Demonstration Plant

June 9, 2012

Abstract

The AguaClara program needs appropriate teaching and publicity aids. The team developed a demonstration plant several years ago that illustrated the early flow control module, the baffled flocculator, and a sedimentation tank with plate settlers. In the intervening years we have developed a dose controller that tracks the plant flow rate, sedimentation tanks designed to include floc blankets, and stacked rapid sand filters. The next generation of the AguaClara demonstration unit should illustrate as many of these concepts as possible.

The demonstration plant will be used as a portable demonstration unit for education and to advertise the AguaClara technologies.

Skills fluids, AguaClara water treatment processes, process controller, fabrication

1 Introduction

The AguaClara demonstration plant will be an excellent educational tool and demonstration unit as well as a device that can be used in households. It will be used at Cornell for outreach activities as well as by implementation partners as they promote the AguaClara technologies to municipalities. A prototype of the demonstration plant is available and it contains most of the relevant components. However, it is too difficult to set up and it appears cluttered. The mounting system needs to be dramatically simplified.

2 General Considerations

The demo plant should be easy to operate, easy to assemble and transportable as a carry-on luggage item. The unit processes should be easy to disconnect and clean. The plumbing connections must all be leak tight to prevent spills. The water level in the plant must be controlled with an exit weir from the filter.

3 Improvements for the Demonstration Plant

1. The dose controller needs to be designed using our design code.

2. The dose controller needs a scale (label) for the coagulant dose

3. The plant flow meter (entrance tank) needs to have a scale in mL/s indicating of the plant flow rate

4. The dose controller must have a float system that is large enough to counteract the weight of the slider.

5. The various unit processes should be mounted on a central tower or a two leg system that is designed to rest on a table.

6. The sed tank could hang off of the edge of the table to keep the overall height reasonable.

7. The SRSF needs to be redesigned so that backwash is possible. It is currently too short and there is not adequate space for bed expansion.

8. The flow rate through the entire system must be set so that backwash for the filter works well. It is possible that backwash will never work real well with this system because of the small diameter of the filter. If we determine that backwash will never be easy then we should explore the possibility of switching to a slightly larger filter column or simply dealing with this inconvenience.

9. The filter controls do not include the fluidics control system that is used on the full scale SRSF. Evaluate whether it would be possible to build a fluidics control system at this small scale.