Component: Manure Pathogens and PACs

1) Kimberly Cook – Co-Chair (KY – MSA)
   a) Fate Transport Pathogens
   b) Odors
   c) Swine/Chicken
2) Cliff Rice – Co-Chair (Beltsville)
   a) PACs
3) Michael Jenkins (GA – S)
   a) Fate Transport Pathogens
   b) Chickens/Dairy
4) Mark Ibekwe (CA – W)
   a) Fate Transport Pathogens
   b) MST
   c) Dairy
5) John Brooks (MS – MSA)
   a) Fate Transport Pathogens
   b) Chickens/Swine
6) Tom Moorman (IA)
   a) Fate Transport Pathogens
   b) Swine

Research Problem Area & Subsets
1) **Microbial Pathogens**
   a) Fate and Transport (Manure, Air, Soil, & Water)
      i) Microbial Ecology
   b) Microbial Source Tracking
      i) TMDLs
2) **Pharmaceutically Active Compounds (Veterinary Pharmaceuticals & Natural Hormones)**
   a) Fate and Transport (Manure, Air, Soil, & Water)
   b) Environmental Frequency
   c) Source
3) **Antibiotic Resistant Bacteria (Pathogens & Commensals)**
   a) Fate and Transport (Manure, Air, Soil, & Water)
   b) Environmental Frequency
   c) Source
4) **Best Management Practices(s) and treatment technologies for Mitigation and Risk Management**

Statement Outline

1) Microbial Pathogens

Statement:

      1) Relationship between manure pathogens to public health issues

      Objective: Determine the fate and transport of pathogens from different animal production systems under different regions to surface water, ground water, soil, and crops.

      Deliverables: Peer-reviewed information necessary to develop predictive systems and prevent transport.

          a. Source identification to determine extent of problem

              i. Fate and Transport (Manure, Surface Water, Ground Water, Soil, Tile Drainage & Air)

                  1. Inactivation Rates

                  2. Persistence

                  3. Transport Modeling

                  4. Source Tracking

              ii. TMDL

2) Pharmaceutically Active Compounds (Veterinary Pharmaceuticals & Natural Hormones)

Statement:

      1) Relationship between manure PACs to public and environmental health issues

      Objective: Determine the fate and transport of veterinary pharmaceuticals from different animal production systems under different regions to surface water, ground water, soil, and crops.

      Deliverables: Peer-reviewed information necessary to develop predictive systems and prevent transport of veterinary pharmaceutical compounds.

      Objective: Determine the fate and transport of endocrine-active natural products from different animal production systems under different regions to surface water, ground water, soil, and crops.

      Deliverables: Peer-reviewed information necessary to develop predictive systems and prevent transport of endocrine-active natural products.

          a. Source identification to determine extent of problem

              i. Fate and Transport (Manure, Surface Water, Ground Water, Soil, Tile Drainage & Air)

                  1. Identify PACs and determine persistence

                  2. Biodegradation

                  3. Sorption

                  4. Source Tracking

3) Antibiotic Resistant Bacteria (Pathogens & Commensal)

Statement:

      1) Relationship between agricultural antibiotic resistant bacteria to public health issues

Objective: To determine the frequency of antibiotic resistant organisms/genes in various agricultural regions and their transfer to surface water, ground water, soil, and crops.

Deliverables: Data necessary to assess agricultural impact on antibiotic resistance in the environment and public health.

    a. Source identification to determine extent of problem

        i. Fate and Transport (Manure, Surface Water, Ground Water, Soil, Tile Drainage & Air)

            1. Baseline data

            2. Gene transfer/movement

4) Best Management Practices(s) and treatment technologies for Mitigation and Risk Management

Statement:

    1) Evaluation of BMPs and treatment technologies on impact of fate and transport of pathogens, PACs, and antibiotic resistant bacteria using an integrated research approach.

Objective: To evaluate and validate BMPs and treatment technologies on pathogens, PACs, and antibiotic resistant bacteria immobilization and inactivation.

Deliverables: Recommendations on implementing BMPs and treatment technologies.

    a. Treatment systems for evaluation and immobilization

SY Locations (Not Final)

Problem Area 1
    i) Bowling Green, KY
    ii) Mississippi State, MS
    iii) Ames, IA
    iv) Lincoln, NE
    v) Riverside, CA
    vi) Kimberly, ID
    vii) Beltsville
    viii) Watkinsville, GA
    ix) Bushland, TX

Problem Area 2
    i) Mississippi State, MS
    ii) Riverside, CA
    iii) Beltsville
    iv) Ames, IA

Problem Area 3
    i) Watkinsville, GA
    ii) Bushland, TX
    iii) Bowling Green, KY
    iv) Mississippi State, MS
    v) Ames, IA
    vi) Lincoln, NE
    vii) Riverside, CA

Problem Area 4
    i) Bowling Green, KY
    ii) Mississippi State, MS
    iii) Ames, IA
    iv) Lincoln, NE
    v) Riverside, CA
    vi) Florence, SC
    vii) Watkinsville, GA
    viii) Bushland, TX

Writing Assignments

1) **Pathogens:**
   a. **Mike Jenkins (Watkensville) (Lead)**
      i. **Fate and transport**
   b. **Mark Ibekwe (Riverside)**
      i. **Source tracking**
      ii. **Microbial ecology**
   c. **Bill Rice (Bushland)**
      i. **Microbial ecology**
   d. **Tom Moorman (Ames)**
      i. **Fate and Transport**
2) **PACs:**
   a. **Cliff Rice (Beltsville) (Lead)**
3) **Antibiotic Resistant Bacteria:**
   a. **John Brooks (Mississippi State) (Lead)**
   b. **Bill Rice (Bushland)**
   c. **Terry Whitehead (Peoria)**
4) **BMPs and treatment technologies:**
   a. **Kim Cook (Bowling Green) (Lead)**
   b. **Pat Hunt (Florence)**
   c. **Mike Jenkins (Watkensville)**
   d. **Mark Ibekwe (Riverside)**

Deadlines

Dec. 15th – Information to Kim Cook or Cliff Rices