

Two-Stage Anaerobic Hybrid System to Pretreat PTA-Production Wastewater at DuPont Far Eastern Petrochemicals Ltd.

In order to meet new, more stringent environmental regulations at its plant in Kuanyin, Taiwan, DuPont Far Eastern Petrochemicals (FEP) decided to anaerobically pretreat a portion of its wastewater flow. In order to reduce the load on its existing activated sludge plant, DuPont FEP decided to pretreat its purified terephthalic acid (PTA)-production wastewater stream using anaerobic technology.

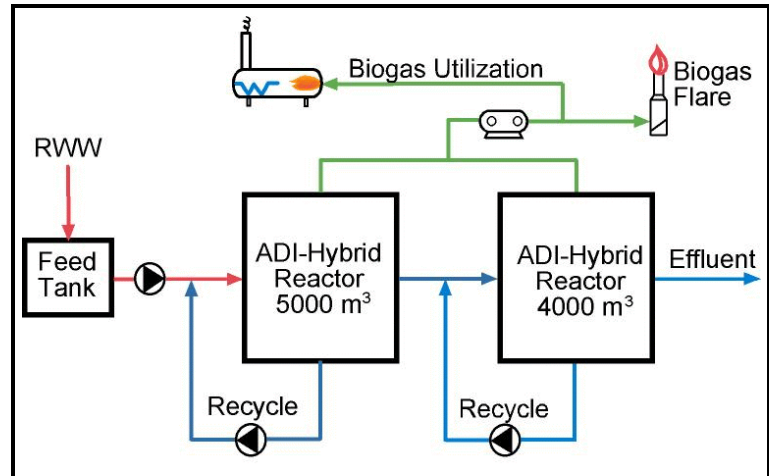
A bid call was issued by DuPont FEP in January 1998 for the design-build job. A Taiwanese design-build company, CTCI, joined with ADI Systems Inc. in bidding on the project.

The CTCI/ADI Systems bid, proposing ADI-Hybrid anaerobic technology, was accepted in March 1998, and the group was awarded the design-build job. Design of the pretreatment facility began immediately, and construction started in September 1998. System start-up took place in August 1999.

ADI Systems Inc. provided a technology package for the system including process design, supply of proprietary equipment and reactor covers, and process start-up and follow-up services.

An extensive wastewater treatability study was performed during the initial design period in order to establish biodegradability of the wastewater and to predict the performance of the full-scale system for the process guarantee. That study revealed that the wastewater was only 65 percent biodegradable anaerobically. The effects of PTA solids on system performance were also studied.

The pretreatment system consists of two ADI anaerobic hybrid reactors, designed to operate in a series mode of operation. Preliminary treatment includes screening, equalization, and pH adjustment for PTA solids dissolution prior to treatment in the



anaerobic reactors. The two reactors, 5000 m³ and 4000 m³ in volume, are each hybrid combinations of the upflow anaerobic sludge blanket and upflow anaerobic filter technologies.

The pretreatment facility is designed to handle 7,800 m³/d of this difficult-to-treat wastewater at a design COD concentration of 6,500 mg/l (50,500 kg COD per day), including 8,400 kg/d of terephthalic acid (TA) solids.

The ADI-Hybrid reactors will remove the majority of the biodegradable organics in the wastewater and convert them into biogas. The biogas generated in the anaerobic digestion process will be captured and utilized in process boilers at the site.

The pretreated wastewater discharges to an existing deep-shaft activated sludge treatment facility for final polishing. The anaerobic hybrid facility will thus allow DuPont FEP to meet the strict new environmental regulations as well as gain a valuable commodity, biogas, as a by-product of compliance.