Chemical Dose Controller

- Purchase and test several different CHT for ease of use. Verify or assess the compatibility with chlorine (especially the cap). Use the mini float valves from Kerick Valve and use the standard float provided with the valve.
- Work with Kerick or the CEE shop to develop a float valve that doesn't have any metal components. The cotter pin and bolt are both susceptible to corrosion and eventually fail when used in chlorine.
- Design, build, and test a simple height adjustment system for horizontal axis CHT (not using 80-20)
- Redesign double arm CDC to incorporate best ideas from single arm CDC.
- Assess if calibration columns on the drop tube are a good idea or not. If drop tube calibration columns are better than calibration columns next to the stock tanks, then integrate calibration columns into the drop tube. Determine what chemical flow rates are compatible with a drop tube calibration column. Print transparent labels for the calibration column and devise a method to make the designs for the calibration column available on our website.
- We need a smaller diameter drop tube and valve to reduce the weight on the lever arm.
- Determine if the half size doser is appropriate for chlorine dosing and if so, design a single lever, half size doser system for village level chlorinators. If the half size doser is not appropriate, then design a single lever, full size doser. Design the single lever system to use the same lever as the double lever system. Test and evaluate the single lever system for ease of use and check its accuracy.
- Develop a method to remove air from the dosing tubes easily. Determine if an easy method for removing air can be created for the 1/16" tubes. If it turns out that it is much easier to remove the air from the 1/8" tubes, then consider whether 1/16" tubes are a viable option.
- Design a better experimental test rig that keeps the dosing tubes straight and tight
- Demonstrate the ability to swap components quickly and easily to adjust flow rate and to calibrate the doser.
- Explore better (lighter, easier to ship, less expensive) options than PVC pipe for the float that moves the doser lever. The parameter that matters for the accuracy of the doser is the horizontal projected area of the float where it pierces the water surface. The volume and mass of the float are NOT important parameters except to ensure that the float is stable. The float could even have a density greater than water given that the other end of the lever has a counterweight. Options include buoys, flat 1-2 cm thick disk of non porous concrete, PVC disk (http://www.mcmaster.com/#8745k487/=o1twlh) or plate (http://www.mcmaster.com/#8747k107/=o1txrv). The PVC disk could be perfect if we can find an easy way to cut the 6" diameter PVC rod into approximately 2 cm long disks. The PVC plate could be perfect if the square fits in the entrance tanks and if the weight is sufficient to match the counterweight. It might be necessary to add a weight hanging on the bottom of the plate or hanging on the cable on top of the plate.
- Determine the flow range for the mini float valve and then design for higher flow rates using a larger float valve
- Locate tubing connectors that are chlorine resistant from constant head tank to rapid mix

- Figure out the flow break points in the design that result in selection of different tubing sizes or different number of tubes.
- Assemble and test all the components for chemical dosers of different flow rates
- Test units at stock concentrations used at AguaClara facilities.
- We need a plan for shipping CDC systems. This should be coordinated with AguaClara LLC.

Doser Package contents

1. Lever arm including slider, drop tube, counter weight, adjustable connector to float, and float
2. calibration columns
3. Piece of aluminum or other corrosion resistant material that provides a mount for the calibration column and CHT. This piece will then be attached to the plant and thus should have holes for mounting.
4. constant head tanks with adjustable height system and float valves
5. tubing assembly that has connection to stock tanks and then connects with valves to calibration column and CHT float valve
6. Tubing assembly that connects CHT to dosing tube inlet manifold (always have n+1 dosing tubes installed on the manifold where n is the number required)
7. dosing tubes and inlet and outlet manifolds
8. Tubing assembly that connects dosing tube outlet manifold to drop tube on lever arm