



Project Description

Zero Effluent Discharge
for ECOLAB (Taicang) Technology Co.,LTD.

By:

PACT Environmental Technology Co., Ltd.

1 Project Introduction

Ecolab Inc, the world's leading provider of water, hygiene, public health and energy technologies by sales volume, has opened a manufacturing plant and distribution center in Taicang, Jiangsu Province, China. The Taicang hub (ECOLAB (Taicang) Technology Co.,LTD., abbreviated as Ecolab Taicang hereinafter) is Ecolab's third-largest in the world and the largest in the Asia-Pacific region. It is located at Lake Tai Area (shown in Fig. 1) where zero phosphate and ammonia discharge is strictly required.

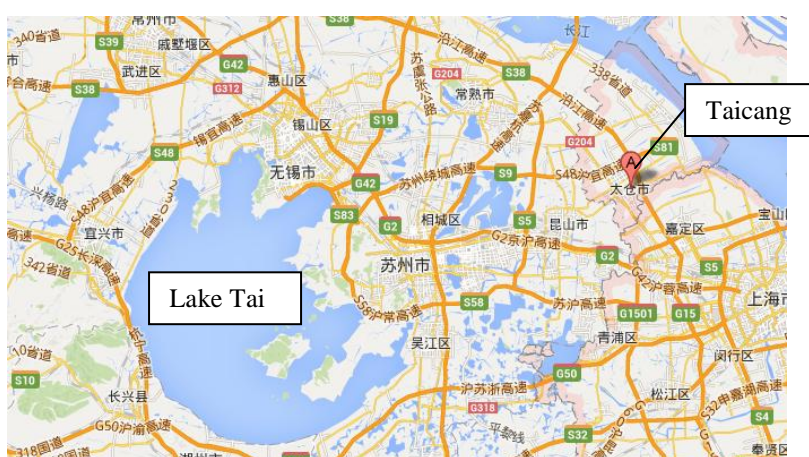


Fig. 1 Location of Ecolab Taicang

1.1 Lake Tai and Zero Effluent Discharge Requirement

With an area of 2,250 square kilometers (869 sq mi) and an average depth of 2 meters (6.6 ft), Lake Tai is the 3rd largest freshwater lake in China in southern part of Yangtze River Delta. It is linked to the renowned Grand Canal and is the origin of a number of rivers. The lake provides water to 30 million residents. In recent years, Lake Tai has been plagued by pollution as a result of rapid economic growth in the surrounding region. In 2007, algal bloom broke out in Lake Tai because of eutrophication caused by Nitrogen and Phosphate and led to the “Wuxi City Water Crisis”. Therefore, zero phosphate and ammonia discharge is strictly required by the government later to prevent eutrophication.

1.2 Wastewater Characteristics

Ecolab Taicang covers a wide range of products, including disinfectants (peracetic acid, quaternary ammonium salt, sodium hypochlorite), industrial cleaning agents (acidic, caustic and surface active agent), hand lotion, floor curing wax, and laundry soap powder series.

Several waste streams come from its process line, which have high concentration of contaminants, i.e. COD, phosphate, surface active agents (LAS), total nitrogen, total suspended solids, etc.

The design flow rate is 80 m³/day as requested, and COD_{Cr} is 5500 mg/l, and TDS is 10000 mg/l, TP is 600 mg/l, and TN is 178 mg/l. Zero phosphate and ammonia discharge calls for zero effluent discharge for Ecolab Taicang.

1.3 Treatment Processes and Treatment Result

Based on the client’s interests, process safety and operation-friendly requirements, the technologies of triple effect evaporator following with MBR are adopted for wastewater treatment. Process Flow Diagram of wastewater treatment is shown in Fig. 2 as below.

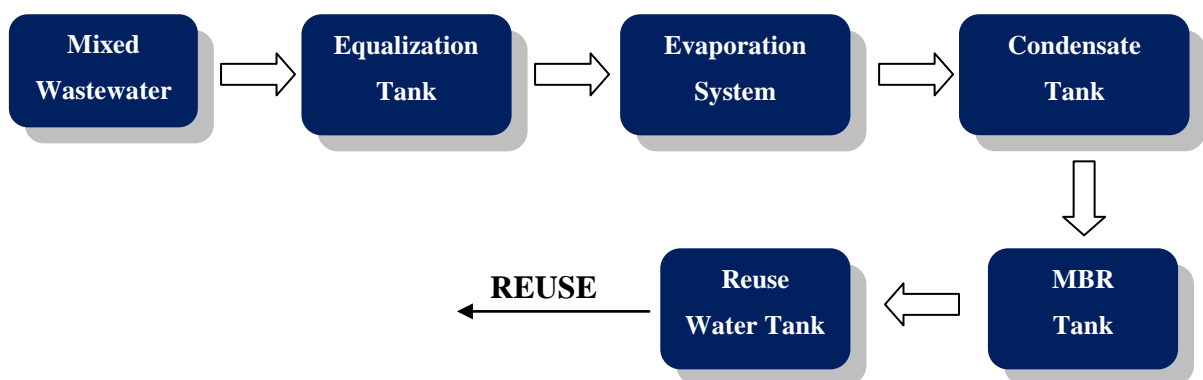


Fig. Process Flow Diagram of Wastewater Treatment

Three-effect evaporator targets to bring down TDS level acceptable for reclaim as grass dewatering and make-up water of cooling water system, and the majority of the COD, total

phosphate and nitrogen as minimum as possible. The downstream MBR functions to reduce the small portion of COD, Phosphate, and Nitrogen escaping from the evaporator with condensate to meet the effluent requirements.

After more than one year's operation, the system performance is stable and cost-effective. The influent contaminants parameters are similar as designed, and the effluent also obtains the data as expected. In summary, the treatment achieved reduction of COD_{Cr} by 99.6%, TDS by 90%, TP by 99.8%, and TN by 90%.

2 Roll of Entrants

PACT Environmental Technology Co., Ltd (abbreviated as PACT hereinafter).

PACT is the EPC contractor of zero effluent discharge for Ecolab Taicang. We provided design, equipment, installation supervision and commissioning service of wastewater treatment.

3 Brief Description of the Entrant Contribution

3.1 Originality & innovativeness

Zero effluent discharge. Ecolab Taicang is the first factory of ECOLAB Inc. to realize zero effluent discharge.

3.2 Complexity of the problem or situation that the project addresses

Stability and effectiveness of the wastewater treatment system arising from evaporation and a large quantity of foams caused by Ecolab Taicang products.

3.3 Social and economic benefits and overall sustainability

1) Prevent eutrophication of Lake Tai The treated wastewater is zero effluent discharged as required by the government. Therefore, zero nitrogen and phosphate (key factors causing eutrophication) is discharged which would affect Lake Tai eutrophication. After the requirement of prohibiting new built factories to discharge Nitrogen and Phosphate at Lake Tai Area, water quality of Lake Tai is improved at a large extend. Large scale algal breaking out hasn't happened since 2007.

2) Save water resource The treated wastewater is reclaimed for either grass watering or as make-up water for cooling water system.

3.4 Exceeding Ecolab Taicang Needs

As described in the client Testimonial, Ecolab Taicang is quite satisfied with our EPC service. The detailed engineering work started in January 2011, and the system put into use in September 2012. After more than one year's operation, the system performance is stable and cost-effective. In 2013, the wastewater treatment result was accepted by local Environmental Protection Bureau.

4 Concluding Comments

Combining technologies of evaporation and MBR and PACT experience in wastewater treatment, zero effluent discharge is finally realized in Ecolab Taicang factory. Zero discharge of Nitrogen and Phosphate is beneficial to prevent eutrophication of Lake Tai and wastewater reclaiming can save water resources.