

**Improving Water Quality by Developing, Implementing and
Field Testing Innovative Methods
FY 03 CWA 319(h)
TSSWCB Agreement No. 03-10**

Quarter no. 17 From 10/01/07 Through 12/31/07

I. Abstract

Work conducted during this quarter has been focused on the collection and analysis of samples at the Wild West Dairy near Stephenville. Sampling there is being used to evaluate the impacts of the demonstration by Ozona Environmental LLC. Work has also continued on the final report for the EnviroLink Demonstration. This report will be finished during the next quarter. Work on the turfgrass demonstration has been completed; however, the final report has yet to be completed. It is anticipated that this report will be finished during the next quarter. Several presentations about the project were given during the last quarter and one peer-reviewed journal article was published on the Geotube demonstration.

II. Overall Progress and Results by Task

TASK 1: Demonstration and Evaluation of New Technologies

Subtask 1.1: Identification of potential technology providers. Texas AgriLife Extension Service, TWRI, TFB, dairy industry representatives, EPA Region 6, TSSWCB, TCEQ, TDA, BRA, NRCS, and Texas AgriLife Research will identify and select promising technologies represented by willing technology providers. (month 1 thru 3)

The following actions have been completed during this reporting period:

- a. Year one projects have been completed. Fact sheets and reports have been completed and are currently posted on the TWRI website for everyone to access at:
<http://twri.tamu.edu/project-info/NewTechnologies/>
- b. Year two technologies have been initiated:
 - 1) “Demonstrate and Evaluate the Use of Technologies to Reduce Animal Waste Pollution” proposed by EnviroLink (Greeley, KS) has been implemented at the Sherwyn Wood Dairy. Sampling for this demonstration concluded in June.
- c. Year three technologies have been selected:
 - 1) Natural Biotechnology has backed out of their agreement to demonstrate their technology during year 3 of the project. A letter has been sent out to the advisory committee to seek input on how to proceed from here.
 - 2) The final demonstration chosen will be conducted by Ozona Environmental LLC. Their demonstration will use a proprietary bacterial enhancement to treat the lagoons.
- d. Supplemental Demonstration:
As a result of rising sample analysis costs and the lack of submitted proposals, the

project workplan was amended to allow for the demonstration of planting turfgrass on soils supplemented with residual material from a Geotube[®]. This demonstration will be conducted in a laboratory setting at Texas A&M and will cost less than the demonstration of a sixth technology. This demonstration will evaluate the changes in physical and chemical changes between soil and soil with added Geotube[®] residual material, evaluate turfgrass responses when grown on soil and soil with added Geotube[®] material, and evaluate leaching losses of nutrients and dissolved organic carbon under the varying scenarios. Sampling funds not used for this demonstration will be used to cover the increased sampling costs for the remaining technology demonstrations.

100% Complete

Subtask 1.2: Identification of dairy cooperators in the North Bosque watershed area that use a flush system and lagoons to remove, store, treat, and land-apply effluent (manure and process-generated wastewater). Extension, TSSWCB and TFB will identify dairy operations willing to participate in these demonstrations. (month 1 thru 3)

The following actions have been completed during this reporting period:

- a. The year one technologies were implemented at the following dairies:
 - 1) “Ecoloclean” – OSVE Dairy (proprietor – Mr. Bert Velson), Bosque Watershed.
 - 2) “Geotube” – Triple X Dairy (proprietor – Mr. Wayne Moermen), Leon Watershed.
- b. The year two technologies have chosen the following dairies to apply their technology:
 - 1) “EnviroLink” - Sherwyn Wood Dairy (proprietor – Sherwyn Wood) Bosque watershed.
- c. Year three technology has chosen the following dairies to apply their technology:
 - 1) “Ozona Environmental” – Wild West Dairies (proprietor – Geoff Vandenuwegiessen) Bosque River watershed.

100% Complete

Subtask 1.3: On-site installation and start-up of the six pilot-scale technologies to be demonstrated. Technology providers will carry out the task of equipment transport, on-site installation, set-up, and start-up. With permission from the cooperating dairy owner/operator, the technology provider will prepare the site to install and operate the system for demonstration. (First installation by August 2003, last installation 6 months before the end of the 3-year project)

The following actions have been completed during this reporting period:

- a. Ozona Environmental has established their demonstration at Wild West Dairy near Stephenville.
- b. Two post-treatment samples were collected during the last quarter on October 16th and November 13th.
- c. Sampling will continue and is anticipated to conclude in the spring.

90% Complete

Subtask 1.4: QAPP preparation and field data collection and analysis. Extension will prepare the DQO and QAPP (August 2003 to August 2004)

- a. No activity to report at this time.

100% Complete

Extension will collect samples from raw and treated effluent and resulting sludge. One of the evaluation tasks will be to analyze the sludge or by-product remaining after raw material treatment for P stability (August 2003 to May 2007)

The following actions have been completed during this reporting period:

- a. Sampling is underway on the Ozona Environmental, LLC project. The last background sample was collected on September 4th to evaluate the quality of water in the lagoons before the treatment is applied.

90% Complete

Subtask 1.5: Develop reports and outreach education materials. Extension in cooperation with TWRI will produce educational brochures and publications on effectiveness of this innovative technology. Quarterly and final reports will be prepared and submitted in a timely manner.

The following actions have been completed during this reporting period:

- a. TWRI submitted the year 5, quarter 1 report to TSSWCB on January 14, 2008.
- b. The final report for the EnviroLink demonstration is currently in the review process and will be submitted to TSSWCB for their review during the next quarter.

90% Complete

Subtask 2.1: Texas AgriLife Research will establish demonstration plots and procure materials to set up the demonstration plots.

The following actions have been completed during this reporting period:

- a. All demonstration plots have been set up. This task is now complete.

100% Complete

Subtask 2.2: Texas AgriLife Research will conduct analysis of physical and chemical properties of Geotube residuals.

The following actions have been completed during this reporting period:

- a. All samples of residual Geotube material have been collected and have been analyzed to determine their physical and chemical properties. This task is now complete.

100% Complete

Subtask 2.3: Texas AgriLife Research will assess the effects of Geotube residues on turfgrass and soil physical, chemical, and biological properties.

The following actions have been completed during this reporting period:

- a. Sampling and analysis have been completed on the demonstration plots. Results about the effects of the Geotube residue on turfgrass growth will be included in the final report for this task.

100% Complete

Subtask 2.4: Texas AgriLife Research will evaluate leaching losses of nutrients and dissolved organic C.

The following actions have been completed during this reporting period:

- a. Residual samples collected after the demonstration has been evaluated to determine the amount nutrient losses during the demonstration. This task is now complete.

100% Complete

Subtask 2.5: Texas AgriLife Research will conduct statistical analysis on samples collected and will draft a final report that summarizes the results of the demonstration.

The following actions have been completed during this reporting period:

- a. Statistical analysis on samples is nearing completion, results will be included in the final report.
- b. Work has begun on the final report for the turfgrass demonstration. It is expected that the final report will be finished during the next quarter.

50% Complete

III. Related Issues/Current Problems and Favorable or Unusual Developments

- a. The Texas Agricultural Experiment Station and Texas Cooperative Extension have changed their names, effective January 1, 2008. The respective agencies will now be called Texas AgriLife Research and Texas AgriLife Extension Service.
- b. Two presentations regarding the project were given during the last quarter, they are:
 1. Rahman, S., and S. Mukhtar. 2007. Efficacy of Microbial Treatment to Reduce Phosphorous and Other Substances from Dairy Lagoon Effluent. 2007 National Conference on Agriculture and the Environment. Agricultural Water Quality alliance. Pacific Grove, CA, November 7-9, 2007.
 2. Schnell, R., D. Vietor, C. Munster, R. White, M. Tahboub and S. Mukhtar. 2007. Cycling of Solids from a Geotube® dewatering System Through Turfgrass Sod. American Society of Agronomy Meeting, New Orleans, LA, November 4-8, 2007.
- c. A peer reviewed paper on the Geotube® Dewatering System was published in the ASABE Journal of Applied Engineering in Agriculture in 2007, Vol. 23(5): 669-675.

IV. Projected Work for Next Quarter

The following will be accomplished during the coming quarter:

- a. Sampling will be conducted at Wild West Dairy for the demonstration of the Ozona Environmental technology.
- b. Work will continue on the final report for the EnviroLink demonstration. The report will be submitted to TSSWCB early in the next quarter for their review.
- c. Work will take place on the final report for the turfgrass demonstration.