

ABSTRACT

Hebron, the city of the West Bank in south, is old and historical city. It is full of activities such as commerce, industrial and agriculture. This city which had 35000 population in 1960 has now more than 150000 persons.

Hebron City faces like other cities in West Bank – problems in wastewater treatment. Wastewater production in the city is increasing from year to year due to the increase in the population and their water consumption.

Nowadays, the population of the city has grown considerably, the wastewater production has increased and additional information on the urgent needs to treat the wastewater to protect the environment become available. In view of this, the need for wastewater treatment scheme that will treat reliably the amounts of the produced wastewater in the city has become pressing necessity. Based on the municipal wastewater characteristics and quantities, this research study is conducted to investigate the best appropriate treatment technology for Hebron City.

In the last 5 years Hebron Municipality has succeeded to implement many sewerage projects, in which the coverage of sewerage network in the city has raised from 45% up to 95% by the end of 1999. On the other hand, no serious measures have been taken towards treating the produced wastewater of the city. Moreover the industrial (stone processing plants and tannery) wastewater in the city is discharged directly into the municipal sewer system, without prior pre-treatment.

There is a wastewater pumping station that was erected in 1987 and designed to pump some of the wastewater to sedimentation ponds constructed at one of the hills, which is adjacent to the city. There are a lot of mistakes in the design of this station and it is considered to be idle system, since it could not operate efficiently till now. In view of the existing bad sewage treatment, taking into consideration the public health aspects and aquatic environment protection, it is crucial to develop sustainable sewage treatment facilities for Hebron City. These facilities should be capable of the treatment and disposal of the entire city of Hebron for the coming 25 years. An evaluation of different wastewater treatment alternatives has been done.

Based on the results obtained, the UASB followed by Oxidation Ditch is the best sustainable alternative with regard to environmental, economical and local condition.

Major findings that can be mentioned are:

- UASB followed by Oxidation Ditch has higher investment costs, but the annual capital and running costs are less than those for the Oxidation Ditch.
- Within almost 3 years, the investment costs for UASB followed by oxidation ditch can be recovered if biogas utilization is made. Moreover, UASB followed by oxidation ditch needs around 38% less energy demand and can produce about 23 kWh/P.year through full biogas utilization yielding more than one million US \$ annually.
- To minimize the process failure of UASB unit operations, and reduce capital investments, industrial effluents like stone cutting, tanneries and slaughterhouses must be pre-treated prior discharge into public sewer networks.

Recommendations have been made with respect to the impact of industrial pre-treatment on the sewage treatment facilities. Furthermore, a large pilot scale UASB reactor followed by Oxidation Ditch is highly recommended.