rl564

Fall 2012

This semester I'm a member of Tube Floc team. The past members of this team have already tested how hydraulic retention time, coagulant dose, water solution properties influence the removal efficiency. My task for this semester is to break large flocs based on calculation of energy dissipation rate to see if this is helpful for improving flocculation performance. This task can be divided into 2 steps: first, I need to reproduce Dr. Karen Swetland's past experiments as a baseline for future experiments; second, in this baseline, the residual turbidity will be measured under the same experimental conditions but with breakup of large flocs at regular intervals.

Throughout this semester, I encountered many problems operating the apparatus, Process Controller, Data Processor, etc. I summarized the problems and troubleshooting in this page. This is a GOOD REFERENCE for future members on this team. I successfully obtained the baseline using the same method as Spring 2012 Team did on 06/29/12. The description of this method is in my final report.

At the end of this semester, I added 6 clamps onto the flocculator (2 on each unit, evenly distributed) as floc breakup device. Then I ran the experiments using the method I used as a baseline and achieved amazing results of residual turbidity with an increase of coagulant dose. Breaking large flocs may improve flocculator performance and thus our design of the flocculator may need to be devised that allow floc breakup at regular intervals.

Spring 2013

This semester I'm working with Margaret to determine the optimal spacing, size and number of clamps as floc break up device. Previous experiments have shown a decrease in residual turbidity under the control condition of no added coagulant. We assume that the tygon tube walls are attractive to clay particles and coagulant. So we replace the tygon tube with hydrophobic silicone tube to see if silicone tube is coagulant and clay resistant. Later we did several experiments on floc break up using silicone tube. All of the current Process Controller methods are saved in N://files.Cornell.edu/EN/aguaclara /RESEARCH/Tube Floc/Spring 2013/Experiments/

Again, we encountered a lot of problems during this semester. A checklist was made to help us check the problem-driven components before each experiment. This checklist could be found on the desktop of the tube floc computer. We also updated the troubleshooting page on wiki.

We derived a new equation of energy dissipation rate at floc breakup points. According to the energy dissipation rate vs clamp size plot, we can pick a desired energy dissipation rate and locate the clamp size and run experiments to see performance change (i.e. residual turbidities).We also made new aluminum pieces of clamps to ensure accurate clamp size.