Manure Irrigation, the Permitting Process and What You Need to Know & Other Nutrient Management Topics

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WDNR – Nutrient Management Program Coordinator

February 4, 2016: Rice Lake
February 11, 2016: Fond du Lac
February 12, 2016: Green Bay
Overview

- What is Manure Irrigation?
  - Potential Benefits
  - Potential Concerns
- Prevalence of Manure Irrigation at CAFOs
- Manure Irrigation Requirements
- Manure Irrigation Plan
- Manure Irrigation Workgroup
- NMP Review – Common Issues
- Common Questions from CAFOs
What is Manure Irrigation?

- The application of liquid manure or process wastewater to cropland using equipment that discharges manure into the air via a single nozzle or multiple nozzles or hoses and disperses the manure over distances greater than could be achieved using typical moving vehicle or manure hauling equipment.
What is Manure Irrigation?

- Center Pivot Systems
What is Manure Irrigation?

• Center Pivot Systems

Photo by Mark Borchardt
What is Manure Irrigation?

- Center Pivot Systems
What is Manure Irrigation?

• Traveling Gun

Photo by Mark Borchardt
What is Manure Irrigation?

- Tanker with Nozzle(s)
Potential Benefits

• Timing of manure application
  – Surface and groundwater protection
    • Less risk for manure surface runoff
    • Reduce leaching below root zone
    • Reduce entry in drain tiles
    • Recycle water / manure treatment
  – More precise nutrient management
• Road safety and reduced road damage
• Farm management
• Economic benefits
Potential Concerns

• Public health risk from airborne pathogens and other contaminants
  – Inhalation
  – Deposition on surface
• Drift or overspray
• Odor and air emissions
• Surface and groundwater contamination
• Implementation and compliance issues
Prevalence of MI at CAFOs

- 7 Approved
- 4 Pending or Temporarily Revoked
- WDNR does not track or regulate manure irrigation at non-CAFO farms.
## Manure Irrigation Requirements

<table>
<thead>
<tr>
<th>Restrictive Feature</th>
<th>Setback</th>
<th>Code Reference</th>
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<tbody>
<tr>
<td>Community Public Water Supply Well</td>
<td>1000 feet</td>
<td>NR 214.14(1)(a)</td>
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<tr>
<td>Non-Community Water Supply Well</td>
<td>250 feet*</td>
<td>NR 214.14(1)(a)</td>
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<td>Inhabited Dwelling</td>
<td>500 feet*</td>
<td>NR 214.14(1)(b)</td>
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<td>Depth to Groundwater &amp; Bedrock</td>
<td>5 feet*</td>
<td>NR 214.14(1)(c)</td>
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<td>Direct Conduit to Groundwater</td>
<td>100 feet</td>
<td>NR 243.14(2)(b)</td>
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<td>Navigable Waters &amp; Conduits</td>
<td>25-100 feet</td>
<td>NR 243.14(4)(a)</td>
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<td>Wetland</td>
<td>25 feet</td>
<td>NR 243.14(4)(a)</td>
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</tbody>
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*Greater setback compared to conventional application method.*
Manure Irrigation Requirements

- Additional restrictions and limitations:
  - Ponding or runoff is prohibited,
  - Even distribution over the field,
  - Hydraulic application rate may not exceed 10,000 gallons per acre,
  - Operated in a load/rest cycle,
  - Annual soil testing requirements, and
  - Other conventional application requirements.
Manure Irrigation Requirements

• Other sections that give DNR authority:
  – Department may require reduced hydraulic application rates or grass buffer strips,
  – Department may restrict irrigation during times of the year (dormant or no crop established),
  – Department may require monitoring of BOD$_5$, TSS, forms of nitrogen, chloride, metals, or others pollutants,
  – Department may require the installation of a groundwater monitoring well system, and
  – Department may require more stringent requirements than what’s in section NR 243.14.
Manure Irrigation Plan

• If a CAFO wants to apply manure and/or process wastewater via irrigation they must develop a manure irrigation plan.

• The manure irrigation plan is part of the farm’s NMP.

• A manure irrigation plan consists of.....
Manure Irrigation Plan

• Narrative / Questionnaire
  – Initially developed in April 2013.
  – May be revised once the Manure Irrigation Workgroup and Research is complete.
Manure Irrigation Plan

- Narrative / Questionnaire
  - Fields
  - Restriction Maps
  - Manure / Process Wastewater Characteristics
  - Equipment Design
  - Operation, Timing and Methods
  - Drift and Runoff Prevention
  - Response Actions for Drift / Runoff
Manure Irrigation Plan

• Restriction Maps
  – Only required for fields planned to be used for manure irrigation.
  – Should include all required setbacks and restricted soils.
    • Department does allow field verification of soils.
  – Must identify on map where manure will be irrigated.
Manure Irrigation Plan

- Restriction Maps
# Manure Irrigation Plan

- **Drift Monitoring Log**

## Irrigation Application Record Sheet

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Pivot Operating Property</th>
<th>Wind Speed (mph)</th>
<th>Wind Direction</th>
<th>Sunlight Exposure (full, partial, none)</th>
<th>Temp (°F)</th>
<th>Evidence of Surface Runoff</th>
<th>Evidence of Offsite Drift</th>
<th>Tile Outlets Inspected</th>
<th>Notes</th>
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<tr>
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Monitoring of irrigation equipment will be completed at least every ___ hour(s) when in operation. Any deficiencies found during monitoring activities should be explained in the notes section.
Manure Irrigation Plan

• Equipment Specifications
  – Typically you can get this information from the manufacture
  – Specs include:
    • Size of nozzle,
    • Operating pressures,
    • Droplet size,
    • Ability to operate the system in changing weather conditions,
    • Etc.
Manure Irrigation Plan

• Other Information:
  – Manure and process wastewater test results,
    • For manure sources planned to be used for irrigation.
  – Soil test results,
    • For fields proposed for manure irrigation only.
  – Photos of irrigation equipment.
Manure Irrigation Plan

• Department Review
  – Complete Manure Irrigation Plan is submitted to the Department.
    • Currently all plans are reviewed by Nutrient Management Program Coordinator (Joe Baeten).
    • An irrigation request is not a substantial revision.
  – Department denies or approves plan.
    • Approval is conditional.
  – Reporting requirements are done with the Annual Report and/or NMP Update.
Manure Irrigation Workgroup

- Diverse workgroup:
  - 3 UW-Madison members (Chaired by Ken Genskow)
  - 1 USDA member
  - 2 WDNR members
  - 1 NRCS member
  - 1 DATCP member
  - 2 DHS members
  - 2 County Health Department members
  - 3 Dairy Farmers / PDPW members
  - 1 Agronomist member
  - 1 PNAAW member
  - 1 Organic Farmer / Concerned Citizen member
  - 1 WLWCA member
Manure Irrigation Workgroup

- Purpose of the workgroup is to review and develop guidance on the practices of applying livestock manure or process wastewater through irrigation equipment.
- Workgroup is developing a report that includes background information, discussions of factors influencing the concerns and benefits associated with the practices, and any recommendations developed by the group.
- Last face-to-face meeting held September 30, 2015.
- Expected release date for the report is mid-February 2016.
- [http://fyi.uwex.edu/manureirrigation/](http://fyi.uwex.edu/manureirrigation/)
Manure Irrigation Workgroup

• Manure Irrigation Research
  – Identify weather variables (e.g., wind speed, solar radiation, relative humidity) most important for airborne pathogen transport during manure irrigation.
  – Develop statistical model to predict airborne pathogen transport.
  – Use quantitative microbial risk assessment to establish safe setback distances.

Photos by Mark Borchardt
END OF MANURE IRRIGATION TALK

QUESTIONS?
NMP Review – Common Issues

• Lack of cross-referencing between SnapPlus and Restriction Maps.
  – Missing restriction maps for fields,
  – Field names don’t match,
  – Missing restrictions in SnapPlus.
NMP Review – Common Issues

• Lack of cross-referencing between NMP and engineering documents.
  – Manure volumes/tonnage do not match,
  – Animal numbers do not match.
NMP Review – Common Issues

• Missing tile line, field verification, and calibration logs

• Issues with recurring gullies / conc. flow paths
  – Not being vegetated
  – Not included on the restriction maps

• Issue with reissuances
NMP Review – Common Issues

• Not receiving all SnapPlus reports (when data file isn’t submitted)
  – Reports that should be submitted include (at minimum):
    • Compliance Check Report
    • Field Data and 590 Assessment Report
    • DNR CAFO Nutrient Mass Balance Report
    • DNR CAFO Annual Spreading
    • Annual Manure Production Report (for first year and each year of expansion)
    • Annual PI Report
    • Crop Trends Production Report
    • Soil Test Summary Report
NMP Review – Common Issues

• Missing 180-day storage calculation.
• Winter spreading maps missing greater setbacks
  – Identify area of the field where winter spreading will occur.
  – Ditches are flow channels.
• Missing land owner table in the narrative.
• Fields not identified as receiving other nutrient sources (industrial, septage, etc.)
Common Questions from CAFOs

• Because I’m a CAFO why can’t I apply manure to a growing cover crop in the fall.
  – False, you can apply manure to a cover crop in the fall just be cautious; don’t kill the crop.
Common Questions from CAFOs

• My manure lagoon is mapped as a lake and has a SWQMA, how can I change this?
  – Verification must be done by the appropriate government entity.
Common Questions from CAFOs

• How can I manage my solid manure during the Winter?
  – Solid manure can be applied during the winter except during February or March.
    • Must follow an approved winter spreading plan.
    • Be aware of snow depth and spreading requirements.
  – Solid manure can be headland stacked during February and March if there is no other storage at the production site.
Common Questions from CAFOs

• How can I manage my solid manure during the Winter?
WDNR CAFO Staff Update
QUESTIONS?

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