

Tiry Engineering, Inc.

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Online Statement of Qualifications
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Company Profile

Tiry Engineering, Inc. (TEI) was formed in 1994 in response to a need for engineering services in agriculture. As agricultural waste management specialists, TEI is dedicated to providing cost effective design solutions for dairy, beef, poultry, and hog livestock on sites ranging from 50 to 20,000 animal units. Services TEI provides includes waste-to-energy feasibility studies and design systems utilizing various means of combustion of separated solids; designs for agricultural waste control, treatment, transfer, and storage; site designs that carefully integrate the landowner's needs with environmental concerns; erosion control, CNMP, wetland delineation, and storm water plans; and waste storage permitting and environmental assessments for compliance with local, state, and federal regulations. TEI currently holds licenses in Illinois, Iowa, Kansas, Minnesota, New York, and Wisconsin.

Examples of Digester Project Experience

Pine River Biomass Development LLC, Wisconsin

Description of Project

This is a community digester project involving four farms and three dairy processing plants in and near Richland Center, Wisconsin. The total number of livestock in the project is 2,600 head of cattle on four farms. Some of the farms use sand bedding. The project will involve a pipeline to transfer the manure to the site to be co-digested with the High Strength Waste (HSW) from the three dairy plants. The project also involves working with the City of Richland Center as they explore the possibility of co-locating their new waste treatment facility on the same site.

Involvement with Project

TEI inventoried participating farms to assess existing waste manure systems to determine potential anaerobic digestion and transfer of waste to a central site. Prepared RFP (request for proposal) and transmitted to prospective digester and Cogeneration vendors. Received proposals and evaluated relative merits of each to present to the organization. TEI worked with the group of four farms, three dairy plants, and the consultants for the dairy plants to prepare an overall process design for a system that includes a digester, a separation system to separate the volatile solids from the HSW, a manure transfer system, and a nutrient recovery system. The nutrient recovery system is intended to reduce the volume of the liquid waste stream to a marketable concentrated liquid fertilizer product, a soil amendment dry product, and a clean water stream. The work included a feasibility study prepared in conjunction with the Richland County Economic Development Corporation (RCEDC) and the newly formed Pine River Biomass Development Corporation (the farm group).

Results

This work is currently in progress. RFPs have been solicited for the digester system, the engine-generator system, and the treatment/nutrient recovery system. A preliminary report of the findings has been presented to the group. The project has been considered feasible. A digester and a cogeneration vendor will be selected soon. The project is still in progress.

Examples of Digester Project Experience

Nobelhurst Farms, Inc., New York

Description of Project

Located in Livingston County, New York, the farm has 1,000 dairy cows, 200 heifers, and 250 calves and is located on 2,000 acres. The farm began operating the digester in January of 2003.

The digester is plug-flow system that incorporates a rectangular in-ground concrete tank (120' x 50' x 16') consisting of two digesters separated by a concrete wall. Manure is scraped from each barn and collected in a reception pit which is then mixed with digested effluent to obtain 10% dry matter content. With 1,000 milk cows plus 200 heifers onsite, the manure production is estimated to be 28,000 gal/day or 10, 220,000 gal/year. Retention time is 25 days.



Separated solids are composted and used as a soil amendment in the cropping program or sold. The separated liquids flow to a concrete storage by gravity.

Involvement of Project

Tiry Engineering, Inc. (TEI) worked with Cow Power to design the parallel path digester system. TEI designed the reinforced concrete tank and the manure transfer system. TEI was also involved in the construction of the project. TEI's responsibility involved the design from the point of collection of the manure to the point of discharge of the treated effluent and the discharge of the biogas to the gen-set building.

Results

Biogas production is 72,000 ft³/day. The engine is a Caterpillar 3406NA. The generator is a Marathon 447. The engine-generator set roughly has an electricity production of 788,400 kWh/year based on 90 kW output.

This digester introduced several unique features to the digester area that has been copied by other designers. One feature being the combination grit pit and heat chamber. This feature enabled the digester to bring the substrate up to a uniform temperature before the substrate entered the methanogenic phase of the digester. It also separated the acid phase from the methanogenic phase. Additionally, it provided a means of removing grit from the digester without having to shut the digester down.



Examples of Digester Project Experience

SUNY Morrisville, New York

Description of Project

After undergoing a feasibility study, the methane digester was designed and built for the College of Agriculture and Technology at the State University of New York (SUNY) at Morrisville. The campus is a two year agricultural college. The digester was built as a parallel path digester set up for demonstration and study. The design is a simple plug-flow digester that included a grit pit and heat chamber as noted above for the Nobelhurst project. The digester is also capable of taking in outside substrate at a dump station built as part of the system.

Involvement with Project

TEI prepared a preliminary concept design for use in a feasibility study prepared by Cow Power Inc. The preliminary work involved preparing a process flow for the system and analyzing the cost effectiveness and productivity of the digester. TEI then prepared the final digester design, prepared plans and specifications, and worked with Cow Power during installation. The design included a combination grit pit and heat chamber – a feature that has been copied by others since.

Results

The digester has been built and is performing well producing about 1 kilowatt per 5 cows. It was designed for a hydraulic retention time of 20 days for 400 head of dairy cattle. There are currently only 200 head on the site. The biogas yield for this digester exceeds expectations.



Examples of Digester Project Experience

Belmont Bio-Ag, Wisconsin

Description of Project

Belmont BioAg (BBA) is purposing to develop an integrated bioagricultural/industrial complex including an ethanol plant (50 million gallon), beef finishing facility (20,000 head), anaerobic digesters, combined heat and power facility, water treatment facility, high-temperature combustion facility, and greenhouse (ten acres under glass) in Lafayette County. The initial scope included a 20,000 head of beef but has since changed to eliminate the beef facility. The entire campus would be self sufficient in energy both from a natural gas and an electrical power standpoint. The treatment facility will clean up the water from the digester for reuse as process water for the ethanol plant.

Involvement of Project

Tiry Engineering, Inc. worked with Earth Tech to design a system to collect the waste from the beef facility using a continuous in-floor flume system and a thickening system. TEI prepared the plans for the entire beef facility and the waste transfer and waste storage facility.

Results

The project is on hold at this time pending Wisconsin DNR permits and a change in economic factors.

Examples of Digester Project Experience

Holsum Dairies, Wisconsin

Description of Project

Holsum Dairy is in Hilbert, Wisconsin. They have 3,000 cows that produce roughly 65,000 gallons of manure per day. They have an auger-type squeeze separator for post digestion solids separation. The dairy uses scrape collection with skid steer to a central flume where it gravity flows into the digester.

The digester consists of two modified plug flow digesters that share a common effluent exit point. The digesters have capacity of about 25 days, and are operating at about 25 days HRT. Each digester is approximately 288'L x 36'W x 15.5'D. The target operation temperature is 100° F.

Involvement of Project

TEI worked with another digester company on the project. TEI's responsibility was the design of the manure transfer system to and from the digester and the design of the digester tank itself. TEI prepared the plans and specifications for the digester and secured the permits through Wisconsin DNR. TEI also inspected the construction of the digester and certified completion.

Results

The last known data on this digester indicated that it was running at about 500 kW plus flaring excess gas. The methane content was between 52 and 56 percent.



Examples of Digester Project Experience

Gordondale, Wisconsin

Description of Project

Gordondale farm has 600 cows that each produces 30 gal/day of manure for about 18,000 gal/day. They use a scrape method collection system and solids separation after digestion with a screw press type separator. They use recycles for bedding. The digester is modified plug-flow digester. The digester has a HRT of 20 days. The target operation temperature is 100° F. The digester size is 65'W x 108' x 14'D, and its volume is 650,000 gallons.

Involvement of Project

TEI worked with the system designer for this project to prepare the civil design and develop the construction plans and specifications for the digester tank itself.

Results

As of June 2002, Gordondale was producing 6 cows per kWh, but they believe that 4.5-5 cows per kWh can be achieved.

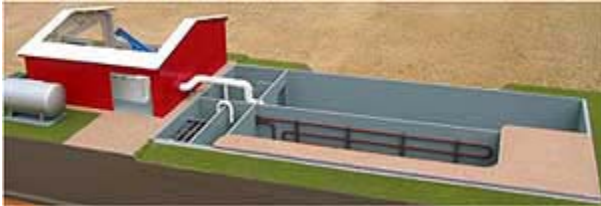


Photo: Alliant Energy

Examples of Sand Separation Project Experience

Hoard's Dairyman, Wisconsin

Description of Project

This historic dairy farm decided to modernize and expand its facility at Fort Atkinson Wisconsin. This farm has one of the premier Guernsey herds in the world. The new facility is set up for sand bedding of the free stalls. The manure handling system is a flush flume. The sand in the sand laden manure is trapped in a sand trap system. This enables the manure to be handled in a conventional liquid manure storage facility and handled with normal liquid manure handling equipment.

Involvement of Project

TEI was involved in the entire planning process for the new facility. TEI then obtained the necessary permits and drafted several preliminary designs. The final design included the site grading, the manure storage, the manure transfer, and a sand trap as components. The inspection of the construction was performed by TEI.

Results

The sand trap was constructed in the fall of 2007 and was used during the winter of 2007 and 2008. The trap is designed to remove sand from the manure prior to storage to enable the manure to be handled as liquid manure slurry. The sand trap has proven to be very effective in removing the sand from the manure stream. However, the sand will not be suitable for reuse unless further processed. It was not the intent of Hoar's Dairy Farm to reuse the sand for bedding. Except for some operational issues due to very cold weather, the sand trap worked well. The issues with the weather will be resolved by the addition of the hoop structure to provide cold weather protection.



Examples of Sand Separation Project Experience

City View Dairy, Wisconsin

Description of Project

City View Dairy is an existing dairy that is expanding to accommodate bringing several more family members into the business. TEI was involved in the design of the site and facility from the manure handling and storage perspective. TEI designed a sand settling lane that would allow sand to be settled out of the sand laden manure so that it could be reused for bedding in free stalls.

Involvement of Project

TEI was involved in the design, permitting, construction inspection of the system.

Results

The sand settling lane was put into service in the fall of 2007. The project is not complete yet as it still needs the two stage pond system to provide lower solids content chaser stream to provide better quality recovered sand. The recovery efficiency of the system is estimated at about 90%+. That is, about 90% or more of the sand in the sand-laden manure stream is settled in the sand settling lane. Once lower solids content is obtained for the chaser stream, the end sand product will be better suited for reuse as bedding. A two-stage pond will be built for manure storage to complete the system this year (2008).

