

## Emerging health concern – manure spraying and airborne pathogens

We've seen it and smelled it for years – liquid manure sprayed into the air through irrigators, pivot guns, and spewing hoses. We've breathed the bad air. Neighbors have reported health problems. Finally researchers are looking at the risks to neighbors when bacteria and pathogens in manure-spray lift off and blow downwind.



Spray irrigation of liquid manure on soy beans, Vreba-Hoff CAFO, 2010, along US-127.

CAFO manure spray-application practices are getting new scrutiny in several states because of health risks to neighbors. We've seen all those practices – pivot spray guns, travel irrigators, spray-applications from tankers or tractors without immediate incorporation.

R. S. Dungan of USDA's Agricultural Research Service, in a *Journal of Animal Science* article from 2010, "Fate and Transport of Bioaerosols Associated with Livestock Operations and Manures," summarized the research, confirming what every neighbor knew then and knows now: when liquid manure is sprayed in the air, some of it drifts downwind.

### Spray guns (photo below)

Of the manure practices studied, spray guns had the greatest concentrations of airborne bacteria at greater distances from the guns, a risk "likely related to the upward discharge of slurry into the air," Dungan noted, because of the smaller droplets formed and the greater drift.

### Bioaerosols

Bioaerosols are extremely small airborne particles that remain when droplets of liquid manure, for instance, evaporate and the microorganisms drift through air. Dungan noted that these airborne bits can be "bacteria, virus, fungal spores, and pollen grains and their fragments and by-products (e.g., endotoxins, mycotoxins), that are suspended in the air."

During spray irrigation of liquid manure, the liquid is broken up into droplets of various sizes. The fine droplets quickly evaporate and the microorganisms in these droplets are transformed into solid or semi-solid particles – the process of aerosolization.

The particles drift through the air, off the CAFO site and downwind. They are so small they can be inhaled and retained in the lining of people's lungs.

### Smallest particles are riskiest

Dungan noted that aerosolized particles 1-5 micrometers (less than 0.0002 in.) in diameter are of the greatest concern because they are readily inhaled or swallowed. The greatest retention in the lung alveoli occurs with the smallest 1-2 micrometer particles.



Pivot spray gun and black liquid manure, drifting bioaerosols, 2003, Bakerlads CAFO.



May 2014, Hoffland CAFO spewing manure through dragline hose with no applicator.

### National attention

The concern with manure spraying gained national attention recently when the Wisconsin Center for Investigative Journalism reported on a study by the Wisconsin DNR on whether to toughen regulations on manure irrigation. The issue has taken on "new urgency," the Center reports, with more Wisconsin dairy CAFOs beginning to use spray-irrigation.

The Center's April 27, 2014 article, "Manure spraying under scrutiny," reports that in North Carolina, where 95 percent of hog farms use the practice, state officials stepped in and imposed bans and stricter regulations after manure irrigation led to fish kills and other pollution problems.

Michigan needs to take action too. Take a deep breath. Understand what neighbors know and research shows – "the plethora of chemicals and pathogens found in liquid manure can have serious health impacts, ranging from respiratory disease to potentially lethal antibiotic resistant infections."

*"Application methods that launch liquid and solid manures into the air create a potentially hazardous situation as pathogens may become aerosolized and transported to downwind receptors."*

– R. S. Dungan, *Journal of Animal Science*

**"downwind receptors" ??**

That's neighbors, old and young. That's us!

## Bakerlads Farm cited for CAFO Permit violations

Bakerlads Farm in Clayton was cited by DEQ for land application violations of its CAFO Permit, including spreading manure on frozen, snow-covered ground on March 1 and March 10, 2014, on a field not included in the CAFO's Comprehensive Nutrient Management Plan.

The field had not been submitted for approval and public notice, as required, and not assessed using the Manure Application Risk Index, required before any application of CAFO waste to frozen or snow-covered ground.

For full details, see DEQ Letter on Permit Violations (March 24, 2014) and complete violations list at: [www.nocafos.org/violations.htm](http://www.nocafos.org/violations.htm)

## Bean Creek Watershed monitoring begins near Milk Source facilities and application fields

ECCSCM began baseline water monitoring in Bean Creek Watershed in early May, at sites draining Milk Source facilities and manure application fields. Cows and manure have not yet arrived.

In the last 3 years, since the Vreba-Hoff CAFOs shut down, water quality has been good at these sites, at Medina Drain in particular, a stream which originates on Milk Source's Medina Dairy property on Dillon Hwy. The stream has been clear, with minnows seen regularly, a remarkable recovery.

### Tile-work, drilling, and more

However, CAFO work has already begun at Hudson Dairy on US-127 and at Medina Dairy. Tile-work, **high-capacity well-drilling (see details next column)**, plumbing, concrete-pouring, construction and de-construction work is in progress. Milk Source representatives told the *Adrian Daily Telegram* (April 29, 2014) that the original May opening of the facilities has been delayed until June. The Hudson facility will open first, with cows shipped in "over a period of weeks," to the Permit capacity of 3,400 cows. After that, 3,400 more cows will be brought into Medina Dairy.

### Early concern for Medina Drain

Unfortunately, on May 6, even before cows and manure have arrived, ECCSCM observed a serious discoloration and foam in Medina Drain. DEQ investigated and found the discoloration the full length of the stream, to a place where multiple tiles open up near the CAFO facility – the source of the stream. DEQ will be conducting follow-up water monitoring tests over the next weeks.

### Stuck Truck

Why CAFOs can't apply manure when there's 100% chance of 1" of rain



May 14, 2014 -Terrehaven manure tanker stuck in Carleton Rd field, in the mud, in rain.

## Milk Source drills 5 new high-capacity wells

According to DEQ's database, Milk Source has drilled and registered 5 new high-capacity wells within 3 miles of each other: 3 wells at Hudson Dairy – total capacity, 900 gal/min (over 1,000,000 gal/day!); 2 at Medina Dairy – total capacity, 400 gal/min. (another 500,000 gal/day).

### "Potential cumulative impact" ruling in Wisconsin

Concerns for groundwater depletion from Milk Source's high-capacity wells in Wisconsin led to a lawsuit and court action in December 2013, with the Wisconsin Court of Appeals ruling an Environmental Assessment had failed to consider the "potential cumulative effects" of the wells and ordered a re-assessment of impact the wells could have on the environment.

### Medina Drain, May 6, 2014 – Degraded already?



5-6-14 – Medina Drain with distinct red discoloration and grayish foam on the surface of the water, downstream and upstream from Ingall Hwy culvert.



**ECCSCM Meetings, 3rd Wednesday of the month, 7:30 p.m. Hudson Community Center**  
Annual business meeting, Wed., July 16, 2014

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- that values and protects farmland, the environment and the rural community