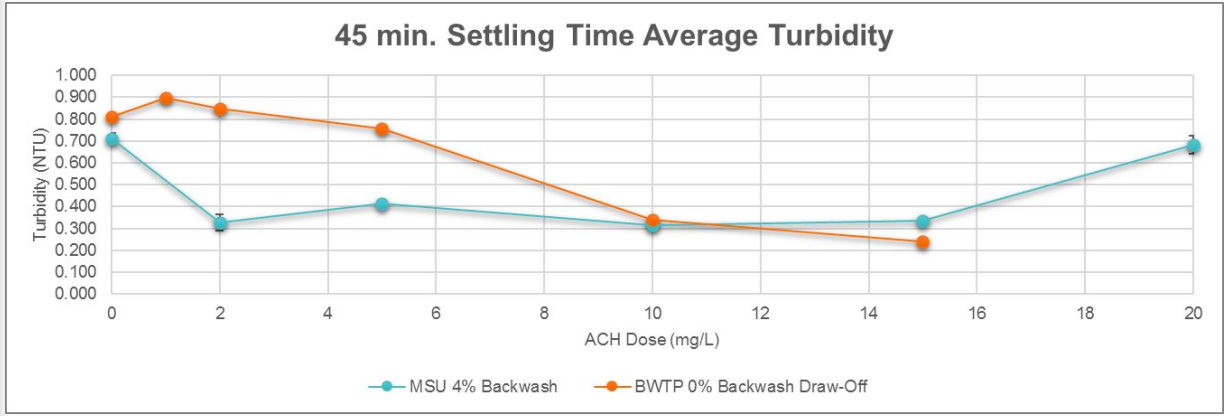
Cold Room Jar Testing- Trial 2

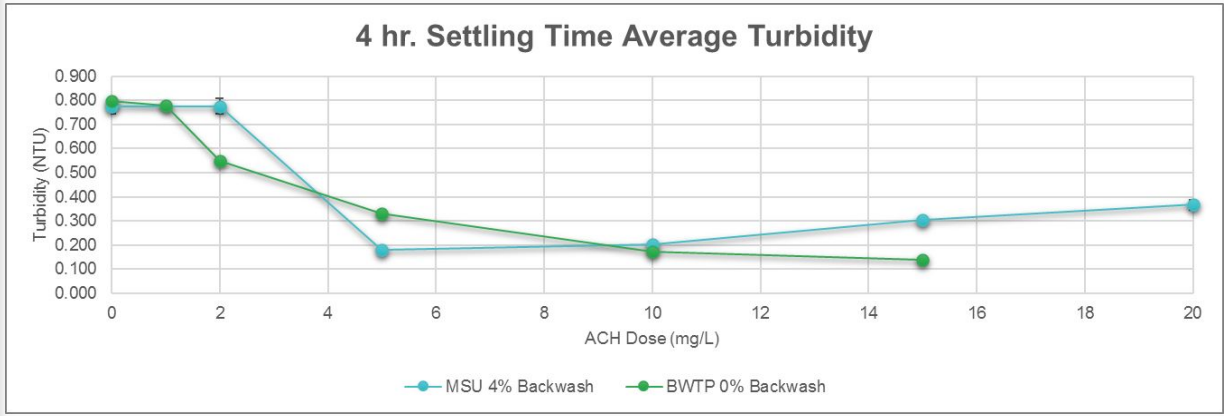
- Average Initial Turbidity 6.09 NTU
- *No Backwash* turbidity and *4% Backwash* turbidity readings close, though increased SD in data
- Greater addition of ACH



MSU & WTP Additional Testing

- Consistent average turbidity readings
- 4% Backwash displays lower turbidity at some ACH doses
- *Draw-Off* turbidity lower than *Sample Valve* turbidity
- Lower turbidity after 4 hr. settling





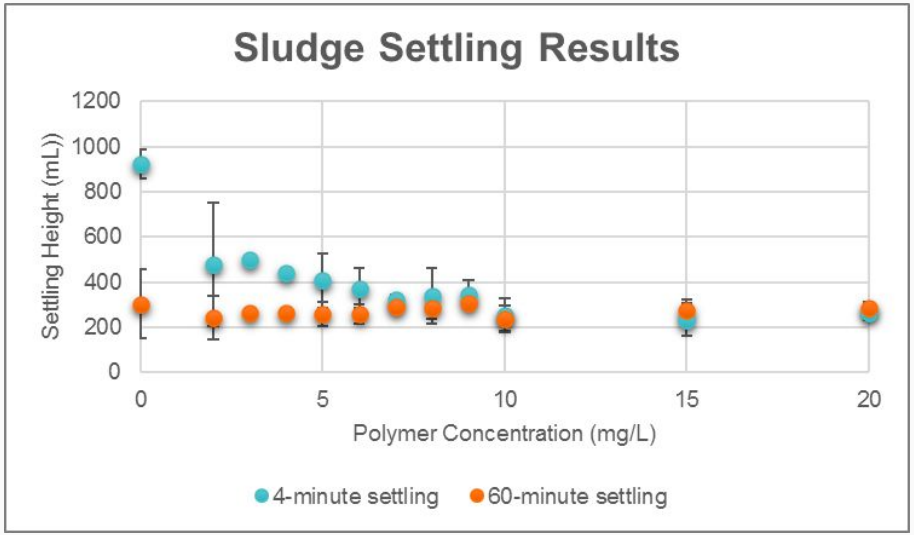
ACH Dose Recommendations

- Can’t make optimal ACH dose due to the variability in data
- More consistent initial turbidity
- Longer settling time
- More consistent sampling

https://www.microdyn-nadir.com/wp-content/uploads/TSG-T-008-Troubleshooting-Jar-Testing-Procedure.pdf

Sludge Settling

Polymer Concentration (mg/L)	% Pass	Pass/Fail
0	0	Fail
2	40	Fail
3	50	Fail
4	50	Fail
5	100	Pass
6	100	Pass
7	100	Pass
8	100	Pass
9	100	Pass
10	100	Pass
15	100	Pass
20	100	Pass

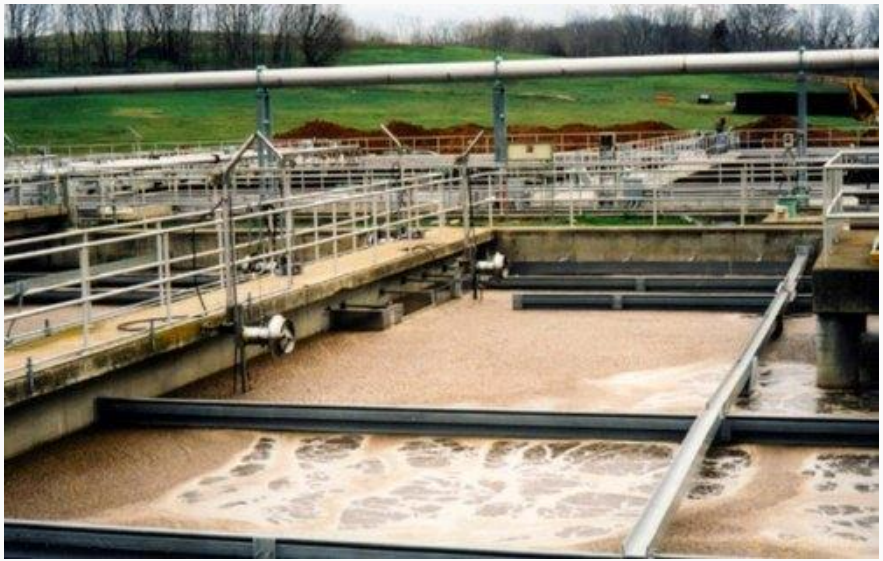


Polymer Dose Recommendation

- Optimal Dose (5 mg/L)
- Cost analysis
- $24.13/day, $8,807/yr

Recommendations for the Future

- Further testing
- Test various backwash additions



https://www.indiamart.com/proddetail/industrial-sewage-water-treatment-plant-20962759930.html

Environmental Impacts

- Would require higher doses of both ACH and polymer.
- Takes more resources to produce chemicals .
- Higher chemical concentration in sludge cakes.
- Less water would be sent to evaporation beds.

https://www.unilever.com/planet-and-society/safety-and-environment/reducing-our-environmental-impact/