



Odors from Animal Facilities: Big Concern...What can be done???



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Assessing the Issue Sizing up the problem.....

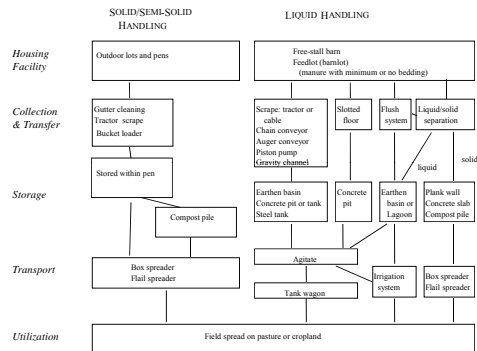
- Odors are the biggest perceived or real liability to farms
- No two farms are the same
- Location to neighbors
- Management
 - Level of oversight
 - Amount of available labor
- Windshield survey ...
 - How do things look?
- Acceptance to technology

Odor Emission Sources

- Livestock buildings
- Manure storage
 - Stockpiles, basins, lagoons
- Land application sites
- Method of land application
- Feed storage
- Mortality storage or disposal areas



Handling Dairy Manure



Planning, Planning, Planning!!

- Odor Management Plans
 - Comprehensive review, plan and design of how farm will minimize odors
 - Manure storage, feed, land application, mortalities, barns and open lots
 - *Be Pro-active!!! it's cheaper and more effective*
 - Not required for new or existing farms



Technologies to Control Odor

- Prevent odor generation
- Capture or destroy odors before any release to the atmosphere
- Dispersion or disguise of odors

Buildings = Constant Source

Buildings typically release a relatively constant amount of odors & gases compared to:

- Land application
 - Occurs once or twice a year
 - Impact is for short period of time
- Storages
 - Releases decrease in cold weather
 - Management may affect releases significantly



Frequent Manure Removal



Manure Separation

- Why are you separating??
- It's not always about loading.....
- Sand, grit, debris
- Difficult to remove fine particles/nutrients
- Knowledge of flowrate is critical
- Efficiency?? Don't believe what you are told!!

Sources of Odor from Outdoor Lots

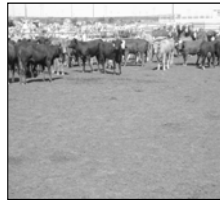
- Open lots
- Manure stockpiles
- Disposal pits
- Land application areas
- Runoff holding ponds
- DUST



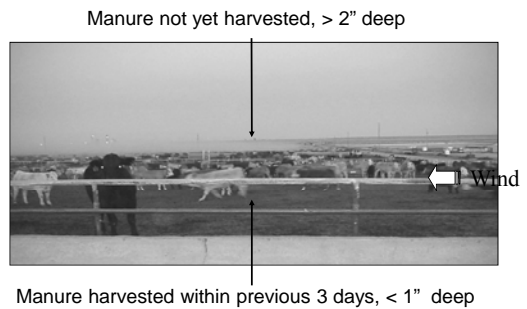
Driver #1: Loose Manure Depth



Deep and soft



Thin & well compacted



Loose manure compounded by evening cow activity (Driver #2)

Driver #3: Manure Moisture Content

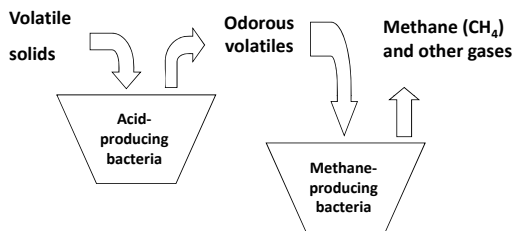


Manure Storage

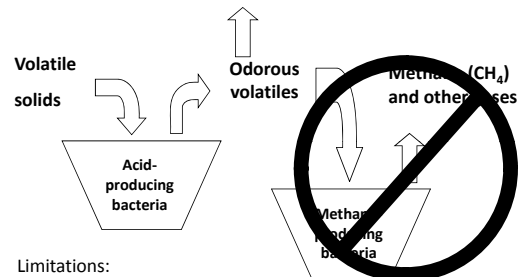
- Liquid and solid manure storage
- ~ 180 days typical
- Coordinate with land application
- 95.0% of facilities are designed for storage only – not treatment



Complete Anaerobic Digestion



Incomplete Anaerobic Digestion



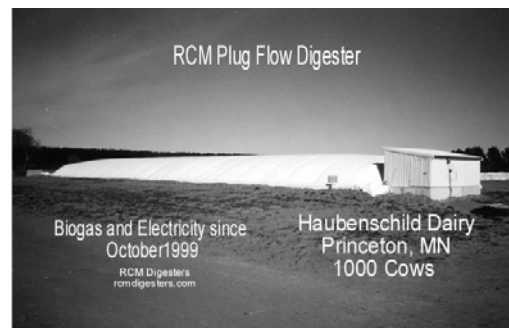
Limitations:

- Design/Construction
- Poor Management
- Cold Temperatures

Treatment: Porous Cover



Treatment: Anaerobic Digestion



Treatment: High-rate Aeration



Treatment: "Compost" Systems



OFFSET:

Odor From Feedlots Setback Estimation Tool

- Scientific process to establish odor based setbacks
- Developed by Univ. of Minnesota, adopted by MN and MI
- Develops an *Odor Emission Factor* for all existing and proposed facilities

Values shown are for Midwestern (IA, MN, MI) conditions, and assumes flat terrain

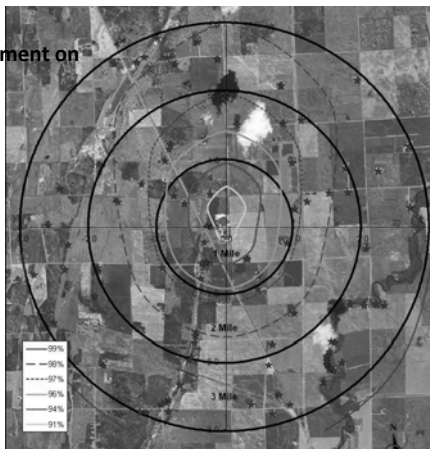
Odor Emission Factor

$$\frac{\text{Odor Emission Number} \times \text{Area (sq.ft)} \times \text{Odor Control Factor}}{10,000}$$

Determine Odor Emission Factor for each odor source on the farm

- Barns
- Manure Storage/Stockpiles
- Feed Storage

No Treatment on 3 Basins



Impermeable Covers on 3 basins





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