

1. Project Name

1.3.9 Joint research for the anti-global warming wastewater treatment technology (Thailand)
1998 (H10)~2000 (H12)

2. Objectives

Although recently in Thailand, the industrialization has been progressing, the effects of industrial wastewater on the environment have been increasing at a high rate. Especially with wastewater treatment of food manufacturing factories, Lagoon treatment (concentration of wastewater from factories to for collective purification) is the most commonly used treatment method. The deterioration of rivers and the massive output of the culprit of the greenhouse effect, methane is becoming a problem. It is estimated that in 1997, approximately 2,100 tons of BOD has been produced and an approximately 800,000m³/day of methane has been outputted into the environment by the lagoons.

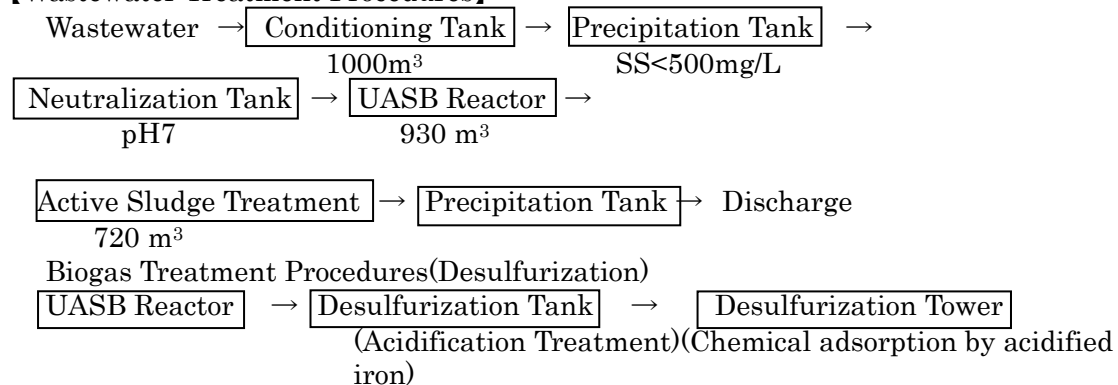
Due to this reason, the solutions to, ①loss of energy, ② the advancement of global warming, ③the deterioration of the environment by odors, ④the treatment of sludge waste, ⑤BOD output limitations (below 20mg/L), etc. are of immediate demand. In order to come to a solution, the Thailand government strongly demanded the installment of the anaerobic wastewater treatment system, effective in the collection of methane for the protection of the environment, at the Green Aid Plan (GAP) conference held in May of 1997.

This cooperative project group has the objective of aiding in the prevention of global warming, the practical use of the system, the demonstration in pilot plants, and planning of the new wastewater treatment system in Thailand as "The Cooperative research for the anti-global warming wastewater treatment technology (Thailand)," sampling results from the NEDO outsourcing project, "The Cooperative Research of a Simple Purification System of Industrial Wastewaters," initiated from 1993 to 1997 for 5 years.

In addition, the providing of maintenance methods, operation, and designing methods of the systems of the counterparts of Thailand, The Thailand Department of Industrial Works (DIW), and The Thailand Institute of Scientific and Technological Research (TISTR) will be done through this project.

3. Contents

【Wastewater Treatment Procedures】



【Operation Conditions】

Source Wastewater: 2,000m³/day (Rice Flour Manufacturing Factory Wastewater)
Source Water Specifications: BOD=2,500mg/L, COD=3,800mg/L, SS=1,200mg/L,

pH=4.6-6.0, Temperature=27-33°C

UASB

Sludge Type: Shipped from Japan, Approx. 30,000mg/L

Inlet SS Concentration: below 500mg/L

Inlet pH level: 7

Active Sludge

Sludge Type: Pineapple Factory Active Sludge

MLSS: 2,000-3,000mg/L

DO : 0.8-1.0mg/L

4. Results

1. The erection and operation of an experimental plant using the UASB method was done based on the experiment done by the pilot plant between 1993 and 1997. Although the UASB method is not used with a high SS level wastewater, this wastewater of a food manufacturing factory contained 2,000mg/L to 3,000mg/L of protein SS, and is dependent on the operational methods of the factory. It was required to control and operate at below 500mg/L at the inlet of the UASB reactor with this high SS concentrated setup. The experimental plant was able to continuously operate stably and was also proven that UASB is compatible for high SS concentrated wastewaters. The product water was able to clear the Thailand standards of wastewater and was also found possible to collect biogas responsible for the composition of methane, further satisfying the starting objectives. The major operating data is as follows.

Water Quality Data

<u>Original Waste Water</u>	<u>UASB Treated Water</u>	<u>Discharge Water</u>	<u>Wastewater Standards</u>	
BOD (mg/L)	2,300	140	15	<60
COD (mg/L)	3,800	370	40	<120
pH (-)	4.6-6.0	6.9-8.1	7.7-8.8	5.5-9.0
SS (mg/L)	1,300	180	12	<50

Biogas Data

Biogas Production Amount : 0.8Nm³/m³ (Treated Water)

Biogas Composition (After Desulfurization): CH₄ 78%, CO₂ 22%, H₂S 12ppm

Methane Production Amount: 0.34N m³/kg-COD

2. Aiding in operation, maintenance methods, and design methods was done with the Thailand counterparts of The Thailand Department of Industrial Works (DIW), and The Thailand Institute of Scientific and Technological Research (TISTR).
3. This project was given a television broadcast with the attention of the media, in addition to the recognition by prefectural ministers, more than 1000 industrial groups, industrial officials and Princess Sirindhorn at the practical plant celebration ceremony. This type of attention was highly effective in the promotion of this system, as environmental experts, government officials, consultants, research groups, and university affiliates appeared for observation. More than 4,000 people were confirmed from the year 2000 to 2001.

5. Reference

New Energy And Industrial Technology Development Organization (NEDO)
Subsidized Project

Counterparts : The Thailand Department of Industrial Works (DIW), and The Thailand Institute of Scientific and Technological Research (TISTR)