

New OSU Swine Center offers a 'breath of fresh air'
by Kelly Sitter, Lone Jack, Mo

Justin Bundy wipes sweat from his brow as he stirs manure in the pit below him. The squeal of pigs and the hum of exhaust fans nearly drown the sound of his voice as he jokes with a colleague. Bundy, an animal science graduate student, assists with research at the new Oklahoma State University Swine Research and Education Center.

When asked if he likes his job, Bundy grins and replies, "It's a dirty job, but somebody has to do it."

Even though livestock facilities have a smell all their own, students and local Stillwater residents agree that being downwind of OSU's new swine facility is a "fresher" experience.

The new OSU SREC is located on McElroy Road west of the Animal Science Arena in Stillwater, Okla., nearly two miles north of the old swine barn.

Opening in November 2004 and housing its first pigs in December 2004, the new swine farm is a state-of-the-art facility recognized for its technologically advanced, odor-eliminating systems.

Odor-producing compounds in swine waste are formed when microorganisms break down nitrogen compounds (proteins) present in a pig's digestive tract and manure. Researchers have found that manure odor is directly influenced by the amount of crude protein in a pig's diet.

Air pollution from hog operations is emitted by barns, lagoons, pits, slurries and land application of manure as fertilizer. Odor from hog farms can be detected downwind and be just as intense as the odor around actual waste management systems located on the site, depending on the facilities waste management system.

Attached to each of the barns at the new SREC is a "Biofilter" exhaust system. These biofilters are boxes housing the outdoor exhaust fans and are connected to the indoor exhaust fans. The boxes are covered by a wire mesh that holds a layer of wheat straw or oat straw mixed with compost. This layer absorbs noxious odors of the indoor air as it filters through. The filtered air is then released to the outdoors. The biofilter system has been studied at the University of Minnesota.

Research has indicated the biofilter boxes must remain moist to maintain bacteria levels. Each filter is connected to a water infiltration system to offset the Oklahoma climate. Bacteria within the biofilter compost layer digest the organic material in the air, reducing odor-causing gases, such as hydrogen sulfide, by an estimated 80 percent and ammonia by an estimated 60 percent.

As another odor-control mechanism, a technologically advanced waste management system is in place and functioning. All waste from the facility is sent through an anaerobic sequencing batch reactor, known as the ASBR. This tank-like structure catches 80 percent of the solid matter in the manure and turns it into "sludge." The "sludge" can be removed, dried and used as a fertilizer. The liquid from the tank is decanted and sent into a bioreactor, which resembles a covered lagoon. Here the waste is cleansed and sent to an open air lagoon. At this stage the waste water is less than 0.1 percent solid matter. It is then clean enough to be used to flush houses on the facility but is not used as "potable"

or drinkable water. Methane and hydrosulfide gases currently are being burned off from the tank, but later they will be used for energy resource research.

"The citizens of Stillwater wanted a less odorous facility," said Doug Hamilton, OSU Cooperative Extension waste management specialist.

Hamilton helped design and still conducts research for the facility's waste management system. Hamilton has been "dealing with manure since 1979" and explained that OSU's new swine facility was designed to be built oversized due to its extensive research use. Hamilton said controlling odor on swine farms is a challenge because most producers use types of buildings with different ventilation systems.

"For people with naturally ventilated buildings, odor is reduced by cleanliness and sanitation," said Hamilton. "The hog farms that clean their facilities regularly are going to be less odorous."

Staff members at the new OSU swine facility work around the clock on maintenance and cleanliness.

The new swine facility, with its 13 barns, can house up to 800 pigs, including up to 110 sows and their litters. The gestation barns can accommodate up to 50 sows. Most of the barns have automated feed systems, and all barns can be temperature controlled.

Because of the swine industry's high-economic impact, today's producers are focusing more on the effects of swine waste on the environment and are using more up-to-date waste management systems at their facilities, said Scott Carter, OSU animal science associate professor.

According to the U.S. Department of Agriculture, swine production in the United States is a \$10-billion industry with Oklahoma being the eighth largest swine-producing state. The United States is the world's third-largest pork producer with more than 60 million sows in the nation and is the second-largest consumer, exporter and importer of pork and pork products. Pork consumption ranks third in annual U.S. meat consumption.

Today's research at the new SREC involves OSU students using the new swine facility. In fall 2005, a nutrition research study was conducted on the effects of feed intake on manure output and nutrient loss. Additional studies are planned for the future. Undergraduate students also use the facility as a teaching guide.

Numerous classes meet at OSU's SREC, including an animal waste management class, SOIL 4863; an introduction to animal science class, ANSI 1124; and swine science, ANSI 4643. Also, OSU's livestock judging team practices at the new facility.

Carter's swine science class students are assigned pigs in different stages of development for the semester. The class, consisting of about 30 animal science juniors and seniors, attend lab every other week at the new swine facility.

At the beginning of the semester, students are split into groups of four and are assigned a sow that is due to farrow. During each lab session, the students keep track of the sow's weight, feed and water intake, body temperature and health maintenance. They learn how to record and measure back fat via ultrasound equipment and have the option of being present when their assigned sow farrows toward the end of the semester.

"This is what every class should be like," said Joanna Litchfield, an animal science senior, as her group pushed and prodded its sow out of a crate and onto a scale to record its weight. "It's very hands on. Nothing compares to actually working in the field."

A litter of finisher pigs also is assigned to the students. Students collect data on water and feed quality and intake and weight gain, as well as provide general health maintenance.

"The technology here is exciting and cool to work with," said Litchfield. "The new waste management system and water treatment plant here at the new barns doesn't even compare to that of the old barns."

Overall, the new, notably less odorous swine facility is just another way for students to gain hands-on experience through OSU.

Spencer Mann (right), a doctoral student at the new SREC, guides a tour of the bioreactor lagoon system to SOIL 4863 students. (photo by Kelly Sitter)

OSU's new Swine Research and Education Center can house nearly 800 pigs and has a state-of-the-art waste management system. (photo by Todd Johnson)

Laura Townley (left), Joanna Litchfield and Justin Bundy admire the first litter of pigs born at the new SREC. (photo by Kelly Sitter)