

AE progress report 9.14.07

Honduras Interns Progress Report

Date: 9/14/07

Location: Ojojona

Work Completed This Week

Improvements to Plant

- Changed overflow outlet from the entrance chamber. We used the cleaning drain and put a 4in to 3in reducer in it to connect a pipe too. When we put it in originally even when glued and the pipe was in it leaked a little bit. To help with this we put cement around the hole thinking that it could be leaking through there but it didn't have enough time to dry. It is still leaking a little bit but not that much and we have been constantly in overflow mode so it hasn't been a problem so far. We are still thinking about better ways to control/fix this. The three inch tube seems to be working well. Still need to work on carrying the overflow away from the plant.
- While cleaning the sedimentation tanks on Thursday September 9 we noticed that the exit hole at the bottom of the entrance tubes in the sedimentation tank were very small and probably caused the break up of flocs. The entrance tubes in sedimentation tank 1, the one closest to the flocculation tank, seemed to have large gaps. However, the ones in sedimentation tank 2 and 3 were only cut on one side at an angle. We cut all of the tubes in the same fashion as the first sedimentation tank. The hole for the latrine is finished and they are doing the masonry work for the floor now.
- On Tuesday September 11 we cleaned out the floc tank and made a few changes. The first is that we installed an elbow at the entrance of the floc tank. Now the flow of the water is directed down instead of into the baffle. This takes up about a foot of space at the entrance, and so a module of three baffles was removed from the end, which didn't seem to be doing much anyways. This seems to help the fact that the baffles appeared to be being pushed at an angle. We also decided to replace the last module of baffles with whatever new material we buy as a test. We will replace some of the baffles that have holes in them and buy new material either this week or next. After replacing the baffles we thought they were working better than before. This could be because we removed one of the last modules, which might have been breaking flocs.

Progress in Problem Solving

Sulfate sediment and doser clogging problems:

- We have been having less problems with the concentration of the sulfate, or at least we haven't had the problem of not being able to create flocs this week. We still don't know exactly why the sulfate doser clogs. It seems to be more of a sediment problem than a bubble problem, or at least we see lots more sediment than bubbles. However, the chlorine doser has not yet clogged and that also gets a good deal of sediment.
- We made two different solutions of sulfate. One with the regular concentration (25 kg/55 gallon barrel) and one with double that. We did this by only filling the barrel half full with water and using the 25 kg bag to make the double concentration and then filling it up the rest of the way to make the normal concentration. We took samples of each in 0.5 L soda bottles and left them. Over time the regular concentration completely settled in a time of about 5 hours and the other in about 18 hours. While the double concentration took more time it still settled. We think that the most effect of the settling occurs when the barrels are low as it takes less time to settle past the location where the sulfate is leaving the barrel. This suggests though that the settling is changing the concentration of the solution.

Sedimentation tanks

- There have been some problems with the sedimentation tanks this past week. We have seen flocs rising up and generally they have been dirtier. We tried operating with just two of the sedimentation tanks but during this trial run we encountered several other problems and so will try again. We also think its possible that they need to be cleaned more often in the winter as the turbidity is generally higher and when we cleaned this past week we saw a lot of sediment.
Horizontal flocculator
- When we cleaned the floc tank, we sent water through the horizontal flocculator. It worked pretty well, producing flocs and an effluent of under 10 NTU. The best flocs were formed in the first half of the tank and got worse during the second half. Tapered flocculation might solve this problem.
Lamina material
- Called the company whose number Monroe sent (www.alucom.com) to ask about aluminum baffles. They make roof sheeting that is an alloy of acero (steel I think) and aluminum. The woman who answered said this would not hold up to submersion in water. The material she described sounds like most of the coated metal roofing material we have seen. Was Fred talking about something specific that just contained aluminum?
- Contacted Dario Murillo, the person at Amanco who deals with APP frequently. Amanco makes the polycarbonate panels we found, but also make PVC pipe and does work with water treatment technology. Dario checked with someone else with a more technical background and said that the polycarbonate panels will hold up fine to being submerged in water as long as they are structurally supported. Perforating them with screws will also not be a problem he said. He said the panels are guaranteed to hold up to water for 13 years. If it's ok with Cornell, and there's money left in the budget, we'll buy enough of these panels to make one trial module in the Ojojona plant.

Peace Corps Presentation

- Presented the AguaClara technology to about 25 water and sanitation volunteers at an annual meeting they have in Siguatepeque. We took 300 NTU water from a dammed stream near at the meeting site and treated it to 14 NTU with the pilot plant. The volunteers were very interested and asked many good questions. Nearly all of them work on distribution system designs and they said that many of these systems end up delivering turbid water during the rainy season.
- A few of the criticisms ideas we received
 - Since distribution tanks are usually at the highest point around in the town, they thought it would often be hard to find a site for the plant that is a few feet higher. We said that the land would have to be built up near the tank if nothing was available. Not having visited many tanks, we're not sure how much of a limitation this is.
 - The technology will not be effective for organic chemicals and pesticides and we need to make sure we're not telling people we're giving them safe water when there are actually chemicals that we aren't taking out. Maybe we need to do some tests of the water at potential sites.

- The technology looks complicated. We agree, but think that with training the fontaneros should be able to operate it. The science behind the plant is quite complicated, but the task of finding a dose to make flocs is actually pretty simple. Many towns won't be able to generate a higher tariff. We may run into this problem in Ojojona, and need to be very sure that Moroceli is ready to increase their tariff.
- We met a volunteer named Eric Harrison, who is working with Fred Stottlemeyer in Marcala. He invited us to visit and said he would like to come to Ojojona. He has been to La 34, and said that given the lack of support they have, they are doing surprisingly well. He was impressed that they were still buying chemicals to operate the plant.

Capacitation of plant operators

- We met with the junta on Saturday, September 8. We asked them for a permanent plant operator and discussed funds for the future. We are working on an a list of costs for the next year for them (attached). They promised that we would get each of the 3 fontaneros for a week for training without other obligations. Later, they will hire a fourth fontanero so that one of the current ones can work permanently on the plant. The other fontaneros will still be trained to cover for vacation and sickness. Despite this plan, Mario was only available to work with us for an hour or so Tuesday. We'll continue to work with the Junta on this.
- Mario has taken quite a bit of interest in the plant. He's been filling out the plant monitoring tables and one afternoon came alone to the plant, refilled an alum barrel, changed the alum dose, and left the plant working effectively.

Plans for the Future

- Buy new laminas (of a new material) for one module at the end of the tank. We will use the laminas in the module that we replace to replace damaged lamina in other modules. At the junctions between modules, we will use 1.5" pvc caps to accept the spacers from the adjacent module. This allow us to actually connect the modules and still keep the spacers in place. We will try to find a way to divert the inlet flow downward without taking up so much space at the beginning of the tank.
- Look into the possibility of buying Ferric chloride, the supplier of aluminum sulfate doesn't appear to have it on their website.

Questions for Cornell Team

- What is the sediment in the barriles for sulfate? Does concentration change over the height of the barrile?
- At the peace corps convention, one criticism was that our technology won't take out chemical contaminants like pesticides from coffee plantations. Is flocculation and sedimentation at all effective with these chemicals? How many of our potential sites would have problems with chemical contamination.

Plant Improvement Ideas

- Also while cleaning the sedimentation tanks on Thursday September 9 two of the tanks had entrance tubes that had fallen off and were merely lying on the ground. So that the water was simply entering at the front of the tank. This could be improved by putting holes in the elbow that connects the pipes from the canal next to the sedimentation tank and the entrance tubes and then putting a pin in so that they can't slip out. This would require putting two holes in the first elbow of the sedimentation tank entrance. One so that the elbow doesn't fall of the vertical tubes and another so that the horizontal tubes don't fall off as well.
- We are looking into another way to make the tables that hold up the laminas in the sedimentation tank or the laminas themselves. As they are now they tend to fold and fall in between the two sides of the tables. Also, perhaps gluing the bottom of the table together would help as its hard to put back together when one is inside the tank. It also seems helpful to have the largest pipe outside of the table as it makes it easier to remove and allows easier access for a ladder.