

# Findings and Recommendations to the Bozeman Water Treatment Plant

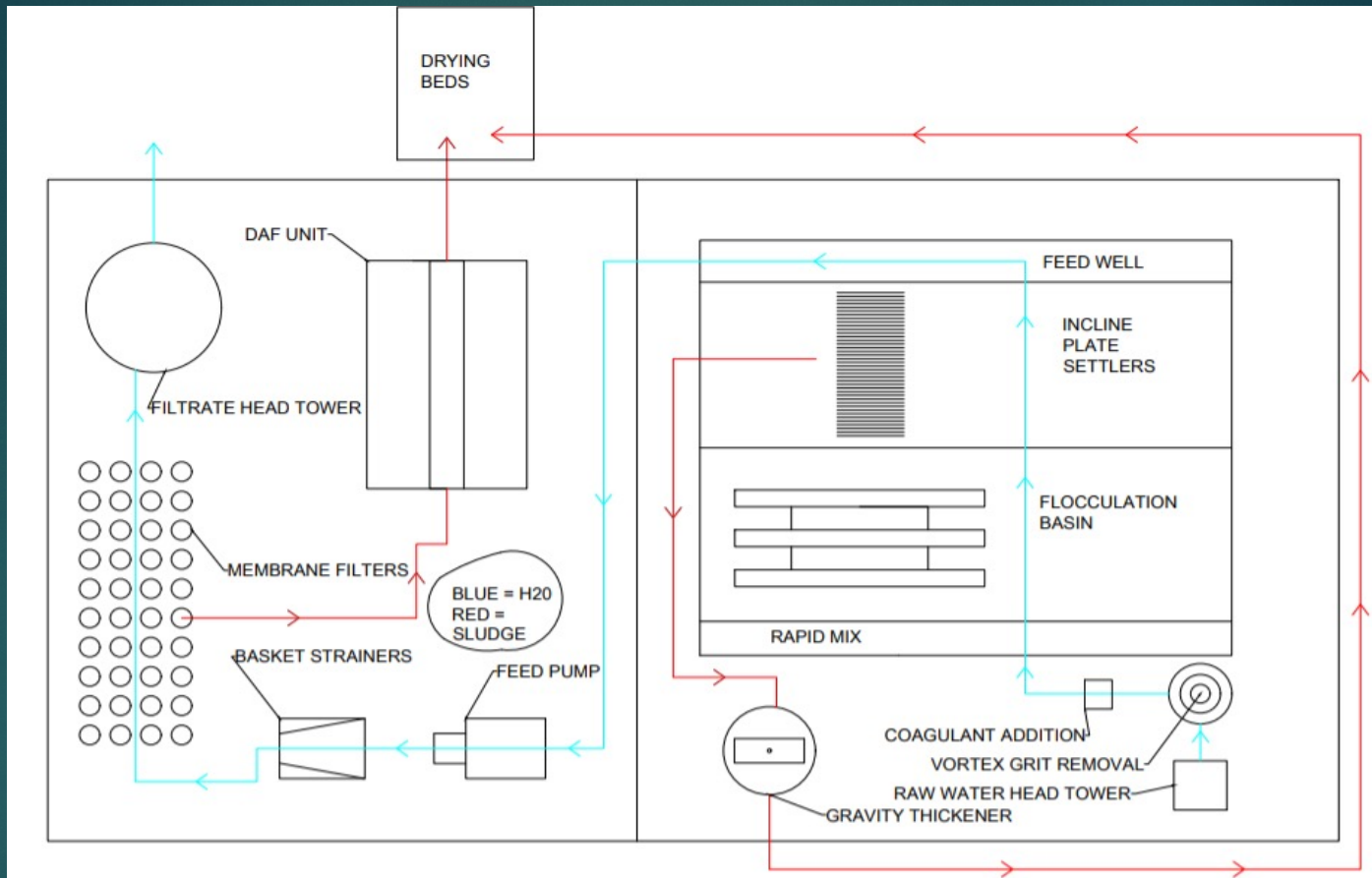
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EENV 341

# Introduction

- ▶ Based on the needs of the Bozeman WTP we will provide recommendations on:
  - ▶ Backwash recycling
  - ▶ Coagulant concentration dosage
  - ▶ Polymer concentration dosage
- ▶ These recommendations are based primarily on experimentation conducted in the environmental engineering lab over the course of this past semester.





Overall water treatment and sludge handling process at the Bozeman WTP.

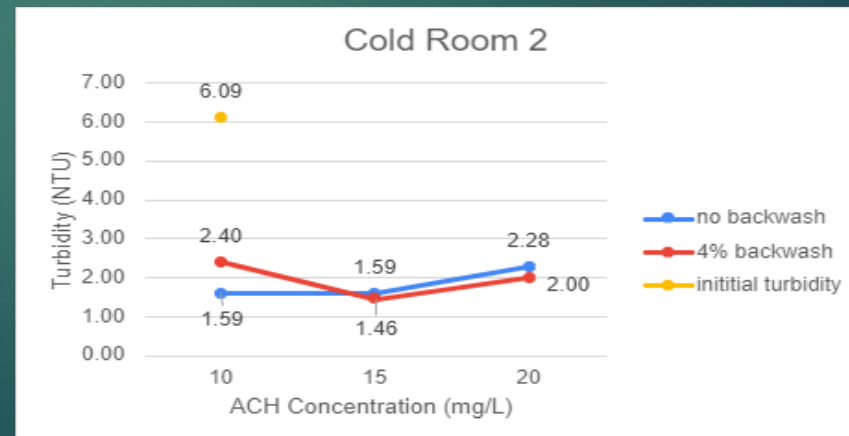
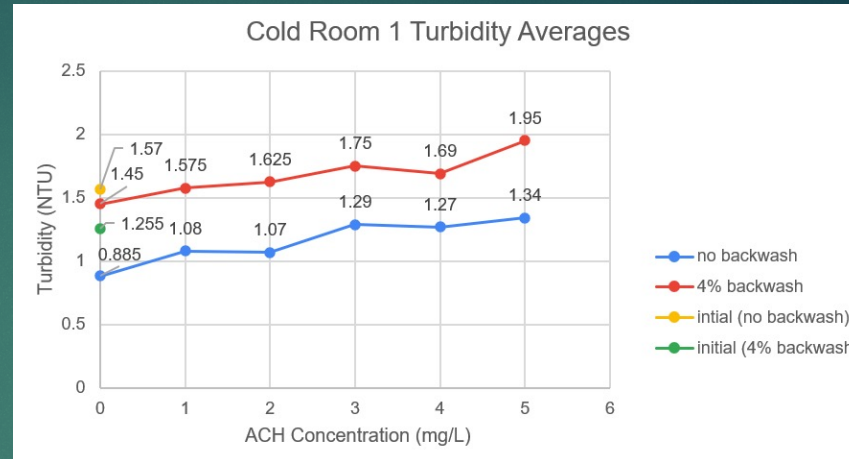
# Jar Testing Parameters

- ▶ The parameters under which the coagulant doses were evaluated:
  - ▶ Turbidity
  - ▶ ACH concentration
  - ▶ Temperature
  - ▶ No backwash and 4% backwash



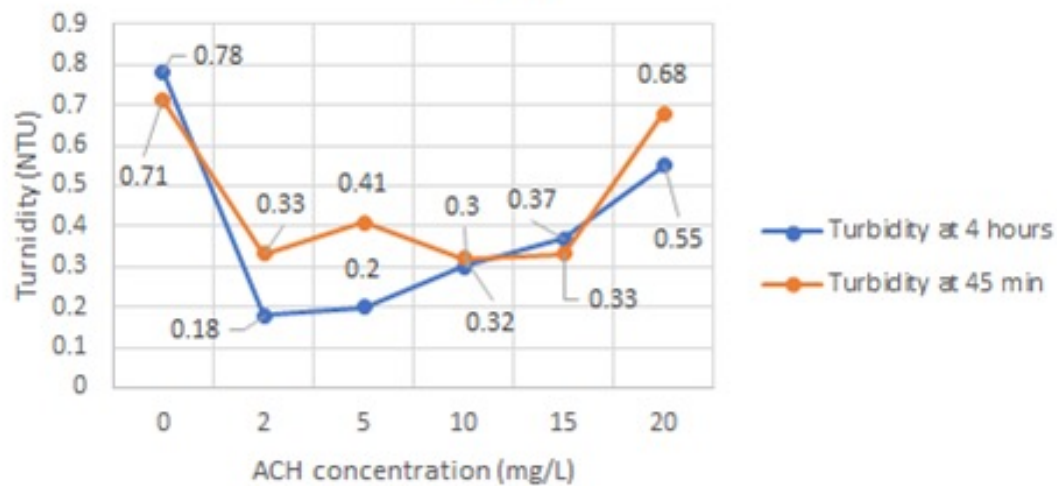
# Backwash Recommendations

- ▶ Temperature affects
- ▶ Increased Turbidity
- ▶ High Concentrations of ACH
- ▶ Recommend to not recycle backwash to headworks



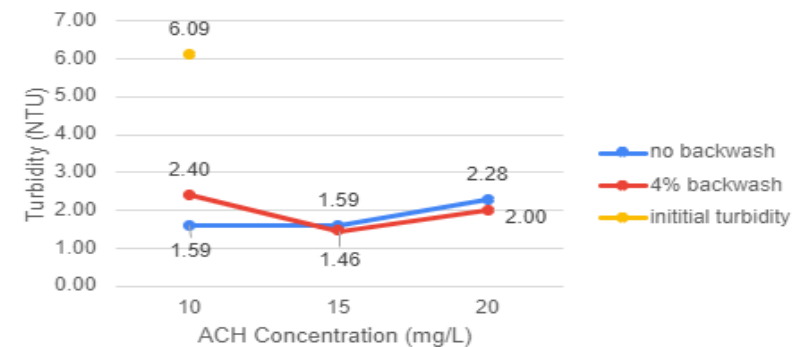
# Coagulant Recommendations

Room temperature Turbidity Averages (4 hour test)

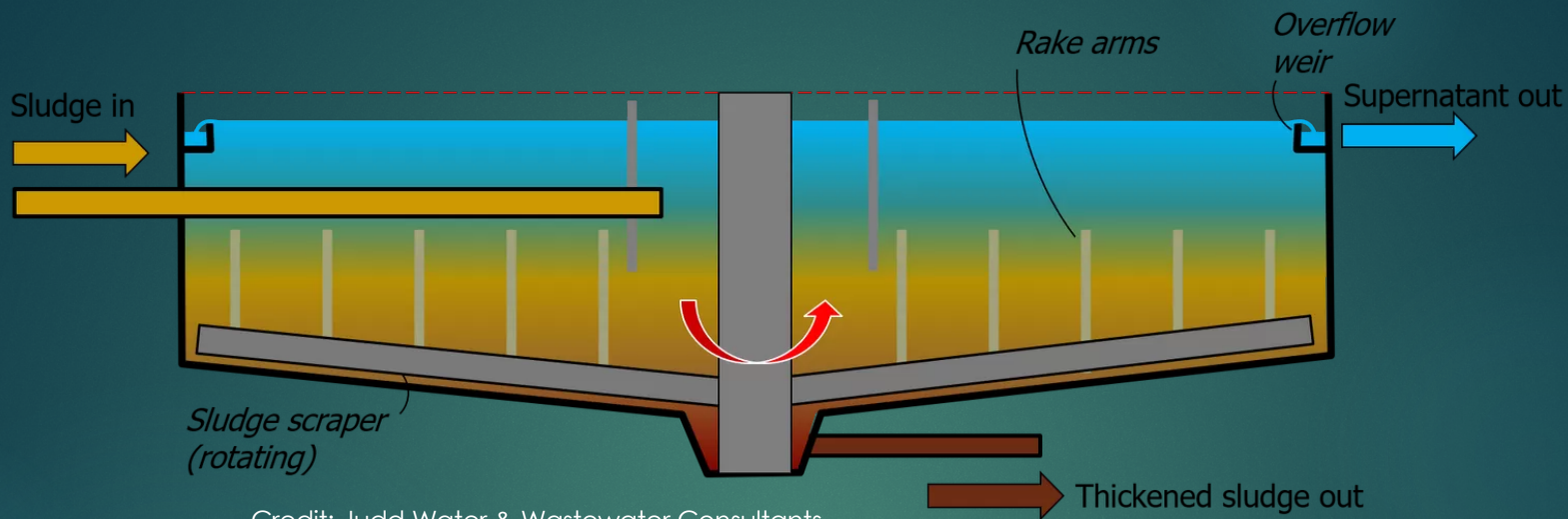


- 4-hour sedimentation period
- 2 mg/L ACH resulted in the lowest turbidity 0.18 NTU
- Experiment should be repeated in the cold room for more accurate results

Cold Room 2







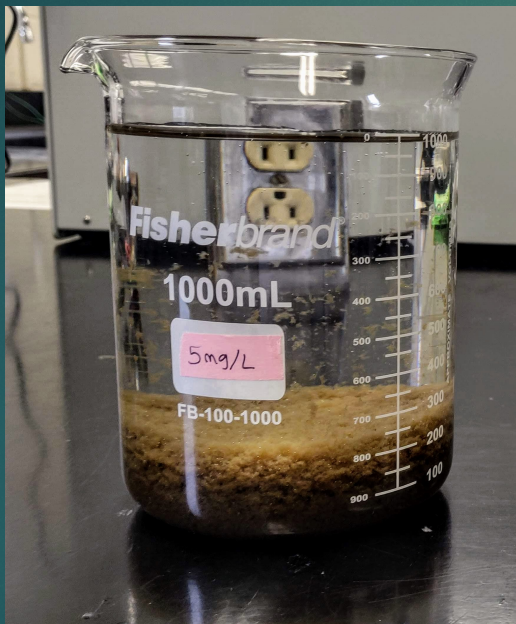
Credit: Judd Water & Wastewater Consultants

# Sludge Settling

- The tests mimicked the process of polymer addition to the gravity thickener.
- Polymer dose evaluation parameters:
  - settling rate
  - sludge cake compaction

# Polymer Recommendation

- 5 mg/L was found to be the most optimal dose



Jar test result with a 5 mg/L polymer addition, after the 60 min settling period.

Round	Polymer Concentration (mg/L)	Most Compact Sludge Cake lab 1	Most Compact Sludge Cake lab 2	Most Compact Sludge Cake lab 3	Most Compact Sludge Cake lab 4
Round 21					
2					
3			X		
4					
5		X		X	X
6		X		X	
7					
8					
9					
10					

The compaction ratings from round 2 of sludge settling tests from each lab section.



# References

- ▶ Jr., R.O. M. (2014). Environmental Engineering: Principles and Practice. Wiley Global Research (STMS).  
<https://bookshelf.vitalsource.com/books/9781118785959>