

10/22/12 Preliminary Draft Comments for Deliberations of the SAB Animal Feeding Operations Emissions Panel Review of EPA's draft Emissions Estimating Methodologies for Broiler Operations and for Lagoons and Basins at Swine and Dairy Operations. Please Do not Cite or Quote. These comments are preliminary and do not represent SAB consensus comments nor EPA Policy.

**Dave Allen's Preliminary List of Discussion Topics on the 9/28/12 Draft Panel Report for the 10/24/12 Teleconference Call**

**Science Advisory Board (SAB) Animal Feeding Operations Emissions Review Panel**

**Purpose:** This is a preliminary list of key unresolved issues identified by Dr. David Allen, Chair of the SAB Animal Feeding Operations Emissions Review Panel, for discussion by the Members of the Panel during the October 24, 2012 SAB Panel teleconference call. This is related to the Panel's review of the Panel's September 28, 2012 draft report entitled *SAB Review of Emissions Estimating Methodologies for Broiler Animal Feeding Operations and for Lagoons and Basins at Swine and Dairy Animal Feeding Operations*. This draft report has been posted onto the SAB's October 24, 2012 teleconference call website at:

<http://yosemite.epa.gov/sab/sabproduct.nsf/MeetingCal/62C8C07477F11CAF85257A3200413D5E?OpenDocument>

Page and line references noted below refer to the page and line number of the Panel's September 28, 2012 draft report that is available on the above-noted website.

**I. Cover Letter**

No key comments/unresolved issues.

**III. Executive Summary:**

**1) Executive Summary Process-Based Model discussion (p. 2, line 9)**

**a) Definition:**

*Consider adding the following text to define process-based model (text would be added after first two sentences of the paragraph beginning on page 2, line 9):*

“In process-based emission modeling, system processes are mathematically represented at an appropriate level of detail to capture the important dynamics and interactions among components. In the most rigorous form, a process-based model is developed from the scientific understanding of the physical, biological, and other processes that control emissions. Although empirical data may be used to help establish certain model parameters or relationships, the primary need for empirical data is for evaluation or verification of the mechanistic models used to describe system processes. This is different from an empirical approach where regression techniques are used to formulate models from experimental data and independent datasets are needed for validation. Process-based modeling provides a robust emission estimation approach,

10/22/12 Preliminary Draft Comments for Deliberations of the SAB Animal Feeding Operations Emissions Panel Review of EPA's draft Emissions Estimating Methodologies for Broiler Operations and for Lagoons and Basins at Swine and Dairy Operations. Please Do not Cite or Quote. These comments are preliminary and do not represent SAB consensus comments nor EPA Policy.

since the mechanistic models are expected to be valid beyond the datasets used to establish model parameters.”

b) Difficulties/issues in developing and applying process-based models:

*Consider adding something to the text that recommends a process-based modeling approach on the potential difficulties/issues in developing and applying process-based models to assess AFO emissions. Some possible text to be added might be the following, to page 2, line 26:*

“SAB recognizes that there are potential drawbacks with developing and applying process-based models to assess emissions at AFO facilities. National consistency in assessing emissions using such a tool may be difficult to achieve. Since a process-based model may not be appropriately applied for all farms across the nation in a particular AFO sector, a large number of parameters and static variables may be required to address the variety of factors that affect emissions on a number of farms within a sector. Also, interactions between the parameters may need to be assessed and incorporated into the modeling approach. Separate decisions would likely be required on which parameters and static variables should be incorporated into the process-based model that would be applied for each farm, resulting in different applications of a processed-based modeling approach for each farm.”

**2) Executive Summary Charge Question 1: EPA’S Approach for Developing the EEMS (p. 2, line 31):**

a) Advice on Developing EEMS for other sectors (p. 2, line 34):

*The following portion of the charge question was not specifically addressed in the Panel’s 9/28/12 draft response: “In addition please comment on the approach for developing draft EEMS for egg-layers, swine and dairy confinement houses.”*

*Possible solution: Add the following as the last paragraph to the text under the Executive Summary response to Charge Question 1, beginning page 4, line 22:*

“In addition, SAB recommends that after EPA updates its approaches for developing EEMS for broiler confinement houses and swine and dairy lagoons/basins consistent with SAB’s advice, EPA use these updated approaches to develop draft EEMS for egg-layers, swine and dairy confinement houses. Thus, assuming these sectors have similar data limitations issues as are evident for the broiler confinement houses and swine and dairy lagoons/basins sectors, EPA should not plan to apply statistical and modeling tools that EPA would develop for estimating emissions beyond those of the dataset. EPA should consider using data collected through mechanisms outside of the consent agreement, including data published in literature, raw data from key studies, and data that support key literature. SAB also recommends that EPA should develop a process-based modeling approach to make predictions of air emissions on these sectors. EPA should consider developing EEMS at a variety of levels of complexity to provide

10/22/12 Preliminary Draft Comments for Deliberations of the SAB Animal Feeding Operations Emissions Panel Review of EPA's draft Emissions Estimating Methodologies for Broiler Operations and for Lagoons and Basins at Swine and Dairy Operations. Please Do not Cite or Quote. These comments are preliminary and do not represent SAB consensus comments nor EPA Policy.

options for producers with different levels of data availability. EPA should also identify critical data gaps associated with development of such modeling approaches and begin the process for identifying which key parameters should be included within the process-based models. EPA should consider conducting a full mass balance analysis to help in the assessment of key parameters that would be used in a process-based modeling approach.”

b) References (p.3, line 17, and p. 37, line 7):

Suggestions for literature that should be considered are included within the attached References section.

*Additional references should be added; the current list seems incomplete.*

c) Key Parameters (p. 4, line 5):

*The Report should note that various key factors and parameters that affect emissions include the following list. Do all Panel members agree?*

*Key factors and parameters that impact broiler emissions:*

- Animal activity (perhaps assessed through lighting program hours for light and dark periods),
- Key diet ingredients (that result in releases of gaseous pollutants, such as total nitrogen),
- Water management,
- Manure composition (moisture and nitrogen),
- Total number of animal units, and
- Ventilation rate.

*Key factors and parameters that affect dairy and swine lagoon emissions:*

- Sulfur, nitrogen and carbon content of feed,
- Percent conversion of feed nutrients to animal product (milk and meat),
- Milk production levels and composition for dairies,
- Seasonality, and
- Lagoon sulfur, nitrogen and carbon content, surface area, depth, manure residence time, volume, temperature and pH.

### **3) Rest of Executive Summary**

No key comments/unresolved issues.

10/22/12 Preliminary Draft Comments for Deliberations of the SAB Animal Feeding Operations Emissions Panel Review of EPA's draft Emissions Estimating Methodologies for Broiler Operations and for Lagoons and Basins at Swine and Dairy Operations. Please Do not Cite or Quote. These comments are preliminary and do not represent SAB consensus comments nor EPA Policy.

## **IV. BODY OF REPORT:**

### **INTRODUCTION**

No key comments/unresolved issues.

## **RESPONSES TO EPA'S CHARGE QUESTIONS**

### **3.1 SPECIFIC CHARGE QUESTIONS**

#### **3.2.1. EPA'S APPROACH FOR DEVELOPING THE EEMS (Page 14, Line 1)**

*Question 1: Please comment on the statistical approach used by the EPA for developing the draft EEMs for broiler confinement houses and swine and dairy lagoons/basins. In addition please comment on the approach for developing draft EEMs for egg-layers, swine and dairy confinement houses.*

- a) Add text that further defines what is a process-based model, identifies the potential difficulties/issues in developing and applying process-based models, and comments on the approach for developing draft EEMs for egg-layers, swine and dairy confinement houses (include text noted above that was added to Executive Summary).
- b) No other key comments/unresolved issues.

#### **3.2.2. COMBINATION OF LAGOON AND BASIN DATA (Page 17, Line 1)**

*Question 2: Please comment on the agency's decision to combine the swine and dairy dataset to ensure that all seasonal meteorological conditions are represented. In addition, the agency also seeks the SAB's comments on whether the agency should combine lagoon and basin data.*

No key comments/unresolved issues

10/22/12 Preliminary Draft Comments for Deliberations of the SAB Animal Feeding Operations Emissions Panel Review of EPA's draft Emissions Estimating Methodologies for Broiler Operations and for Lagoons and Basins at Swine and Dairy Operations. Please Do not Cite or Quote. These comments are preliminary and do not represent SAB consensus comments nor EPA Policy.

### **3.2.3. USE OF STATIC PREDICTOR VARIABLES (Page 19, Line 1)**

*Question 3: Please comment on the agency's decision to use static predictor variables as surrogates for data on lagoon/basin conditions. Given the uncertainties in that approach, does the SAB recommend that EPA consider specific alternative approaches for statistically analyzing the data that would allow for the site-specific lagoon liquid characteristics to be used as predictor variables?*

#### 1) Clarify Overall Recommendation:

SAB's response is that the static predictor variable approach is problematic for a number of interrelated reasons, noted in SAB's specific charge question response. The response also notes that EPA should move in the direction of a more process-based approach that uses appropriate, physically-based, region- and species-specific variables. However, SAB also provides an alternative approach for statistically analyzing the data.

The text should clarify SAB's overall response and advice.

### **3.1.4. ALTERNATIVE APPROACHES FOR NH<sub>3</sub> EEM (Page 23, Line 1)**

*Question 4: Does the SAB recommend that EPA consider alternative approaches for developing the draft NH<sub>3</sub> EEM that balances the competing needs for a large dataset (to reflect seasonal meteorological conditions) versus incorporating additional site-specific factors that directly affect lagoon emissions. If so, what specific alternative approaches would be appropriate to consider?*

No key comments/unresolved issues.

### **3.1.5. COMMENTS ON APPROACH FOR HANDLING NEGATIVE AND ZERO DATA (Page 27, Line 1)**

*Question 5: Please comment on the EPA's approach for handling negative or zero emission measurements.*

#### 1) Outliers (p. 30, line 13):

Delete all text from the 9/28/12 draft report after the first paragraph under this discussion. The text under the first paragraph was vague, and did not include specific recommendations beyond what EPA is already doing (conducting QA/QC per the QAPP).

10/22/12 Preliminary Draft Comments for Deliberations of the SAB Animal Feeding Operations Emissions Panel Review of EPA's draft Emissions Estimating Methodologies for Broiler Operations and for Lagoons and Basins at Swine and Dairy Operations. Please Do not Cite or Quote. These comments are preliminary and do not represent SAB consensus comments nor EPA Policy.

**3.1.6. ALTERNATIVE APPROACHES FOR NEGATIVE AND ZERO DATA (Page 31, Line 1)**

*Question 6: In the interest of maximizing the number of available data values for development of the draft H<sub>2</sub>S EEMs for swine and dairy lagoons/basins, does SAB recommend any alternative approaches for handling negative and zero data other than the approach used by the agency.*

No key comments/unresolved issues.

**3.2.7. BROILER VOC EEM (Page 32, Line 1)**

*Question 7: Please comment on the approach EPA used to develop the draft broiler VOC EEM.*

No key comments/unresolved issues.

**4. SPECIFIC RECOMMENDATIONS FOR EPA'S DRAFT REPORTS (Page 34, Line 1)**

1) Add Additional Suggested References for Broiler and Lagoon Reports (Page 37, Line 37).