

Wastewater Treatment System

“SMP Farm (3)”

88 Moo 2 Tambon Donsai Ampur Paktor Ratchaburi

Department of Livestock Development

Thailand

Table of Contents

| | |
|--|---|
| WASTEWATER TREATMENT SYSTEM | 1 |
| “SMP FARM (3)” 88 MOO 2 TAMBON DONSAI AMPUR PAKTOR RATCHABURI | 1 |
| 88 MOO 2 TAMBON DONSAI AMPUR PAKTOR RATCHABURI | 3 |
| SURVEY INFORMATION (BEFORE CONSTRUCTION) | 4 |
| <i>Farm in General</i> | 4 |
| <i>Expected Outcome from the Biogas System</i> | 4 |
| CONSTRUCTION | 4 |
| INFORMATION DURING SYSTEM RUNNING | 5 |
| <i>Farm Conditions</i> | 5 |
| <i>Power Utilization</i> | 5 |
| <i>System Performance (as May 2001)</i> | 5 |
| <i>Organic Fertilizer</i> | 6 |

Wastewater Treatment System

“SMP Farm (3)”

88 Moo 2 Tambon Donsai Ampur Paktor Ratchaburi



Under Biogas Production from Livestock Farm Promotion Project
Phase 2 Year 1999

Survey Information (before construction)

Farm in General

- Large size pig farm, total area 120 rai (1 rai = 1,600 square meter) not close to community and operated since 1984
- Total pig 21,000 heads, feed in evaporative house (21 units)
- Water supply from public canal and store in own reservoir (24,405 m³)
- Peak electricity consumption in day time 200 kW and low 100 kW in night time
- Farmer had intension to use biogas technology to reduce pollution, obtain renewable energy and digested sludge for fertilizer, reuse treated wastewater

Electricity consumption before biogas system construction

- Monthly charge 270,000 Baht

Expected Outcome from the Biogas System

Energy Production

- Biogas production CH₄ 65% about 2,000 m³ per day
- Renewable Energy

| | | |
|-------------|-----------|---------------|
| Electricity | 2,500 | kW-hr/day |
| or about | 2,737,500 | baht per year |

Environment

- Reduce pollution, odor and flies
- Reduce methane emission
- Treated wastewater about 220,000 m³ per year

Organic Fertilizer

Dry digested sludge from sludge drying beds with 15% moisture about 1,500 ton per year

Recycle Treated Wastewater

About 200 m³ per day

Construction

Area use 40 rai consisted of :-

- Sewer and drainage system
 - Biogas system (Wastewater treatment system)
 - Biogas pipe and accessories
 - Power line
 - Post treatment for wastewater
- | | | |
|---------------------|---|--|
| Total investment | : | 16,000,000 baht |
| Construction period | : | 15 months (November 1998 – January 2000) |
| System start up | : | March 2000 |

Information during system running

(May 2001)

Farm Conditions

- Pig house 21 units
- Feeding pig (all in all out) 21,000 heads
- Total weight 1,260,000 kgs
- Livestock unit 1,260-4,294 LU.
- Wastewater discharge 1,100 m³ per day

Power Utilization

- Electricity generator from biogas 1 unit 230 kW and Modified Diesel engine 1 unit 135 kW
 - Produced Electricity 2,000 kW-hr/day
 - Or about 2,190,000 baht/year (based on 3 baht per unit)

System Performance (as May 2001)

| Operating Units | Parameter | TSS (mg/l) | COD _t (mg/l) | TKN (mg/l) | BOD (mg/l) | pH |
|---|-----------|---------------|----------------------------|---------------|---------------|-------|
| Raw wastewater | | 3,900 | 16,400 | 570 | 5,130 | 8.3 |
| After Biogas unit | | 180 | 600 | 410 | 80 | 7.8 |
| After stabilization ponds system | | 220 | 300 | 140 | 30 | 8.3 |
| In recycle pond | | 35 | 300 | 60 | 30 | 8.5 |
| Standard for Discharged Effluent | | 150 | 300 | 120 | 60 | 5.5-9 |
| Sample from recycle pond (October 2007) | | 15 | 89 | 20 | 8 | 7.8 |

Organic Fertilizer

With moisture 15% about 3,000 kg/day (1 Baht per kg)
Or income 88 USD/day



Modified Diesel Engine Generator 90 kW



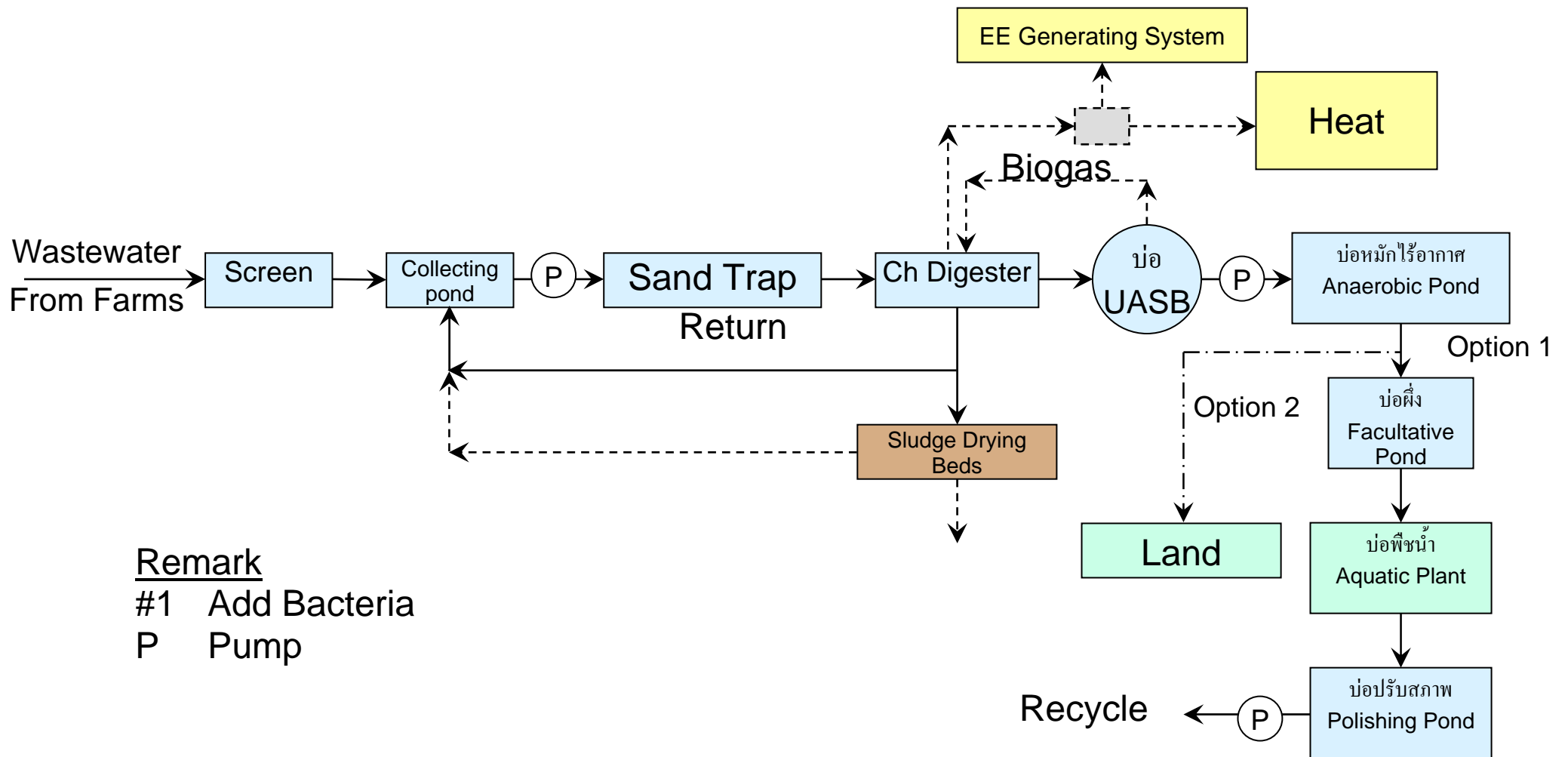
Biogas Generator 230 kw



**Biogas Purification Unit
(Biological Treatment)**



Biogas Purification Unit



Process Flow Diagram MC-UASB#1 : SPM Farm

