Foam Filtration Detailed Task List

Fall 2011

1. Evaluate foam pre-treated with aluminum sulfate as a filtration media for Point of Use (POU) scale

   (a) Previous research has shown potential for irreversible binding of alum to polyurethane foam. This means that foam can be used as a filter media without a chemical feed. This reduces the costs of building and operating a point-of-use foam filter as well as reducing the complexity of the unit and making it more user-friendly.

   (b) Though it has been proven that foam filtration performance improves when the foam is pre-treated with alum, it is not yet known how long the alum will stay concentrated in the foam. A study must be done to determine the longevity of pre-treatment effects. Ongoing throughout semester

2. Evaluate effectiveness of foam filtration on POU scale without any chemical coagulant

   (a) In previous semesters studies have been completed analyzing foam filter performance as a function of approach velocity. The optimal velocity was determined to be 6 mm/s with a chemical feed. This was determined by calculating the volume of filtered water produced at an acceptable effluent turbidity.

   (b) Data suggests that as approach velocity decreases, effluent quality increases, therefore it is possible that an extremely low approach velocity (~1 mm/s) without a chemical feed will produce effluent turbidities below 0.3 NTU (from an influent of 5 NTU). To be completed by 9/23

   (c) A study will be completed varying approach velocities without an alum feed in order to determine the optimal approach velocity through foam without a coagulant feed. If applicable, complete by 10/7

   (d) If it is proven that foam can acceptably filter water without a chemical feed, a study will be completed testing the ranges of influent turbidity that can be successfully treated without a coagulant feed at lower approach velocities.

3. Find a new source for foam

   (a) Explore new foam suppliers and possibly alternative materials that may be more available in developing countries (ie a mattress). To be completed by 9/16

   (b) Explore new filter designs that have a different geometry than a traditional cylinder to simplify the filter implementation process and reduce costs. To be completed by 9/16

4. Simplify and expand upon initial foam filtration design

   (a) Experimental results will have significant impact on the design of a foam filter. If it is found that performance is not acceptable without a chemical feed or pre-treated foam, we may have to evaluate the overall applicability of foam as a filtration media.

   (b) Explore POU designs on the household level if foam can effectively filter water without a chemical feed.

   (c) Explore the possibility of a village-scale design or water kiosk that would incorporate all of the processes in a current AguaClara plant. Determine which filter media (sand or foam) would be best for water treatment at this scale.