

Missouri Clean Water Commission Meeting
Department of Natural Resources
Lewis and Clark State Office Building
LaCharrette/Nightingale Creek Conference Rooms
1101 Riverside Drive
Jefferson City, Missouri

July 13, 2011

**Request a Finding of Necessity for the Proposed New Rule
10 CSR 20-8.300 – Manure Storage Design Regulations**

Issue: The Department recently public noticed a Regulatory Impact Report (RIR) on the proposed new rule, Manure Storage Design Regulations. The Water Protection Program (WPP) anticipates filing this proposed new rule, 10 CSR 20-8.300, following this Commission meeting.

Background: The Department has developed proposed regulations specifically for the design of manure management systems. Having such regulations in place is desired by environmentalists and the regulated entities. These regulations were developed by a team of experts and further analyzed in stakeholder's meetings. Based on these discussions, the resulting rule is believed acceptable and reasonable to all parties engaged in the process.

The RIR was open for public comment from December 15, 2010 through February 14, 2011. No comments were received on the RIR. While there is no public sector cost involved, there is a slight increase in construction and engineering costs in the private sector. Only new operations or existing operations proposing a construction project will be impacted.

While the new 10 CSR 20-8.300 rule includes important provisions not directly related to the Environmental Protection Agency (EPA) rule, this rulemaking is necessary in order to address the new EPA New Source Performance Standards requirements.

Recommended Action: Staff recommends the Commission approve a finding of necessity for this proposed new rule.

Suggested Motion Language: "The Commission approves the finding of necessity for the proposed new rule, 10 CSR 20-8.300."

List of Attachments:

- Rulemaking Report with Schedule
- Proposed New Rule
- Signed RIR
- Private Fiscal Note

Affected Rule: New Rule, 10 CSR 20-8.300 Manure Storage Design Regulations

1. What is the purpose of this rulemaking?

The purpose of this rule is to ensure consistent water quality protection from Concentrated Animal Feeding Operations (CAFOs) by setting forth specific design criteria for the construction of manure management systems. The proposed rule will better protect both surface and groundwater by setting forth comprehensive, technical design requirements.

In addition, spelling out the requirements for construction permit applications in regulation will provide consultants and the Missouri Department of Natural Resources' (Department) review engineers clear and consistent standards, thereby making the submittal and review of construction permit applications more efficient.

2. Why is the rulemaking being proposed now?

This rulemaking is due in part to the Environmental Protection Agency (EPA) changes to CAFO effluent limitation guidelines (ELG) causing us to address our state design standards. Our proposal goes well beyond the changes initiated by EPA. We feel it is efficient to address all CAFO design criteria at one time.

In addition, we have been seeing an increasing number of wet weather events in the past three years, where CAFO operators are forced to take emergency land applications measures during less than ideal conditions in order to prevent lagoon overflows. These proposed regulations attempt to address this problem by increasing the minimum design storage capacity of lagoons and increasing the required amount of "safety" or "reserve" volume in lagoons that receive storm water runoff.

3. Will the rulemaking incorporate any document by reference, rather than state the language within the rulemaking?

Yes. A portion of a federal regulation will be referenced. In the proposed rulemaking, new swine, veal and poultry operations shall evaluate proposed uncovered manure storage structures in accordance with 40 CFR 412.46(a). This EPA requirement will apply to only a very small number of CAFO operations. The vast majority of new swine, veal and poultry manure storages are under roof and not subject to this additional requirement. Therefore the evaluation criteria was incorporated by reference because staff did not want to add a significant amount of complexity to the rule for the benefit of a very few.

4. Is a Regulatory Impact Report required for this rulemaking?

In some cases, the proposed standards will hold animal manure management systems to a higher standard than was previously required. This will require higher initial costs of construction, so an RIR has been developed.

5. What authority does DNR have to carry out this rulemaking?

Sections 640.710 Department to regulate facilities--rules--setback—exemption and 644.026, Powers and duties of commission—rules, procedure, RSMo 2010*

*Original authority: 640.710, RSMo 1996 and 644.026, RSMo 1972, amended 1973, 1987, 1993, 1995, 2000.

6. What does the rulemaking require and how does it produce benefits?

This rule provides basic requirements for the technical documents and project engineering reports and facility plans including plans and specifications needed to accompany construction permit applications. The Department sets specific requirements allowing the applicant to submit a complete construction application for the Department's review. These requirements ultimately reduce the time, cost and effort exerted by the applicant and the Department, during the construction permit application review process.

CAFO confinement buildings and manure management systems will need to be sited above or otherwise protected from the 100-year floodplain. This is a change from the current requirement that they be above the 25-year flood level.

In addition, the regulation will raise the requirement for manure storage systems that are open to rainfall or storm water runoff. Rather than meet the new requirements, CAFO owners may opt to build a covered structure instead, resulting in fewer proposed uncovered storage structures. This is a benefit, as structures exposed to storms present a higher risk to the environment than covered structures.

Furthermore, new poultry buildings will have to do some soils exploration to better verify the suitability of their location. Installed land application systems, including underground pipelines, will have specific requirements as well to help ensure proper functionality and water protection.

By building these structures to a higher standard they will likely last longer and have less chance of a malfunction or, in the case of a lagoon, an overflow. That will reduce potential future replacement or liability costs which will be of financial benefit to the CAFO owners in addition to the benefits of a cleaner environment for everyone.

7. Who is most likely affected by the rulemaking?

All new and expanding CAFOs will be affected. These are located in the rural areas across Missouri. In most cases, the costs will be negligible.

Most new manure storage structures are covered, for example, deep pit hog buildings store the manure under the hog building. But in the cases of uncovered manure storage structures, there will typically be a measurable increase in costs.

In the case of a new poultry building, there may be increased cost due to new requirements for soil exploration if the operation chooses not to use the free services of National Resource Conservation Service. This will mainly impact the SW and West Central parts of our state where most of the poultry industry is located.

We receive between 25 and 50 CAFO construction permits every year, including new CAFOs, expanding CAFOs and modifications. All of these applicants would be at least minimally affected. The CAFO owners will bear the potential cost of the additional requirements.

The beneficiaries include CAFO owners, who will have better manure management systems, engineering consultants, and Department staff, who will have clear guidance as to what the construction permit entails, and downstream residents who will have a cleaner environment.

8. What impact will the rulemaking have on small businesses? (A small business is defined by statute as a for-profit enterprise with fewer than 100 full or part-time employees.)

This rule will impact small businesses as the vast majority of newly built CAFOs are owned by small businesses.

The ultimate affect on small businesses should be positive because their manure management systems will be built to a higher standard and will likely last longer and have less chance of a malfunction or spill. This will reduce potential future replacement or liability costs.

A Small Business Impact Statement has been prepared to further analyze the impact on small businesses.

9. What are the probable costs for the Department or any other public agency in the implementation and enforcement of the rulemaking?

There should be no additional costs to the agency for implementation over and above the current costs of reviewing CAFO construction permit applications. Though there may be increased time reviewing the applications, this will be absorbed by reduced time explaining and/or debating requirements with consultants and the public at large. As consultants become familiar with the revised requirements, staff time to review the applications may even be reduced. There may also be a reduction in staff time defending permits in permit appeals to the Administrative Hearing Commission (AHC) due to the existence of clearer requirements.

The USDA's Natural Resource Conservation Service (NRCS) provides both technical design services and cost share on the installations of manure management systems. The Department worked closely with NRCS on developing these rules and developing cost estimates for the fiscal analysis. The NRCS will be affected, but they report that additional requirements will be absorbed by their current staff and resources. We are confident that NRCS feels the new regulations are valuable and are willing to accept the additional requirements.

Fiscal notes have been prepared to further analyze the costs of this regulation.

10. What is the anticipated effect of the rulemaking on state revenue?

There are no anticipated effects to state revenue from this rule.

11. Who was/will be involved in developing the rulemaking?

Staff has worked closely with representatives of the USDA's NRCS and the University of Missouri's Commercial Agriculture Program in developing the draft rule. In addition, staff included small business representatives by soliciting comments on the draft rule from the Missouri Department of Agriculture's

Missouri Small Business Authority and the USDA's Farm Service Agency before the rule was more widely circulated.

12. How has/will the development of the rulemaking been/be shared with interested parties and the public at large?

The Department has held two stakeholders meetings, on September 28 and October 26, 2010. The proposed rule was explained and discussed. Some changes were made to the proposal as a result of the discussion and comments. In addition, the rule will be placed on public notice.

The regulatory impact report was public notice for 60 days, ending on February 14, 2011. No comments were received on the RIR, but comments were received on the draft rule. Some changes were made to the draft as a result of these comments.

13. Who may I contact to either ask questions or provide input on this rulemaking?

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By e-mail at: Barbara.Li@dnr.mo.gov or by telephone at 573-751-1299.

14. What are the expected dates for the comment period and public hearing?

The Public Notice of the Regulatory Impact Statement (RIR) was held from December 15, 2010 to February 14, 2011.

The Department anticipates a publication of the proposed amendment in the *Missouri Register* August 15, 2011. A public hearing is scheduled for November 2, 2011.

*Rulemaking schedules are developed or revised through internal coordination, the Department's decision to proceed, or other appropriate actions.

Meetings with Stakeholders	September 28, 2010 October 26, 2010
Interagency Coordination	Dec. 10, 2010 thru publication
RIR Public Notice	December 15, 2010
Signed Finding of Necessity	July 6, 2011 CWC Meeting
RIR Public Notice	December 15, 2010 through February 14, 2011

Filing with Small Business Regulatory Fairness	July 14, 2011 (may be filed July 11 th through July 15 th)
Board, & Joint Committee on Administrative Rules & Secretary of State	
Publication in the <i>Missouri Register</i>	August 15, 2011
Public Comment Period	August 15, 2011 thru <i>Nov., 16, 2011</i>
Public Hearing	November 2, 2011
<i>Actual scheduled dates for this rulemaking are in italic bold:</i>	
<i>End of Comment</i>	<i>November 9, 2011</i>
<i>End of Comment</i>	<i>November 16, 2011</i>
Response to Comment & Adoption	January 4, 2012
<i>File Order of Rulemaking with JCAR</i>	<i>File Jan. 6</i>
<i>File Order of Rulemaking with JCAR</i>	<i>File Jan. 12</i>
<i>Note 60 Days from Nov. 9 = Jan. 6 (Jan. 8 Sun.)</i>	<i>File 5th thru 6th</i>
<i>Note 60 Days from Nov. 16 = Jan. 13 (Jan. 15 Sun.)</i>	<i>File 5th thru 13</i>
<i>Note End of Comment Nov. 9, 2011 + 90 = Feb. 7, 2011</i>	<i>File Feb. 6 through 7</i>
<i>Note End of Comment Nov. 16, 2011 + 90 days = Feb., 14</i>	<i>File Feb. 13 through 14</i>
<i>Order of Rulemaking Filed with Secretary of State</i>	<i>February 7, 2012</i>
<i>Order of Rulemaking Filed with Secretary of State</i>	<i>February 13, 2012</i>
Order of Rulemaking Published in <i>Missouri Register</i>	March 15, 2012
Rule Published in <i>Code of State Regulations</i>	March 30, 2012
Rule Effective	April 30, 2012

Title 10 – DEPARTMENT OF NATURAL RESOURCES

Division 20 – Clean Water Commission

Chapter 8 – Design Guides

PROPOSED RULE

10 CSR 20-8.300 Manure Storage Design Regulations

PURPOSE: This rule sets forth specific design criteria for manure management systems and guidelines for preparing and submitting construction permit applications for Concentrated Animal Feeding Operations. This rule shall be used together with 10 CSR 20-6.300, Concentrated Animal Feeding Operations.

(1) Definitions.

(A) Definitions as set forth in the Missouri Clean Water Law, Chapter 644, Concentrated Animal Feeding Operation (Hog Bill) section 640.703 RSMo, 10 CSR 20-2.010 and 10 CSR 20-6.300 shall apply to the terms in this rule unless otherwise defined by subsection (B) below.

(B) Other applicable definitions are incorporated as follows:

1. Design storage period – the calculated number of days that will fill the manure storage structure from the lower to the upper operating level during a period of average R-E.

A. For a design storage period of fewer than three hundred and sixty-five (365) days, the largest consecutive average monthly R-E, corresponding with the number of months of the storage period, shall be used.

B. For multiple storage stages, the storage period is the sum of available storage days in each stage;

2. Freeboard – The elevation difference between the bottom of the spillway to the top of the berm for an earthen manure storage basin;

3. Groundwater table – the seasonal high water level occurring beneath the surface of the ground, including underground watercourses, artesian basins, underground reservoirs and lakes, aquifers, other bodies of water located below the surface of the ground, and water in the saturated zone. For the purposes of this rule, groundwater table does not include the perched water table;

4. Manure – The fecal and urinary excretion of animals and process wastewater and dry process waste as defined in 10 CSR 20-6.300(1)(B);

5. Missouri Concentrated Animal Feeding Operation Nutrient Management Technical Standard (NMTS) – The current version of the technical standard published by the department;

6. Rainfall minus evaporation (R-E) – the average depth of monthly liquid precipitation minus evaporation as published in the most recent National Weather Service Climate Atlas for the geographical region of the proposed structure;

6. Safety depth – One foot (1') of liquid depth or the depth needed to hold the volume of the ten-year, ten-day storm, whichever is greater;
7. Solid Manure – Manure that can be stacked without free flowing liquids;
8. Storage volume – The volume of manure between the lower and upper operating levels; and
9. Ten-year, ten-day storm – the depth of rainfall occurring in a ten (10) day duration over a ten (10) year return frequency as defined by the most recent publication of the National Weather Service Climate Atlas for the geographical region of the proposed manure storage structure.

(2) General.

(A) The manure storage design regulations shall be utilized by all Animal Feeding Operations (AFOs) which need or desire permit coverage. These regulations shall be used when evaluating all new AFOs or new or expanded components of existing AFOs after Month Day Year (effective date of this regulation).

(B) These design regulations may also be applicable to other types of agricultural waste management systems regulated by the department. Other facilities that wish to use this regulation when preparing a permit application shall first obtain written approval from the department.

(C) Careful consideration should be given to the type of storage, treatment, and land application before choosing a final system design. Important factors to consider include: location and topography of the operation; concentration and quantity of the manure to be managed; land available for manure utilization; operating costs; and the probable type of supervision and maintenance the operation will require.

(D) New processes, methods, and equipment. The policy of the department is to not obstruct the development of new methods, equipment, and management practices for manure management. The lack of inclusion in this standard of a particular type of treatment process or equipment should not be construed as precluding its use. The department will approve other types of processes or equipment under the following conditions:

1. The operational reliability and effectiveness of the process or device shall have been demonstrated with a suitably sized prototype unit operating at its design load conditions to the extent required by the department; and

2. The department may require additional tests including:

- A. Results and engineering evaluations demonstrating the efficiency of the processes or equipment; and

- B. Appropriate, independent testing/evaluation conducted under the supervision of an engineer not employed by the manufacturer or developer.

(3) Permit Application Documents.

Applications for a construction permit, or for an operating permit that did not previously receive a construction permit, shall submit one (1) set of documents described in this section for department approval as part of the permit application process.

(A) Engineering Documents. The engineering documents shall provide the basic information, present design criteria and assumptions, examine alternate systems,

where appropriate, and provide plans and specifications. The documents shall also include process description, sizing, data, controlling assumptions, and considerations for the functional operation of a manure management system. All engineering documents shall be prepared by or under the direct supervision of a registered professional engineer licensed to practice in Missouri. The department will not examine the adequacy or efficiency of the structural, mechanical, or electrical components of the manure management systems, only adherence to rules and regulations.

1. Engineering Report - The following paragraphs should be utilized as a guideline for the content of the project engineering report to be submitted to the department for review and approval:

A. Letter of transmittal. A one (1)-page letter typed on the design engineer's letterhead should be included in the submission of the report;

B. Title page. Title of project, date, operation's name and address, name and address of firm preparing the report, seal and signature of the engineer;

C. Project location map. This map shall include state and county roads, county boundaries, city boundaries, and show the location of the proposed project;

D. The table of contents shall include section and subsection headings. All pages of the report shall be numbered and the table of contents shall reference these numbers;

E. Narrative project summary. This section should provide an explanation of any existing conditions at the operation and a summary of the proposed modifications to the operation;

F. Technical information and design criteria. This section should include the design data, calculations, all assumptions, and all relevant information used to justify the design. If the engineering documents contain known deviations from the design criteria contained in this rule, documentation and justification for the deviation should be submitted with the design criteria. The following items should be included:

(I) Each animal type and number within the production area, the maximum design animal capacity, and the average weight for each animal type;

(II) A detailed explanation of the process by which manure is deposited, handled, managed, and transferred within the operation; and

(III) Calculations showing the estimated annual amount of manure generated at the production area.

(a) Where possible, design manure volume shall be based on past operating records or operating data from facilities with similar feed inputs and animal characteristics. Documentation of these volumes shall be included; and

(b) If operating data is not available, the design manure volume shall be estimated using the most recent edition of a research-based reference. The reference name, edition, and data shall be included.

(IV) Design calculations justifying the size of manure storage structures. For anaerobic treatment lagoons, the volume of treatment shall be based on the geographical region of the proposed structure and calculated using the most recent edition of a research-based reference. The reference name, edition, and data shall be included;

(V) Depth and volume tables on at least one foot (1') increments for all manure storage basins with design operating depths clearly identified;

(VI) Collection, treatment, and disposal of all domestic wastewater flows associated with the operation; and

(VII) If applicable, justifications for constructing an uncovered manure storage structure. Covered storages are preferred due to the lower risk of environmental damage from excessive rainfall.

G. Soils report/soils information. The engineering report shall contain county soil survey information for the soil types and characteristics of the production areas. Unless required otherwise by the department, soils information shall include soil series name, soil texture, soil permeability, and water-holding capacity. If a county soils map is available, the approximate boundaries of the different soils shall be shown. When applicable, the engineering report shall incorporate all recommendations by the Division of Geology and Land Survey. Any soil boring logs shall also be included in the report; and

H. Operation and maintenance plan - An operation and maintenance plan shall be provided to explain the key operating procedures. At a minimum, the plan shall address operation and maintenance of mechanical equipment.

2. General layout drawings.

Plans shall include both an aerial and a topographic map or drawing that shows the spatial location and extent of the production area. Each drawing or map must be easily readable and include a visual scale, a north directional arrow, a fixed geographic reference point, and the date the drawing or map was completed. Each drawing or map shall include the following:

A. All confinement barns, open lots, manure storage, and control structures, along with the other various components of the operation such as areas designated for stockpiling, composting, and for the management of animal mortalities;

B. The source of the operation's water supply and all wells within three hundred feet (300') of the production area; and

C. The location of all surface water features within the boundaries or immediately adjacent to the production area.

3. Construction plan drawings. Plan drawings shall include the following:

A. The name of the operation and the scale in feet, a graphic scale, a north directional arrow, and the signed and dated engineer's seal;

B. The plans shall be clear and legible. They shall be drawn to a scale which will permit all necessary information to be plainly shown. The size of the plans generally should not be larger than thirty inches by forty-two inches (30" × 42"), with a preference for smaller sizes;

C. Locations of all test borings with date shall be shown on the plans;

D. Detail plans shall consist of plan views, elevations, sections and supplementary views which, together with the specifications and general layouts, provide the working information for the construction of the containment facilities; and

E. Include dimensions and relative elevations of structures, the location and outline form of equipment, storage tanks, location and size of piping and ground elevations.

4. Specifications. When specifically directed by the department, technical specifications shall accompany the plans.

(B) Other Documents.

1. Neighbor notice and buffer verification. One (1) copy of the neighbor notice letter and proof that the notification has been sent. A map shall also be included that meets the requirements of 10 CSR 20-6.300(3)(C)4.

2. Geohydrologic evaluation by the department's Division of Geology and Land Survey. This is required only for proposed earthen manure storage basins.

3. An emergency response plan, if not included in the nutrient management plan.

(C) Nutrient management plan.

The application shall include a nutrient management plan that meets the specifications of the NMTS and the requirements of 10 CSR 20-6.300(5). This plan shall include:

1. Land application maps - An aerial, topographic, and soils map that shows the spatial boundaries of planned land application areas. The aerial map(s) must clearly show the following within three hundred feet (300') beyond the field boundaries:

A. The location and extent of all permanent flowing streams, intermittent flowing streams, wetlands, and sinkholes;

B. Open tile line intake structures that will not be plugged during land application;

C. Lakes, reservoirs, or other private and publicly owned water impoundments;

D. Private and public wells;

E. Public roads;

F. Public use areas;

G. Public dwellings; and

H. Property boundaries; and

2. All additional components necessary to prove compliance with 10 CSR 20-6.300(5).

(4) Revisions to Approved Plans.

Deviations from approved plans affecting storage capacity, flow, or location must be approved in writing before these changes are made. Revised plans shall be submitted well in advance of any construction work which will be affected by these changes to allow sufficient time for review and approval. Structural revisions or other minor changes not affecting storage capacity, flow, or location will be permitted during construction without approval. As-built plans clearly showing these alterations shall be submitted to the department after the completion of the work.

(5) Location.

(A) Protection from Flooding – Manure storage structures, confinement buildings, open lots, composting pads, and other manure storage areas in the production area shall be protected from inundation or damage due to the one hundred (100)-year flood.

(B) The minimum setback distances from manure storage structures, manure storage areas, confinement buildings, open lots, or mortality composters are as follows:

1. Ten feet (10') to public water supply pipelines;
2. Fifty feet (50') to property lines;
3. Fifty feet (50') to public roads;
4. One hundred feet (100') to wetlands, ponds, or lakes not used for human water supply;
5. One hundred feet (100') to gaining streams, (classified or unclassified; perennial or intermittent);
6. Three hundred feet (300') to human water supply lakes or impoundments; and
7. Three hundred feet (300') to losing streams, (classified or unclassified; perennial or intermittent) and sinkholes.

(C) Distances from earthen manure storage basins shall be measured from the outside edge of the top of the berm.

(D) Separation distance from wells for manure storage structures or confinement buildings shall be in accordance with 10 CSR 23-3.010.

(E) An all-weather access road shall be provided from a public road to the AFO. Sufficient room shall be provided at the site to permit turning vehicles around. In determining the type of roadway and method of construction, consideration shall be given to the types of vehicles and equipment necessary to maintain and operate the AFO.

(6) Manure Storage Sizing.

(A) No discharge requirement. All manure storage structures shall comply with the Design Standards and Effluent Limitations of 10 CSR20-6.300(4).

(B) Design Storage Period.

1. The recommended design storage period is three hundred and sixty-five (365) days.
2. The minimum design storage period for liquid manure and for solid manure that will be used in the land application area is one hundred and eighty (180) days.
3. Solid manure to be sold or used as bedding shall have a minimum design storage period of ninety (90) days unless justification is given for a shorter time period.
4. An operation proposing an uncovered, liquid manure storage structure, *with less than three hundred and sixty-five (365) days of storage*, will be evaluated based upon the ability to actively manage the system. The following, at minimum, will be evaluated:
 - A. Does the AFO owner(s) have at least fifty percent (50%) ownership in the land application equipment;
 - B. Does the AFO owner(s) own at least fifty percent (50%) of the needed annual land application area;
 - C. Is at least fifty percent (50%) of the needed annual land application area in permanent, perennial vegetation; and
 - D. Is the available equipment and labor capable of lowering the liquid level by ten percent (10%) of the storage volume in one (1) working day?
5. The design storage period must be accounted for in the Nutrient Management Plan.
6. The minimum design storage period for anaerobic treatment lagoons without an impermeable cover is three hundred and sixty-five (365) days.

(C) New, Class I, swine, veal, or poultry operations shall evaluate proposed uncovered manure storage structures in accordance with applicable federal regulation as set forth in 40 CFR 412.46(a)(1), November 20, 2008, which is hereby incorporated by reference, without any later amendments or additions, as published by the Office of the Federal Register, National Archives and Records Administration, Superintendent of Documents, Pittsburgh, PA 15250-7954.

(D) Sizing Manure Storage Structures.

1. The structure shall be designed to hold all inputs, between the upper and lower operating levels, anticipated during the design storage period. This typically includes:

- A. Animal manure;
- B. Bedding material;
- C. Wash water;
- D. Flush water (excluding recycled flush water);
- E. Cooling water for animals or from equipment; and
- F. Runoff from pervious and impervious areas, due to average rainfall.

2. Uncovered liquid storages shall also include:

A. R-E from the surface of the structure, held between the operating levels; and

B. Safety depth, above the upper operating level.

3. Tanks and pits shall also include six inches (6") of depth below the lower operating level for incomplete removal allowance unless there is adequate justification for not including this depth.

4. Earthen manure storage basins shall also include:

A. Freeboard of at least one foot (1'). Two feet (2') is required for structures that receive storm water from open lots larger than the surface area of the storage structure;

B. Two feet (2') of permanent liquid depth, below the lower operating level. Anaerobic treatment volume greater than two feet (2') will satisfy this requirement;

C. Sludge accumulation volume; and

D. Anaerobic treatment lagoons shall include treatment volume, below the lower operating level.

(7) Construction and Maintenance of Earthen Manure Storage Basins.

(A) Geohydrologic Evaluation. A geohydrologic evaluation of the proposed earthen manure storage basin prepared by the department's Division of Geology and Land Survey shall be submitted. To obtain a geohydrologic evaluation of the proposed site, the engineer shall submit the appropriate request form to the Division of Geology and Land Survey. All potential basin sites will receive two ratings from the geohydrologic evaluation. The ratings will infer the relative geological limitations for designing and constructing a basin at the site in question.

1. Collapse potential rating. If the geohydrologic evaluation gives a severe rating for collapse potential, an earthen basin is not acceptable. Concrete or steel structures or an alternate site should be considered.

2. Overall geologic limitations rating. Sites that have a severe rating for the overall geologic limitations, but a slight or moderate collapse potential will be

reviewed on a case-by-case basis. The department may require artificial liners or additional geotechnical exploration and design implementation and/or post-construction testing in these situations.

(B) Detailed Soils Investigation.

1. A detailed soils investigation is required to substantiate feasibility. The quantity and quality of soil materials on-site and from a borrow area must be identified and evaluated for use in the basin and/or liner.

2. Exploration shall be sufficient to identify and define the quantity and quality of the soil material. The use of test pits, split spoon (barrel) or thin walled tube sampling or a combination of these techniques may be used depending on the total area of investigation and the depth to which exploration is needed. The following information, in whole or in part, is required:

- A. Atterburg limits;
- B. Standard proctor density (moisture/density relationships);
- C. Coefficient of permeability (undisturbed and remolded);
- D. Depth to bedrock;
- E. Particle size analysis; and
- F. Depth to seasonal high groundwater table.

3. Information gathered from the investigation shall be presented on a map drawn to scale. Slope, location, and other surface features should also be included. The soil profile should be shown of the representative soil material. Copies of original boring and other soil test logs shall also be included. An interpretation of the collected data shall be incorporated into the report. Any site constraints and how they will be dealt with should be discussed.

(C) Shape and Location.

1. Shape of cells. The shape of all cells should be such that there are no narrow or elongated portions. Round, square or rectangular cells (length not exceeding three (3) times the width) are recommended. No islands, peninsulas or coves shall be permitted.

2. Constant elevation of floor. The floor of the structure shall be a consistent elevation. Finished elevations shall not be more than three inches (3") above or below the average elevation of the floor.

3. Distance to groundwater and bedrock. The floor of the basin shall be at least four feet (4') above the high water table or the water table as modified by subsurface drainage. In addition, the floor shall be at least two feet (2') above bedrock. For perched water tables, a curtain drain with a positive outlet may be installed around the structure to permanently lower the water table.

(D) Slopes. Inner and outer berm slopes shall not be steeper than three to one (3:1, horizontal to vertical). Inner slopes shall not be flatter than four to one (4:1). Consideration may be given to steeper inner slopes provided special attention is given to stabilizing the slope with rip-rap, concrete or other rigid materials. These stabilization methods shall be specified. The flatness of the outer slope is of no concern provided surface water can be diverted around the lagoon. Long outer slopes should be flatter than three to one (3:1) to assist in safe mowing of vegetation.

(E) Berm Construction and Width.

1. Soil used in constructing the basin floor (not including clay liner) and berm cores shall be relatively incompressible, tight, and compacted between two

percent (2%) below and four percent (4%) above the optimum water content and compacted to at least ninety percent (90%) standard proctor density.

2. Compaction of lifts for berm construction shall not exceed twelve inches (12").

3. Maximum rock size should not exceed one-half (1/2) of the thickness of the compacted lift.

4. The minimum top of berm width shall be four feet (4'). If large equipment is to be used for mowing, a top minimum width of at least eight feet (8') shall be provided.

(F) Emergency Spillway. To prevent overtopping and cutting of berms, an emergency overflow shall be provided. The spillway shall:

1. Be located in the location with the minimum amount of constructed earthen fill;

2. Provide passage of liquid at a safe velocity to a point outside of the berm(s);

3. Have a minimum bottom width of ten feet (10') and a minimum depth of one foot (1'); and

4. Be compacted and vegetated or otherwise constructed to prevent erosion due to possible flow.

(G) Compacted Clay Liner. The following criteria are for design and construction of soil liners. Engineering reports, plans and specifications should address these criteria.

1. Soils Information. The soils used for construction of an earthen basin liner should meet the following minimum specifications:

A. Be classified under the Unified Soil Classification Systems as Cl, Ch, Gc, or Sc;

B. Allow more than fifty percent (50%) passage through a Number 200 sieve;

C. Have a liquid limit equal to or greater than thirty (30);

D. Have a plasticity index equal to or greater than twenty (20); and

E. Have a coefficient of permeability equal to or less than 1×10^{-7} centimeters per second (cm/sec) when compacted to ninety percent (90%) of standard proctor density with the moisture content between two percent (2%) below and four percent (4%) above the optimum moisture content.

2. Liner construction.

A. Construction shall include scarification and compaction of base material between two percent (2%) below and four percent (4%) above the optimum water content and compacted to at least ninety percent (90%) standard proctor density.

B. Compaction of lifts shall not exceed six inches (6"). Maximum rock size should not exceed one-half (1/2) of the thickness of the compacted lift.

C. The completed seal shall be maintained at or above the optimum water content until the basin is prefilled with water in accordance with this section of the rule.

3. Permeability. All earthen basins shall be sealed so that seepage loss through the seal is minimized. The basin seal shall cover the floor and extend up the inner slope to where the side slope intersects with the top of the berm.

A. The design permeability of the basin seal shall not exceed five hundred (500) gallons per acre per day in areas where potable groundwater might become contaminated or when the wastewater contains industrial contributions of concern. Design seepage rates up to three thousand five hundred (3,500) gallons per acre

per day may be considered in other areas where potable groundwater contamination is not a concern, provided that the cells will maintain adequate water levels to provide treatment and avoid nuisance conditions.

B. Liner thickness. The minimum thickness of the liner is twelve inches (12"). For soils which have a coefficient of permeability greater than 1×10^{-7} centimeter per second (cm/sec), unusual depth or potable ground water contamination potential, liner thickness of more than twelve inches (12") may be required. The following equation shall be used to determine minimum seal thickness:

$$t = (H*K) / 5.4 \times 10^{-7} \text{ cm/sec}$$

where

K = permeability coefficient of the soil in question;

H = head (maximum water level depth) of water in the basin; and

t = thickness of the soil seal.

Units for H and t may be English (feet) or metric (meters); however, they must be the same.

4. Soil Additives. Bentonite, soda ash, or other sealing aids may be used to achieve an adequate seal in systems using soil. The design shall include information on the type of soil additive and the method of application.

(H) Prefilling. The basin shall be prefilled in order to protect the liner, prevent weed growth, reduce odor, allow measurement of percolation losses, and maintain moisture content of the seal. However, the berms must be completely prepared before the introduction of water. If the clay liner is allowed to dry, the liner must be scarified and recompacted as described in this section of the rule.

(I) Protection of Berms.

1. Livestock, burrowing animals, and woody vegetation must be excluded from basins to protect the integrity of the berms and liners.

2. The berms, diversion ditches, and terraces shall be seeded and a good vegetative cover established to minimize erosion and aid in weed control. The inner berms should be seeded down to the upper operating level of the structure. Where the structure is not anticipated to reach its upper operating level during the first growing season, consideration should be given to further seeding on the berm slope. Long rooted grasses shall not be used for seeding of berms. Fertilization needs, mulching, and watering must be considered for all basins to ensure that a good growth of grass occurs rapidly and is sustained. Specifications shall detail specific amounts and variety of seeds to be used, mulching, and fertilizer requirements as appropriate and the proper time period for application to be reasonably assured that vegetative cover will be established.

3. Rip-rap or some other acceptable method of erosion control is required as a minimum around all piping entrances and exits. For aerated cell(s), the design should ensure erosion protection on the slopes and floor in the areas where turbulence will occur.

4. For basins with a surface area greater than five (5) acres, consideration shall be given to providing embankment protection from wave action.

(J) Alternative Liners. Seals consisting of asphalt, concrete, soil cement, or synthetic liners may be used provided the permeability, durability and integrity of

the proposed materials can be satisfactorily demonstrated for anticipated conditions.

(K) Percolation Losses. Measurement of percolation losses, when required, shall consider flow into and out of the lagoon, rainfall and evaporation, and changes in water level. Measured percolation losses in excess of one-sixteenth (1/16) inch per day will be considered excessive. The barrel test as described in 10 CSR 20-8.020(16) is an acceptable water balance study. Other tests will require department approval.

(L) Depth Gages. A permanent depth measurement gauge or marker shall be installed and maintained in the basin and shall be easily readable at one-foot (1') increments or smaller. It shall clearly display the lower and upper operating levels and the spillway elevation. The gauge shall be placed in a suitable location where it is easily accessible during routine operations.

(M) Sludge Accumulation. Sludge levels shall be maintained so as to not reduce the approved storage volume of the basin.

(8) Construction of Tanks and Pits.

(A) Soils and Foundation. A thorough site investigation shall be made to determine the physical characteristics and suitability of the soil and foundation for the fabricated storage structure. The floor of the below-ground storage tanks shall be two feet (2') above the high water table unless curtain drains or interception drains are installed around the perimeter of the structure to permanently lower the water table. The drain shall be at an elevation of at least one foot (1') below the floor to permanently lower the water table. A sump or a positive outlet for the drain shall be provided.

(B) Depth Allowance for Agitation and Ventilation. An allowance of one foot (1') should be provided at the top of covered structures for agitation and/or ventilation requirements.

(C) Depth Gages. Uncovered tanks and pits shall include a permanent depth measurement gauge or marker that is easily readable at one-foot (1') increments or smaller.

(D) Footing Drains/Perimeter Tiling. Perimeter tiling and granular backfill are required for below ground pits unless justification is given that they are not needed. Tiles should be located below the base of the outside of the footing. At least two feet (2') of granular drain material, such as pea gravel or three-quarter inch (3/4") crushed rock shall be placed around the tile. A positive outlet or sump for the drain shall be provided.

(E) Tank and pit footings are to be located at or below the maximum frost depth unless adequate justification is given that it is not needed. A compacted foundation of frost-free material such as drained granular material, extending to below frost depth, may be used as an alternate to extending the structural footing.

(F) Concrete and steel features shall be designed according to published guidelines. These guidelines must be referenced in the application packet.

(G) Watertight requirement. Tanks and pits must be designed, constructed, and maintained to be watertight.

(9) Construction of Solid Manure Systems.

This section covers the construction of poultry buildings, open lots, stacking pads, and other similar structures.

(A) Surface water shall be diverted around or away from animal confinement areas and buildings.

(B) Floors and Pads. The base of covered and uncovered lots, poultry buildings and other solid manure storage areas can be made of concrete or other rigid, essentially watertight materials, ~~or~~ from a firm, compacted, earthen base that meets the following criteria:

1. The floor shall be evaluated for suitable soils and groundwater table to a depth of four feet (4') below the proposed floor elevation;
2. The finished earthen floor shall be a minimum of two feet (2') above the apparent high water table or the water table as modified by subsurface drainage;
3. The finished earthen floor shall be at least two feet (2') above bedrock;
4. The existing soils shall have at least one (1) continuous foot of suitable soils within four feet (4') of the proposed earthen floor in order to use existing soils without amendments. Suitable soils are defined in this section as Unified Soil Classification System (USCS) class CH, MH, CL, GC, SC, and permeability group III or IV according to the USDA's National Engineering Handbook, Agricultural Waste Management Field Handbook;
5. Existing soils can be modified using soil amendments provided that the modified soil has at least one (1) compacted, continuous foot of soil modified to meet permeability group III or IV;
6. Borrow soils can be used for the floor. Borrow soils must provide at least one (1) compacted, continuous foot of suitable soils as defined above; and
7. The use of one (1), five foot (5')-deep test pit, near the center of each proposed set of four (4) buildings, or each acre, will generally be sufficient to satisfy the intent of this section.

(C) Uncovered solids storage areas must also meet the following:

1. Have an overall slope between two percent (2%) and four percent (4%) for unpaved lots;
2. Be maintained in a way that prevents ponding; and
3. Have a runoff collection structure that meets the requirements of 10 CSR 20-8.300.

(D) Roofed areas of five thousand (5,000) square feet or less, that are used for mortality composting or to store solid manure, are exempt from the requirements of this section.

(10) Temporary Stockpiling of Solid Manure.

(A) Temporary stockpiling of uncovered solid manure within the production area, without runoff collection, is not allowed.

(B) Temporary stockpiling within the land applications areas shall be in accordance with the following:

1. Location.

A. Any temporary stockpiles need to be placed to prevent storm water from draining into or through the pile. If storm water does drain through the pile, a one foot (1') berm will be required on the up slope side of the pile.

B. No location shall be used for stockpiling for more than two (2) weeks, unless the pile is covered.

C. Separation distances shall be maintained between the stockpile and other features as follows:

(I) Three hundred feet (300') from any losing stream, well, sinkhole, water supply (for human consumption) reservoir, non-owned dwelling or residence, public building or public use area;

(II) One hundred feet (100') from intermittent and permanent flowing streams; and

(III) Fifty feet (50') from public roads and property lines.

D. Stockpiles cannot be placed on slopes steeper than six percent (6%).

2. Size. No temporary storage site can be larger than two (2) acres.

3. Formation. All piles shall be placed so as to minimize forming pockets, hollows or mini dams that would collect and hold water. One (1) pile with an angle of repose so that it forms a crust and will tend to shed water off the pile will be the desirable design. If there are two (2) or more stockpiles, they should be placed far enough apart that they do not trap and hold water.

4. In no case shall runoff from a stockpile cause a violation of water quality standards.

(11) Design and Construction of Pipelines, Pump Stations, and Land Application Systems.

(A) General. Design of pipelines shall be in accordance with sound engineering principles considering the manure properties, management operations, exposure, etc.

1. The minimum pipeline capacity from storage/treatment facilities to utilization areas shall ensure the storage/treatment facilities can be emptied within the time limits stated in the nutrient management plan.

2. All pipes shall be designed to convey the required flow without plugging, based on the type of material and total solids content.

3. All pressure pipelines shall be installed at a depth sufficient to protect against freezing.

4. Pipelines shall be installed with appropriate connection devices to prevent contamination of private or public water supply distribution systems and ground water.

5. Pumps shall be sized to transfer material at the required system head and volume. Type of pump shall be based on the consistency of the material and the type of solids. Requirements for pump installations shall be based on manufacturer's recommendations.

6. The top of all pipelines entering or crossing streams shall be at sufficient depth below the natural floor of the stream bed to protect the pipe. The top of the pipe should be a minimum of three feet (3') below the natural stream floor. Pipelines crossing streams should be designed to cross the stream as nearly perpendicular to the stream flow as possible. Aerial pipeline crossing of streams shall be in accordance with 10 CSR 20-8.120(9).

7. Buried pipeline crossings under roads shall be properly cased.

8. Potable water line and buried manure pipeline separation. There shall be no permanent physical connection between a potable water supply and buried manure pipeline or appurtenances thereto which will permit the passage of wastewater or contaminated water into the potable water supply. Whenever

possible, buried manure pipelines and pump stations should be located at least ten feet (10') horizontally from any existing or proposed water line. Should local conditions prevent a lateral separation of ten feet (10'), a manure pipeline may be laid closer than ten feet (10') if it is in a separate trench or if it is in the same trench with the waterline located at one (1) side on a bench of undisturbed earth. In either case, the elevation of the top of the manure pipeline must be at least eighteen inches (18") below the base of the water line.

(B) Gravity pipelines.

1. The minimum slope for a gravity pipe installation is one percent (1%). The design slope shall account for the head differential and the percent solids of the manure.
2. Clean-out access shall be provided for gravity pipelines at a maximum interval of one hundred fifty feet (150') unless an alternative design is approved. Gravity pipelines shall not have horizontal curves or bends except minor deflections (less than ten (10) degrees) in the pipe joints unless special design considerations are used.
3. Gravity discharge pipes used for emptying a storage/treatment structure shall have a minimum of two (2) gates or valves in series, one of which shall be manually operated.

(C) Force Mains and Pressure Pipes. To minimize settling of solids in the pipeline, design velocities shall be between three (3) and six (6) feet per second.

(D) Testing. Hydro-pressure tests shall be made only after the completion of backfilling operations and after the concrete thrust blocks have set for at least thirty-six (36) hours.

1. The duration of pressure tests shall be a minimum of one (1) hour unless otherwise directed by the engineer.
2. The minimum test pressure shall be the maximum system operating pressure. All tests are to be conducted under the supervision of the engineer.
3. The pipe line shall be slowly filled with water. The specified pressure measured at the lowest point of elevation shall be applied by means of a pump connected to the pipe in a manner satisfactory to the engineer.

(E) Pump Stations.

1. Water supply protection. There shall be no physical interconnection between any potable water supply and a pump station or any of its components which under any conditions might cause contamination of a potable water supply unless otherwise approved by the department's Division of Geology and Land Survey. Manure pumping stations shall be located at least three hundred feet (300') from any potable water supply well.

2. Alarm systems. Alarm systems are required for pumping stations where a failure could cause an overflow. Alarm systems shall be activated in cases of power failure, pump failure or any cause of high water in the wet well.

(F) Land Application Systems. The following shall be considered in the design of land application systems:

1. Any spray application equipment specified shall minimize the formation of aerosols;
2. The pumping system and distribution system shall be sized for the flow and operating pressure requirements of the distribution equipment and the application restrictions of the soils and topography;

3. Provisions shall be made for draining the pipes to prevent freezing, if pipes are located above the frost line;

4. A suitable structure shall be provided for either a portable pumping unit or a permanent pump installation. The intake to the pumping system shall provide the capability for varying the withdrawal depth. The intake elevation should be maintained twelve to twenty-four inches (12"-24") below the liquid elevation. The intake shall be screened so as to minimize clogging of the sprinkler nozzle or distribution system orifices. For use of a portable pump, a stable platform and flexible intake line with flotation device to control depth of intake will be acceptable;

5. Thrust blocking of pressure pipes shall be provided. For use of above ground risers for sprinklers, a concrete pad and support bracing should be considered; and

6. Automatic pump or engine shut-offs, in case of pressure drop, are required.

(12) General System Details.

(A) Mechanical Equipment. Mechanical equipment shall be used and installed in accordance with manufacturers' recommendations and specifications. Major mechanical units should be installed under the supervision of the manufacturer's representative.

(B) Construction Materials. Due consideration should be given to the use of construction materials which are resistant to the action of hydrogen sulfide and other corrosives frequently present in manure.

(C) Grading and Groundcover. Upon completion of construction, the ground shall be graded and reseeded to prevent erosion and the entrance of surface water into any storage structure or animal confinement area.

(D) Potable Water Supply Protection. No piping or other connections shall exist in any part of the manure management system which, under any conditions, might cause the contamination of a potable water supply.

(13) Groundwater monitoring.

An approved groundwater monitoring program may be required around the perimeter of a manure storage site and/or land application areas to facilitate groundwater monitoring. The necessity of a groundwater monitoring program, which may include monitoring wells and/or lysimeters, will be determined by the department's Division of Geology and Land Survey on a case-by-case basis and will be based on potential to contaminate a drinking water aquifer due to soil permeability, bedrock, distance to aquifer, etc. Where the Division of Geology and Land Survey has deemed groundwater monitoring necessary, a geohydrological site characterization will be required prior to the design of the groundwater monitoring program.

(14) Mortality Management.

(A) Class I operations shall not use burial as a permanent mortality management method to dispose of routine mortalities.

(B) Operations shall first receive approval from the department before burying significant numbers of unexpected mortalities and shall conduct the burial in accordance with Missouri Department of Agriculture requirements. Rendering,

composting, incineration, or landfilling, accordance with Chapter 269, RSMo 2010 shall be considered acceptable options and do not require prior approval.

AUTHORITY: section 640.710 and 644.026, RSMo 2010 Filed (month) (date), 2012, effective (month) (date), 2012.*

**Original authority: 640.710, RSMo 1996 and 644.026, RSMo 1972, amended 1973, 1987, 1993, 1995, 2000.*

Public Cost: This proposed amendment will not cost the Department or other state agencies and political subdivisions more than \$500.00 in the aggregate.

Private Cost: This proposed amendment will cost private entities \$24,050 in the aggregate.

NOTICE OF PUBLIC HEARING AND NOTICE TO SUBMIT COMMENTS: Anyone may file a statement in support of or in opposition to this proposed amendment with the Department of Natural Resources, Division of Environmental Quality, Water Protection Program, Barbara Li, P.O. Box 176, Jefferson City, MO 65102. Comments may be sent with name and address through e-mail to barbara.li@dnr.mo.gov. Public comments must be received by November 16, 2011. The Missouri Clean Water Commission will hold a public hearing at 9 A.M., November 2, 2011 at the Lewis and Clark State Office Building, Nightingale Creek Conference Room, 1 East, 1101 Riverside Drive, Jefferson City, Missouri 65102.

Missouri Department of Natural Resources
Regulatory Impact Report
In Preparation For Proposing
New Rule, 10 CSR 20-8.300 Manure Storage Design Regulations

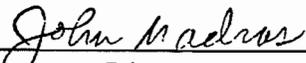
Division/Program: Division of Environmental Quality/Water Protection Program

Rule number: 10 CSR 20-8.300 **Rule title:** Manure Storage Design Regulation

Type of rule action: New Rule

Nature of the rulemaking: Prescribes environmental standards and administrative requirements

Approval of the Completed Regulatory Impact Report



Program Director

11/26/10

Date

Missouri Department of Natural Resources
Regulatory Impact Report
In Preparation For Proposing
New Rule, 10 CSR 20-8.300 Manure Storage Design Regulations

Applicability: Pursuant to Section 640.015 RSMo, “all rulemakings that prescribe environmental conditions or standards promulgated by the Department of Natural Resources...shall... be based on the regulatory impact report...” This requirement shall not apply to emergency rulemakings pursuant to section 536.025 or to rules of other applicable federal agencies adopted by the Department “without variance.”

Determination: The Missouri Department of Natural Resources has determined this rulemaking prescribes environmental conditions or standards and verifies that this rulemaking is not a simple unvarying adoption of rules from other federal agencies. Accordingly, the Department has produced this regulatory impact report which will be made publicly available for comment for a period of at least 60 days. Upon completion of the comment period, official responses will be developed and made available on the agency web page prior to filing the proposed rulemaking with the Secretary of State. Contact information is at the end of this regulatory impact report.

1. Describe the environmental conditions or standards being prescribed.

This rule describes the administrative procedures for obtaining a Concentrated Animal Feeding Operation (CAFO) construction permit and sets technical design standards specific to CAFOs. The technical requirements used previously were from 10CSR20-8.020 and department policy. The proposed rule combines many of the existing procedures and technical standards into a specific regulation pertaining to CAFOs. The proposed rule contains revised procedures or additional parameters that are identified in current peer-reviewed scientific documents. Some of the more significant changes include an increase of the minimum manure storage volume, minimum soil characteristics and separation from ground water tables and bedrock for earthen floored structures, and a change from allowing a CAFO to be built with protection from the 25-year floodplain to the 100-year floodplain. This rule will apply to new and expanding CAFOs.

One of the objectives of this draft rule was to ensure that all newly built or expanding CAFOs in Missouri would meet the EPA’s 2008 Effluent Limitation Guidelines for CAFOs found in 40 CFR 412.

2. A report on the peer-reviewed scientific data used to commence the rulemaking process.

The Department relied heavily on the experience and technical knowledge of Joe Zulovich, Professional Engineer (P.E.), Ph.D., Teng Lim, P.E., Ph.D., and John Lory, Ph.D., all of the University of Missouri’s Extension program, and Troy Chockley, P.E., with the USDA Natural Resources Conservation Service (NRCS.) The draft was written by Barbara Li, P.E. with the Department, in consultation with Darrick Steen, P.E., also with the Department.

In addition, we utilized the American Society of Agricultural and Biological Engineers' technical standards, including EP393.3 FEB04, *Manure Storages*, EP403.3 FEB04, *Design of Anaerobic Lagoons for Animal Waste Management*. Another source both consulted and referenced by this regulation is the USDA's National Engineering Handbook, Part 651: Agricultural Waste Management Field Handbook. Manual 121, Second Edition, was also consulted. This manual was developed by Missouri Department of Natural Resources, University of Missouri Cooperative Extension and USDA's Soil Conservation Service. Additionally, several of the specifications were taken directly from the current version of 10 CSR 20, Chapter 8.

Uncovered, liquid storage structure design considerations were tested using NRCS's Animal Waste Management (AWM), Version 2.4 and University Extension's AG0003, *Lagoon Design*, Revision 3.14. Midwest Plan Service (MWPS) 18, *Manure Management Systems Series* was also used as a source of information.

3. A description of the persons who will most likely be affected by the proposed rule, including persons that will bear the costs of the proposed rule and persons that will benefit from the proposed rule.

All new and expanding CAFOs will be affected, as well as new operations proposing to store un-manipulated manure from CAFOs. These are located in the rural areas across Missouri. In most cases, the increase or decrease in costs to comply with the proposed rule will be negligible.

Most new manure storage structures are covered, for example, deep pit hog buildings store the manure under the hog building. However, in the cases of uncovered manure storage structures, there will be a measurable increase in costs.

In the case of a new poultry building, there may be increased cost due to new requirements for soil exploration if the operation chooses not to use the free services of National Resource Conservation Service. This will mainly impact the South West and West Central parts of our state where most of the poultry industry is located.

We receive between 25 and 50 CAFO construction permit applications every year, including new CAFOs, expanding CAFOs and modifications. All of these applicants would be at least minimally affected. The CAFO owners will bear the cost of the additional requirements.

The beneficiaries include CAFO owners, who will have better manure management systems, the general public, engineering consultants, and Department staff, who will have clearer guidance as to what the construction permit entails, and the state as a whole, particularly downstream residents, who will have a cleaner environment.

4. A description of the environmental and economic costs and benefits of the proposed rule.

Environmental costs:

There should be no costs to the environment from this proposed rule.

Environmental benefits:

- Water quality protection from the 25 year through the 100 year floods from new or expanded portions of CAFOs.
- Well head protection from future or expanded portions of CAFOs by setting equivalent separation distances for the construction of CAFOs from wells as the construction of wells from CAFOs.
- Reduction of the likelihood of an overflowing or leaking lagoon from new or expanded CAFOs.
- Possibility of a reduction in the number of lagoons or uncovered manure-holding structures built, in favor of covered and uncovered tanks and pits.
- Better protection from contamination of groundwater and/or soil from future open lots, solid manure storage areas and poultry buildings.
- Better protection of surface waters by prohibiting uncovered, temporary stockpiling of solid manure in the production areas.
- Better protection of ground water by requiring separation distances from the bottom of manure storage structures and the water table or bedrock, unless curtain drains or interception drains are used.
- Better protection from contamination of groundwater and/or soil by prohibiting the use of burial for routine mortality loss for Class I operations.

Economic Costs:

- Between 0 to 30% increase in the cost of building an earthen basin.
- Expense to build up or locate above the 100-year floodplain. For much of Missouri this will equate to two feet of elevation above the 25 year floodplain.
- In some cases, more in-depth soils investigation will be needed for building earthen basins. There would be no increased cost to CAFO owners using the free technical design services of USDA's Natural Resource Conservation Service (NRCS).
- Additional soils investigation cost for operations not using the free technical design services of NRCS to ensure separation from the bottom of manure storage structures to bedrock or groundwater table.
- Cost of soils investigation for owners not using the free technical design services of NRCS for proposed poultry houses.
- Cost of building a composter or buying an incinerator for Class I operations currently burying routine mortalities. This is not expected to affect many operations.
- Preapproval for burial of large numbers of mortalities.

Economic Benefits:

- Clear design criteria and the ability to use nationally available software could potentially lead to lower design costs due to the potential for an increased number of consultants bidding for the work.
- The increased availability of the 100-year flood maps over the 25-year flood maps will save consultants time in justifying the location in relation to the flood plains. This time saving may result in a slight cost savings to the CAFO owners.
- In general, the owners of the systems built to these higher standards could have lower repair, replacement and liability costs.
- Forestry, fish and wildlife will be better protected, all of which are very important to the state's economic well-being.
- Potentially lower issuance time for permits due to applications submitted as complete.

5. The probable costs to the agency and to any other agency of the implementation and enforcement of the proposed rule and any anticipated effect on state revenue.

There should be no additional costs to the agency for implementation or enforcement over and above the current costs of reviewing CAFO construction permit applications. Though there may be increased time reviewing the applications, this will be absorbed by reduced time explaining and/or debating requirements with consultants and the public at large. As consultants become familiar with the revised requirements, staff time to review the applications should decrease as a result of the efficiencies gained from having clear and consistent standards spelled out in regulation. There may also be a reduction in staff time defending permits in permit appeals to the Administrative Hearing Commission (AHC) due to the existence of clearer requirements.

There will be additional costs for the NRCS. This agency provides both technical design services and cost share on the installations of manure management systems. As the Department worked closely with NRCS on developing these rules and developing cost estimates for the fiscal analysis, we are confident that NRCS feels the new regulations are valuable and are willing to accept the potential increased costs.

6. A comparison of the probable costs and benefits of the proposed rule to the probable costs and benefits of inaction, which includes both economic and environmental costs and benefits.

It is believed that public and Department costs will decrease, due to the expected efficiencies. No action at this time will cause continued use of an inefficient system, which relies on various interpretations, both by the Department and the public. By making it clear as to what the necessary engineering requirements are for submitted documents, more time can be spent on addressing the environmental and regulatory issues involving manure management.

In addition, there are potential environmental costs of inaction, including potential for occasional fish kills, and/or occasional or continuous low levels of contamination of soil and state water resources. This rule will not require changes to existing systems, with the exception of operational changes required by Sections 10 and 14 of the draft rule. Instead this rule will reduce the risk from systems built in the future.

7. A determination of whether there are less costly or less intrusive methods for achieving the proposed rule.

We are proposing what we believe are the least costly and intrusive methods while still providing increased consistency, efficiency, and environmental protection in the regulation of CAFOs.

8. A description of any alternative method for achieving the purpose of the proposed rule that were seriously considered by the department and the reasons why they were rejected in favor of the proposed rule.

In considering the manure storage sizing section, many scenarios and possibilities were evaluated. The proposal reflects the desire to allow, 1) an easily understood design criteria, 2) a

criteria that can utilize NRCS's Animal Waste Management (AWM) software and 3) a design criteria that will end the discrepancy that exists in the amount of safety volume required for an operation that receives runoff from an open lot and from one that does not. In addition, we wanted to ensure that all new lagoons would not be more vulnerable to discharge or overflow from excess rainfall than current policy would permit.

9. An analysis of both short-term and long-term consequences of the proposed rule.

Immediately after the rule becomes effective, some extra time may be needed to help consultants understand the new requirements.

The long-term outcome is that the public and consultants will have a better understanding of the Department's requirements for engineering and permitting documents which will produce efficiencies in the submittal, review and approval process. In addition, the state's waters will be better protected through improved manure management systems and the systems may last longer and have less chance of a malfunction or overflow.

10. An explanation of the risks to human health, public welfare or the environment addressed by the proposed rule.

Improperly managed animal waste can contaminate surface water, ground water and soil with excess nutrients and bacteria. This rule helps ensure the proper management of animal manure through engineering standards, separation distances and administrative requirements.

11. The identification of the sources of scientific information used in evaluating the risk and a summary of such information.

In considering the potential need for poultry, feed lot and composter floor regulations the following documents were reviewed:

- A. *The Degree of Leaching of Nitrogen, Phosphorus, and Permeability of Earthen Floors within Turkey Barns*, K.W. Koelkebeck, et. al., Poultry Science Association, Inc., 2002
- B. *Barn Age Impact on Nutrient Leaching for Turkey Barns Built on Clay Loam Soils*, J. Zhu, et.al, American Society of Agricultural Engineers, 2002
- C. *Nitrate Concentrations Under Turkey Litter*, J. Zhu and D. Schmidt, Minnesota/Wisconsin Engineering Notes, 2000
- D. *Improving Poultry Litter Management and Carcass Disposal*, a guide sheet from the University of Arkansas, Division of Agriculture, 2006
- E. *Feedlot Abandonment Recommended Procedures*, University Nebraska-Lincoln Extension, Institute of Agriculture and Natural Resources, June 2006
- F. *Virginia Farmstead Assessment System: Livestock and Poultry Yard Management*, Virginia Cooperative Extension, May 2009
- G. *Poultry Barn Floors Technical Guidelines for Construction*, Minnesota Pollution Control Agency, December 2007

In summary, these documents pointed out the potential risks of contamination from manure stored on soil. Risk was reduced where clay (or low permeability) soils were present and the groundwater table was not near the surface.

12. A description and impact statement of any uncertainties and assumptions made in conducting the analysis on the resulting risk estimate.

The intent of the regulations was to provide the desired level of efficiency and environmental protection while minimizing additional costs to the CAFO owners. There are dozens of uncertainties and assumptions, but these have all been agreed to by our team of experts and further analyzed in the Stakeholder's meetings. Based on these discussions, the resulting rule is reasonable and is believed to be acceptable by all parties that were engaged in the CAFO workgroup process.

13. A description of any significant countervailing risks that may be caused by the proposed rule.

The Department has not identified any significant countervailing risks that would result from the implementation of the proposed rule.

14. The identification of at least one, if any, alternative regulatory approaches that will produce comparable human health, public welfare or environmental outcomes.

The Department could have produced a Manure Storage Design Technical Standard rather than design regulations. In evaluating this option, the Department determined that a Technical Standard is better suited in situations where conditions are likely to change every few years. Setting the standards in regulation provides better predictability and stability for the industry, consultants and the Department staff.

15. Provide information on how to provide comments on the Regulatory Impact Report during the 60-day period before the proposed rule is filed with the Secretary of State

RIRs for current rule developments of the Water Pollution Control Branch may be found on the Water Protection Program's Rule Development page:
<http://www.dnr.mo.gov/env/wpp/rules/wpp-rule-dev.htm>

The public may comment on this RIR from Dec. 1, 2010 through January 30, 2011.
Comments can be submitted by e-mail to Barbara Li at Barbara.Li@dnr.mo.gov or by mail to:

Barbara Li
Missouri Department of Natural Resources
Water Protection Program
P.O. Box 176
Jefferson City, Missouri 65 102-01 76

16. Provide information on how to request a copy of comments or the web information where the comments will be located.

*Comments may be viewed on the Department's web site at:
<http://dnr.mo.gov/env/wpp/rules/wpp-rule-dev.htm> Copies of these comments may also be
requested directly from Barbara Li at 573-751-1299 or via e-mail at Barbara.Li@dnr.mo.gov*

**FISCAL NOTE
PRIVATE COST**

- I. Department Title: MISSOURI DEPARTMENT OF NATURAL RESOURCES
Division Title: Environmental Quality
Chapter Title: 10 CSR 20-8.300 Manure Storage Design Regulations**

Rule Number and Title:	10 CSR 20-8.300 Manure Storage Design Regulations
Type of Rulemaking:	New regulation

II. SUMMARY OF FISCAL IMPACT

Estimate of the number of entities by class which would likely be affected by the adoption of the rule:	Classification by types of the business entities which would likely be affected:	Estimate in the aggregate as to the cost of compliance with the rule by the affected entities:
Four dairy operations each year	New or expanding dairies	\$18,400/yr
Ten poultry operations each year	New or expanding poultry operations	\$2,500/yr
One swine operation every three years	Expanding swine operation, currently located within the 100 year floodplain	\$800/yr
Total		\$21,700

III. WORKSHEET

1. Four new or expanding grazing dairies, spending an extra \$4600 each to build a larger earthen manure storage basin.

$$4 \text{ dairies/year} \times \$4,600 = \$18,400/\text{year}$$

2. Ten poultry operations spending \$250 to conduct soils investigations, not previously required.

$$10 \text{ poultry operations/year} \times \$250 = \$2,500$$

3. One confinement operation building a levee to protect the expanding operation from the 100-year flood. This is estimated to happen only once every three years.

$$\text{One (swine or other) operation} \times \$2,400/3 \text{ years} = \$800/\text{year}$$

IV. ASSUMPTIONS

The past five years (Jan. 2006 – Dec. 2010) are used as a baseline to predict what will be built in the future.

All dollar figures are based on 2010 costs.

New grazing dairies will need to build larger earthen manure holding basins due to the increase in the minimum days of storage from 90 in a 1-in-10 year to 180 in an average year. Based on an analysis of the 20 grazing dairy basins permitted over the last five years, it is estimated that the rules will increase the cost of construction by about \$4,600 per basin, which represents an increase of almost 30%. At four built per year, this is a total increase of \$18,400/year. This cost will be incurred by the dairy owners.

Soil testing before building earth-floored poultry houses. Forty-nine (49) permits have been issued for new sets of poultry houses in the last five years. Because NRCS provides technical services on nearly all permitted poultry construction in Missouri, NRCS is assumed to incur the cost of analyzing the soil. They conduct a site visit already and therefore will not need to spend additional resources to classify the soil. If NRCS, in the future, does not provide this service the private sector will need to provide the service. The expense of hiring a private soil scientist to conduct this evaluation is estimated at \$250. For the purposes of this fiscal note, NRCS is assumed to provide this service.

The permittee will have to provide the open pit. Assuming that a backhoe is rented for this purpose, the cost estimate is \$250 for the backhoe rental and associated costs. At approximately ten per year, the total annual cost is estimated at \$2,500.

It is assumed there is no expense associated with *not* locating a poultry building at a location the previous regulations allowed. It is assumed that producers will select a different site rather than amend the soil or install a rigid floor.

The private sector will incur expenses to build a small levee to protect an expanding operation from the 100-year floodplain. For much of Missouri this will equate to two feet of elevation above the 25 year floodplain. The total cost of the small levee is estimated at \$2,400. This will be a rare occurrence and will likely take place not more than once every three years. This leaves a total annual cost of \$800 per year.