

# Something in the Air

Walk through the perfume section of any department store and you realize what smells pleasing to one person is offensive to another. While few think manure smells pleasing, its level of offensiveness is purely subjective, or is it? That is one of the tasks set before Dr. Wendy Powers, director of Environmental Stewardship for Animal Agriculture at MSU, to quantify the odorous byproduct of dairy farms. Once quantified, research can be done to find ways to adjust the level of air quality emitted from dairy farms and other livestock and poultry operations.

Dr. Powers came to MSU nearly a year ago from Iowa State University. In Iowa, she developed one of the first air quality research facilities in the nation that focused on looking at how diet changes air emissions. There her work focused

primarily on swine and poultry and led to some significant changes in nutrition that were found to improve the air emissions from the operations. Since coming to MSU, she has overseen the construction of an air quality research center at the university. The first research study, involving dairy animals, is now underway.

“We want to look at specific feedstuffs to see how we can manipulate the diet to adjust the composition of the excretion, without compromising performance levels,” Powers says. “We need to look at optimal levels of both.”

The state-of-the-art research facility can be used for different species. The individual chambers pipe air in and out to be monitored by computer systems. Individual containers are also used to simulate manure storage and will be used



*Wendy Powers, Director of Environmental Stewardship for Animal Agriculture, oversees research conducted at the air quality research center on the MSU campus.*

to conduct research on emissions generated from storage units.

The work being done at the university coincides with the EPA

movement to regulate air quality from farms. The announcement by EPA to issue air quality regulations caught most of production agriculture unprepared because there is little scientific research on the air quality of farms. Powers has been instrumental in working with the EPA in helping determine appropriate benchmarks for the regulations.



*Animals in the research trials are housed in the individual rooms where air emissions can be monitored and evaluated.*

“I would like to see MSU on the forefront of this work,” Powers says. “It is not often that we get ahead of regulations, trying to get the information out before decisions are made.”

Dr. Powers and a team of researchers have slated several studies to be conducted at the facility over the next few years. The first project now under way is measuring the levels of methane, ammonia, hydrogen sulfide, volatile organic compounds, carbon dioxide and oxygen from the cows relative to dietary changes.

During the research trials, the cows are kept in individual chambers for a two-week period. The cows are fed, milked and stalled in the chamber. The air entering the zero-pressure chamber is analyzed for the test compounds as it leaves the room.

The cows are rotated back to the MSU dairy farm where their diet will again change. The cows will be given two weeks to adjust to the diet changes before going back to the

chambers for analysis.

“In this research we are looking at how changes in the diet can affect methane production,” says Dr. Beede, animal science researcher. “The cows seem content in the rooms. We monitored their activity to see how they were adjusting. They are used to the tie-stalls at the MSU dairy farm so it doesn’t appear to be a big transition.”

Being able to put numbers on the air quality will be beneficial to producers when they design manure management systems. It is also beneficial in determining any impact the air quality may have on farm workers and neighbors.

“We may know if something smells, but we also want to know if there are any harmful properties in the air,” Powers says. “Through our research we may be able to determine that.”

Powers is part of an 11-state project team looking at developing a tool to assess air quality on



*Excretions from the animals are stored in these containers to simulate manure storage. Emissions from the barrels are also monitored.*

farms. The two-year project, which began this fall, hopes to generate an evaluator that will help identify the management changes, which make the biggest impact on air quality. The researchers hope to help pinpoint the options individual farms have to integrate into current management styles.

“We don’t know yet what that assessment tool will look like, but once we meet as a team we hope to develop something rather quickly so we can begin field testing,” Powers says.

Once the tool is designed the researchers will be asking for producers to help with the trials. When regulations do come in to place, the tool will be useful in helping producers make decisions about how to best achieve compliance.

## **Balancing Animal Agriculture and Communities:**

February 29, 2008  
Kellogg Hotel and Conference Center  
Michigan State University  
East Lansing, Michigan

The interaction between animal agriculture and residents continues to be a hot topic in many rural communities. This conference features experts in physical and social sciences from across the country who will take a close look at the issues that affect us all.

Wendy Powers, MSU’s director of environmental stewardship and animal agriculture, says the one-day event will bring Michigan residents, farmers and policymakers together to discuss critical aspects of growth and development of communities and agriculture.

“The conference is not designed to end the debate,” she explains. “It’s designed to start the conversation. We hope people will walk away from this with new knowledge and a renewed commitment for collaboration and partnering with people in their communities.”

Specific conference information will be made available soon. Check the Animal Agriculture & the Environment Team Web site for more information at [www.animalagteam.msu.edu](http://www.animalagteam.msu.edu).