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Ed Hanlon
Designated Federal Officer
Animal Feeding Operations Emission Review Panel
EPA Science Advisory Board Staff Office

VIA ELECTRONIC MAIL

Re: Comments on EPA's Draft Emissions Estimating Methodologies for Broiler Chickens and Swine and Dairy Lagoons and Basins

Dear Mr. Hanlon,

Thank you for the opportunity to submit comments on EPA's draft emissions estimating methodologies (EEMs) for broiler chickens and swine and dairy open sources. Environmental Integrity Project's (EIP) initial review of the draft EEMs and EPA's charge to the Science Advisory Board (SAB) has raised several questions and concerns. Although EIP intends to submit more detailed comments during EPA's public comment period, we hope that this initial input will inform the SAB's upcoming discussions as well as the EEMs still in development by EPA.

Adequacy of EPA's Data.

Technical problems, limited sampling days, and other factors led to significant gaps in the NAEMS data. As a result, EPA was unable to establish a draft EEM for VOCs from open sources and has created EEMs for other pollutants with extremely spotty data. However, EPA has the opportunity to consider and include many other peer-reviewed studies that would bolster this problematic data set and increase confidence in the accuracy of the final EEMs.

a. EPA did not sufficiently consider outside data

EPA considered numerous outside studies during its draft open source EEM development, yet decided ultimately not to use them because "none of the articles . . . used remote sensing techniques to measure lagoon emissions." (Swine and Dairy EEM at page 3-14). EPA fails to explain why remote sensing is the only useful technology, and must justify this decision. The articles in question appeared to report on the use of 'flux chambers' or 'dynamic chambers'

(Tables 3-4 and 3-5). The differences between remote sensing and these other technologies should be spelled out in sufficient detail to support the exclusion of the existing research, particularly given the paucity of EPA's own data.

Similarly, EPA seems to have cursorily disregarded peer-reviewed poultry emissions studies solely because the researcher used different measurement methods than NAEMS (Broiler EEM at 4-13). Given the severe data quality and quantity problems in NAEMS, forgoing the opportunity to improve the EEMs through additional peer-reviewed research without justifying this decision is arbitrary. Neither the NAEMS study nor EPA's draft EEMs provide a compelling argument that alternative study methods are not as good – or better – than those used in NAEMS.

EPA could also use existing research without directly including the results of outside studies in EEM development. Given the limited dataset available to EPA, it seems that every effort should be made to incorporate outside knowledge. At a minimum, EPA should present quantitative comparisons of the NAEMS results with existing research. Outside information could also be used, for example, to reaffirm apparent differences between swine and dairy operations or to validate the observed daily patterns in humidity and temperature.

b. Gaps in the NAEMS data severely compromise the value of open source EEM development

EPA has failed to account for critical variables affecting NH₃ emissions from lagoons and basins. According to the Swine and Dairy EEM Table 5-4, EPA has no data on the liquid composition of dairy lagoons at all. It is unclear how EPA could have even considered quantitative modeling of these variables given the bias that this would produce. This gap is troubling in light of EPA's acknowledgement that "[b]ecause the organic and ammoniacal nitrogen present in the lagoon liquid are precursors to NH₃ emissions, the EPA expected that NH₃ emissions would be higher at lagoons with higher total nitrogen concentrations" (page 5-15), and that "[o]f all the candidate predictor variables discussed in Section 5.1.1, those describing lagoon liquid, for which the effects on NH₃ emissions were detailed in Section 5.1.1.2, are the variables whose effects on emissions come closest to representing the quantity of precursors and potential for conversion of precursors to emissions" (page 5-47).

Moreover, Table 4-10 reveals that lagoon temperature data were only available for 7 of the 9 sites, and that the nine available sites did not allow EPA to distinguish between lagoons and basins (page 5-18). EPA should attempt to address these data gaps in the final EEMs.

Charge Issues 1 and 2: Questions on EPA's Statistical Methodology.

a. EPA's method to filter data to account for completeness is not clear.

The draft EEMs state that EPA considered all valid data days, whether or not they achieved the NAEMS completeness goal. From the context, it appears that EPA did not exclude data that failed to meet long-term monitoring goals as long as the data met daily completeness goals. It is clear that EPA did not always exclude data that failed the ‘valid data days’ test, however. Table 5-2 of the swine and dairy EEM lists hundreds of NH₃ emissions values for sites that had no valid data NH₃ radial plume mapping (RPM) days (see Table 4-1), and EPA claims to have only used RPM data in EEM development (page 5-6). This suggests that EPA included all 30-minute values in developing the EEMs, regardless of whether the data met the ‘valid data days’ test. EPA should clarify when it decided to consider ‘valid data days’ and when it considered all valid 30-minute readings, and should adequately explain and justify those decisions.

b. EPA should explain why it excluded backward Lagrangian stochastic (bLs) method-produced estimates of NH₃ emissions.

On Page 5-6 of the open source EEM, EPA states that “the RPM emissions dataset is much larger than the bLs dataset,” and that “including bLs measurements in the EEM development dataset would not provide any additional information on lagoon emissions.” Both of these statements appear inconsistent with the data presented in Table 4-1. That table shows 276 valid emissions days for NH₃ estimates using bLs and only 69 valid days for NH₃ using RPM.

The numbers for the dairy sites are particularly uneven, with 96 valid bLs days and only 18 valid RPM days. Moreover, all of the valid RPM days for dairies came from only one dairy. It seems that the bLs data would in fact provide a substantial amount of useful additional information for the dairy sites. After all, one of EPA’s concluding caveats is that the emissions from the dairy lagoons during summer were underrepresented (see page 5-69), and the report also states that “the great majority of measurements at two of the dairy sites were made in the colder months of October through April.” Perhaps the bLs data would help address this bias. EPA should explain the apparent inconsistency and explain why, given the limited data pool, it chose to exclude so many data points.

c. EPA’s methodology to develop the swine and dairy open source EEMs

EPA’s justification for combining lagoon and basin data in the draft NH₃ EEM does not seem adequate, considering the fundamental differences between lagoons and basins. Because lagoons are considered treatment systems that change the nutrient content and stability of CAFO waste, while basins merely store waste before disposal, EPA should explain how combining these data sets will not adversely affect the accuracy of the final EEM for NH₃.

Charge Issue 3: EPA does not sufficiently explain the presence of negative values or its decisions for when to use negative data.

In its charge to the SAB, EPA explains that it chose not to include negative concentration values in the broiler and open source NH₃ EEMs. This makes sense, as negative pollution concentration

values do not represent emissions values, but rather equipment inaccuracies or methodological errors. EPA has attributed negative emissions values to instrumental drift (see, e.g., Swine and Dairy EEM pages 3-2 and 4-12), but did not explain this conclusion in any detail. EPA should explain whether the instrumental drift and related sampling methods produced errors in a way that was purely random (i.e., as likely to result in overestimates as underestimates), or potentially biased toward underestimates.

Regardless the source of the negative values, EPA has determined that these data points should not be included in the current draft EEMs. However, EPA has stated its intention to include negative values in developing its open source H₂S EEM, due to the lack of adequate monitoring data. This defies common sense. Not only will inclusion of negative values skew emissions estimates downwards, including such values when data sets are extremely limited will have a proportionately greater impact on estimated emissions because erroneous data points will comprise a greater share of the total data considered. EPA should abandon this proposal. Including invalid data to account for “uncertainty” will lead to inaccurate and arbitrary EEMs that underestimate CAFO emissions. Moreover, EPA’s willingness to include invalid NAEMS data while refusing to include valid, peer-reviewed outside data, undermines the credibility of the entire EEM process.

Charge Issue 4: EPA’s lack of VOC data again requires inclusion of outside studies

Due to persistent technical problems monitoring VOCs during the NAEMS study, EPA has virtually nothing upon which to base VOC EEMs. Due to the failure to effectively monitor these pollutants in NAEMS, EPA proposes to forego establishing a VOC EEM for open sources and will rely solely on the Kentucky broiler site data for the broiler EEM. EPA should instead consider all peer-reviewed studies of VOC emissions from open sources and begin developing a draft methodology. In addition, EPA should not ignore the data from one of just two broiler sites simply because the two sites used different measurement techniques. Though EPA may believe that one measurement method is superior to the other, its reliance on sparse data sets from single sites may lead to EEMs incapable of representing CAFO emissions from facilities nationwide.

Thank you for your consideration,

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