

Midwest Environmental ADVOCATES

pro bono publico

VIA ELECTRONIC MAIL

November 15, 2004

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Rod Nilsestuen, Secretary
Wisconsin Department of Agriculture, Trade, and Consumer Protection
2811 Agriculture Drive
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Re: Comments on the Preliminary Draft of ATCP 51, Livestock Siting Standards

Dear Mr. Rhode and Secretary Nilsestuen,

Thank you for your invitation to comment and testify on the preliminary draft rule developed by the Wisconsin Department of Agriculture, Trade and Consumer Protection's ("DATCP's") Livestock Siting Technical Advisory Committee under Act 235 ("Livestock Facility Siting Act").

Midwest Environmental Advocates, Inc. is a 501(c)(3) nonprofit environmental law center. We represent communities struggling with the air and water pollution from Concentrated Animal Feeding Operations ("CAFOs") in Wisconsin.

As you know, I attended the Committee's meeting on November 11, 2004 and provided spoken testimony. I am now providing detailed written comments on Draft ATCP 51. These written comments are submitted on behalf of the following organizations:

Centerville Citizens for Air, River and Environmental Solutions
Church's Center for Land and People
Citizens for Responsible Agriculture and the Environment
Concerned Farmers and Neighbors of the Town of Hixton
Family Farm Defenders
Sierra Club – John Muir Chapter
Waupaca Citizens for Public Response
The Woodlands

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Organizations listed for identification purposes only.

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Like livestock operations, members of these organizations will be directly affected by the recommendations that the Committee ultimately adopts. Lives will change, for better or for worse, as a result of the Committee's actions. On behalf of the members of the organizations listed above, I respectfully request that the Committee carefully consider these written comments before its next meeting on December 10, 2004.

I. INTRODUCTION

Midwest Environmental Advocates and other rural neighborhoods throughout the state opposed Act 235 because of concerns that the law limits local authority over large livestock operations, and that siting standards represented a ceiling, not a floor, for public health protection. Eighty Wisconsin citizens traveled from all over the state to testify against Act 235 before a legislative committee that seemed predisposed to enact the law, regardless of their testimony. Despite that, rural people in Wisconsin continue to monitor DATCP's implementation of Act 235 to ensure that their health and property will be protected from the impacts of expanding livestock facilities throughout Wisconsin.

Under Act 235, and with limited exceptions, local governments with zoning authority are required to apply Act 235's technical standards in granting or denying permits for siting livestock facilities throughout the state. Wis. Stat. § 93.90(3). Even in some instances, local governments can be less stringent than the technical standards. *See e.g.* Wis. Stat. § 93.90(3)(ae) (allowing less stringent setbacks); Proposed ATCP 51.14(1)(c) (allowing an "odor index" of less than zero). Because of our concerns about Act 235's limits on local authority to protect public health, we pressed for and received a requirement that the siting standards be protective of public health and safety, first and foremost. *See* Wis. Stat. 93.90(2)(b)1.

As a result, it is critical that the final technical standards, in addition to being workable and practical, are truly protective of public health. It is also important that local governments receive the information in a siting application that they need to judge whether those technical standards have been met. Finally, that information should be included in the public record, in the event that *de novo* review by the Livestock Facility Siting Board is necessary.

II. SPECIFIC COMMENTS

A. ATCP 51.14 Odor Management

COMMENT: The Odor Index referred to in ATCP 51.14(1) appears to be based on the University of Minnesota's Odor From Feedlots Setback Estimation Tool, or "OFFSET," for calculating odor setbacks. However, neither the proposed rule nor the supporting materials state that the odor index is based on OFFSET, or provide any explanation of the technical basis or the assumptions that are incorporated into the odor index or OFFSET. I was pleased to listen to Ed Odgers overview of the Odor Index during the Committee's meeting, and request that Mr. Odgers be included in the supporting materials to the draft rule.

Please provide a narrative, included in the summary of the proposed rule, that describes the technical basis of OFFSET and the assumptions and inputs used by OFFSET. Please also provide a description of why and how the proposed “odor index” deviates from OFFSET.

COMMENT: Based on our preliminary review of the Odor Index, the Odor Index is severely under-protective of public health, and may do little to solve the odor problems that are generated at some of the largest livestock operations. Specifically, the Odor Index as crafted presents at least the following problems:

- The Odor Index is based on OFFSET, which is in turn based on the INPUFF model, which itself is not an acceptable regulatory model according to the U.S. Environmental Protection Agency.
- The Odor Index, in so far as it is based on OFFSET/INPUFF, underestimates emissions from manure pits because it does not account for wind speed, and it is commonly known that manure pit emissions increase with wind speed.
- The setback curves in the Odor Index are inaccurate because of the Odor Index’s failure to account for wind speeds, and as a result annoyance thresholds are likely to be much lower when wind speeds are higher.
- The threshold for annoyance in the setback curves is inaccurate because it was not based on real data from real people; instead it is based on a user’s guide for an olfactometry machine.

A more detailed scientific review of the Odor Index is attached to this comment letter. *See* Letter from Charles Gantzer, Ph.D, Gantzer Environmental Software and Services, to Andrew Hanson, Midwest Environmental Advocates, November 9, 2004.

At the November 11, 2004 Committee meeting, livestock industry representatives commented that the Odor Index would likely be too stringent and that many existing facilities they knew of could not comply. However, none of the commenters mentioned whether facilities had adopted odor management practices listed in the Odor Index. I assumed that none had, and as a result, could not comply with the Odor Index. Regardless, the Odor Index would apply to new or expanding facilities, not existing facilities. For the privilege of being granted the right to expand or locate in a community, those new or expanding facilities must adopt practices that control and limit the environmental and public health impact on that community.

The fact that the livestock industry has done practically nothing to address odor and air pollution for years as it has continued to consolidate and expand should not be an excuse to continue to do nothing. Instead, it is clear that the livestock industry must evolve and adapt to address the new environmental and public health impacts that livestock expansions have created in Wisconsin. Public health demands nothing less.

COMMENT: ATCP 51.14(1)(b) allows a livestock facility to divide its structures into two or more “clusters” where livestock structures are separated by 1,000 feet for the purpose of calculating the odor index.

Please explain the technical basis for allowing the separation of livestock structures at a livestock facility. What if one cluster is downwind from another cluster, and then other rural landowners live downwind of both? In such a situation, rural landowners living downwind of both may feel the odor impacts of two clusters of livestock structures, even though each cluster may, individually, have an odor index of zero. Please explain how the proposed “odor index” accounts for this potential problem.

COMMENT: ATCP 51.14(1)(c) allows a local government to approve an odor index that is less than zero but not less than negative 20 for a new livestock facility and negative 30 for an expanded livestock facility.

It is not clear from the proposed rule or its supporting materials why new livestock facilities are afforded a 20 point range from zero. If an odor index of zero is deemed necessary to protect public health, why allow a deviation of 20 points from zero? We understand that odor estimation is far from an exact science, and realize that some variation may be appropriate. As a result, we propose that ATCP 51.14(1)(c)1. read: “Negative 5 for a new livestock facility.”

It is also not clear why expanded livestock facilities are entitled to a 30 point deviation from an odor index of zero. Expanded livestock facilities can include those that expand from 200 animal unit operation to a 5,000 animal unit operation. Clearly, such a large expansion is the same as or similar to a new livestock facility, and that new operation can afford to meet the same odor index as a new livestock facility. Moreover, the rules are required to be protective of public health and safety. *See Wis. Stat. 93.90(3)(b)1.* If an odor index of zero is necessary, then it should be irrelevant whether the operation is new or expanded.

COMMENT: In Worksheet 2, Table D on page A-11, an “odor response plan” is included as an odor mitigation technique. An odor response plan, according to the worksheet, simply involves having a protocol for responding to odor complaints and reviewing odor control measures. Although it may be good business, an odor response plan is not an odor mitigation technique and should not be used to offset odor generation at the facility for purposes of meeting an odor index of zero. Please delete “odor response plan” from Table D and include a note that encourages odor response plans but does not provide a “practice factor” in the odor index.

COMMENT: ATCP 51.14(1)(d)2. provides that if an operator obtains local approval for a livestock facility, an operator seeking approval for a further expansion of the same livestock facility may use distances to the same non-affiliated residence and high public use area, even if other non-affiliated residences have located closer to the livestock facility.

This provision is problematic because the locally approved expansion may cause nuisance odors to enter and trespass on nearby properties. In doing so, ATCP 51.14(1)(d)2. takes away the property rights of the nearby non-affiliated residences and grants those rights to the livestock

facility. If the livestock operation causes nuisance odors, as evidenced by the odor index according to the distance from the nearest non-affiliated residence, this represents an unconstitutional taking of property without just compensation by DATCP. See *Bormann v. Kossuth County Board of Supervisors*, 584 N.W.2d 309 (Iowa 1998); *Gacke v. Pork Xtra*, 2004 Iowa Sup. LEXIS 193 at *11; *Buchanon v. Simplot Feeders Limited Partnership*, 952 P.2d 610 (Wash. 1998).

Aside from presenting constitutional problems, ATCP 51.14(1)(d)2. will set the stage for continued land use conflicts in Wisconsin unless there is some effort by a local government to prevent residential sprawl on productive farmland. We also need a stronger effort by the Wisconsin Department of Agriculture, Trade, and Consumer Protection and the Wisconsin Department of Commerce to help keep Wisconsin's small family farms on the land. Further, Wisconsin should recommit itself to implementing our Smart Growth law to ensure that productive farmland remains so, and residential development is carefully planned to meet the needs of Wisconsin's growing communities.

The answer to urban sprawl and the loss of farmland is not to take away the property rights of rural landowners. This is exactly what ATCP 51.14(1)(d)2. will do.

COMMENT: ATCP 51.14(2) regulates manure applications to land and establishes 1,000 foot and 2,000 foot setbacks from non-affiliated residences and "high public use areas," respectively. Neither the proposed rule nor its supporting materials explain the scientific and technical basis for the 1,000 foot and 2,000 foot setbacks. Please provide a summary of the technical basis for these setbacks and how they protect public health and safety.

COMMENT: The setback distances in ATCP 51.14(2)(a)1. and 2. do not apply if the "manure is injected directly into the soil, incorporated into the soil within 72 hours, or covered with vegetative residue within 72 hours." ATCP 51.14(2)(c)1.

The 72 hour application requirement stems from NRCS 590, which is a standard designed to protect water quality rather than air quality. The purpose of ATCP 51.14(2) is to protect air quality and prevent odors, not water quality. Therefore, the incorporation requirement should be based on what is necessary to protect air quality and public health, not water quality. Because it stands to reason that odor problems will be worse within 72 hours, the incorporation requirement should be changed to 24 hours.

PROPOSED AMENDMENT: ATCP 51.14(2)(c)1. should be amended to read:

The manure is injected directly into the soil, incorporated into the soil within 24 hours, or covered with vegetative residue within 24 hours.

B. ATCP 51.16 Nutrient Management

COMMENT: ATCP 51.16(1) only requires that a livestock facility submit a nutrient management plan to a local government if requested by the local government consistent with

NRCS Standard 590. *See* ATCP 50.04(3). Unless the local government requests it, ATCP 51.16(1) does not require a livestock facility to submit a nutrient management plan as part of its application or at any later time. Instead, the livestock facility is only required to submit a worksheet that certifies that a nutrient management plan has been completed and complies with the requirements of ATCP 51.16.

ATCP 51.16(1) deprives the public of the opportunity to review a nutrient management plan for a new or expanded livestock facility. In fact, it is likely that no member of the public will ever see the nutrient management plan because it may never be submitted to the local government. And, ATCP 51.16(3) presumes compliance if the worksheet is completed. *See* ATCP 51.30(1). Yet, the note to ATCP 51.16(3) states that the presumption can be rebutted by “clear and convincing evidence in the record.” However, without a copy of the nutrient management plan, there can be no way to determine whether it complies with NRCS Standard 590 plan.

Further, the local government has no standards by which to approve the nutrient management plan portion of the siting application, except for a two-page fill-in-the-blank “worksheet” in which the livestock facility and the nutrient management planner sign a statement that they have met the requirements of ATCP 51.16(1). The local government needs to be able to independently determine that the statement is true and should not have to ask that it be provided with the nutrient management plan. Instead, the nutrient management plan should be submitted as a matter of course with the siting application.

Finally, ATCP 51.16(1) deprives the Livestock Facility Siting Review Board (“Siting Review Board”) of a reviewable record, should a local decision to grant or deny a siting permit be appealed to that body. The Siting Review Board will only review whether the worksheet had been signed and the blanks had been filled in. The Siting Review Board will not be able to see the manure spreading maps and the proximity of fields to streams, residential wells, and sinkholes that typically accompany nutrient management plans, and will not be able to determine whether the facility is in fact meeting phosphorus requirements on a field by field basis. In short, there will be nothing in the record with which to rebut the presumption of compliance. The absence of a nutrient management plan from the record on review renders meaningful *de novo* review impossible.

ATCP 51.16(1) should be amended, in relevant part, to read:

The operator shall provide a copy of a preliminary manure management plan to the political subdivision as part of its application for approval.
[strike remaining part of sentence.]

COMMENT: ATCP 51.16(4) allows an operator to update a nutrient management plan “as necessary.” There is no requirement to notify the local government or the public that an operator has updated the plan. Consistent with our comment on ATCP 51.16(1), the operator should be required to submit any updates to the nutrient management plan to the local government.

ATCP 51.16(4) should be amended to read:

An operator may update a nutrient management plan as necessary, and shall provide a copy of the updated nutrient management plan to the political subdivision within 30 days of the update.

C. ATCP 51.18, Waste Storage Facilities.

COMMENT: ATCP 51.18(2) states that existing waste storage facilities are presumed to comply with the requirement to minimize leakage and failure if a registered professional engineer or certified agricultural engineering practitioner certifies that existing NRCS standards were met when it was constructed. As with the nutrient management plan requirement, there is no requirement that as-built plans and specifications or even any documentation showing a formal evaluation of the existing waste storage facility accompany the application. As a result, it will be impossible for local government to provide meaningful review, and the Siting Review Board will be deprived of its *de novo* review of the application. We note that operators with new or substantially altered facilities must submit design specifications with the application for approval. ATCP 51.18(3)(a).

COMMENT: ATCP 51.18(5) requires that the “waste storage capacity of a livestock facility...shall be adequate for reasonably foreseeable storage needs based on the operator’s waste and nutrient management strategy under s. ATCP 51.16.” Notably, there is no requirement that a livestock facility have a waste storage facility. The only requirement is that if a waste storage facility is constructed it meet the standards under the proposed rule.

Livestock facilities with 500 or more animal units should be required to have waste storage facilities to contain the manure and raw materials generated at the operation. Otherwise, discharges of pollutants to our public waters are likely whenever rainfall events wash those pollutants into nearby conduits to surface waters.

COMMENT: It is not clear what constitutes “reasonably foreseeable storage needs.” ATCP 51.18(5). As written, this requirement is impossible to enforce. If it is based on the nutrient management plan and the amount of manure and raw materials produced, then it should be required that a livestock facility present the local government and the public with what it believes to be its foreseeable storage needs. Then, the local government can review whether the forecast is accurate based on the nutrient management plan and judge compliance with ATCP 51.18(5).

D. ATCP 51.20 Runoff Management

COMMENT: ATCP 51.20(2)(a) allows existing animal lots to discharge 15 lbs. of phosphorus annually if a lot is not within 1,000 feet of a lake or 300 feet of a navigable stream. An animal lot may discharge 5 lbs. of phosphorus annually if it is within 1,000 feet of a lake or 300 feet of a navigable stream.

However, ATCP 51.20(2)(a) does not prohibit an animal lot from discharging phosphorus to an area of concentrated flow or non-navigable tributary to a navigable stream that may carry phosphorus and other pollutants during spring and fall runoff events. These runoff events may overwhelm the design capacity of the waste treatment strip. The result is a direct discharge of pollutants to waters of the state. This violates the requirements of Wis. Stat. 281.16(3).

PROPOSED AMENDMENT: ATCP 51.20(2)(a) should be amended to read as follows:

3. In any event, there shall be no direct discharge of phosphorus or other pollutants to waters of the state.

COMMENT: ATCP 51.20(3)(a) states that “[f]eed storage shall be managed to prevent *any significant discharge* of leachate or polluted runoff from stored feed to waters of the state.” (emphasis added) We are glad to see a requirement to collect leachate on one-acre paved areas to prevent discharges to surface waters. However, in spite of this requirement, ATCP 51.20(3) allows discharges of leachate for all other livestock facilities, provided they are not “significant.”

And, it is not clear under the rule what constitutes a “significant” discharge. The proposed rule states that “[f]eed leachate is a potentially serious water pollutant,” suggesting that any leachate discharge would be significant. And, Concentrated Animal Feeding Operations (“CAFOs”) are prohibited from allowing leachate discharges to surface waters, whether significant or not. The protection of water resources requires a prohibition on all leachate discharges.

PROPOSED AMENDMENT: ATCP 51.20(3) should be amended to read as follows:

Feed storage shall be managed to prevent any discharge of leachate or polluted runoff from stored feed to waters of the state.

COMMENT: ATCP 51.20(8) requires a livestock facility to implement a construction site erosion control plan that complies with NR 151.11(6) if it will disturb more than one acre. ATCP 51.20(8) does not require that the livestock facility submit the plan to the local government as part of its application. Instead, the livestock facility needs only to fill in the blanks on a worksheet and provide his or her signature and that of an “engineer” or “practitioner.” See “Worksheet 5.” Again, this deprives the public, the local government, and the Siting Review Board with the ability to determine whether the operator has, in fact, met the application requirements.

PROPOSED AMENDMENT: ATCP 51.20(8) should be amended to read as follows:

If the construction or expansion of a livestock facility will disturb more than one acre of land, the operator of the facility shall submit a construction site erosion control plan that complies with NR 151.11(6) as part of its application for approval, and, if approved, implement that plan at the construction site.

E. ATCP 51.01 Definitions.

COMMENT: In ATCP 52.01(37), the definition of “Substantially altered” should be amended to read:

“Substantially altered” livestock structure means a livestock structure that undergoes a material change in construction or use, **including but not limited to** one of the following material changes:...”

(emphasis added). This amendment clarifies that the list of changes that define “substantially altered” livestock structures is non-exclusive. There may be other material changes that constitute substantial alteration that are not on the list, such as an increase or decrease in land available for application of waste, or a substantial change in or installation of new technology used to treat and store waste (e.g. shifting from liquid manure storage and application to spray irrigation and composting, or manure digestion).

Alternatively, the following additional language should be included:

(f) a material increase or decrease in the amount of, or change in location of, land available for application of waste;

(g) a material change in or planned installation or construction of new technology used to treat and storage waste;

(h) any other material change that reflects a change in waste handling and management at the operation.

COMMENT: In ATCP 51.01(11), the following language should be **deleted** from the definition of expansion:

The acquisition of an existing livestock facility, by the operator of an adjacent livestock facility, does not constitute an “expansion” unless that operator increases the largest number of animal units kept at the combined livestock facilities on at least 90 days in any 12-month period.

First, it is unclear whether the language above means that the acquisition is not an expansion if the acquired facility is empty. Alternatively, the language could mean that the acquisition is not an expansion despite that the combined facilities may have livestock structures that house more than 20% more animal units than the adjacent livestock facility which acquired the new facility during at least 90 days in any 12-month period.

Second, if the latter is true, this makes no sense. If an adjacent livestock facility acquires a neighboring facility, with appurtenant livestock structures sufficient to house more than 20% more animal units during at least 90 days in any 12 month period, an “expansion” has taken place and the application requirements should be triggered.

III. CONCLUSION

Thank you in advance for reviewing these comments and responding to our concerns. We look forward to working with you to protect public health in Wisconsin's rural communities.

Sincerely,

MIDWEST ENVIRONMENTAL ADVOCATES, INC.

A handwritten signature in cursive script that reads "Andrew Hanson". The signature is written in black ink and includes a horizontal line extending to the right from the end of the name.

Andrew C. Hanson

Encl.

Gantzer Environmental Software and Services, Inc.

November 9, 2004

Andrew Hanson
Midwest Environmental Advocates
702 East Johnson Street
Madison, Wisconsin 53703

Re: Wisconsin's Proposed Odor Management Worksheet

Dear Mr. Hanson:

Thank you for the opportunity to comment on the Odor Management Worksheet that is being evaluated for regulatory use in Wisconsin. I have provided site-specific air quality modeling for livestock operations in Minnesota for the past 8 years. The modeling has been performed in conjunction with obtaining permits for new and expanding feedlots and with public nuisance lawsuits. I have also been hired by the Minnesota Pollution Control Agency (MPCA) to perform local and regional air quality modeling for assessing the impacts of livestock operations in a three county area in western Minnesota as part of the Hancock Pro-Pork Environmental Impact Statement (EIS). The modeling has examined hydrogen sulfide, ammonia, chemistry-based odor indices, and olfactometry-based odor indices. During these 8 years of air quality modeling of livestock operations, I have developed a sense of what is acceptable to regulatory agencies and the courts. In addition to my consulting work, I teach environmental engineering at the University of Minnesota.

The proposed Odor Management Worksheet appears to be a repackaged version of the Odor for Feedlots Setback Estimation Tool (OFFSET) developed at the University of Minnesota. In particular, the Worksheet's Curves A and B are just a different means of expressing the mathematical relationship between setback distance and odor emissions found in OFFSET. The Worksheet's Curve A is identical to OFFSET's 94 percent annoyance free condition and the Worksheet's Curve B is identical to OFFSET's 98 percent annoyance free condition. Because the air quality modeling components of the Odor Management Worksheet (Curves A and B) and OFFSET are identical, any limitations that apply to OFFSET apply to the Odor Management Worksheet.

A fundamental problem with OFFSET is that it is not based, from a regulatory perspective, on an acceptable air quality model. OFFSET is based on the INPUFF model,¹ which is not listed in Appendix W to the Revision to the Guideline for Air Quality Models in the federal regulations as an acceptable air quality model according to the U.S. Environmental Protection Agency.² Because

¹ Petersen W. B. and Lavdas L. 1986. INPUFF 2.0 – A multiple source Gaussian puff dispersion algorithm. User's Guide. EPA-600/8-86/024

² U.S. EPA. 2003. *Revision to the Guideline for Air Quality Models*. 40 CFR Ch. 1, Part 51, Appendix W (April 15, 2004 Edition).

Gantzer Environmental Software and Services, Inc.

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INPUFF is not listed in Appendix W, the MPCA does not accept any OFFSET-generated data during the environmental review process and permitting process for new and expanding livestock operations. For the Hancock Pro-Pork EIS, both the MPCA and the Minnesota Environmental Quality Board supported the use of site-specific modeling with the EPA-approved CALPUFF model instead of OFFSET, because the use of INPUFF as a non-listed air quality model would be hard to defend in any post-EIS challenges by environmental groups. Although a direct challenge has not yet occurred, the potential inadmissibility of OFFSET data in court should be a concern to any livestock operation.

In addition to not being a regulatory approved model, the use of INPUFF in assessing the air quality impacts associated with feedlots is highly questionable. The combination of INPUFF and OFFSET results in a poor tool to estimating setback requirements as indicated in the following paragraph obtained from a technical review published by the Minnesota Environmental Quality Board:

The review findings indicate that the INPUFF-2 model is not an appropriate choice for assessing the impact of low-level, distributed emission sources such as feedlot sources. This model, which is designed for point sources, does not account for the spatial distribution of source emissions, and near-field predictions (within about 500 m of sources) are therefore not reliable. U of M researchers have applied empirical scaling factors to the model predictions to match observed odor levels. In light of this model calibration, the model performance reported in the U of M publications is not a valid demonstration that the approach is either valid or reliable.”³

Another limitation with the INPUFF/OFFSET combination is the inability to account for changes in emission rates as a function of wind speed. While this is less of a concern when modeling the emission of gases from livestock barns, it is a major limitation when modeling the emissions from livestock manure basins. As shown in Figure 1, the emission of odorous gases increases rapidly with increases in wind speed. The INPUFF/OFFSET combination assumes that the same odor emission rate, *i.e.*, the relatively low emission rates measured at the low air velocities found within floating emission chambers. By not considering the rapid increase in odorous gas emissions with increases in wind speed, the INPUFF/OFFSET combination and the proposed Wisconsin Odor Management Worksheet under protect residences near manure storage basins to offensive odors.

In addition to the intrinsic limitations of the INPUFF air quality model, there are several fundamental problems with the development of the setback curves. The OFFSET and Odor Management Worksheet setback curves are based on the premise that the strongest odor episodes are found at near calm wind speeds. This is not the case at livestock feedlots with manure basins, where the strongest odor episodes are often associated with wind speeds between 12 and 20 miles per hour. Hence, the fundamental OFFSET assumption of when odor episodes occur is flawed and the annoyance frequencies associated with the setback curves are invalid when the

³ MEQB. 2001. *Final Annual Report for Air Quality and Odors*. Minnesota Environmental Quality Board, St. Paul, MN. Prepared by Earth Tech, Minneapolis, MN.

feedlot has a manure basin. The OFFSET setback curves should not be used to evaluate odor emissions from manure basins.

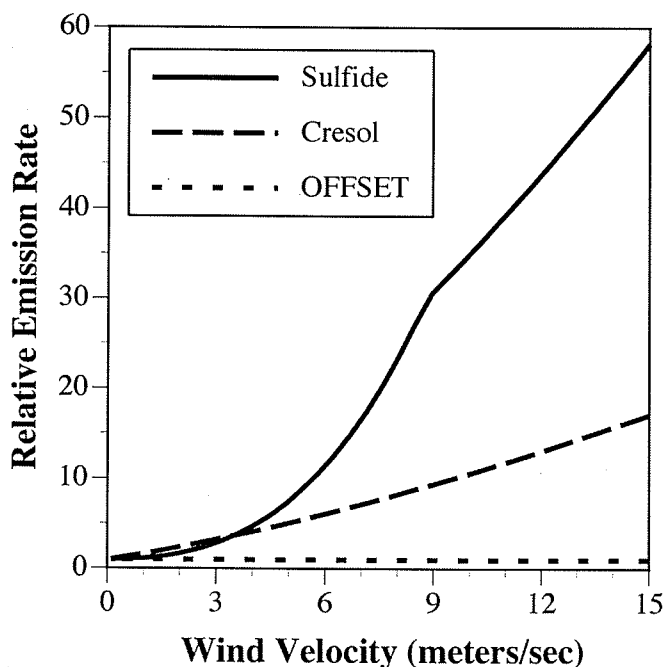


Figure 1. Odorous gas emission rates for uncovered manure basins as a function of wind speed. Most odorous gases will have response curves between the sulfide and cresol response curves. The plotted emission rates are relative to the emission rate at a 0.1 meters/sec wind velocity, which is a typical air velocity in an emission flux chamber. OFFSET does not account for wind effects on basin emission rates. (1 meter/sec = 2.24 mph)

With regard to the assumed weather conditions used in developing the OFFSET and Odor Management Worksheet setback curves, I have two nagging questions. First, the setback curves are based on Minnesota annual wind roses. Are the annual wind roses for Wisconsin identical to those in Minnesota? If the wind roses are not identical, then Wisconsin needs to develop its own setback curves. Second, in developing the setback curves, the University of Minnesota assigned odor episode frequencies to selected wind rose conditions (wind speed and atmospheric stability). Did the University consider the impact mixing height on odor episode frequency?

Another fundamental problem with OFFSET is related to the interpretation of the INPUFF-generated odor intensities. Typically, air quality models calculate hourly gas concentrations (60-minute time-averaged concentrations) to assess maximum impacts, because this is the minimum averaging time specified in regulatory guidance, this is the averaging time used in

most modeling verification studies, and weather data is often compiled on an hourly basis. It is puzzling to note that the OFFSET and Odor Management Worksheet setback curves are based on two-hour time-averaged gas concentrations when the wind rose data used to develop the setback curves was apparently hourly. Basing the setback curves on two-hour time-averaged gas concentrations instead of one-hour time-averaged gas concentrations means that the setback curves are based on concentrations that are 87 percent of the hourly concentrations. Thus, the setback curves are underestimating odor impacts.

The OFFSET and Odor Management Worksheet setback curves assume that a livestock odor intensity of 75 detection-threshold odor units (OU, d/t) is the threshold of annoyance. This annoyance threshold was not obtained from studies examining the response of the general population to livestock odors. Instead, the annoyance threshold was arbitrarily defined using as guidance the owner's manual for the olfactometry machine that the University of Minnesota used in developing its odor emission database. To my knowledge, the public (or for that matter a laboratory-scale study) has not evaluated the appropriateness of the annoyance threshold used in the OFFSET and Odor Management Worksheet setback curves.

The other fundamental problem with the assumed annoyance threshold is related to time averaging. During olfactometry measurements, the nose of the panelist is only exposed to the odorous gas for seconds. However, the OFFSET and Odor Management Worksheet setback curves assume an exposure of 2 hours. An odor intensity that an odor panelist may find to be merely detectable in a short-term field or olfactometry measurement could be annoying if present for an hour or longer. Similarly, an odor intensity that is faintly annoying when present for a few seconds could be severely annoying when present for 2 hours. OFFSET documentation provides no guidance on how the annoyance threshold derived from virtually instantaneous exposure correlates to the 2-hour time intervals assumed in the setback curves. In other words, if the instantaneous annoyance threshold has been arbitrarily set at 75 OU (d/t), what is the 2-hour annoyance threshold? Without knowing the answer to this question, how can you develop setback curves based on 2-hour exposures?

Another problem with OFFSET is the assumed odor emission rates from swine barns. The University of Minnesota database was developed by collecting gas samples in Tedlar bags and shipping the bags to the olfactometry laboratory for analysis. The problem is with the bags. The dust particles present in the air exhausted from the hog barns adsorb to the sides of the bags. In the laboratory, the odor panelist never smells the odor from the dust particles, because the dust never makes it to the sampling port. It stays in the bag. Researchers at Iowa State University indicate that about 75 percent of the odor from hog barns is associated with the dust. Thus, the odor emission rates in the University of Minnesota database are a factor of 4 too small, because the dust-related odors were never assessed.

In summary, the proposed Wisconsin Odor Management Worksheet is based on the air quality model that is not approved for regulatory purposes, is deemed inappropriate for modeling emissions from livestock feedlots, and should never be used to model the emissions from a manure basin. In addition to the intrinsic limitations of the air quality model, there are fundamental problems with development of the setback curves including the assumed weather conditions, the assumed instantaneous annoyance threshold, and the appropriateness of using an

instantaneous annoyance threshold to define annoyance during a 2-hour exposure. These limitations and conceptual problems should preclude the regulatory use of the proposed Wisconsin Odor Management Worksheet.

If you have any questions or concerns, please call my office at 612-824-6662.

Sincerely,

A handwritten signature in black ink, consisting of several loops and a long horizontal stroke extending to the right.

Charles J. Gantzer, Ph.D.
President