Manure Treatment Technology Subgroup
DRAFT Final Report Overview

Manure Treatment Subgroup Members

- Marel Raub, Chesapeake Bay Commission
- Glenn Carpenter, USDA
- Peter Hughes, Red Barn Ag
- Ted Tesler, PA Dept. of Env. Protection
- Beth McGee, Chesapeake Bay Foundation
- Dwight Dotterer, MD Dept. of Agriculture
- Kristen Hughes Evans, Sustainable Chesapeake

Chesapeake Bay Program guidance and support by Mark Dubin and Emma Giese

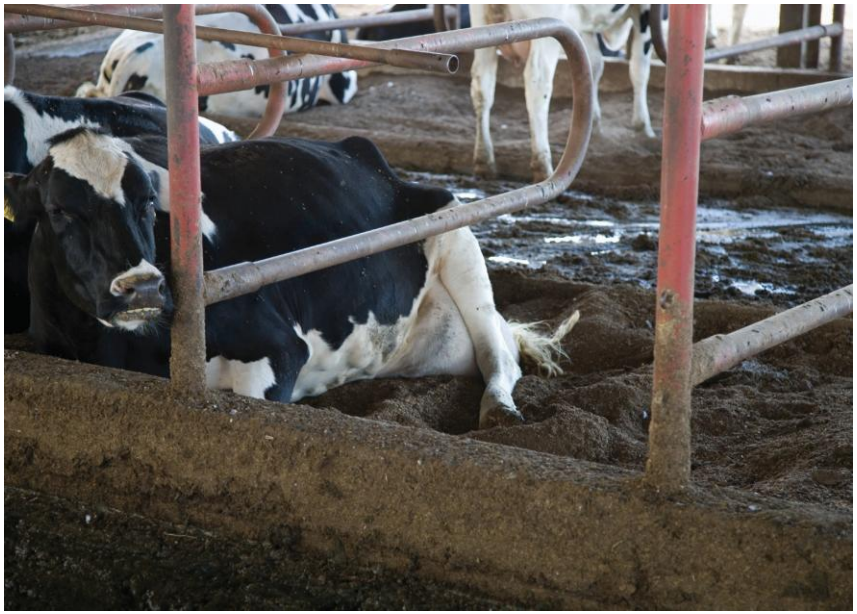
Manure Treatment Subgroup Tasks

The goal of this ad hoc subgroup is to recommend a framework for an expert review panel to develop BMPs for manure treatment technologies for the Ag Workgroup's approval:

- Identify technologies for review;
- Prioritize order of review;
- Recommend ares of expertise for panel members; and
- Draft guidelines and scope of work for the review process.

Focus Area for Manure Treatment Technologies

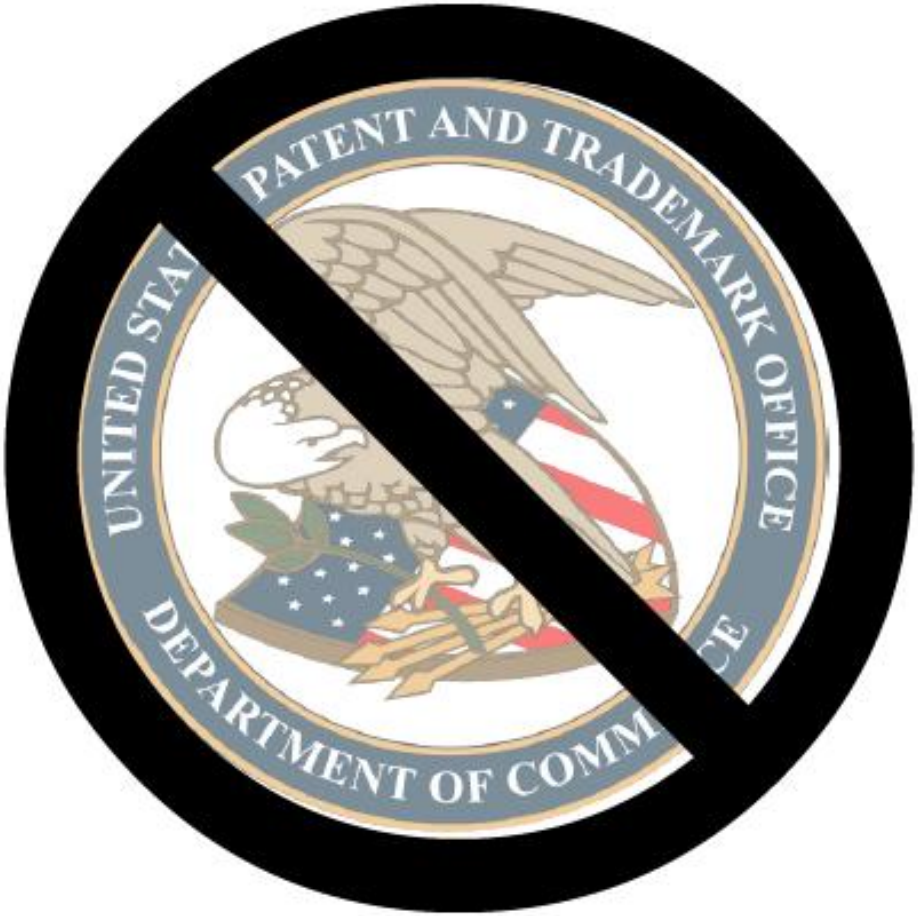
After Excretion



Before Land Application

Photos courtsey of NRCS

Focus on General Technology Categories (Rather than Patented Technologies)



Methods

I. Soliciting Partner Input:

- Drafted a list of technologies and a survey – solicited feedback on priorities from Workgroup members and affiliated partners.

- We eliminated technologies that fell out of our purview, and ranked technologies according to partner responses (21 received).

- Presented results to Ag Workgroup on Dec. 12th, 2014 and requested feedback.

Methods

II. Subgroup Prioritization Process: Three primary areas of consideration for technology prioritization.

1. Partner input based on survey responses

1. Availability of reliable monitoring data

1. Level of current and proposed adoption

Workgroup/Partner Survey Results

(Based on 21 responses, subgroup members not included)

Manure Treatment	Priority Average Score*
Liquid/solid separation	**2.70**
Anaerobic digestion	**2.42**
Composting	**2.21**
Phosphorus removal	**2.11**
Treatments for reducing ammonia volatilization and phosphorus solubility	**2.10**
Thermochemical treatment	**2.10**
Pelletizing	**1.94**
Aerobic/liquid manure digester	**1.85**
Biological N removal	**1.60**
Enzyme digestion	**1.56**

*Average priority score based on assigned values as follows: 3 = High; 2 = Medium; 1 = Low priority. Average score = sum of total values/# assigned priority values.

Subgroup Proposed Prioritization

(3=high, 2=med, 1=low)

Technologies	Level of Current and Proposed Adoption	Monitoring Data Availability
Microbial digestion (aerobic/anaerobic)	**3**	**3**
Chemical treatments - dry	**3**	**3**
Thermochemical	**3**	**3-2**
Liquid/solid separation	**3**	**3-2**
Composting	**3-2**	**2**
Chemical treatments - wet	**1**	**1**
Other Technologies:		
Biological nitrogen removal		
Enzymatic digestion		

Technologies Not Included in Scope of Work

- Baled poultry litter
- Fluidized co-digestion
- Constructed wetland
- Feed management
- Improving crop uptake of nutrients
- System changes (liquid to dry pack)
- Pelletizing
- Manure injection

Suggested Expert Panel Expertise

- Biological/bio-systems engineering
- N and P cycling through agriculutral systems, air and water resources
- Nutrient management planning/agronomy
- Atmospheric emissions from manure treatment/handling systems including fate and deposition of manure ammonia and NOx emissions
- Manure management systems for Chesapeake Bay animal production facilities
- BMP tracking and reporting and the Chesapeake Bay modeling tools.

Note we also recommend the panel include experts representing diverse geographic regions of the watershed.

Summary of Recommendations for Expert Panel Scope of Work

- Detailed definition of technology
- Recommend N, P and sediment loading or effectiveness estimates and justifiction for estimates
- Land uses/manure types to which BMP is applied
- Load sources that the BMP will address with potential interactions with other practices
- Conditions where BMP will work & where it won't work (or will be less effective)
- Temporal performance of BMP
- Useful life/effectiveness over time
- Description of how BMP will be tracked and reported

Recommendations for Prioritization of Monitoring Data*

	High Confidence	Medium Confidence	Lowest Confidence
Applicability	Definition matches technical specs	Generally representative	Somewhat representative
Study location	Very representative	Generally representative	Somewhat representative
Variability	Relatively Low	Medium	Relatively High
Number of studies	Many	Moderate	Few
Scientific support	Operational scale research (peer reviewed)	Research scale (peer reviewed)	Not peer reviewed ("gray" literature)

From Table 1 in Chesapeake Bay Program WGIT Protocol for the Development, Review, and approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model.

Feedback from Ag Workgroup?