NATIONAL AIR EMISSIONS MONITORING STUDY [NAEMS] UPDATE FOR PA DEP- DEC 2011

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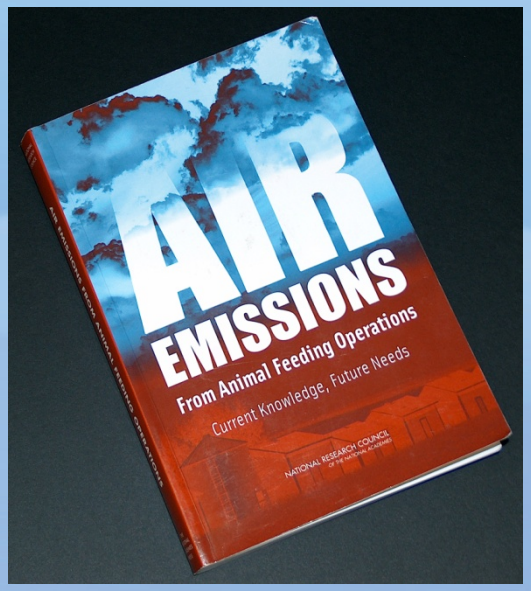
2000…2003…2005…2010…2011

- Citizen concern and lawsuits over odor, air emissions, and mega-livestock farms
- Individual EPA actions
- 2003 National Academy of Sciences report
  - Insufficient scientific data to regulate
- Consent Agreement between EPA and livestock organizations to support National Air Emissions Monitoring Study-- data collection completed 2010 at commercial farms



Air Emissions from Animal Feeding Operations. 2003. National Research Council

Environmental Protection Agency Air Quality Regulations Applicable to Agriculture

- CAA - Clean Air Act
- CERCLA –Comprehensive Environmental Response, Compensation and Liability Act
- EPCRA –Emergency Planning and Community Right-to-Know Act

Environmental Protectio cy Air Quality Regulati e to Agriculture

- CAA - C

EPA has never initiated a response based upon notification of a hazardous substance release to the air from animal waste at farms.

Reporting requirements relaxed for most animal farms.

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Emissions from Animal Agriculture Review the Importance

- Ammonia- a major source & regulated gas
- Hydrogen sulfide – minor but regulated gas
- Particulate matter, PM a.k.a dust
- Volatile organic compounds, VOCs
- Greenhouse gases – Anthropogenic sources
  - Carbon dioxide – not a major source
  - Methane > 40% all Ag: cattle a major source
  - Nitrous oxide > 50% all Ag: land application primarily

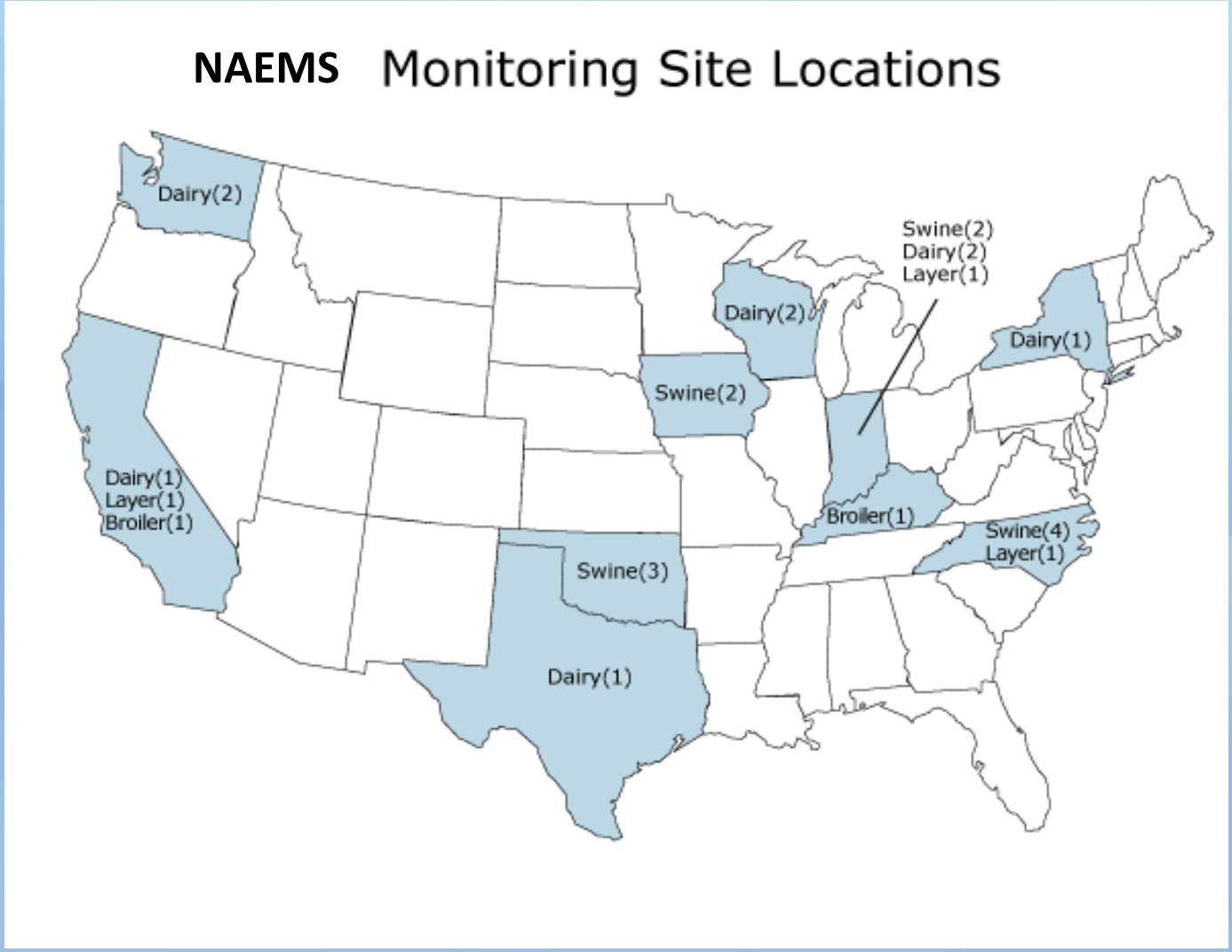
Data Scope NAEMS

- The study was funded by industry and conducted by university researchers with EPA oversight. 2300 sensors; 24 sites

"The data set is very extensive. If we were to analyze one million data points per day, it would take us seven years to analyze, and that's just for the barns." Al Heber, study leader, Professor Agricultural Engineering, Purdue University

– source: Wisconsin Dept Natural Resources

National Air Emissions Monitoring Study



Summary of NAEMS monitoring sites

- Dairy monitoring included 8 dairy barns (CA, IN, NY, WI, WA); 4 dairy lagoons (WI, IN, WA); and 1 dairy corral (TX).
- Broiler included 2 barn sites(CA, KY)
- Egg layer barns at 3 farms (CA, IN, NC)
- Swine barn emissions measured at 5 farms (2NC, IN, IN, OK); 6 swine lagoons (IA, IN, 2NC, 2OK)

Dairy NAEMS Study Sites & Sources

- Washington freestall barn & manure lagoon
- Wisconsin two freestalls & two manure lagoons
- Indiana two freestall barns (milking center) & manure lagoon
- New York freestall barn (milking parlor)
- Texas corral lot
- California two freestall barns

Dairy barn ammonia emissions in g NH_3/cow/day

- CA dairy (flush): 5
- WI dairy (flush changed to scrape): 10 and 30
- IN dairy (scrape): 24
- NY dairy (scrape): 46
- WA dairy (flush): 48 and 78

Source: Alex Hristov, Penn State, Animal Science

New York NAEMS Dairy example

- 1000 cow dairy central NY State
- Cow 590 kg; 54% forage diet; milking 3x/day
- Mechanically (fan) ventilated 442-stall 6-row freestall was monitored
  - Results ammonia: 43.2±16.5 g d^{-1} cow^{-1} (source EPA)

  Per barn: 7-9 kg d^{-1} in the winter; 40-43 kg d^{-1}summer
- Monitored milking parlor with 31-stall freestall; mechanically ventilated
- Manure alley scrapers to below-grade channel

NAEMS coordinator EPA Larry Elmore Order of Data Analysis (4 November 2011)

- Growing animal: increased emission with size
  - Broiler (first, under analysis now)
  - Swine lagoon (analysis now)
  - Swine
- Stable animal population and size
  - Egg layer
  - Dairy (last to be analyzed)
  - dairy lagoon (order not noted)

Order Rationale for Data Analysis

- Need critical review of Emission Estimating Methodology and then approval before applying EEM to additional species
  - Broiler “barn” and swine lagoon “area” used as demonstration data sets for EEM source reviews
- Will not start on swine barn, egg layer and dairy until EEM approved by Scientific Advisory Board

Emission Estimating Methodology

- Nearly complete for broiler and (swine) manure lagoon (Nov 2011)
- Science Advisory Board to review methods starting January 2012 followed by public comment period. Currently….
  - Nominees to SAB on web
  - Public input on nominees until November 15
  - "List of Nominated Candidates for the EPA Science Advisory Board Animal Feeding Operation Emission Review Panel "

No Action on NAEMS Dairy data to date (Nov2011)

- Preliminary skim of data looks challenging
- Acknowledge that wide variety of dairy systems cannot be captured in the current data set

Emission Estimating Methodology

- Must include **readily available** information e.g. animal number, animal weight, typical production
- **Avoid confidential** information where possible e.g. proprietary diet ingredients

Summer 2012 Goal for all data analysis to be completed by EPA

- Admittedly ambitious goal
- All species released at same time
- Potential Producer Action:
  - Clean Air Act: discharge permits required
    - Particulate matter
  - EPCRA & CERCLA: reporting requirements
    - Ammonia (possible for largest farms)
    - Hydrogen sulfide (highly unlikely for dairy)

Estimating Tools

- EPA and USDA (considered the 'experts') to help producers with emission estimation via (currently undetermined) equation(s) or look-up tools
- USDA being asked to provide guidance on any future mitigation strategies

Interested in Details of National Air Emissions Monitoring Study?

- All NAEMS data are available:

www.epa.gov/airquality/agmonitoring/data.html

- More on NAEMS study farms and methods:

www.epa.gov/airquality/agmonitoring/fs20110113.html

More Air Quality Resources

Livestock and Poultry Environmental Stewardship (LPES) Curriculum

A National Educational Program

www.extension.org

Select → animal manure management

Select → air quality

NATIONAL AIR EMISSIONS MONITORING STUDY [NAEMS] UPDATE DAIRY SITUATION-NOV 2011

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