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A Receptor-Based Siting Strategy for Swine Production Systems

Steven J. Hoff¹, Dwaine S. Bundy¹, Jay D. Harmon¹, Colin D. Johnson¹
Iowa State University¹

Species: Swine

Use Area: Animal Housing, Manure Storage

Technology Category: Facility Siting

Air Mitigated Pollutants: Odor

Point of Contact:

Steven J. Hoff, Ph.D.
Iowa State University
212 Davidson Hall
Ames, IA 50011
USA
515-294-6180
hoffer@iastate.edu

System Summary:

A model, called the Community Assessment Model for Odor Dispersion (CAM), was developed to predict receptor odor exposure from multiple swine production sources. The intended use of CAM was to provide a tool for evaluating the odor exposure to receptors in a community when siting new swine production systems and how a change in odor control technology alters the odor exposure to receptors. CAM can handle up to 20 swine production sources with up to 100 receptors in a community of any size. The model incorporates historical (10+ years) average local weather data, coordinates locations of all sources and receptors, ground and above-ground area sources, seasonal variations in odor emission, source production footprint and orientation, and documented proven odor mitigation technologies. CAM does not predict the influence of calm conditions, topography, or obstruction downwash. CAM predicts the number of hours of exposure to weak (2:1) and greater or identifiable (7:1) and greater odors and these are used to assess siting options.

Applicability and Mitigating Mechanism:

- Site location planning for new swine housing and manure storage systems
- Model developed specific for swine production systems
- CAM can model up to 20 swine sources and up to 100 receptors in a land area of any size

Limitations:

- CAM has been developed and calibrated for swine systems only
- Calm conditions not modeled
- Terrain features beyond rural terrains not modeled
- CAM requires local historical weather data (10+ years)

Cost:

The CAM model requires site specific information to properly implement. Currently CAM is implemented with the ½-time support of an on-campus staff member with no charge to the farmer. A more formal procedure is being developed where a CAM evaluation will require a farmer-fee of either \$500/siting case or \$1,000/siting case depending on the complexity of the proposed site. A \$500 cost to a farmer would be a situation where a campus or extension field staff member is required to visit a proposed site to help guide siting decisions using localized odor plots (described in paper). If the complexity of the proposed site warrants a full CAM modeling run, an additional \$500 is required from the farmer.