

National Air Emissions Monitoring Study

**Emerging Trends and Environmental
Challenges Facing Livestock Production**

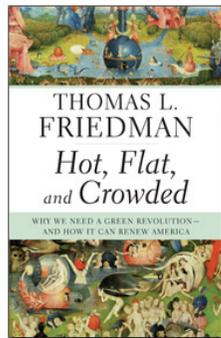


**U.S. Environmental Protection Agency
Clean Air Act Advisory Committee
January 8, 2009**

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The New York Times

If all you ever do is all you've ever done,
then all you'll ever get is all you ever got.



- Thomas Friedman
September 13, 2008



Background and Overview



- National Pork Board
 - Research, Education, Promotion
 - The Other White Meat
 - Mandatory Check-off
 - Reports to USDA-AMS
- National Pork Producers Council
 - Des Moines & Washington, D.C.
 - Membership
 - Voluntary Producer Membership
 - 43 State Pork Councils
 - Allied Industry Membership
 - Public Policy / Advocacy Arm
 - Lobbying, Litigation & Trade Negotiations



Background and Overview

US Pork Industry Today

- 67,000 Pork Producers Nationwide
 - 116.2 million hogs marketed
 - Total gross receipts ~\$15 billion
 - Supporting > 550,000 rural jobs
 - 34,720 full time equivalent jobs
 - 127,492 agricultural jobs
 - 110,665 manufacturing jobs (packing)
 - 65,224 professional jobs (vet/finance)
 - \$20.7 billion personal income
 - \$34.5 billion gnp



Background and Overview

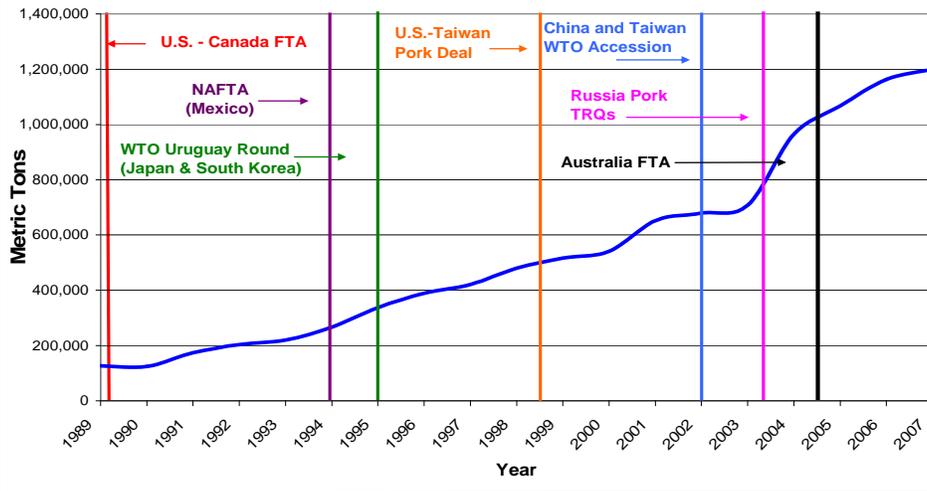
- **100 million gallon ethanol plant**
 - 37 million bushels of corn
 - 80 Iowans directly employed
- **37 million bu corn** **Direct jobs**

Farrow-finish	800
Or Wean-finish	242
Or Beef feedlot	278
- Further processing of livestock to meat?



Background and Overview

U.S. Pork Exports



Background and Overview

Top Global Exporter of Pork

Top 10 Countries Receiving U.S. Pork Exports: January - April 2008

Country	Amount exported (in million tons)	Value of pork exports (in million U.S. Dollars)
Japan	144,950	460.0
China/Hong Kong	144,800	243.6
Mexico	103,682	163.4
Russia	58,334	119.0
Canada	53,348	165.4
South Korea	48,550	98.9
Australia	12,216	29.3
Philippines	8,963	15.2
Taiwan	5,754	9.2
Dominican Republic	4,312	7.7



Background and Overview

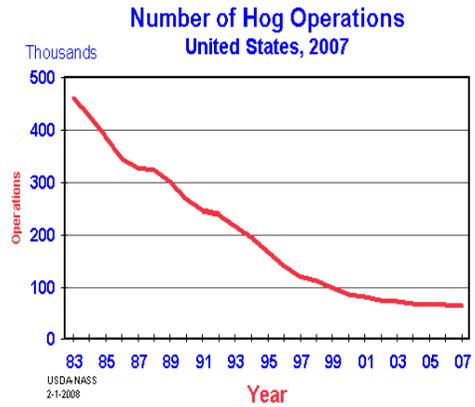
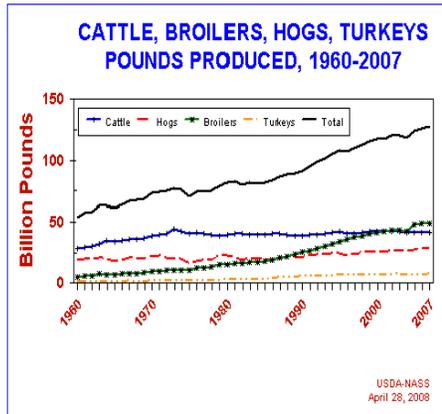
Production Evolution

- Economic Cycles Drive Efficiency Gains
- Indoor Production
 - Food Safety, Disease, Predation, Environmental
- Feed Mills and Integration
 - Food Safety, Quality Control, Consistency

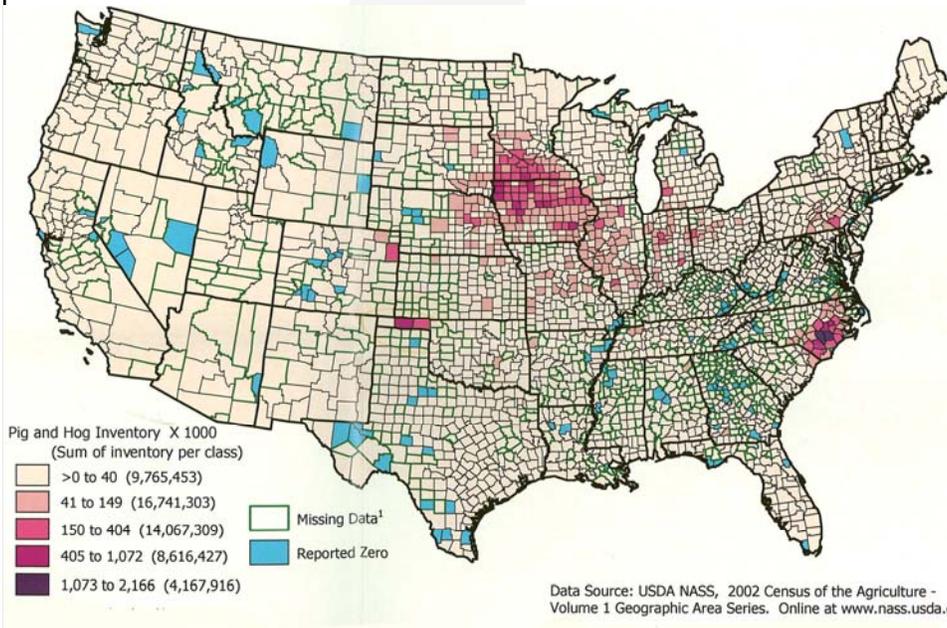


Background and Overview

Production Evolution



Background and Overview



Production

- Corn & Soybean Meal
- Specialization
- Manure Management & Environmental Concerns
- Deep Pits vs Lagoons



Lagoon Management



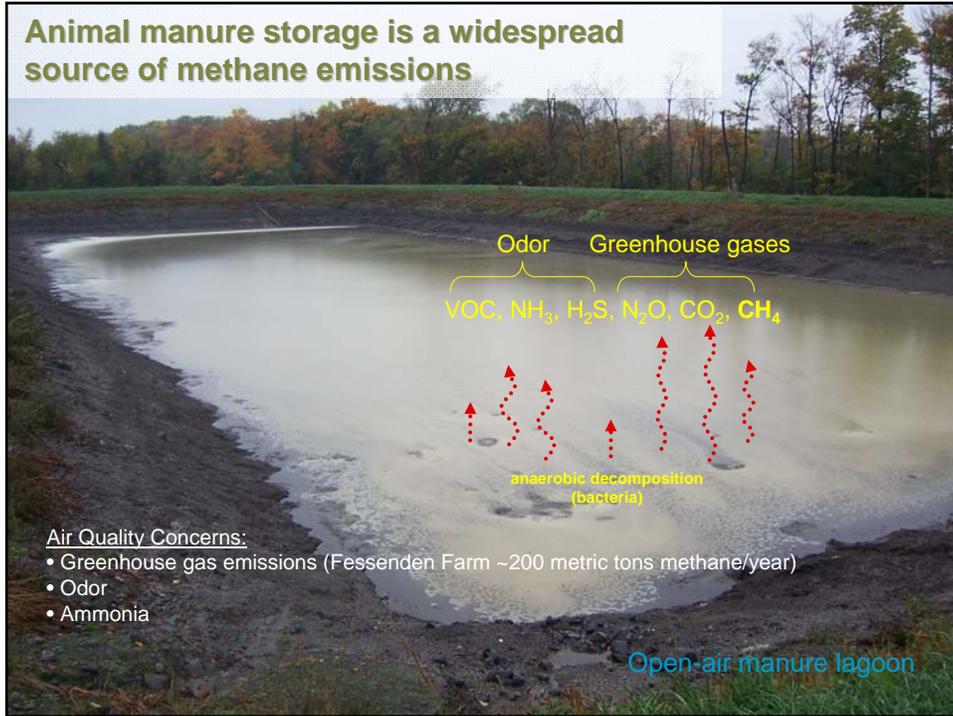
Lagoon Management



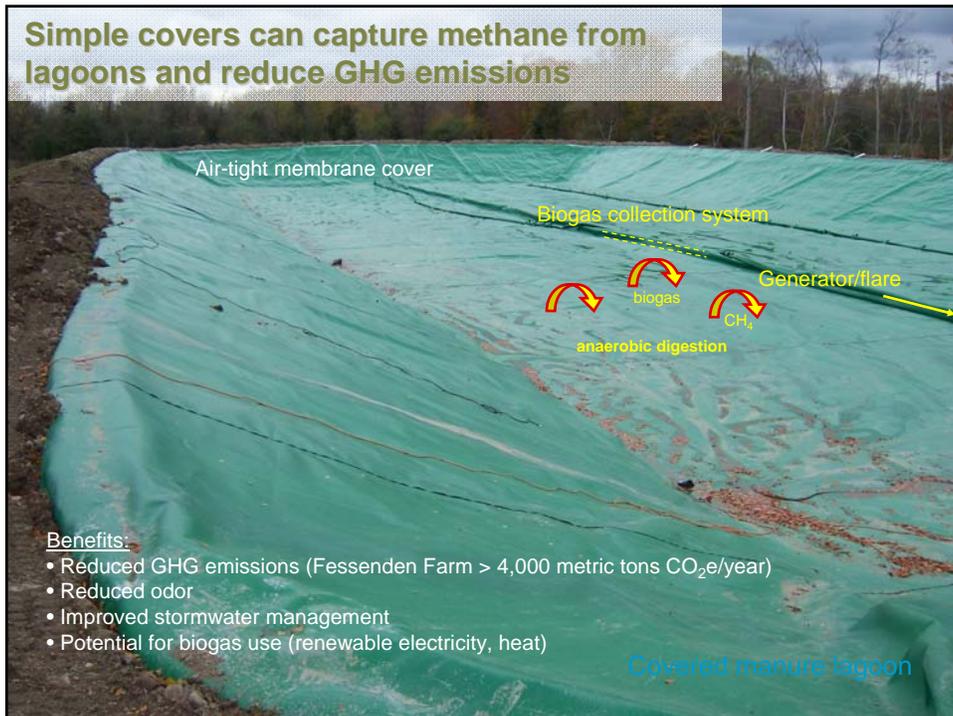
Methane Capture Project



Animal manure storage is a widespread source of methane emissions



Simple covers can capture methane from lagoons and reduce GHG emissions



Deep Pits



Environmental Challenges

- Pork Industry Response
 - Settlement of lawsuits
 - Engaged In National Dialogue
 - Regulators, Environmentalists
 - CAFO Rules and Permits
 - Improved Manure Management
 - Deep Pits, Setbacks, Application Improvements
 - Nutrient Management Plans
 - Goal: Zero Discharges



Environmental Challenges

History of manure release incidents involving swine operations during 2000 to 2005

Swine Operations – 8 States Representing 76% of Production						
State	Rank in Production	# Regulated Sites (Estimated)	# Years Reported	# Incidents Reported, Total	Average # Incidents Per Year	Average Rate of Incidents Per Facility Per Year
IA	1	5,250	4	30	7.5	0.001
NC	2	2,300	2.5	64	25.6	0.011
MN	3	2,300	6	2	0.3	0.000
IL	4	3,400	4	6	1.5	0.000
NE	6	950	6	10	1.7	0.002
MO	7	570	6	5	0.8	0.001
OK	8	220	5	40	8	0.036
OH	10	690	6	23	3.8	0.006
Total		15,460		140	5.9	0.007

Environmental Challenges



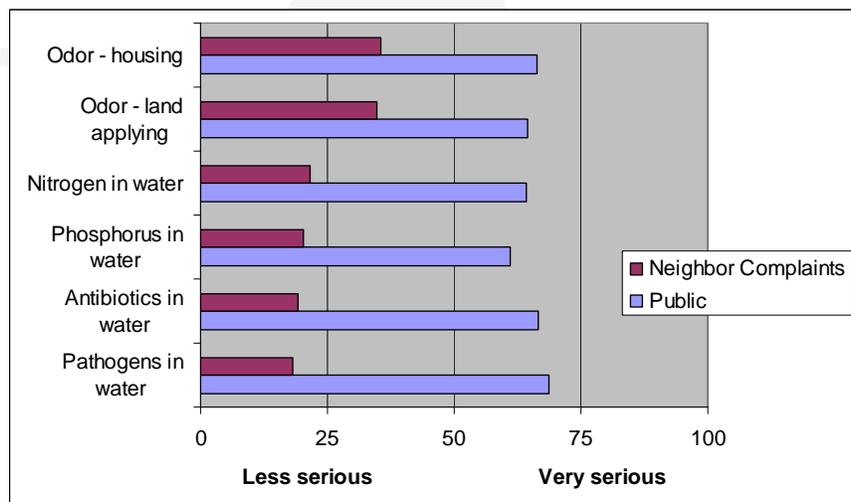
Air Emissions

CERCLA/EPCRA
Reporting Rule

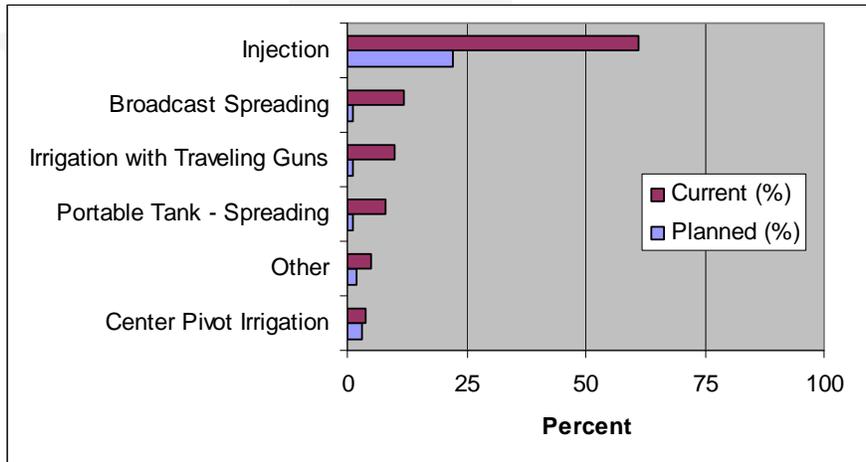
National Air
Emissions
Monitoring Study



Neighbor Relations



Manure application and odor control



Environmental Challenges

Timeline

- 1998-1999
 - EPA OECA investigations into CAFO air emissions
 - EPA/DOJ determination that insufficient data exists to support enforcement action
 - First suggestion of settlement agreements as method to develop data
- 2000 - 2002
 - Referral to National Academy of Science
 - Report found EPA lacked scientifically credible methodologies for estimating emissions from AFOs
- 2002 - 2004
 - EPA commences settlement negotiations with livestock producers
 - *Sierra Club, Inc. v. Tyson Foods, Inc.*, 299 F. Supp. 2d 693 (W.D. Ky. 2003): Failure to report emissions under CERCLA/EPCRA



Environmental Challenges

CERCLA / EPCRA Reporting

- Proposal
 - Exemption from reporting requirement related to releases of hazardous substances to the air where the source of those hazardous substances is animal waste at farms.
 - EPA proposed finding that reports are unnecessary because there is no reasonable expectation that Federal, state or local emergency responders would respond to such report
- NPPC Compromise
 - Develop threshold based on facility size
 - Large CAFO's - file periodic report
- Final Rule
 - Preserved CERCLA Reporting Exemption
 - EPCRA Report Based on size (Large CAFOs - 1000 Animal Units)



AFO Consent Agreements

- EPA announced Air Compliance Agreement Jan. 21, 2005.
- Organized agreements by animal type, evaluating each separately and sending them to the Environmental Appeals Board (EAB) for signature and approval.
- Sign-up period for the Environmental Protection Agency (EPA) Air Quality Compliance Agreement (the Agreement) ended on Aug.12, 2005.
- Environmental Appeals Board ratified all agreements by mid August 2006.
- 2,568 agreements representing 6,267 farms
 - 1,856 swine,
 - 468 dairy,
 - 204 layers,



AFO Consent Agreements

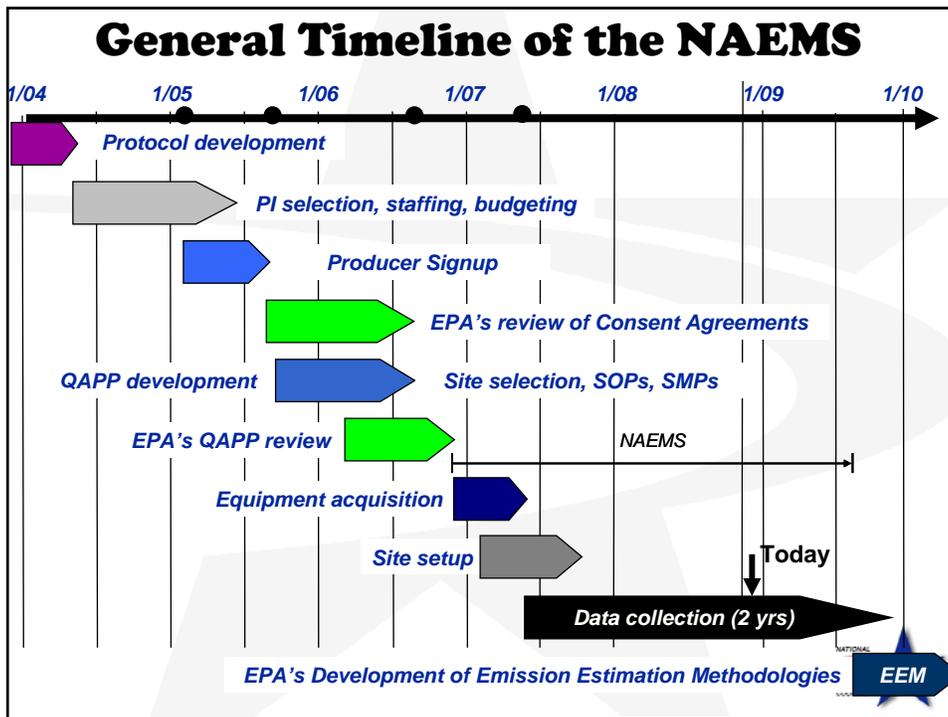
- Producer Agreed To
 - Pay a civil penalty, ranging from \$200 to \$100,000, depending on the size and number of AFOs.
 - Pay up to \$2,500 into a fund for a nationwide emissions monitoring program
 - Make facilities available for monitoring.
 - Apply for all applicable air permits and comply with permit conditions.
 - Report any qualifying releases of ammonia (NH₃) and hydrogen sulfide (H₂S) as required by section 103 of CERCLA and section 304 of EPCRA.
- Producers Received A Covenant Not To Sue For Past and Current Violation During Course of Study
- Legal Challenge
 - DC Circuit (*Association of Irrigated Residents v. E.P.A., v EPA*, 494 F.3d 1027, July 17, 2007)
 - USDA-AMS (In re: Mark McDowell, Jim Joens, et al., AMA PPRCIA Docket No. 05-001, Dec 18, 2008)



General Timeline of the NAEMS

- 2004 *Protocol Development*
- 2005 *PI Selection, Staffing, Budgeting at Purdue*
- 2006 *Site Selection, Quality Assurance Project Plan*
- 2007 *Setup of Barn and Open Source Emission Monitoring*
- 2008 *Data Collection, Analysis and Reporting*
- 2009 *Data Collection, Analysis and Reporting*
- 2010 *Prepare Final Report for EPA*
- 2011 *EPA Develops Emissions Estimating Methodologies*





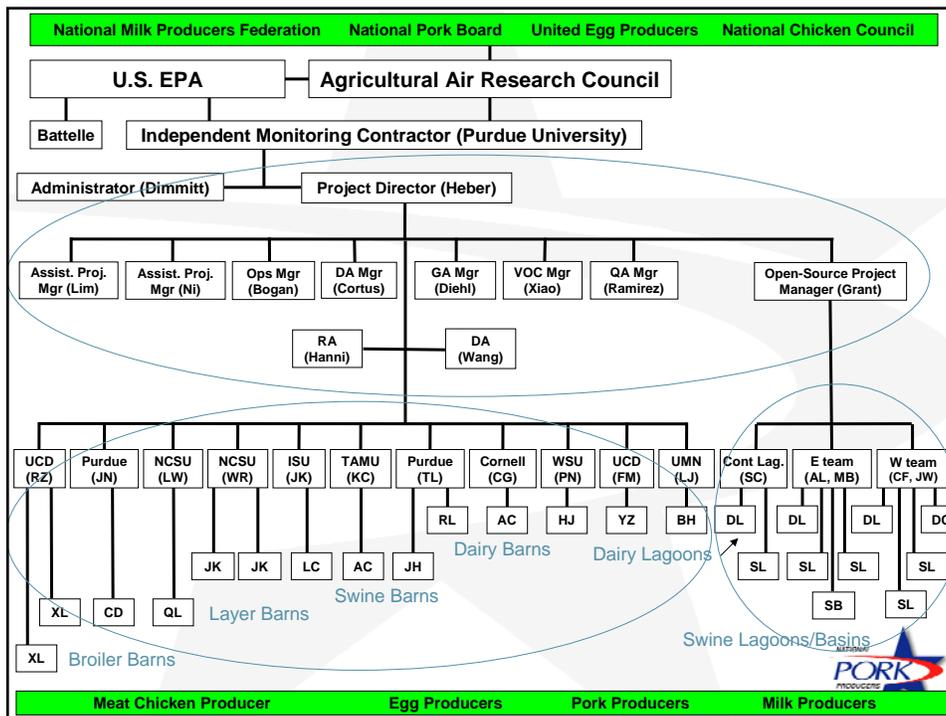
NAEMS

- Objective:
 - Collect quality-assured emission measurements from representative farms across America to generate a database from which emission estimation methodologies can be developed
 - Particulate Matter (PM₁₀, PM_{2.5} and TSP)
 - Ammonia
 - Hydrogen Sulfide
 - VOCs
- Quality Assurance Project Plan and Standard Operating Procedures



Uniqueness of the NAEMS

- Pollutants (PM_{2.5}, PM₁₀, TSP, NH₃, H₂S, CO₂, CH₄, VOC)
 - Add-on studies measure N₂O, odor and airborne pathogens.
- 24-months of continuous monitoring at each farm
- 38 livestock & poultry barns tested with same protocols
- Quality assurance/quality control (raising the bar)
 - Oversight by the U.S. EPA OAQPS in Raleigh, NC
 - Quality Assurance Project Plan (Category 1)
 - 57 standard operating procedures (SOPs)
 - 15 site monitoring plans (SMPs)
 - On-site audits
- Novel methods
 - NV barn airflows measured with 3-D sonic anemometers.
 - Fan operation measured with vibration sensors.
 - Custom designed data acquisition & processing systems

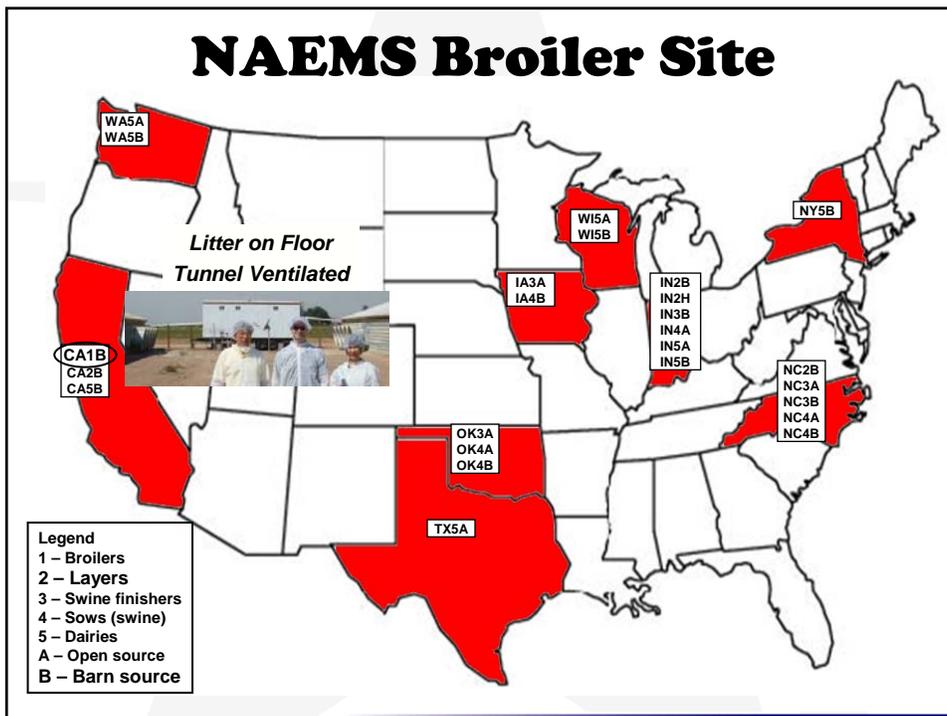


Summary of NAEMS Sites

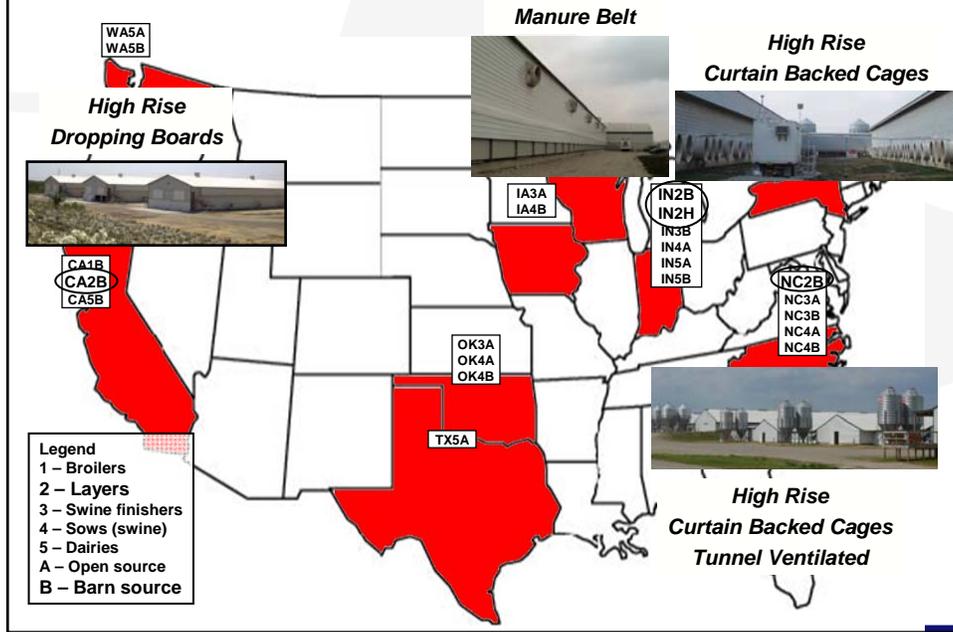
Species	Barns per Site			Total number		Number of Area Sites			
	2-b	3-b	4-b	Sites	Barns	Corrals	Lagoons	Basins	Total
Swine	0	4	1	5	16	0	5	1	6
Dairy	3	2	0	5	12	1	3	0	4
Layers	2	0	1	3	8	0	0	0	0
Broilers	1	0	0	1	2	0	0	0	0
Total	6	6	2	14	38	1	8	1	10



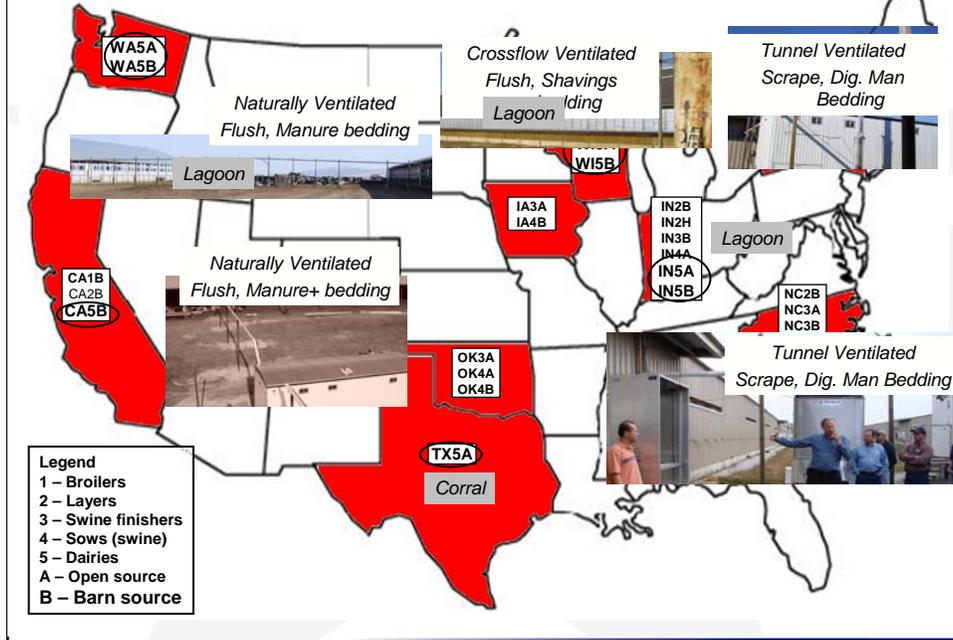
NAEMS Broiler Site

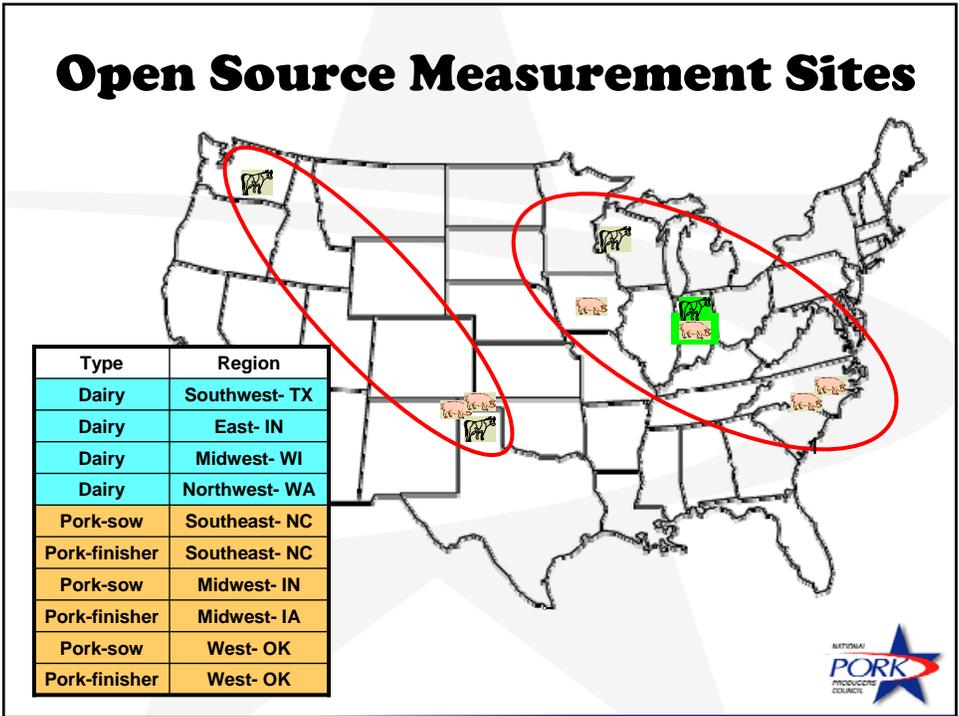
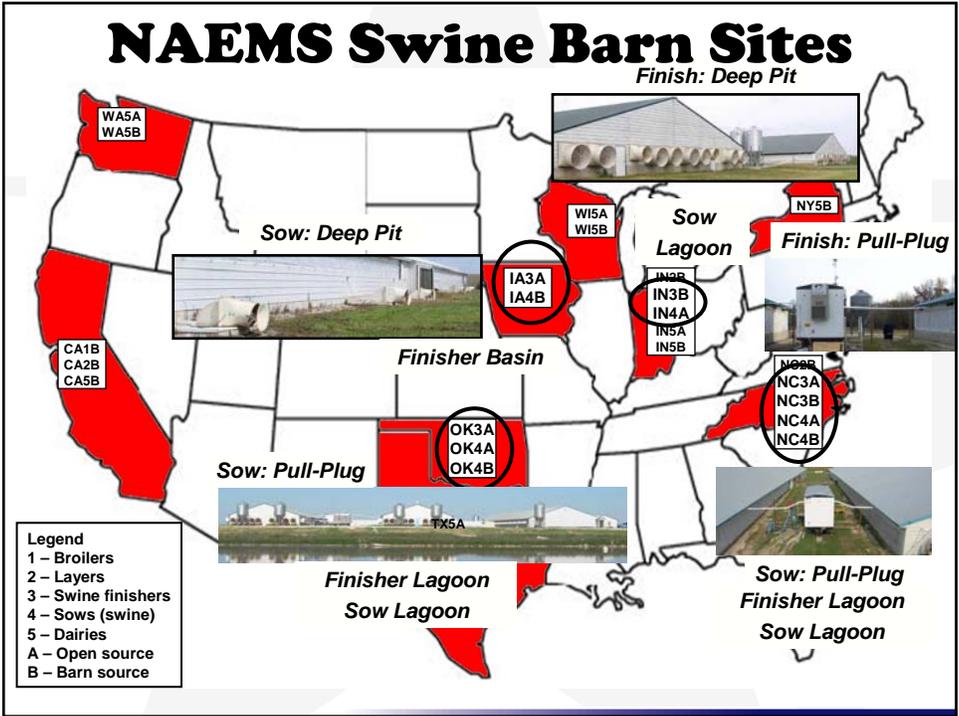


NAEMS Layer Sites



NAEMS Dairy Sites





Criticisms

- Inadequate Number of Facilities Monitored
- Not fully responsive to NAS demands
- No study of mitigation technologies
- Industry Funded / Lack of Environmentalist Participation
- No Adequate Oversight



Independent Review and Oversight

- Independent Review Committee
 - Dr. Robert Burns and Dr. Hongwei Xin
 - Iowa State University
 - Conducted Kentucky Broiler Study (Tysons v. Sierra Club) on Behalf of Sierra Club
 - "We were impressed with the ammonia emissions study which scientists at Iowa State did for Tyson as part of the fulfillment of the settlement from the Sierra Club v. Tyson lawsuit. This report is definitely the most comprehensive ever done on the issue of chicken house emissions and we are pleased that it has been completed and can be viewed by the public."
 - Aloma Dew
Sierra Club Midwest Representative
September 7, 2007 Statement/Press Release
- SAC, PASPAC



Questions ?



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