State of Wisconsin
Livestock Facility Siting Review Board

PO Box 8911
Madison, WI 53708-8911
livestocksiting.wi.gov

Meeting Agenda

State of Wisconsin
Livestock Facility Siting Review Board Meeting

11:00 AM
April 1, 2016
DATCP Board Room
2811 Agriculture Drive, Madison

CALL TO ORDER— Andy Johnson, LFSRB Chair

- Open meeting notice
- Approval of agenda
- Approval of February 27, 2015 meeting minutes
- Introduction of Scott Sand, new board member, and recognition for outgoing member, Fran Byerly

ELECTION OF OFFICERS—Cheryl Daniels, Board Attorney

UPDATE ON LIVESTOCK SITING IN WISCONSIN—DATCP Staff

DEPARTMENT UPDATE ON SITING RULE– DATCP Staff

- Report of the technical committee regarding review of livestock siting standards
- Rulemaking status
- NRCS 590 standard update

BREAK – The Board will not have a formal break for lunch but will have a short break and continue with a working lunch.

ETHICS AND PUBLIC RECORDS PRESENTATION – Karley Downing, DATCP Chief Legal Counsel

TENTATIVE BOARD SCHEDULE FOR 2016 MEETINGS – No set meetings, although we will look to Fridays when requesting meeting dates.

ADJOURN

Andy Johnson, Chair • Bob Topel, Vice-Chair • Bob Selk, Secretary
Members: Scott Sand • Dr. Jerome Gaska • Lee Engelbrecht • Ray Diederich

State of Wisconsin
Livestock Facility Siting Review Board

Meeting Minutes

State of Wisconsin
Livestock Facility Siting Review Board Meeting

12:00 PM
February 27, 2015
DATCP Board Room
2811 Agriculture Drive, Madison

12:00 p.m. CALL TO ORDER— Andy Johnson, LFSRB Chair

The meeting was called to order by Chairman Andy Johnson at 12:00 p.m. Roll call was taken by Daniels, members attending via teleconference included Engelbrecht, Byerly, Diederich, Gaska, Selk, and Topel. In attendance at DATCP were Daniels, Castelnuovo, and Trumble with three visitors in audience.

Castelnuovo confirmed that the meeting was publicly noticed as required. Topel moved to approve the agenda as presented. Engelbrecht seconded. The motion carried. Gaska moved to approve the May 16, 2014 minutes as prepared. Byerly seconded. The motion carried.

12:05 p.m. ELECTION OF OFFICERS – Cheryl Daniels, Board Attorney

The committee decided to elect a slate of officers. Topel moved to nominate Andy Johnson for Chairman, Byerly seconded the motion. Byerly moved to nominate Bob Topel for Vice-Chairman, Johnson seconded the motion. Topel moved to nominate Bob Selk for Secretary, Johnson seconded the motion. The nominations were closed and Engelbrecht moved to cast a unanimous ballot for the slate of officers, Diederich seconded the motion, motion carried.

12:10 p.m. DEPARTMENT UPDATE ON SITING INCLUDING REVIEW OF LIVESTOCK SITING STANDARDS– DATCP STAFF

Castelnuovo presented an update on livestock siting and the progress of the livestock siting technical review committee.

To date, 102 ordinances have been adopted. They are located in 25 counties and 71 towns (largest group). 63 are through zoning and 38 are through licensing. 124 permits have been issued.

An expert panel has been formed and is made up of 18 public and private sector members/advisors whose assignment is to focus on the technical aspects of siting rule. Castelnuovo highlighted tentative recommendations related to incorporation of NR 151 and ATCP 50 standards, engineering, odor management, and nutrient management. A timeline for completing the committee's work was shared.

DRAFT

Notes from the most recent technical committee meeting can be forwarded to the board if there is an interest. Daniels explained the rulemaking steps and timeline moving forward once the technical committee completes the review and recommendations. Nuisance impacts will be addressed by the technical committee through setbacks. Reverse osmosis systems and their effectiveness were discussed. There is a balancing act that must take place in establishing siting standards such as the odor management worksheet and making changes to those standards.

12:55 a.m. TENTATIVE BOARD SCHEDULE FOR 2015 MEETINGS

No meeting dates were set, although the group agreed to focus on Fridays when requesting meeting dates. Terms of member appointments were reviewed. Terms for Selk and Gaska will be expiring in 2 years.

1:00 p.m. ADJOURN

Byerly moved to adjourn the meeting. Diederich seconded. The meeting was adjourned at 1:00 p.m.

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Bob Selk, Secretary Date

Recorder: LT

DRAFT

Livestock Facility Siting
Four-Year Review:
Report and Recommendations from the Technical Expert Committee

September 22, 2015

Executive Summary

The Technical Expert Committee (TEC) was convened as part of the Department of Agriculture Trade, and Consumer Protection's (DATCP) required four year review of the livestock facility siting standards under ch. ATCP 51, Wis. Admin. Code (siting rule or ATCP 51). DATCP Secretary Ben Brancel appointed eight Members and nine Advisors to serve on the committee. Members with expertise in nutrient management, engineering, odor, setbacks, and public health were tasked with making recommendations on technical standards in the siting rule. Chaired by the DATCP's Deputy Secretary, the committee met on seven occasions from October 2014 to June 2015 to discuss the assigned questions and reach an agreement on the final recommendations presented in this report for consideration by the DATCP Secretary.

The TEC Members' recommendations are arranged according to topic areas: Consistency of water quality rules affecting livestock operations (NR 151, ATCP 50, ATCP 51), Engineering, Nutrient Management (including manure irrigation), Odor, and Setbacks. The main body of the report includes each of the questions asked of the TEC, and a list of considerations related to each recommendation:

Committee Recommendations

Consistency of Rules (Incorporation of NR 151 and ATCP 50 Standards)

- To be consistent with the state standards in chs. NR 151 Runoff Management (NR 151) and ATCP 50 Soil and Water Resource Management Program (ATCP 50), Wis. Admin. Codes, which are collectively referred to as the "nonpoint rules", ATCP 51 should include a requirement for livestock operators to manage their operations to avoid significant discharges of process wastewater to waters of the state.
- ATCP 51 should require livestock facilities with 500 or more animal units to meet NRCS waste treatment standard 629 (January 2014) (NRCS 629) for the design, construction and maintenance of new or substantially altered bunker silos, paved or other lined structures that store feed with as low as 40 percent moisture.
- ATCP 51 should allow livestock facilities under 1,000 animal units to design and construct new or expanded feed storage structures smaller than one acre in accordance with the appropriate Table 1, 2, or 3 in NRCS 629 (January 2014) if the proposed storage structures present low environmental risks not requiring a collection system or vegetative treatment areas. A clean water diversion would be required, if applicable.
- An operator must perform a site assessment, and where appropriate a structural assessment for expanded feed storage structures, to verify low environmental risk. The evaluation must document that any existing structure to be altered is not causing a substantial discharge, the site of the proposed structure has adequate separation distances to protect against surface water and groundwater contamination, and the soils surrounding the proposed structure do not have a high potential for leaching contaminates to groundwater. (This recommendation is similar to the evaluation required for existing feed storage structures; see page 4, Engineering: Feed Storage).
- ATCP 51 should require milking center wastewater be discharged to waste storage or other structure designed according to NRCS waste storage facility standard 313 (January 2014) (NRCS 313).

- ATCP 51 should create an exception to the milking center wastewater storage requirement to allow a livestock facility to manage wastewater using the treatment practices in NRCS 629 (January 2014) if the livestock facility produces less than 500 gallons of wastewater daily and does not store the wastewater for an extended period.
- ATCP 51 should require cropland covered by a permitted facility's nutrient management plan to have an average Phosphorus Index (PI) of 6 over a rotation and an annual PI not to exceed 12.
- A local government should be allowed to request nutrient management plan updates and other documentation to monitor a permitted livestock facility's compliance with the PI requirement, regardless of the livestock facility's size.
- ATCP 51 should incorporate the following standards: a) a requirement that pastures be managed to control erosion and be covered by a nutrient management plan if they have certain stocking rates consistent with ATCP 50, and b) a requirement that tillage not be conducted within a 5-20 foot setback between cropped fields and surface water.
- No adjustments should be made to the committee's earlier recommendations to account for differing standards imposed by NR 151 and ch. NR 243 Animal Feeding Operations (NR 243), Wis. Admin. Code. In light of DNR's current or future incorporation of the NR 151 performance standards into CAFO permits issued under NR 243, livestock facilities permitted under ATCP 51 will not be subject to requirements greater than those imposed on CAFOs under NR 243.
- To achieve consistency with the nonpoint rules, ATCP 51 should update all references to listed NRCS practice standards [i.e. NRCS waste storage facility standard 313 (January 2014), NRCS waste transfer standard 634 (January 2014), NRCS waste facility closure standard 360 (March 2013), NRCS vegetated treatment area standard 635 (October 2014)].

Engineering: Animal Lots

- ATCP 51 should retain the "BARNY" model as the tool used to predict runoff from animal lots.
- ATCP 51 should require a livestock facility to submit documentation (e.g. a printout of the BARNY model inputs and outputs) as part of its siting application to verify compliance with the runoff limits for animal lots.
- ATCP 51 should require applicants to document management or structural practices proposed as "minor alterations" to achieve compliance with ATCP 51.20(2) runoff thresholds for animal lots. The applicant must submit a design for the practice that meets the applicable NRCS or other technical standard.
- The rule should specify the following: lot cleaning, changes to provide laminar flow (e.g., shaping, seeding), roof gutters, diversions, underground outlets, and sediment basins, as minor alterations.
- ATCP 51 should be modified to require installation of "minor alterations" within one year of a permit approval, and authorize a local government to shorten that time if the unmanaged runoff presents an unacceptable risk of contamination to surface or groundwater.

Engineering: Waste Storage Structures

- While technically sound, the standards and procedures for evaluation of existing waste storage structures and waste transfer systems (Worksheet 4, Appendix A, 390-33 and Existing Manure Storage Evaluation Flowchart) should be clarified and improved to provide

more accurate guidance in assessing water quality risks. Specific areas of improvement include:

- Recognizing waste storage structures as old as 10 years may be safely operated if an inspection reveals no problems, as long as they were designed according to the technical standards in effect at the time storage was constructed.
- Establishing criteria for emptying storage structures, especially earthen-lined structures, to allow for proper inspection and identifying exceptions to those criteria.
- Requiring test pits or borings to complete a facility evaluation if there is no documentation available regarding a facility's separation distances to groundwater or bedrock.

Engineering: Odor Management

- ATCP 51 and related worksheets should be updated to reference the most current technical standards for the following engineered and related practices used in connection with odor management and other siting standards:
  - For composting facilities, reference NRCS composting facility standard 317 (January 2012).
  - For anaerobic digesters, NRCS anaerobic digester standard 366 (August 2011).
  - For digester substrate storage, NRCS waste storage facility standard 313 (January 2014) or DNR industrial waste rules, such as ch. NR 213 Lining of Industrial Lagoons and Design of Storage Structures, Wis. Admin. Code, based on types and amounts stored.
  - For manure residual storage, NRCS waste storage facility standard 313 (January 2014).
  - For solid separation, NRCS waste separation facility standard 632 (April 2014).
  - For treatment of liquid waste, NRCS waste treatment standard 629 (January 2014), except for vegetated treatment areas covered under NRCS vegetated treatment area standard 635 (October 2014).
  - For sand settling lanes, NRCS waste separation facility standard 632 (April 2014).
  - For impermeable manure storage covers, NRCS roofs and covers standard 367 (October 2011).
  - For natural crust and bio-covers, DNR recommendations related to control practices for air emissions.
  - For treatment membranes, NRCS waste treatment standard 629 (January 2014).

Engineering: Feed Storage

- ATCP 51 should require permit applicants to evaluate existing bunker silos, paved or other lined feed storage structures from ½ to ¾ acre in size to determine if the structures are in good condition and do not present risks of discharging leachate or contaminated runoff to waters of the state.
- The evaluation process should be consistent with evaluation processes for manure storage and animal lots, and include a flowchart to outline the evaluation process.
- ATCP 51 should include management requirements for existing storage structures including those operated without modification.

Engineering: Monitoring Compliance

- ATCP 51 should provide more clarity regarding local government monitoring of a permitted facility's compliance with the siting standards, including local review of whether engineered practices are properly operated and maintained.

- DATCP should strongly encourage local governments to monitor compliance, and support these local efforts by developing effective tools and providing training and guidance. Checklists are effective tools to ensure accuracy, completeness, and consistency in monitoring livestock facilities for compliance.

Nutrient Management

- ATCP 51 should not exempt CAFOs from requirements to submit documentation to substantiate a nutrient management plan complies with NRCS nutrient management standard 590 (September 2005) (NRCS 590) and to submit annual plan updates if requested by a local government.
- ATCP 51 should retain the requirement that applicants submit nutrient management plans based on the maximum number of animal units for which they are seeking local approval.
- ATCP 51 should simplify the permit modification process to enable permitted livestock facilities to secure streamlined approval of nutrient management plans if they add animals in the future.
- Waste and Nutrient Management Worksheet 3 in ATCP 51 should be modified to require an applicant to identify rented and owned land spreading acres.
- Based on the concepts in the March 23, 2015 draft of the revised NRCS nutrient management standard 590, ATCP 51 should incorporate the revised NRCS 590 upon adoption. (For consistency within the agency, the updated NRCS 590 should be incorporated into ATCP 50 and 51.)
- DATCP should clarify how local governments may impose locally-identified nutrient application restrictions authorized in the current or revised version of NRCS 590 including restrictions in Section V.A. designed to protect surface and groundwater resources.
- DATCP should help local governments understand how they can meet current state requirements for adopting more stringent standards to protect groundwater.
- By incorporating the latest version of NRCS 590, the siting rule will include manure application setbacks and restrictions designed to protect surface and ground water quality.
- ATCP 51 should not incorporate the recommendations of the Manure Irrigation Workgroup, whose work will be completed in the summer of 2015.

Odor: Odor Generation

- Worksheet 2 (Chart 2) of ATCP 51 should retain the odor generation numbers for the 17 housing types, and make modifications, as specified in Appendix A, to increase the odor generation number for dairy/beef alley flush to storage, and to add a new lower generation number for poultry layer housing using dryer belts.
- Worksheet 2 (Chart 2) should retain the odor generation numbers for Waste Storage Facilities, but base the method for predicting odors on surface area, not storage duration, as specified in Appendix A.
- Worksheet 2 (Chart 2) should add odor generation numbers for sand and solids separation systems, as specified in Appendix A, to account for acres of active treatment area and storage of separated materials.

Odor: Odor Control

- Worksheet 2 (Chart 3) of ATCP 51 should retain the credits for 17 odor control practices for housing, manure storage and animal lots, and make modifications, as specified in Appendix

B, to add wet scrubbers and recirculated flush water as a Category B odor control practice for housing; replace fresh water flush with recirculated flush water as a Category B odor control practice for housing; increase the credit for housing windbreaks and geotextile covers; reduce the credit for anaerobic digestion, and solids separation and reduction; and eliminate the predetermined credit for aeration of storage.

- Worksheet 2 (Chart 3) should change the specifications, as detailed in Appendix B, for the following odor control practices for housing and manure storage: diet manipulation, bio-filter, treated flush water, anaerobic digestion, chemical and biological additives, compost, solids separation and reduction, and natural crust.
- ATCP 51 should continue to exempt the three categories of facilities from the odor standard (i.e. a new livestock facility with fewer than 500 animal units, an expanded livestock facility with fewer than 1,000 animal units, and a livestock facility in which all livestock structures will be located at least 2,500 ft. from the nearest affected neighbor).
- ATCP 51 should require all applicants to complete plans related to incident response, employee training, and odor management.
- Applicants who complete the required three plans should receive additional points, not to exceed 100, toward a passing odor score.

Odor: Odor Scoring

- In determining the number of points credited toward a passing odor score, DATCP should consider and balance the three approaches collectively used to manage odor in ATCP 51: management and other plans, modeling using Worksheet 2, and road and property line setbacks for livestock structures.
- To support compliance monitoring, DATCP should support local government efforts by developing checklists and providing other support to facilitate local review.

Setbacks

- For new or substantially modified manure storage structures located on livestock facilities over 1,000 animal units, ATCP 51 should require a greater road and property line setback than 350 feet.
- For livestock facilities under 1,000 AUs, DATCP should consider requiring greater setbacks for livestock structures, unless these facilities use established methods to document how they will manage odor to secure a passing odor score.
- To provide greater protection for neighbors, DATCP should consider increasing the property line/road setback distance for structures (such as feed storage) that may have nuisance impacts, applying increased setbacks to occupied buildings in addition to property line setbacks, and accounting for schools and other high density uses in establishing a setback.

Technical Expert Committee: Background and Process

This is the third iteration of the Technical Expert Committee (TEC) convened by DATCP (2004, 2010) to provide advice regarding the livestock facility siting standards under ch. ATCP 51 Wis. Admin Code (siting rule).

Under sec. 93.90, Stats. (siting law), the DATCP Secretary is required to appoint a committee of experts to review the technical standards in ATCP 51. In carrying out this requirement, DATCP committed to a process with an exclusive focus on scientific and technical matters and a committee composed of experts from the public and private sector selected based on their knowledge and experience with water quality, odor and other technical areas covered under ATCP 51.

Background: Groundwork for the TEC

Before convening the 2014-2015 TEC, DATCP first presented a four year evaluation report on implementation of the livestock facility siting rule in February 2014 to the Board of Agriculture, Trade and Consumer Protection (ATCP Board). The report addressed the appropriate areas for the agency's rule review and identified policy and other issues beyond the scope of the rule review. As follow-up, DATCP invited Farm/Livestock Groups, Government Agency Groups, and Environmental/Citizen Groups to participate in separate listening sessions. All participants were asked two questions:

1. What do you like/what is working in the siting rule?
2. What changes would you like to be made to the livestock siting rule?

Based on feedback from stakeholders, DATCP narrowed the issues appropriate for the committee, and developed the assignment questions for the committee to address. Specifically DATCP undertook these actions:

1. Identified issues within the committee's scope of review. The need to ensure consistency between water quality standards in ATCP 51 and the other water quality rules (NR 151 and ATCP 50).
2. Established sideboards for issues outside of the committee's scope, including but not limited to policy issues such as the potential lack of finality surrounding a local government's determination regarding the completeness of a siting application were deemed outside the TEC's scope.
3. Developed assignment questions with background information for the committee that allowed for maximum participation by all Members and Advisors.

TEC Process: Committee appointments

For the 2014-2015 TEC, DATCP appointed eight Members and nine Advisors (see page 10 for list). Drawn from both the public and private sectors, the participants were selected because they possessed expertise necessary to provide advice regarding permitting of livestock operations, air emissions, odor, livestock regulation, nutrient management, public health, runoff management, and agricultural engineering.

TEC Process: Review scope and criteria

The committee was charged with recommending options for adjusting the existing siting technical standards and related rule provisions to ensure the standards keep pace with changing agricultural practices and remain environmentally protective. The standards in the siting rule must be practical for producers to achieve and for local governments to implement, while continuing to meet the objectives of the siting law.

The scope of the committee was limited to technical issues related primarily to water quality and odors. Manure irrigation was not covered in detail by the committee since a UW-Extension workgroup was charged with evaluating research in that area. However, on June 11, 2015 the committee did receive a status report from the workgroup, whose work was nearly complete, and considered whether or not to incorporate into the siting rule any recommended standards related to manure irrigation.

The required review of the siting rule has multiple purposes:

- Maintain a viable rule by responding to new information.
- Balance responsible industry growth with community interests.
- Ensure the siting standards keep pace with and reflect changes in the size, technology, and complexity of livestock operations.
- Update the siting standards to incorporate important changes in technical standards.
- Respond to local experiences with permitted and non-permitted farms.
- Improve implementation of the siting rule through refinements to procedures.

These purposes were reflected in the questions posed to the committee. Assignment questions focused on the impacts of facility size, Natural Resources Conservation Service (NRCS) updates to technical standards, developments in research and new technologies, and implementation experiences including monitoring for compliance.

In addressing their assignment, the committee followed an objective and science-based approach consistent with their background and expertise. Deliberations focused on research, field studies, knowledge and experience of the nationally-recognized experts, and other credible sources of information related to water quality, odor and other impacts of livestock facilities. Also considered were changes in technical standards developed by NRCS and others. The group evaluated this information based on soundness of the methods used, validation using peer review, and other criteria to assess reliability.

The committee's considerations were informed to a degree by conditions and issues related to farms granted local siting permits in the last eight years. However, the committee was limited in its capacity to evaluate this information. First, due to the lack of verifiable data pertaining to conditions on existing permitted farms, the information did not fit within accepted scientific approaches used for evaluation. Second, the lack of data reported to DATCP concerning performance of permitted farms makes it difficult to interpret how the standards are working on the ground. The committee took a cautious approach to evaluation. Where there was uncertainty, the committee considered options to retain the status quo or make adjustments in the standard to reflect the lack of clarity in science supporting the standard.

While the primary focus was on objective, science-based information, the siting law required the committee also consider whether proposed changes to the standards are:

- Protective of public health or safety
- Practical and workable
- Cost-effective
- Designed to promote the growth and viability of animal agriculture in this state
- Designed to balance the economic viability of farm operations with protecting natural resources and other community interests
- Usable by officials of political subdivisions

TEC Process: Meeting framework and deliberative process

Committee meetings took place on September 18, October 15, November 18, and December 19, 2014, and January 27, March 24, and June 11, 2015. During these meetings, technical committee Members and Advisors answered all assignment questions, and then reviewed and vetted all recommendations for inclusion in this report.

To ensure a transparent and public process related to the committee's deliberations, DATCP committed to the following:

- Publicly notice and conduct each meeting according to the open meetings law.
- Prepare staff notes for each meeting.
- Maintain a website to share critical documents and information, such as the committee assignment, meeting agendas, and staff notes for each committee meeting: http://datcp.wi.gov/Environment/Livestock_Siting/Technical_Expert_Committee/index.aspx.

The committee followed ground rules intended to create an environment conducive to the free exchange of information and thoughtful deliberation on technical issues. Though the public did attend committee meetings, in accordance with state law, there were no presentations by the public. This structure recognized that there will be other occasions for the public to comment and share their ideas, during any rulemaking related to the committee's recommendations.

The committee utilized a consensus process to develop their recommendations. Although the turnaround time made it challenging to fully address all assignment questions and resolve every difference of opinion among TEC Members and Advisors, the process allowed the committee to complete its work in achieving final, consensus recommendations.

Livestock Siting Technical Expert Committee 2014-15

Committee Chair

Jeff Lyon – Deputy Secretary, DATCP

Technical Committee Members

Matt Ruark – Department of Soil Science, UW-Madison
Jerry Halverson – Manitowoc County Soil and Water Conservation Department
Charles McGinley, P.E. – St. Croix Sensory, Inc.
Tonya Gratz – Green County Land and Water Conservation Department
Kevin Beckard – AgSource Laboratories
Bob Pofahl, P.E. – Resource Engineering Associates, Inc.
Brian Holmes – (retired) Department of Biological Systems Engineering, UW-Madison
Mark Borchardt – US Dairy Forage Research Center, USDA

Technical Committee Advisors

Pat Murphy – Natural Resource Conservation Service, USDA
John Ramsden – Natural Resource Conservation Service, USDA
Robert Thiboldeaux – WI Bureau of Environmental and Occupational Health, Department of Health and Family Services
Joe Baeten – WI Department of Natural Resources
David Panofsky – WI Department of Natural Resources
Gretchen Wheat – WI Department of Natural Resources
Sue Porter – WI Department of Agriculture, Trade and Consumer Protection
Steve Struss – WI Department of Agriculture, Trade and Consumer Protection
Richard Castelnuovo – WI Department of Agriculture, Trade and Consumer Protection

Recommendations and Considerations

Livestock Siting Technical Expert Committee

The following captures the committee's response to the questions posed in assignments prepared by DATCP. These responses, which include specific recommendations and related considerations, are the product of seven committee meetings held from September 2014 to June 2015. The committee used a consensus process to reach agreement on its recommendations. Except for the last meeting on June 11, 2015, staff notes were prepared to summarize committee discussions, and were reviewed by the committee members at a subsequent meeting. At its last meeting, the committee reviewed in detail the cumulative set of staff notes in anticipation of preparing a final report.

The committee's recommendations are arranged by the five topic areas defined in the assignment: Consistency of water quality rules affecting livestock operations (NR 151, ATCP 50, ATCP 51), Engineering, Nutrient Management (including manure irrigation), Odor, and Setbacks. Within these topic areas, each of the committee's assignment questions is reproduced, followed by a bulleted list of committee recommendations and considerations.

Consistency of Rules (Incorporation of NR 151 and ATCP 50 Standards)

Question #1: Both NR 151 and ATCP 50 adopted a prohibition against significant discharges of process wastewater. What is the best way to accomplish incorporation of this standard into ATCP 51?

Recommendation

- To be consistent with the state standards in NR 151 and ATCP 50, which are collectively referred to as the "nonpoint rules", ATCP 51 should include a requirement for livestock operators to manage their operations to avoid significant discharges of process wastewater to waters of the state.

Considerations

In applying this new standard, ATCP 51 should use the definition of process wastewater and significant discharge in NR 151 and NR 243, but not the "zero discharge" concept in NR 243. Complying with this standard will depend on a number of factors including a farm's proximity to waters of the state. The siting application should be modified to better document current and future compliance with the process wastewater requirement.

Question #2: Consistent with NR 151 performance standards, ATCP 50 adopted NRCS 629 [January 2014] as the technical standard for the design, construction and maintenance of new and substantially altered feed storage runoff control systems. What is the best way to accomplish incorporation of NRCS 629 into ATCP 51?

Recommendations

- ATCP 51 should require livestock facilities with 500 or more animal units to meet NRCS 629 (January 2014) for the design, construction and maintenance of new or substantially

altered bunker silos, paved or other lined structures that store feed with as low as 40 percent moisture.

- ATCP 51 should allow livestock facilities under 1,000 animal units to design and construct new or expanded feed storage structures smaller than one acre in accordance with the appropriate Table 1, 2, or 3 in NRCS 629 (January 2014) if the proposed storage structures present low environmental risks not requiring a collection system or vegetative treatment areas. A clean water diversion would be required, if applicable.
- An operator must perform a site assessment, and, where appropriate, a structural assessment for expanded feed storage structures, to verify low environmental risk. The evaluation must document that any existing structure to be altered is not causing a substantial discharge, the site of the proposed structure has adequate separation distances to protect against surface water and groundwater contamination, and the soils surrounding the proposed structure do not have a high potential for leaching contaminates to groundwater. (This recommendation is similar to the evaluation required for existing feed storage structures; see page 17, Engineering Question #5).

Considerations

These design and construction requirements apply to new or substantially altered storage areas holding commonly stored feeds, not just feed over 70 percent moisture (cannery, brewers and distillers byproduct feeds). The design and construction requirements do not apply to feed stored in bags, bins, or tower silos.

Question #3: ATCP 50 adopted NRCS technical standard 629 as the technical standard for control of milking center wastewater. What is the best way to incorporate this standard into ATCP 51 and achieve consistency with the nonpoint rules?

Recommendations

- ATCP 51 should require milking center wastewater be discharged to waste storage or other structure designed according to NRCS 313 (January 2014).
- ATCP 51 should create an exception to the milking center wastewater storage requirement to allow a livestock facility to manage wastewater using the treatment practices in NRCS 629 (January 2014) if the livestock facility produces less than 500 gallons of wastewater daily and does not store the wastewater for an extended period.

Question #4: Both NR 151 and ATCP 50 adopted a phosphorous management tool for croplands. What is the best way to accomplish incorporation of this component into ATCP 51?

Recommendations

- ATCP 51 should require cropland covered by a permitted facility's nutrient management plan to have an average Phosphorus Index (PI) of 6 over a rotation and an annual PI not to exceed 12.
- A local government should be allowed to request nutrient management plan updates and other documentation to monitor a permitted livestock facility's compliance with the PI requirement, regardless of the livestock facility's size (see Nutrient Management Question #1).

Considerations
A facility's required nutrient management plan, if it includes an appropriate phosphorus index (PI) calculation value, may be used to demonstrate compliance with these PI requirements. A livestock operator may meet the phosphorus management requirements in NRCS 590 (September 2005) by using a soil test management approach as an alternative to a PI calculation.

Question #5: Both NR 151 and ATCP 50 adopted the following standards: a) a requirement that pastures be managed to control erosion and be covered by a nutrient management plan if they have certain stocking rates, and b) a requirement that tillage not be conducted within a 5-20 foot setback between cropped fields and surface water. Should these requirements be included as a standard that must be implemented as a condition of a siting permit?

Recommendation

- ATCP 51 should incorporate the following standards: a) a requirement that pastures be managed to control erosion and be covered by a nutrient management plan if they have certain stocking rates consistent with ATCP 50, and b) a requirement that tillage not be conducted within a 5-20 foot setback between cropped fields and surface water.

Considerations
As a condition of their siting permits, livestock facilities would be responsible for maintaining compliance with these requirements on all cropland, including rented acres.

Question #6: Regarding recommendations for Questions #1-5, what, if any, adjustments should be made if full incorporation of NR 151 and ATCP 50 standards subjects livestock facilities permitted under ATCP 51 to requirements greater than those imposed on CAFOs under NR 243?

Recommendation

- No adjustments should be made to the committee's earlier recommendations to account for differing standards imposed by NR 151 and NR 243. In light of DNR's current or future incorporation of the NR 151 performance standards into CAFO permits issued under NR 243, livestock facilities permitted under ATCP 51 will not be subject to requirements greater than those imposed on CAFOs under NR 243.

Considerations
DNR does not currently enforce the tillage setback through its CAFO permits, but it may revise its rule requirements to incorporate this and other NR 151 requirements. While DNR does not currently enforce the PI standards in NR 151, it has other CAFO requirements that function in a similar manner and may include this particular requirement in a future rule update.

Question #7: To be consistent with ATCP 50, should ATCP 51 references be updated to reflect the following NRCS technical standards?

a. NRCS technical guide waste storage facility standard 313 (January, 2014).
b. NRCS technical guide, closure of waste impoundments standard 360 (March, 2013).
c. NRCS technical guide waste treatment standard 629 (January, 2014).
d. NRCS technical guide waste transfer standard 634 (January, 2014).

e. NRCS technical guide vegetated treatment area standard 635 (September, 2012).

Recommendation

- To achieve consistency with the nonpoint rules, ATCP 51 should update all references to the listed NRCS technical standards [i.e. NRCS waste storage facility standard 313 (January 2014), NRCS waste transfer standard 634 (January 2014), NRCS waste facility closure standard 360 (March 2013), NRCS vegetated treatment area standard 635 (October 2014)].

Considerations

The committee recognized that references to additional NRCS practice standards (e.g. NRCS 590) may need to be updated in ATCP 51.

Engineering

Question #1: The siting rule references a model for predicting animal lot runoff, the Wisconsin Barnyard Runoff Model (BARNY), that is not the most current model supported by NRCS, which now uses the Barnyard Evaluation Rating Tool (BERT). Should NRCS BERT replace BARNY as the model for predicting runoff under the siting rule? Does BERT include all the necessary functionality to model runoff for the siting rule? For example, does BERT need modification to confirm laminar (sheet) flow across the buffer? Whichever model is used, what documentation must an applicant provide to demonstrate compliance with the runoff limits (e.g. a printout of the model inputs and outputs)?

Recommendations

- ATCP 51 should retain the "BARNY" model as the tool used to predict runoff from animal lots.
- ATCP 51 should require a livestock facility to submit documentation (e.g. a printout of the BARNY model inputs and outputs) as part of its siting application to verify compliance with the runoff limits for animal lots.

Considerations

Despite its limitations, BARNY has a long history and wide acceptance as a barnyard evaluation and design tool. While the siting rule incorporates an older version, NRCS currently maintains BARNY as a worksheet in its Spreadsheet on Vegetated Treatment Areas. However, NRCS supports BERT as the barnyard evaluation tool and BARNY as the design tool for buffers. NRCS will be updating its Vegetated Treatment Area tool (which includes BARNY) to reflect the most recent NOAA rainfall data.

For evaluating animal lot runoff and design practices to meet targets for annual phosphorus runoff, BARNY is a more appropriate tool than the BERT or Annual Phosphorus Loss Estimator (APLE-Lots), although modifications to APLE-Lots may make this tool more useful.

Question #2: When an existing animal lot fails to meet the applicable runoff threshold in ATCP 51.20(2) it may be retained only if it, or an adjacent treatment area, is altered in some manner to control runoff. An applicant may be issued a permit based on a commitment in the application

(e.g. submission of engineered design) to install practices to control the runoff. How can the rule be clarified or improved to support minor alterations to animal lots needed to meet the runoff thresholds in ATCP 51.20(2)? For example, can the rule better identify practices and related technical standards that constitute a minor alteration? Should applicants be required to submit designs or other documents to reflect their commitment to install water quality practices related to a minor alteration? If there is a significant discharge, or other problem that presents a significant risk to water quality, should a local government be able to impose a condition to correct the problem within a time period of less than two years?

Recommendations

- ATCP 51 should require applicants to document management or structural practices proposed as "minor alterations" to achieve compliance with ATCP 51.20(2) runoff thresholds for animal lots. The applicant must submit a design for the practice that meets the applicable NRCS or other technical standard.
- The rule should specify the following: lot cleaning, changes to provide laminar flow (e.g., shaping, seeding), roof gutters, diversions, underground outlets, and sediment basins, as minor alterations.
- ATCP 51 should be modified to require installation of "minor alterations" within one year of a permit approval, and authorize a local government to shorten that time if the unmanaged runoff presents an unacceptable risk of contamination to surface or groundwater.

Considerations

By fleshing out the requirements for "minor alterations," ATCP 51 will reduce the uncertainty about achieving compliance with runoff standards, without implementing the full set of requirements in NRCS 635 related to wastewater treatment. Clarification of these requirements will more firmly establish the boundary between "minor alterations" and "substantial alterations," which requires an operator to comply with NRCS 635 if the animal lot is "substantially altered," which is defined as "an increase of more than 20% in the area or capacity of a livestock structure used to house, feed or confine livestock."

With added requirements for documentation, an operator will make specific promises to perform work in the permit application, and local governments may enforce this commitment in the same manner as other permit requirements. In this and other areas requiring the submission of engineering designs, local governments should offer to review preliminary designs to provide guidance to siting applicants and their consultants.

Question #3: To continue to use existing manure storage structures and waste transfer systems, an applicant for a siting permit must document that these facilities were designed according to certain technical standards and do not present unacceptable risks of structural failure or leaking. How can the worksheet's [Worksheet 4] evaluation requirements be improved? For example, should the rule provide more concrete direction on how to conduct a visual inspection? Is there a way to make use of the evaluation processes used for NRCS Comprehensive Nutrient Management Plan (CNMP) and DNR Wisconsin Pollution Discharge Elimination System (WPDES) permits for animal feeding operations?

Recommendations

- While technically sound, the standards and procedures for evaluation of existing waste storage structures and waste transfer systems (Worksheet 4, Appendix A, 390-33 and Existing Manure Storage Evaluation Flowchart) should be clarified and improved to provide more accurate guidance in assessing water quality risks. Specific areas of improvement include:
  - Recognizing waste storage structures as old as 10 years may be safely operated if an inspection reveals no problems, as long as they were designed according to the technical standards in effect at the time storage was constructed.
  - Establishing criteria for emptying storage structures, especially earthen-lined structures, to allow for proper inspection and identifying exceptions to those criteria.
  - Requiring test pits or borings to complete a facility evaluation if there is no documentation available regarding a facility's separation distances to groundwater or bedrock.

Considerations

Additional guidance is critical for engineering professionals hired to evaluate these systems. As a general recommendation, storage structures should be emptied before inspection. There are circumstances where it is reasonable not to empty a facility. A number of factors may determine whether or not to act, including the structure's age, the results of visual inspection of its exposed area, and the likelihood that agitation may have compromised its liner. This approach is consistent with the procedures used by DNR in its evaluation of storage facilities under NR 243.

By definition, a manure storage facility includes the waste transfer portion of the facility. It is feasible to evaluate exposed portions of an existing waste transfer system. If the waste transfer system was installed according to technical standards, a professional engineer could review the design and "as-built" documentation. Reception tanks may be visually inspected, or assessed for leakage using soil borings. Likewise open channels and equipment such as pumps and valves can be visually inspected. The evaluation of conveyances, such as underground pipes, is more challenging; it may not be realistic to require pressure testing of pipes or digging test wells at various intervals along its length.

Question #4: When adopted in 2006, ATCP 51 did not include emerging technologies that were not in common usage, such as sand settling lanes, and also did not set technical standards for newly developed technologies in advance of standards set by NRCS and other custodians. Regarding the following, do you agree with the standards cited or do you have other recommended standards?

a. For composting facilities, reference NRCS Standard 317.
b. For anaerobic digesters, NRCS Standard 366.
c. For digester substrate storage, NRCS Standard 313 or DNR Industrial waste rules, such as NR 213, Wis. Admin. Code, based on types and amounts stored.
d. For manure residual storage, NRCS Standard 313.
e. For solid separation, NRCS Standard 632.
f. For treatment of liquid waste, NRCS Standard 629.
g. For sand settling lanes, NRCS Standard 632.

h. For manure storage covers, NRCS Standard 367 (does not include natural crust and bio-cover).

Are there other new technologies that are not adequately addressed in the rule or worksheets?

Recommendation

- ATCP 51 and related worksheets should be updated to reference the most current technical standards for the following engineered and related practices used in connection with odor management and other siting standards:
  - For composting facilities, reference NRCS composting facility standard 317 (January 2012).
  - For anaerobic digesters, NRCS anaerobic digester standard 366 (August 2011).
  - For digester substrate storage, NRCS waste storage facility standard 313 (January 2014) or DNR industrial waste rules, such as ch. NR 213 Lining of Industrial Lagoons and Design of Storage Structures, Wis. Admin. Code, based on types and amounts stored.
  - For manure residual storage, NRCS waste storage facility standard 313 (January 2014).
  - For solid separation, NRCS waste separation facility standard 632 (April 2014).
  - For treatment of liquid waste, NRCS waste treatment standard 629 (January 2014), except for vegetated treatment areas covered under NRCS vegetated treatment area standard 635 (October 2014).
  - For sand settling lanes, NRCS waste separation facility standard 632 (April 2014).
  - For impermeable manure storage covers, NRCS roofs and covers standard 367 (October 2011).
  - For natural crust and bio-covers, DNR recommendations related to control practices for air emissions.
  - For treatment membranes, NRCS waste treatment standard 629 (January 2014).

Considerations

NRCS standards such as practice standard 632 (April 2014) may need to be supplemented with provisions reflecting specific issues in the siting rule. For example, composting should include requirements to ensure adequate containment and treatment of contaminated runoff.

Question #5: While all existing feed storage must be managed to avoid significant discharges, the rule does not impose affirmative requirements for permitted livestock operations except those limited number of facilities that store high moisture feed. Should existing feed storage structures be required to meet certain minimum conditions to reduce runoff risks regardless of the moisture content of the feed being stored? What, if any, standards should be used to evaluate the water quality risks posed by existing storage at the time of a permit application? What, if any, structural and management requirements should apply to existing feed storage after the livestock facility is permitted? How do the following factors affect your answers to these questions: type of structure, the volume of feed stored, the type of feed stored?

Recommendations

- ATCP 51 should require permit applicants to evaluate existing bunker silos, paved or other lined feed storage structures from ½ to ¾ acre in size to determine if the structures

are in good condition and do not present risks of discharging leachate or contaminated runoff to waters of the state.

- The evaluation process should be consistent with evaluation processes for manure storage and animal lots, and include a flowchart to outline the evaluation process.
- ATCP 51 should include management requirements for existing storage structures including those operated without modification.

Considerations

For structures constructed within the last 10 years, the evaluation should determine if the facility was designed according to then-existing standards. To establish that a facility is in good working condition, a visual inspection should be performed looking for signs of failure (e.g. cracks) or discharge of leachate. The evaluation also should determine the separation distances of a facility from streams, lakes, areas of concentrated flow, wetlands, floodplains, and other surface waters susceptible to pollution risks. In terms of groundwater risks, the evaluation should determine the separation distances of a facility to bedrock and saturated soils, and any soils with a high potential for groundwater contamination. Tables 1 through 3 in NRCS 629 should be used as a starting point to determine adequate separation distances.

DATCP should develop a flowchart to outline the evaluation process. The draft flowchart should account for the risk of infiltration and runoff of leachate and contaminated runoff. Specifically, the flowchart should have one or more steps that take into consideration: 1) separation from groundwater, 2) permeability of soil, and 3) the likelihood of runoff reaching surface water. Based on evaluation of these factors, the operator may or may not need to perform repairs, install a leachate collection system, or make improvements to the treatment area.

For all feed storage facilities, livestock operators should be required to divert clean water and follow basic management practices such as waste feed cleanup and snow handling to minimize accumulations of waste feed that can lead to the discharge of contaminated runoff during spring thaw.

In addition, the requirement for leachate collection in ATCP 51.20(3) should be retained for existing paved facilities storing feed with 70% or more moisture content (cannery, brewers and distillers byproduct feeds). DATCP may want to consider lowered feed moisture levels, down to 40 percent, to be consistent with other recommendations (see Consistency of Rules, Question #2).

Question #6: ATCP 51 provides no guidance for conducting monitoring to determine whether engineered practices are properly operated and maintained. Do you agree that the following recommendations are technically sound or would you make other recommendations?

"Checklists are an effective tool to ensure accuracy and consistency in monitoring livestock facilities for compliance. Checklists need to be specific to either the producer, if self-certifying, or regulatory authority, if for a compliance review. Checklists should be practice specific and incorporate the operation and maintenance (O&M) requirements in NRCS technical standards. For example, animal lots should follow the O&M requirements in NRCS technical standard 635. Consideration should be given to a combination of self-certification with periodic review by an

administering authority. Duplication should be avoided and existing compliance assurance measures (CAFOs) should suffice for most compliance objectives. DATCP should provide guidance and training to local authorities on checklist development and usage, and should work with these authorities to collect accurate information concerning the implementation of the siting law and the performance of permitted farms, including responding to changes in farming operations and documentation of monitoring results."

Recommendations

- ATCP 51 should provide more clarity regarding local government monitoring of a permitted facility's compliance with the siting standards, including local review of whether engineered practices are properly operated and maintained.
- DATCP should strongly encourage local governments to monitor compliance, and support these local efforts by developing effective tools and providing training and guidance. Checklists are effective tools to ensure accuracy, completeness, and consistency in monitoring livestock facilities for compliance.

Considerations

Checklists need to be specific to either the producer to support self-certification, or the local government to enable consistent review of compliance. Checklists should be practice specific and incorporate the operation and maintenance (O&M) requirements in NRCS practice standards. For example, animal lots should follow the O&M requirements in NRCS 635 (October 2014). (Regarding checklists, see Odor Question #4.)

While local governments are generally responsible for determining the nature and extent of monitoring activities performed on permitted farms within their jurisdiction, DATCP may consider the option of requiring that all permitted facilities complete and submit a self-certification checklist to local governments every two years. Monitoring of permitted facilities should be coordinated with DNR activities to avoid unnecessary duplication in the submissions required of CAFOs. DATCP should work with local authorities to collect accurate information concerning the implementation of the siting law and the performance of permitted farms, including responding to changes in farming operations and documentation of monitoring results. An additional fee to cover the monitoring costs incurred by local governments might be considered and could help encourage local implementation.

Nutrient Management

Question #1: Should local governments be given the ability to request additional documentation from WPDES permit applicants? What information and documentation would be helpful for local governments to request to substantiate compliance? For example: items included in the NRCS 590 NM plan and Checklist, nutrient application restriction maps, and/or NM database, and specific WPDES Permit Components?

Recommendation

- ATCP 51 should not exempt CAFOs from requirements to submit documentation to substantiate a nutrient management plan complies with NRCS 590 (September 2005), and to submit annual plan updates if requested by a local government.

Considerations

As part of their review of a permit application under ATCP 51, local governments should have access to documentation supporting a nutrient management plan, regardless of the size of the applicant's livestock facility. Local governments should be able to request documentation to substantiate that the applicant, who may also hold a WPDES permit, is meeting the requirements for a nutrient management plan under the siting law; namely, the livestock facility complies with NRCS 590 (September 2005) and has a plan covering the maximum number of animal units requested in the permit application.

In a typical case, applicants or their consultants can easily satisfy a local request for documentation by providing the applicant's SnapPlus database and NRCS 590 (September 2005) nutrient application restriction maps from the annual planning process. Local governments may deny approval if the documentation does not reasonably substantiate compliance with nutrient management planning requirements.

Question #2: Should the rule requirements for maximum Animal Unit planning remain as is, or should other options be explored? Is the permit modification process feasible, implementable, and reliable enough to be used as an option?

Recommendations

- ATCP 51 should retain the requirement that applicants submit nutrient management plans based on the maximum number of animal units for which they are seeking local approval.
- ATCP 51 should simplify the permit modification process to enable permitted livestock facilities to secure streamlined approval of nutrient management plans if they add animals in the future.

Considerations

The framework of the siting law requires applicants complete Waste and Nutrient Management Worksheet 3 and their nutrient management plans to account for the manure generated by the maximum number of animal units for which they are seeking approval. A livestock operator must have adequate land, either rented or owned, to spread manure produced by the maximum number of approved animal units. A livestock operator cannot phase in a nutrient management plan, including the land needed for spreading, as the operation adds animals to reach its maximum allowed number.

A permit modification offers an alternative to accommodate the needs of operators while maintaining the "maximum animal unit" concept fundamental to the permitting process under the livestock siting rule.

Question #3: When determining permit approval related to land base access for spreading, would it help local governments if applications identified the acres owned versus rented? If so, what is the best way to accomplish this?

Recommendation

- Waste and Nutrient Management Worksheet 3 in ATCP 51 should be modified to require an applicant to identify rented and owned land spreading acres.

Considerations

To support the information in Worksheet 3, local governments may request maps depicting the rented and owned land spreading acres. Also, local governments can request additional information regarding rental agreements for acres acquired for cropping and/or spreading manure.

Question #4: Should this committee identify the high risk conditions and risk-reducing practices that might be included in a siting rule standard related to winter spreading restrictions? Should the Committee wait until the NRCS 590 NM standard is revised before making recommendations since additional winter spreading restrictions are likely to be added as a statewide requirement?

Recommendations

- Based on the concepts in the March 23, 2015 draft of the revised NRCS nutrient management standard 590, ATCP 51 should incorporate the revised NRCS 590. (For consistency within the agency the updated NRCS 590 should be incorporated into ATCP 50 and 51.)
- DATCP should clarify how local governments may impose locally-identified nutrient application restrictions authorized in the current or revised version of NRCS 590 including restrictions in Section V.A. designed to protect surface and groundwater resources.
- DATCP should help local governments understand how they can meet current state requirements for adopting more stringent standards to protect groundwater.

Considerations

The Committee supports incorporation of the revised NRCS 590 based on its review of a March 23, 2015 draft that includes the following:

1. Additional winter spreading restrictions, including a new risk assessment tool and planning requirements, a prohibition on nutrient applications on frozen- and snow-covered fields locally identified as areas contributing direct runoff to ground water, and a prohibition on liquid manure applications on frozen- and snow-covered fields in DNR Well Compensation areas or on shallow Silurian dolomite soils.
2. Expanded nitrogen (N) application restrictions and prohibitions related to bedrock depth, soil types, and/or timing.
3. Enhanced nutrient application setbacks including a restriction on spreading untreated manure on cropland in locally identified areas as contributing direct runoff to groundwater conduits, unless the manure is substantially buried within 24 hours of application.
4. Additional restrictions related to N recommendations and rates, including restrictions on late summer and fall applications of commercial N in sensitive fields (e.g. within 5 feet of bedrock).
5. Increased phosphorus management (PI and Soil Test P limits and resulting restrictions).
6. Greater focus on erosion control.

When the standard is finalized, DATCP should evaluate the best approach to include the new requirements in the siting rule.

Question #5: What, if any, standards should be incorporated into the siting rule (ATCP 51) to address manure irrigation?

Recommendations

- By incorporating the latest version of NRCS 590, the siting rule will include manure application setbacks and restrictions designed to protect surface and ground water quality.
- ATCP 51 should not incorporate the recommendations of the Manure Irrigation Workgroup, whose work will be completed in the summer of 2015.

Considerations

With possible revisions, NRCS 590 will include some water quality setbacks and requirements more closely aligned with those imposed on CAFOs under NR 243. The Manure Irrigation Workgroup plans to prepare recommendations to address irrigation-related concerns involving public health with focus on airborne pathogens, drift, odor and nuisance, surface and ground water protection, and implementation and compliance. The recommendations will focus on factors such as siting (including setbacks), weather, waste characteristics, and equipment. The Workgroup has not considered application of manure stored with other wastes (e.g. septage) and the fate of volatile compounds when manure is irrigated. The TEC viewed the use of manure irrigation as another method to land spread manure. Best management practices recommended by the Workgroup to address this issue will evolve and may translate into NRCS practice standards or other future actions.

Odor

Question #1: Worksheet 2 (Appendix A, Chart 2, 390-25) calculates the odor generated by livestock structures using odor generation numbers developed in accordance with the best available science. What is your recommendation with respect to odor generation numbers? Should the numbers stay the same or should they be raised or lowered?

With respect to dairy housing types, should it be clarified whether this housing includes natural and power ventilated barns? With respect to poultry, there is currently only one category. Should two categories be created for layers with different odor generation numbers? For example, currently layers and litter in the same building have an odor generation number of 20. There is no category for layers in housing equipped with a dryer belt system where litter is stored separately from the birds. Currently, broilers in housing with litter have an odor generation number of 1.

With respect to waste storage facilities, should the method for predicting odors be switched from storage duration to storage surface area? Currently short term storage has an odor generation number of 28 and long term storage (6 months or longer) has a generation number of 13. If so, the current odor generation number of 28 could be used for structures less than one acre in size and the current odor generation of 13 for structures larger than 1 acre, when measured at the maximum operating level. Are the generation numbers correct? Is there a need to combine storage duration and surface area to properly predict odor?

Currently there is no category for sand and solid separation systems. First, should a category be established? If so, is it appropriate to distinguish between parts of the system used for separation

and those used for storage of separated materials? It has been suggested that an odor generation number of 40 could be assigned to treatment areas (e.g. a lane where sand is separated or a building that houses mechanical separation equipment) and a generation number of 2 for the sand/solids storage area. For systems enclosed by buildings, the use of appropriate odor control practices, e.g. bio-filters could be used.

Do you have additional recommendations regarding any source listed in Chart 2 or sources that should be listed in Chart 2?

Worksheet 2 (Appendix A, Chart 3, 390-26) identifies odor control practices that reduce odor from livestock structures, and assigns an odor control percentage to each of the practices consistent with the best available science. In 2010, DNR developed a list of control practices for air emissions including a rating of the effectiveness of the practice in controlling odor.

In the area of housing there are several odor control practices that livestock operators can implement. Do any of the reduction factors/multipliers need to be adjusted for diet manipulation, bio-filters, fresh water flush, treated water flush, immediate return flush, air dams, or windbreaks. Also, should a new category for wet scrubber be added?

With respect to waste storage should the reduction factor/multiplier be adjusted for anaerobic digestion, chemical or biological additives, compost, solid separation and reduction, aeration, geotextile covering or natural crust? Should a category for poultry layer housing utilizing a dryer belt system be added?

Do you have additional recommendations regarding any source listed in Chart 3, or sources that should be listed in Chart 3?

Recommendations

- Worksheet 2 (Chart 2) of ATCP 51 should retain the odor generation numbers for the 17 housing types, and make modifications as specified in Appendix A, to increase the odor generation number for dairy/beef alley flush to storage, and to add a new lower generation number for poultry layer housing using dryer belts.
- Worksheet 2 (Chart 2) should retain the odor generation numbers for Waste Storage Facilities but base the method for predicting odors on surface area, not storage duration as specified in Appendix A.
- Worksheet 2 (Chart 2) should add odor generation numbers for sand and solids separation systems, as specified in Appendix A, to account for active treatment area and storage of separated materials.
- Worksheet 2 (Chart 3) of ATCP 51 should retain the credits for 17 odor control practices for housing, manure storage and animal lots, and make modifications, as specified in Appendix B, to add wet scrubbers and recirculated flush water as a Category B odor control practice for housing; replace fresh water flush with recirculated flush water as a Category B odor control practice for housing; increase the credit for housing windbreaks and geotextile covers; reduce the credit for anaerobic digestion, and solids separation and reduction; and eliminate the predetermined credit for aeration of storage.
- Worksheet 2 (Chart 3) should change the specifications, as detailed in Appendix B, for the following odor control practices for housing and manure storage: diet manipulation,

bio-filter, treated flush water, anaerobic digestion, chemical and biological additives, compost, solids separation and reduction, and natural crust.

Considerations
Considerations are included as part of the recommendations set forth in Appendices A and B.

Question #2: ATCP 51.14(2)(c) and Worksheet 2 (Appendix A, 90-22) exempts operators from the odor standard if their proposed livestock facilities are: 1) a new facility with fewer than 500 animal units, 2) expansions less than 1,000 animal units, or 3) have livestock structures at least 2,500 feet from the nearest affected neighbor. "Affected neighbors" (ATCP 51.01 (2)) are residences or "high-use buildings" (ATCP 51.01 (16)) other than those owned by the livestock operator or by persons who agree to a shorter setback. Is it appropriate from a technical standpoint to continue these exemptions from the odor standard?

Recommendation
- ATCP 51 should continue to exempt the three categories of facilities from the odor standard.

Considerations
From a technical standard, there is insufficient basis to change the exemptions to the odor standard in ATCP 51.14(2)(c) and Worksheet 2 (Appendix A, 90-22). Exempting livestock facilities by size (new facilities with fewer than 500 AUs and expansions under 1,000 AUs) can be justified. For example, smaller operations have fewer significant odor sources. Exempting operations with structures at least 2,500 feet from the nearest affected neighbor encourages good site selection. However, odor management is still encouraged even when the 2,500-foot setback is met.

Question #3: Livestock operators who complete required plans related to incident response and employee training and an optional odor management plan (Appendix A, Application for Local Approval, Nos. 12 and 13, p. 390-18) may claim additional points toward a passing odor score. Is it appropriate from a technical standpoint to award 80 points for the mandatory plans and 20 points for the optional plan? Can the plans be improved or strengthened to better control odor? If not, should the odor scoring system be adjusted and still include a requirement to have a mandatory plan to address odor practices?

In addition to a checklist, is it appropriate to allow for self-reporting by farm operators, requests by local governments for documentation, and on-site inspections of permitted facilities? Should DATCP provide guidance and training to local authorities on compliance monitoring?

Do you have other recommendations?

Recommendations
- ATCP 51 should require all applicants to complete plans related to incident response, employee training, and odor management.
- Applicants who complete the required three plans should receive additional points, not to exceed 100, toward a passing odor score.

- In determining the number of points credited toward a passing odor score, DATCP should consider and balance the three approaches collectively used to manage odor in ATCP 51: management and other plans, modeling using Worksheet 2, and road and property line setbacks for livestock structures.

Considerations
Increasing the planning requirements for applicants makes sense because planning is a critical component in successfully managing complex issues such as odor, and the most effective plans are all-encompassing.

There are conflicting arguments for setting point awards that count toward a passing odor score. If the full 100 points were to be awarded, planning requirements must be strengthened. For example, there will need to be enhanced requirements related to plan implementation and monitoring. If applicants are limited to earning only 50 points, they could be unnecessarily penalized, particularly if the rule is changed in other ways to increase setbacks or impose additional hurdles to securing a passing odor score.

In determining the points to award for the three plans, DATCP should consider and balance the three tools used to manage odor. In considering adjustments to one or more of these tools, DATCP's decisions should be informed by the overall goal of effectively combining these approaches to achieve acceptable levels of odor. Reaching this goal is complicated by the challenges presented by each tool. The odor standard ultimately is tied to an air dispersion model that does not fully capture how odors travel. Also, additional research is needed to shed more light on odor generation and control practices. In the case of setbacks, property line setbacks do not take into account the proximity of existing residences, schools, and other occupied buildings adjacent to a permitted livestock facility. However, applicants who must complete the odor management worksheet do measure and account for odor impacts on nearby residences.

Question #4: ATCP 51 provides no guidance to local governments for monitoring livestock operations to determine whether odor control practices are properly implemented and maintained. Should a checklist be developed similar to the one used for nutrient management that producers and local governments can use to verify a facility has installed, and continues to properly operate, odor control practices and management activities required under a siting permit?

Recommendation
- To support compliance monitoring, DATCP should support local government efforts by developing checklists and providing other support to facilitate local review.

Considerations
Regarding monitoring compliance with odor control practices, the committee believes it sufficiently addressed this issue in its recommendations related to engineering practices (see Engineering Question # 6 above).

Setbacks

Question #1: ATCP 51.12 establishes the maximum setback distance that local governments may impose on permitted livestock facilities through a local siting ordinance. They are:

- No more than 350 feet for manure storage structures from the property line and road right of ways for all sized livestock facilities.
- No more than 100 feet to 200 feet, depending on the size of the livestock facility, for other structures including animal housing, animal lots, milking parlors and feed storage from property line and road right of ways.

Do current road and property line setbacks provide adequate protection to residences, high use buildings, parks, seasonal residences for hunting, and public spaces while still allowing for new and expanded livestock operations?

Could structure-to-structure setbacks more effectively protect certain land uses from the impacts of livestock facilities, or does the odor standard adequately address potential odor impacts while still providing options for producers?

Recommendations

- For new or substantially modified manure storage structures located on livestock facilities over 1,000 animal units, ATCP 51 should require a road and property line setback greater than 350 feet.
- For livestock facilities under 1,000 AUs, DATCP should consider requiring greater setbacks for livestock structures, unless these facilities use established methods to document how they will manage odor to secure a passing odor score.
- To provide greater protection for neighbors, DATCP should consider increasing the property line and road setback distances for structures (such as feed storage) that may have nuisance impacts, applying increased setbacks to occupied buildings in addition to property line setbacks, and accounting for schools and other high density uses in establishing a setback.

Considerations

If setbacks are increased beyond 350 feet, DATCP should allow the use of effective odor control practices to reduce setbacks larger than 350 feet. Local governments should check the implementation of these odor control practices as part of any monitoring activities.

If DATCP increases the setback requirements for manure storage, it should consider exemptions in the rule reducing setbacks from property lines where minimum distances from manure storage to residential and other occupied buildings are met.

Appendix A: Odor Generation Recommendations (Worksheet 2, Chart 2)		
Odor Source: Type of livestock structure	*Current odor generation number*	*Recommendation*
Housing: Dairy Free Stall and Beef and Dairy Heifers	Slatted floor including floor and pit below (6); scrape (4) and bedded pack (2)	Retain generation numbers but modify the definition of housing types to include naturally-ventilated (which is wind-driven and random) and power-ventilated (which is controlled and adjustable). In the case of power-ventilated housing, if ventilation is located on the side further from the property line, this additional separation may be included in the calculation of the odor generation number.
Housing: Dairy Free Stall and Beef and Dairy Heifers (Alley flush to storage),	10	Increase to 20, clarify this housing type includes natural and power-ventilated housing, and define in the specification the baseline related to flush water used in the system (e.g. untreated water drawn from manure storage). This recommendation is supported by observational data, the anaerobic quality of the flush water, and findings from the National Air Emissions Monitoring Study (NAMS), http://www.epa.gov/agriculture/airmonitoringstudy.html, a two-year examination of air emissions from poultry, swine and dairy animal feeding operations sponsored by the US Environmental Protection Agency. The odor control practices for these flush systems will be reviewed to ensure operators have the full benefit of the latest technologies and treatments.
Housing: Poultry layer housing utilizing a dryer belt system	Not currently included	Create a second category for layers, in addition to Poultry layers with generation number of 20. Belt system housing (litter stored separately from birds) should be assigned a number of 1, which is the same number used for broiler housing with litter. This recommendation is supported by observational data and inference and analogy based on the removal of manure before it goes anaerobic.
Waste Storage Facilities	Short term-less than 6 months, 28; Long term-6 months or more, 13	Retain the generation numbers of 13 and 28, but the method for predicting odors should be based on surface area, not storage duration. The odor generation number of 28 should be assigned to structures less than one acre and the number of 13 to structures larger than 1 acre. One acre of storage, at average depth, holds manure from a 500 cow dairy for six months. Surface area should be determined based on a measurement of the stored waste with the structure at its maximum operating level (MOL). This recommendation is supported by the science of odor generation, observational data, and opinions of experts. In addition, surface area is less challenging to measure than duration. A higher odor generation number should not be assigned to storage of manure from swine vs. dairy or poultry.
Sand and Solids Separation Systems, including sand separation lanes (a.k.a. sand channels) and mechanical separation systems (e.g. screen, friction dryers, and screw presses	Not currently included	Create a new odor generation number of 40 for areas of active treatment (e.g. lane where sand is separated, or a building housing mechanical separation equipment) and a generation number of 2 for the sand/solids storage areas. A lower generation score of 20 might be assigned to settling lanes and other separation systems that do not use water drawn from manure storage. In counting the area of sand lanes, the new standard should distinguish between intermittent vs. continuous use and not double count a second lane if it used in alternation with the first lane. The idle lane should be treated as sand or solids storage. This recommendation is supported by a published study, and analogy to similar structures. For systems enclosed by buildings, appropriate odor control practices, e.g. bio-filters, should be recognized.

Appendix B: Odor Control Practice Recommendations (Worksheet 2, Chart 3)			
Odor Source and Control Practice	*Reduction Credit*	*Cannot combine with*	*Recommendation*
Housing: Diet Manipulation (A1)	20% (0.8 multiplier)	None	Retain credit but improve the specification to include odor control as a feed nutrition management goal and require applicants to document the specific feed ration for verification of its effectiveness. Milk urea nitrogen (MUN), commonly used to monitor feed nitrogen efficiency, can be used to track the control of nitrogen emissions from a dairy farm, http://ars.usda.gov/SP2UserFiles/Place/36553000/pdf's/30_MUN_2nd_study.pdf
Housing: Bio-filter (B1)	90% (0.1 multiplier)	B2, B3, B4, B5	Refine the specification to apply credit only to the portion of the total ventilation air that is treated, which typically only involves air from the under floor pit. The specification should include a scheduled bio-filter maintenance component.
Housing: Fresh Water Flush (B3)	60% (0.6 multiplier)	B1, B2, B4, B5	Eliminate this practice, and replace with the immediate return flush water practice (see below).
Housing: Recirculated Flush Water (Replaces B3)	Not currently included		Replaces (B3), and should be assigned a credit of 50%. A specification must be developed that accurately captures the practice of using gray water and re-circulating flush liquids stored for less than 7 days. Some treatment may be needed to remove solids. This new practice cannot be combined with practices from Chart 3, Category B.
Housing: Treated Water Flush (B4)	30% (0.7 multiplier)	B1, B2, B3, B5	Refine the specification to ensure adequate treatment. If separately treated in a small basin, for example, wastes from manure storage could be aerated without excessive power requirements. Treatment should not include anaerobic digestion as an option. DATCP may need to more clearly identify appropriate treatment methods. A minimum of 2 mg/l dissolved oxygen should be required when aeration is used as the treatment method.
Housing: Air Dam (B5)	20% (0.8 multiplier)	B2, B3, B4	Allow air dam as a control practice applicable to all types of positively ventilated animal housing (not just swine). Merge the windbreak and air dam practices; a separate air dam control practice is not needed.
Housing: Wet Scrubber	Not currently included		Create a new odor control practice with two parts: one that provides 90% credit if bleach or other chemicals are used, and another that provides 50% credit if only water is used. Like bio-filter, the credit should only be applied to the portion of the total ventilation air that is treated. This practice cannot be combined with practices in Chart 3, Category B.
Housing: Windbreak (C1)	10% (0.9 multiplier)	None	Retain the current 10% credit but consider offering additional credit if certain conditions are met (such as a plantings exceeding the minimum standard).
Waste Storage: Anaerobic Digestion (E1)	80% (0.2 multiplier)	E2, E3, E4, E5	Reduce credit 50% to more realistically reflect the odor control from this practice. This approach accounts for the best available research (e.g. Manure Storage & Handling - Anaerobic Digestion Overview, https://store.extension.iastate.edu/Product/AMPAT15), and recognizes the variables in the digestion process (e.g. reduced retention times). The specification, which will draw on NRCS 366, should be modified to cover use of off-farm feed stocks to avoid compromising odor control. This practice should not be combined with other practices in Chart 3, Category E.

Appendix B: Odor Control Practice Recommendations (Worksheet 2, Chart 3)			
Odor Source and Control Practice	*Reduction Credit*	*Cannot combine with*	*Recommendation*
Waste Storage: Chemical Or Biological Additives (E2)	20% (0.8 multiplier)	E1, E3, E4, E5	Refine the specification, in a manner similar to the recommendation for diet manipulation, to require applicants to identify the additive to be used, and provide documentation to show it is effective. DATCP should allow applicants to claim a higher credit by meeting the requirements for an innovative odor control practice. Applicants should not be allowed to combine this practice with others listed in Chart 3, Category E.
Waste Storage: Compost (E3)	80% (0.2 multiplier)	E1, E2, E4, E5	Refine the specification by incorporating the NRCS practice standard 317, and include requirements to ensure adequate containment and treatment of contaminated runoff.
Waste Storage: Solids Separation And Reduction (E4)	40% (0.6 multiplier)	E1, E2, E3, E5	Reduce the credit to 20%, and refine the specification to limit this practice to manure separation (as opposed to sand separation), to apply odor control practices separately to each chamber of a storage facility, and to include periodic checks (e.g. after agitation) to document compliance with the 2% or less solids requirement.
Waste Storage: Aeration (F1)	70% (0.3 multiplier)	F2, F3, F4, F5, F6	Eliminate the predetermined credit of 70% and require applicants to seek individual DATCP approval for innovative practices and to receive a credit consistent with the documented effectiveness for the proposed technology. This approach recognizes the variety of practices being installed and the risks of increased odor from under-designed systems.
Waste Storage: Geotextile Cover (F3)	50% (0.5 multiplier)	F1, F2, F4, F5, F6	Increase the credit to 60% based on the most current scientific research on odor control.
Waste Storage: Natural Crust (F5)	70% (0.3 multiplier)	F1, F2, F3, F4, F6	Refine the specification to include more measurable criteria for coverage, e.g. “80% of the surface, 80% of the time.”

Natural Resources Conservation Service
CONSERVATION PRACTICE STANDARD
NUTRIENT MANAGEMENT
Code 590
(Ac.)

I. DEFINITION

Managing the amount (rate), source, placement (method of application), and timing of plant nutrients and soil amendments.

II. PURPOSES

To *budget*, supply, and conserve nutrients for plant production. To minimize the risk of agricultural nonpoint source pollution of surface and groundwater resources. To properly utilize manure or *organic by-products* as a plant nutrient source. To protect air quality by reducing odors and reactive nitrogen emissions (ammonia, inorganic oxidized forms, and organic compounds). To maintain or improve the physical, chemical, and biological condition of the soil.

III. CONDITIONS WHERE PRACTICE APPLIES

This standard applies to all *fields* where plant nutrient sources and soil amendments are applied during the course of a *rotation*.

IV. CRITERIA

This section establishes requirements for planning, design parameters, acceptable management processes, and performance requirements for nutrient management plan development and implementation. Nutrient management plans shall be prepared according to all of IV. Criteria A., B., C., D., and E., as well as VI. Plans and Specifications, and VII. Operations and Maintenance.

All of the information contained in this section is required. Wisconsin Conservation Planning Technical Note WI-1 (Technical Note WI-1) is the companion document to this standard and includes criteria that are required where referenced within this section.

A. Criteria for Surface and Groundwater Resources

1. Nutrient Criteria for All Sites

   a. Develop and implement an annual field-specific nutrient application plan. Account for the source, rate, timing, form, and method of application for all *major nutrients* consistent with this standard and nutrient application guidelines found in University of *Wisconsin-Extension (UWEX) Publication (Pub.) A2809*, "Nutrient application guidelines for field, vegetable, and fruit crops in Wisconsin," (UWEX Pub. A2809) unless use of one of the following options are appropriate:

      - For crops not listed in UWEX Pub. A2809, use other appropriate Land Grant University recommendations.
      - For nutrient application decisions based on plant tissue analysis, the sampling and testing of plants and the resulting nutrient recommendations shall be done in accordance with University of Wisconsin recommendations. See IV.A.1.o.
      - *Adaptive Nutrient Management* has validated alternative nutrient management strategies that improve nutrient use efficiency. See IV.A.1.i.

Annual plan updates shall document the crops, tillage, nutrient application rates, sources, and methods actually implemented.

b. The plan shall be based on yield goals that are attainable under average growing conditions and established using soil productivity, local climate information, multi-year *documented yields*, and/or local research on yields for similar soils and crop management systems. Yield goals should not be higher than 15% above the previous 3-5 year average.

c. The plan shall include a Winter Spreading Plan that is consistent with sections IV.A.2.d., VI. Plans and Specifications, and Technical Note WI-1 Part II, if manure and/or organic by-products are mechanically applied.

d. The plan shall demonstrate that *adequate acreage* is available for all nutrients from manure and/or organic by-products applied to fields while maintaining compliance with the standard. If an adequate land base is NOT present the plan shall document the strategy to utilize the remaining projected volume of manure or other nutrient sources produced on the farm.

e. Soils shall be tested a minimum of once every four years by a DATCP-certified laboratory for pH, phosphorus (P), potassium (K), and organic matter. A laboratory list is provided in Part VI of the Technical Note WI-1. Soil sampling shall be consistent with UWEX Pub. A2809, "Nutrient application guidelines for field, vegetable, and fruit crops in Wisconsin," or A2100, "Sampling Soils for Testing." For perennial fruit crops, use of soil test recommendations from UWEX Pub. A2809 is only required as the basis for fertilizer applications prior to establishment of new plantings. Subsequent nutrient recommendations should be based on plant tissue analysis results. See IV.A.1.o.

f. Where practical, adjust soil pH to the specific range of the crop(s) grown to optimize nutrient utilization.

g. Annual P and K nutrient recommendations may be combined into a single application that does not exceed the total nutrient recommendation for the rotation. Commercial P fertilizers shall not be applied to soils testing excessively high in P for the crop being grown with the exception below (IV.A.1.h).

h. All the nitrogen (N), P, and K fertilizer shall be credited against crop needs, which are based on the crop to be grown and on soil test results. The exceptions are: 1. Up to 20 pounds per acre of P2O5 *starter fertilizer* may be applied to corn grown on soils testing excessively high, where no fertilizer is recommended. 2. To account for variability in N mineralization and manure application, when nutrients other than commercial fertilizers are used to meet 100% of the N requirement for corn, an additional 20 pounds per acre of commercial N may be applied as starter fertilizer.

i. Available N from all sources shall not exceed the annual N requirement of non-legume crops consistent with UWEX Pub. A2809, or the annual N removal by a legume crop or a legume and companion crop. See Technical Note WI-1, Part III.B for additional nitrogen utilization planning guidance.

   Where excessive rainfall has caused *crop N deficiency*, up to 46 pounds per acre of in-season supplemental N may be applied if the need for rescue N is documented using "Guidelines for Adaptive Nutrient Management", Technical Note WI-1, Appendix 3. To justify applying more than 46 pounds per acre, two different methods must be used to document the need.

j. First and second-year legume nitrogen credits shall be applied as described in UWEX Pub. A2809 Table 9.4 through 9.6 or through soil nitrate testing as identified in Chapter 6 of UWEX Pub. A2809.

k. Where *gleaning or pasturing* occurs, verify through computations that the manure nutrients deposited within a field, do not exceed the N and P limitations of this standard.

l. Estimates of first-year available nutrient credits for manure shall be established in accordance with one of the following methods:

   (1) Manure samples shall be collected for three or more consecutive years, as necessary, to establish a representative baseline. After which samples should be collected once every four years. If no operational changes occur, less frequent manure testing is allowable.

- Sample all manure types separately according to UWEX Pub. A3769 "Recommended Methods of Manure Analysis."
- Send manure samples to a laboratory participating in the Manure Analysis Proficiency (MAP) testing program where the manure analyses shall consist of total N, total P2O5, total K2O, and dry matter content at a minimum and the results shall be interpreted according to Table 3 in UWEX Pub. A2809.

(2) Use an average or "book" value of available nutrients. Follow Table 9.3 in UWEX Pub. A2809. See Part IV, Table 3 of the Technical Note WI-1.

Note: Consider analysis for ammonium-N for liquid (<4.0% dry matter) manures, which have the potential for more than 50% of the total N to be in the ammonium form.

For areas receiving manure applications in consecutive years, it is recommended that a second-year N credit be included in the nutrient management plan. Follow Chapter 9 in UWEX Pub. A2809 to determine second-year N credits.

m. Organic by-products other than manure shall be analyzed for total N, ammonium N, total P, total K, and solids content and applied to fields in accordance with this standard and any applicable regulations including restrictions on heavy metal content, mandatory separation distances and land application rates.

n. Manures, organic by-products, and fertilizers shall not run off the field site during or immediately after application. If the applied material ponds, runs off, infiltrates to subsurface tiles, or flows toward wells or *direct conduits to groundwater*, implement the following activities as appropriate:

(1) Stop application.

(2) Take corrective action to prevent off-site movement.

(3) Modify the application rate, method, depth of injection, and/or timing.

(4) Notify the Wisconsin Department of Natural Resources (WDNR) in the event that a spill or accidental release of any material or substance when required by the Agricultural Spill Law (s.289.11, Wis. Stats.) or the terms of a WPDES permit. Refer to "Agricultural Spills and How to Handle Them," Pub-RR-687-2002, August 2002 and the Technical Note WI-1, Part V, for WDNR contact information.

o. Where nutrient application decisions are based on plant tissue analysis, for crops such as cranberries or established fruits, the sampling and testing of plants and the resulting nutrient recommendations shall be done in accordance with University of Wisconsin recommendations and/or other recommendations in the references section of this standard. Also see Technical Note WI-1 Appendix 2.

2. Nutrient Application Prohibitions

a. Nutrients shall not be spread on the following:

(1) Surface water; *saturated soils*; areas of active snow melt where water is flowing; *concentrated flow channels*; or non-harvested *vegetative buffers*, except for the establishment of perennial vegetation in the concentrated flow channels, or non-harvested vegetative buffers.

(2) A non-farmed wetland.

(3) A potable well or direct conduits to groundwater and within 50 feet of these features, unless directly deposited by gleaning or pasturing animals or applied as starter fertilizer to corn. See V.A.1.h and K.

(4) Within eight feet of irrigation wells, except for nutrients applied through fertigation.

(5) Land where vegetation is not removed mechanically or by grazing, except to provide nutrients for establishment and maintenance of a conservation practice.

(6) Fields exceeding *tolerable soil loss (T)*. Erosion controls shall be implemented so that tolerable soil loss (T) over the crop rotation will not be exceeded on fields that receive nutrients.

(7) Fields with *ephemeral erosion* in which mitigation practices in IV.C. 1.c. have not been implemented.

b. Do not apply manure within areas delineated by the local Land Conservation Committee or in a *conservation plan* as *areas contributing runoff* to direct conduits to groundwater unless the manure is *substantially buried* within 24 hours of application.

c. Application of untreated manure is prohibited; however, *treated manure* may be mechanically applied on the following areas:

(1) Within 1000 feet of a public water supply designated as a *Community potable water well*.

(2) Within 100 feet of a public water supply designated as a *Non-community potable water well*.

Note: Commercial fertilizer and manure deposited by grazing animals may be applied consistent with this standard. Based on site conditions as related to well placement, an additional setback may be needed to protect wells from contamination.

d. All farms mechanically applying manure and/or organic by-products must have a Winter Spreading Plan that has application areas in compliance with criteria (1) - (7) below. The balance of the crop nutrient requirement may be applied in other seasons. These criteria do not apply to manure deposited through winter gleaning or pasturing of plant residue. Winter applications shall be conducted according to Section VI.B.

A Winter Spreading Plan identifies:

- Quantity of manure and/or organic by-products spread during periods of frozen or snow-covered soil, or generated in 14 days, whichever is greater;
- Capacity of storage for each manure type generated;
- Capacity for stacking manure that is ≥ 16% dry matter without permanent storage. Refer to NRCS *313 Standard, Waste Storage Facility*, to locate potential stacking sites.

In addition, when frozen or snow-covered soils prevent *effective incorporation* at the time of application:

(1) Do not apply nutrients within the *Surface Water Quality Management Area (SWQMA)*.

(2) Do not exceed the P removal of the following growing season's crop when applying manure. Liquid manure and/or organic by-products applications are limited to 7,000 gallons per acre. All winter applications are not to exceed 60 pounds of P2O5 per acre.

(3) Do not apply manure and/or organic by-products to fields where concentrated flow channels are present unless two or more of the following are implemented:

a. Contour buffer strips or contour strip cropping;

b. Leave all crop residue (this prohibits removal of silage or bedding) and no fall tillage;

c. Apply in intermittent strips on no more than 50% of the field;

d. Apply on no more than 25% of the field during each application waiting a minimum of 14 days between applications;

e. Reduce application rate to 3,500 gallons or 30 pounds of P2O5, whichever is less;

f. No application within 200 feet of all concentrated flow channels;

g. Fall tillage is on the contour and slopes are less than 6%.

(4) Do not apply manure and/or organic by-products on slopes greater than 6%, unless the plan documents that no other accessible fields are available for winter spreading AND two or more of the following are implemented:

a. Contour buffer strips or contour strip cropping;

b. Leave all crop residue (this prohibits removal of silage or bedding) and no fall tillage;

c. Apply in intermittent strips on no more than 50% of the field;

d. Apply on no more than 25% of the field during each application waiting a minimum of 14 days between applications; or

e. Reduce application rate to 3,500 gallons or 30 pounds of P2O5, whichever is less.

(5) Do not apply N and P commercial fertilizer. An exception is allowed for grass pastures and on winter grains that do not fall within a prohibition area defined by IV.A.2.

(6) Do not surface apply liquid manure and/or organic by-products during February and March on areas depicted on the 590 spreading restriction maps as areas where DNR Well Compensation funds provided replacement water supplies for wells contaminated with livestock manure or *Silurian dolomite (SD) soils*.

(7) Do not apply manure and/or organic by-products within 300 feet of direct conduits to groundwater.

3. Nutrient Application Restrictions

a. For all nutrient applications on non-frozen soil within a SWQMA use one or more of the following practices as appropriate to address water quality concerns for the site:

(1) Install/maintain permanent vegetative buffers (harvesting is allowed unless restricted by other laws or programs). Refer to *NRCS Field Office Technical Guide (FOTG)*, Section IV, Standard 393, Filter Strip, or ATCP 48 for land located within a drainage district.

(2) Maintain greater than 30% crop residue or vegetative cover on the soil surface after nutrient application.

(3) Effective incorporation of nutrients within 72 hours of application, leaving adequate residue to meet tolerable soil loss.

(4) Establish a crop or *cover crop* prior to, at, or promptly following application.

(5) Apply nutrients within seven days of planting on *long term no-till* soil with less than 30% residue.

b. When unincorporated liquid manure and/or organic by-products applications with ≤ 11.0% dry matter occur on non-frozen soils within a SWQMA, OR where *subsurface drainage* is present:

(1) Limit applications to 12,000 gallons per acre per application.

(2) No applications are allowed on saturated soils.

(3) No ponding is allowed at the application site.

(4) Visually monitor accessible tile outlets before, during, and after applications for potential discharge of manure and/or organic by-products. If a discharge is observed, implement the activities in IV.A.1.n.

(5) Follow VI.A.12. for subsurface drainage practices.

Sequential applications may be made to meet the desired nutrient additions consistent with this standard. Wait a minimum of 7 days between sequential applications.

B. Criteria to Minimize Entry of Nutrients to Groundwater

1. To minimize N leaching to groundwater on *N restricted soils* which include *high permeability soils (P)*, or *rock soils* with less than 20 inches to bedrock (R), or *wet soils* with less than 12 inches to *apparent water table* (W), use the following applicable management practices and the crop N rate guideline from UWEX Pub. A2809 or rates specified below:

Note: The balance of the crop N requirements may be applied the following spring or summer. The Technical Note WI-1 provides a list of N-restricted soils which have a higher potential for N leaching to groundwater in Appendix 1 and more information on *nitrification inhibitors* in Part III.B.2.

a. For commercial N fertilizer applications:

(1) No late summer or fall applications on areas identified as having soil depth of 5 feet or less over bedrock, P, R, W soils, areas within 1,000 feet of a Community potable water well, except where needed for establishment of fall seeded crops or blended commercial fertilizer

materials are needed to meet UWEX Pub. A2809 guidelines. For these exceptions, the N application rate shall not exceed 36 pounds N per acre and all nutrients must be credited towards the requirement of the crop.

(2) On P, R, W, and combination soils, when commercial N is applied, follow IV.A.1(h) and (i).

(3) On P soils, when commercial N is applied for full season crops in the spring and summer, do not exceed the UWEX Pub. A2809 crop N rate guidelines and apply one of the following management strategies:

- A split or delayed N application to apply a majority of crop N requirement after crop establishment.
- Use a nitrification inhibitor with ammonium forms of N.
- Use *slow and controlled release fertilizers* for a majority of the crop N requirement applied near the time of planting.

b. For late summer and fall applications of manure and/or organic by-products with > 4% dry matter:

(1) On W soils or combination W soils, use rates that will not smother these crops and limit N rates to those specified in UWEX Pub. A2809 or 120 pounds per acre of available N, whichever is less.

(2) On P and R soils:

a. When a crop is growing, such as perennial crops, overwintering annual crops, *double crops*, and cover crops, use rates that will not smother these crops and limit N rates to those specified in UWEX Pub. A2809 or 120 pounds per acre of available N, whichever is less.

b. For annual crops that will not be planted until the following spring or summer, delay application until *soil temperatures* are less than 50°F or October 1, whichever occurs first, and limit N rates to those specified in UWEX Pub. A2809 or 90 pounds per acre of available N, whichever is less.

c. For applications of manure and/or organic by-products with ≤ 4.0% dry matter:

(1) On W soils or combination W soils, reduce applications to 90 pounds per acre of available N or apply no more than 120 pounds of available N per acre and use at least one of the following practices:

a. Use a nitrification inhibitor.

b. Apply on an established cover crop, or an overwintering annual crop, or a perennial crop.

c. Establish a cover crop within 14 days of application.

d. Surface apply and do not incorporate for at least 3 days.

e. Delay application until October 1 or soil temperatures are less than 50°F.

(2) On P and R soils, delay applications until soil temperatures are less than 50°F or October 1, whichever occurs first, and use a nitrification inhibitor or surface apply and do not incorporate for at least 3 days. Application rates are limited to those in section IV.B.1.b.(2).

2. Where P enrichment of groundwater is identified as a conservation planning concern, implement practices to reduce delivery of P to groundwater.

C. Additional Criteria to Minimize Entry of Nutrients to Surface Water

1. Where manure, organic by-products, or fertilizers are applied:

a. Avoid building soil test P values, when possible, beyond the non-responsive soil test range for the most demanding crop in the rotation. For most agronomic crops in Wisconsin, the non-responsive soil test range is 30 to 50 parts per million (ppm) Bray P-1 soil test.

b. Establish perennial vegetative cover in all areas of concentrated flow that result in reoccurring gullies.

c. In crop fields where ephemeral erosion is an identified problem, a minimum of one of the following runoff-reducing practices shall be implemented:

(1) Install/maintain contours, contour strips and/or contour buffer strips. Refer to *NRCS FOTG*, Section IV, Standard 585, Contour Farming Standard 220, Strip Cropping, and/or Standard 332, Contour Buffer Strip.

(2) Install/maintain filter strips (NRCS FOTG, Section IV, Standard 393, Filter Strip) along surface waters and concentrated flow channels that empty into surface waters.

(3) Maintain greater than 30% crop residue or vegetative cover on the soil surface after planting.

(4) Establish fall cover crops.

(5) Reduce tillage, adjust the crop rotation, or implement other practices to control ephemeral erosion.

2. Develop a P management strategy when manure or organic by-products are applied during the crop rotation to minimize surface water quality impacts. Use either the *Phosphorus Index (PI)* in section IV.C.2.a. or Soil Test Phosphorus Management Strategy in section IV.C.2.b. on all fields within a farm or tract and follow IV.A.1.h.

a. PI Strategy – The planned average PI values for up to an 8-year rotation in each field shall be 6 or lower. P applications on fields with an average PI greater than 6 may be made only if additional P is needed and according to UWEX Pub. A2809. Strategies for reducing the PI, algorithms, and software for calculating the Wisconsin PI can be found at *http://wpindex.soils.wisc.edu/*.

b. Soil Test Phosphorus Strategy - Management strategies based on soil test phosphorus may be used. Operations using this strategy shall have a conservation plan addressing all soil erosion that is consistent with the current crops and management or use the erosion assessment tools included with the Phosphorus Index model.

Available phosphorus applications from all sources shall be based on the following soil test P values (Bray P-1):

(1) Less than 50 ppm soil test P - nutrient application rates allowed up to the N needs of the following crop or the N removal for the following legume crop.

(2) 50-100 ppm soil test P - P application shall not exceed the total crop P removal for crops to be grown over a maximum rotation length of 8 years.

(3) Greater than 100 ppm soil test P - total P applications from all sources shall not exceed guidelines from UWEX Pub. A2809. If manure P applications above these guidelines are necessary due to lack of suitable application sites, P applications shall be 25% less than the cumulative annual crop removal over a maximum rotation length of 8 years.

D. Additional Criteria to Protect Air Quality by Reducing Particulates, Odors, and Reactive Nitrogen Emissions Where Air Quality is Identified in a Conservation Plan or Nutrient Management Plan as a Resource Concern

1. Apply one or more of the following management strategies that minimizes nutrient volatilization and particulate losses while maintaining tolerable soil erosion levels for wind and water:

a. Slow or controlled release fertilizers

b. Nitrification inhibitors

c. *Urease inhibitors*

d. Nutrient enhancement technologies

e. Immediate incorporation or injection

f. Stabilized nitrogen fertilizers

g. Residue and tillage management

h. No-till or strip-till

i. In-field and edge-of-field wind breaks

j. NRCS Wind Erosion Prediction System (WEPS) to confirm fields meet tolerable soil loss

k. Other technologies that minimize the impact of these emissions

2. Do not apply poultry litter, manure, or organic by-products of similar dryness/density when there is a high probability that wind will blow the material off-site.

E. Additional Criteria to Protect the Physical, Chemical, and Biological Condition of the Soil

1. Nutrients shall be applied in a manner that does not permanently degrade the soil's structure, chemical properties, or biological condition.
2. To the extent practical, nutrients shall not be applied when the potential for soil compaction and/or the creation of ruts is high.

V. CONSIDERATIONS

The following statements are optional management considerations and are not required practices.

A. Seed and stabilize all concentrated flow channels. Install and maintain vegetative filter strips, riparian buffers, and other buffer areas adjacent to surface water and wetlands in conjunction with other conservation practices in order to reduce the amounts of sediment and nutrients that reach surface water and/or groundwater.

B. Use additional management practices found in the Technical Note WI-1, Part III to improve N use efficiency.

Use variable-rate nitrogen, phosphorus, and potassium application rates based on site-specific variability in crop yield, soil characteristics, soil test values, and other soil productivity factors. Application rates must be consistent with recommendations found in UWEX Pub. A2809.

Develop site-specific yield maps using a yield monitoring system. Use the data to further diagnose low and high yield areas, or zones, and make the necessary management changes. See Title 190, Agronomy Technical Note (TN) 190.AGR.3, Precision Nutrient Management Planning.

C. Apply nutrients not specifically addressed by this standard (i.e., secondary and micro nutrients) based on recommendations found in UWEX Pub. A2809.

D. To minimize N leaching on medium and fine-textured soils, avoid fall commercial N applications for crops to be seeded the following spring. If commercial N is applied in the fall, use ammonium forms of N and delay N application until soil temperatures drop below 50°F. Use of a nitrification inhibitor with fall-applied N is recommended.

E. For liquid and slurry manure, consider using a nitrification inhibitor to limit the potential risk for N loss.

F. Use irrigation strategies (ex. irrigation scheduling, reduced-pressure drop nozzles for center pivots, etc.) to minimize N leaching losses, improve crop water use efficiency, and not exceed intake/infiltration capacity of the soil.

G. Consider the use of animal feeding strategies based on published nutrition research findings (National Research Council, etc.) to reduce excess P in rations when manure applications are made to cropland.

H. Consider delaying surface applications of nutrients if precipitation capable of producing runoff is forecast within 24 hours of the time of planned application.

I. Consider modifying the crop rotation in order to provide crop fields for the application of manure during the summer crop growing season.

J. On fields directly adjacent to or on fields with areas of concentrated or channelized flow that drain directly to surface waters, consider the following:

- For operations using the soil test P strategy, avoid raising soil test P levels beyond optimum. In addition, implement conservation practices that reduce delivery of nutrients.
- For operations using the P-Index, reduce the P-Index values by applying additional conservation practices.

K. Where residual nitrate carryover is probable, the preplant soil nitrate test is recommended to adjust N application rates for corn.

L. To improve N use efficiency of wheat, the preplant soil nitrate test is recommended to adjust the N

application rate.

M. Where cropland with less than 50' soil depth overlays Silurian Carbonate Bedrock, identify karst land features that are direct conduits to groundwater and use management practices to minimize N loss to groundwater. See Technical Note WI-1 for a list of soils and/or map.

N. On Silurian dolomite (SD) soils in the spring, summer or fall and before crop planting or after crop harvest, implement at least one of the following if liquid manure is injected or surface applied:

1. Complete pre-tillage prior to application
2. Immediately incorporate manure after application
3. Reduce application rate to 7,000 gallons per application; complete sequential applications to meet desired nutrient additions consistent with this standard. Wait a minimum of three days between sequential applications.

O. When there is a high risk of transport of nutrients, the coordinated installation of conservation practices can be used to avoid, control, or trap manure or nutrients before they can leave the field by surface and subsurface drainage. The number of applications and application rates must also be considered to limit the transport of nutrients to tile.

P. Incorporate nutrient applications in flood prone areas of a field in order to prevent nutrient losses to surface waters. Consider applying manure nutrients after seasonal flooding risk period(s) has passed.

Q. Nutrient containers should be recycled in compliance with State and local guidelines or regulations.

R. Avoid applying manure and other organic by-products upwind of residences.

S. Use the Wisconsin NRCS recognized *Nitrogen Leaching Index* to evaluate N pathway loss via leaching, solution runoff, reactive N emissions for planning N reduction alternatives located on the Wisconsin NRCS website under Nutrient Management: *http://www.nrcs.usda.gov/wps/portal/nrcs/main/wi/technical/cp/* or refer to Technical Note WI-1, Part III.B.

T. Evaluate conditions for high risk of snow melt within ten days or less before manure nutrient application.

VI. PLANS AND SPECIFICATIONS

A. The minimum requirements for a nutrient management plan are specified in the previous sections of this standard and expanded in Part I of the Technical Note WI-1. The following items are required in a nutrient management plan:

1. Field features identified on maps or aerial photos including:

   a. Field location, soil survey map unit(s), field boundary, acres, field identification number, a North directional arrow if north is not oriented at the top of the page;
   Areas prohibited from receiving nutrient applications: Surface water, established concentrated flow channels with perennial cover, non-farmed wetlands, lands where established vegetation is not removed, and fields eroding at a rate exceeding tolerable soil loss (T);

   b. Direct conduits to groundwater, such as wells, sinkholes, swallets, fractured bedrock at the surface, mine shafts, non-metallic mines, tile inlets discharging to groundwater, quarries, or depressional groundwater recharge areas over shallow fractured bedrock, and their restrictions or prohibited areas defined in IV.A.2.and IV.A.3.;

   c. Regulated water sources including potable water wells, Community potable water wells, and Non-community potable water wells, and their restrictions or prohibition areas;

   d. Areas prohibited from receiving nutrient applications to frozen or snow-covered soil: Slopes > 6% ; Surface Water Quality Management Areas (SWQMA); Areas where DNR Well Compensation funds provided replacement water supplies for wells contaminated with livestock manure; Silurian Dolomite soils; Additional areas identified as contributing runoff to surface or groundwater;

   e. N-restricted soils including areas identified as having soil depth of 5 feet or less over bedrock, P, R, W soils, and areas within 1,000 feet of a Community potable water well, and listed in Appendix 1 of Technical Note WI-1;

   f. Areas of concentrated flow that result in reoccurring gullies;

2. Each field's tolerable and calculated soil losses;
3. Soil test reports and results of soil, plant, manure, or organic by-product sample analysis with the initial plan and upon resampling. For subsequent updates, this information should be available upon request. Tissue test reports must be provided annually to document the need for nutrient applications based on tissue analysis results;
4. Current and planned crops and crop yields, realistic yield goals;
5. Recommended nutrient application rates;
6. Documentation of actual nutrient applications including the rate, form, timing, and method. Revise the plan to reflect any changes in crops, yields, tillage, management, and soil or manure analyses;
7. For supplemental nitrogen application, documentation of weather conditions; soil conditions; crop growth stage; and photographs, soil/tissue testing, crop canopy reflectance sensing, or nitrogen management models;
8. Guidance for implementation and maintaining records;
9. Soil test P-ppm, P balance calculation, or P Index level where applicable;
10. Other management activities required by regulation, program requirements, or producer goals;
11. A narrative to explain other implementation clarifications.
12. The location, to the maximum extent practical, of inlets, outlets, tile lines and tile depth of subsurface drainage systems in fields where nutrients are applied. To address discharges of liquid manure and/or organic by-products from the tile lines follow IV.A.1.n. See Technical Note WI-1 Part III.D. for guidance for locating tile line/subsurface drainage, preventing discharges of liquid manure or organic by-products from tile lines and emergency response actions in Technical Note WI-1.
13. When grouping fields for nutrient application purposes, N, P, and K application rates shall match individual field recommendations as closely as possible to make implementation feasible.

B. The Winter Spreading Plan shall be developed according to the criteria defined in the NRCS FOTG Standard 590, Nutrient Management and be consistent with Part II of Technical Note WI-1.

The plan shall:

1. Reflect a minimum of 14 days of manure and/or organic by-products generated by the farm or all manure and/or organic by-products anticipated to be spread during frozen or snow-covered soil, whichever is greater;
2. Document the storage capacity for each manure type generated;
3. Document the capacity for stacking manure that is = 16% dry matter without permanent storage. Refer to NRCS 313 Standard, Waste Storage Facility, to locate potential stacking sites;
4. Provide Winter Manure Spreading Plan Implementation Maps (as per Part II of Technical Note WI-1) that identify areas of fields that meet the restrictions for applications on frozen or snow-covered soil;
5. Document that fields with slopes less than 6% are not accessible for winter spreading, if winter spreading on fields with slopes greater than 6%.
6. Identify necessary runoff mitigation practices in IV.A.2.d.(3) and (4);

C. Persons who review or approve plans for nutrient management shall be certified through any certification program acceptable to the NRCS (NRCS General Manual, Title 180, Part 409.9, NRCS TechReg) or other appropriate agencies within the state.

D. Industrial wastes, municipal sludge and some organic by-products are regulated by the Wisconsin Department of Natural Resources (WDNR). They must be spread in accordance with a Wisconsin Pollution Discharge Elimination System (WPDES) permit as obtained from the WDNR and also in accordance with IV.A.1.m.

E. Plans for nutrient management shall be developed in accordance with policy requirements of the NRCS General Manual Title 450 Part 401.03 and Title 190, Part 402, the contents of this standard, the procedures contained in the National Planning Procedures Handbook, and NRCS National Agronomy Manual, Section 503. Plans for Nutrient Management that are elements of a more comprehensive conservation plan or

nutrient management plan shall recognize other requirements of the plan and be compatible with the other requirements. A Comprehensive Nutrient Management Plan (CNMP) is a conservation system unique to animal feeding operations (AFO). The CNMP will be developed to address the environmental risks identified during the resource inventory of an AFO. A CNMP will require use of all the applicable criteria in this technical standard along with the additional criteria located in NRCS National Planning Procedures Handbook, Subpart B, Part 600.54.

VII. OPERATION AND MAINTENANCE

The minimum operations and maintenance requirements for a nutrient management plan are specified in this section. The following items are required:

A. Document the actual nutrient application including the rate, form, timing, and method of the application. Revise the plan to reflect any changes in crops, tillage, management, soils, and manure tests. Producers shall have access to the current version of the nutrient management plan.

B. Minimize operator exposure to potentially toxic gases associated with manure, organic by-products, and chemical fertilizers, particularly in enclosed areas. Wear personal protective equipment appropriate to the material being handled.

C. Protect commercial fertilizer from the weather, and agricultural waste storage facilities from accidental leakage or spillage. See Wisconsin administrative rules and county or local ordinances concerning regulations on siting, design, operation, and maintenance of these facilities.

D. Temporary placement or storage of manure shall be in accordance with the criteria for temporary unconfined stacks of manure contained in *NRCS FOTG* Standard 313, Waste Storage Facility.

E. When cleaning equipment after nutrient application, remove and save fertilizers or wastes in an appropriate manner. If the application equipment system is flushed, use the rinse water in the following batch of nutrient mixture where possible or dispose of according to state and local regulations. Always avoid cleaning equipment near high runoff areas, ponds, lakes, streams, and other water bodies. Extreme care must be exercised to avoid contaminating potable drinking water wells.

F. Document the methodology used to determine the nutrient application rate of equipment.

G. Concentrated flow channels where gully erosion has/will occur shall be maintained in permanent vegetation. This does not include low velocity surface drains where channel erosion does not occur.

VIII. FEDERAL, STATE, AND LOCAL LAWS

Users of this standard are responsible for compliance with applicable federal, state, tribal, and local laws, rules, or regulations governing nutrient management systems. This standard does not contain the text of federal, state, or local laws. Implementation of this standard may not eliminate nutrient losses that could result in a violation of law.

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X. DEFINITIONS

Adaptive Nutrient Management (IV.A.1.a.) - A process that utilizes on-farm research data to refine nutrient management strategies based on site specific crop production conditions. Implementation of Adaptive Nutrient Management shall use multiple years of field data collected and evaluated utilizing methods recognized by the University of Wisconsin as outlined in Technical Note WI-1, Appendix 3 "Guidelines for Adaptive Nutrient Management".

Adequate Acreage (IV.A.1.d.) – There is enough land described in the plan to use all the manure generated by the farm annually while maintaining compliance with this standard.

Apparent Water Table (IV.B.1.) - Continuous saturated zone in the soil to a depth of at least 6 feet without an unsaturated zone below it.

Areas Contributing Runoff (IV.A.2.b.) – Areas located up gradient from an identified feature which generate surface runoff during precipitation and/or melting periods that flows toward and eventually reaches the feature. The contribution area may be identified utilizing digital elevation models, topographic maps or infield measurement and/or observation.

Budget (II) - Document present and prior year's crop, estimated nutrient removal by these crops and known nutrient credits. When nutrients are applied for future crop needs in the rotation, implement a tracking process to allow adjustment of subsequent nutrient applications so that the total amount of nutrients applied to the farm or tract complies with this standard and is documented in the plan. Required as a component for all nutrient management plans.

Community Potable Water Well (IV.A.2.c.(1)) - Found in NR 811.02 (16) means a public water system, regulated under NR 811,which has at least 15 service connections and is used by at least 25 residents for at least 6 months per year. Any water system serving 7 or more single family homes, 10 or more mobile homes, 10 or more apartment units, 10 or more duplex living units or 10 or more condominium units shall be considered a community water system unless information is provided by the owner indicating that 25 year-round residents will not be served.

Concentrated Flow Channel (IV.A.2.a.(1)) - A natural channel or constructed channel that has been shaped or graded to required dimensions and established in perennial vegetation for the stable conveyance of runoff. Refer to NRCS FOTG Standard 412, Grassed Waterway, for more information on construction. This definition may include non-vegetated channels caused by ephemeral erosion. These channels include intermittent streams, drainage ditches, and drainage ends identified on the NRCS soil survey. Concentrated flow channels are often identifiable as contiguous up-gradient deflections of contour lines on the USGS 1:24,000 scale topographic map.

Conservation Plan (IV.A.2.b.) - A plan developed and field verified by a conservation planner to document crop management and the conservation practices used to control sheet and rill erosion to tolerable levels (T) and to provide treatment of ephemeral soil erosion. A conservation plan must be signed by the land operator and approved by the county Land Conservation Committee or their representative. A conservation plan will be needed for designating winter spreading restrictions other than those specifically listed in this standard, and when implementing the soil test P management strategy where the soil erosion assessment is not calculated with the Wisconsin Phosphorus Index model. A conservation planner must develop conservation plans using the minimum criteria found in the USDA, NRCS National Planning Procedures Handbook and the Wisconsin Field Office Technical Guide and be qualified by one of the following:

1. Meeting the minimum criteria in the NRCS General Manual, Title 180, Part 409.9(c), NRCS Certified Conservation Planner Designation.
2. Meeting the NRCS TechReg Certified Conservation Planner Option 1, 2, 3.
3. For non-NRCS funded plans meet the training and performance criteria established by the county Land Conservation Committee.

Cover Crop (IV.A.3.a.(4)) – Grasses, legumes, forbs or other herbaceous plants established for seasonal cover and conservation purposes. Cover crops are typically terminated prior to the production of viable seed.

Crop N Deficiency (IV.A.1.i.) - The condition where plant tissue concentrations of N are low enough to limit crop growth and development. Nitrogen deficiency in corn exhibits as yellowing at the tips of the oldest leaves. As deficiency progresses yellowing moves along the midrib towards the stalk and yellowing moves from the bottom leaves towards the top. In general N deficiency produces a paler green or yellow color in the oldest leaves. For more detail see: *https://www.ipni.net/ppiweb/bcrops.nsf/$webindex/8A1BFC4E9E01AEB0852568F1005777BC/$file/97-3p08.pdf*. Crop N deficiency is often caused by low availability of soil inorganic N which may be a product of nitrate leaching, denitrification, or slow mineralization of N from soil organic matter, manure, crop residues.

Direct Conduits to Groundwater (IV.A.1.n.) – Wells, excluding irrigation wells; sinkholes; swallets (a sinkhole or rock hole that intercepts a stream, diverting all or a portion of it to the groundwater); fractured bedrock at the surface, mine shafts; non-metallic mines; tile inlets discharging to groundwater, quarries, or depressional groundwater recharge areas over shallow fractured bedrock. For the purpose of nutrient management planning, these features will be identified on the Nutrient Application Restriction Maps, NRCS soil survey and/or USGS 1:24,000 scale topographic map, or otherwise determined through on-site evaluation and documented in a conservation plan, nutrient management plan or other local process approved by the Land Conservation Committee.

Documented Yields (IV.A.1.b.) - Crop production yield records documented by field for at least two consecutive years that are used to determine phosphorus and potassium fertility recommendations. Yield record documentation may include measurements of harvested crop weight, volume, or the use of calibrated yield-monitors.

Double Crop (IV.B.1.a.(3)) – Two crops grown and harvested in the same harvest season. A second crop is typically planted early enough to allow for at least one month's growth.

Effective Incorporation (IV.A.2.d.) - Mixing with topsoil or residue, or subsurface placement of nutrients by such means as injector, disc, sweep, mold-board plow, chisel plow, or other tillage/infiltration methods. Nutrients will not run off the field or drain to subsurface tiles during application.

Ephemeral Erosion (IV.2.a.(7)) – Erosion which forms by the convergence of overland sheet flow and rill erosion to form shallow channels which reoccur in the same locations even after these channels are filled by tillage. The location of ephemeral erosion channels are typically determined by the macro topography of the field. Ephemeral erosion channels are characterized by a dendritic (branch shaped) pattern vs. the small parallel channel pattern formed by rill erosion (Page 10 Technical Note WI-1).

Fields (III) - A group or single nutrient management unit with the following conditions: similar soil type, similar cropping history, same place in rotation (i.e., second year corn fields, established alfalfa), similar nutrient requirements, and close proximity. Examples include: alternate strips in a contour strip system, pasture, variable rate nutrient application management units, and other management units where grouping facilitates implementation of the nutrient management plan.

Gleaning or Pasturing (IV.A.1.k.) - An area of land where animals graze or otherwise seek feed in a manner that maintains the vegetative cover over all the area and where the vegetative cover is the primary food source for the animals. Livestock shall be managed to avoid the routine concentration of animals within the same area of the field. Manure deposited near a well by grazing of livestock does not require incorporation.

Long term No-till (IV.A.3.a.(5)) – No tillage has occurred for a minimum of three consecutive previous years.

Major Nutrients (IV.A.1.a) - Nitrogen (N), phosphorus (P), and potassium (K).

Nitrification Inhibitor (IV.B.1.) - A compound that temporarily blocks the activity of nitrifying bacteria and limits the conversion of ammonium to nitrate. Use of a nitrification inhibitor with ammonium based fertilizers or manure has the potential to reduce nitrate loss via leaching or denitrification. Follow product label.

Nitrogen Leaching Index (V.S.) - A tool written in the programming language Java and developed by the USDA—Agricultural Research Service and designed for use in Wisconsin to calculate nitrogen uptake and leaching for different farming and management operations.

Non-community Potable Water Well (IV.A.2.c.(2)) – Public water system, regulated under NR 812, which serves at least 25 or more people for 6 months or more per year. Well users may be non-transient (same 25 people) or transient. Non-community potable wells include schools, restaurants, or churches.

N Restricted Soils (IV.B.1.) Are defined below and also include the area within 1000 feet draining to community potable water wells or areas identified as having soil depth of 5 feet or less over bedrock (See Technical Note WI-1).

High Permeability Soils (P) – Are equivalent to drained hydrologic group A meeting both of the following criteria:

1. Permeability = 6 inches/hour or more in all parts of the upper 20 inches and
2. Permeability = 0.6 inches/hour or more in all parts of the upper 40 inches.

Use the lowest permeability listed for each layer when evaluating a soil. For a multi-component map unit (complex), evaluate each component separately. If the high permeability components meet the criteria and cannot be separated, the entire map unit should be considered as high permeability.

Wet Soils (W) - Have an Apparent Water Table within 12 inches of the surface at any time of the year. The apparent water table is a continuous saturated zone in the soil to a depth of at least 6 feet without an unsaturated zone below it. A W soil is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions. These soils can be non-hydric, saturated, or soggy for short periods in the spring after periods of rain or flooding and usually occur in low areas of the landscape.

Rock Soils (R) - Have less than or equal to 20 inches to bedrock. Bedrock is a general term for the solid rock (lithic) or unconsolidated material (paralithic) that underlies the soil or is exposed at the surface. If R soils are field verified and the depth is more than 20 inches to bedrock, then the soil is not considered restricted for bedrock.

Note (IV.A.1.l.) - Any section labeled as a 'note' is to be considered a recommendation rather than a requirement. The note is included in the criteria section to ensure subject continuity.

Organic By-Products (II.) – Organic materials that are produced as a byproduct of an industrial or agricultural process which can be land applied as a source of nutrients. Examples include paunch, manure solids, food production wastes, process wastewater, and waste water treatment plant bio-solids and waste water if land applied. This definition does not include hazardous and/or inorganic industrial waste or manufactured nutrient sources. Use of the term "organic" refers to carbon-based materials and is not intended as a reference to the certification criteria of the USDA National Organic Program.

Phosphorus Index (PI) (IV.C.2.) - The Wisconsin Phosphorus Index (PI) is an assessment of the potential for a given field to deliver P to surface water. The PI assessment takes into account factors that contribute to P losses in runoff from a field and subsequent transport to a water body, including:

- Soil erosion as calculated using the current approved NRCS soil erosion prediction technology located in Section I of the NRCS FOTG.
- Estimated annual field rainfall and snowmelt runoff volume.
- Soil P concentrations as measured by routine soil test P (Bray P-1).
- Rate and management of P applications in the form of fertilizer, manure, or other organic material.
- Characteristics of the runoff flow pathway from the field to surface water.
- The algorithms and software for calculating the Wisconsin PI can be found at *http://wpindex.soils.wisc.edu/*.

Rotation (III) - The sequence of crops to be grown for up to an 8-year period as specified by the conservation plan or as part of the soil erosion assessment calculated with the Wisconsin Phosphorus Index model.

Saturated Soils (IV.A.2.a.(1)) - Soils where all pore spaces are occupied by water and where any additional inputs of water or liquid wastes cannot infiltrate into the soil.

Silurian Dolomite (SD) Soils (IV.A.2.d.(6)) - Areas where Silurian dolomite bedrock is present within 60 inches of the surface. The location of Silurian dolomite limestone is determined by maps created by the Wisconsin Geologic and Natural History Survey. Depth to bedrock assessment is based on the most current Natural Resources Conservation Service soil survey map unit interpretations.

Slow and Controlled Release Fertilizer (IV.B.1.b.(2)) – Fertilizer materials that have been coated with a material (eg. polymers, sulfur) that prevents the nutrients from being immediately available. Instead the nutrients become slowly available over time.

Soil Temperature (IV.B.1.a.(3)) – The soil temperature can be documented with soil temperature at at least 4" depth, or by a 5-day average maximum daily air temperature =55°F, or 5-day average minimum daily air temperature =40°F.

Starter Fertilizer (IV.A.1.h.) – Fertilizer applied at the time of planting and placed with or in a band in close proximity to the seed.

Substantially Buried (IV.A.2.b.) – Mixing the manure or process wastewater with surface soil so that at least 80% of applied manure or process wastewater is covered with soil and the application rate is controlled to ensure that applied material stays in place and does not run off. Incorporation includes standard agricultural practices such as tillage or other practices that are the equivalent to providing 80% soil coverage.

Subsurface Drainage (IV.A.3.b.) – A conduit installed beneath the soil surface to collect and/or convey excess water. Tile drainage is an example of subsurface drainage. For the purposes of this standard, subsurface drainage does not include structures that divert surface water from ponding or running off a field.

Surface Water Quality Management Areas (SWQMA) (IV.A.2.d.(1)) - For the purposes of nutrient management planning, Surface Water Quality Management Areas are defined as follows:

1. The area within 1,000 feet from the ordinary high-water mark of navigable waters that consist of a lake, pond or flowage, except that, for a navigable water that is a glacial pothole lake, "surface water quality management area" means the area within 1,000 feet from the high-water mark of the lake.

2. The area within 300 feet from the ordinary high-water mark of navigable waters that consists of a river or stream that is defined as:
    - Perennial streams (continuous flow) identified on the NRCS soil survey and/or USGS 1:24,000 scale topographic map as solid lines,
    - Otherwise determined through an on-site evaluation and documented in an approved conservation plan or nutrient management plan. Areas within the SWQMA that do not drain to the water body are excluded from this definition.

Areas within the SWQMA that do not drain to the water body are excluded from this definition.

Tolerable Soil Loss (T) (IV.A.2.a.(6)) - For sheet and rill erosion. T-value means the maximum rate of soil erosion established for each soil type that will permit crop productivity to be sustained economically and indefinitely. Erosion calculations shall be based on current approved erosion prediction technology found in NRCS FOTG Section I or the soil loss assessment calculated using the Phosphorous Index Model. Tolerable soil erosion rates shall be determined using the RUSLE2 Related Attributes Report located in Section 2, FOTG, Soil Report.

Treated Manure (IV.A.2.c.) – Manure and/or manure constituents that HAVE been subjected to treatment or processing that has the documented effect of substantially eliminating pathogens. Treatment or processing examples include thermophyllic anaerobic digestion, high temperature composting of manure solids or manipulation of pH.

Urease Inhibitor (IV.D.1.) - A compound that prevents the hydrolysis of urea by blocking the urease enzyme. Use of a urease inhibitor will reduce ammonia volatilization losses from surface applied urea.

Vegetative Buffer (IV.A.2.a.(1)) - A strip or area of perennial herbaceous vegetation situated between cropland, grazing land, or disturbed land (including forest land) and environmentally sensitive areas (as defined in NRCS Technical Standard 393, Filter Strip).