Tom Hebert's Context

- Assume that the production chain will be under ever-increasing expectations for environmental performance
- LGU research system has been highly fragmented
- Not much room for error in publishing findings with regulatory implications
- Regulatory trajectory places a premium on standardization, cooperation, and collaboration

Key Observations by WP Authors

- "Of prime importance is expressing emissions in terms of the unit that is causing them."
  - Authors: this is key for *both modeling and regulations*
  - Distinguish between *primary* and *secondary* units

Primary Units: Can We Populate This Table?*

Source Type	NH_3	H_2S	$PM_{2.5}$	PM_c
Broiler House				
Layer House				
Swine Farrowing				
Swine Finishing				
Dairy FS Barn				
Dairy Open Lots				
Runoff Holding Pond				
Treatment Lagoon				
Composting Facilities				
etc.				

*Or something like it

Secondary Units: Can We Populate *This* Table?*

Source Type	NH_3	H_2S	$PM_{2.5}$	PM_c
Broiler House				
Layer House				
Swine Farrowing				
Swine Finishing				
Dairy FS Barn				
Dairy Open Lots				
Runoff Holding Pond				
Treatment Lagoon				
Composting Facilities				
etc.				

*Or something like it

…For example, first principles models are ranked lower than measurements of any kind. **However, a model developed using first principles but calibrated or refined using measurement data might rank higher than estimates based on only one of these methods.** The relative ranking is highly dependent on the nature of the source category; in general, the more that emissions are affected by the actual site conditions, the less representative laboratory measurements will be.

Lee Beck and Darcy Wilson, 1997, “EPA’S DATA ATTRIBUTE RATING SYSTEM”

$$\left\{[ER_G]_t\left(\frac{P_{std}}{P_a}\right)\left(\frac{T_a}{T_{std}}\right)\left(\frac{V_m}{w_m}\right)\bullet 10^6\right\}+\sum_{e=1}^{n}[Q_i]_t\left(\frac{\rho_e}{\rho_i}\right)[G_i]_t=\sum_{e=1}^{n}[Q_e]_t[G_e]_t$$

Net Volumetric Emission Rate + Background Contributions = "Measured" Volumetric Emission Rate

$$\sum_{e=1}^{n}[Q_e]_t[G_e]_t = \left\{[ER_G]_t\left(\frac{P_{std}}{P_a}\right)\left(\frac{T_a}{T_{std}}\right)\left(\frac{V_m}{w_m}\right)\bullet 10^6\right\} + \sum_{e=1}^{n}[Q_i]_t\left(\frac{\rho_e}{\rho_i}\right)[G_i]_t$$

$$\sum_{e=1}^{n} [Q_e]_t [G_e]_t = RHS_t$$

Key Observations by WP Authors

- "Not all measurement techniques are equally valid for a given source type and a given pollutant."
  - Are we prepared to "stick our necks out" on these professional judgments?
  - Beyond yes/no determinations, do we have firm rationales for admitting data collected using marginal techniques?

EPA's Emission Factor Rating Framework: Can We Fill *This*?

Source Type	NH_3	H_2S	$PM_{2.5}$	PM_c
Broiler House				
Layer House				
Swine Farrowing				
Swine Finishing				
Dairy FS Barn				
Dairy Open Lots				
Runoff Holding Pond				
Treatment Lagoon				
Composting Facilities				
etc.				

*Or its next generation; using the NAEMS dataset

A = Excellent

Emission factor is developed primarily from A and B rated source test data taken from many randomly chosen facilities in the industry population. The source category population is sufficiently specific to minimize variability.

B = Above average

Emission factor is developed primarily from A or B rated test data from a moderate number of facilities. Although no specific bias is evident, is not clear if the facilities tested represent a random sample of the industry. As with the A rating, the source category population is sufficiently specific to minimize variability.

C = Average

Emission factor is developed primarily from A, B, and C rated test data from a reasonable number of facilities. Although no specific bias is evident, it is not clear if the facilities tested represent a random sample of the industry. As with the A rating, the source category population is sufficiently specific to minimize variability.

D = Below average

Emission factor is developed primarily from A, B and C rated test data from a small number of facilities, and there may be reason to suspect that these facilities do not represent a random sample of the industry. There also may be evidence of variability within the source population.

E = Poor

Factor is developed from C and D rated test data from a very few number of facilities, and there may be reason to suspect that the facilities tested do not represent a random sample of the industry. There also may be evidence of variability within the source category population.

U = Unrated (Only used in the L&E documents)

Emission factor is developed from source tests which have not been thoroughly evaluated, research papers, modeling data, or other sources that may lack supporting documentation. The data are not necessarily "poor," but there is not enough information to rate the factors according to the rating protocol. "U" ratings are commonly found in L&E documents and FIRE rather than in AP 42.

Key Observations by WP Authors

- "The key move is the establishment of a baseline."
  - When does a mitigation technique become a new industry baseline?
  - Is there a way to accommodate biological limits to the effectiveness of a mitigation technique?

“Deploying” the White Papers

- Is there a need to put the White Papers through their paces?
  - What would be the benefit or outcome?
  - What would such a process look like?
- To what extent could/should the content of the White Papers be brought to bear on the data analysis against the 12/2011 deadline?