ORDINANCE 22 - 2016

ORDINANCE REGULATING DISTRIBUTION OF MANURE BY SPRAY IRRIGATION

The County Board of Supervisors of the County of Adams does ordain as follows:

WHEREAS: The Wisconsin Division of Public Health raises the potential for substantial health concerns resulting from the land application of liquid manure using Spray Irrigation Manure Distribution Systems; and

WHEREAS: The Adams County Board believes that the regulation of Spray Irrigation Manure Distribution systems is necessary to promote the public health and safety of the citizens of the County of Adams, and wishes to take action to that effect pending the adoption of appropriate controls by other governmental authorities.

NOW THEREFORE, THE ADAMS COUNTY BOARD OF SUPERVISORS DOES HEREBY ORDAIN AS FOLLOWS:

SECTION 1. Purpose and Intent. The purpose of this Ordinance is to promote the health and safety of Adams County and it is the general intent of this Ordinance to provide for a moratorium on the use of Spray Irrigation Manure Distribution Systems within Adams County. If a person desires to move forward with installing such a system, they shall comply with the requirements of Sections 5, 6, 7 and 8 of this Ordinance.

SECTION 2. Abrogation and Greater Restrictions. It is not intended by this Ordinance to repeal, abrogate, annul, impair or interfere with any existing easements, covenants, deed restrictions, agreements, ordinances, rules, regulations or permits previously adopted or issued pursuant to law. However, when this Ordinance imposes greater restrictions, the provisions of this Ordinance shall govern.

SECTION 3. Interpretation. In its interpretation and application, the provisions of this Ordinance shall be liberally constructed in favor of Adams County and shall not be construed to be a limitation or repeal of any other power granted by the Wisconsin Statutes except as expressly set forth herein.

SECTION 4. Definition. "Spray Irrigation Manure Distribution System" means 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 which disperse the manure or process wastewater over distances greater than could be achieved using typical moving vehicle or manure hauling equipment.

SECTION 5. License Required. No person or entity shall operate a Spray Irrigation Manure Distribution System in Adams County unless such person or entity shall first obtain a license for such operation from Adams County.

SECTION 6. Application. Any person or entity desiring or intending to operate a Spray Irrigation Manure Distribution System in Adams County shall, before operating the same, apply to Adams County for a license for such operation. Said license application shall include, at a minimum, the following:

a. The name and address of the applicant.
b. The name and address of the owner of the property upon which said System is intended to be operated.
c. The dates or range of dates when such operation is intended to occur.
d. A detailed description of the material intended to be distributed by the System.
e. The legal description and address of the property upon which the System is to be operated.
f. The manner in which the volume of material to be distributed by the System is intended to be regulated.
g. The name and addresses of the owners of all property located within 1,000 feet of the property line of any parcel upon which the proposed Spray Irrigation Manure Distribution System is to be operated.

At the time of application, the applicant shall pay to Adams County an application fee in the amount of $500.00 or such other fee as may be determined by the Adams County board by resolution.

SECTION 7. Public Hearing. Upon receipt of an application for a license for operation of a Spray Irrigation Manure Distribution System, Adams County shall hold a public hearing within forty-five (45) days upon receipt of an application for a license for operation of a Spray Irrigation Manure Distribution System. Notice of such hearing shall be mailed by the Land and Water Department, by certified mail, not later than ten (10) days before the date of the hearing to all property owners of property located within 1,000 feet of the property line of any parcel upon which the proposed Spray Irrigation Manure Distribution System is to be operated. If direct service is used in lieu of certified mail, service shall occur no later than five (5) days before the public hearing. Such notice shall also be published as a Class 2 notice.

SECTION 8. Standards and Conditions. In addition to holding a public hearing, before issuing a license for operation of a Spray Irrigation Manure Distribution System, Adams County shall review the application for such permit. No permit shall be issued unless the Board first determines that the proposed operation will not cause undue harm to the health of nearby residents. The Board may impose

appropriate conditions upon the proposed operation as necessary to protect such residents and the health and safety of other persons living and traveling through the County. Signs advising the public shall be posted in the public road right-of-way 100 feet before and after on any roadway abutting said property on which manure is being sprayed, commencing one (1) day prior to dispersal, and these signs shall remain posted for a one (1) day period after dispersal is complete. Said signs shall at a minimum be 11" X 17" and the wording shall advise the public of the spraying application in letters at least 1½ inches in height. The lettering shall be in contrast with the background color of the sign. The violation of any such conditions imposed by the Board shall be deemed a violation of this Ordinance.

SECTION 9. Enforcement. Any person who operates or causes the operation of a Spray Irrigation Manure Distribution System without first obtaining a lawful license for such operation under this Ordinance, or operates or causes the operation of such a System in a manner which violates any conditions imposed by Adams County upon any such license shall be deemed in violation of this Ordinance and Adams County may take action to enjoin such violation and/or to impose a fine by initiating an action in Adams County Court. Any person shall, upon conviction of any such violation, forfeit not less than $1,000.00 nor more than $10,000.00 plus court costs, for each day the violation continues, together with the costs of prosecution.

SECTION 10. Lien on Real Estate. In all cases in which the County Board or its duly appointed representative, takes action to enforce the provisions of this Ordinance because of the unlawful operation of a Spray Irrigation Manure Distribution System, the sum expended in accomplishing such enforcement shall become a lien on the property where such system is located in the same manner as any tax upon real estate. The Adams County Treasurer shall certify the description of such property, and the costs of such removal, and the Treasurer shall include the same in the annual schedule if land subject to special taxation. Payment of costs included in a lien hereunder shall be enforced in the same manner as a special tax upon real estate levied and collected in Adams County.

SECTION 11. Emergency dispersion of liquid manure. It is understood that there may be times when liquid manure distribution, due to natural or unforeseen events, needs to be dispersed forthwith. Such things as an inordinate amount of rain, or a breech in a manure pit wall, may require liquid manure to be dispersed. If such an emergency occurs, it is the responsibility of the Owner to get DNR permission, through the Agricultural Runoff Specialist for the West Central Region, to disperse the liquid manure immediately.

SECTION 12. Severability. If any section, clause, provision or other portion of this Ordinance is adjudged unconstitutional or invalid by a court of competent jurisdiction, the remainder of this Ordinance, or Section of which it is a part, shall

not be affected thereby. If any application of this Ordinance to a particular structure or parcel of land is adjudged unconstitutional or invalid by a court of competent jurisdiction, such judgment shall not be applicable to any other structure or parcel of land not specifically included in the court's judgment except as expressly ordered by the court.

SECTION 13. Effective Date. This Ordinance shall take effect and be in force from and after the day of passage and publication as required by law.

Recommended for enactment by Land & Water Conservation Committee this 8th day of November, 2016.

Barbara A. Morgan

Enacted X
Defeated ____ by the Adams County Board of Supervisors
Tabled ____ this 15th day of November, 2016.

Chairman

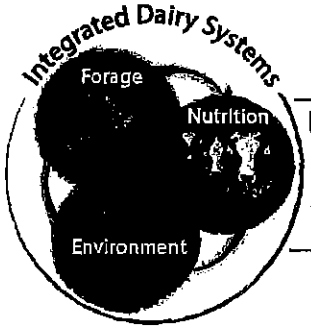
County Clerk

☒ Reviewed by Corporation Counsel
☒ Reviewed by County Manager/Administrative Coordinator

USDA

United States Department of Agriculture

Airborne pathogens from dairy manure aerial irrigation and the human health risk



U.S. Dairy Forage Research Center

by Mark A. Borchardt and Tucker R. Burch

Application of liquid dairy manure by traveling gun or center pivot irrigation systems is becoming more common because it offers several potential benefits: reduced road impacts from hauling, optimal timing for crop nutrient uptake, and reduced risks of manure runoff and groundwater contamination.

However, irrigation could also increase the risk of airborne pathogen transmission from manure to humans and livestock compared to other application methods. This concern about airborne pathogens prompted the Wisconsin Department of Natural Resources to fund field research on this topic. This fact sheet is a summary of that study, the first study to use measured concentrations of airborne microorganisms during irrigation of dairy manure on working farms to estimate human health risk.

Setting up the equipment in the field to measure microorganism transport during irrigation.

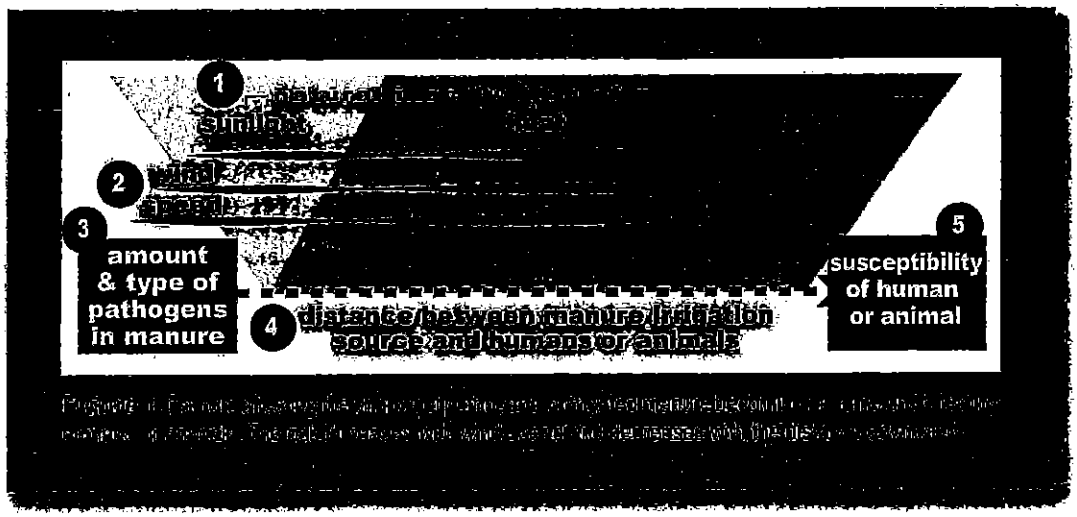
Pathogens in dairy manure

Dairy manure, like the fecal excrement from any domesticated or wild animal, can contain pathogens capable of infecting humans. Six pathogens that can be found in dairy manure and are frequently associated with human health effects include: *Salmonella, E. coli, Campylobacter jejuni, Listeria monocytogenes, Cryptosporidium parvum,* and *Giardia lamblia.* These all cause acute gastrointestinal illness with diarrhea, abdominal pain, fever, nausea, and vomiting. In some cases illness can progress to a systemic infection involving other organ systems.

It is important to recognize that the number and types of pathogens in dairy manure can be highly variable from herd to herd and even in the same herd through time. Thus, exposure to dairy manure does not always equate to exposure to human pathogens. On the other hand, the absence of pathogens in a specific dairy herd at a specific point in time does not equate to the universal absence of health risk from exposure to dairy manure. The risk assessment described in this fact sheet accounted as best as possible for varying infection susceptibilities in the exposed population and varying pathogen presence in dairy manure.

Study summary

- Airborne microbial concentrations, some of which may be pathogenic, decline with distance but can still be measurable at 700 feet downwind from irrigation depending on wind velocity and the initial concentration of the microorganism in manure.
- Using quantitative microbial risk assessment, we estimate the risk for acute gastrointestinal illness for exposure to airborne pathogens 500 feet downwind from dairy manure irrigation is on the order of *1 in 100,000* to *1 in 100* per irrigation event.
- The risk estimate depends primarily on pathogen type, pathogen prevalence on dairy farms, downwind distance from the irrigation equipment, and the number of irrigation events during a growing season.
- Also, it is important to recognize the risk values reported herein are medians of the risk distribution; users of this report might decide to use lower or higher percentiles of the risk distributions in



Wisconsin study

The Wisconsin study described in this fact sheet had two primary objectives. The first objective was to identify weather variables (e.g., wind speed, solar radiation, and relative humidity) most important for airborne pathogen transport during manure irrigation. The second objective was to estimate the risk of illness for people by using microbial risk assessment computer models.

At the foundation of this effort was an extensive, largest of its kind, field sampling for airborne microorganisms during 23 irrigation events (8 trials by center pivot and 15 trials by traveling gun) in 2012 through 2014. Air samples were analyzed for culturable bacteria in 13 trials and for microorganism genetic markers in 23 trials.

Weather data were collected every 30 seconds during each trial – wind direction and speed, air temperature, solar radiation, relative humidity, and precipitation, which was always zero.

In two additional trials we measured airborne transport of microorganisms during conventional manure application by a tanker with a high splash-plate.

Study findings

Airborne bacteria detection frequencies. Not surprisingly, bacteria that normally live in the gut tract of cattle (*Bacteroides*, gram negative bacteria, *E. coli*, and *Enterococci*) were present in manure 100% of the time. In addition, *Campylobacter jejuni* also was present in the study manure. While the bacteria listed above were detected frequently in manure samples, they were detected less frequently in downwind air samples. The greatest difference was for non-pathogenic *E. coli*; it was detected in 100% of manure samples but only 11% of air samples.

Airborne bacteria concentrations. Like detection frequencies, concentrations of the bacteria in air decreased with increasing distance downwind from manure irrigation. In general, the concentration of the bacteria with the highest survival rate (most likely to cause illness) decreased approximately 30% for every 100-foot increase in downwind distance.

Weather variables

Why are bacteria detections and concentrations in air so much less than in manure? Four well-known processes are responsible. 1) When liquid manure is released through an irrigation nozzle, very few bacteria become aerosolized and suspended in the air. 2) Gravitational settling of manure aerosols onto surfaces, like plants and soil, as they move through the air removes aerosol-associated bacteria from the air stream, reducing their concentration further downwind. 3) Dilution by the wind scattering and dispersing manure aerosols

and bacteria into the larger atmosphere also reduces bacteria concentrations. 4) Lastly, inactivation by warm temperatures, low humidity, and sunshine kills the bacteria, reducing their numbers in air (Figure 1).

In this study, the most important weather variable in determining downwind microbe concentrations was wind speed. Two non-weather variables that were as important as wind speed in predicting microbe concentrations downwind from manure irrigation were distance downwind and the microbial concentration in the manure source.

Human health risk

Despite environmental processes that inactivate airborne pathogens, airborne pathogens can still be measured downwind from manure irrigation. The question then becomes: "Do these concentrations pose a risk to public health?"

The prevalence and concentration of pathogens in manure is always changing. In order to make conclusions about the potential health risk, we analyzed the data under four different scenarios that differ in their assumptions and therefore lead to different levels of precaution toward protecting public health.

The four scenarios are shown in Figure 2. We compared two rates of prevalence: 1) the typical prevalence of a pathogen in manure as reported in existing national data; and 2) a worst case scenario in which a pathogen is present in 100% of manure. And we used two different microorganisms in the analysis, one that has a high rate of survival in the environment and is more likely to transmit a disease, and one that has a low rate of survival and is unlikely to result in disease transmission. If you assume the pathogen is present in all manure and has a high rate of survival, the estimated health risk is much higher than if you assume the pathogen is present at typical levels and has a low rate of survival.

Then we compared the risk level determined for each scenario against water quality standards already in use by the EPA: 1) acceptable level of illness risk for drinking water, 1 infection/10,000 people/year; and 2) acceptable level of risk for recreational water, 32 illnesses/1,000 swimmers/exposure event. As seen in Figure 3, risk from manure irrigation is generally between the acceptable risk levels for drinking water and recreational water.

There are two caveats to consider. The reported risk levels are for a single manure irrigation event. However, manure can be irrigated multiple times on a field during a growing season and each time people are exposed to irrigated manure the risk of illness increases. Second, the reported risk levels are medians of the outputted risk distributions (i.e., 50% of the risk estimates are lower and 50% are higher). Risk managers may wish to use a summary statistic more conservative toward protecting public health (e.g., 75th percentile).

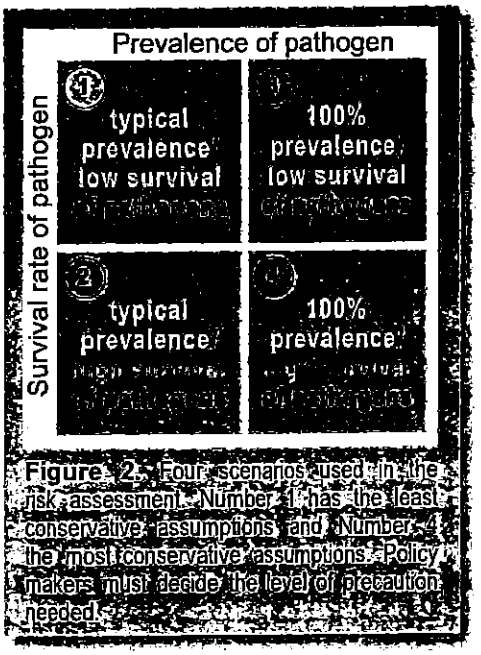


Figure 2. Four scenarios used in the risk assessment. Number 1 has the least conservative assumptions and Number 4 the most conservative assumptions. Policy makers must decide the level of precaution needed.

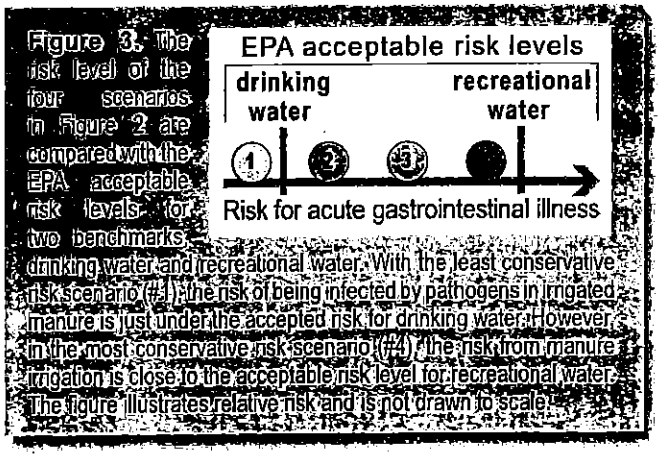
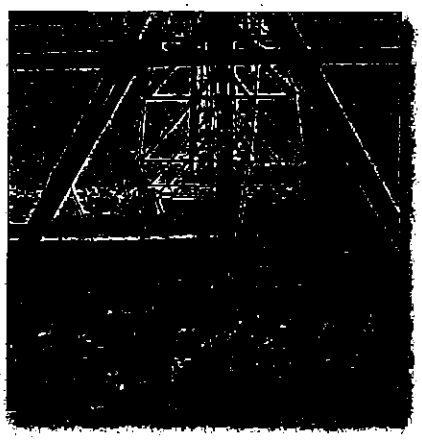


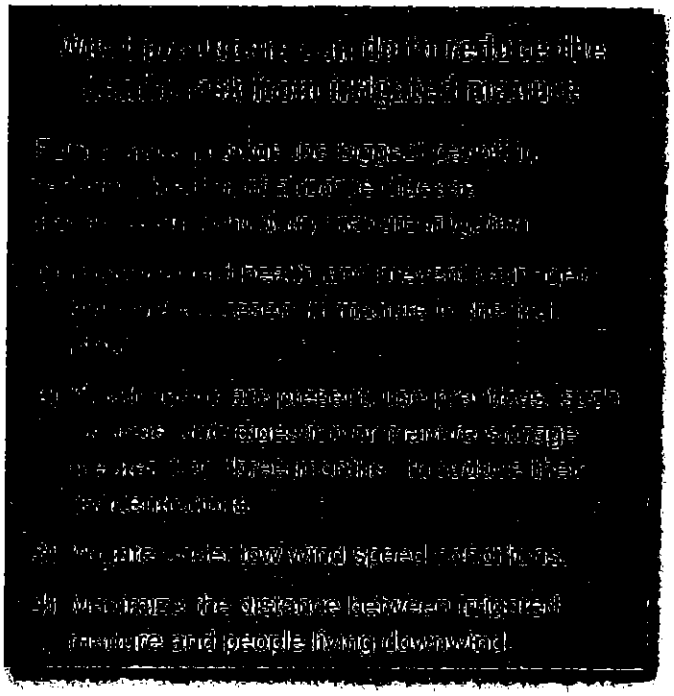
Figure 3. The risk level of the four scenarios in Figure 2 are compared with the EPA acceptable risk levels for two benchmarks, drinking water and recreational water. With the least conservative risk scenario (#1), the risk of being infected by pathogens in irrigated manure is just under the accepted risk for drinking water. However, in the most conservative risk scenario (#4), the risk from manure irrigation is close to the acceptable risk level for recreational water. The figure illustrates relative risk and is not drawn to scale.



Little difference found when comparing spreading and irrigation methods

Conventional tanker versus irrigation. On two dates we measured airborne transport of pathogens and microbial surrogates during dairy manure application by conventional tanker. There was no clear pattern in the differences in downwind microbe concentrations during manure application by tanker or irrigation. For some comparisons there was no statistical difference between application methods, and for other comparisons sometimes the tanker produced significantly lower air concentrations and sometimes irrigation produced significantly lower air concentrations. With only two tanker trials, it is not possible to determine definitively which application method creates the fewest airborne microbes.

Traveling gun versus center pivot irrigation. Comparing traveling gun versus center pivot manure irrigation methods, there are no statistical differences in the probabilities of detection or levels of concentration of airborne bovine *Bacteroides* or gram negative bacteria. The traveling gun method did result in a significantly lower probability of detection and concentration of enterococci bacteria in air. Overall, however, there was no clear pattern of differences between traveling gun and center pivot manure irrigation methods in the downwind transport of microbes.



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Leading the world in integrated dairy forage systems research.

ODINANCE #22-2016
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BY SPRAY IRRIGATION

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Adopted by County Board November 15, 2016
Full Ordinance on file in County Clerk's Office

STATE OF WISCONSIN)
) SS.
ADAMS COUNTY)

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Publish: 12/14/16 WNAXLP

(SEAL)

NANCY PRICE, being duly sworn, doth depose and say that he (she) is an authorized representative of THE ADAMS-FRIENDSHIP TIMES-REPORTER, a legal newspaper of general circulation, published in the Village of Friendship, Adams County, Wisconsin, and that an advertisement of which the annexed is a true copy, taken from said paper, was published therein on

Dec 14, 2016

Signed Nancy Price
Manager (Title)

Subscribed and sworn to before me this 15th day of December, 2016.

Linda Laskowski
Notary Public, Adams County, Wisconsin

My Commission expires Mar. 22, 2019

No. Lines ____ No. Times 1 Publication Fees $ 25.65
Affidavit 1.00
Total $ 26.65