Environmental Issues in Animal Agriculture

Tamilee Nennich, Ph.D.
Department of Animal Sciences
Purdue University
Introduction

• Water quality issues and regulation
  • Current regulations
  • New and future regulations
• Air quality issues and regulation
  • Current regulations
  • New and future regulations
• NAQSAT
Introduction

• What are the greatest actual environmental concerns from animal agriculture?

• Which environmental regulations would be the most damaging to animal agriculture?
Water Quality

- Federal regulations
  - National pollutant discharge elimination system (NPDES) permits
- Federal CAFO NPDES rule
  - Revised rule released in October 2008
- The EPA requires states to meet their rules or lose the ability to permit anything under NPDES
- States may have more stringent rules
Water Quality

• Indiana Department on Environmental Management (IDEM)
  • EPA still has oversight
• Indiana regulations – Water Quality
  • NPDES permits
  • Confined feeding operations (CFO) permits
Water Quality

Water Quality Permits

- **Indiana Concentrated Animal Feeding Operations (CAFOs)**
  - 321 IAC Article 15, Rule 15
  - $\geq 700$ dairy cattle; $\geq 2500$ swine (55 lbs & greater)

- **Confined Feeding Operations (CFOs)**
  - 327 IAC Article 16, Rule 1
  - $\geq 300$ dairy cattle, $\geq 600$ swine

- *These rules are in the process of being revised*
Indiana NPDES Permits

• Being revised to accommodate federal revisions
  • NPDES permits only required if an operation discharges or proposes to discharge

Is having a lagoon/storage pond a proposal to discharge?
Indiana NPDES Permits

- Being revised to accommodate federal revisions
  - NPDES permits only required if an operation discharges or proposes to discharge

- General versus individual permits?
Indiana NPDES Permits

- Being revised to accommodate federal revisions
  - NPDES permits only required if an operation discharges or proposes to discharge

- General versus individual permits?

- Should CFO regulations be stricter to cover operations opting out of NPDES permits?
Indiana CFO Permits

- Areas of concern in proposed CFO rules
  - Soil phosphorus levels – 200 ppm threshold
    - Phase-in period
  - Nitrogen – calculating N availability
  - Mortality management
  - Acreage area needed for application
  - Groundwater, storm water and tile line sampling
  - No application to snow-covered/frozen ground
New Water Quality Regulations

• Federal rules
  • Oil pollution prevention; Spill prevention, control, and countermeasure (SPCC) rule
    • Facilities must prepare and implement a plan by Nov. 10, 2011. (Delay for dairy operations)
    • Plan necessary for above ground storage of 1,320 gal or below ground storage of 42,000 gal
Water Quality Regulations

• Potential future issues
  • What is the smallest operation size that should be regulated?
Water Quality Regulations

- Potential future issues
  - Should manure application by third-party sources be regulated?
  - What about satellite lagoons?
Air Quality

• Air quality is not currently regulated on a national basis

• Reporting requirements
  • Based on requirement to report if ammonia emissions are ≥100 lbs/day
  • EPCRA – Emergency Planning and Community Right-to-Know Act
    • Large CAFOs are required to report
    • Livestock is exempt from CERCLA reporting
  • Air Consent Agreement
Air Quality Issues

- Which air quality issue is the greatest environmental concern in animal agriculture?

- Regulation of which air quality issue would be the most serious for animal agriculture?
New Air Quality Regulatory Concern

- Particulate matter ($\text{PM}_{10}$)
  - Possible revision of National Ambient Air Quality Standards (NAAQS)
    - Proposal to lower from current standard from 150 \(\mu\text{g/m}^3\) to 65-85 \(\mu\text{g/m}^3\)
    - Should be based on human health risks
Air Quality Issues

- Dust/PM regulation
- GHG regulations
  - Carbon footprint
- Ammonia emissions
- Odor
- VOC
- Hydrogen sulfide
National Air Quality Site Assessment Tool

Purpose: The National Air Quality Site Assessment Tool (NAQSAT) has been developed for the voluntary use of livestock producers and their advisors or consultants. It is intended to provide assistance to livestock and poultry producers in determining the areas in their operations where there are opportunities to make changes that result in reduced air emissions. Air emissions research from livestock production systems is increasing every year. NAQSAT is based on the most accurate, credible data currently available regarding mitigation strategies for air emissions of ammonia, methane, volatile organic compounds, hydrogen sulfide, particulates, and odor.

NAQSAT was designed to provide information and education, only. It is not intended to provide emissions data and/or regulatory guidance. All users receive a report of priority areas where improvements can be made, regardless of the amount of emissions produced by the facility. These priorities are not a reflection of risk, but rather a relative evaluation of current production systems based on the most accurate data and understanding of management systems currently available. The report generated cannot be used to compare one livestock facility to another because the evaluation is of a facility relative to its potential given current understanding of management practices and mitigation options.

Scores for each emission are generated upon online completion of NAQSAT. Scores reflect the degree to which an operation has incorporated all of the possible practices needed that would effectively minimize air emissions from the facility. Trade-offs may exist within a housing type that all categories of emissions cannot effectively be minimized. The tool considers the impact of diet, housing management, manure handling, management, and transport, land application of manure, neighbor relations, and internal and nearby road management practices. Once areas where changes could be made are identified, resources to help implement changes are identified for the user. A user can run NAQSAT a second time with a proposed change included to determine the impact a change would have on emissions.
Tailored to individual livestock species

Dairy

Laying hen, turkey & broiler chicken

Swine

Beef feedlot
Housing type: Select the photo that best represents your facility for each set of photos revealed below.

- Pasture
- Freestall/Tie stall/Stanchion/Confinement

Bedding conditions: (Click on an image below; your selection will highlight in green.)

Percentage of floor manure covered:
- Up to 25%
- 26 to 50%
- >50%

- Freestall/Tie stall/Stanchion with lot
- Bedded pack/compost barn
- Dry lot
Effectiveness Results:

White or white box indicates room for improvement to reduce emissions within each constituent or concern. More white area signifies greater opportunities to make changes and reduce air emissions. Click on a section name to quickly modify your answers.

<table>
<thead>
<tr>
<th></th>
<th>Odor</th>
<th>Particulate Matter</th>
<th>Ammonia</th>
<th>Hydrogen sulfide</th>
<th>Methane</th>
<th>Volatile organic compounds (VOCs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animals and Housing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feed and Water</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collection and Transfer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manure Storage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land Application</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mortalities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-farm Roads</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perception</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
NAQSAT Education

http://naqsat.tamu.edu/

- LPE Learning Center Webcasts
  - August 20, 2010 – Beef and Dairy
  - October 15, 2010 – Swine and Poultry
- Archived presentations
Future Issues for Animal Agriculture

- Water quality regulation
  - Regulation of smaller operations
  - Phosphorus
  - Bacteria, hormones, etc.
- Air quality regulation
  - Greenhouse gases (GHG)
  - Dust and PM
  - Ammonia
  - Odor
- What does the future hold?
QUESTIONS?