

Residuals Management

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I. DETAILED TASK LIST

A. To be completed by 9/15/2011:

- 1) Several methods and guidelines for residuals management should be researched and synthesized. Ten State Standards, the USEPA, and the World Health Organization should be consulted, as well as texts such as Water Quality and Treatment, by the American Water Works Association.
- 2) The flow rate of liquid waste from filter backwash should be estimated, using data from previous AguaClara research into Stacked Rapid-Sand Filtration.
- 3) The composition and flow rate of entrance and sedimentation tank sludge outputs should be approximated and then added to backwash waste to yield a total volume of residuals that must be managed per month.
- 4) Any pertinent information from several research papers covering sludge settling and sludge use as a soil fertilizer should be collected.
- 5) The initial draft of the research report should be begun, starting with a general outline.

B. To be completed by 9/22/2011:

- 1) The chemical composition and volume per time of chemical waste from the preparation of chlorine solutions at AguaClara plants should be approximated.
- 2) Equations to predict volumetric waste based on raw water turbidity and flow rate should be formulated in preparation for use with Mathcad. Stochastic variability due to rainfall events should be considered.
- 3) The first research report should be completed, with the due date on 9/23/2011.
- 4) AguaClara engineer Sarah Long should continually be contacted regarding approximation of flows and characteristics of waste outputs in Honduras.
- 5) Cornell faculty (CEE and BEE) with potentially useful information should be contacted for help with this issue.
- 6) Soil characteristics and common plants in Honduras should be researched to see how feasible an engineered, sludge-irrigated garden would be.

C. To be completed by 9/29/2011:

- 1) The initial skeleton/draft of the midterm teach-in should be assembled, in preparation for the presentation next week.
- 2) The basic design considerations for irrigation, lagooning, and any other possible management methods should be compiled and compared.
- 3) A strategy for dealing with chemical waste resulting from calcium hypochlorite solution precipitates should

be assembled, looking into the possibility of using precipitated calcium carbonate as a soil strengthener.

D. To be completed by 10/6/2011:

- 1) The research report should be edited and turned in again on 10/7/2011.

E. To be completed during October:

- 1) All pertinent subteams and AguaClara members should be contacted for advice on current progress, giving special attention to those who have visited plants in Honduras and are familiar with the topography experienced on plant property.
- 2) The new Stacked Rapid-Sand Filter should be installed in Honduras by this point; information about the quality and quantity of its backwash water should be relayed from Honduras to the residuals management subteam to see if any manipulation of our estimates is needed.
- 3) At the end of the month (10/28/2011), the next draft of the research report should be completed and turned in.

F. To be completed during November:

- 1) If a space-constrained design has been selected as viable, it should be added to the design tool and the necessary drawing scripts should be included.
- 2) The next draft of the research report should be turned in on 11/18/2011.

G. To be completed during December:

- 1) The feasibility of the chosen design should be decided upon, leading to a decision on whether AguaClara will move forward with the residuals management design in the future.
- 2) Peer evaluations and the final report draft are due on 12/2/2011.
- 3) The final edited report should be turned in on 12/8/2011, and the individual contribution page edited.
- 4) The final presentation should take place on Saturday, 12/10/2011.