

# Researchers 'sniff out' emissions from feedyards

March 7 2007

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Setting up an air quality trailer in the midst of cattle pens at a feedlot will help measure gaseous emissions, said a Texas Agricultural Experiment Station researcher. Dr. Ken Casey, Experiment Station air quality engineer in Amarillo, wants to measure ammonia and hydrogen sulfide emissions from feedyards.

His research team is setting up two climate-controlled instrument trailers in different locations at a feedyard. The trailers will be equipped with two continuous emissions analyzers -- one for ammonia, the other for hydrogen sulfide.

Samples from above the trailer are drawn into a heated manifold inside the trailer, where the analyzers draw their sample, Casey said. This instrumentation allows measurement of both ammonia and hydrogen sulfide with a high degree of precision.

Ammonia is an environmental pollutant associated with a number of undesirable issues that are both regional and extensive in nature, he said.

Two federal acts -- the Comprehensive Environmental Response, Compensation and Liability Act and Emergency Planning and Community Right-to-Know Act -- establish reportable levels of ammonia, hydrogen sulfide and other emissions, Casey said.

In recent years, the courts have applied this legislation to swine and poultry operations, which resulted in a heightened awareness of

environmental concerns within the agriculture community, he said. To date, these acts have not been applied to cattle feedyards.

Ammonia emitted at feedyards comes from excess nitrogen fed to cattle and excreted primarily in the urine, Casey said. His research is aimed at determining when conditions are most favorable for emissions to occur. Then feedyard operators can better target their mitigation strategies.

Combining the measurement data with meteorological data collected by other researchers at the same yard and an air pollution model allows the total emission rate to be determined, he said.

"Because we're going to monitor this over the course of a year, we'll pick up daily and seasonal trends," he said. "We'll be able to correlate the rate with feedyard and climatic conditions, such as pen moisture content, days since rainfall, temperature and solar radiation."

By better understanding the mechanisms that influence these emissions, researchers can establish strategies that may be useful in controlling them, Casey said.

"Clearly addressing the problem at its source through waste minimization potentially has the greatest effect," he said. "That means not feeding a level of nutrients to cattle in excess of what they need."

Hydrogen sulfide is the other pollutant Casey will measure. It, too, can impact human health, particularly at high concentrations. Although hydrogen sulfide is being monitored, concentrations are usually very low around feedyards, he said.

"There is concern that even relatively low concentrations of hydrogen sulfide can have health effects as well," Casey said. "There is legislation in a number of states, including Texas, of threshold exposure limits for

hydrogen sulfide in the community around sources of emission."

Within a feedyard, most of the hydrogen sulfide emissions are thought to come from the runoff retention structures or lagoons, he said. Yard emissions are already being measured. The next step is to float a wind tunnel on the surface of the lagoon to measure emissions.

Additional measurements of the ambient concentration downwind of the runoff retention structure also will be taken, allowing an emission rate to be obtained through modeling.

"So in effect, we get two goes at measuring the emission rate -- directly and indirectly," Casey said. "This will give us more confidence in the emission rates we have for these facilities."

Source: Texas A&M University

Citation: Researchers 'sniff out' emissions from feedyards (2007, March 7) retrieved 25 April 2024 from <https://phys.org/news/2007-03-emissions-feedyards.html>

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