Case Study Pico Wastewater Treatment

Eastern Seaboard Industrial Park (Rayong, THAILAND)

Results of operations.
The digested sludge accumulation of wastewater treatment and odor control at Central Biological Waste Water Treatment System, The Eastern Seaboard Industrial Park (Rayong, THAILAND).

Background

Wastewater into the sewage system of the global biodiversity of industrial Eastern Seaboard (New) tends to increase beyond the capacity of the treatment wetland system, which supports the waste water not more than 3,000 cubic meters per day, The Eastern Seaboard Industrial Park (Rayong) Co., Ltd. is a wastewater treatment plant, such as a pool aeration (Aerated Lagoon), according to the original design. During the initial installation of three air aeration pond aeration No.1 (AL1), which was used as a pretreatment pond water. (Equalization pond) and it is necessary to remove accumulated sediment at the bottom of the pond aeration number. The survey found that the amount of up to 6760 cubic meters. PICO Technology Co., Ltd. has been proposed to decompose accumulated sediments and odor from water and sediment control pond aeration No.1. With the use of bio-products to the environment PICO Wastewater Treatment (products) in conjunction with a septic system. The total duration of 90 days, as detailed below.

1.Operations

1.1 To digested sludge accumulated at the bottom of the pool aeration No. 1 and Control odors caused by decomposition of organic matter in the aeration reactor. Using product with walking wastewater at a rate of 4 ppm. at the start of the first day, a rate of 2 ppm. on the second day and at 1 ppm. on the third day until the ninetieth day. The rate is calculated based on the amount of water that enters the system by about 3,500 cubic meters per day.

Dosing equipment.

Preparation of the solution.

Enzyme Solution

Log dosing.

Materials and equipment

1. Water Tanks 2,500 liters for 2 tanks and accessories. For dosing into the sewage system.
2. PICO Wastewater Treatment (Product) 329 kg.

Prepare the solution, and dosing into solution to the wastewater treatment system.

- Cleaning solution tank to clean up all contaminated or chemical disinfectants.
- Fill 2,500 liters of clean water into the solution tank.
- Started inject aeration into the water tank to the circulate solution, then put the PICO Wastewater Treatment (Product) 14 kg. into the tank and leave it open 24 hours aeration time.
- Next day, start dosing PICO solution to the wastewater treatment plant through pipes that hang over the grid as picture above. By the dosing rate constant and adequate water supply for the day.
- Preparation and dosing into the wastewater treatment system on day 2 by reducing the amount specified in Article 2-4 down to 7 kg product per 2,500 liters of water for solution preparation.
- Preparation and dosing into the sewage system on the ninetieth day following the procedure set forth in Article 2-4 was reduced down to 3.5 kg product per 2,500 liters of water for solution preparation.

1.2 To Reduce Malodor from the decomposition of organic substances during a refueling operation in the first 7 days of the product solution by spraying the surface of the water in the pond aeration No.1.

Concentrate solution for spraying.

Spraying solution in the aeration pond.

Materials and equipment

1. 200 liter solution tank and accessories. For preparation of solution concentration.
2. PICO Wastewater Treatment Products 7 kg.

Preparation and spraying the solution.

- Cleaning solution tank to clean the contamination effects of chemical disinfectants.
- Fill water volume 200 liters in the tank for the solution.
- Started inject aeration into the water tank to the circulate solution, then put the PICO Wastewater Treatment Product 1 kg. into the tank and leave it open 24 hours aeration time.
- After 24 hours, the enzyme concentration solution added into the water truck, then fill in water into the water for sufficient water to the spray solution covers that aeration pond No. 1. Then started to pump high-pressure spray enzyme solution to cover the water surface of aeration pond No. 1, especially around the aerator. The spray nozzle should be adjusted to an appropriate size to prevent water spray blown away with the wind.
- Prepare and inject the solution covers the surface of the water in the pond aeration number one. On the second day to the seven day by follow steps outlined in Section 2-4.

2. Monitoring and performance evaluation of the product.

2.1 Analysis of wastewater.

Monitoring performance by collecting water from the outlet area of aeration pond No. 1. on during the time using the product with wastewater. The analysis in the index, ammonia nitrogen (NH3-N: Ammonia Nitrogen), Sulfide (as H2S), BOD (BOD: Biochemical Oxygen Demand), COD (Chemical Oxygen Demand), TSS (Total Suspended Solids),TDS (Total Dissolved Solids) acidity and alkalinity (pH), FOG (Fat, Oil and Grease), TN (Total Nitrogen) and TP (Total Phosphorous).

Waste water from the outlet on November 7, 2008.

Waste water from the outlet on November 13, 2008.

Waste water from the outlet on December 8, 2008.

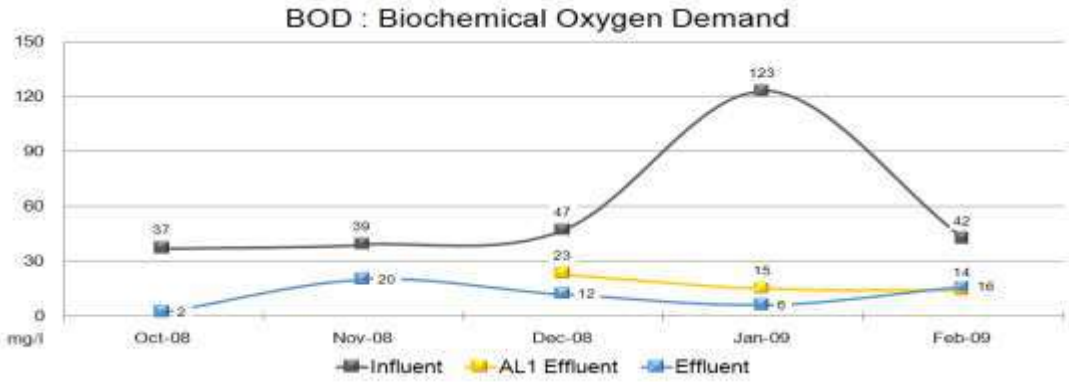
Waste water from the outlet on February 13, 2009.

Collect water sample from outlet on December 9, 2008.

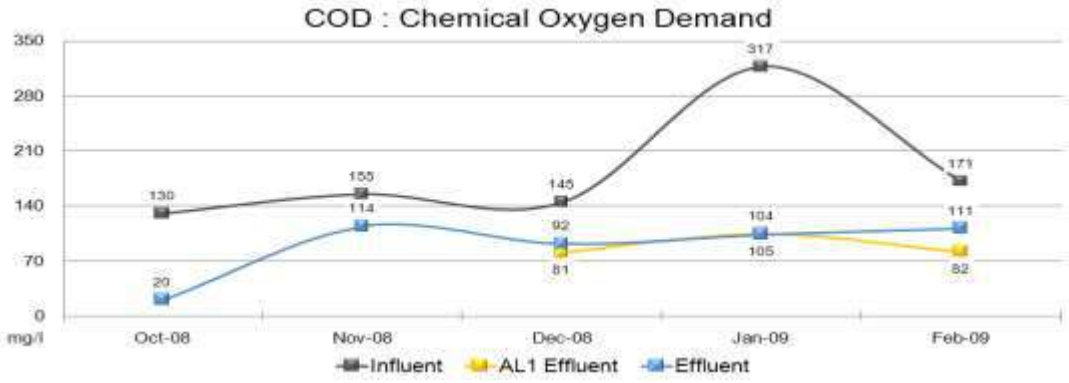
on January 13, 2009.

on February 3, 2009.

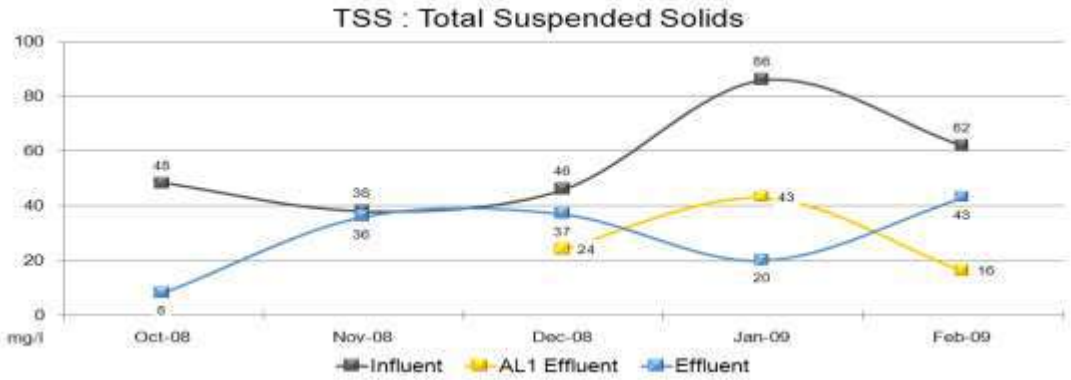
To evaluate the efficacy of the product with the wastewater treatment plant. Therefore, we do comparing the results of the analysis of inlet waste water into the system with result from the outlet water by started from December 2008 to February 2009 based on the characteristics of wastewater in the index, BOD (Biochemical Oxygen Demand), COD (Chemical Oxygen Demand), TSS (Total Suspended Solids), including FOG (Fat, Oil and Grease) as shown by the chart below. Detailed analysis of the water entering to the system, the outlet water from the aeration pond No. 1 and waste water out of the system. Show as Attachment 1.



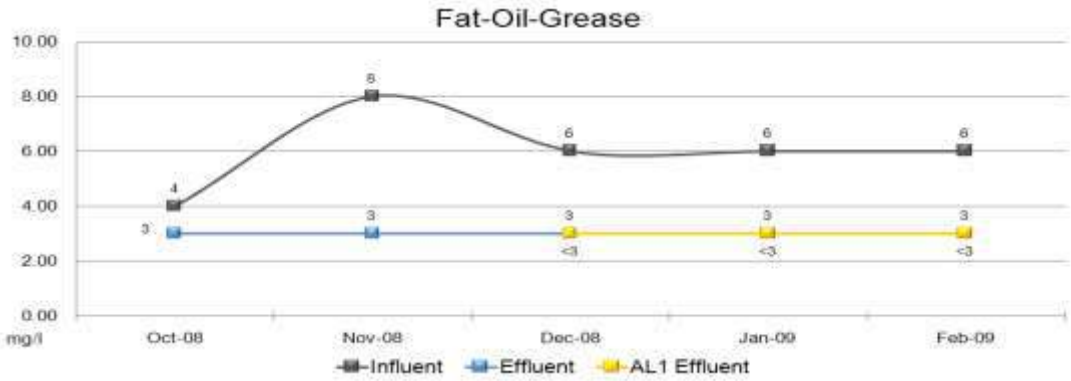
During using the product in wastewater treatment system to reduce BOD (Biochemical Oxygen Demand) start from December 2008 was decreased from 51.06 percent up to 87.80 percent in January and 66.67 percent in February 2009.



During using the product with a wastewater treatment system to reduce COD (Chemical Oxygen Demand) start from December 2008 was decreased from 44.14 percent up to 66.88 percent in January 2009 and 52.05 percent in February 2009.



During using the product with a wastewater treatment system to reduce the TSS (Total Suspended Solids) start from December 2008 was decreased from 47.83 percent to 50.00 percent in January 2009 and 74.19 percent in February 2009.



During using the product with a wastewater treatment system to reduce the amount of FOG (Fat, Oil and Grease) in water more than 50.00 percent during use.

In addition, based on the characteristics of wastewater in the index, TDS (Total Dissolved Solids) acidity and alkalinity (pH), TN (Total Nitrogen) and TP (Total Phosphorous) were quite low and close with the characteristics of the waste water into the sewage system. It showed that the use of the product in wastewater treatment system does not affect the characteristics of the wastewater by the index mentioned above. The index value of ammonia nitrogen (NH3-N: Ammonia Nitrogen) and sulfide (Sulfide as H2S) found that the volume is low. It showed that the product can help eliminate odors caused by sediment accumulation in the bottom of the aeration pond as well. The detailed analysis of wastewater quality flow to these system, wastewater quality flow out from aeration pond No.1 and wastewater quality flow out from the wastewater treatment plant to outside since start from October 2008 to February 2009 in the table shown below.

Date	Parameter	Hydrogen Sulfide	Ammonia Nitrogen	BOD_5	COD	Fat-Oil-Grease	pH	Total Dissolved Solids	Total Suspended Solids	Total Nitrogen	TKN	Nitrate	Total Phosphorous
2/10/2008	WWTP		17.1	37	130	4	7.5	920	48	20.8	15.6	4.3	3.9
-	-												
14/10/2008	WWTP			2	20	3	7.6	620	8				
3/11/2008	WWTP			39	155	8	7.6	580	38				
-	-												
3/11/2008	WWTP			20	114	3	7.5	696	36				
1/12/2008	WWTP			47	145	6	7.6	736	46				
9/12/2008	AL1	<0.5	20.5	23	81	<3	8	752	24	28.6			2.3
1/12/2008	WWTP			12	92	3	7.6	780	37				
6/01/2009	WWTP			123	317	6	7.4	948	86				
13/01/2009	AL1	<0.5	17.5	15	105	<3	7.8	756	43	31.7	28.1		3.5
6/01/2009	WWTP			6	104	3	7.9	884	20				
3/02/2009	WWTP			42	171	6	7.8	644	62				
3/02/2009	AL1	<0.5	19.3	14	82	<3	7.8	748	16	29.5	28	0.9	2.6
13/02/2009	WWTP			16	111	3	8.3	760	43				

Dec 2008	AL1			51.06	44.14	50.00			47.83				
Jan 2009	AL1			87.80	66.88	50.00			50.00				
Feb 2009	AL1			66.67	52.05	50.00			74.19				

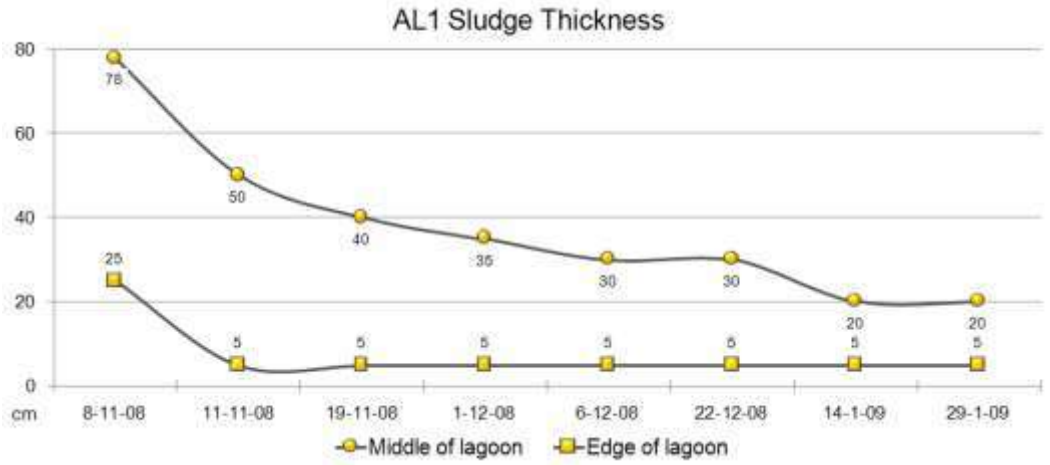
* Via Constructed Wetland
** Bypass to Polishing Pond

Note: Start using product in the wastewater from November 7, 2008 to February 4, 2009.

It should be noted that Based on the characteristics of wastewater from the wastewater treatment plant in October 2008 in the index, BOD (BOD: Biochemical Oxygen Demand), COD (COD: Chemical Oxygen Demand), TSS (Total Suspended Solids) TDS (Total Dissolved Solids) is found to be lower than that determined in the course of using the product with a wastewater treatment system. This is because prior to before using the product with the wastewater from the aeration pond No. 1 had no put aerator yet but using aeration pond No. 1 as stabilization ponds (Equalization pond). When it started using the product with these waste water treatment system, the waste water was treated organic matter. Suspended sediment and other nutrients from the bottom sludge with add aerator and the product. The accumulate organic sludge, suspended sediment and nutrients in sediments deposited at the bottom of the aeration pond for a long time were turn on and mix well then start digestion process to smaller particle and flow out with water to Polishing pond. it cause of the higher index such as TSS (Total Suspended Solids) which remained relatively high. If the product is used in conjunction with a wastewater treatment sludge continues to decompose the accumulate of the bottom sludge in aeration pond which will help reduce the amount of sediment came out with a small particle in the water.

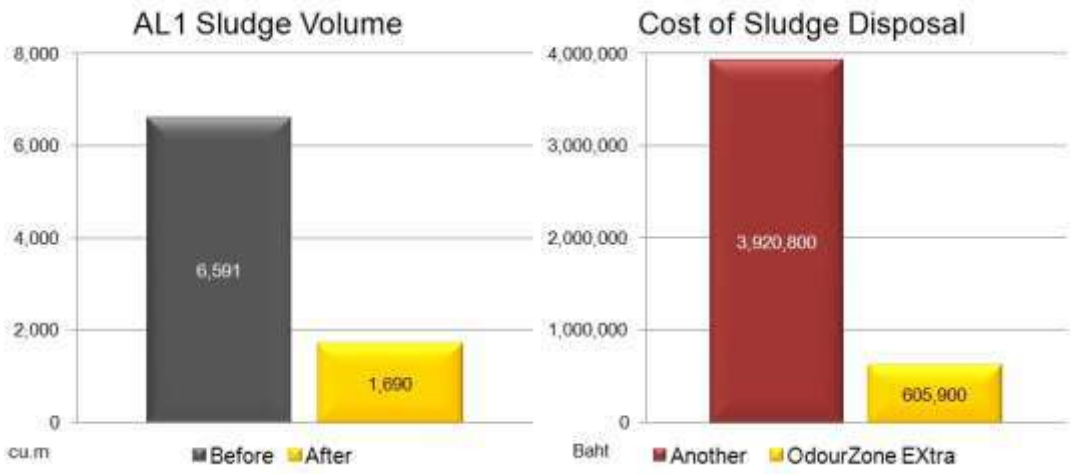
2.2 The measurement and analysis of sediment thickness.
Monitored by measuring the thickness of sediment accumulated at the bottom of the aeration pond No. 1 with the product for a period of time. The sediment samples were collected from the bottom of the aeration pond No. 1 at the end of the analysis period using the product with a wastewater treatment system.

To evaluate the use of the product with the wastewater treatment plant. Therefore, comparing the measurement result of sediment accumulation at the bottom sludge in the aeration pond. With measurements in the time it used product with wastewater treatment as shown by the chart below. Detailed measurements of the thickness of the sediments by Attachment 2, Details the analysis of the sediment by Attachment 3.



The measurement of the thickness of sediment accumulated at the bottom of the aeration pond No. 1 on November 8, 2008, the accumulated sludge at the center of pool with a thickness of 78 cm with volume of 6,591 cubic yards of sediment estimated. During use in conjunction with a wastewater treatment system that measures the thickness of the sediments is. The final measured thickness of sediment accumulated in the center of pool on January 29, 2009 by measuring the thickness of sediment accumulated in the center of pool was 20 cm with approximately volume of 1,690 cubic meters. Compared to the thickness of sediment accumulated at center of pool during the first measurement to the last measurement. The using PICO product with a wastewater treatment system to degrade and reduce the amount of sediments deposited at the bottom sludge of the aeration pond No. 1 of 58 cm or 74.36 percent reduction, representing a sediment removal by about 4,901 cubic meters of sediment sludge.
The results of the analysis of sediment at the end of the period of use combined with a wastewater treatment system that figures of acidity and alkalinity (pH), NO_3 (Nitrate), TN (Total Nitrogen) and TP (Total Phosphorous) is normal.

Summary of the product.
The monitoring implementation and evaluation of the PICO product by comparing the results of the analysis of waste water into the sewage system. The analysis of the water from the aeration pond No. 1 showed that the use of the product with a wastewater treatment system can help reduce the amount of organic matter and nutrients and suspended solids in the water as well. In addition to using the product in combination with a water treatment system to control odors caused by wastewater and sludge accumulated in the aeration pond and the removal of sulfide (Sulfide as H2S) and ammonia nitrogen (NH3. -N: Ammonia Nitrogen) can be observed from the analysis of waste water in the Index which is low and close to the measurements.



The comparison of the measured thickness of sediment accumulated at the center of aeration pond during from the first measurement to the last measurement. The demonstrate of the efficacy of the PICO product in the degradation of sediment accumulated at the bottom of the pond aeration No. 1 is the target of the operation. By using the product in combination with a water treatment system can increased digestion sludge accumulated at the bottom of the aeration pond by 74.36 percent sludge reduction which equivalent amount of sludge that can be disposed within 90 days of the operation over by approximately volume of 4,901 cubic meters. which it cost up to 3,314,900 Baht in sediment removal rate calculated based on the cost of sludge disposal by the general rate of 800 Baht per cubic meter.