Senior Design Project Data Sheet

| Project # | Project Name | Project Track | Project Family |
|---|---|---|---|
| 11413 | Crumb Rubber Pre-filer and Heater | Energy & Sustainable Systems | Open Source / Open Architecture Sustainable Water Systems |
| **Start Term** | **Team Guide** | **Project Sponsor** | **Doc. Revision** |
| 2010-2 | Sarah Brownell | | |

# Project Description

## *Project Background:*

The goal of this project is to use crumb rubber to pre-filter drinking water to meet EPA requirements and NSF standards. The first phase of this project will be to determine if crumb rubber will have any leaching characteristics that will be hazardous. If it does, possibly crumb rubber could be used for pasteurization or some other water treatment application. Crumb rubber is currently used in construction and turf field applications. It has also been tested in a ballast water filter application.

## *Problem Statement:*

Crumb rubber is to be investigated for use in a pre-filter for UV water disinfection to remove particulates and turbidity in order to improve functioning of a UV treatment system.
Crumb rubber is to be investigated for use in pasteurization of drinking water as a heating medium to improve the SODIS (solar disinfection using clear plastic bottles in the sun) process

## *Objectives/Scope:*

1. Economical way to provide water to world population
2. Develop new applications for using crumb rubber
3. Provide detailed designs, prototype, and instructions
4. Design appropriate test fixtures

## *Deliverables:*

- Specifications for filter dimensions
- Specifications for appropriate crumb rubber
- Data on leeching contaminants
- Potential pasteurization applications
- Specification for cleaning system
- Model of operational filter
- Model of operational disinfection system
- Preliminary chemical and biological test results
- Detailed and simple instructions for use

## *Expected Project Benefits:*

- Provide higher flow rates and be easier to maintain than traditionally used cloth cartridge pre-filters.
- The crumb rubber pre-filter should be cheaper and more re-usable than the traditional cloth cartridge pre-filters.
- Able to be used to improve the traditional SODIS pasteurization process because of it's heat transfer capabilities.

## *Core Team Members:*

- Burleigh, Bettina
- McDowell, Thomas
- Taylor, Codyshane

# Strategy & Approach

## *Assumptions & Constraints:*

- Multiple team agreement on appropriate interfaces is required.
- Final design cost must not exceed 15% of gross community income.
- Filter must improve turbidity and decrease particulates.
- Filter must be easy to maintain and clean.
- Instructions on use and maintenance must be provided.

## *Issues & Risks:*

- Testing of Crumb rubber is expensive or time consuming
- Crumb rubber leaches hazardous contaminants
- Orders not received on time
- Team members lost (we only have 3!!)
- The modeling results indicate oversized filter needed
- Pressure greater than gravity would create is needed
- More expensive than customer needs demand