Jer-Lindy farms digester upgrades

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The proposed enhancements to the digester system at Jerry and Linda Jennissens have been completed with the following results.

1. The manure influent system has been re-built and is now more reliable with very little maintenance. It is capable of pumping a wide range of varying viscosity manure and substrate combinations without plugging or losing prime. It utilizes a small hydraulic power system to operate a custom built piston pump. This pump will move in excess of 30 gpm of the available liquid manure. This pump is also capable of producing in excess of 50 psi that allows the ability to move high solid concentrations through the system with ease. Adjustable pressure regulation ensures that the pump will not harm system components downstream of the influent system with the minimum power consumption needed for the process. Upon operation of the unit, several other changes have been made to ensure sustained operation with very little wear. A rubber seal has been added to the top and bottom of the piston for an additional seal for low solid content material. This will ensure reliable pumping when using substrates with a low viscosity that dilute the influent material.

The overall performance of the new pump has been a success giving enhanced reliability to the digester system.

2. The effluent system of the digester has unique issues that had led to poor solids recovery from the separator, accelerated building decay and hazardous fumes in close proximity to the barn.

Upon further discussion of the effluent system and the need for more bedding solids, it was decided to separate the raw solids and compost them in a separate building away from the barn. The effluent no longer has any exposure to the air adjacent to the barn and as a result, has limited the amount of struvite build up inside the effluent piping to the lagoon.

The separator and supply pump have been relocated to the primary collection pit attached to the freestall barn. Separating the raw solids has given more than double the available bedding with less maintenance and faster separation time. The reduction in separation time directly effects the power consumption and wear of the separator for lower operating cost and less maintenance as well.

The separated liquid is then transferred directly to the "old" effluent pit. From there it is pumped through the existing heat exchanger and into the digester using the new custom pump.

This process has proven very reliable utilizing the existing slurry pump and allowing it to feed the seperator with a much lower lift giving the seperator ample volume while agitating the primary collection pit. Processing manure in this method still deleted a pump in the process by allowing the effluent from the digester to go directly to the pit via gravity.

3. The gen-set has been the main hurdle for the reliable health of this digester. The maintained heat and energy that it produces is critical to the success of this system. The prototype engine is currently running at the site and has shown very promising in power output, oil consumption, lower maintenance and gas flexibility. The electronics adapted to the generator that allow it to be fine-tuned to the correct volatility of the gas have been difficult to quantify to date. The company that provided the bulk of the technology has been cooperative in the enhancements for this system. It has recently been re-furbished at the company's expense to the latest version. It is hoped that these updates will eliminate the interruptions in generation at the site. We have been unable to tune in the generators power seeking capability in the upper generation level due to a lack of gas volume. Available substrates have been unable to produce sufficient volumes of high btu gas needed for sustained power output and tuning opportunity for the gen-set.

The low gas volume and volatility have however proved the concept of tuning the generator to gas volatility a success. A manual control is currently used to adjust the tuning of the gen-set and the horsepower output on the display is utilized to "tune in" on the power available from the current gas. Simple calibration shows the increase or decrease in power output on the display. It is our hope to find a reliable effective substrate that will be available for a long term test.