# Foam Filtration Tasks, Fall 2014

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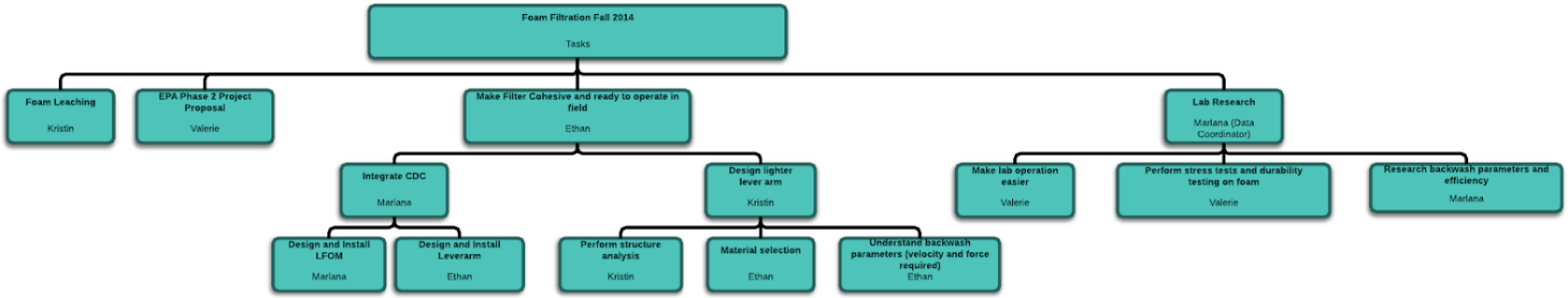
## Abstract

During the Fall 2014 semester, the Foam Filtration team will focus on foam leaching, redesign of the backwash system, and the integration of the CDC while keeping in mind the end goal of creating a cohesive and operation-ready system.

## Task List

### Task Map




### Task Details

Task (date) - Individual responsible. Detailed explanation.

1. Make Filter Cohesive and Easier to operate in the Field (End of the semester)- Ethan
    a. Design Lighter Lever Arm (10/31)- Kristin
        i. As there are multiple tasks needed to be completed before this design can be constructed, it is unlikely the construction of a lighter lever arm will be completed by the end of this semester. However, designing a lighter

lever arm is essential to the overall goal of fabricating a cohesive and operation-ready system which can be sent to Honduras or any other country.

ii. A structures analysis of the current design and new design recommendations will be necessary to make the operation of filter easier.

iii. Continue communication with John and Walker in Honduras to formulate a proposal for the design, taking into account the materials available in Honduras.

b. Integrate CDC (10/25) -Marlana

i. We need to be certain that the LFOM, float, and CDC lever-arm are integrated seamlessly and effectively, and that the system accurately responds to flow changes. Design should be robust, affordable, easily constructible and easy to understand.

ii. Design and install LFOM (10/10) -Marlana

1. Brainstorm ideas for re-desiging the LFOM, creating a greater surface area for the float or lightening the CDC lever arm. This will increase the accuracy of the dosage, especially when moving from lower to higher dosages.
2. Build and install the LFOM, redesigning the inlet system if necessary. Try a reversed LFOM such that the water would flow out of the holes and into the filter body.
3. Add a dose controller.

iii. Design and install CDC Lever Arm (10/10) - Ethan

1. The current half-size lever arm is still heavy for the system we have in mind. We have two options: 1) to work with this lever arm and design an entrance tank or 2) create a new, lighter design and improve on our previous design ideas of having the entrance tank inside the LFOM.

2. Foam Leaching (End of semester)- Kristin

a. One of the primary tasks to be completed is to be certain that there are no harmful chemicals being released into the water due to the use of foam for water treatment. The manufacturer has not expressed great concern that there leaching of any sort should occur, but for more certainty we will run tests using a technology that Professor Damien Helbling has knowledge. The first step would be to set up a meeting with him to discuss how this technology works, and then determine a series of experiments to run using this information. Much chemical research will likely to be included in this task.

b. Depending on the technology available, we can test the effluent for foam leaching throughout the semester as we run experiments and wear out the foam. We will especially be focused on the difference in the evidence of leaching between new foam and foam that has been used in experiments throughout the semester.

3. EPA Phase 2 Project Proposal (12/05)- Valerie
    a. This project will be ongoing as we continue research and further develop our design. As I have edited and reviewed grant proposals in the past, I can help compile our information into an organized report.
    b. We will all work together to keep an eye on this proposal, as it is a very important task that must be completed by the end of the semester.

4. Lab Research (Throughout semester)- Marlana
    a. Make Lab Operation Easier (9/26)- Valerie
        i. The first step for this will be to clean up and organize the lab space. As I familiarize myself with how the system works, I can help provide input and a new perspective on how to make it simpler to use for experimenting in the lab, and less prone to messes. Ideally entirely operable by one person.
    b. Perform Stress Tests and Durability Testing on Foam (12/05)- Valerie
        i. Will research degradation of foam over time. Does the foam break down? As it breaks down, does chemical leaching from the foam become more evident? Does the foam develop headloss more quickly? How fast does it clog, and under what conditions? Does the clean out cycle reach a reasonable steady state? A great deal of experiments will be performed with the smaller, 4 inch. foam filter.
    c. Research Backwash Parameters and Efficiency (11/14)- Marlana
        i. Run several iterations of cleaning cycles changing a TBD variable (coagulant dosage, total foam width, backwash with turbid water, backwash with tap water, etc.) and analyze results.
        ii. Brainstorm ways to reduce water wastage in the cleaning and filter to waste states.
        iii. Implement and test these techniques to be sure they are effective.

## Task Roles

1. Team Coordinator: Ethan
    a. As Ethan is one of the subteam leaders in AguaClara, he has the best ability to coordinate Foam Filtration with the rest of the team. He will help keep the team on a critical path and set up bi-weekly meetings with Walker (Honduras Field Engineer) to discuss foam filter progress in Honduras. He will also help with developing sketchup drawings of designs and working through the design process.

2. Data Coordinator: Marlana
    a. Will coordinate research in an organized manner, making sure experiments are controlled and results are analyzed thoroughly. In addition, the Data Coordinator is also responsible for ensuring that the collected data is saved appropriately and leading discussions on experimental data in meetings.

3. Materials Coordinator: Kristin
    a. Kristin was involved with the team last semester, and has experience with ordering and tracking materials.

4. Proofreader: Valerie
    a. As Valerie is the newest member to AguaClara, she will be proofreader as she gains more experience with the group.