Challenges for Future Teams

What still needs to be determined is the failure point of the subsurface injection column (the point at which the inlet tube injection site becomes clogged). We want to see what effects this has on the measured parameters of headloss and effluent turbidity as well as the filter itself. We believe clogging may occur at a very high coagulant dosage and very high influent turbidity over an extended period of time. For example, a possible future experiment could be to filter 400 NTU water treated with 20 mg/L of PAC coagulant for a period of 8 hours. If clogging occurred, any resulting physical impacts on the filter would provide insight into what may happen in a real AguaClara plant if the slotted pipes in the Stacked Rapid Sand Filter became clogged.

Another future task would be to investigate the effect of high velocities on the location of particle capture in each column. Our data showed that at higher velocities the control column behaved similarly to the subsurface injection column in that there was little floc accumulation on the surface of the control column's sand bed. Further tests could evaluate this phenomenon, especially for velocities through the control column that are similar to the fast velocity of the water entering through the small inlet tube in the subsurface column.

The next team should also strive to improve the design of the test filter and choose the experimental parameters in such a way that they more closely mimic the actual AguaClara plants. For example, the injection of coagulant and clay could be altered to better imitate the respective parts of the AguaClara plant.

Any kind of fluids class would be very helpful in understanding the theory behind the subsurface injection filter and in performing necessary calculations. I would recommend taking the time to learn how Process Controller works at the beginning of the semester beyond the required tutorial posted on the Wiki. Exploring different options and understanding how the program works is crucial to running experiments. MathCAD was not overly difficult to learn how to use, but any experience would be beneficial.

We would suggest that about 3-4 people be on this team if all of them are fairly new to AguaClara and the filtration process. It may be possible to have only 2 members on this team if these people are familiar with filtration and Process Controller.