

“Tube Flocc” Detailed Task List Spring 2013

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Literature Review

Finish by 2/8/13

- Read research papers, prior team reports and AguaClara wiki about tube flocculator apparatus, PACl, alum, capture velocity and Process Controller.
- Read Dr. Karen Swetland’s submitted paper to understand the underlying model and basic experiment setup for tube flocculator.
- Read Dr. Ian Tse’s two published papers to understand FReTA , and prior work with this apparatus.
- Understand the mechanisms of coagulation and flocculation by reviewing CEE 4540 course notes and reading Chapter 5 and 6 in Wastewater Engineering Treatment and Reuse (Metcalf & Eddy, 4th ed.)
- Clarify our goals and topics for future research through conversation with Monroe Weber-Shirk and AguaClara team leaders.

Develop Fundamental Understanding of Tube Flocc Experiments

Finish by 2/28/13

- Become familiar with the fundamental experiment steps.
- Learn how to use FReTA, Process Controller and MathCAD.
- Add head loss measurement across the flocculator
- Add acid backwash state in order to eliminate residual coagulants attached to the tube walls.
 - Assess safety of this technique - we don’t want high pressure acid leaks in the lab

- Develop a method that can be automated and that is safe
- An alternative is to replace the flocculator tubing with a new tubing that has weaker molecular polarity. Casey is investigating this option.

Tube Flocculator Experiment

Finish by 4/28/13

- Verify Fall 2012 experiments involving floc break up using the same method as the control experiment.
- Test varied clamp positions and shapes for optimal floc break up.
- Design and implement a test of tapered flocculation using different diameters to vary the energy dissipation rate.

Technical Writing and Final Presentation

Finish by 5/10/13

- Analyze the data, plot residual turbidity vs. alum dose curve and compare the curve after floc breakup with the baseline.
- Explore extending our understanding of flocculation based on the results of the floc breakup tests. If possible create a model that explains the observed results.
- Summarize the results and devise future work for next semester.
- Write final report and update team wiki page.