

第七部分: 疑难问题处理

Section 7: Troubleshooting

- 生物和物理问题：维持沼气生产
- Biological and Physical Problems: *Maintaining Biogas Production*
 - 良好做法 Good practices
 - 问题 Problems
- 安全预防措施
- Safety precautions
 - 施工期间 During the construction
 - 操作期间 During operation

生物和物理问题 Biological and Physical Problems

良好做法

Good Practices

- 避免施用大量猪粪。最好是每天将猪粪加入封闭发酵池内。
- Avoid slug loads of manure. Ideally, manure should be added to the covered lagoon daily.
- 确保进水无砂岩和大块的草垫。
- Make sure the influent is free of sand rock and large chunks of bedding
- 防止诸如消毒剂 and 杀虫剂等化合物进入发酵池。
- Prevent toxic compounds such as sanitizers and pesticides from entering the lagoon.
- 每天检测沼气产量。
- Measure biogas production daily.
- 遵循运行和维护手册中的良好做法。
- Follow good practices per O&M manual.

盖子上的水 Water on the cover



盖子上的水 Water on the cover



压力积聚 Pressure build-up



压力积聚2 Pressure build-up 2



压力积聚 3

Pressure build-up 3



过度膨胀的结果 Result of Overinflation



安全预防措施 Safety precautions

- 施工期间 During construction
 - 搬动材料 Moving material
 - 加装盖子 Installing the cover
 - 焊接 Welding
- 发酵池操作期间 During the operation of the digester
 - 一般安全措施 General safety measures
 - 盖子 Cover
 - 长明灯 Flare
 - 沼气设备 Gas equipment



施工期间 1/2

During construction 1/2

工作内容 Work Activity	风险 Risks	安全措施 Safety Measures
卸载和移动材料 Offloading and moving materials	挤压 Crush	<ul style="list-style-type: none"> - 使用专用设备处理材料重量 - Use equipment designed to handle weight of material - 避免悬浮荷重 - Stay clear of suspended loads.
加盖 Installing the cover	沼气 Gases	<ul style="list-style-type: none"> - 起风 - Work up wind - 使用外部通风和气体探测器 (如有必要) - Use external ventilation and gas detector (if necessary)

施工期间 2/2

During construction 2/2

工作内容 Work Activity	风险 Risks	安全措施 Safety Measures
焊接 Welding	<ul style="list-style-type: none"> - 火 - Fire - 电击 - Electrical shock 灼伤 - Burns 	<ul style="list-style-type: none"> - 禁止吸烟 - No smoking - 所有电动工具使用接地故障线路开关。检查垂落的电线电缆。 - All power tools used with a ground fault circuit. Inspect Drop Cords - 远离新焊接的材料直至接缝冷却。 - Stay clear of newly seamed material until seams are cooled.

操作期间 1/5

During operation 1/5

概述 General



- 在盖子、气体管道或者缸体处理设备处及其附近，禁止吸烟。
- **No smoking** on or near the cover, gas piping, or gas handling equipment.
- 应保持一份维护和修理日志。日志内容应该包括一张盖子的草图，指出修理位置和日期。
- **A maintenance and repair log should be kept.** Log should include a sketch of the cover showing locations and dates of repairs.

操作期间2/5

During operation 2/5

概述 General

- 禁止在盖子上独自行走。建议“结伴同行”、携带个人漂浮设备、索具和救生索。
- **Do not walk on the cover alone.** “Buddy”, Personal Floatation Device, harness and lifelines are recommended.
- 在罐和门结构上使用梯子时要小心。
- Use **ladders** on tanks and gate structures with caution.



操作期间3/5 During operation 3/5

盖子 Cover

- **沼气和火灾危险 : Biogas and Fire Hazard :**
 - 便携式灭火器随手可得 ;
 - Have easily accessible portable fire extinguishers;
 - 避免产生火花 ;
 - Avoid sparks;
 - 使用吹风机系统或者临时通风孔 , 防止气体逸入工作区域 ;
 - Use blower system or temporary vent to prevent gas escaping into the work area;
 - 在上风方向工作或者使用一台便携式风扇使缸体远离设备。
 - Work from upwind or use a portable fan to keep the gas away from the equipment
- **划伤 : Tears:**
 - 修补划伤/穿刺 ;
 - Patch any tear/puncture;
 - 检查鞋底上的碎屑之后 , 再在盖子上行走
 - Check soles of shoes for debris before walking out onto the cover

操作期间4/5 During operation 4/5

长明灯 Flare

- 关闭气体管线上的阀门和点火器之后，再检查或者维修长明灯。
- **Shut valve** on gas line and turn off the igniter before inspecting or servicing the flare.
- 确保通向长明灯侧的门关闭之后，再点亮长明灯。
- Ensure the access **door** on the side of the flare is closed before lighting the flare.



操作期间5/5

During operation 5/5

气体设备 Gas equipment

- 在适当的气体空气混合比例时，沼气极易爆炸/燃烧。
- Biogas has the potential of being extremely explosive/flammable with the right gas-to-air mixture.
- 检查脱湿器(P-traps) 中的水位。如果水位低，则气体可能通过它们排放出去。
- Check water level in the P-traps. Low water level could allow gas to vent off through them.
- 检查电池和设备支架的地线是否连接到接地棒。
- Check ground wire from the battery and the equipment stand is connected to the ground rod.
- 检查点火器导线固定就位、连接牢固。
- Check igniter wires are in place and connections are tight.

第八部分：海东养猪场

Section 8: Haidong swine farm

- 位置、温度和降雨
- Location, temperature and rain

- 猪群
- Swine population

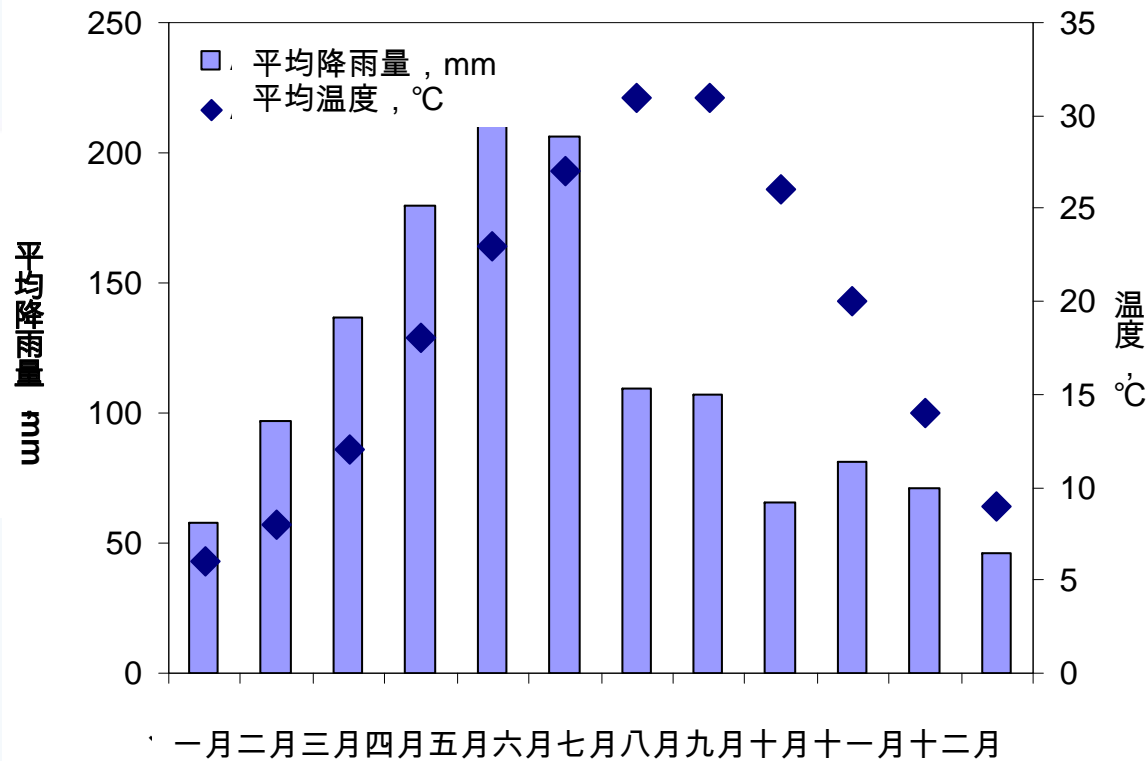
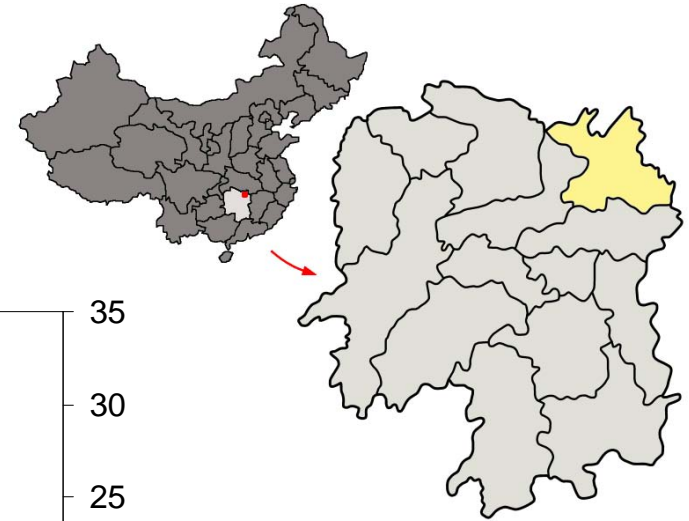
- 发酵池特点
- Digester characteristics

- 照片和海东农场平面图
- Pictures and site plan of the farm

位置，温度和降雨

Location, temperature and rain

- 湖南省岳阳县
- Yueyang County, Hunan Province



猪群 Swine population

- 分娩到育成 Farrow-to-finish
- 平均数量Average : 10,000
- 最大数量Maximum : 13,000



发酵池特点

Digester characteristics

- 发酵池周围的环境温度
- Ambient temperature covered lagoon

- 操作容积：~15,032 m³
- Operating volume: ~15,032 m³

- 进水流量：~328 m³/天
- Influent flow: ~328 m³/day

- 水力停留时间：46 天
- HRT: 46 days

- 挥发性固体负荷量: 2,309 kg/天
- VS loading: 2,309 kg/day

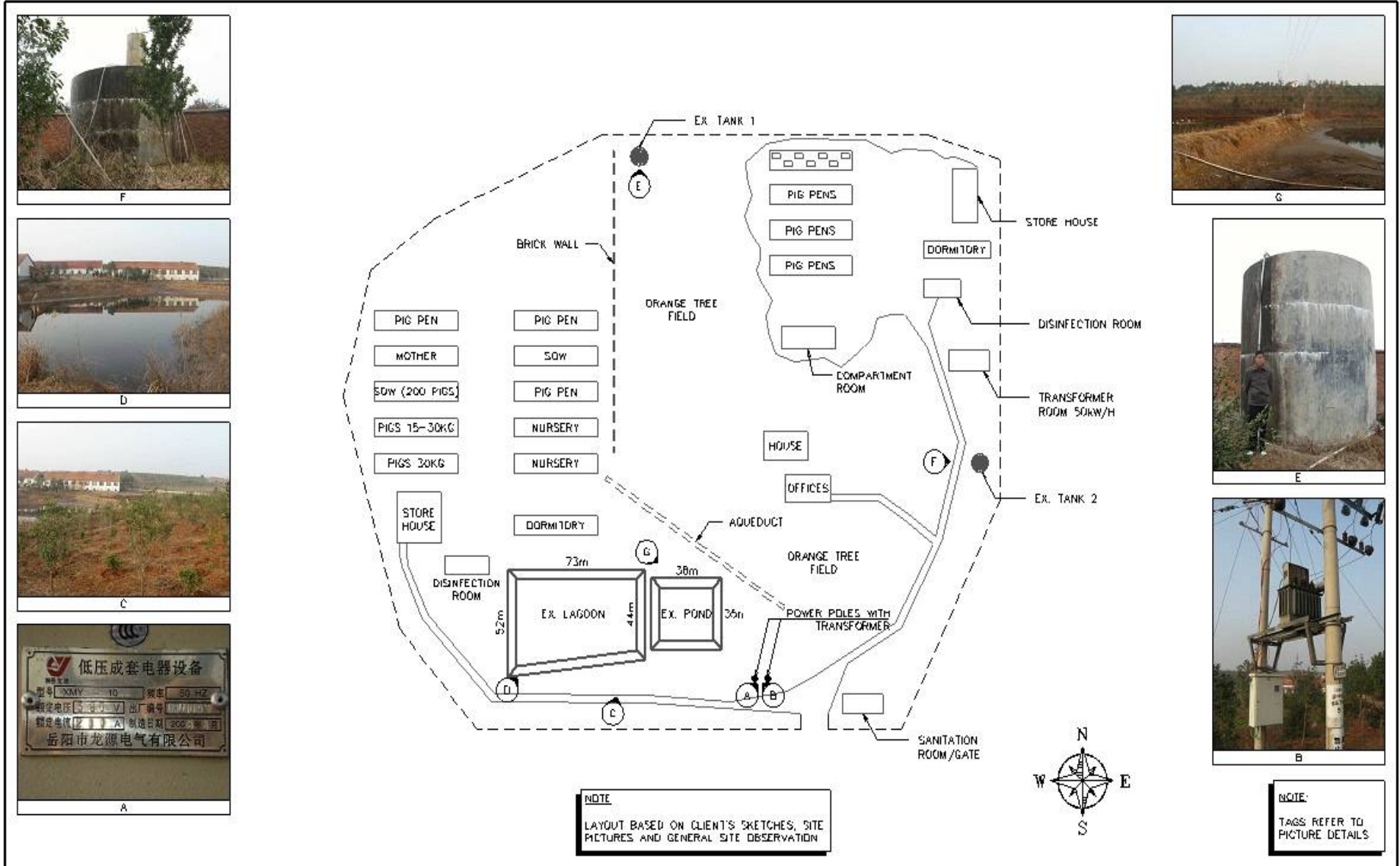
- 挥发性固体负荷率: 154 kg/1,000 m³/天
- VS loading rate: 154 kg/1,000 m³/day

农场 The farm



海东农场-平面图

Haidong farm – Site plan



DATE: 4/8/09
 SCALE: N.T.S.
 DRAWN BY: DP
 CHECKED BY: GL



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PROJECT DESIGNED FOR:
HI TONG FARM
YU YANG, CHINA

PRELIMINARY
 NOT FOR
 CONSTRUCTION

CIVIL SET
 SITE PLAN

SHEET NUMBER:
SP
 REVISION 1
 REV. DATE: 04/08/09

研讨会结束。谢谢！
The End. Thank you!



若干有用网站

Some websites

- 甲烷市场化
- Methane to Markets:
- <http://www.methanetomarkets.org>

- 美国环保署
- EPA Farmware:
- <http://www.epa.gov/agstar/resources/handbook.html>

- 政府间气候变化专业委员会
- IPCC, Intergovernmental Panel on Climate Change
- <http://www.ipcc.ch/>

- 联合国气候转变框架公约
- UNFCCC, United Nations Framework on Climate Change
- <http://unfccc.int/2860.php>

- 东亚禽畜废物管理
- LWMEA, Livestock Waste Management in East Asia
- <http://www.lwmea.org/>