



November 21, 2007

BIOFILTER TO TREAT ODOROUS AIR

Terry and Diane O'Neel celebrated November 17th with an open house of their new swine finishing barn facility southwest of Friend. As we ate delicious pork loin for lunch, I noticed 10 area businesses all had a hand in the construction or supplies for the building. Terry is the current president of the Nebraska Pork Producers Association and has been working with Rick Stowell at the University of Nebraska using a new idea in environmentally friendly, biofiltered pork facilities. This is a 2,200 head finishing barn that is typical of new swine finishing barns today, but the back of the barn created the most interest with the visitors looking at a biofilter. It is the first of its kind in Saline County and the Eastern part of Nebraska.

A biofilter is one of several air pollution control technologies that use microorganisms to treat odorous air. It is used around the world and researchers at the University of Nebraska are demonstrating its effective use for treating odors from animal facilities. A Nebraska Environmental Trust grant helped with some of the biofilter expense at the O'Neel facility.

Stowell and O'Neel created some inexpensive duct work or an air plenum from the main floor air exit fans and manure pit fans, so any odorous air would be processed through a biofilter. Wooden pallets were stacked on each other to create an air space. Hog panels and chicken wire created a foundation for wood mulch placed on top. The air passes from the exhaust fans through the plenum area and then to the biofilter media where odor eating microorganisms treat it before it exhausts to the atmosphere.

Research in Minnesota says a well-managed biofilter can reduce odor emissions by 85%, hydrogen sulfide by 90%, and ammonia by around 60%. Emission odor reductions can vary widely but managed properly up to 90% reduction. Biofilter media moisture content and the time required for air to pass through the mulch are the key factors for the effectiveness.

The microorganisms use the odorous gases as food for energy and nutrients. The microorganisms are key to making a biofilter perform effectively. The wood mulch tends to get dry, therefore, one must control the moisture content of the pile. Based on research and reports on biofilters, the mulch is expected to last 5 to 10 years, then new mulch is applied.

A negative with the biofilter could be rodents trying to tunnel up into the mulch. The warm mulch might be attractive to certain pests. A good rodent control program is required similar to programs used on other existing swine finishing barns.

The air from both the ventilating and pit fans in warm barns has enough heat to keep the biofilter operating throughout the winter. Snow melts and provides valuable moisture to the mulch pile. An automatic sprinkler system can be set up to control moisture, especially in the fall, spring and summer months. Fan size using biofilters is crucial so static pressures are appropriate to move air through the mulch pile.



Livestock production adds economic value in rural areas including the construction phase, maintenance on the buildings, and increase demand for grain. Livestock production creates jobs in rural areas and creates fertilizer from the manure resource. At this facility, fertilizer value for nitrogen and phosphate fertilizer produced at current prices is just shy of \$24,000 per year.

Manure will be injected into surrounding cropland at agronomic rates, replacing commercial fertilizer, and completing the environmental loop.

Randy Pryor, Extension Educator
University of Nebraska-Lincoln Extension in Saline County
306 West 3rd Street, Wilber, NE 68465
Phone (402) 821-2151 • Fax (402) 821-3398 • e-mail: randy.pryor@unl.edu