Laminar Tube Flocculator Group's Detailed Task List Fall 2013

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Goals

- Figure out the effects that clamps have on flocculation
- Test the theory that when flocs reach a certain size, they are no longer effective because the shear on the surface is too high for colloids to attach
- Create a base case to compare all variable experiments
- Test whether or not clamps break up flocs effectively

Task- Base Case & Clamp Effectiveness

Finish by October 4th

- Create a base case flocculator run that produces data that can be replicated. We will then be able to compare our results to this base case. The dosage of PACl with be set from 0 to 10 mg/L with each run increasing by 1 mg/L. The base case data will be collected from three separate experiments spaced out with one experiement per day, running about eight hours each.
- Analyze the control case by examining the asymptote region of the Residual Turbidity vs. PACl dosage graph to decide a new dosage to be used for the following variable experiments.
- Experiment with one clamp (of varying sizes: 4-7mm) at the end of the tube arrangement to see if using clamps effectively breaks up the flocs and to test the theory that breaking the flocs by speeding flow actually causes there to be more turbidity, but eventually results in more agglomeration of the small particles that were broken up by the higher velocity

Task- First Test: Clamp Number & Size

Finish by October 25th

- Test the base case flocculator to see whether or not we can get consistent data and see the effects on turbidity without having any clamps on the tubes
- Run experiments with varying number of clamps (1-16 clamps) spread evenly across the middle arrangement of tubes with each experiment going around 8 hours each
- Set the dosage from what was determined from the base case. (During the summer they had tested around 0 to 18 mg/L and come to realize that there was a range of PACl dosage values around 15 mg/L that indicated as PACl dosage continuously increased, residual turbidity would gradually approach zero. Our group wants to test with the coagulant dosage around the asymptote.)
- Run each experiment with different sized clamps (uniformly sized clamps per experiment, but different size for a different experiment)

Task-Second Test: Tapered Flocculator

Finish by end of semester (or if time allows)

- Test the effectiveness of a tapered flocculator by running experiments of varying dosage levels between 0 and 20 mg/L

Technical Writing and Presentation

Finish by end of the semester

- Analyze the data that we collect, plot residual turbidty vs. PACl dose curve and compare the curve after floc breakup with the basline. Extend our understanding of flocculation and the effect clamps have on floc build up based on the results of the three tests.
- Create a model to explain our results, summarize the results, devise future work for next semester, write a final report and presentation, and update the team wiki page to include all our research.