IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

College of Agriculture
Experiment Station
138 Curtiss Hall
Ames, Iowa 50011-1050
515 294-2518
FAX 515 294-6800

July 27, 2001

Concentrated Animal Feeding Operation Proposed Rule
USEPA Office of Water
Engineering and Analysis Division (4303)
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Greetings:

Thank you for providing an opportunity to comment on the proposed regulations addressing EPA's National Pollutant Discharge Elimination System Permit Regulation and the Effluent Limitations Guidelines and Standards for Concentrated Animal Feeding Operations. In early January 2001, we convened a group of 26 faculty and staff for the purpose of reviewing and commenting on EPA's proposed CAFO rules and regulations. These faculty and staff represent a broad array of expertise and disciplines appropriate to address the proposed rules. Based on the work of these scientists, we are submitting the attached comments for your consideration.

Iowa is a major livestock producer of swine, beef, dairy and poultry. It is also the largest animal producing state in the humid northern Midwest, an area significantly different hydrologically from many other large animal-producing states. Livestock production is based upon grains grown from contiguous surrounding cropland. There are approximately 300 open feedlot facilities, primarily beef and dairy, in Iowa that have a capacity of more than 1,000 animal units. There are an estimated 13,000 open feedlots in Iowa, many of which could fall under EPA's proposed regulations. These smaller, yet efficient production systems are generally family owned and operated. Units like these have been the backbone of animal production systems in the Midwest for many decades.

In addition, there are approximately 3,500 confinement feeding operations in Iowa, mostly swine and a few poultry, that would require NPDES permits under EPA's current threshold of 1,000 animal units. If the threshold limit is lowered to 500 animal units, it is anticipated the number of confinement facilities needing permits would double.

Today, many animal production systems that have not been shown to be detrimental to the environment face significant capital expenditures to meet EPA's proposed total containment requirements. The EPA approach seems to be a process-based control system rather than a successful performance-based system.

Based on regional difference in soils, topography and climate, it is our belief that states be allowed to implement state specific rules to address water quality results that meet or exceed federal requirements. The significant point is that EPA cannot provide all the answers, for it does not have all the information.

Therefore, we recommend that EPA establish performance standards and allow states to define the "process" that is appropriate for their climate, soil, topography and geology, as long as the "performance" (measured water quality impacts) meets or exceeds that national standard. Use of performance standards by EPA allows states flexibility, recognizes the local regulations already in place and serves notice that states may have to change their rules and regulation to meet the standards.

We appreciate the opportunity to provide our observations and recommendations with regard to the pending changes in the regulations addressing water pollution from concentrated animal feeding operations. We look forward to updates on the progress addressing this fundamental and vital issue.

Sincerely,

Richard F. Ross
Dean, College of Agriculture

for Stanley R. Johnson
Vice Provost, University Extension

Attachments

ATTACHMENTS

® **Preamble (and comments)**

® **Publications in Support of Bibliography**

- **Earthen Waste Storage Structures in Iowa (Executive Summary)**
- **1999 Iowa Farm Costs and Returns**
- **Beef Feedlot Systems Manual**
- *Cost of Alternative Technologies for Managing Feedlot Effluent*
- *An Analysis of Six Years of Cattle Feeding Production Records by Feedlot Size*
- *Odor Mitigation for Concentrated Animal Feeding Operations: White Paper and Recommendations (draft)*

PREAMBLE

Iowa State University hereby submits the following comments regarding EPA's proposed rules concerning the National Pollutant Discharge Elimination System Permit Regulation and the Effluent Limitations Guidelines and Standards for Concentrated Animal Feeding Operations. This response includes both specific comments detailed in the following pages, and general concerns outlined in this preamble.

The rules need to clearly address the overall goal of cleaning up the waters of the states and nation. Regulations should not be imposed merely to control large numbers of feedlots when the environmental benefits may be very low. Reducing the size of regulated facilities from 1,000 to 750 to 500 or fewer animal units (A.U.) captures incrementally fewer animals while the incremental number of farms increases. Because of economies of scale in construction and management of the total containment systems proposed, the marginal costs of compliance at the lower limits of regulated facilities will be considerably higher than the average costs estimated. The goal of examining both the economic and the environmental impact of the proposed rules is appropriate. However, the EPA has overlooked lower cost alternatives that can provide effective environmental protection at the small to mid-sized livestock facilities that still predominate in the upper Midwest. The "more sustainable" operations that EPA holds as model operations will be greatly impacted by the proposed changes. The philosophy of utilizing manure nutrients for crops on the same family-owned farm touted in the EPA document is still the general rule in much of the Midwestern Cornbelt.

While all citizens want clean water, the rules and regulations imposed by these proposed rules will have an impact on Midwestern livestock producers. The Midwestern (Cornbelt) situation is different from the West and Southwest. The Midwest has significantly more rainfall, and more than adequate cropland for manure nutrients. Because rainfall and evaporation are approximately equal in the Midwest, requiring feedlot operators to install complete detention basins below feedlots will result in capturing significant quantities of liquids to manage. Unlike the West and Southwest, evaporation ponds will not eliminate the need to de-water the basins. While total detention is a noble goal, it places great financial and management burdens on Midwest producers, especially the small producers. It should be utilized only where the risk of pollution is the greatest, if there are other technologies usable by small producers that will protect the nation's waters. Numerous detention basins increase the potential for catastrophic damage from a risk of breaching the containment basin and discharging several months of stored wastewater. Citizens of Iowa are clearly opposed to having additional "lagoons" in their state. When the environment can be adequately protected by functionally equivalent controls (such as vegetative filter strips, infiltration area, and wetlands), these should be allowed in lieu of total detention.

It is our belief (detailed in our comments and data that follow) that reducing the size of regulated facilities down to 500 or 300 A.U. would pose a significant burden on many of the small facilities, with little environmental benefit. The economies of scale are

significant as facility size goes from 500 to 1,000 AU. Imposing total containment requirements on the smaller operations will accelerate and encourage the consolidation of the beef and dairy industries at the expense of the family farm, reinforcing a trend that has already largely happened in the swine and poultry industries. We also believe that much of the consolidation will accrue to larger feedlots in the more arid regions of the United States, further concentrating nutrients in a grain-deficient region, compounding the very problem the proposed rules attempt to address. The EPA needs to concentrate its efforts where the benefit:cost ratio is the greatest, focusing on the many facilities larger than 1,000 AU that are currently out of compliance. To the extent that regulatory oversight is necessary for facilities smaller than 1000 AU, oversight should not preclude runoff treatment alternatives when such treatment is adequate to protect local water quality.

We recommend that states be allowed to implement their own rules as long as water quality results meet or exceed federal requirements. At least 22 states, including Iowa, have strict environmental regulations already in place (Sweeten et al., 2001), including nutrient planning rules and regulations. It is highly desirable that those state-specific regulations be honored, as they can effectively target local issues, and local environmental threats and conditions more accurately than national regulations. The significant point is that EPA cannot provide all of the answers, for it does not have all of the information. Therefore, we recommend that EPA establish performance standards and allow states to define the "process" that is appropriate for their climate, soils, topography, geology, and so forth, as long as the "performance" (measured water quality impacts) meets or exceeds that national standard. Performance standards provide a systematic approach for addressing pollutant levels entering surface and/or groundwater. Science-based site-specific systems based on research and/or periodic monitoring then can be designed by the individual states. Use of performance standards by EPA allows states flexibility, recognizes the local regulations already in place, and serves notice that states may have to change their rules and regulations to meet the standards.

Specific Comments By Chapter

The following comments are made in reference to specific chapters. Specific suggestions and recommendations are listed in *italicized text*.

Chapter VII

Animal Unit (A.U.)
Eliminate A.U. term although use A.U. for the purpose of describing which operations are automatically designated as CAFOs. See Table 7-7.

Proposed structures for CAFO designation.

Two-tier structure

Soliciting comments on
500 A.U. and
750 A.U.

Where operations with below the A.U. limit are CAFOs only if designated by EPA or State NPDES permit authority

Three-tier structure

>1,000 A.U. are CAFOs; <300 A.U. can be designated if they meet the criteria of a 'man-made device' or 'stream running through operation'. For the 300 – 1,000 A.U. size range, 4 options considered:

- New conditions established, producers must certify that they do not meet the conditions. EPA recognizes that some degree of burden will be placed on all in this tier
- Develop different permitting and certification requirements for the middle tier.
- Retain existing conditions (3-tier) and qualifications for middle tier (i.e., 'man-made device' or 'stream running through operation'). This option is not currently proposed.
- New conditions established but producers not required to certify that they don't meet the conditions. This option is not currently proposed.

Proposed new conditions for meeting CAFO designation for middle tier producers. EPA is soliciting comments on which of the following items to include and whether permit requirements should be left to Best Professional Judgment (BPJ) of permit authority and development of an alternate set of effluent guidelines.

- Direct contact of animals with water of the U.S.
- Insufficient storage (elimination of 25-yr, 24-h storm event exemption)
- Beef/dairy: must be able to contain discharge in the event of a 25-yr, 24-h event, p. 2999
- Swine/poultry: must meet zero discharge standard, p. 2999
- Evidence of discharge in past 5 yr; including discharge from facilities designed for 25 yr, 24-h storm event in the event of such a storm
- Location of production area within 100 ft of a water of the U.S.
- Does not have or is not implementing a PNP
- >12 T of manure shipped offsite to a single recipient annually –co-proposed options for offsite transport that address certification by the recipient as well as manure analyses, information on application practices and record keeping.

EPA estimates that 10% of all producers and 72% of all manure produced will be addressed; 7000 producers will have to develop a PNP at minimum and remaining 19,000 in this tier must adopt additional practices. EPA acknowledges that these requirements

are more stringent than obtaining a permit given that a producers who certifies that they are not a CAFO does not have the benefits of NPDES coverage (25-yr, 24-h protection).

Our position is the EPA retain a single tier structure of 1,000 A.U. threshold for CAFOs. We recommend that alternative management practices be implemented for animal concentrations less than 1,000 A.U. These recommended alternative management practices are described in other sections of our comments. However, given that EPA asks for comments on multiple tiers, our analysis shows that a two-tier structure is a better option than a three-tier structure. The three-tier option is more confusing and will not go as far to make it clear which producers are subject to NPDES permit requirements. In addition, based on the list or criteria to be exempt from the NPDES permit requirements, producers in the middle tier would need to meet requirements that are as stringent as those required to obtain an NPDES permit. It is unlikely that operations in Iowa would meet the outlined criteria without first investing in containment systems or at the bare minimum, a certified permit nutrient planner.

Of the six options put forth, the 750 A.U. threshold, which EPA projects to encompass about 5% of all AFOs and 58% of all AFO manure and nutrients, is consistent with the USDA-EPA Unified National Strategy and poses an achievable goal for permitting. In states where specific circumstances below this threshold pose significant environmental risk, the states should be encouraged to write local regulations to complement the EPA permitting process and address the additional needs. An example of success with this procedure in Iowa would be the requirement for removal of settle-able solids from runoff for <u>ALL</u> open feedlots regardless of size.

Given the trends in animal production, 5% of operations in Iowa, and perhaps nationwide, will exceed 750 A.U. in just a matter of years. For Iowa specifically, remaining at the 1,000 A.U. threshold but under a two-tier structure would achieve EPA's objectives of 5% of operations and greater than 50% of manure. To avoid undue financial burden on the smaller operations, the threshold should be set no lower than 750 A.U. to determine regulatory requirements. The EPA should consider imposing an enforcement timeline that is adjusted to size of operation in order to accommodate the financial stresses that may be placed on the smaller producer. In many cases a producer may have recently adapted technologies for one purpose that will be in conflict with newly proposed Best Acceptable Technologies (BATs) for that particular operation. An enforcement timeline that adjusts for this scenario will assist with the financial aspects of compliance.

Emphasis should be placed on clarifying existing regulations so that it is clear who does and does not need an NPDES permit. Efforts to do so have been made in the proposed document

Change in AFO definition to address pasture or range land and to include the production area and land application areas.

The current definition is actually less confusing than the proposed definition.

One part of the proposed definition that is clearer is found in the middle of the first column on page 3005r. It simply uses the words "pasture" and "range land" to exclude those systems. This would be more clear to producers than current wording that leaves uncertainty about bare feeding spots in pastures and minor vegetation growth in feedlots. The only unanswered concern is how winter grazing of crop residues would qualify. It seems that grazing cornstalks still qualifies as grazing (pasture) rather than feedlot. Perhaps the addition of "residue-covered crop fields" to the exception statement for pastures & range land would be appropriate. What does need to be conveyed better is that it is not EPA's intent to define as AFOs those producers who must bring to feed range animals during periods when climate prohibits growth of pasture, despite the fact the amount of time may be greater than 45 days.

Elimination of the mixed animal provision.
Operations are designated as CAFOs based on a single species but once designated, all manure generated is calculated for NPDES

The mixed species multiplier was confusing to some and elimination of the provision will help to promote understanding and enforcement of the rules. It is our understanding this section references the mixed animal provision for the purposes of determining which producers need a PNP rather than who falls under the restrictions of total containment. But the document is not clear. For example, is an operation with a large number of pigs in confinement (>1,000 A.U.) and a small feedlot (<500 A.U.) required to provide total containment for the feedlot? Or is it required to account for manure from both swine and beef in developing the PNP? Given the statement in EPA document 305-F-98-003, it appears swine operations that are totally confined are not CAFOs regardless of size, which adds to the confusion.

On page 3005, it appears clear EPA considers all livestock at the operation to be subject to all permit requirements once the permit threshold is reached for any one of the species present. In our interpretation, the example operation above would require total containment even if the beef feedlot were 10 A.U. due to EPA's assumption that the number of operations subject to this provision would be very small. That may be correct. Iowa has separate state rules for confined livestock (e.g. finishing swine confinement), so this issue has not come up. It is not clear what an EPA operation permit would require for a site that had 10,000 finishing hogs in total confinement over a pit and 10 beef cattle in an outside lot. Would it require total containment for the small outside lot?

Regarding the proposal to eliminate the 25-year 24-hour storm exemption from the rules: As discussed on page 3006, this exemption is worded in such a manner as to be circular in logic (you need a permit to discharge from this event, but if you only discharge from this event, you don't need a permit) and very confusing. This exemption should be eliminated to reduce confusion. We know of at least one, and maybe two feedlots in Iowa that have been told they do not need a permit based on similar wording in Iowa rules. These operations would have to request a determination of "no potential to discharge" as outlined elsewhere in the EPA rules.

Agricultural stormwater exemption

EPA is considering if it is reasonable to interpret the exemption as not applicable to land discharges from CAFOs. Therefore any discharge from land application would be subject to NPDES requirements unless it consists entirely of stormwater, p. 3029. The exemption applies to permitted CAFO land application areas if manure had been applied at recommended rates, p. 3030. Production areas are excluded from the exemption, p. 3031

There is concern regarding a producer's responsibility to prove land application of manure occurred at recommended rates in the event a discharge occurs from the production area. It is unclear how EPA plans to determine liability in such an event. What EPA will use as its source for determining recommended rates and how it will be determined if BMPs were followed is unclear and will rely heavily on record keeping. On page 3030, the proposed definition specifies storm water (which is excluded from the definition of "point source discharge") to include runoff from land that has had manure applied at a nitrogen or phosphorus-based application rate. While this implies a calculation of N or P crop use, it does not specify N or P crop needs. In Iowa for manure management plans, crop N is used plus 10%. To simply say a nitrogen-based application rate would leave the door open to a rate calculated - for example - to supply 500 pounds of nitrogen. Since this storm water exemption is intended for land application areas from CAFOs, (which it is assumed must have a PNP), it could be simply stated that runoff from land upon which manure was applied according to a PNP qualifies as storm water. This would leave the definition of proper application rate in the PNP section and avoid misinterpretation of the brief wording in this section.

Inclusion of all types of poultry operations removing limitation on type of manure handling or watering system

EPA is addressing runoff from stockpiled litter on small parcels of land
100,000 layers or broilers = 1,000 A.U.

Inclusion of poultry operations that handle manure as a solid material will create some controversy in states such as Iowa, where poultry manure is currently regulated as a fertilizer by an agency that does not serve as the NPDES permit authority. The intent of EPA to address runoff from stockpiles is valid. However, the volume of manure produced from 100,000 layers or broilers is a fraction of that generated by the 1,000 A.U equivalent of other species. 100,000 layers would produce approximately 11,520 kg of manure daily. 740 dairy cows would produce 40,749 kg manure daily. The logic behind the determination that 100,000 layers or broilers would be a CAFO is unclear. It would be much easier to calculate the equivalency using bodyweight. If 1,000 1,000-lb beef animals are equivalent to 1,000 A.U. then 250,000 4 lb layer hens should be the equivalent of 1,000 A.U.

Inclusion of specialized animal operations

Two-tier: 500 A.U. = >5000 swine weighing <55 lbs; >500 heifers
Three-tier: 300 – 1000 A.U. = 3,000 – 10, 000 swine weighing <55 lbs; 300 - 1000 heifers

Thresholds established based on average phosphorus excretion for young animal relative to mature animal. See Technical Development Document
The environmental consequences for these specialized operations are no different than systems that raise animals at all stages of production. However, A.U. equivalency for the immature animal operations should be based on bodyweight. These numbers would equate to 13,636 swine weighing < 55 lbs and 1,500 500-lb heifers under a two-tier 750 A.U. scenario. Operations of smaller size would be much less able to bear the financial burden of an NPDES permit given the higher costs to raise animals during younger stages of growth.

Control of manure from operations that cease to exist. Proposed options include:
Required closure plan
Contribution to a sinking fund - $$ available to cleanup any abandoned site, including non-permitted site
Provide financial assurance
Provide financial assurance or contribute to a sinking fund
Maintain NPDES permit coverage until proper closure (EPA-preferred option)

Existence of this fund may create more of a temptation to abandon sites. Resistance to contribute to the fund may be less if the fund only served to cleanup sites that had contributed to it. The preferred option is to maintain an NPDES permit until proper closure. Beyond this provision by the EPA, further regulation should be in accordance with state and local guidance.

Hydrologic connection
NPDES permit required for all operations with potential to discharge to navigable waters via groundwater with a direct hydrologic connection
Effluent Limit Guidelines (ELG) may require some CAFOs to achieve zero discharge from production area including via groundwater (all existing and new beef and dairy operations and all new swine and poultry, p. 3015)
Presumption that there is a direct hydrologic connection to surface water

It is unlikely an expert could be found who would claim to find an area in Iowa that does not have a connection between groundwater and surface water resources. There is nearly always some connection. The degree of environmental risk is the question. The best solution would be to strictly follow the legislative language and restrict the Clean Water Act to surface waters, relying on states and local authority to regulate groundwater resource protection. In Iowa, this practice has worked well, as evidenced by the Groundwater Protection Act of 1987, and has allowed the complex issue of groundwater hydrology and vulnerability to be handled at the local level where local experience and expertise can be applied. If EPA feels obligated to oversee groundwater discharge to surface waters, the application of such regulation should be upon "vulnerable areas" and these vulnerable areas of groundwater connection should be defined by the states.

Co-permitting entities that exert substantial operational control over a CAFO
Option to each hold a separate permit
Permit authority can allocate individual responsibility for various activities to any of the co-permitees
Factors relevant to substantial operational control listed on p. 3024; states should develop additional factors
Ownership of animals may be sufficient to create responsibility for ensuring proper manure disposal
EMS as an alternative to co-permitting

- Third-party auditor
- Address additional issues (odor, etc.)
- Difficult to administer

The EPA needs to clarify its position on co-permitting of feedlots where the feedlot is owned by an individual and there are many owners of the animal versus the situation, such as found in the swine industry, where animals are owned by a few and grown in numerous locations with separate owners. The goal of the provision might best be met by addressing each species separately to reflect the structure of the specific industries.

The difficulty of defining co-permitting makes it impractical. The responsibility for management of the animal feeding operation clearly lies with the operator, regardless of the legal animal ownership. Where substantial operational direction or restrictions are being dictated by a contract arrangement, the facility operator is still responsible for the management of the animals and the manure. The costs of regulatory burdens will have to be considered in the contract negotiations.

Point source discharges from AFOs
All point source discharges from AFOs are covered by NPDES regulations even if the facility is not a CAFO. Any AFO, which has a discharge through a point source at the production area or the land application area to waters of the U.S. which is not the result of precipitation is in violation of the CWA

It is unclear how such a discharge violation will be determined. Following any precipitation event, there will be nutrient movement on land where manure has been applied. Inevitably, some of this movement will be from the land application area to an offsite location. This proposal unjustly applies CAFO permit requirements on AFOs regardless of size. In essence, this interpretation would apply the provisions of the proposed 3-tier system on all AFOs below CAFO size designation. This is an unreasonable regulatory burden upon AFOs intended to be exempted from the rules. Minimum regulation of smaller AFOs should be left to the discretion of the states and local authorities and the EPA should regulate only CAFOs. For example, in Iowa, solids settling with no discharge to waters of the state is required as a minimum for all feedlots. Total containment is the minimum control for confinement operations. It is most clear to call a CAFO a CAFO and not try to address discharge from land application areas as point sources when an AFO is involved. The EPA must clarify between a one-time accident and chronic discharge.

CHAPTER VIII

Best practicable control technology limitations currently available (BPT)
EPA proposes 7 options to achieve the "Best Practicable Control Technology" (BPT) to prevent discharges from animal operations p. 3053. The first two, (options 1 and 2) define the basic requirements including:

- zero discharge except for the 25-yr, 24-hr storm overflow
- depth markers for lagoons
- annual manure testing

Option 1 bases land application of collected manure and runoff on nitrogen-based Permit Nutrient Plans (PNP).
Option 2 bases land application of collected manure and runoff on phosphorus-based PNP instead of nitrogen, and requires soil testing every 3 years.

All options require 100-foot setbacks from lakes and streams for land application

Options 3 through 7 use either option 1 or 2, and add additional requirements as identified below.

Option 2 (P planning) may be more appropriate than option 1(N planning) because of the current increased concern about phosphorus in surface waters. However, the following caveats must be considered: Concerning a nationwide 100-ft setback requirement, Iowa already has separation distance requirements that are stricter than the 100-ft proposed setback in some conditions. In Iowa, a 100-ft setback from tile inlets used in erosion control terraces on many sloping fields would render those fields unusable for manure application, and increase pressure to over apply on usable fields. Many states already have manure management regulations in places (Sweeten, et al., 2001) EPA should allow the states to establish setback requirements. Iowa has recently established a phosphorus index. It's impossible to include specific agronomic practices in a national document and have them be effective on a local or regional basis. For instance, EPA's requirement to sample soil every three years disagrees with ISU's recommendations on soil sampling. EPA should allow the states to utilize existing phosphorus planning tools and manure application regulations as designated at the state level.

Option 3 would require monitoring wells to be installed up gradient and down gradient from the production site, and sampled at least twice a year unless it could be determined that a direct hydraulic link did not exist.

Option 3 is not practical, due to the great cost to the industry with very little likelihood of any significant improvement in water quality. Here's why:

- *In Iowa, almost all AFO/CAFO and surface area has direct hydrologic links to groundwater. Some are more sensitive than others, and should be subject to local interpretation and control.*
- *There are few, if any, engineers who will certify that no connection exists, even if a thick clay liner is installed.*

- *Research shows that in the Midwest monitoring wells are not effective tools to determine groundwater pollution occurrences from manure storage facilities or feedlots. (See Iowa State University, 1999).*
- *Monitoring wells could become potential groundwater contamination sources.*
- *In Iowa there is no confirmed evidence that feedlots or manure storage facilities pose a serious risk to groundwater in Iowa except in a few very sensitive areas such as karst regions and areas with ag drainage wells. State regulations presently address the risk in those areas. Midwestern research has never shown contaminants moving underground more than a few feet from manure storage facilities.*
- *Clearly the primary effect of feedlots is on surface water. That is where EPA's emphasis should be.*

Option 4 would require surface water sampling upstream and downstream from feedlots or land receiving manure during land application. Samples would have to be taken after every ½ inch rain up to 12 sampling dates per year, and the results reported to the permitting authority. The samples would have to be analyzed for nitrogen, phosphorus, and total suspended solids**.**

We oppose option 4 for the following reasons:

- *It would be a tremendous burden on operators, and would most likely not be accomplished, even if required.*
- *Cause and effect would often be impossible to determine. The size of the nearby sampled stream could mask any useful data. For example, sampling near a large feedlot on the Mississippi River would show no effect. Conversely a very small (non-CAFO) feedlot next to a small ditch or stream could indicate a significant effect with little actual effect on the overall water quality of the state. From land application areas it would be impossible to tell if contaminants came from manure, commercial fertilizer, or simply from the field itself.*

Option 5 requires zero discharge under any circumstance for swine, poultry, and veal operations. They would be required to have complete confinement. EPA believes zero discharge could be achieved by covering open manure storage facilities, constructing a second cell at facilities that utilize lagoons, using solids separation, feeding strategies, and dry bedding and composting.

Option 5 is not appropriate for the following reasons:

- *Covering open manure storage to achieve zero discharge is not an effective solution. Zero discharge depends on proper management, specifically timely pump out of manure storage facilities, not whether they are covered or*

not. Every state with manure storage regulations has freeboard requirements, which assure zero discharge under proper management.

- *Covering pits and lagoons is expensive, and can increase management requirements significantly. Methane gas collecting beneath covers can be a safety hazard.*
- *The treatment technologies listed to meet the zero discharge requirement would not achieve the desired objectives*
- *Solids separation results in two waste streams, both of which contain significant pollutants. The liquid stream is essentially unchanged in volume and still contains many contaminants, so solids separation does not help reach the stated objective of zero discharge.*
- *Feeding strategies reduce nutrient concentrations slightly, but have no effect on liquid volumes.*
- *The EPA's assessment that high-rise solid manure swine buildings would not be an economic burden for producers is incorrect. These are more expensive to build, and significantly more expensive to operate due to added utility costs for additional fans required to force air through the manure.*
- *We oppose the solid manure recommendation generally as the only way to manage swine manure because of the requirement to harvest crop residues to use as bedding, haul it to the production site, and haul the additional volume back to the field. Based on cornstalk production of 4 T/acre the bedding required to bed all swine in Iowa (14 million head) would require over 1 million acres of corn stalk residue, with the resulting increase in potential soil erosion due to the residue removal from those acres.*
- *The EPA's assessment that zero discharge under any circumstance would not be practical for beef or dairy operations is correct.*

Option 6 would require anaerobic digesters to be installed on swine and dairy operations with 2000 AU or more.

ISU opposes option 6 requiring anaerobic digestion for the following reasons:

- *A study just completed in Iowa for the Iowa Department of Natural Resources (Garrison and Richard, 2001) showed that anaerobic digestion is far from being cost effective in the Midwest due to the high capital cost and the cheap price of energy. All cost benefit analyses that show a positive payback either: 1) ignore the interest cost of money, 2) are based on a high percentage of the cost being*

borne by government grants, 3) assume utility companies will pay retail rates for electricity generated, or 4) assume all three of the previous statements.

- *Anaerobic digestion requires a high degree of management, preferably by a trained operator.*
- *Captured methane presents an explosive safety hazard if not managed properly.*

Option 7 Prohibits spreading manure on frozen ground

ISU opposes a prohibition against spreading manure on frozen ground for the following reasons:

- *Many small dairy producers still use scrape-and-haul systems that require spreading year around. This option will pose a significant financial burden particularly on the smaller operators, increasing pressure for consolidation in the dairy industry.*
- *Research has shown that when properly done, manure can be spread on frozen soil with little increase in risk of runoff. While application in frozen conditions should be avoided if at all possible, four studies have shown erosion benefits from spreading solid manure on frozen fallow soil (Steenhuis et al., 1979; Converse et al., 1976, Shulte et al., 1979, Young & Mutchler, 1976). Under some conditions application to frozen soil may be the BAT, so it should not be prohibited.*
- *Iowa NRCS recently has adopted an updated 590 Practice Standard, which defines conditions under which manure can be applied to frozen or snow-covered ground. Conflicting regulations by EPA would be confusing to producers and counterproductive for protecting water quality.*

Overall, ISU recommends that EPA consider adopting selected provisions of option 2 and not adopt any of the additional options 3 through 7. These will do little to help achieve the goal of cleaner water, and will impose significant burdens on producers. We encourage EPA to allow state and local control wherever possible to achieve more effective water quality protection.

PNP Requirements

PNP requirements should be in accordance with state regulatory guidance and NRCS standards. To impose additional standards will cause a great deal of confusion for producers and result in a great deal of additional paperwork for producers, EPA, and other agencies, with no additional water quality protection benefits.

Chapter X.

Criteria for economic achievability

Three criteria for economic achievability of the proposed regulatory options are used: 1) sales test, 2) projected post-compliance 10 year cash flow, and 3) post compliance debt to asset ratio. EPA estimates that 1420 hog operations, 320 dairies, 150 broiler operations, and 10 beef operations would experience financial stress.

Sales test: *We agree that firm level economics should play a significant role in determining how to achieve viability of the proposed rules. Cattle feedlots operate on a thin profit margin and we believe that far more than 10 beef operations will be significantly impacted. Feedlots buy feeder cattle from cowherds and stocker operations and feed them until they reach slaughter weight. Iowa State University has been monitoring feedlot costs through record keeping systems and closeout services since the mid 1970s. The Iowa State University Beef Feedlot Monitoring Program has provided closeout analyses for cost comparison and benchmarking since 1986 (http://www.extension.iastate.edu/Pages/ansci/feedlot/) In a nine-year summary of this actual data (Koknaroglu et. al., 2000), including 1836 pens of cattle fed from 1988 through 1997, average returns per head were $7.10 for heifers and $10.75 for steers. This data was collected on a pen-by-pen basis so an analysis by feedlot size was not possible. Another interesting note from this study involves regional differences in feedlot returns within the state of Iowa. Cattle fed in the region east of Interstate 35 returned $3.99 per head. This compares to $15.52 (north of I-80) and $7.26 (south of I-80) for lots west of I-35. This region of lower return, east of I-35, is also the region of higher rainfall.*

Another barometer of cattle feeding returns showed average estimated net profits for feeding yearling steers in Iowa during 1991-2000 has been $11.85 per head (Iowa State University Estimated Livestock Returns, Pm 1284). The average gross revenue during this period was $855.64/head for a 1250-pound steer. Thus, profits are about 1.4% of gross revenue. Approximately two-thirds of the gross revenue was the value of the purchased feeder calf (Table 1). Feed represents approximately 18-20% of total costs. Overhead, including fuel, utilities, depreciation, repair and interest on equipment and facility costs accounts for approximately $66/head or 7-8% of total revenue. Thus, EPA's annualized cost of compliance of up to 5% of gross revenue greatly exceeds the profit margin per head. The per-animal post-tax annualized compliance costs (Table 8-17, Supplemental Document, Section Eight, Summary of Economic Impacts: Beef and Dairy Subcategory) that range from $38-65/head exceeds all of the profit and non-cash operating cost (depreciation and interest) and cuts into the out-of-pocket operating cost (fuel, utilities, repairs). If the initial investment doesn't encourage producers to exit, the inability to repair and replace their facility will eventually leave them with little choice other than to divest from their feedlot.

We suggest criteria using a percentage of the profit margin (revenue less cost of goods sold defined as the feeder animal, feed, trucking, and vet & medical)or gross margin (a

return to labor and overhead before taxes). Then the question becomes, how much of a firm's profit margin or gross margin should go to compliance costs?

Cash flow: *As described in the sales test section, the cash flow of Midwest cattle feedlots is smaller than is represented by the analysis in Tables 4-7 and 4-8 (Supplemental Document, Section Four, Methodology for Estimating Compliance Costs and Economic Impacts). While history is not necessary a predictor of the future, the narrow margins are expected to continue in cattle feeding because it is a mature industry with excess capacity across the United States. If EPA's projected compliance costs for Midwest feedlots of $51.50 per head (Supplemental Documents Table 8-17) is subtracted from the estimated cash flow from Iowa cattle feeding (adding non-cash expenses of facility depreciation and interest to estimated profits (Pm 1284)), the resulting cash flow was negative for selling calves in 54% of the months and 69% of the months for selling yearlings during the 10 years 1991-2000 (Table 2).*

Table 1. Average estimated cost and returns to feeding steer calves and yearling steers, Iowa State University Extension, 1991-2000

	Calves		Yearlings	
	Amount	% of Sales	Amount	% of Sales
Purchase Price $/cwt.	86.94		77.96	
Purchase cost	478.18	61%	584.73	68%
Feed costs:				
Corn	111.80		120.29	
Corn silage	51.15		31.23	
Supplement, salt & minerals	19.90		10.85	
Total Feed Costs	182.85	23%	162.37	19%
Operating (int, vet, fuel, etc)	57.42		47.00	
Facility & equip overhead	28.68	4%	19.18	2%
Labor	21.00		14.00	
Transportation	14.50		16.50	
Total cost/head	782.63	99%	843.79	99%
Break-even price, $/cwt.	68.05		67.50	
Selling price, $/cwt.	68.45		68.45	
Sales value	787.19		855.64	
Profit (Loss) ($/hd)	4.56	1%	11.85	1%

Table 2. Distribution of Estimated Cash Flow from Finishing Steer Calves and Yearling Steers, Iowa State University Extension, 1991-2000 with Proposed EPA Compliance Costs		
	Calves	Yearlings
Less than -$100	13%	21%
-$75 to –100	14%	15%
-$50 to-75	9%	6%
-$25 to-50	12%	11%
-$0 to-25	6%	17%
$0 to 25	12%	17%
$25 to 50	19%	8%
$50 to 75	8%	3%
$75 to 100	3%	2%
Over $100	4%	2%

Debt: asset ratio: Page 8-27 (Supplemental Document, Section Eight, Summary of Economic Impacts: Beef and Dairy Subcategories): For the purposes of this analysis and because of the lack of other statistically validated survey data, EPA uses the ARMS data for cow and calf operations to depict conditions at regulated cattle operations.

Cattle feedlots are very different operations than cow-calf herds and are financed differently as well. It would be a grave mistake to use the ARMS cow-calf data to represent feedlot income statement or balance sheet data. This assumption is reflected in the projected return per animal in Tables 4-7(a & b) and the projected cash stream per animal in Table 4-8. It is of particular concern in calculating the debt:asset ratio.

Because cattle feeding loans are self-collateralized (the cattle gain in value as they grow and can be liquidated to pay the loan), banks often are willing to loan 75-90 percent of the value of the cattle, feed and operating expenses. It is not unusual for a feedlot to have a high debt:asset ratio because of the high capital turn over (cattle are on feed 4-9 months) and low equity requirement of lenders for the liquid assets. In addition, the value of the feedlot and equipment is relatively low compared to the value of the cattle fed. A recent study by Iowa State University (Pm-1867, January 2001), estimated the total investment to build a new open earthen feedlot including operating equipment, water well, office, etc was between $135-175 per head capacity. Even if the feedlot is debt-free, there would be a 70% debt:asset ratio (for the feedlot and animal) if the producer financed 85% of the cattle costs. The debt:asset ratio of typical Midwest farmer feeder operations is very close to the 40% threshold before the proposed changes are imposed. Table 3 summarizes data from the Iowa Farm Business Association (FM 1789, various years, Iowa State University Extension) for beef feeding operations for 1997-1999. These farms have approximately 600-700 acres of cropland and feed 400-500 head of cattle year. They have ample land for manure application, but on average would be at or near the 500 AU threshold and be classified as a CAFO. Total net farm income on an accrual basis before a payment for operator labor or owner equity averaged approximately $34,000 for this three-year period. These farms have over

$900,000 in total assets of which 40-50% is in land and buildings, and the debt:asset was 39% in 1999.

Table 3. Characteristics of Specialized Beef Feeding Farms			
	1997	1998	1999
Acres/farm	694	783	774
Total Crop Acres	625	698	699
Beef cattle sold	462	455	510
Net farm income (accrual)*	55,734	-565	46,730
Return on assets	6.7%	-1.0%	5.5%
Debt to Asset ratio	44%	35%	39%
* Before charge for family labor and owner equity			

We suggest the debt:asset ratio test be made on the feedlot without the cattle or feed inventory included. It would be relatively simple to model a facility with moderate debt and determine the impact of financing the construction of control structures needed to meet compliance under the proposed rules.

EPA does not expect that today's proposed requirements will have a significant impact on where animals are raised. The proposed regulations may favor more traditional production systems where operators grow both livestock and crops, since these operations tend to have available cropland for land application of manure nutrients.

The proposed regulations may favor "more traditional" crop-livestock system. However, lowering the threshold to the 300 or 500 head level will penalize the very operations EPA wishes to reward, particularly in the higher rainfall regions of the Midwest Cornbelt. In particular, newly defined CAFOs under 1,000 head are particularly vulnerable due to economies of scale in cattle feeding, the environmental controls (total containment) proposed and the extremely narrow feeding margins. Loy and Wilson (1985) evaluated Iowa feedlot costs by feedlot capacity in a 6-yr analysis of Iowa Feedlot Enterprise records from 1978 though 1983. This data represented observations from 50 Iowa cattle feeders and 84,076 head of cattle. Average returns for feedlots marketing <300, 300-1,000, 1,001-1,500 and >3,000 head of cattle per year were -$14.52, -$10.43, -$4,82 and +$4.41, respectively. Thus, within this range of feedlot sizes, returns increase as feedlot size increases.

We believe many newly designated CAFOs will either reduce inventories to remain below the threshold or exit the business all together increasing consolidation and concentration of animal numbers and manure production in more arid regions — regions that often are grain deficient and lacking the cropland to effectively utilize the manure nutrients.

Table 4 reports the number of Iowa cattle feedlots in 1997 by annual marketing. Many Iowa feedlots will feed only one group of cattle per year. Thus it is likely that many in the 1000-head and over category are currently CAFOs and many of the 339 feedlots in the 500-999 head category will become CAFOs under the two-threshold strategy. Lowering

the threshold to include these farms would increase the number of permitted operations 123 percent and increase the number of animals regulated only 37 percent.

Table 4. Iowa Cattle fattened on grain and concentrates for slaughter, 1997							
Farms by number sold, not inventory							Avg Profits at $11.85/head
Head/farm	Farms	Head sold	Average		% of Farms	% of Sales	
Under 200	11,516	421,104	37		88.1%	25.6%	$433
200-499	941	171,068	182		7.2%	10.4%	$2,154
500-999	339	287,035	847		2.6%	17.4%	$10,034
1000-2499	206	227,532	1,105		1.6%	13.8%	$13,089
2500-4999	42	299,862	7,140		0.3%	18.2%	$84,604
5000 & up	27	239,876	8,884		0.2%	14.6%	$105,279
Total	13,071	1,646,477	126				
Source: 1997 Census of Agriculture Average profits based on ISU Extension *Estimated Livestock Returns, 1991-2000*							

Newly regulated CAFOs will have a significant initial investment and ongoing annual operating costs under the regulations proposed. Estimates by Iowa State University (PM-1867, January 2001) indicated that the initial investment for total containment for a newly constructed 750 head open earthen feedlot in Iowa would be approximately $40 per head of capacity. This estimate is for an "ideal" situation for new construction. The cost to retrofit an existing feedlot likely will be higher given that it was not sited or constructed with future regulations in mind. Approximately $13 of this new compliance cost is for engineering to design and monitor construction of the detention basin. The remaining $27 per head is for earth moving and construction.

The annual ownership cost is expected to be $3.75 per head of capacity. The greater concern is the cost of annual de-watering the storm water detention basin, which is estimated to be $19 per head of capacity based on current commercial liquid manure hauling rates. Many Midwestern feedlots will feed one group of cattle per year, making the annual ownership and de-watering cost larger than the profit margin. Other feedlots may feed two groups per pen per year making these annual costs approximately equal to the profit margin for the last 10 years. These costs do not account for the added compliance cost due to paper work, nutrient management planning, or the structures and management already in place. A further complication is that there is relatively little

nutrient value remaining in the run-off after solid settling to allow the farmer to recoup some of the added expense through the nutrient value of the effluent.

Alternative effluent management systems that reduce the risk of surface and groundwater pollution and are less expensive to build and operate may be more acceptable to Midwestern feedlots. Two such systems include: 1) a properly constructed grass buffer strip that filters the effluent after the settling basin, and 2) an infiltration field ahead of a constructed wetland. Estimates by Iowa State University (Lorimor and Lawrence, 2001, special report) indicated that the initial investment in total containment of effluent for a 500-head feedlot is 6 times more costly than a properly designed buffer strip and 3.7 times more costly than an infiltration field and constructed wetland. Besides lower initial investment and thus lower annual ownership cost, the operating costs are reduced to maintenance because the effluent is not pumped to a spray field.

Because the nutrient value of the effluent is less than the cost to move it to the field and because the initial investment is high relative to the overall investment in the feedlot, many Cornbelt cattle feedlots will close. Given the excess pen space in the remaining feedlot sector, remaining cattle feeders or beef cow herds will not likely benefit from higher prices.

The proposed rules also will impact 325 percent more Iowa hog farms while increasing the number of hogs regulated only 58 percent if the threshold is lowered to 500 head (Table 5). Profit margins in hog production have been extremely narrow, $2.24/head for the 1991-2000 period and actually negative for 1996-2000. Many producers, if faced with higher investment and/or operating costs, will choose to exit the business before the regulations go into effect, resulting in further consolidation of the pork sector.

Table 5. Iowa Hog Farm Numbers, Inventory, Marketing and Returns, December 2000

Inventory	Number of Farms	Inventory	Average Inventory	Marketing Rate[1]	Annual Profit[2]
Under 500	5,900	1,078	183	1.000	409
500-999	2,500	1,540	616	1.057	1,458
1,000-1,999	2,200	3,080	1,400	1.482	4,649
2,000-4,999	1,300	3,542	2,725	1.824	11,131
5,000 & up	400	6,160	15,400	2.000	68,992
Total	12,300	15,400	1,252		

[1]Assumes marketing rate by size reported in 1997 Census
[2]Iowa State University Extension Estimated Returns 1991-2000 average $2.24/head.

The assumption by EPA that the additional cost of compliance will be "passed through" in the form of higher hog and pork prices is wrong. Unlike manufacturers, Iowa pork producers sell into a commodity market with competition not only from other regions of the United States but also from Canada, Denmark, and increasingly South America.

Higher production costs for newly designated CAFOs will not be offset with higher selling prices. The higher costs will cause some producers to quit the business, and prices will rise temporarily due to smaller supplies. The higher prices will encourage expansion by remaining producers and prices will return to lower levels.

The EPA also assumes a high degree of integration in the pork sector. Recent studies indicate that packers own less than 20 percent of the hogs produced in the United States. An additional 53 percent are under a marketing contract to a packer, but the vast majority of these hogs have no price guarantee. Thus packers will only pay higher prices if supply and demand conditions dictate. If higher prices occur, it will be due to a segment of producers going out of business and reducing supply.

Enforceability of the rules and administrative costs. The monitoring effort required by the rule is substantial. However, according to the development document (section 9.4), is to be inspected once a year. It is not obvious how this would guarantee adequate monitoring of manure applications according to the agronomic rates, for instance.

The EPA rule is implicitly based on the amount of manure generated and not on its effects on the community/watershed. Unless all CAFOs contribute evenly to water pollution, economic theory says the resulting pollution reduction is not being achieved at the minimum cost (Baumol and Oates, 1988).

The proposed rule does not discuss how the NPDES regulations and changes in effluent guidelines tie in with other water quality initiatives. This rule has potential impacts for the voluntary programs that are in place, which the document does not consider. For example, the rule could crowd out voluntary efforts in the 303(d) list impaired watersheds that have to implement TMDLs. Since the TMDLs are based on the effects of pollutants in the watersheds, they take into account reductions coming from point sources.

The proposed rule makes no mention of water quality monitoring. Since the rationale for the rule is a reduction in water pollution, and since baseline data are lacking for the great majority of U.S. watersheds, it is unclear how the EPA will be able to measure if the rule is having the intended effect (particularly since on-farm monitoring is going to be limited as noted above). The EPA seems to be assuming the reductions in emissions that followed the permitting of point sources are going to occur in this case too, but has set-up no mechanism to make sure that it can monitor if this will actually be the case. The economic benefit analysis contained in Appendix A of the Environmental and Economic Benefit Analysis document considered only impacts of the policy on boating, fishing and swimming. It does not explain where the willingness-to-pay numbers come from, and it arbitrarily attributes a 0.66 fraction of the willingness-to-pay to state waters (and the other third to national waters).

Bibliography

Baumol, W.J. and W.E. Oates. 1988. The theory of environmental policy. 2nd edition. Cambridge University Press, New York.

Converse, J.C., G.D. Bubenzer, and W.H. Paulson. 1976. Nutrient losses in surface runoff from winter spread manure. Transactions of ASAE. 1976. ST. Joseph, MI.

Garrison, M.V. and T.L. Richard. 2001. Market assessment for the Iowa livestock industry waste characterization and methane recovery information dissemination project. A study done for the Iowa Department of Natural Resources, Des Moines, IA. (In review).

Iowa State University. 1999. Earthen Waste Storage Structures in Iowa: A Study for the Iowa Legislature. [Online]. Available at http://www.ag.iastate.edu/iaexp/reports (Verified 25 April 2001).

Iowa State University. 2000. 1999 Iowa Farm Costs and Returns. FM-1789. Iowa State University Extension.

Iowa State University Extension, various years. State of Iowa Feedlot Summaries. [Online]. Available at http://www.extension.iastate.edu/pages/ansci/feedlot/.(Verified 08 May 2001).

Iowa State University Extension. Summary of Estimated Livestock Returns: 1991-1999. [Online]. Available at http://www.econ.iastate.edu/faculty/lawrence/EstRet/ESTRET97.htm. (Verified 08 May 2001).

Koknaroglu, H., D. D. Loy, D. E. Wilson, M. P. Hoffman and J. D. Lawrence. 2000. Factors affecting beef cattle performance and profitability in Iowa. J. Anim. Sci. 78(Suppl. 2):36 (Abstr. 49).

Lawrence, J., J. Harmon, J. Lorimor, W. Edwards and D. Loy. 2001. Beef Feedlot Systems Manual. PM-1867. Iowa State University Extension

Lorimor, J. and J. Lawrence. 2001. Cost of Alternative Technologies for Managing Feedlot Effluent. Special report to the Iowa Cattlemen's Association.

Loy, D. D. and D. E. Wilson. 1985. An analysis of 6 years of cattle feeding production records by feedlot size. Iowa State University Beef Research Report. A. S. Leaflet R385.

Shulte, D.D., M.B. Tokarz, and G.E. Laliberte. 1979. Nitrogen and phosphorus transport from swine-manured fields during snowmelt runoff events in the red river valley. ASAE paper 79-2116. St. Joseph, MI

Steenhuis, T.S., G.D. Bubenzer, J.C. Converse and M.F. Walter. 1979. Winter-spread manure nitrogen loss. ASAE paper 79-2118. St. Joseph, MI.

Sweeten, J.M., L. Jacobson, A.J. Heber, D. Schmidt, J. Lorimor, M. Williams, P. Westerman, B.W. Auvermann, J.R. Miner, and R. Zhang, R. 2001. Odor mitigation for concentrated animal feeding operations: white paper and recommendations (draft copy). White paper written for the National Center for Manure and Animal Waste Management. North Carolina State University, Raleigh, M.C.

Young, R.A. and C.K. Mutchler. 1976. Pollution potential of manure spread on frozen ground. J. Environ. Qual., 5(2). 1976.