Air Quality Component--introduction
Bioaerosols, list compounds, emission factors move to processed based models
Recognize that system studies need to be conducted…
Information that certain management practices or technologies will be used as the basis for making sound decisions about environmental benefits, such as carbon credits.
Making sound decisions on reducing the impact of livestock production on the environment, improving sustainability by reducing the carbon footprint, and improving air quality.

Problem Areas

1. Measure concentrations and quantify emissions
    Objectives
    a. Develop appropriate methods and protocols to measure concentrations and emissions from animal agriculture (Dungan & Leytem)
    Todd, Cole—Bushland—NH3, GHG—Beef cattle, Dairy
    Dungan, Leytem—Kimberly—endotoxins, bioaerosols, NH3, GHG, VOC—dairy
    Trabue—Ames—VOC, Reduced S, PM—swine, poultry
    Spies—Clay Center—GHG, NH3, H2S—beef cattle
    Moore—Fayetteville—NH3—poultry
    Ro—Florence—NH3, GHG—poultry, swine
    Miles—Mississippi State—NH3, GHG—poultry
    Silva, Loughrin—Bowling Green—PM, VOC—poultry, swine

    b. Determine emission factors from various production practices (Dungan & Leytem)
            Animal units, field application, etc
    Todd, Cole—Bushland—NH3, GHG—Beef cattle, Dairy
    Dungan, Leytem—Kimberly—endotoxins, NH3, GHG, VOC—dairy
    Trabue—Ames—VOC, Reduced S, PM—swine, poultry
    Spies, Varel—Clay Center—GHG, NH3, H2S—beef cattle
    Moore—Fayetteville—NH3—poultry
    Ro—Florence—NH3, GHG—poultry, swine
    Miles—Mississippi State—NH3, GHG—poultry

    Anticipated Products
    - Scientifically sound methods for the research community to accurately measure airborne compounds
    - Quantify spatial and temporal variations in emissions for commodity groups and other government agencies
    - Special ARS session on emission factors for future EPA emissions conferences.
    - Publications and fact sheets on the state of science of emission factors for delivery to stakeholders (extension, producers, action agencies, commodity groups, and industry personel)

2. Develop and test abatement technologies and improved management practices
    a. Evaluate impact of diet modification on emissions (Kerr)
    Miller—Lincoln—H2S, VOC—beef

Todd, Cole—Bushland—NH3, GHG—Beef cattle
Moore—Fayetteville—NH3—poultry
Spies, Woodbury—Clay Center—GHG, NH3, H2S—beef cattle
Kerr, Trabue—Ames—NH3, VOC, Reduced S—swine

b. Evaluate impact of animal/facilities management on emissions (Miles)
Kerr, Trabue—Ames—NH3, VOC, Reduced S—swine
Miles, Brooks—Mississippi State—NH3, GHG, bioaerosols—poultry
Moore—Fayetteville—PM, endotoxin, NH3—poultry, swine
Woodbury—Clay Center—NH3, GHG—beef
Vanotti, Szogi, Ro—Florence—NH3—swine, poultry

c. Evaluate impact of manure handling, storage, & treatment on emissions (Szogi)
Vanotti, Szogi—Florence—NH3—swine, poultry
Todd, Cole—Bushland—NH3, GHG—Beef cattle
Miller—Lincoln—GHG—Beef cattle
Moore—Fayetteville—NH3—poultry, swine
Whitehead, Cotta—Peoria—microbes, H2S, GHG—swine
Miles—Mississippi State—NH3, GHG—poultry
Dungan, Leytem—Kimberly—bioaerosols, NH3, GHG, VOC—dairy
Varel—Clay Center—VOC, NH3, microbes, GHG—beef, swine
Loughrin, Lovan—Bowling Green—VOC, GHG, NH3—swine, poultry

d. Evaluate impact of land application on emissions (Watts)
Watts—Auburn--GHG, NH3—poultry
Miles—Mississippi State—NH3, GHG—poultry
Sistani, Lovan—Bowling Green—GHG, NH3—swine
Pote, Moore—Fayetteville & Booneville—NH3—poultry
Mooreman—Ames—microbes—swine
Dungan, Leytem—Kimberly—bioaerosols—dairy

Anticipated Products
- Delivery of cost effective BMPs that reduce emissions to producers, extension, and action agencies
- Delivery of improved systems for the handling and storage of manure that increase manure value to producers, extension, and action agencies
- Delivery of peer-reviewed reports documenting the effectiveness of abatement technologies and practices that reduce emissions and enhance manure value to producers, extension, and action agencies

3. Model emissions based upon physical, chemical, and biological processes
    a. Identify and verify existing process-based models (Todd)
    Todd, Cole—Bushland—NH3—beef
    Ro—Florence—NH3, GHG—swine, poultry

b. Identify critical physical, chemical, and biological processes contributing to emissions
    (Loughrin)

Todd, Cole—Bushland—NH3, GHG—Beef cattle, Dairy
Dungan, Leytem—Kimberly—endotoxins, NH3, GHG, VOC—dairy
Trabue—Ames—VOC, Reduced S, PM—swine, poultry
Spies, Varel, Woodbury, Eigenberg—Clay Center—GHG, NH3, H2S—beef cattle
Moore—Fayetteville—NH3—poultry, swine
Ro, Szogi, Vinotti—Florence—NH3, GHG—poultry, swine
Miles—Mississippi State—NH3, GHG—poultry
Loughrin, Lovan—Bowling Green—VOC, GHG, NH3—swine, poultry
Whitehead, Cotta—Peoria—microbes, H2S, GHG—swine
Miller—Lincoln—VOC, microbes, NH3, GHG—Beef cattle

Anticipated Products
- Knowledge of fundamental processes and mechanisms controlling emissions from animal agriculture for use by other scientists and model developers
- Databases of input variables and emissions for evaluating process-based models for use by other scientists and model developers
- Scientific peer-reviewed manuscripts describing new knowledge of mechanisms affecting emissions available to the scientific community, action agencies, and extension