

# ANAEROBIC DIGESTION

## SMALLER DIGESTER THAT RETAINS MICROBES GIVES A SHORTER RETENTION TIME

J.J. Farber Farm, East Jewett, Greene County



Back flush system installed to reduce heat exchange plugging.



Fixed Film plugged with  $\text{CaCO}_3$  sediment

“ We were spreading [manure] for three days before my wife realized. Usually she smells it within an hour.”

--John Vanheven

### LESSONS LEARNED

The external shell and tube manure-heating system performed well. There was some initial plugging of the 5/8-inch tubes, but a back flush system was installed to provide periodic cleaning. A grinder pump was also installed to feed liquid to the digester, in order to ensure that large particles would not plug the tubes.

The biogas boiler consumed all biogas produced. Conversion from gas energy to heat energy was 80% efficient. The boiler heat exchanger required periodic cleaning due to the high hydrogen sulfide content of the gas. Biogas production was 25 cubic feet per cow per day.

Several foaming incidents were attributed to abrupt feed changes for the cows, or rapid temperature changes within the digester. Gas line piping was changed to include a positive foam trap prior to the gas meter and boiler gas valve.

The converted feed mixer did not perform well as a compost/dryer. The mixer reel and augers caused solids to be compacted such that warm air could not be forced through the pile. Modifications are being considered.

The digester was operated continuously for a twenty-month period. On 6/30/03 the digester was emptied in order to inspect the fixed-film media. A large amount of calcified deposits were found attached to the media, and approximately 10 inches of grit had settled to the digester floor. The half-inch thick deposits threatened to block the media, and had the effect of reducing retention time to 3 days. This reduced retention time is another possible cause of foam production.

One source of deposit material is the 150 pounds of lime that is added every day to alley floors to reduce cow slippage. At this point, the fixed-film media has been removed and the digester is being restarted with a 5-day retention time.

