



Quarterly Program Performance
Report 3 of 2001

Grant Number: PCE-G-00-98-00011-00
Project Title: Appropriate Technology for Wastewater Treatment
and Reuse in Rural Middle East Areas
Organization I.D.: 10287
Organization Name: The Galilee Society
Resource Code: 410463
Account Number: ES97/98DES798
Reporting Period: July 1, 2001 - September 30, 2001
Date Submitted: October 30, 2001

Summary:

- 1 - Management Progress Report (The G.S).
- 2 - Technion Technical Progress Report: Quarterly technical evaluation of the Sakhnin pilot system.
- 3- PHG - Beny Zaid Site: Continuation of the implementation of the sewage network and the pilot treatment facilities.
- 4 - ECOA - Sadat City Site: Progress in building the pilot.

1. Management Progress Report

The GS management team has conducted two main tasks in addition to the routine overall supervision and coordination work. These two major tasks were: 1) to study and USAID midterm evaluation report and discuss its recommendations with all partners and take the required steps needed. 2) To successfully shift the management responsibilities from Dr. Isam Sabbah the project Manager to Dr. Basel Ghattas the GS General Director and the co principal investigator of the project. Dr. Sabbah has left for Post-Doctoral position at Johns Hopkins University.

To successfully conduct all these assignments the Management team has established the following:

- 1) Two study workshops with the Technion team to carefully review the progress, study the USAID evaluation report and decide on the future plans. The workshops aimed to start involving Dr. Ghattas in the management work and start shifting responsibilities to him.
- 2) Three days field visit to Egypt July 30-August 2. The visit program included: two workshops with the ECOA team for reviewing the progress and studying the preliminary evaluation report findings, and field visit to the pilot site in Al- Sadat City. The other mission of the visit was to coordinate with the Egyptian team the transfer of the management responsibilities to Dr. Ghattas. The visit was very much successful and achieved its planned objectives.
- 3) with the PHG team to review the USAID evaluation report and draw and implement the derived conclusions and to plan to stimulate the work to be achieved despite the really terrible conditions which have prevailed in the region during the last few months.

In the following reports of progress of the partners there are clear indications for serious progress specially, with the Egyptian and Palestinian partners. The evaluation report has arrived to us only on August and thus its impact is not fully recognized during this quarter and naturally its impact will be more prominent during the coming months.

MERC - Alternative Technologies Consortium
Technion Quarterly Progress Report: July September 2001

During the period of July through September 2001, the UASB operated continuously with pre-settled raw sewage with decreasing retention times. Its effluent was fed to the horizontal wetland. The three vertical beds were still running in the regeneration mode.

UASB

During the last four months (June-September) the retention time was reduced gradually from an average 20 hours in June to 8 hours by mid-August. After an apparent decrease in COD removal efficiency during June (Progress report April-June 2001), the system recovered. During the following months, COD removal efficiency was on average 60% during July, at operating retention times of 14 and 10 hours, and 70% during August when retention times were 10 and 8 hours (Figure 1 top). The results demonstrate that decreasing the retention time down to 8 hours, did not hinder the performance. COD removal rate increased with the decrease in retention time from an average 1 g COD/L/d to an average of 3 g COD/L/d and more (Figure 1 bottom). Sludge washout was not significant most of the time except some periodical incidences of washout, as can be deduced from the comparison between total COD removal and COD removal based on effluent settleable COD (Figure 1 top). During the last two months, influent COD concentrations fluctuated between 1000 and 2500 mg/L and effluent COD was mostly between 400 and 800 mg/L (average of 500 mg/L, Figure 2). The results from analyses of VFA concentrations in UASB effluent will determine the possible further decrease in retention time.

Figure 1: UASB performance
Top: % COD removal at different retention times
 COD_t is total COD removed, COD_{set} is based on effluent settleable

Bottom: COD_t removal rate gCOD_t/liter reactor/day

COD

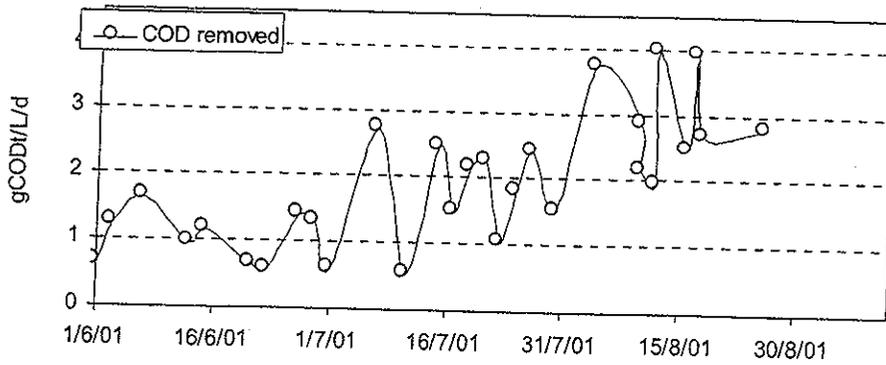
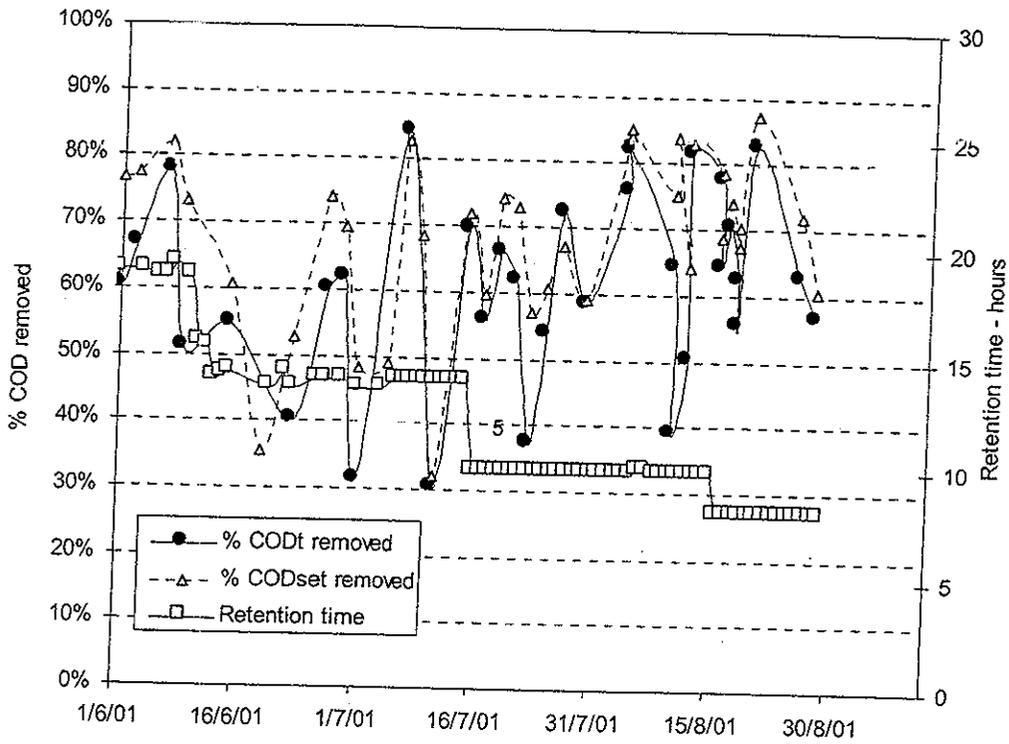
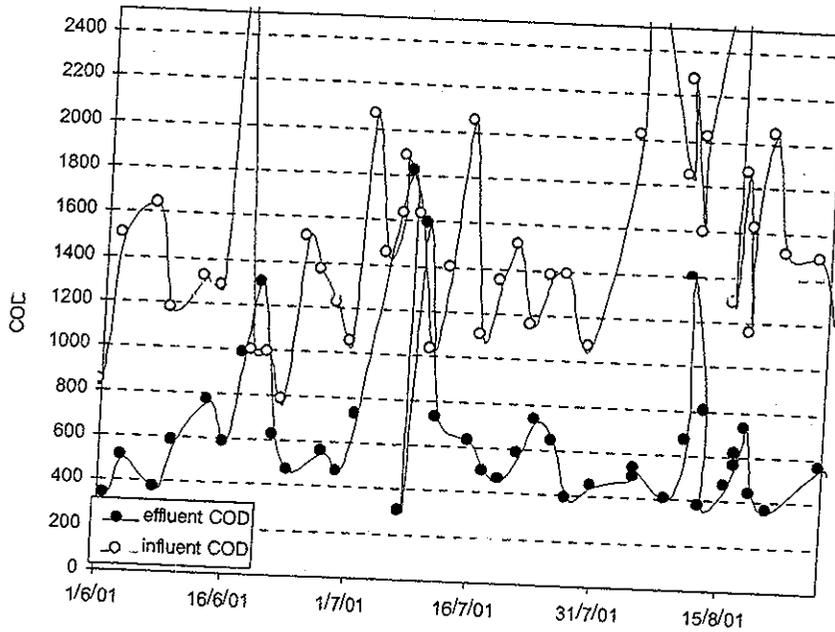


Figure 2: UASB performance influent and effluent CODt



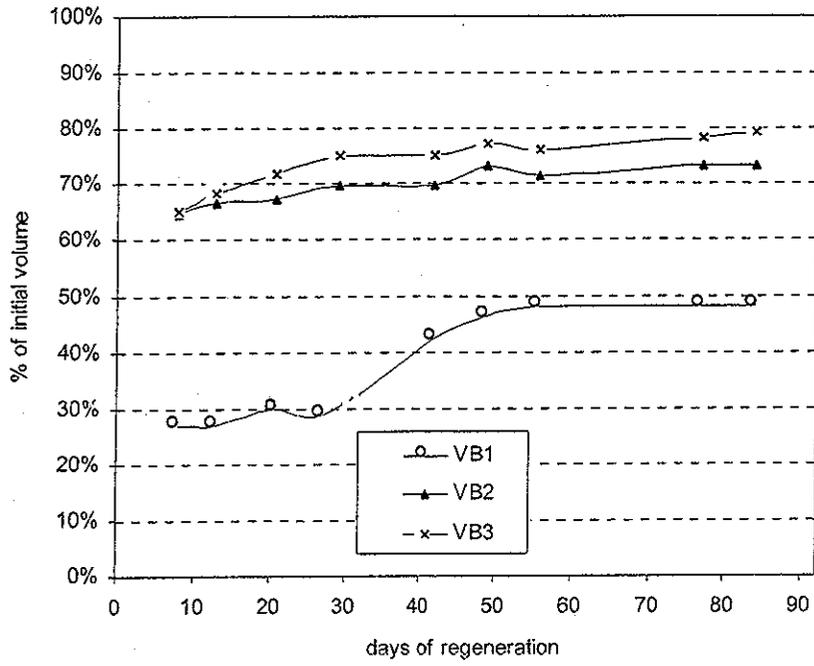
Vertical Beds

During the last months, the three vertical beds continued to operate in regeneration mode, preparing them for the next operation cycle. The results show that after two months of regeneration, the recovered pore space in the three beds was 50% , 72% and 78% for VB1, VB2 and VB3 respectively (Figure 3) with no significant increase in the pore space volume during an additional month of regeneration. In the next few months, the three sequential beds will be used to treat UASB effluent at the long cycle mode.

Subsurface Horizontal Wetland

During the first part of the reported period, the subsurface horizontal wetland continued to operate downstream from the UASB. Later on, the feeding was discontinued due to clogging in the bed. As most of the clogging occurred in the inlet area, the area was excavated and at present the accumulated sludge is being removed and the rocks are being cleaned before returning them to the wetland. The clogging probably occurred because the wetland was operated during long periods at higher than designed loading rates.

Figure 3: Vertical bed continuous regeneration



3. Progress Report
Appropriate Technology Project
Bani Zaid Palestine
July - September 2001

PHG activities during the past period were focussed on the first phase of the implementation of the sewage network and the treatment pilot in Bani Zaid. Key accomplishments can be summarized as follows:

1. First Phase Implementation

Two kilometers of the sewerage network in Bani Zaid area started to be implemented after awarding the tender to one local firm, the Green Land Company. The contract was awarded on August and the work started early September. There was a delay in moving the equipment to the site due to the closure. However, the work is ongoing and the following has been accomplished:

1. Defining the root of the main lines on the ground.
2. Completing the manholes
3. Surveying the land and starting the detailed design of the treatment system.
4. Start excavating for the main lines

It is expected the work will be finished within three to four months and after that the operation will take place.

2. Follow Up Meeting

PHG attended a follow up meeting with the Galilee Society at Shefa Amr. The attendants were Dr. Basel Ghattas and Dr. Isam Sabbah. The purpose was to report on progress, to learn and discuss the USAID evaluation report and to plan for the future activities taking into consideration the existing difficult circumstances and the USAID evaluation recommendations. We planned the implementation and detailed design of the treatment system as well. In addition to discuss the follow up after Dr. Isam leaves the project.

3. Securing Additional Funds for Construction

PHG has been actively engaged in securing additional funds for the project. However, due to the fact that there was no complete documents, it was difficult to raise funds properly. PHG succeeded in introducing part of the collection system for funding under some small scale funding projects. Almost 35,000\$ have been approved verbally by CIDA through the World Bank.

4. Planned Activities over the Coming 3 Months

PHG is devoting the coming three months for construction of additional part of the sewage network and for vast establishment of the treatment units. The anticipated key activities are as follows:

1. To complete the implementation of main pipes from the old center of Deir
2. Ghassaneh village and include the schools. Also to extend the conveyance line to the treatment site.
3. To finish the design of the treatment plant and to start building the treatment facilities.
4. To start establishing the resource center
5. supervise implementation

**4. THE EGYPTIAN CENTER OF ORGANIC AGRICULTURE
SOCIETY (ECOAS)
July September/2001**

The activities conducted during the period, from the 1st of July to the end of September, brought the following achievements.

1. Completion of gravel filling in the constructed wetland at 80cm-level.
2. Partial filling of the constructed wetland with treated wastewater.
3. Modification of the piping system from the polishing pond, wetland disinfection ponds, and outlet manholes in order to ensure free waste water flow by gravity.
4. Installation of the pumping system: two poster pumps $15\text{m}^3/\text{h}$ at 35m beat, specific for wastewater (5.5KW, 12.1A, 3 phase), installed in each manhole to deliver the output of water through the irrigation system.
5. Completion of the installation of the irrigation control head, which consists of two stations: one for the irrigation water from the polishing pond and the other for the irrigation water out of the disinfection pond (of the constructed wetland). Each station includes: two media filters, automatic back wash facilities, a disk filter, complete manifolds for inlet and outlet, valves, pressure gauges, air vent, pressure relief valves, and other required fittings to connect the control head with the experimental plots.
6. Completion of the electric work required for the supply of electric energy to the poster pumps. This work includes the installation of: an electric distribution panel, switches, cables, and sealed protection boxes.
7. Attribution by the real estate department at Sadat City Municipality of the building permit for the resource center, which will enable us to start the construction of the resource center building, since the construction design is already completed.
8. Execution of the startup application for the polishing pond and the constructed wetland, by adding: 10m^3 of raw sewage, 30m^3 of the sludge from the bottom of the Sadat oxidation pond in the polishing pond, and 40m^3 of sludge from the Sadat oxidation pond to the constructed wetland.
9. Inclusion of an Environmental Engineering expert in the project team, Dr. Mohamed Abdel Hamid, as a part-time consultant. He has a long-term experience of working with the wastewater treatment plan of Sarabium, Ismaillia Governorate, which has been established through a USAID grant, and includes many sophisticated treatment units and a well-equipped wastewater analysis laboratory. This treatment plant is managed by the Suez Canal Authority.

10. Arrangement of a series of workshop and training programs for the project staff and technical officers from Sadat Municipality. These programs deal with: wastewater treatment operations and maintenance of wastewater treatment units, the design and implementation of aquatic plant systems, and environmental and public health considerations and precautions. This task was assigned to Prof. Mamdouh Fawzy Abdallah, our part-time expert in the fields of Horticulture and Training.