Comments from

The University of Missouri Commercial Agriculture Program

To the

Environmental Protection Agency

In response to its

Notice of Data Availability

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IV.A.2 Chronic Storm Event

In EPA's proposed revisions to the effluent guidelines for the production areas for beef and dairy subcategories, EPA proposed to retain [the 25-year, 24-hour storm] design standard. EPA did not, however, propose to define chronic or catastrophic storm events (FR 58561).

EPA NODA Language

EPA solicits comments on the extent to which chronic events cause discharges from the production areas that subsequently reach surface waters (FR 58561).

Comment

According to the Missouri Department of Natural Resources Water Pollution Control Division enforcement section records, there are currently 13 cases of CAFO effluent discharges on record. Of these thirteen, six occurred as a result of land application problems, five were due to lagoon overflows, and two are described as miscellaneous.

Although lagoon overflows occurred as a result of a storm event or series of storm events in some instances in Missouri, proper management of the lagoons would have prevented the overflows. In discussion with DNR personnel, no enforcement case of a lagoon overflow due only to rainfall could be recalled.

Lagoon covers would not have prevented the discharge of effluent in these situations where poor management led to lagoon overflow. Secondary containment may have contained the lagoon overflows in these situations; however, one would hesitate to recommend another structure requiring management if the primary storage structure is being poorly managed.

With more intense record keeping being proposed in the EPA CAFO rule, lagoon levels will ideally be more closely monitored, possibly reducing the likelihood of effluent discharges from lagoons.

EPA NODA Language

EPA is soliciting comment on the consequences of establishing design standards based on chronic events, such as the standards that would significantly increase the size of manure storage systems, significant increases in costs to expand existing storage capacity, and potentially increased environmental risks of creating larger liquid impoundments (FR 58562).

Comment

University of Missouri recommends and the Missouri Department of Natural Resources currently requires a higher standard than the 25-year 24-hour storm for manure storages built in Missouri. Uncovered storages currently must be designed to hold the wettest year in 10 rainfall amount for the proposed storage period plus the 25-year, 24-hour rainfall event. In that sense we support setting more stringent standards that address chronic rainfall events such as the wettest year in 10 used in Missouri.

University of Missouri submitted extensive comments on "second storage cells" and "emergency storage cells" during the original comment period (Zulovich et al., 2001a; Zulovich et al., 2001b). Much of that material is highly relevant to the current NODA requests on this topic and we encourage EPA to review our original comments.
One conclusion from the study was that the average incremental cost:sales ratio for obtaining 18-month storage capacity by adding a second storage cell is 7% for the farms using lagoon effluent storage in this study. Fifty percent of these farms would be in the EPA's Moderate to Financial Stress 3 categories. From this same study, the average incremental cost:sales ratio for adding an emergency storage cell designed to contain a 10-year, 10-day frequency storm plus 30 days of manure and facility wastewater production is 1%. All of the lagoon system farms studied would be in the EPA's Affordable 1 category.

EPA NODA Language

EPA also solicits comment on the extent to which potential CAFOs already have sufficient storage to accommodate chronic events (FR 58562).

Comment

Existing and potential CAFOs with lagoons currently in operation could achieve sufficient storage to accommodate chronic events by reducing the storage period of the existing lagoon. If existing manure storage structures are not modified to contain greater storage volume (i.e. through construction of secondary storage cells or emergency storage cells), then the only option is more intense management of the existing storage structure and a reduced storage period. This option requires a more frequent hauling of manure and may result in increased operating costs.

IV.B.6 Feasibility of Zero Discharge Standard

EPA's proposed technology option 5 assumes outside liquid manure storage (lagoons) that do not collect open lot runoff could be designed and maintained to handle precipitation from virtually any storm through the use of liquid-impermeable covers (FR 58565).

From comments received during the initial CAFO Rule Proposed Regulation comment period, EPA learned that some stakeholders felt impermeable lagoon covers in particular posed a number of operations challenges: freezing, biogas collection, clean storm water management, wind shear, cover repair, and disposal of spent covers. For these reasons, these stakeholders concluded the zero discharge standard was technologically unfeasible.

EPA … has extensive experience in the use of impermeable lagoon covers in the AgStar program… [and] these systems have routinely demonstrated zero discharge is attainable (FR 58565).

EPA NODA Language

EPA… solicits data that would support a determination that the technologies serving as a basis for the proposed BAT and NSPS are infeasible. Examples of such data include detailed information on specific locations where the technologies were attempted but failed, data regarding the design and size of the system employed (both physical dimensions and wastewater throughput), construction materials and methods employed, and detailed description of the manner in which the technology failed and the reasons for the failure (FR 58565).

Case Studies: Failure of Liquid-Impermeable Lagoon Covers

The University of Missouri review of lagoon cover case studies represents a series of lagoon cover failures over a wide geographic range.

With present lagoon cover technology, the capability of this technology to achieve zero discharge is unsubstantiated.

Northern Missouri

Premium Standard Farms has been experimenting with lagoon covers for nearly seven years. During that time, seven lagoons have been covered with impermeable covers. Each of these installations has failed. The following summarizes a history of the impermeable covered lagoons installed at Premium Standard Farms.

During the period of May 1995 to approximately May 1996, partial lagoon covers were constructed in northwest Missouri at several PSF sites: Locust Ridge Farm Site No. 1, Scott Farm Site No. 3, Whitetail Farm Site No. 1, Whitetail Farm Site No. 6, and Whitetail Farm Site No. 10. Each of these lagoons was approximately 18 million gallons in volume, 22 feet deep, and 3.5 acres in surface area. The cover material was 80-mil high-density polyethylene.

The partial cover was divided into four quadrants. Foam floatation material was used around the perimeter of the quadrants. Gas collection piping extended to the center of the cover. Storm water management involved the use of a potable submersible pump.

The cover at Locust Ridge Farm Site No. 1 blew completely off in the summer of 1995 soon after installation. The cover was replaced.

Immediately after installation, each of these covers experienced conditions of partial sinking due to difficulties in managing rainwater collected on the cover and extreme ballooning of the cover from gas buildup underneath. The ballooning was the result of two factors: gas generation seemed to be in pockets within the lagoon rather than uniformly distributed across the bottom, and, as rainwater collected on top of the cover, it aggravated the situation by cutting off the pathways for gas to flow to the collection header. As large gas pockets formed in certain areas of the cover, wind damage followed. Wind loads on the gas balloons ripped the cover and caused the one to be blown off. In the end, the lagoon contents were intermingled with the collected storm water on top of the cover and within one to two years the covers were a total loss. The covers remained submerged in the lagoons until they were removed with great difficulty and were required to be disposed of in a landfill.

Texas Panhandle

Premium Standard Farms installed lagoon covers on a sow and nursery lagoon in the Panhandle region of Texas in 1995 and 1996. The covers were constructed of 80-mil HDPE and were of similar construction to the Missouri covers. Over approximately 18 months, many difficulties in managing storm water collection on the cover were experienced. Since the area is in an arid climate as compared to Missouri, storm water collection issues did not result in cover failure but did contribute to their ultimate demise.

The main problem in the high plains region was dust collection on the cover. Even though storm water was being pumped off the cover, the cover surface still had some pockets of water remaining. Eventually, water pockets on the cover trapped enough dust that the additional weight on the cover caused them to sink. There was insufficient gas generation below the cover to maintain flotation.

Additionally, the recycle system for flushing the barns was configured to withdraw supernatant from beneath the cover. It was quickly learned during startup that significant quantities of gases were being released within the barns. A correction was implemented due to concerns over employee exposure. Constructing an additional open basin adjacent to the covered basin and moving the recycle pump suction to the new basin corrected the gas release issue. Today, a permeable floating membrane has replaced one of the covers. The other cover remains in a partially submerged state.

Oklahoma

Murphy Family Farms installed 40-mil high-density polyethylene covers on three primary lagoons in 1997 and 1998. Two of the covers were secured by welding the cover to liners of the same materials that were trenched into the berm. The third cover was partial and not anchored. It was blown away by wind and never re-installed. The two covers that are still there today are on primary lagoons with effluents flowing into secondary lagoon.

Ag Star Program

The following case studies are taken from the USEPA's AgSTAR handbook, first edition. Of the six scenarios describing covered swine lagoons, three covers had failed at the time of publication of the handbook. Those that had not failed were located in California. No information was given regarding the size of the covered basins or method of securing the covers.

Warsaw, North Carolina 1,000-sow farrow-to-finish swine farm

Covered lagoon with XR-5 material in 1992; lagoon cover ripped and sank in 1995; replacement planned for 1997, but no record of whether or not replacement of cover actually occurred.

Capital cost was estimated at $300,000 with projected operation and maintenance costs of $8,000- 10,000.

Morrilton, Arkansas 300-sow farrow-to-feeder swine farm

Lagoon covered in 1992 with unspecified material; lagoon cover deteriorated during removal after its fourth year.

Capital cost was estimated at $16,000 with operation and maintenance costs of approximately $500 per year.

South Boston, Virginia 600-sow farrow-to-finish swine farm

Lagoon covered with XR-5 cover material in 1995; Original cover partially sank; Cover replaced in 1997.

Capital cost was estimated at $85,128 with operation and maintenance costs of approximately $2,500 per year.

IV.A.3. Alternative approach to nutrient management planning

EPA NODA Language

EPA is considering but does not explicitly ask for comments on changing the name of regulatory nutrient management planning from "permit nutrient management plan" to "comprehensive nutrient management plan". (FR 58562).

Comment

The NODA states that EPA is considering calling the "permit nutrient management plan" or "PNP" a "comprehensive nutrient management plan" or "CNMP". The change in terminology does not affect the definition of what constitutes the requirements of a PNP by EPA.

This proposed change in terminology, calling a PNP a CNMP will create extensive confusion. The term CNMP already has a clear, more demanding, definition by the Natural Resource Conservation Service (NRCS).

EPA states in the original proposed rule (FR 2001, pg. 3032-3033) "EPA is proposing to use the term "Permit Nutrient Management Plan" in today's proposed regulation in order to have a separate and distinct term that applies solely to the subset of activities in a CNMP that are directly connected with the effluent guidelines and NPDES permit requirements…" In short, EPA acknowledges that the PNP is not a CNMP. Yet EPA now proposes that for regulatory purposes, the PNP will be called a CNMP even though the PNP (now called CNMP) does not meet the requirements of a CNMP set by another government agency that coined and defined the term CNMP.

If the PNP and the NRCS CNMP do not have the same requirements, EPA must use a different term than CNMP to designate the planning activities connected with the effluent guidelines and NPDES permit.

IV.B.3. Manure application rates based on limiting nutrients

General comments

University of Missouri submitted extensive comments on annual versus phosphorus-banking strategies for implementing a phosphorus rule during the original comment period (Lory et al., 2001a; Lory et al., 2001b; Lory et al., 2001c). Much of that material is highly relevant to the current NODA requests on this topic and we encourage EPA to review our original comments.

In our original submitted comments we used the terminology of phosphorus rotation approach to describe the concept that EPA has designated a phosphorus banking approach in the NODA. We suggest that EPA adopt the phosphorus-rotation terminology because it more clearly communicates the cyclic nature of manure applications embodied in this phosphorus limiting strategy.

Reading other comments related to the proposed rule indicates that it is important to clearly define the terms EPA designates as annual phosphorus limits and phosphorus banking. An annual phosphorus limit prevents a farmer from applying more than the annual amount of phosphorus required by the plant in a year. In a phosphorus banking approach, manure is applied to the crop based on the nitrogen needs of the crop or some other multi-year phosphorus basis but further applications are not allowed until harvested crops have removed the applied phosphorus. The same number of acres of land will be needed for a manure plan based on the phosphorus banking strategy and the annual phosphorus strategy. Every acre in the plan will receive manure every year with an annual phosphorus-based plan. In contrast, a portion of the acres will receive manure in any given year with the phosphorus banking approach and manure applications will be rotated from field to field until all acres receive manure.

EPA NODA Language

EPA solicits comments on reasonable amounts of phosphorus banking that could be considered an acceptable nutrient management practice (FR 58564).

Comment

We advocate implementation of nitrogen-based phosphorus banking limits, not to exceed the 5-year planning window of the nutrient management plan. This approach protects water quality while minimizing the impact of the phosphorus-based nutrient management planning on farmers.

Farmers would be allowed to apply manure to meet the nitrogen needs of crop if the phosphorus application rate did not exceed the projected 5-year phosphorus need of the crop rotation. No further manure applications would be allowed on the field until the applied phosphorus had been removed. Over the period of the phosphorus bank, the same amount of phosphorus would be applied to a field using either the annual phosphorus limit or the phosphorus banking approach. In the banking approach, multiple years of phosphorus would be applied in one year and then no additional phosphorus applications would be allowed in subsequent years. In the annual limit approach, applications would be allowed every year but the rate of application would be limited by the annual crop need for phosphorus. Under all systems of manure application no manure application could exceed the nitrogen needs of the crop and no manure application would be allowed on land designated as unsuitable for manure applications using the phosphorus assessment tool. In short, this is a discussion of how phosphorus can be applied to land suitable for phosphorus-based manure applications (banking verus annual limits), not a discussion of which land can receive manure.

University of Missouri submitted extensive analysis and comments on the benefits of nitrogen-based phosphorus banking strategies over annual phosphorus limits for implementing phosphorus limits in our original comments to EPA (Lory et al., 2001b). Much of the information in that chapter addresses the issues raised by this question and we encourage EPA to review our original comments on this topic. The following information builds on that initial analysis.

No manure application can exceed nitrogen needs of the crop so the nitrogen-based application rate sets the maximum multiyear basis for phosphorus-banking strategies. Figure 3-1 estimates the number of years of phosphorus that are applied at the nitrogen-based rate for selected crops and manure types. Nitrogen-based applications exceeded annual phosphorus removed by the harvested crop in all but 10 of the 204 manure-crop scenarios evaluated. In some cases nitrogen-based rates resulted in over 9 years of nitrogen being applied but less than 5 years was applied in over 85% of the cases. Most of the cases that exceeded 5 years were related to manure applications on crops with high nitrogen to phosphorus ratios in the harvested crop such as soybean and cool-season hay and with manure that had a low nitrogen to phosphorus ration such as poultry litter (Fig. 3-1). This analysis did not include pastures. Pastures will typically require longer banking periods than hay because phosphorus removal is lower in pastures but nitrogen need is often similar to hay. A single nitrogen-based application of broiler litter to pasture will provide over 17 years of phosphorus (years of P applied at the nitrogen-based rate = crop nitrogen need: phosphate removal ratio/manure plant available nitrogen:phosphate ratio = 13.3/0.75=17.7) whereas the same application to cool season hay will apply 5.6 years of phosphorus (4.2/0.75=5.6)

Nitrogen-based phosphorus banking provides many benefits to the farmer.

- It allows the farmer to continue applying manure using the same equipment currently used for manure application.
- It allows the farmer to meet all the fertilizer needs of the crop in the year manure is applied eliminating the cost and time required to apply supplemental chemical fertilizers to the crop.
- It promotes the rotation of manure onto crops that need both nitrogen and phosphorus by reducing the incentive to apply one year of phosphorus to crops with no nitrogen need such as soybean.

These last two points help maximize the fertilizer value of the manure and make it a more competitive with commercial fertilizers on land currently not receiving manure.

Manure application rates below nitrogen-based rates have many costs to the farmer, particularly if the farmer is currently applying at nitrogen-based application rates.

- Application rates below nitrogen need will require the farmer to apply additional nitrogen fertilizer to all N needing crops (e.g. corn, wheat, grass forage). The second pass increases the time needed for nitrogen fertilization during a period of the year farmers are short on time. It also reduces the nitrogen value of the manure because there is no longer any savings in fertilizer application costs in the year the field receives manure.

- Application rates below nitrogen need will promote applications of manure to crops that do not require additional nitrogen. With phosphorus banking manure can be applied to the non-legume component of the rotation (e.g. corn) while supplying phosphorus for the whole rotation. This approach maximizes the value of the manure. For example, a surface application of grow-finish pig slurry to a corn-bean rotation may provide 3 to 4 years of phosphorus. The farmer can create a balanced manure rotation by fertilizing corn once every fourth year with manure and then applying fertilizer nitrogen only in the alternate corn year. At the other extreme, annual limits would force the farmer to apply manure on legume crops if they needed additional land for manure application, losing the fertilizer value of the nitrogen when manure is applied to soybean.

- The farmer may need to invest in modifying current equipment or invest in new equipment to reduce application rate. The flexibility of current equipment to meet the needed reduction will depend on the system used to apply the manure and the degree of reduction required. Slurry systems are typically relatively inflexible in the rate of manure applied and most would need to change or upgrade equipment if they were required to lower single-pass rates. Traveling gun systems typically have fewer problems attaining lower rates and typically require smaller reductions. Litter systems typically are more flexible than slurry systems but the amount of reduction in rate is typically higher in litter systems. These issues were dealt with in detail in our initial comments to EPA (Lory et al., 2001b).

- Many strategies to reduce application rate will require the farmer to reduce discharge rate of the manure. Reductions in discharge rate increase the time required for manure application. Reducing manure application rate from a 4-year phosphorus banking limit to an annual phosphorus-banking limit increased mean manure application time from 162 to 201 hours per year for 31 US swine operations we evaluated (Lory et al., 2001c). The new rules emphasize timely applications of manure close to the time of crop need. Annual phosphorus limits consumed an average of 79% of the spring preplant field work hours whereas a 4-year phosphorus banking approach consumed 65% of spring preplant work hours for these 31 operations. We estimated these operations currently use 51% of preplant field work hours for manure during the year for nitrogen-based manure management. The more restrictive the banking restrictions on the phosphorus rule, the more time the farmer will need for land application of manure during a busy period of the year.

- Annual phosphorus limits will promote surface applications of manure. Wider swath widths are most feasible with surface applications. An operation injecting manure with 15-foot tool bar can more than halve application rate by converting to a surface application tool bar of 30 to 40 feet. Additional reductions may be possible with the increased travel speed potentially possible with surface applications compared to injection.

The fewer years allowed for banking, the greater the potential hardship because the shorter the banking period allowed the more operations that will need to reduce application rates below nitrogen need of the crop. If only 2 years of phosphorus banking is allowed, 70% of the scenarios in Fig. 3-1 would result in manure application rates below the nitrogen need of the crop; 3-year phosphorus banking would result in just under 50% of the scenarios in Fig. 3-1 with manure application rates below the nitrogen need of the crop. A 5-year limit would result in 14% of the scenarios in Fig. 3-1 with manure application rates below nitrogen need of the crop.

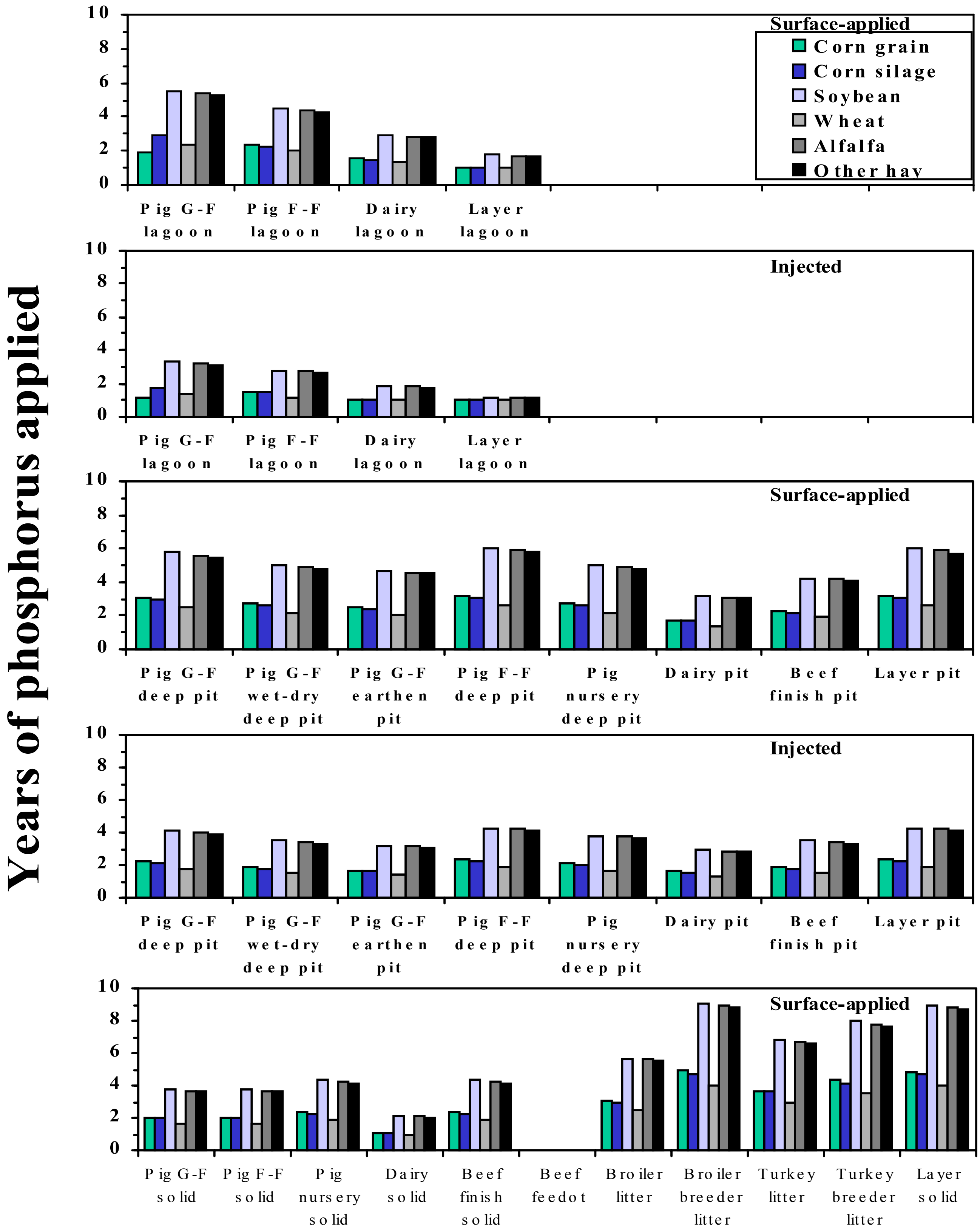
Phosphorus banking will not degrade water quality compared to annual phosphorus limits. The concentration of phosphorus in runoff soon after a surface application of manure is linearly related to the rate of application (e.g. Edwards and Daniels, 1993). Any increase in the amount of manure applied to a field will result in a similar increase in phosphorus concentration in runoff from the field until the phosphorus attaches to the soil. Many people erroneously conclude that this relationship means water quality decreases as the length of the banking period increases. Closer inspection of the system reveals there is little difference in the water quality impact of an annual phosphorus limit versus a nitrogen-based phosphorus rotation limit as a consequence of the linear nature of this relationship.

For example, under the annual phosphorus limit, if every acre in the watershed received phosphorus, all acres would lose phosphorus in the runoff water when runoff occurred. In the nitrogen-based phosphorus rotation, a portion of the acres would receive manure each year, for example 50%. Runoff concentrations from those acres receiving manure would be double those observed with the annual phosphorus rule but the losses would only be from 50% of the watershed (manure is only applied to half the watershed each year). No difference in phosphorus load to the watershed would exist between the two approaches for the same runoff event. In scenario 1, 100% acres would contribute 50% of the phosphorus loss. In scenario 2 50% of the acres would contribute 100% of the phosphorus loss.

The objective of phosphorus limits is to improve water quality yet reducing the years allowed for phosphorus-banking will not improve water quality and potentially could reduce water quality in some cases. Forcing farmers to not apply manure based on nitrogen-based phosphorus banking will increase the time needed for manure application making applications during marginal conditions more likely. This will increase the likelihood of major phosphorus runoff events. It will also promote surface applications of manure, a practice that increases soluble phosphorus losses from manure and other fertilizers. Reduced banking periods will also promote additional fertilizer nitrogen applications on land receiving manure, a practice likely to promote over-application of nitrogen fertilizer. In short, forcing farmers to apply manure based on annual phosphorus limits or short-term phosphorus banking strategies may create conditions that promote greater nutrient losses from agricultural fields. This effect would reduce the potential water quality benefits of a phosphorus rule.

We initially suggested a 5-year limit on phosphorus banking (Lory et al., 2001b). This was based on the 5-year planning window suggested by NRCS in the current Agronomy 590 standard. We concluded that banking periods longer than the planning period and longer than farmers were required to maintain records were unrealistic. The 5-year limit will pose a hardship for some operations, particularly operations that apply manure to pasture systems. We would support longer phosphorus banking periods if appropriate record-keeping safeguards were put in place to insure long-term phosphorus balances were maintained.

Figure 3-1. The number of years of phosphorus applied when manure is applied at the nitrogen-based rate. Phosphorus need is based on crop removal capacity of the crop.



EPA NODA Language

EPA solicits comments on whether phosphorus-banking practices should be limited to solids and slurries or should be considered for all manure applications (FR 58564).

Comment

There is no rational basis for selectively applying phosphorus-banking practices based on forms of manure. We recommend that no artificial limits be put on forms of manure qualifying for phosphorus-banking practices.

EPA, in the proposed rule, acknowledged that in some cases,annual phosphorus limits would be infeasible for some forms of manure, specifically, poultry litter. The Federal Register (2001, pg 3142) stated "Manure application equipment designed for dry poultry manure or litter cannot obtain an application rate low enough to meet a phosphorus based application rate as determined by the PNP." In the current Notice of Data Availability, EPA apparently acknowledges annual phosphorus limits may also be infeasible for some manure types defined as slurries and solids (FR 58564).

EPA is correct in citing poultry litter, slurry manure and solid manure as examples of manure forms that are likely to create substantial feasibility problems for farmers implementing annual phosphorus rules. For example, we investigated the feasibility of annual phosphorus application rates for 15 farms that applied hog slurry manure (Lory et al., 2001c). On 11 of the 15 farms the equipment currently used for manure application was not capable of attaining annual phosphorus application rates and on 5 of the farms most equipment currently on the market is incapable of applying slurry at an annual phosphorus rate.

We contend that the poultry litter, solid manure and slurry examples demonstrate the general rule that manure, crop and equipment factors can combine on some operations to make annual phosphorus applications infeasible. The intent of the proposed rule is to allow farmers to use their current equipment to apply manure. We and others have submitted examples that demonstrate that annual limits create feasibility issues for more than poultry litter during the initial comment period (e.g. Lory et al., 2001a; Lory et al., 2001b). These examples were submitted to demonstrate the general rule that there are numerous examples beyond poultry litter where feasibility of annual phosphorus applications is likely to be a problem.

EPA is suggesting the rule anticipate and identify all situations where feasibility is likely to be an issue and then write a specific exemption. This is an impossible task; there will always be unanticipated exceptions where annual phosphorus limits are infeasible on a specific farm, with a particular class of manure, or when manure is applied to a particular crop.

A complicated array of factors combine to make annual phosphorus limits infeasible for a particular manure type on a particular farm. These include:

- The ratio of nitrogen to phosphorus in the manure and the harvested crop receiving manure.
- The ability of the application equipment to adjust application rate through travel speed, swath width and/or discharge rate.

We outlined in detail the effects of manure, crop and equipment characteristics on the feasibility of annual phosphorus rates in our initial comments submitted to EPA (Lory et al., 2001a; Lory et al., 2001b; Lory et al., 2001c).

Specifying exceptions to annual phosphorus limits in the rule poses other implementation issues. Exceptions that can use phosphorus banking such as "litter", "solids" and "slurry" will need to be defined, defended and enforced. A mechanism to anticipate new manure forms creating feasibility problems will need to be drafted. It is more sensible to let the manure and crop characteristics determine the best means to reach phosphorus goals, not an incomplete designation system.

The objective of the proposed regulation is to implement phosphorus rules in a manner that protects water quality and allows the farmer to continue to use currently owned equipment. These objectives are only met by implementing a generic form of phosphorus banking available to all forms and types of manure.

V.A. Industry Profile

EPA NODA Language

"Some commenters endorse USDA's analysis and cite these results to highlight the perceived lower environmental gain relative to the increase in the number of operations affected as the regulatory threshold is lowered. EPA will consider this information when re-evaluating the range of proposed CAFO threshold definitions for the final CAFO regulations. EPA solicits comment on the use of these USDA estimates for the development of EPA's final regulations (FR 58570)."

Comment

Vatn (1998) defines precision as the distance between the desired and realized environmental outcome and indicates that as the total benefits from precision increase, marginal benefits decrease and marginal *transaction costs* increase. (Transaction costs associated with environmental policies include research and information costs, design and implementation costs, and monitoring and enforcement costs.) This will obviously be the case as the threshold is decreased from 1000 animal units to some lower number, say 500. From Table 5.2 (FR 58568), the number of enterprises affected would thus increase from 11,380 to 26,930, more than doubling. While transaction costs involved with design and implementation of the program would differ little, monitoring and enforcement costs would be expected to more than double since they would relate directly to the number of enterprises. From Table 5.4 (FR 58570), the regulations would go from affecting 5.4 % of enterprises to affecting 12.8% of enterprises while increasing the level of excess N covered from 64.4% to 84.1% and the level of excess P from 67% to 84.5%. EPA would have to determine whether the increased benefits outweigh the increased costs and at what level this is no longer true.

Another question that arises is whether these benefits would actually be realized, i.e. to what extent does the level of non-compliance affect the data presented in Table 5.4? While the current level of non-compliance is not presented in the EPA documents, the fact that there is non-compliance testifies to the importance of transaction costs as limiting the effectiveness of regulations compared to some ideal. It might be more important to bring the firms over 1000 animal units into compliance (and determine the reasons for non-compliance) rather than expanding the program at the current time. Over time technological change (as well as consolidation in the industry) will lower aggregate compliance costs for smaller firms.

The full cost of regulations must include the transaction costs borne by the government and also the stakeholders (Coase 1960). These costs are not trivial, McCann and Easter (2000) for a NRCS program found that transaction costs as a percentage of total costs (abatement/compliance costs plus transaction costs) were 38%, while Falconer et al. (2001) in the U.K. found that transaction costs were 30% of the total cost of an environmental management agreement scheme.

Consideration of transaction costs is very important as EPA considers expanding the regulated operations. There are transaction costs that each firm will have to bear, independent of the compliance costs or environmental benefits associated with the new regulations. These include learning about the regulations, learning about relevant technologies, filing necessary documents, etc. These costs would be independent of the size of the operation and thus would impact more severely on smaller enterprises. There will also be greatly increased monitoring and enforcement costs incurred by EPA and related agencies as well as the implementation costs of the program. All these costs, as well as the compliance costs and the value of the environmental benefits need to be considered to determine what level of expansion is desirable.

V.B.1.a. EPA's Assumptions Of Full Compliance With Existing Regulations For CAFOs With More Than 1,000 AU

EPA NODA Language

"EPA is soliciting comment on an approach that would be conducted in two stages, which is outlined as follows. The first stage of this analysis would assess the cost to CAFOs to comply with current requirements—specified for the production area—promulgated under the existing 1970s regulations and further evaluate the expected financial impacts of these costs. Using a representative farm approach, where the Agency determines that compliance with the existing regulations would have resulted in financial stress and potential closure of a representative facility, this operation would be removed from the analysis under the assumptions that this operation would not have remained in business. This representative facility would now constitute a baseline closure for purposes of evaluating the proposed revisions to the existing rule. This approach by which baseline closures are removed from any subsequent analyses is consistent with longstanding Agency practice to assess only the incremental costs associated with a specific regulatory action.

The second stage of this analysis would evaluate costs and financial impacts to comply with the proposed new requirements. These costs and impacts would be assessed for operations within the assumed remaining CAFO universe based on the number of operations assumed to have remained in business while complying with the existing regulations (i.e., excluding assumed baseline closures determined to close under the existing regulations in the first stage of this analysis). EPA solicits comment on this approach and requests data and information in order to conduct this supplemental analysis (58572)."

Recommendation

The University of Missouri recommends that the EPA avoid designating existing AFO's as baseline closures.

The following premises appear to be self-evident:

1. Existing operations are viable or they would have closed. Though the existing operation might be on very weak financial footing, for some reason the manager has continued operation. Even if the operation is currently losing money, the manager's utility function considers on-going production worthwhile.
2. The operations believe that they are operating within the current requirements promulgated under the existing 1970s regulations as carried out by the authorized state environmental authority.

The EPA, in order to deem some current operations out of compliance and subject to baseline closure, judges that the authorized state agency charged with carrying out the 1970s regulations has failed to do so. An alternate judgment could be that the state agency has carried out the 1970 regulations but that the state's interpretation of best available technology differs from that of the EPA. This different interpretation could be due to difference in time and/or opinion.

A different interpretation due to difference in time would occur when a state wrote their guidelines based on best available information (say in 1975) and have not revised their guidelines for 25 years. Were the state to revise their guidelines given the 1970 regulations they might make them more stringent. Nevertheless, the farms operating under guidelines issues decades ago believe they are in compliance and may be in compliance with regulations written by authorized state agencies. To declare these farms out of compliance and "baseline closures" is to ignore a legitimate interpretation of why they are "out of compliance".

A different interpretation due to difference in opinion would occur when an authorized state authority permitted compliance in a different manner than current EPA personnel would specify. This could happen because the state authority better understands the situation in their state and what practices do or do not work. To have federal EPA personnel judge that the state's application of the guidelines is erroneous should not reflect on whether or not a business is a baseline closure.

In summary, the concept of baseline closure is contrary to what is obviously the case. The operations are in business and have no indication that they are out of compliance (either due to presumed compliance with existing state regulations or due to no violations). To now deem these operations as baseline closures would understate the true impact of the proposed regulations.

It appears that at the very least the EPA would need evidence that the "baseline closure" farms knowingly out of compliance. Otherwise the facts are that the operation is in business and will experience costs due to compliance with the proposed regulations. The costs need to be considered in the economic analysis of the proposed rule.

As a separate matter, not only should the number of firms going out of business be reported when compliance costs are presented, but costs associated with going out of business should be included in the costs of the regulation. Costs of going out of business include such costs as 1) the decreased asset value of buildings that can no longer be used for the purpose for which they were built, 2) the cost of closing the existing manure storage structures in an environmentally benign manner and 3) moving and retraining costs for employees displaced.

V.B.1.b. EPA's Cost Model Assumptions and Use of "Frequency Factors"

EPA NODA Language

"Use of these estimated costs (using frequency factors) to assess financial impacts might, therefore, either understate or overstate economic impacts to CAFOs in EPA's analysis. To address this concern, EPA is considering alternative ways to characterize the variability of costs that may be incurred by increasing the number of representative models EPA uses to assess compliance costs. ….This alternative approach would generate three sets of compliance costs per representative model CAFO, instead of a single average cost per representative model. (FR 58572)."

"EPA is considering breaking out its estimated average compliance costs across three different performance group scenarios: below average performers, average performers, and above average performers. For the purpose of this analysis, average performers would represent 50 percent of all operations that employ an average mix of waste management practices and technology controls. ….Costs incurred by operations assumed to be above (below) this average would reflect 25 percent of all operations with a higher (lower) mix of practices and controls in place. (FR 58573)"

"Preliminary estimates that USDA has developed depicting the percent of operations needing upgrade across these three groups of operations that EPA is considering to use for the final analysis are provided in the EPA's record. (FR 58573)"

Recommendation

The University of Missouri commends the EPA for increasing the number of representative models it uses to assess compliance costs.

The University of Missouri recommends that the EPA:

1. use the frequency factor to determine how many farms are in each performance category and
2. not use the frequency factor to decrease the cost incurred for any particular component on any particular farm.

The proposed assignment of 25%, 50% and 25% to "below average performers," "average performers" and "above average performers," respectively, is arbitrary and needs refinement. It is common to categorize farm production into below, average and above average farms when analyzing data and a clear objective such as yield or net income has been specified prior to gathering the data. It doesn't make sense to a priori assign a percentage of farms to a particular group when creating data from a model. Subjective judgment (capable of withstanding legal challenge) will need to be used to discern what cost components are needed by each category.

Frequency factors obtained from surveys (NPPC, NAHMS, Sobecki and Clipper) need to be interpreted realizing that the information the survey instrument requested and the EPA definition of a compliance component may (likely) differ in both intensity and frequency. For example, management practices, such as soil sampling, have two intensity aspects (e.g. acres per sample; P and K only; P, K and N; P, K, N and trace nutrients) and a frequency aspect (e.g. every year; every other year; every 4th year). Because practices have varying intensity of current adoption, some portion of the total compliance cost would be the incremental increase.

The EPA assumes that CAFOs already incurring costs have zero additional compliance costs. In reality, CAFOs already performing some of the activity would incur a fraction of the compliance cost because of increased intensity and/or frequency. In this case, the farms assumed to already comply would have a "partial" cost (unrelated to the frequency factor but related to the degree that the intensity or frequency is increased) associated with increased standards.

Farms assumed not to already comply with management practices would experience the full estimated cost of compliance.

As opposed to management practices, technologies usually entail an initial investment. Examples of technologies include lagoon covers, ground water well installation and the initial nutrient management plan. These technologies, as defined by the proposed rule, are sufficiently different from technologies normally used so that anyone incurring the cost is likely to incur the full cost. The least needs CAFOs would have no compliance cost because it is assumed these CAFO's already have the technology. Both the "average needs" and "most needs" CAFOs would have full compliance costs because the possibility of partial compliance cost is unlikely. Either the CAFO will incur the full cost of an investment or none of the cost. This is particularly true for investments that have no other value than regulatory compliance.

Table 1 summarizes the proper use of frequency factors given different farm categories. It makes clear that frequency factors should never be used to reduce the cost of compliance if the representative farm is designated as having need. The frequency factor is properly used to determine whether it is a need in the "least needs," "average needs" and "most needs" categories. Frequency factors indicate the number of farms that will have full compliance costs. Under average needs CAFOs, some portion of the cost related to management practices is incurred rather than all. The portion is not related to the frequency factor but some judgment of how much the new rules increase intensity and frequency of a practice.

Table 1. Frequency Factor Usage for Representative CAFOs.

Cost Components Related to	Type of CAFO Least needs	 Average needs	 Most needs
Management Practices	specific component cost = $0	specific component cost = portion of estimated cost	specific component cost = 100% of estimated component cost
New technologies	specific component cost = $0	specific component cost = 100% of estimated component cost	specific component cost = 100% of estimated component cost

Practices are distinguished from technologies in that practices are "smaller," recurring, management related costs. Examples of practices would be soil sampling, record keeping and feeding strategies

Miscellaneous comment on Frequency Factors in the NODA

The EPA needs to confirm that its definition of frequency factors is interchangeable with the USDA definition. The NODA states that "For USDA's analysis, it compiled data representing the percent of facilities needing upgrades to meet CNMP requirements. For example, a value of 80 percent indicates that 20 percent of the operations in that category meet the requirements and 80 percent of the operations need to install or adopt the required controls or practices." The EPA Cost Methodology Report for the Swine and Poultry Sectors Section 5.2.1 says the "EPA then applied these frequency factors to model farms to develop a weighted-average cost for each model farm. For example, if a practice costs $100 and 60 percent (the frequency factor) of the operations in the model category already implement the practice, the average cost to facilities represented by that model farm is $40." It appears that the EPA frequency factor is really 1 minus the USDA frequency factor.

V.B.1.d. Changes To Costs For Land Application Of Lagoon Liquids For Beef And Dairy Operations

There are several statements in the NODA that indicate a possible misunderstanding of manure handling systems. These are mentioned here along with comments in an effort at clarity.

Hydraulic Loading Limit

"EPA acknowledged in the proposal that in some cases factors other than nutrients could limit the application rates of manure to crop land. EPA is evaluating those areas where the water holding capacity of the soil could result in a manure application rate more limiting than the phosphorus based rate. For these areas, EPA intends to perform a sensitivity analysis of application rates that considers the hydraulic loading limitations of the crop land. EPA believes facilities currently applying manure on a nitrogen based rate and that need to go to a phosphorus based rate will be mostly unaffected by hydraulic limitations. EPA solicits comments and information on the extent to which hydraulic loading limitations may affect the costs of applying manure (FR 58575)."

Comment: Current application practice is to limit the single pass application of manure to hydraulic loading capacity. If the nutrient limit permits more than the hydraulic loading limitation, producers use multiple passes, limiting each pass to less than or equal to the hydraulic loading limit. Any restriction to allowing a single pass (or single hydraulic loading) would serve no environmental benefit because soil that has dried from a previous application can still receive additional manure without runoff.

Lagoon effluent is likely to be the only manure dilute enough to reach a hydraulic loading limit before a nutrient limit. Any restriction to a single hydraulic loading would increase the number of acres needed for manure application of CAFOs using lagoons. This would also impact producers who are growing crops that remove a lot of nutrients (e.g. burmudagrass). It is presumed that the EPA would encourage use of crops that remove a lot of nutrients.

Manure Hauling Estimates

"EPA also assumed that all manures would be distributed evenly on all land available to the animal feeding operation. EPA is considering revisions to the cost estimates for hauling manure to the closest fields first, particularly under a scenario that would allow phosphorus banking. Under such a scenario, additional commercial nitrogen fertilizer would not be needed the year the manure was "banked". EPA solicits comments on these modeling assumptions, as well as the baseline model changes under consideration (FR 58575)."

Comment: It is recommended that no distinction be made in the hauling costs when phosphorus banking is permitted (as opposed to the original proposal of limiting manure application to the annual phosphorus removal capacity of the crops grown). To the extent that the EPA's cost estimates account for commercial fertilizer application costs on land receiving manure, these would legitimately be eliminated for the portion of acres that no longer need commercial fertilizer due to the permitting of phosphorus banking.

Hauling costs are comprised of travel (or distance related) costs and infield application costs. Travel costs are expected to be identical under either an annual phosphorus removal or phosphorus banking rule. Producers allowed to bank nutrients are expected to access nearby land (shortest distance) in the early years of the banking period and distant land in the later years. Producers limited to annual nutrient removal would be expected to access all necessary land every year. Over the course of the banking period, the average road travel distance will be identical, thus incurring an identical cost.

The infield application costs will be slightly lower with phosphorus banking than with annual phosphorus limits. Producers applying manure under annual nutrient removal limits are expected to make fewer trips to each *individual* field every year than if allowed to apply with a nutrient banking concept.

Earlier comments to the EPA from the University of Missouri Commercial Ag Program indicate that the difference will be the feasibility of compliance. Annual phosphorus limits require application rates that are not easily obtainable given existing application technology and the time requirement of accessing all of the acres every year makes application within a reasonable window of fieldwork days doubtful.

In summary, the biggest difference between phosphorus banking applications and annual phosphorus limited applications is not the monetary cost but the feasibility of compliance. Phosphorus banking fits much better with existing technology and within the time windows available to farmers to land apply manure.

V.B.1.e. Cost Offsets and Savings

EPA NODA Language

The EPA Notice of Data Availability (NODA) states that the "EPA is considering an approach that places a nutrient value on manure" and that the "EPA also intends to consider the 1997 (EPA's baseline year) Commercial Fertilizer Institute values of nitrogen and phosphorus for purposes of estimating the nutrient value of manure. (FR 58575)."

Recommendation

The University of Missouri recommends that the EPA should *not* value manure (neither on-farm or off-farm uses) when determining the economic consequence of its proposed rule for the following reasons:

1. The EPA's economic analysis of its proposed rule considers only *incremental* costs (FR 3079). Nothing in the proposed rule increases the value of manure and therefore there is no incremental cost offset to be considered. To credit the full nutrient value of the manure while only considering the incremental increase in cost would be capricious.
2. The methodology proposed by the EPA for valuing manure nutrients overstates the market value of manure. The University of Missouri considers that the use of 1997 fertilizer prices overestimates the cost offsetting value of nutrients in manure for the following reasons:
    1. 1997 prices are 13 to 23% higher than 10-year average fertilizer prices. If fertilizer prices are used, either a 10-year historical average price or a 10-year projected price should be used.
    2. Commercial fertilizer value is expected to exceed manure supplied nutrient value because of its form.

The following sections show how the EPA proposed methodology overstates the market value of manure.

Use of 1997 prices for fertilizer.

Table 2 presents USDA Agriculture Price Summary statistics for the price paid by farmers for various fertilizers for the 10-year period from 1992 to 2001. Fertilizer prices are variable and choosing a single year to establish the value of a nutrient is arbitrary. The 10 year average price is 13 to 23% lower than the 1997 price for nitrogen fertilizers. The 10-year average price for triple super phosphate is 11% lower. Any estimation of manure nutrients value from the single year of 1997 would likely overstate the value of fertilizer by at least 10%.

Table 2. Historical Fertilizer Prices (USDA Agricultural Prices Summary)

Year	Ammonium Nitrate	Anhydrous Ammonia	Urea	Triple Super Phosphate
	---Dollars per pound of N---			--$/lb P_2O_5--
1992	0.27	0.13	0.22	0.23
1993	0.28	0.13	0.22	0.21
1994	0.29	0.15	0.23	0.24
1995	0.33	0.2	0.3	0.26
1996	0.35	0.18	0.31	0.29
1997	0.34	0.18	0.29	0.29
1998	0.29	0.15	0.22	0.28
1999	0.27	0.13	0.2	0.28
2000	0.29	0.14	0.22	0.26
2001	0.39	0.24	0.31	0.26
10 year average	0.31	0.16	0.25	0.26
Percent off 1997	-13%	-13%	-23%	-11%

Long term agricultural economic analyses are best done using forecasts of prices or historical averages. It is difficult to justify the use of a single year's data.

Value is a function of Form

The value of identical nutrients changes with its form. 1997 data for US nitrogen (N) fertilizer prices is reported in Table 3. Using the percent N in the various fertilizers, the cost per pound of N has been calculated. Anhydrous ammonia is the least expensive form of N; ammonium nitrate is the most expensive. Ammonium nitrate is nearly twice as expensive per pound of N as anhydrous ammonia.

Table 3. US nitrogen fertilizer prices (1997).

Fertilizer	Price/ton	% N	Price/lb N
Ammonium Nitrate	$227	33.5	$0.34
Anhydrous Ammonia	$303	82	$0.18
Urea	$257	45	$0.29

Source: USDA Agriculture Prices Summary

Commercial fertilizer prices show that the value of a unit of some nutrient is dependent upon not only the nutrient (the assumed underlying value) but also the form in which is sold. The value the manure supplied nutrients are relative to, but not equal to, commercial fertilizer nutrient values. Any estimate of the value of manure would need to take into account the predominant form of commercial fertilizer used.

The following factors decrease the value of manure supplied nutrients relative to commercial sources of fertilizer nutrients.

1. Manure nutrient concentration is not guaranteed. Commercial fertilizers have guaranteed analysis of nutrients. Manures have uncertain concentration of nutrients and heterogeneous distribution of nutrients in the manure.
2. Manure distribution equipment lacks spreading consistency. Dry manure spreaders apply an uneven application due to clumping of the manure.
3. Manure is bulky. The handling of manure as a fertilizer is more difficult than the handling of commercial fertilizers causing farmers to discount its value.
4. Application time is greater. Because of the low concentration of nutrients in manure it requires more time to apply manure than commercial fertilizer. This can cause time crunches during peak labor demand periods.
5. Manure nutrients are not available in the ratio needed by crops. When applying according to a P limit, N will usually be undersupplied causing a second trip to apply N fertilizer. When applying according to an N limit, applied P will usually exceed crop need. P in excess of crop need has no economic value once the soil test level of P is high.
6. Manure contains contaminants. The presence of contaminants such as weed seeds, wire, plastic artificial insemination tubes, etc. causes farmers to discount manure.
7. Manure nitrogen availability is less certain than commercial fertilizer nutrients.

In addition to the reasons listed above that manure nutrients have a lower value than commercial fertilizers, the EPA proposed rule is also likely to lower the value of manure supplied nutrients to non-CAFO recipients. The EPA proposes to "address the risk of improper manure application off-site by either requiring that the CAFO operator obtain from off-site recipients a certification that they are land applying CAFO manure according to proper agricultural practices or requiring the CAFO to provide information to manure recipients and keep appropriate records of off-site transfers, or both (FR 2964)." By making recipients of manure provide a certification that they are not required to provide for commercial fertilizer use, those potential recipients will view the use of manure supplied nutrients as opening the door for government oversight of their farms so that they discount the value of the manure accordingly.

EPA's Poultry Litter Value as an Illustration

The NODA specifically requests comments on the "EPA's calculated value of $8 per ton for litter (FR 58575)." Table 4 shows the value that poultry litter would have if nutrient values from Midwest Plan Service for poultry litter are valued at 1997 commercial fertilizer values. The total value of manure supplied nutrients is estimated at $27.52/ton of poultry litter.

Table 4. Value of poultry litter nutrients.

Nutrient	Nutrients in litter (lbs/ton)[1]	Commercial Fertilizer Value ($/lb)	Total Value of Manure Nutrients
N	47	0.20	$9.40
P_2O_5	48	0.29	$13.92
K_2O	30	0.14	$4.20
Total			$27.52

[1]Source: Livestock Waste Facilities Handbook. Midwest Plan Service. MWPS-18.

The difference between $27.52/ton calculated using the proposed method in the NODA and $8.00/ton suggested by the EPA in the NODA raises the question of how accurate any EPA estimate of manure value will be. The calculated value is 244% greater than the EPA's estimated market value.

The EPA has data indicating that the value of manure supplied nutrients does not equal the expected market value of the sum of the supplied nutrients. Given the EPA data, it can be argued that dairy, beef and swine manures valued according to the proposed system outlined in the NODA will overestimate their value by at least 244%. The likely overestimate will be greater because, as the EPA has acknowledged, "poultry litter in particular is considered more valuable than most other animal manures due to its low moisture content and relatively high nutrient value (FR 58575)."

Regarding the use of $8/ton of poultry litter as a cost offset, we conclude that the incremental cost offset caused by the proposed regulations is zero. Given that incremental costs only are considered, the incremental cost offset due to this rule is zero and any valuation of poultry litter is contrary to the EPA methodology.

Crop Need Value of Manure Nutrients

The EPA states that valuing of manure "based on the volume of manure nutrients … adjusted by the average reported value of these nutrients" is "consistent with much of the academic research (FR 58585). The academic literature does in fact contain many examples of manure that is valued as sum of the value of its constituent parts. This simplistic valuation found in the academic literature shows an erroneous view of the value of nutrients applied to crop land. The proper valuation of manure recognizes that it has value in crop production only if it enhances yield or quality.

More recent economic estimates of manure value make it clear that a nutrient has value only if it is needed for crop production (Innes, 2000). Nutrients applied in excess of crop need are not valued. This has several implications for the proposal to value manure nutrients as a cost offset.

First, the EPA proposed rule states that a "USDA study also looked at the potential for available manure nitrogen and phosphorus generated in a county to meet or exceed plant uptake and removal in each of the 3,141 mainland counties. Based on this analysis of conditions, … available manure phosphorus exceeds crop system needs in 485 counties. (FR 2977)." In the counties where the soils are P rich, P will have no value since they are already present in excess of crop need. Because livestock production occurs in these counties where excess P exists in manure, the potential to recoup the P value is limited.

Second, Lory et al. (2001a) have demonstrated that "phosphorus application limits will increase land needed for manure application as much as 900% and as little as 0%, depending on crop removal capabilities and manure characteristics." As farmers look for more land to spread manure they will begin to apply it to land and crops that would not normally receive manure. For example, manure applied to corn receives the value of the nitrogen in the manure. If in the search for additional land, manure is applied to soybeans, which needs no nitrogen fertilizer, its nitrogen value would be zero.

The Center believes that valuing manure based on its nutrient content will overestimate the value of manure supplied nutrients because many of the nutrients will not serve to increase either yield or quality of crops produced.

Valuing manure nutrients off-farm

The valuation of nutrients off-farm sales is less defensible than valuing them for on-farm use. On the farm, the CAFO operator is likely to recognize the benefit of the nutrients and the difficulty associated with manure supplied nutrients (form) is a cost of raising animals.

Off-CAFO sales of manure will not likely recover the value of all nutrients in the manure as was demonstrated using the EPA's estimate of poultry litter value relative to the value of its nutrients. Under the proposed rule, off-farm value of manure is likely to decrease because:

1. supply increases – more manure will come to the market as decreased application rates force farmers to seek neighbors willing to accept manure on their land;
2. demand decreases – non-farm use will be subject to an approved nutrient management plan that farmers are going to resist. The form of manure becomes more undesirable than it previously was because commercial fertilizers are not subject to application according to a nutrient management plan.

Supply increases and demand decreases are both economic forces acting to lower the price of a commodity.

Miscellaneous comments from the section of "Cost Offsets and Savings"

Several statements in the NODA indicate a misunderstanding of economics analyses and manure valuation. Excerpts of those statements, with comments, follow.

- "Some stakeholders have confirmed manure sales, in some cases, can exceed the value of livestock sales. (FR 58575)." This statement is anecdotal and subject to peculiar conditions. If this were the general case, we would not see manure treated as a waste product but as a primary product. While it gives a target at which to aim, the proposed rule has no provisions that would foster this increased value of manure.

- "Similarly wetter manures have increased value after composting or treatment, on the order of $17 per ton for composted dairy and steer manure (FR 58575)." When moisture is dissipated via composting, nitrogen is volatilized. Composting increases the *per ton* value of the remaining product but decreases the *total* manure volume and nutrients available for sale.

- "Wetter manures have increased value after composting or treatment, on the order of $17 per ton for composted dairy and steer manure (FR 58575)" is much greater than "EPA estimated an incremental value of $1.70 per ton of for composted manure for Option 5 for beef and dairy. (FR 58575)" Is there a typographical error here? Which value would the EPA propose using?

- The reference to previous EPA valuations of manure nutrients is puzzling. The NODA states "In the EPA's cost reports, EPA estimated an incremental value of $1.70 per ton of for composted manure for Option 5 for beef and dairy. (FR 58575)" Why did the EPA estimate a value to composted manure but now say that it is considering applying a value to manure? Has it already done so? Did compost have a value imputed while untreated manure did not?

- "EPA believes its current approach to account for the cost of hauling excess manure offsite is further overstated, as EPA did not consider alternative uses and destinations of manure in its cost analysis. For example, EPA has documented an increasing *trend in centralized manure treatment* (emphasis mine) and value-added processing…. (FR 58575)." Using the trend toward centralized manure treatment as evidence that the cost of hauling is overstated poses several dilemmas.
    1. First, centralized manure treatment can only occur where there is a high concentration of animal feeding operations. But concentration of animal feeding operations is presumed to be the cause of environmental degradation. The proposed rule would likely cause the closure of some AFOs in areas of high concentration, making development of centralized manure treatment less likely.
    2. Second, any trend in increased integrator involvement in manure marketing indicates that a market solution is surfacing. To the extent that the proposed rule creates impediments to manure market development, by labeling manure supplied nutrients as pollutants, any trend in manure marketing will diminish and the cost of hauling excess manure offsite will not be overstated. If a market is developing the justification for the proposed rule diminishes.

V.C.1.f. Consideration of Various Cost Offsets

EPA NODA Language

"Another source of potential cost offset is cost share and technical assistance available to farmers for on-farm improvements from various State and Federal programs, such as the Environmental Quality Incentives Program (EQIP) administered by USDA (FR 58585)."

Recommendation

The University of Missouri recommends that the EPA should not consider potential cost share and technical assistance to be a cost offset when determining the economic consequence of its proposed rule for the following reasons:

1. Cost share and technical assistance are available to producers to aid in compliance. However, their availability is not universal and therefore should be discounted, if used as a cost offset.
2. Currently USDA Environmental Quality Incentives Program (EQIP) dollars are restricted to animal feeding operations (AFOs) not designated as concentrated (CAFOs; i.e. "permitted operations"). The impact of the proposed regulation is to require that more AFOs become permitted as CAFOs. Unless legislation can be passed which allows the USDA to make available EQIP dollars to CAFOs, the cost offset should not be presumed. Additionally, unless there is strong indication that the Congress and President will authorize additional, sufficient spending into the EQIP program, the cost offset should not be presumed.
3. Many state programs, such as low interest loans, are also restricted to AFOs. *Permitted* CAFOs are not eligible for these programs. In Missouri, making CAFOs eligible will require legislative action to change the law restricting state assistance to small farmers. Given the budgetary constraints of Missouri and other states, it would be presumptuous to count on state assistance as a cost offset.

If the EPA chooses to recognize the cost offset of cost share and technical assistance it should be recognized only as a factor potentially affecting the number of farms incurring financial stress. The expense of the cost offsets are still a cost to society and should be reflected in increased state and federal "administrative" costs.

V.C.2.b. Alternative Financial Data for the Hog Operations

EPA NODA Language

"Today EPA presents summary information on alternative data provided USDA and FAPRI. EPA is considering use of these data to supplement available data from the 1997 ARMS database used by EPA for the proposal. The USDA data are from a special ARMS survey conducted by USDA in 1998 of the hog sector. FAPRI provided enterprise budgets developed by a panel of industry experts. EPA is considering using these data to characterize financial conditions at hog operations and solicits comment on the use of these alternate financial data (FR 58587)"

Recommendation

The University of Missouri recommends that the EPA not use USDA data from the special 1998 ARMS survey. The University of Missouri recommends that the USDA use the FAPRI data for hogs.

The USDA data from the special 1998 ARMS survey suffers from the same problem as the 1997 ARMS data used for the original proposed rule. While 1997 hog prices were at record highs, 1998 hog prices were at record lows. The USDA data presented in Table 5-11 of the NODA show all operations losing money. If the USDA data are used, all operations would be considered baseline closures and the financial impact of the rules understated.

The FAPRI data are more robust because they are derived from a multiyear model not subject to extremes. FAPRI economic projections are recognized by policy makers as being based on sound scholarship.

V.C.2.d. Alternative Data to Supplement Available Financial Data for a Single Year

EPA NODA Language

"EPA is considering ways to derive more average, representative data across a few years (say, 1997-1999) based on an extrapolation from other available market and financial data to represent a longer-term average representation of revenues, costs and returns.

There are two possible approaches that EPA is considering. The first approach involves using price indices representing hog prices and feed prices, as well as cost indices representing other cost of production factors (Commodities, Services, Interest, Taxes, and Farm Wage Rates). The second approach that EPA is considering would use USDA estimates of hogs costs and returns, which are from the same ARMS survey, to establish a set of indices based on these data. Using available financial data for 1998, on an enterprise specific basis, these indices can be applied to approximate financial returns for other years (e.g., 1996- 2000). Given potential data limitations and unforeseen difficulties in adopting such an approach, the only other alternative would be to use a single year of data since publicly available data is not available to characterize these sectors over a multiple year period. EPA solicits comment on the preferred approach that the Agency should use—either single year or EPA-derived multiple year data based on available data and information (FR 58590)."

Recommendation

The University of Missouri recommends that readily available USDA price and cost indices be applied to the 1997 data to develop a 10 year average price, cost and net income estimate.

One of the major weaknesses of the EPA economic analysis is that it attempts to use a single year to estimate revenues and costs. This is entirely unnecessary since USDA indices are readily available that can give a more comprehensive analysis. The agricultural economic literature does not contain any analysis of a policy change that looks at only 1 year of data. Price cycles are too well established and understood in agriculture for any agricultural economist to consider that a single year's financials are sufficient for a policy review.

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