



Odor and Nutrient Management

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EPA's CAFO Rule - What's Next?

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In December 2002, the U. S. Environmental Protection Agency (EPA) finalized regulations to reduce the amount of water pollution from large livestock operations. The revised Concentrated Animal Feeding Operations (CAFO) Rule was published on Feb. 12, 2003 in the *Federal Register*, and became effective on April 14, 2003.

Why did EPA revise the CAFO Rule? The regulations, which dated from the mid-1970s, needed to be updated to reflect changes in the livestock industry, especially the trend for fewer, but larger feeding operations. Water quality problems were being caused by some of these operations. Also, because EPA was under a court order to do so.

The revised CAFO Rule was challenged by industry and environmental groups. All the challenges to the Rule were combined and heard by the United States Court of Appeals, Second Circuit. On Feb. 28, 2005, the Second Circuit Court announced its decision. Before discussing the Court's decision, I will briefly review two important aspects of the revised CAFO Rule.

The Rule requires that all CAFOs apply for a permit under the National Pollutant Discharge Elimination System (NPDES). The Rule included dry poultry operations in the definition of a CAFO for the first time (some states already regulated them). It also did away with the exemption for operations that did not discharge from the production area. Under the CAFO Rule, total confinement operations that met the exemption for operations that did not discharge from the production area, are considered newly

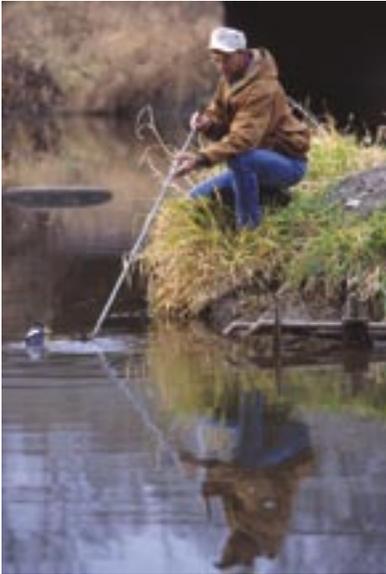
defined CAFOs and must apply for a permit by April 14, 2006. Open lot operations already should have NPDES permits. The Iowa Open Feedlot Plan is being implemented to address this issue.

The Rule concentrates on nutrient management with the centerpiece being the requirement for a Nutrient Management Plan to be developed and implemented by all permitted CAFOs on or before Dec. 31, 2006.

In the Second Circuit Court decision, the Court upheld most of EPA's CAFO Rule. Almost all of the technical standards remain unchanged. Three issues were remanded to EPA for further information. However, the Court did vacate two issues. EPA will have to change or add to the regulations to address these.



The Court held that since the Nutrient Management Plan was to contain many of the requirements that the CAFO would have to do under the permit, that Plan was an effluent limit. Effluent limits must be a part of the permit. Since they are so important, the Plans must be reviewed by the permitting authority to assure that all the "right stuff" is addressed. The Plan must be available to the public to review as part of the permit issuance process, and also be available so that compliance with the permit can be evaluated.



The other issue that the Court vacated was the “Duty to Apply.” EPA’s Rule had required that all CAFO operations must apply for a permit because of the potential to discharge. Getting a permit and following the requirements of the permit would help prevent

discharges. The court ruled that EPA could not require applications based on the “potential to discharge.” The result is that permits are only required for CAFOs that discharge. However, it should be emphasized, that any discharge of pollutants from a CAFO, regardless of storm size, is illegal without a permit.

Key issues for EPA to consider in response to the Court decision include:

- who must apply for a NPDES permit, based on production area and land application discharges,
- how to include the nutrient management plans in permits
- how to address the April 2006 and December 2006 compliance date deadlines.

The impact of the Second Circuit Court’s decision on CAFOs in Iowa is still not completely known. As EPA makes decisions, asks for public comments, and goes through the rule making process in changing the CAFO Rule, EPA Region 7* staff will keep you informed.

The Iowa perspective

Iowa rules are not currently in compliance with the EPA CAFO rule. To correct this, rules were drafted and presented to the Environmental Protection Commission. The Commission approved proceeding with rule making, so comments were collected from the public on the appropriateness and impact of the proposed rules. Since the Second Circuit Court’s

decision will require some modifications to the CAFO Rule, the rule making process for Iowa was terminated.

The Commission has instructed the DNR to move forward with rule making for the portions of the CAFO rule that are supported by the court ruling. This rule package will include the parts of the CAFO rule that were not affected by the court ruling and some of what was indicated in the court ruling, such as the requirement for operations that have discharged to acquire a NPDES permit.

Upon the adoption of EPA’s revised CAFO rule, a second rule package proposal will be developed to bring Iowa’s rules into agreement with the CAFO rule.

* The EPA 7 Region includes Iowa, Kansas, Missouri, Nebraska and nine Tribal Nations

Soil Phosphorus Testing for the Iowa P Index and Manure Management Plans in Calcareous Soils

by Jeremy Klatt, Iowa Department of Natural Resources

There are four soil testing analytical methods calibrated for use with the Iowa phosphorus (P) index. These four tests are the Bray P₁, Olsen and Mehlich-3 tests determined colorometrically; and the Mehlich-3 test determined using an inductively coupled plasma spectrometer (ICP).

While the Olsen and Mehlich-3 are suitable across virtually all Iowa soils, the Bray P₁ test is not suitable for use in calcareous soils. This is because Bray P₁ extract, which is a weak acid, is largely neutralized by calcareous soils and therefore loses its extracting power and underestimates available P. Because of this, many soil testing labs may run Bray P₁ on samples with a pH of less than 7.4 and use the Olsen test on samples where the pH is greater than 7.4.

Having two different soil test methods used in the same field creates a problem when running the P index because a field average soil P value is needed for each field in the manure management plan. Because each soil test is interpreted differently, different soil tests can not be averaged together.



The easiest way to avoid this problem is to specify to the soil lab that you'd prefer the Olsen or Mehlich-3 (either colorimetric or ICP) method used on all samples.

If the Olsen or Mehlich-3 test is not specified and the soil lab results have both Bray P₁ and Olsen values within the same field, Olsen values should be adjusted so they can be included in the average with the Bray P₁ samples. Iowa research by Antonio Mallarino (Department of Agronomy, ISU) has shown a strong relationship between the Olsen and Bray P₁ soil tests, and therefore the Olsen value can provide an accurate estimation of the Bray P₁ value. This research has shown that on average the Olsen P test extracts about 60 percent of the P extracted by the Bray P₁ and Mehlich-3 colorimetric P tests, but the actual range for non calcareous soils varies from 50 to 70 percent depending on various soil chemical properties. This is the reason why planning ahead for either Olsen or Mehlich-3 for all samples is the best option.

To adjust the Olsen value, divide it by 0.6. For example, if an Olsen test has a value of 30 ppm, dividing this number by 0.6 would give an approximated Bray P₁ value of 50 ppm. The value of 50 ppm then could be used in an average that included Bray P₁ soil test results.

This process is acceptable when developing a manure management plan for DNR.



For more information on soil testing for P, refer to the ISU Extension publication: *General Guide for Crop Nutrient Recommendations in Iowa* (PM 1688). It is available on-line at: <http://www.extension.iastate.edu/Publications/PM1688.pdf> or can be ordered through the ISU Extension Distribution Center by calling (515) 294-5247.

Voluntary Environmental Improvement Programs: Comparing CNMP and EMS on Western Iowa Livestock Farms

by Suzanne Schuknecht, John D. Lawrence, and Joe Lally, Department of Economics

Introduction

Two separate programs to assist livestock producers voluntarily implement practices to protect water quality were undertaken in western Iowa. The Livestock Environmental Management System Pilot Project (LEMS) was a four part educational program to teach producers to assess their operation, identify environmental priorities and develop, implement and document an action plan to address them. The Western Iowa Livestock External Stewardship Pilot Project (WILESPP) used livestock industry representatives, state and federal agencies and producers to develop and implement a Comprehensive Nutrient Management Plan (CNMP) for each participant.

The WILESPP involved 19 participants representing contract hog producers, independent hog producers and cattle producers. The LEMS project started with 35 beef feedlots with 200-8,000 head capacity and ended with 19 implementing their environmental management system (EMS). Each project took approximately a year to develop, a year to implement and the survey of participants was taken a year after implementation was completed. The programs differ fundamentally in that the CNMP is a prescriptive process completed for the producer by consultants while the EMS is an educational process in which the producer develops his or her own plan. This summary looks at the accomplishments and attitudes of the participants. Approximately half of those finishing the projects responded to the survey.



Findings

All the participants surveyed are currently using their EMS or CNMP plan. Eighty-four percent have referred to the plan in the last three months, but only 28 percent have updated their original plan. All the participants believe that because of the programs they have a better understanding of environmental regulations and are better complying with these rules and regulations. Ninety-five percent of the participants believe that they practice better stewardship because of the programs. Both groups believed that the producer was the person most responsible for environmental protection, followed by the DNR, NRCS and then commodity groups. Forty-six percent have seen improved crop yield or performance since using their plans, while 45 percent have seen improvement in soil conservation through less erosion and runoff.

There is little difference in the response between the two groups suggesting that either method of voluntary participation can result in adoption of environmental protection practices. However, there were three differences that largely reflect differences between hog and cattle farms in Iowa.

- By design, all of the WILESPP participants implemented a CNMP that includes soil and manure analysis and manure application based on phosphorous. Some type of nutrient management plan was already required and used by the hog producers in the project. A smaller percent of the LEMS participants have a nutrient management plan.

It was not identified as a priority in their EMS and for most it is not required by regulations.

- LEMS participants invested more in manure control structures than those in WILESPP. The hog producers in the WILESPP already had the structures in place while the cattle producers in the LEMS project needed additional construction.
- The LEMS project represented a journey of continuous improvement towards environmental stewardship while the WILESPP project represented a destination of completing a CNMP document and implementing the plan. WILESPP participants had few plans for future improvements other than to implement the CNMP. LEMS participants are continuing to identify new objectives and changes to implement.

Summary

A vast majority of participants were satisfied with different aspects of the pilot programs that they participated in and feel that the programs met their goals. Perhaps most telling is that the majority would participate again and all the participants would recommend their program to another producer.

Although prescriptive and more consultant driven, at the end each WILESPP participant had implemented a CNMP for the land receiving manure. While few have, or are required to have, a nutrient management plan, LEMS participants working largely on their own after learning the process identified their priorities, developed a strategy and implemented changes and had plans for future business and environmental improvements.

For a complete summary of the report: http://www.econ.iastate.edu/faculty/lawrence/Acrobat/Voluntary_Environmental_Improvement_Programs_CNMP_EMS.pdf





Diet Modifications as a Means to Address Air Emissions

by Wendy Powers, Department of Animal Science

Diet modification can be a useful tool in any operation's plan to reduce air emissions. While diet modification approaches may not be the only tool needed to obtain air emission objectives, changing diet formulation is a proven method. The observed reduction will, however, depend upon the initial and modified formulation and how that compares to animal nutrient needs.

While reducing air emissions is important, the diet strategy employed must maintain animal performance and be affordable. For this reason, most studies to date have focused on reducing excess nutrients in the diet. Ammonia and hydrogen sulfide emissions result from the excretion of unused dietary protein as urine and feces. Odor, too, is believed to be formed largely from the excretion of what was fed as dietary protein. Therefore, research has focused on meeting dietary protein needs without overfeeding protein.

In a study conducted at Iowa State University, growing pigs were fed diets containing no supplemental amino acids (17.4 percent crude protein), added lysine (17.0 percent crude protein) or added lysine, methionine, threonine and tryptophan (14.5 percent crude protein), recognizing that the large majority of the swine industry in Iowa is adding lysine to the diet to reduce total protein fed and still meet the lysine requirement. Ammonia emission rates from the three diet formulations were 2.5, 2.2, and 1.1 mg per minute, respectively. No animal performance differences were observed. Adding lysine to the diet decreased

feed costs by \$3 per ton when compared to the diet with no amino acids. The reduced cost reflects a replacement of soybean meal with lysine and corn. Adding the four amino acids increased diet cost by over \$4 per ton due to the cost of the amino acids, particularly tryptophan. However, the added feed cost was associated with a decrease in ammonia emission rate of over 50 percent, which may be important to operations in the near future.

A portion of the industry is adding lysine, methionine and threonine and this portion increases as threonine becomes more affordable. In a follow-up study ammonia and hydrogen sulfide emissions from pigs were measured over the entire grow-finish period. Diets offered contained 1) lysine, 2) lysine, methionine and threonine or 3) lysine, methionine, threonine, tryptophan, and valine or isoleucine. Ammonia emissions (pounds per day) were reduced 22 percent with the three amino acid diet, compared to the lysine only diet and 48 percent for the five amino acid diet compared to the lysine only diet. No animal performance differences or hydrogen sulfide effects were found. While the five amino acid diet is unrealistically expensive at the present time, the three amino acid diet may offer an option to producers who are above reporting thresholds and feeding lysine only at the present time.

Similar work is currently underway with laying hens with plans to quantify diet potential in broiler chickens, turkeys and cattle in pending studies. The use of carbohydrates in feed formulation and the associated impacts on air emissions is being studied at various locations in the U.S. and will be the subject of a future article.





Weight Restrictions on Public Roadways for Tank Wagons

by Mark Hanna, Extension Ag Engineer, Department of Agricultural and Biosystems Engineering

Legislation passed in 2000 established axle weight restrictions on public roadways for tank wagons hauling manure, grain carts with non-steerable axles and fence-line feeder wagons. Beginning July 1, 2005 these implements are restricted to a maximum gross vehicle weight of 96,000 pounds (not including weight of the farm tractor). Maximum weight of any single axle is limited to 24,000 pounds from February through May or 28,000 pounds the rest of the year.

In addition to weight restriction on these implements, all agricultural vehicles (including tractors, combines and implements) are required to comply with weight embargoes posted for bridges and culverts.



Although the look is similar, the form has been re-organized in a manner that applicants for a construction permit will know when a construction permit is required and what information the DNR needs before being approved. The form now includes tables to calculate required fees and animal weight capacity, a factor that would dictate some separation distance requirements at certain operations.

One of the highlights of the new application form is that applicants and their consultants can fill in the information on their computers and print the completed forms for signature and submittal. However, electronic submittals are not possible yet.

Also new, the form has three different checklists—one for when an engineer is required, one for when an engineer is not required and one for those building an earthen structure. Using the right checklist and information will avoid unnecessary revisions and delays.

To expedite review, the DNR requests that applicants place the construction application form on top of all other materials submitted. Applications consist of various documents and when applications include the manure management plan as the first document, the operation can be mistaken as a facility not required to obtain a permit, including at the county level. This could result in the required public notice not being published in a timely manner or worse yet, the master matrix evaluation being delayed.



Changes to Construction Requirements for Animal Feeding Operations

by Sara Smith, Iowa Department of Natural Resources

If you are planning to do new construction or modifications at your confinement feeding operation, you may welcome changes made to the DNR's construction application forms. All applicants should begin to use the new form, available at www.iowadnr.com.

The changes were necessary, partly due to rule amendments modifying some conditions when a construction permit (CP) must be obtained, but mostly as part of a department-wide initiative to streamline application processes.





This delays the application process and has forced some applicants to request extensions to the DNR and the county.

Complete applications can be approved in approximately 45 days. Incomplete or inaccurate applications can take several months. Iowa law requires that DNR make a decision to approve or to disapprove an application within 60 days. In some instances however, even complete applications can take as much as 90 days or more if the county demands a hearing to the Environmental Protection Commission (EPC).

During the last week of July, the DNR will meet with stakeholders to improve the construction permit process. The revised process is expected to increase efficiency and improve customer service. This is especially important because the DNR has received 160 applications in the first half of 2005, more than the 122 received in the entire 2004 calendar year.

Because producers must also consider other siting restrictions such as alluvial soils, flood plain and the presence of karst and sinkholes, early planning is key when considering constructing or modifying a confinement operation.

Upcoming Manure Management Events

by Angela Rieck-Hinz, Extension Program Specialist, Department of Agronomy

Several manure management events throughout Iowa and the Midwest are being offered by commodity groups, local producers, watershed groups, equipment manufacturers, state agency staff and extension services for summer 2005.

Some of these events require registration. For more information regarding these events, including directions, please visit the Iowa Manure Management Action Group (IMMAG) Web page at <http://extension.agron.iastate.edu/immag/> and click the Events button. The list on the IMMAG Web will be updated continuously throughout the year.

August 11

Waseca, MN

2005 Upper Midwest Manure Handling Expo

For more information call (612) 625-7024 or visit <http://manure.coafes.umn.edu/fieldday05/index.html>

August 16

Clarion, IA

Dry Manure Application Field Day

For more information call (515) 532-3453

August 22

Storm Lake, IA

Developing Iowa DNR Manure Management Plans

For more information call (712) 732-5056

August 23–24

Ames, IA

2005 Manure Management Clinic

For more information call (515) 432-9548 or see the program brochure, agenda and registration form at: <http://www.aep.iastate.edu/>

August 30–September 1

Iowa Farm and Field Fest

Manure Application Demonstrations

For more information call (515) 382-6551

August 22, 24, 25

Environmental Regulations Update

Sponsored by the Iowa Pork Producers Association. Please see the IPPA Web page for more details: http://www.iowapork.org/edopps/assistance_meetingsi.html



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