

## ENVIRONMENT

**Title:** Release and Dispersion of Volatile Organic Compounds and Trace Gases From Swine Manure Systems in Iowa, Arkansas, and North Carolina – NPB #97-1911

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### Abstract

Release of gaseous compounds from swine manure storage systems has been poorly quantified; however, the perception of intensive amounts of gases is one of the larger problems for the pork industry. There is little quantitative evidence to compare among production units in different locations and little information to guide the development of any comprehensive understanding of swine manure storage systems. This study was designed to begin the development of a series of comparisons of swine manure lagoons in Iowa, Arkansas, and North Carolina. These sites were selected because of the ability to locate manure storage units with similar characteristics and the wide range in climatic conditions among sites. At each site a similar set of instrumentation was installed. This consisted of a unit that floated in the center of the lagoon and collected air samples through a series of Tenax TA® and Carboxen-569® organic carbon absorbing materials. Also in the center of the lagoon a platform with environmental equipment was deployed along with instrumentation around the edge of the lagoon.

Data collection commenced in April of 1997 and continued through October 1998. There was large variation in the emission rates of the different volatile organic compounds; however, there was consistency in the volatile organic compounds emitted. The reason for these responses is due to the reaction of the lagoon to environmental conditions. In an intensive monitoring effort on methane it was found that the emission rates of methane varied by a factor of three throughout the day with the largest emissions during the middle of the day. The temperature profiles recorded within the lagoon are indicative of an active biological system that is generating heat. There are differences among locations in the temperature within lagoons; however, this is more a function of the general environment than management differences. These data show that lagoons are active biological systems producing a complex mixture of volatile organic compounds. Producers will be able to utilize this information to show that anaerobic lagoons behave consistently among locations and that changes in management (loading rate, liquid level) are minor factors in emission rates.

*These research results were submitted in fulfillment of checkoff funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer reviewed*

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