Foam Filtration Detailed Task List

Summer 2012

1 Determine effectiveness of coarse and fine filter components over long periods of time and multiple filtration cycles

To be completed by 20 July

1. Thus far it has been proved that polyurethane foam provides an effective filtration media for achieving a turbidity of 0.3 NTU from a range high-turbidity waters. However, the tests have been run short term and with frequent cleaning of the filters media. Further investigation is required to determine over what period of time the filter will continue to remove particles from water to maintain an acceptable turbidity before cleaning is required.

2. As the filter components become clogged with more flocs and become less effective at removing particles, head loss will occur and the turbidity of the effluent will decrease. A marker based either on turbidity or head loss must be established in order for an operator to know with certainty when a filter requires cleaning.

2 Assess effectiveness of the plunger cleaning method

To be completed by 20 July

1. Similar to wringing out a sponge, cleaning the filter components is done by compression of the foam by a perforated disk to dislodge flocs. The filter components are then flushed with approximately a gallon of clean water to reestablish initial effectiveness of the filter. How many times this can be done before the filter is unable to return to its initial level of performance and how close the filter components can be brought to the initial level of performance are questions that demand more exploration.

2. Studies from previous semesters suggest that the coarse filter and fine filter will require cleaning at different times. Doing so will prevent the

filter from being offline for very long. Further studies will be required to determine exactly how frequently each will need to be cleaned.

3. The amount of water required to flush the filters after cleaning is approximately one gallon and the water must travel through the entire filter. In order to reduce the time the filter is offline and potentially reduce the amount of clean water necessary to complete cleaning, investigation must be done into placing a valve at the base of both the coarse and fine filters to release the dirty water.

3 Evaluate longevity of filter materials

To be completed by 3 August

1. Eventually the PVC and polyurethane foam will begin to break down, probably into the water. Analysis of when this occurs and therefore when the materials should be replaced is necessary.

2. Additionally, when the filter components begin to break down, the types of molecules that are washed into the clean water must be determined to assess whether both the molecules and the levels of molecules present in the water are safe.

4 Find a way to get water to the filter without electricity

Contingent on other objectives

1. If the foam filtration system is to be contained in a truck bed or something similar, getting water to be treated into the filter will be a challenge without some kind of pump. However, in disaster areas where emergency relief includes treating water, electricity is not guaranteed. If possible, a feasible way to get water to the filter without using electricity should be considered.