# The Liquid Waste Management Of Tapioca Miniplant In Negara Bumi Ilir Center Of Lampung

**M C T Atmodjo[1]**

[1.] Starch Technology Center. BPPT. Bandar Lampung, Indonesia. Email: atmojo_b2tp@yahoo.com

**Abstract.** The Liquid Waste of Tapioca Plant needs work hard for liquid waste application for us with circumstance friendly . The design of mini pool with 12 $m^3$ in volume close to miniplant and make 3 inch dia. of PVC pipe as channel to Waste Water Treatment Plant (WWTP) is one of the waste solution. The WWTP has 700 $m^3$ of anaerobic digester for biogas process. The Biogas yield collected in biogas tank which able to use for cooking stove and lamp for light. The liquid waste from WWTP can be use for irrigation and the sludge able to use for fertilizer. Key words : Biogas, Liquid waste, Tapioca miniplant, digester.

## I. Introduction

Disposing of waste in an environmentally-friendly manner is crucial to our business. It need assess the waste streams and develop the right recycling and disposal solution. If the proposed liquid waste disposal system does not meet a specific requirement of the Liquid Waste Disposal and Treatment Regulations but the applicant believes the proposed liquid waste system will provide equal or better protection for public health and will not degrade any body of water, the applicant may apply for a variance to the specific requirement. Below is the procedure to follow in requesting a variance.

1. Complete aLiquid Waste Disposal & Treatment Permit Application.
2. Determine what section(s) of the Liquid Waste Disposal Regulations the proposed system does not meet.
3. Complete a Variance Application.
4. Document why or how the proposed system provides equal or better protection than what the regulations require. Applicants must provide clear and convincing evidence that: a).The proposed Liquid Waste system will, by itself, or in combination with other sources, neither cause a hazard to public health nor degrade any body of water, and b). granting the variance will result in public health and environmental protection equal to, or greater, than the minimum protection provided by the specific requirement of the regulations.
5. Notify all adjacent property owners sharing a common property line within 1,000 feet of the proposed liquid waste system of your intentions to apply for a variance. Also notify property owners sharing a common right of way if their property is within 100 feet of the proposed liquid waste system. Notification may be by Certified Mail with Return Receipt requested or by Hand-Delivered notification.

6. The notification must include the following:

a. The nature of the request (section of the Liquid Waste Disposal & Treatment Regulations from which the variance is requested and the specifics of that requirement);

b. The address of the Department Office where the application will be submitted;

c. The time frames for NMED action, and;

d. The proposed date the variance application will be submitted to the NMED field office.

7.Submit completed variance package to the appropriate NMED office (the one specified in the variance notification). The package must include:

a. The completed Permit Application;

b. The completed Variance application (signed and dated);

c. Clear and convincing documentation and evidence showing why the variance should be granted;

d. Documentation showing that if the variance is granted how the requirements of Number 4 above are met;

e. Documentation that the adjacent property owners have been notified.

Acceptable documentation are:

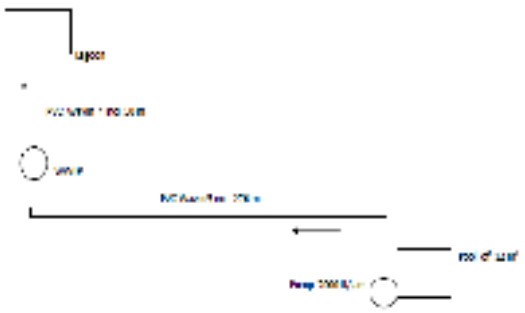
1) The return receipts (originals or copies) of the certified letters mailed to the property owners.10/05

2) Sheets signed by the property owners that they received the hand-delivered letters.For either the mailed or the hand-delivered letters, attach a map or drawing indicating who owns which adjacent lot. NMED will not evaluate the variance application until all forms are complete and documentation provided. NMED will act on the variance application a minimum of 10 days after, but within 20 working days following submission of a completed package.

Applicants dissatisfied with NMED's action may request a hearing by following the procedure in Section 406, Liquid Waste Disposal & Treatment Regulations. The hearing request must be in writing and submitted within 15
days of the written notice on the variance application.

## 2. The Design Of Waste Treatment

The design of waste treatment of plant tapioca to WWTP is ilustrated in figure 1 as follow.



`**Figure 1**. The Figure of waste distribution from 12 m3 pool to wwtp and lagoon pond

The tapioca mini plant will produce about 60 $m^3$ of liquid waste in 1 day of operation. The 12 $m^3$ pool will collect liquid waste temporary before pumping to WWTP. This waste should be under FEPA, 2012 as ilustrated in table 1.

**Table 1.** Industrial effluent limits in mg/l Source: (PEPA, 2012)

| PARAMETER | DISCHARGE STANDARDS |
|---|---|
| Temperature ($^0$C) | <40 |
| Total suspended solids | <200 |
| Grease/oil( total fatty matter) | 10 – 220 |
| $BOD_5$ (mg/L) | 30 |
| COD (mg/L) | 160 |
| Phosphate | 15 -20 |
| Detergents | 10 – 15 |
| Sulphate | <250 |
| Toxic/metals/heavy/cyanide | 0.1- 0.15 |
| Nitrates mg/L | 20 |
| Conductivity | <200FTU |
| Turbidity (NTU) | <50 |
| Total coliform (MPN/100ML) | 400 |
| Alkalinity ( mg/L) | 100 |
| Total Hardness (mg/L) | 200 |

In order to fullfil the FEPA 2012 we design Waste water Treatment as follow.

1). The liquid waste are aeration before flowing to anaerobic digester as fig.2

**Figure 2.** The aeration pool

**Figure 3.** Under sun shine of solid waste

2) The solid waste was put under sun shine as fig 3

3) The 700 cubic m of anaerobic digester keep the liquid waste 20-30 days as fig 4.

**Figure 4.** The 700 cubic m of anaerobic digester

**Figure 5.** The aerator of slurry before flowing liquid waste to irrigation water.

**Figure 6.** Biogas Holder tank (Blue collor)

4) The overflow of slurry from anaerobic digester is aeration by the aerator before flowing to irrigation water as fig 5.

5) The Biogas yield collected on biogas holder tank as fig 6.

6) The liquid waste after anaerobic fermentation in digester able to use for fish, irrigation and other purpose.

## 3. Conclussion

1. The Waste Water Treatment help us to find out usefull thing such as biogas for cooking stove, water for fish and irrigation and water for other purpose.
2. The Circumstance friendly is one of benefit by this Waste Water Treatment.

## Reference


[1] Aguilar, FX., (2001), *How to install a polyethylene biogas plant*, Proceeding of the IBSnet Electronic Seminar, (The Royal Agricultural College, Cirencester, UK. 5-23 March 2001), http://www.ias.unu.edu/proceedings/icibs/ibs/ibsnet/e-seminar/FranciscoAguilar/index.html

[2] Anonim, 2008, *Dasar-Dasar Teknologi Biogas*. http://www.google.com/teknologi biogas [ pdf ]

[3] Biogas Support Program (BSP), (2003), *Construction option for RABR Remote Area Biogas Reactor*, SNV-Nepal
[4] Dadang dan Cahyono, 2012. *Pembangunan Instalasi Biogas dari air limbah domestik di Pondok Pesantren Al Ashriyyah Nurul Iman*, Parung, Bogor**.**
[5] Garcelon, J. and Clark, J., 2001, *Waste Digester Design, Civil Engineering laboratory Agenda,* University of Florida, http://www.ce.ufl/activities/waste/wddndx.html
[6] Haryati, Tuti; 2006 : Biogas : *Limbah Peternakan Yang Menjadi Sumber Energi Alternatif*, Journal Wartazoa, **volume 16** no 4
[7] Hammad S.M.D., 1999, *Integrated Environmental and Sanitary Engineering Project at Mirzapur*, Journal of Indian Water Work Association 28 : 231-236
[8] Hendroko, R., Liwang, T. dan Saefudin, 2008, *Sinergi Bio-metana Berbahan baku Limbah Jatropa curcass.L dan Pangan Dalam Penerapan Program Kawasan Rumah Pangan lestari*, Pasca sarjana Universitas Darma persada, Jakarta.
[9] Kadarwati, Sri, 2003, *Studi Pembuatan Biogas Dari Kotoran Kuda dan Sampah Organik Skala Laboratorium*, Journal P3TEK II
[10] Khori Ex Indarto, 2010, *Produksi Biogas Limbah Cair Industri Tapiokas Melalui Peningkatan Suhu dan Penambahan Urea Pada Perombakan Anaerrob*; Skripsi, Jurusan Biologi, FMIPA, Universitas Sebelas Maret, Surakarta
[11] Karim, K., Hoffmann, R., Klasson, T., Al-Dahhan, MH., (2005), *Anaerobic digestion of animal waste: Waste strength versus impact of mixing, Bioresource Technology*, 96, 1771-1791
[12] Metcaff dan Eddy, 2003, *Wastewater Engineering Treatment, Disposal, and Reuse,* 4th ed, McGraw-Hill, Singapore
[13] Moog, FA., Avilla, HF., Agpaoa, EV., Valenzuela, FG., Concepcion, FC., (1997), *Promotion and utilization of polyethylene biodigester in smallhold farming systems in the Philippines*, Livestock Research for Rural Development, **Volume 9,** Number 2.
[14] Nurhasanah, Ana.,Teguh W.W., Ahmad A., dan Elita R., 2006, *Perkembangan Digester Biogas di Indonesia ( Studi Kasus di Jawa Barat dan Jawa Tengah )*, Balai Besar Pengembangan Mekanisasi Pertanian, Serpong
[15] Pambudi, N.A., 2008, *Pemanfaatan Biogas Sebagai Energi Alternatif, Jurusan Teknik Mesin dan Industri*, Fakultas Teknik ,Universitas Gajah Mada. http://www.dikti.org/
[16] Ratnaningsih, Widyatmoko, H dan Yananto, T. , 2009, *Potensi Pembentukan Biogas Pada Proses Biodegradasi Campuran Sampah Organik dan Kotoran sapi Dalam batch Reaktor Anaerob*, Journal Teknologi Lingkungan 5 ; 20-26
[17] Rahman, B., (2005), *Biogas, Sumber Energi Alternatif,* Kompas 8 Agustus. 6. Raven, RPJM., Gregersen, KH., (2005), *Biogas Plant in Denmark: Sucesses and Setbacks, Renewable and Sustainable Energy Reviews*, Article in Press Simamora, S. et al., 2006, *Membuat Biogas Pengganti Bahan Bakar Minyak dan Gas Dari Kotoran Ternak*, Jakarta : Agro Media Pustaka
[18] Syamsudin, T.R dan Iskandar, H.H.,2005, *Bahan Bakar Alternatif Asal Ternak*, Sinar Tani, Edisi 21-27 Desember 2005, no 3129
[19] Sa"id, E. G., 2006, *Bioindustri, Penerapan Teknologi Fermentasi*, Jakarta : PT Mediyatama Sarana Perkasa.
[20] Teguh Wika Widodo and Agung Hendriadi, 2005, *Development of Biogas Processing for Small Scale Cattle Farm in Indonesia*, Conference Prpceeding : International Seminar on Biogas Technology for poverty Reduction and Sustainable Development, Beijing, 2005, pp 255-261
[21] Udin Hasanudin, dkk, 2007, *Optimasi Fermentasi Air Limbah Tapioka Sebagai Sumber Biogas*, Ringkasan Eksekutif Hasil-Hasil Penelitian, Jurusan Teknologi Hasil Pertanian, Fakultas Pertanian, Universitas Lampung

.