

From: [REDACTED]

Sent: Sunday, September 16, 2012 4:05 PM

To: Anderson, Russell A - DNR

Cc: [REDACTED]; Baumann, Dan G - DNR

Subject: Letter of concern regarding the distribution of private wells in the area of the proposed Golden Sands CAFO

Mr Anderson,

I've attached a letter of concern regarding the proposed CAFO in Saratoga and have printed it below as well.

September 16, 2012

September 16, 2012

Mr. Russ Anderson
Environmental Review Coordinator
DNR South Central Region
3911 Fish Hatchery Road,
Fitchburg, WI 53711

Dear Mr. Anderson,

I would like this information included in the Environmental Impact Study being done for the proposed CAFO in Saratoga.

I have a document which I received from Adams County that shows the distribution of private wells in the area of the proposed Golden Sands Dairy, including Adams, Wood, Portage, and Juneau counties. I'll send it to you electronically. It is especially meaningful, in that it shows the distance in miles of existing private wells from the 47 proposed CAFO farm wells. Even more glaring is the sheer number of private wells in close proximity to the proposed farm. There are too many to count easily, but one could estimate their number by the number of residential properties in the area. Professor Robert Glennon, in his book Water Follies, indicates the cone of depression from a high cap well can extend up to 3 miles.

As an example:

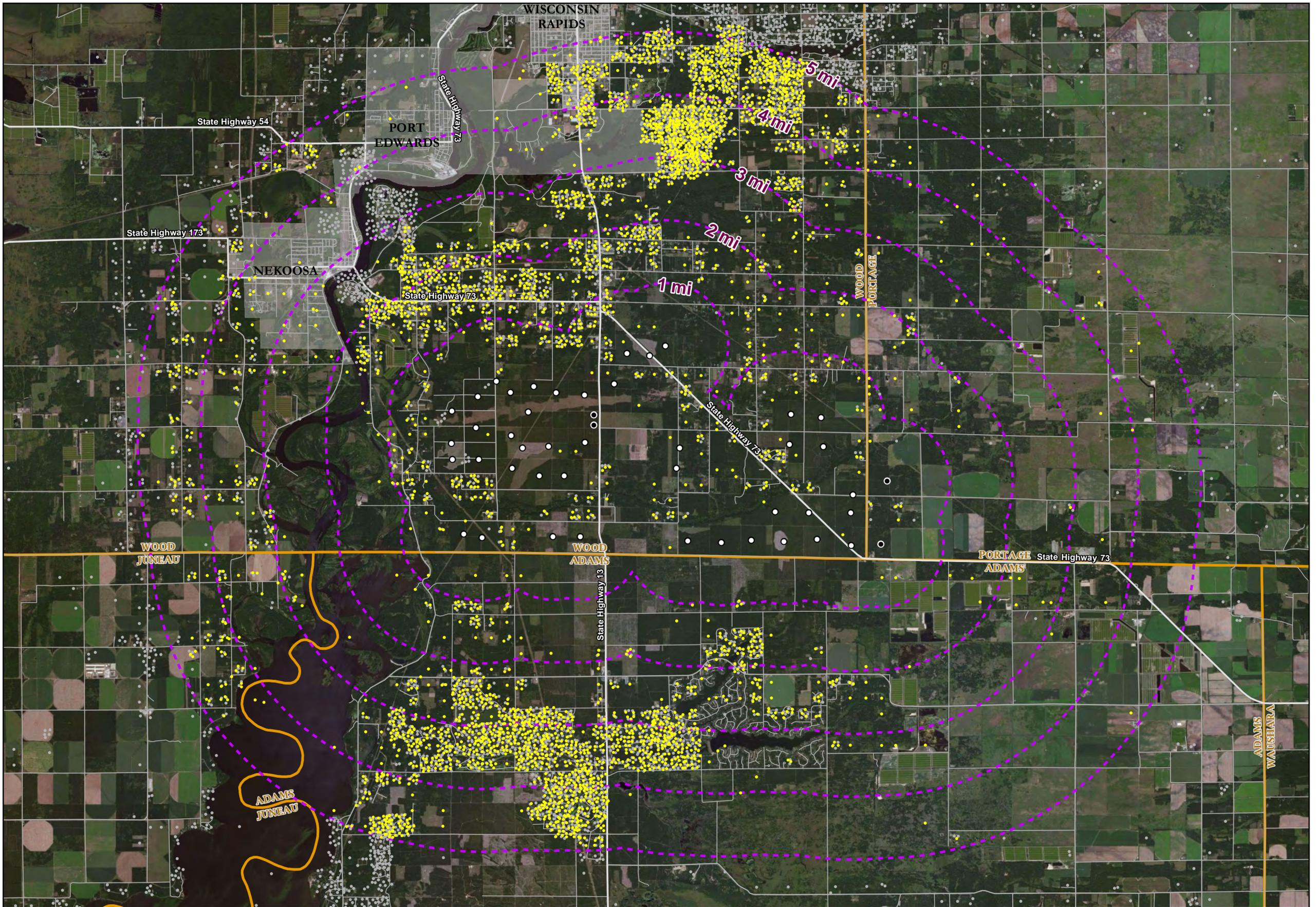
There are 5500 properties in the Town of Saratoga, conservatively a third within 3 miles = 1833 wells. There are 7,000 properties in the Town of Rome, 990 on municipal water, and about a third of the remaining 6,000 within 3 miles = 2,000 wells. That's nearly 4,000 private wells at risk.

Another interesting comparison on the map is the small number of private wells in the Town of Armenia, where another Wysocki CAFO resides. There appear to be a few dozen private wells at most. In addition, that is an existing agricultural area, whereas Saratoga is not. That amplifies the extreme difference in the two environments and the risk to a recreational area already inhabited by many thousands of residents and the new home facility of the Wisconsin Trapshooters Association. Imagine the damage and impending civil liability if Professor Glennon is right, and even half these wells go bad as a result of low water levels or high nitrate levels. As keepers of the environment, the Wisconsin DNR needs to do all it can to do the right thing and not just hide behind the diluted requirements of the well permits. I believe it was you who said in a presentation a few weeks ago that this EIS has to be done right to avoid a court action. I hope it doesn't come to that.

[Redacted]

Rome (Nekoosa), WI 54457

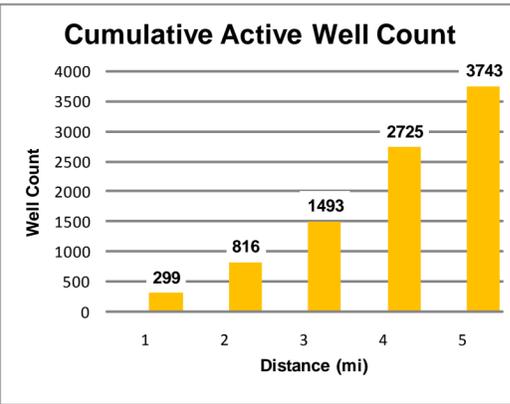
CC: Dan Baumann
Gov. Scott Walker & local representatives
Wisconsin Rapids Tribune



Proposed High Capacity Wells Golden Sands Dairy

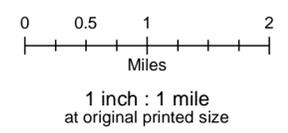
With existing wells in Wood, Adams, Portage, and Juneau Counties.

Data Sources:
 Proposed Well: High Capacity Well Applications filed with WDNR
 Distance From Well: Adams County
 Existing Well, County Boundary, Incorporated Community: WDNR
 Road: US Census Bureau - 2010
 Imagery: Bing / DigitalGlobe - August 2011



Legend

- Dairy Well
- Irrigation Well
- Distance From Well
- Active Well Within 5 Miles
- Other Existing Well



Prepared for Patt and Paul Pisellini
 Adams County GIS - August 2012

Note that well positions shown on the map are not precise. The source data is generalized to quarter-quarter centers. Dots for locations that represent multiple wells we dispersed to more better show the number of wells.

From: [REDACTED]
Sent: Friday, September 14, 2012 8:42 AM
To: Anderson, Russell A - DNR
Subject: Re: Proposed Dairy Farm in Saratoga WI

Dear Russ Anderson,

We are residents of IL but also property owners on Lake Camelot in Rome WI. Over the past 15 years, we have owned three different pieces of property. We currently own a lakefront lot. We have three other family members who now own property and a home on Lake Camelot. We are all residents of IL who have made sizeable investments in Wisconsin.

We have been keeping abreast of the latest information on the proposal for a large dairy and vegetable farm in the town of Saratoga. We understand that there are significant amounts of homes that receive water from a community water system in the Town of Rome. There are problems with the system due to the two deep wells causing them to be shut down because of excessive nitrates in the water. We hear that the newest well, which is still usable, is the one that is closest to the proposed location of the farm. We also understand that the stench it will create will also be a serious issue depending upon the way the wind is blowing, as well the lowering of the lake water levels.

We are counting the WI DNR to monitor these issues and prevent any further well or lake water level problems down the road.

We came to WI and Lake Camelot and made a very sizable financial investment in our property there. We invested in WI rather than IL because of the desirable recreational lake area and surrounding natural areas. We plan to retire there in the next five years and now fear that if nothing is done to stop the current proposed Dairy and Vegetable Farm (or any future proposed development of that size and type) – we will lose our investment and certainly not retire in WI.

Again, we are counting on your ability to set the appropriate standards that will prevent the lakes and surrounding areas from being damaged by the negative impact that will occur if farms of this size and type can be established.

[REDACTED]
[REDACTED]
St. Charles, IL 60175
[REDACTED]

Property that we own in WI:
On Lake Camelot
[REDACTED]

Nekoosa, WI 54457

From: [REDACTED]

Sent: Thursday, September 13, 2012 2:24 PM

To: Baumann, Dan G - DNR

Cc: Anderson, Russell A - DNR

Subject: Golden sands CAFO

Gentlemen:

As a resident of Saratoga Township residing on 10-Mile Creek, I want to express my adamant opposition to the Golden sands CAFO proposal.

In the interest of your time, I will be brief. My opposition is based on the following reasons:

1) The high capacity wells will most assuredly reduce the level of the 10-mile creek flow.

This will reduce my property value.

2) My well will likely show an increase in the level of nitrates.

This will reduce my property value.

3) There will be necessarily more noise and dust from the planting, fertilizing and harvesting of the farm crops.

This will reduce my property value.

4) There will be necessarily more heavy, slow moving traffic on Highway 13 and the connecting secondary roads.

This will reduce my property value.

The foregoing items are real issues which will reduce my property value, as well as the property values of hundreds of property owners in the Town of Saratoga.

I ask you: Should Wysocki benefit at the expense of me and hundreds of other property owners??

I truly hope the DNR will consider the effect of this CAFO on the residents of Saratoga before perfunctory approving this proposal.

Respectfully,

[REDACTED]

Wisconsin Rapids, WI 54494

From: [REDACTED]
Sent: Friday, September 14, 2012 12:47 PM
To: Anderson, Russell A - DNR
Subject: Golden Sands Dairy - EIS - SEEPAGE from Mortality Pit, & Sewage Lagoon

Objection to: Mortality Pit

The following information is taken from the Web Soil Survey, United States Department of Agriculture, Natural Resources Conservation Service concerning the use of a Mortality Pit in the Plainfield 0.2 soils in Wood County; namely in the town of Saratoga, Wisconsin.

After I plotted the proposed site for the Golden Sands CAFO, the following rating for a mortality pit is given by the conservation service:

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. Numerical ratings indicate the severity of the individual limitations. The ratings are shown in decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The rating given for a mortality pit is "VERY LIMITED", rating reasons SEEPAGE (1.00), TOO SANDY (1.00), UNSTABLE EXCAVATION WALLS (0.50)

I also plotted for Sewage Lagoon -

without liner: rating "VERY LIMITED", rating reasons SEEPAGE (1.00)

Objection to: Sewage Lagoon with Clay liner: Plainfield sand, 0.2 pfa soil, rating POOR, rating reasons HARD TO PACK (0.00), AREA RECLAIM DIFFICULT (0.00), SMALL STONE CONTENT (0.28) A poor rating indicates that the soil has one or more features that are unfavorable for the specified use.

Objection to Concrete Lagoon: Risk of Corrosion in Plainfield sand, 0.2 is HIGH. Pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens concrete.

All of the above, among many more CAFO features in the web survey, rate the Plainfield 0.2 sand area as a VERY LIMITED TO POOR area for a CAFO. (Note: this is only one resource stating this information, there are many more).

Seepage from the above sources will pollute our private wells, streams, lakes and rivers. There is too much evidence available. I ask, as a resident of Saratoga, that you and the Department of Natural Resources in Wisconsin REFUSE ANY PERMITS for the proposed Golden Sands Dairy to build a CAFO in the Town of Saratoga, Wisconsin.

From: [REDACTED]
 Sent: Saturday, September 15, 2012 4:28 PM
 To: Anderson, Russell A - DNR
 Subject: Wood Co. CAFO

9-15-12
 Russell Anderson
 Wisconsin DNR

Dear Mr. Anderson;

I am requesting that these concerns become part of the DNR's Environmental Impact Statement on the proposed CAFO in southern Wood County.

If any or all of the required permits are granted by the DNR to the investors in the proposed "dairy"-factory farm, I am concerned that:

- 1) individual landowners wells could go dry due to the high-capacity wells drawing down the town's watertable,
- 2) nitrates & pesticides could pollute our wells,
- 3) run-off fertilizers & pesticides could run onto our adjoining lands, ultimately get into creeks and streams and pollute the Wisconsin River which is less than 2 miles away,
- 4) e-coli contamination of the aquifer could occur if the hardpan layer is fractured or collapses due to over-pumping by the CAFO,
- 5) the loss of trees now in forestland designation could be catastrophic in the long-run (Quoting the great 20th Century environmentalist and U.S. President, ". . . when the trees are gone, the soil must go and the process doesn't take long . . .")
- 6) air pollution (methane, ammonia, etc.) from the CAFO's manure reservoir and land spreading practices could be widespread,
- 7) a future "dust bowl" situation (habob) could develop along state highways 13 & 73 if windbreaks are not allowed to be grown after deforestation and before cropping begins,
- 8) unsightly berms of stumpage from cutover forest lands or illegal burning of said stumpage,
- 9) "7 Mile", "10 Mile", and "14 Mile" creeks going dry and the consequent loss of nationally-recognized trout streams,
- 10) related dairy industries, slaughterhouses, and fertilizer plants further polluting the fragile ecosystem of the entire Central Sands area,
- 11) increased township and county taxes for road repairs,
- 12) decreased house and land values and the inability to sell our unattractive properties,
- 13) the cruelty of CAFO practices on milk cows & their offspring could give the "dairy state" a bad name,
- 14) the indifference of local & state officials who may be looking to add minimal low-paying jobs to a "Great Recession"-depressed economy could further erode or destroy the recovery,
- 15) "big-business" might be allowed to run roughshod over powerless landowners,
- 16) state agencies using state statutes to overrule local comprehensive plans whose intent it was to discourage large operations like CAFOs could lead to future lawsuits,
- 17) anticipated ineffectiveness of CAFO's "self-policing" of environmental concerns (local complaints & violations not handled because state agencies and inspectors have little time to monitor the ever-increasing number of factory farms & related industries)

- 18) the damages and disappearance of a sportsman's paradise (hunting, fishing, ATV trails, dog-mushing areas, horse-riding trails. etc)
- 19) new CAFO's may quietly increase in size in the near future once they have obtained the initial permits,
- 20) time wasn't taken to do verifiable environmental-impact studies on what might happen if a CAFO were built on the poorest soil in Wisconsin,
- 21) impatient investors didn't do adequate research to locate a more advantageous place to build away from a bedroom community of 5500 people living near a larger community of 18,000 (Wisconsin Rapids),
- 22) any one or a combination of the above destroying the already depressed South Wood County economy thereby leading to an out-migration of young people over the next several decades.

I, therefore, request that before granting any permission to build that the Wisconsin DNR commission a longitudinal study of communities nationwide where large agricultural "factory farms" have been built. That study needs to address all these concerns plus the issues of increased crime and drug trafficking when itinerant workers with questionable legal immigration status are attracted to an area.

Respectfully submitted,



Nekoosa, Wi. 54457

From: [REDACTED]
Sent: Sunday, September 16, 2012 11:19 PM
To: Anderson, Russell A - DNR
Subject: CAFO's in Saratoga

Hi Russ, we are residents in the Town of Saratoga and are concerned about the Wysocki Farm that is trying to build in our town. Like everyone else in the town, we are concerned about how the 49 wells that the Wysocki's are asking permits for will affect the quality and quantity of water coming into our home and the homes of our neighbors.

From the information that we have been reading, it seems more likely than not that their high capacity water use will deplete the water supply in our area. It's not just the water supply coming into our homes that may be depleted, but what about the river, lakes, and creeks in our area? The water from the well in our home is superior in quality and needs no filtering. If we are forced to drill a new, deeper well, there is no guarantee that the quality will be anywhere close to what we have now. If a deeper water supply needs filtering, who will pay for the \$5-10,000 cost for the well plus the monthly filtering costs?

Another concern is how the air quality will be affected by the removal of thousands of acres of trees. We have been told that trees planted by the paper mills were used to help offset the negative affect of the paper industry on the air quality.

From what we have been reading about the lawsuit that Wysocki has filed against the Town of Saratoga regarding the building permits, it seems that the DNR is our last hope for shutting down the farm attempting to come into our township.

I ask you to consider this thought....if you lived a mile from the site of the proposed farm, would you allow the permits to be approved? Would you risk the health of your family, your extremely valuable asset of clean water coming into your home, and the value of your home?

It doesn't seem fair that so many families could (and if the permits are approved, probably will) suffer because of the traumatic change in the use of this land in our township for the benefit of a few jobs and the further wealth of the Wysocki family.

Please put yourself in our shoes when you are considering the approval or disapproval of the well permits. Please stop this and any future factory farms from coming into our beautiful town.

The following are our questions:

If the farm does deplete the homeowner's wells, what will the liability be to the Wysocki company? How will the nitrates in the groundwater be monitored and how often? How will the DNR monitor the Wysocki wells and how often? How will the DNR monitor the water table in our town and how often? If the water table is lowered from their high capacity water usage, at some point can their permit be withdrawn? If so, at what point? Based on the Wysocki's predicted usage, how will the DNR stop them before they ruin our water supply? What is the DNR's responsibility if they approve the permits and then later determine that it really should not have been approved?

[REDACTED]

Wisconsin Rapids, WI 54494

[REDACTED]

From: [REDACTED]
Sent: Monday, September 17, 2012 6:43 AM
To: Anderson, Russell A - DNR; sen.lassa@legis.wi.gov; rep.krug@legis.wi.gov;
rep.molepske@legis.wi.gov; rep.vruink@legis.wi.gov
Subject: PROPOSED CAFO in Saratoga

Dear Mr Anderson,

First of all we are not residents of the Town of Saratoga, but are residents of the adjacent Town of Rome. We feel we have the right and obligation to speak out against the proposed CAFO because of the potential impact on our area. We have done our own research and seen the results of others' research on the potential impact this farm could have on the surrounding areas and are very concerned and frankly scared. We won't recite the facts and figures on the amount of existing deep wells and the impact they have had on our area lakes and waterways because by now we hope the DNR knows all that. What frightens us is the possibility that it will be ignored in order to favor big business. We are in disbelief of the amount of deep wells that have already been approved in central Wisconsin, although the evidence of the destruction of lakes, stream and waterways is evident by the loss of these areas where several deep wells have been allowed. This not only affects our waterways, but potentially would impact our personal use of water by polluting it or depleting it altogether.

One would have to be a fool to believe that there will be minimal or no impact on the air quality as well. You would only need to interview residents near existing CAFO to know that.

This is also the financial impact on the area residents. Our taxes will go up in order to maintain the roads needed to service an industry of this size while our property values will decrease because of the air and water quality issues.

PLEASE DO WHATEVER YOU CAN TO STOP THIS FACTORY FARM FROM DESTROYING OUR AREA.

Thank you.

[REDACTED]

From: [REDACTED]
Sent: Sunday, September 16, 2012 8:13 PM
To: Kafka, Terence - DNR
Subject: info

Terry,

[REDACTED] said that you might be able to forward me information on Opitz & Van Der Geest (violations?)...I have not had any luck on the Internet. Can you help? Or other CAFO violations in Wisconsin (relating to groundwater contamination, wells/streams drying up, etc.).

Also, I am trying to find information on why a dairy should not be placed on land that was previous forested...if there is any.

Thanks.

[REDACTED]

From: [REDACTED]
Sent: Monday, September 17, 2012 12:55 PM
To: Anderson, Russell A - DNR
Subject: Wysocki Farm in Saratoga

Dear Mr. Anderson,

We are writing to express our concern about the 49 proposed deep water wells that will be part of the CAFO in Saratoga.

We live on Lake Camelot in the Town of Rome and even though we are not in the immediate vicinity of the proposed farm, we are worried that the proposed wells will impact our lake levels and cause our lake to lose more water. Our Lake is already down 12-15 inches as a result of the dry summer. It is essential that you quantify the impact on our lake and other wells in the area before reaching a decision to approve these wells. If our lake dries up or other wells go bad in the area - the only remedy is to sue in Civil Court. That won't bring back the water!!!! Only the DNR can stop a catastrophe before it happens by not approving the 49 proposed wells in the first place. The impact of these wells must be looked at not only in the immediate area of the farm, but in the broader geographic area surrounding the farm.

We understand you have a difficult job, but we urge you to take every precaution in this approval process because the consequences can be disastrous with no effective remedy for an incorrect decision. Thank you.

[REDACTED]
Nekoosa, WI 54457

From: [REDACTED]
Sent: Monday, September 17, 2012 3:23 PM
To: Baumann, Dan G - DNR; Anderson, Russell A - DNR
Subject: Proposed Sartatoga Dairy

Hi Dan and Russell,

My name is [REDACTED] and I live at [REDACTED], Wisconsin Rapids. I am concerned about my water quantity and water quality. We have live here for 12 years and our nitrate level has gone from a 1.8 to a 1.5. Our water tastes great and is colorless.

We also have the Ten Mile Creek running in our back yard.

My hope is that if this CAFO goes thru that it is monitored and not something that is forgotten as staffing runs short or people get overloaded.

I understand that my property values may also suffer as a result of this CAFO.

Here is my wish, Wysocki's want to be good neighbors. Then this is what would make me feel at ease and think they are serious about being a good neighbor.

If my water goes dry, drill me a new well.

If my nitrates get up to 9. Put a filter system on my water.

If the flow in the Ten Mile lessens due to the dairy, stop pumping water

If my property value goes down (due to the dairy) pay me the difference of current value to new value.

Then I will have a good neighbor. If you can't get that promise, and if you can't tell me that with your study. then stop it or limit its size. What about deforestation of that many trees, do you know just the affect of deforesting that much acreage??

These are my concerns.

Thanks,

[REDACTED]

From: [REDACTED]
Sent: Tuesday, September 18, 2012 5:54 AM
To: Anderson, Russell A - DNR
Cc: Home Facetime
Subject: Saratoga EIS concerns, CAFO Doc.

Russ,

Please review attached letter

To: Dan Baumann WDNR
To: Russ Anderson WDNR

9-14-12

Page 1

CC: [REDACTED]
CC: [REDACTED]
CC: Protect Wood County and Neighbors Org.

The purpose of this letter is to share an overview of [REDACTED] family and Saratoga residential concerns with the WDNR in regards to the Wysocki Central Sands Dairy LLC CAFO Proposal within the residential limits of the Town of Saratoga habitation.

* Extreme volume of manure waste & process wastewater that is generated at such a proposed facility and spread or discharged onto the ground, pollutants are leached into the groundwater and aquifers because of the total sand composite makeup.

* Pollutants that will poison our water but not be limited to:

Nitrogen

Phosphorus

Pathogens

E Coli

Growth Hormones

Antibiotics,

Chemicals from manure cleaning processes

Animal Blood

Silage Leachate

Copper Sulfate chemicals from footbaths for cows.

Herbicides

Pesticides

* Health effects of water-laden poisoning issues.

Blue Baby Syndrome, Cancer, Guardia - gastro-intestinal issues.

WDNR you already have admitted that Agricultural business in huge scale pollute ecology and waters.

No matter how well of a crop nutrient program is implemented can you guarantee that such listed, are not going to enter the groundwater and have to be dealt with by citizens of this township? I do not believe so.

Excessive use of manure applications run off or leach into the nearby-recognized world-class trout streams, the Ten Mile Creek and the Seven Mile Creek. Other nearby waters that will be affected are Wisconsin River, Nepco Lake, Mengels Marsh. Waters that are utilized by the public via WDNR access to fish, canoe and swim in by many individuals. How can you guarantee those waters are going to remain unpolluted from Algal bloom, fish kill potentials or lower levels due to high cap. Well pumping??? The Ten Mile Creek flows into the Wis. River, which could be affected also.

The lagoons slated for manure will not hold up in this area poured with cement it will crack & will leak thus creating contaminations, they will be laden with flies that carry pathogens, viruses, bacteria, diseases laden potentials that are unhealthy to workers and residents.

There will be an impact of clearing 6000-8000 acres on all of the wildlife in area. Deer, Bear, Turkeys, Rabbits, Squirrels, Wood chuck, Porcupine, opossum, Skunks, Various species of butterfly, moths, birds, bees, ETC. ETC. there are many more impacts to ecology and wildlife that you are well aware of, just to mention a few.

The volume of water that is utilized just at the facility for operations 2 high capacity wells with another 47 for crop irrigations will overtax the aquifer, which is over taxed already. This will dry up resident's wells and not to mention the creeks in area.

Cranberry growers waters also will be affected. To the south the lake levels of Camelot, Sherwood and Arrowhead will be affected. Planning and Zoning had indicated full scope of project up to 90 wells, this is unrealistic any amount of high volume pumping, the WDNR had already issued permits for such and dried up the Little Plover River, Buena Vista, and other areas, with this previously established impacts we have learned our lessons.

Don't issue the permits it is detrimental to the waters here quality and quantity, your modeling can't represent true impacts in town as there are almost 4000 wells with in a 4 mile radius of 47 high cap wells.

Air Pollution is another liability to all in this town. Sometimes the smell of a CAFO can drift for up to 6 or more miles depending on winds. Gases listed from emissions.

* Hydrogen Sulfide, Ammonia, Methane, Carbon Dioxide and airborne pathogens are the top threats to any resident to all who are established in the mentioned surrounding Saratoga areas. I will share with you negatives of such, but not limited to.

Negative mood swings.

Depression

Anger

Reduced Vigor

Fatigue

Confusion

Headaches

Runny Nose

Bronchitis

Asthmatic conditions

Burning Eyes

Excessive Coughing

Diarrhea

Reduced quality of life

Sore Throats

Large factory farms are conglomerations, which put extra pressures on family farmers and could drive them out of business.

With this list of health effects in conjunction with pesticides, herbicides, all of the pollutants from manure laden with chemicals leaching into ground water and steams contaminating such waters and soils, Etc. High Cap wells depleting quantity of water, higher taxes, lower property values, effects have negative impacts.

Agriculture is taxed at a lower rate than residential, but yet running heavy equipment ruins the road that the town and residents are responsible for so taxes go up for residents, property values decrease living next to CAFO thus another downfall.

In closing having two small children [REDACTED] age 5½, [REDACTED] age 4, [REDACTED] ([REDACTED]) my wife and myself we feel, with the majority of Saratoga Residents that we should not have to deal with any negative affects from pollutions from a CAFO, which will cause health effects, and are recommending that all permitting and work associated with this CAFO be stopped as you as the WDNR and Wysocki Farms can't guarantee that poisoning and polution won't ever happen here in Saratoga.

Please acknowledge this letter is received.

Yours Truly,

[REDACTED]

4457

[REDACTED]

From: [REDACTED]
Sent: Tuesday, September 18, 2012 6:05 AM
To: Anderson, Russell A - DNR; Baumann, Dan G - DNR
Subject: Questions to include in the EIS report

Dear Mr. Anderson,
I would like this information included in the Environmental Impact Study being done for the proposed CAFO in Saratoga.

Attached is a site from the Center of Disease Control and Prevention (CDC). It outlines the horrid effects of CAFO's on individuals that live in close proximity. Most concerning to me is the increase of childhood health issues. This section can be found on page 6 of the report and states

There is consistent evidence suggesting that factory farms increase asthma in neighboring communities, as indicated by children having higher rates of asthma (Sigurdarson & Kline, 2006; Mirabelli et al., 2006). CAFOs emit particulate matter and suspended dust, which is linked to asthma and bronchitis. Smaller particles can actually be absorbed by the body and can have systemic effects, including cardiac arrest. If people are exposed to particulate matter over a long time, it can lead to decreased lung function (Michigan Department of Environmental Quality [MDEQ] Toxics Steering Group [TSG], 2006). CAFOs also emit ammonia, which is rapidly absorbed by the upper airways in the body. This can cause severe coughing and mucous build-up, and if severe enough, scarring of the airways.
http://www.cdc.gov/nceh/ehs/Docs/Understanding_CAFOS_NALBOH.pdf

As a concerned resident I would like numerous questions answered within the EIS, they are as follows:

How many children and/or elderly adults will be put at risk in the surrounding area of the proposed CAFO? Taking into consideration the CDC research, this is not a "potential" threat to health if the dairy is approved, health issues in our community "will" increase.

What other sites have been investigated for this project, do they not have to list Alternative Plans within their proposal? It would seem to me that the land West of their current Armenia CAFO would be a much more appropriate location for such a business and has a very low human population.

The township of Saratoga and its Rome neighbors is a highly populated and recreational area in comparison to other CAFO's in our state. What is Wysocki's reasoning for potentially wiping out a township and its economic attraction with a business that is so toxic?

Understanding Concentrated Animal Feeding Operations and Their Impact on Communities



Understanding Concentrated Animal Feeding Operations and Their Impact on Communities

Author

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Editor

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National Association of Local Boards of Health



Foreword

The National Association of Local Boards of Health (NALBOH) is pleased to provide *Understanding Concentrated Animal Feeding Operations and Their Impact on Communities* to assist local boards of health who have concerns about concentrated animal feeding operations (CAFOs) or large industrial animal farms in their communities. The Environmental Health Services Branch of the Centers for Disease Control and Prevention (CDC), National Center for Environmental Health (NCEH) encouraged the development of this product and provided technical oversight and financial support. This publication was supported by Cooperative Agreement Number 5U38HM000512. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the CDC.

The mission of NALBOH is to strengthen boards of health, enabling them to promote and protect the health of their communities, through education, technical assistance, and advocacy. Boards of health are responsible for fulfilling three public health core functions: assessment, policy development, and assurance. For a health agency, this includes overseeing and ensuring that there are sufficient resources, effective policies and procedures, partnerships with other organizations and agencies, and regular evaluation of an agency's services.

NALBOH is confident that *Understanding Concentrated Animal Feeding Operations and Their Impact on Communities* will help local board of health members understand their role in developing ways to mitigate potential problems associated with CAFOs. We trust that the information provided in this guide will enable board of health members to develop and sustain monitoring programs, investigate developing policy related to CAFOs, and create partnerships with other local and state agencies and officials to improve the health and well-being of communities everywhere.

A special thanks to Jeffrey Neistadt (NALBOH's Director – Education and Training), NALBOH's Environmental Health subcommittee, and any local board of health members and health department staff who were contacted during the development of this document for their contributions and support.



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Introduction

Livestock farming has undergone a significant transformation in the past few decades. Production has shifted from smaller, family-owned farms to large farms that often have corporate contracts. Most meat and dairy products now are produced on large farms with single species buildings or open-air pens (MacDonald & McBride, 2009). Modern farms have also become much more efficient. Since 1960, milk production has doubled, meat production has tripled, and egg production has quadrupled (Pew Commission on Industrial Animal Farm Production, 2009). Improvements to animal breeding, mechanical innovations, and the introduction of specially formulated feeds and animal pharmaceuticals have all increased the efficiency and productivity of animal agriculture. It also takes much less time to raise a fully grown animal. For example, in 1920, a chicken took approximately 16 weeks to reach 2.2 lbs., whereas now they can reach 5 lbs. in 7 weeks (Pew, 2009).

New technologies have allowed farmers to reduce costs, which mean bigger profits on less land and capital. The current agricultural system rewards larger farms with lower costs, which results in greater profit and more incentive to increase farm size.

AFO vs. CAFO

A CAFO is a specific type of large-scale industrial agricultural facility that raises animals, usually at high-density, for the consumption of meat, eggs, or milk. To be considered a CAFO, a farm must first be categorized as an animal feeding operation (AFO). An AFO is a lot or facility where animals are kept confined and fed or maintained for 45 or more days per year, and crops, vegetation, or forage growth are not sustained over a normal growing period (Environmental Protection Agency [EPA], 2009). CAFOs are classified by the type and number of animals they contain, and the way they discharge waste into the water supply. CAFOs are AFOs that contain at least a certain number of animals, or have a number of animals that fall within a range and have waste materials that come into contact with the water supply. This contact can either be through a pipe that carries manure or wastewater to surface water, or by animal contact with surface water that runs through their confined area. (See Appendix A)

History

AFOs were first identified as potential pollutants in the 1972 Clean Water Act. Section 502 identified “feedlots” as “point sources” for pollution along with other industries, such as fertilizer manufacturing. Consequently, a permit program entitled the National Pollutant Discharge Elimination System (NPDES) was created which set effluent limitation guidelines and standards (ELGs) for CAFOs. CAFOs have since been regulated by NPDES or a state equivalent since the mid-1970s. The definitions of what was considered an AFO or CAFO were created by the EPA for the NPDES process in 1976. These regulations remained in effect for more than 25 years, but increases and changes to farm size and production methods required an update to the permit system.

The regulations guiding CAFO permits and operations were revised in 2003. New inclusions in the 2003 regulations were that all CAFOs had to apply for a NPDES permit even if they only discharged in the event of a large storm. Large poultry operations were included in the regulations, regardless of their waste disposal system, and all CAFOs that held a NPDES permit were required to develop and implement a nutrient management plan. These plans had CAFOs identify ways to treat or process waste in a way that maintained nutrient levels at the appropriate amount.

The 2003 CAFO rule was subsequently challenged in court. A Second Circuit Court of Appeals decision required alteration to the CAFO permitting system. In *Water Keeper et al. vs. the EPA*, the court directed the EPA to remove the requirement for all CAFOs to apply for NPDES. Instead, the court required that nutrient management plans be submitted with the permit application, reviewed by officials and the public, and the terms of the plan be incorporated into the permit.

As a result of this court decision, the CAFO rule was again updated. The current final CAFO rule, which was revised in 2008, requires that only CAFOs which discharge or propose to discharge waste apply for permits. The EPA has also provided clarification in the discussion surrounding the rule on how CAFOs should assess whether they discharge or propose to discharge. There is also the opportunity to receive a no discharge certification for CAFOs that do not discharge or propose to discharge. This certification demonstrates that the CAFO is not required to acquire a permit. And while CAFOs were required to create nutrient management plans under the 2003 rule, these plans were now included with permit applications, and had a built-in time period for public review and comment.

Benefits of CAFOs

When properly managed, located, and monitored, CAFOs can provide a low-cost source of meat, milk, and eggs, due to efficient feeding and housing of animals, increased facility size, and animal specialization. When CAFOs are proposed in a local area, it is usually argued that they will enhance the local economy and increase employment. The effects of using local materials, feed, and livestock are argued to ripple throughout the economy, and increased tax expenditures will lead to increase funds for schools and infrastructure.

Environmental Health Effects

The most pressing public health issue associated with CAFOs stems from the amount of manure they produce. CAFO manure contains a variety of potential contaminants. It can contain plant nutrients such as nitrogen and phosphorus, pathogens such as *E. coli*, growth hormones, antibiotics, chemicals used as additives to the manure or to clean equipment, animal blood, silage leachate from corn feed, or copper sulfate used in footbaths for cows.

Depending on the type and number of animals in the farm, manure production can range between 2,800 tons and 1.6 million tons a year (Government Accountability Office [GAO], 2008). Large farms can produce more waste than some U.S. cities—a feeding operation with 800,000 pigs could produce over 1.6 million tons of waste a year. That amount is one and a half times more than the annual sanitary waste produced by the city of Philadelphia, Pennsylvania (GAO, 2008). Annually, it is estimated that livestock animals in the U.S. produce each year somewhere between 3 and 20 times more manure than people in the U.S. produce, or as much as 1.2–1.37 billion tons of waste (EPA, 2005). Though sewage treatment plants are required for human waste, no such treatment facility exists for livestock waste.

While manure is valuable to the farming industry, in quantities this large it becomes problematic. Many farms no longer grow their own feed, so they cannot use all the manure they produce as fertilizer. CAFOs must find a way to manage the amount of manure produced by their animals. Ground application of untreated manure is one of the most common disposal methods due to its low cost. It has limitations, however, such as the inability to apply manure while the ground is frozen. There are also limits as to how many nutrients from manure a land area can handle. Over application of livestock wastes can overload

soil with macronutrients like nitrogen and phosphorous and micronutrients that have been added to animal feed like heavy metals (Burkholder et al., 2007). Other manure management strategies include pumping liquefied manure onto spray fields, trucking it off-site, or storing it until it can be used or treated. Manure can be stored in deep pits under the buildings that hold animals, in clay or concrete pits, treatment lagoons, or holding ponds.

Animal feeding operations are developing in close proximity in some states, and fields where manure is applied have become clustered. When manure is applied too frequently or in too large a quantity to an area, nutrients overwhelm the absorptive capacity of the soil, and either run off or are leached into the groundwater. Storage units can break or become faulty, or rainwater can cause holding lagoons to overflow. While CAFOs are required to have permits that limit the levels of manure discharge, handling the large amounts of manure inevitably causes accidental releases which have the ability to potentially impact humans.

The increased clustering and growth of CAFOs has led to growing environmental problems in many communities. The excess production of manure and problems with storage or manure management can affect ground and surface water quality. Emissions from degrading manure and livestock digestive processes produce air pollutants that often affect ambient air quality in communities surrounding CAFOs. CAFOs can also be the source of greenhouse gases, which contribute to global climate change.

All of the environmental problems with CAFOs have direct impact on human health and welfare for communities that contain large industrial farms. As the following sections demonstrate, human health can suffer because of contaminated air and degraded water quality, or from diseases spread from farms. Quality of life can suffer because of odors or insect vectors surrounding farms, and property values can drop, affecting the financial stability of a community. One study found that 82.8% of those living near and 89.5% of those living far from CAFOs believed that their property values decreased, and 92.2% of those living near and 78.9% of those living far from CAFOs believed the odor from manure was a problem. The study found that real estate values had not dropped and odor infestations were not validated by local governmental staff in the areas. However, the concerns show that CAFOs remain contentious in communities (Schmalzried and Fallon, 2007). CAFOs are an excellent example of how environmental problems can directly impact human and community well-being.

Groundwater

Groundwater can be contaminated by CAFOs through runoff from land application of manure, leaching from manure that has been improperly spread on land, or through leaks or breaks in storage or containment units. The EPA's 2000 National Water Quality Inventory found that 29 states specifically identified animal feeding operations, not just concentrated animal feeding operations, as contributing to water quality impairment (Congressional Research Service, 2008). A study of private water wells in Idaho detected levels of veterinary antibiotics, as well as elevated levels of nitrates (Batt, Snow, & Alga, 2006). Groundwater is a major source of drinking water in the United States. The EPA estimates that 53% of the population relies on groundwater for drinking water, often at much higher rates in rural areas (EPA, 2004). Unlike surface water, groundwater contamination sources are more difficult to monitor. The extent and source of contamination are often harder to pinpoint in groundwater than surface water contamination. Regular testing of household water wells for total and fecal coliform bacteria is a crucial element in monitoring groundwater quality, and can be the first step in discovering contamination issues related to CAFO discharge. Groundwater contamination can also affect surface water (Spellman &

Whiting, 2007). Contaminated groundwater can move laterally and eventually enter surface water, such as rivers or streams.

When groundwater is contaminated by pathogenic organisms, a serious threat to drinking water can occur. Pathogens survive longer in groundwater than surface water due to lower temperatures and protection from the sun. Even if the contamination appears to be a single episode, viruses could become attached to sediment near groundwater and continue to leach slowly into groundwater. One pollution event by a CAFO could become a lingering source of viral contamination for groundwater (EPA, 2005).

Groundwater can still be at risk for contamination after a CAFO has closed and its lagoons are empty. When given increased air exposure, ammonia in soil transforms into nitrates. Nitrates are highly mobile in soil, and will reach groundwater quicker than ammonia. It can be dangerous to ignore contaminated soil. The amount of pollution found in groundwater after contamination depends on the proximity of the aquifer to the CAFO, the size of the CAFO, whether storage units or pits are lined, the type of subsoil, and the depth of the groundwater.

If a CAFO has contaminated a water system, community members should be concerned about nitrates and nitrate poisoning. Elevated nitrates in drinking water can be especially harmful to infants, leading to blue baby syndrome and possible death. Nitrates oxidize iron in hemoglobin in red blood cells to methemoglobin. Most people convert methemoglobin back to hemoglobin fairly quickly, but infants do not convert back as fast. This hinders the ability of the infant's blood to carry oxygen, leading to a blue or purple appearance in affected infants. However, infants are not the only ones who can be affected by excess nitrates in water. Low blood oxygen in adults can lead to birth defects, miscarriages, and poor general health. Nitrates have also been speculated to be linked to higher rates of stomach and esophageal cancer (Bowman, Mueller, & Smith, 2000). In general, private water wells are at higher risk of nitrate contamination than public water supplies.

Surface Water

The agriculture sector, including CAFOs, is the leading contributor of pollutants to lakes, rivers, and reservoirs. It has been found that states with high concentrations of CAFOs experience on average 20 to 30 serious water quality problems per year as a result of manure management problems (EPA, 2001). This pollution can be caused by surface discharges or other types of discharges. Surface discharges can be caused by heavy storms or floods that cause storage lagoons to overflow, running off into nearby bodies of water. Pollutants can also travel over land or through surface drainage systems to nearby bodies of water, be discharged through manmade ditches or flushing systems found in CAFOs, or come into contact with surface water that passes directly through the farming area. Soil erosion can contribute to water pollution, as some pollutants can bond to eroded soil and travel to watersheds (EPA, 2001). Other types of discharges occur when pollutants travel to surface water through other mediums, such as groundwater or air.

Contamination in surface water can cause nitrates and other nutrients to build up. Ammonia is often found in surface waters surrounding CAFOs. Ammonia causes oxygen depletion from water, which itself can kill aquatic life. Ammonia also converts into nitrates, which can cause nutrient overloads in surface waters (EPA, 1998). Excessive nutrient concentrations, such as nitrogen or phosphorus, can lead to eutrophication and make water uninhabitable to fish or indigenous aquatic life (Sierra Club Michigan Chapter, n.d.). Nutrient over-enrichment causes algal blooms, or a rapid increase of algae growth in an aquatic environment (Science Daily, n.d.). Algal blooms can cause a spiral of environmental problems to an aquatic system. Large groups of algae can block sunlight from underwater plant life, which are

habitats for much aquatic life. When algae growth increases in surface water, it can also dominate other resources and cause plants to die. The dead plants provide fuel for bacteria to grow and increased bacteria use more of the water's oxygen supply. Oxygen depletion once again causes indigenous aquatic life to die. Some algal blooms can contain toxic algae and other microorganisms, including *Pfiesteria*, which has caused large fish kills in North Carolina, Maryland, and the Chesapeake Bay area (Spellman & Whiting, 2007). Eutrophication can cause serious problems in surface waters and disrupt the ecological balance.

Water tests have also uncovered hormones in surface waters around CAFOs (Burkholder et al., 2007). Studies show that these hormones alter the reproductive habits of aquatic species living in these waters, including a significant decrease in the fertility of female fish. CAFO runoff can also lead to the presence of fecal bacteria or pathogens in surface water. One study showed that protozoa such as *Cryptosporidium parvum* and *Giardia* were found in over 80% of surface water sites tested (Spellman & Whiting, 2007). Fecal bacteria pollution in water from manure land application is also responsible for many beach closures and shellfish restrictions.

Air Quality

In addition to polluting ground and surface water, CAFOs also contribute to the reduction of air quality in areas surrounding industrial farms. Animal feeding operations produce several types of air emissions, including gaseous and particulate substances, and CAFOs produce even more emissions due to their size. The primary cause of gaseous emissions is the decomposition of animal manure, while particulate substances are caused by the movement of animals. The type, amount, and rate of emissions created depends on what state the manure is in (solid, slurry, or liquid), and how it is treated or contained after it is excreted. Sometimes manure is “stabilized” in anaerobic lagoons, which reduces volatile solids and controls odor before land application.

The most typical pollutants found in air surrounding CAFOs are ammonia, hydrogen sulfide, methane, and particulate matter, all of which have varying human health risks. Table 1 on page 6 provides information on these pollutants.

Most manure produced by CAFOs is applied to land eventually and this land application can result in air emissions (Merkel, 2002). The primary cause of emission through land application is the volatilization of ammonia when the manure is applied to land. However, nitrous oxide is also created when nitrogen that has been applied to land undergoes nitrification and denitrification. Emissions caused by land application occur in two phases: one immediately following land application and one that occurs later and over a longer period as substances in the soil break down. Land application is not the only way CAFOs can emit harmful air emissions—ventilation systems in CAFO buildings can also release dangerous contaminants. A study by Iowa State University, which was a result of a lawsuit settlement between the Sierra Club and Tyson Chicken, found that two chicken houses in western Kentucky emitted over 10 tons of ammonia in the year they were monitored (Burns et al., 2007).

Most studies that examine the health effects of CAFO air emissions focus on farm workers, however some have studied the effect on area schools and children. While all community members are at risk from lowered air quality, children take in 20-50% more air than adults, making them more susceptible to lung disease and health effects (Kleinman, 2000). Researchers in North Carolina found that the closer children live to a CAFO, the greater the risk of asthma symptoms (Barrett, 2006). Of the 226 schools that were included in the study, 26% stated that there were noticeable odors from CAFOs outdoors, while 8% stated

Table 1 Typical pollutants found in air surrounding CAFOs.

CAFO Emissions	Source	Traits	Health Risks
Ammonia	Formed when microbes decompose undigested organic nitrogen compounds in manure	Colorless, sharp pungent odor	Respiratory irritant, chemical burns to the respiratory tract, skin, and eyes, severe cough, chronic lung disease
Hydrogen Sulfide	Anaerobic bacterial decomposition of protein and other sulfur containing organic matter	Odor of rotten eggs	Inflammation of the moist membranes of eye and respiratory tract, olfactory neuron loss, death
Methane	Microbial degradation of organic matter under anaerobic conditions	Colorless, odorless, highly flammable	No health risks. Is a greenhouse gas and contributes to climate change.
Particulate Matter	Feed, bedding materials, dry manure, unpaved soil surfaces, animal dander, poultry feathers	Comprised of fecal matter, feed materials, pollen, bacteria, fungi, skin cells, silicates	Chronic bronchitis, chronic respiratory symptoms, declines in lung function, organic dust toxic syndrome

they experience odors from CAFOs inside the schools. Schools that were closer to CAFOs were often attended by students of lower socioeconomic status (Mirabelli, Wing, Marshall, & Wilcosky, 2006).

There is consistent evidence suggesting that factory farms increase asthma in neighboring communities, as indicated by children having higher rates of asthma (Sigurdarson & Kline, 2006; Mirabelli et al., 2006). CAFOs emit particulate matter and suspended dust, which is linked to asthma and bronchitis. Smaller particles can actually be absorbed by the body and can have systemic effects, including cardiac arrest. If people are exposed to particulate matter over a long time, it can lead to decreased lung function (Michigan Department of Environmental Quality [MDEQ] Toxics Steering Group [TSG], 2006). CAFOs also emit ammonia, which is rapidly absorbed by the upper airways in the body. This can cause severe coughing and mucous build-up, and if severe enough, scarring of the airways. Particulate matter may lead to more severe health consequences for those exposed by their occupation. Farm workers can develop acute and chronic bronchitis, chronic obstructive airways disease, and interstitial lung disease. Repeated exposure to CAFO emissions can increase the likelihood of respiratory diseases. Occupational asthma, acute and chronic bronchitis, and organic dust toxic syndrome can be as high as 30% in factory farm workers

(Horrigan, Lawrence, & Walker, 2002). Other health effects of CAFO air emissions can be headaches, respiratory problems, eye irritation, nausea, weakness, and chest tightness.

There is evidence that CAFOs affect the ambient air quality of a community. There are three laws that potentially govern CAFO air emissions—the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also known as the Superfund Act), the Emergency Planning & Community Right to Know Act (EPCRA), and the Clean Air Act (CAA). However, the EPA passed a rule that exempts all CAFOs from reporting emissions under CERCLA. Only CAFOs that are classified as large are required to report any emission event of 100 pounds of ammonia or hydrogen sulfide or more during a 24-hour period locally or to the state under EPCRA (Michigan State University Extension, n.d.). The EPA has also instituted a voluntary Air Quality Compliance Agreement in which they will monitor some CAFO air emissions, and will not sue offenders but instead charge a small civil penalty. These changes have attracted criticism from environmental and community leaders who state that the EPA has yielded to influence from the livestock industry. The changes also leave ambiguity as to whether emission standards and air quality near CAFOs are being monitored.

Greenhouse Gas and Climate Change

Aside from the possibility of lowering air quality in the areas around them, CAFOs also emit greenhouse gases, and therefore contribute to climate change. Globally, livestock operations are responsible for approximately 18% of greenhouse gas production and over 7% of U.S. greenhouse gas emissions (Massey & Ulmer, 2008). While carbon dioxide is often considered the primary greenhouse gas of concern, manure emits methane and nitrous oxide which are 23 and 300 times more potent as greenhouse gases than carbon dioxide, respectively. The EPA attributes manure management as the fourth leading source of nitrous oxide emissions and the fifth leading source of methane emissions (EPA, 2009).

The type of manure storage system used contributes to the production of greenhouse gases. Many CAFOs store their excess manure in lagoons or pits, where they break down anaerobically (in the absence of oxygen), which exacerbates methane production. Manure that is applied to land or soil has more exposure to oxygen and therefore does not produce as much methane. Ruminant livestock, such as cows, sheep, or goats, also contribute to methane production through their digestive processes. These livestock have a special stomach called a rumen that allows them to digest tough grains or plants that would otherwise be unusable. It is during this process, called enteric fermentation, that methane is produced. The U.S. cattle industry is one of the primary methane producers. Livestock production and meat and dairy consumption has been increasing in the United States, so it can only be assumed that these greenhouse gas emissions will also rise and continue to contribute to climate change.

Odors

One of the most common complaints associated with CAFOs are the odors produced. The odors that CAFOs emit are a complex mixture of ammonia, hydrogen sulfide, and carbon dioxide, as well as volatile and semi-volatile organic compounds (Heederik et al., 2007). These odors are worse than smells formerly associated with smaller livestock farms. The anaerobic reaction that occurs when manure is stored in pits or lagoons for long amounts of time is the primary cause of the smells. Odors from waste are carried away from farm areas on dust and other air particles. Depending on things like weather conditions and farming techniques, CAFO odors can be smelled from as much as 5 or 6 miles away, although 3 miles is a more common distance (State Environmental Resource Center, 2004).

Because CAFOs typically produce malodors, many communities want to monitor emissions and odors. Quantifying odor from industrial farming can be challenging because it is a mixture of free and particle-bound compounds, which can make it hard to identify what specifically is causing the odor. Collecting data on specific gases, such as hydrogen sulfide, can be used as a proxy for odor levels.

CAFO odors can cause severe lifestyle changes for individuals in the surrounding communities and can alter many daily activities. When odors are severe, people may choose to keep their windows closed, even in high temperatures when there is no air conditioning. People also may choose to not let their children play outside and may even keep them home from school. Mental health deterioration and an increased sensitization to smells can also result from living in close proximity to odors from CAFOs. Odor can cause negative mood states, such as tension, depression, or anger, and possibly neuropsychiatric abnormalities, such as impaired balance or memory. People who live close to factory farms can develop CAFO-related post traumatic stress disorder, including anxiety about declining quality of life (Donham et al., 2007).

Ten states use direct regulations to control odors emitted by CAFOs. They prohibit odor emissions greater than a set standard. States with direct regulations use scentometers, which measure how many times an odor has to be doused with clean air before the smell is undetectable. An additional 34 states have indirect methods to reduce CAFO odors. These include: setbacks, which specify how far CAFO structures have to be from other buildings; permits, which are the most typical way of regulating CAFOs; public comment or involvement periods; and operator or manure placement training.

Insect Vectors

CAFOs and their waste can be breeding grounds for insect vectors. Houseflies, stable flies, and mosquitoes are the most common insects associated with CAFOs. Houseflies breed in manure, while stable and other flies breed in decaying organic material, such as livestock bedding. Mosquitoes breed in standing water, and water on the edges of manure lagoons can cause mosquito infestations to rise. Flies can change from eggs to adults in only 10 days, which means that substances in which flies breed need to be cleaned up regularly.

Flies are typically considered only nuisances, although insects can agitate livestock and decrease animal health. The John Hopkins Bloomberg School of Public Health found evidence that houseflies near poultry operations may contribute to the dispersion of drug-resistant bacteria (Center for Livable Future, 2009). Since flies are attracted to and eat human food, there is a potential for spreading bacteria or pathogens to humans, including microbes that can cause dysentery and diarrhea (Bowman et al., 2000). Mosquitoes spread zoonotic diseases, such as West Nile virus, St. Louis encephalitis, and equine encephalitis.

Residences closest to the feeding operations experience a much higher fly population than average homes. To lower the rates of insects and any accompanying disease threats, standing water should be cleaned or emptied weekly, and manure or decaying organic matter should be removed twice weekly (Purdue Extension, 2007). For more specific insect vector information, please refer to NALBOH's vector guide (*Vector Control Strategies for Local Boards of Health*).

Pathogens

Pathogens are parasites, bacterium, or viruses that are capable of causing disease or infection in animals or humans. The major source of pathogens from CAFOs is in animal manure. There are over 150 pathogens in manure that could impact human health. Many of these pathogens are concerning because

they can cause severe diarrhea. Healthy people who are exposed to pathogens can generally recover quickly, but those who have weakened immune systems are at increased risk for severe illness or death. Those at higher risk include infants or young children, pregnant women, the elderly, and those who are immunosuppressed, HIV positive, or have had chemotherapy. This risk group now roughly comprises 20% of the U.S. population.

Table 2 Select pathogens found in animal manure.

Pathogen	Disease	Symptoms
<i>Bacillus anthracis</i>	Anthrax	Skin sores, headache, fever, chills, nausea, vomiting
<i>Escherichia coli</i>	Colibacillosis, Coliform mastitis-metris	Diarrhea, abdominal gas
<i>Leptospira pomona</i>	Leptospirosis	Abdominal pain, muscle pain, vomiting, fever
<i>Listeria monocytogenes</i>	Listeriosis	Fever, fatigue, nausea, vomiting, diarrhea
<i>Salmonella</i> species	Salmonellosis	Abdominal pain, diarrhea, nausea, chills, fever, headache
<i>Clostridium tetani</i>	Tetanus	Violent muscle spasms, lockjaw, difficulty breathing
<i>Histoplasma capsulatum</i>	Histoplasmosis	Fever, chills, muscle ache, cough rash, joint pain and stiffness
<i>Microsporium</i> and <i>Trichophyton</i>	Ringworm	Itching, rash
<i>Giardia lamblia</i>	Giardiasis	Diarrhea, abdominal pain, abdominal gas, nausea, vomiting, fever
<i>Cryptosporidium</i> species	Cryptosporidiosis	Diarrhea, dehydration, weakness, abdominal cramping

Sources of infection from pathogens include fecal-oral transmission, inhalation, drinking water, or incidental water consumption during recreational water activities. The potential for transfer of pathogens among animals is higher in confinement, as there are more animals in a smaller amount of space. Healthy or asymptomatic animals may carry microbial agents that can infect humans, who can then spread that infection throughout a community, before the infection is discovered among animals.

When water is contaminated by pathogens, it can lead to widespread outbreaks of illness. Salmonellosis, cryptosporidiosis, and giardiasis can cause nausea, vomiting, fever, diarrhea, muscle pain, and death, among other symptoms. *E.coli* is another serious pathogen, and can be life-threatening for the young, elderly, and immunocompromised. It can cause bloody diarrhea and kidney failure. Since many CAFO use sub-therapeutic antibiotics with their animals, there is also the possibility that disease-resistant bacteria can emerge in areas surrounding CAFOs. Bacteria that cannot be treated by antibiotics can have very serious effects on human health, potentially even causing death (Pew Charitable Trusts, n.d.).

There is also the possibility of novel (or new) viruses developing. These viruses generate through mutation or recombinant events that can result in more efficient human-to-human transmission. There has been some speculation that the novel H1N1 virus outbreak in 2009 originated in swine CAFOs in Mexico. However, that claim has never been substantiated. CAFOs are not required to test for novel viruses, since they are not on the list of mandatory reportable illness to the World Organization for Animal Health.

Antibiotics

Antibiotics are commonly administered in animal feed in the United States. Antibiotics are included at low levels in animal feed to reduce the chance for infection and to eliminate the need for animals to expend energy fighting off bacteria, with the assumption that saved energy will be translated into growth. The main purposes of using non-therapeutic doses of antimicrobials in animal feed is so that animals will grow faster, produce more meat, and avoid illnesses. Supporters of antibiotic use say that it allows animals to digest their food more efficiently, get the most benefit from it, and grow into strong and healthy animals.

The trend of using antibiotics in feed has increased with the greater numbers of animals held in confinement. The more animals that are kept in close quarters, the more likely it is that infection or bacteria can spread among the animals. Seventy percent of all antibiotics and related drugs used in the U.S. each year are given to beef cattle, hogs, and chickens as feed additives. Nearly half of the antibiotics used are nearly identical to ones given to humans (Kaufman, 2000).

There is strong evidence that the use of antibiotics in animal feed is contributing to an increase in antibiotic-resistant microbes and causing antibiotics to be less effective for humans (Kaufman, 2000). Resistant strains of pathogenic bacteria in animals, which can be transferred to humans through the handling or eating of meat, have increased recently. This is a serious threat to human health because fewer options exist to help people overcome disease when infected with antibiotic-resistant pathogens. The antibiotics often are not fully metabolized by animals, and can be present in their manure. If manure pollutes a water supply, antibiotics can also leech into groundwater or surface water.

Because of this concern for human health, there is a growing movement to eliminate the non-therapeutic use of antibiotics with animals. In 2001, the American Medical Association approved a resolution to ban all low-level use of antibiotics. The USDA has developed guidelines to limit low-level use, and some major meat buyers (such as McDonald's) have stopped using meat that was given antibiotics that are also used for humans. The World Health Organization is also widely opposed to the use of antibiotics, calling for a cease of their low-level use in 2003. Some U.S. legislators are seeking to ban the routine use of antibiotics with livestock, and there has been legislation proposed to solidify a ban. The Preservation of Antibiotics for Medical Treatment Act (PAMTA), which was introduced in 2009, has the support of over 350 health,

consumer, and environmental groups (H.R. 1549/S. 619). The act, if passed, would ban seven classes of antibiotics important to human health from being used in animals, and would restrict other antibiotics to therapeutic and some preventive uses.

Other Effects – Property Values

Most landowners fear that when CAFOs move into their community their property values will drop significantly. There is evidence that CAFOs do affect property values. The reasons for this are many: the fear of loss of amenities, the risk of air or water pollution, and the increased possibility of nuisances related to odors or insects. CAFOs are typically viewed as a negative externality that can't be solved or cured. There may be stigma that is attached to living by a CAFO.

The most certain fact regarding CAFOs and property values are that the closer a property is to a CAFO, the more likely it will be that the value of the property will drop. The exact impact of CAFOs fluctuates depending on location and local specifics. Studies have found differing results of rates of property value decrease. One study shows that property value declines can range from a decrease of 6.6% within a 3-mile radius of a CAFO to an 88% decrease within 1/10 of a mile from a CAFO (Dakota Rural Action, 2006). Another study found that property value decreases are negligible beyond 2 miles away from a CAFO (Purdue Extension, 2008). A third study found that negative effects are largest for properties that are downwind and closest to livestock (Herriges, Secchi, & Babcock, 2005). The size and type of the feeding operation can affect property value as well. Decreases in property values can also cause property tax rates to drop, which can place stress on local government budgets.

Considerations for Boards of Health

Right-to-Farm Laws

With all of the potential environmental and public health effects from CAFOs, community members and health officials often resort to taking legal action against these industrial animal farms. However, there are some protections for farms in place that can make lawsuits hard to navigate. Right-to-farm laws were created to address conflicts between farmers and non-farming neighbors. They seek to override common laws of nuisance, which forbid people to use their property in ways that are harmful to others, and protect farmers from unreasonable controls on farming.

All 50 states have some form of right-to-farm laws, but most only offer legal protections to farms if they meet certain specifications. Generally, they must be in compliance with all environmental regulations, be properly run, and be present in a region first before suburban developments, often a year before the plaintiff moves to that area. These right-to-farm laws were originally created in the late 1970s and early 1980s to protect family farms from suburban sprawl, at a time when large industrial farms were not the norm. As industrial farms grew in size and number, the agribusiness industry lobbied for and achieved the passage of stricter laws in the 1990s, many of which are now being challenged in court by homeowners and small family farmers. Opponents to these laws argue that they deprive them of their use of property and therefore violate the Fifth Amendment to the Constitution.

Some state courts have overturned their strict right-to-farm laws, such as Iowa, Michigan, Minnesota, and Kansas. Others such as Vermont have rewritten their laws. Vermont's updated right-to-farm bill

protects established farm practices as long as there is not a substantial adverse effect on health, safety, or welfare.

Boards of health need to be aware of what legal protection their state offers farms. Right-to-farm laws can hinder nuisance complaints brought about by community members. State laws can prevent local government or health officials from regulating industrial farms.

Board of Health Involvement with CAFOs

Boards of health are responsible for fulfilling the three public health core functions: assessment, policy development, and assurance. Boards of health can fulfill these functions through addressing problems stemming from CAFOs in their communities. Specific public health services that can be tackled regarding CAFOs include monitoring health status, investigating health problems, developing policies, enforcing regulations, informing and educating people about CAFOs, and mobilizing community partnerships to spread awareness about environmental health issues related to CAFOs.

Assessment: Board of health members should ensure that there is an effective method in place for collecting and tracking public complaints about CAFOs and large animal farms. Since environmental health specialists at local health departments are often responsible for investigating complaints, the board of health must take measures to ensure that they are properly trained and educated about CAFOs. It is possible that the board of health may be responsible or choose to do some investigations itself. Schmalzried and Fallon (2008) advocate that local health districts adopt a proactive approach for addressing public concerns about CAFOs, stating that health districts can offer some services that may help ease public frustration with CAFOs. A fly trapping program can establish a baseline for the average number of flies present prior to the start-up of CAFOs or large animal farms, which can then establish if a fly nuisance exists in the area. Testing for water quality and quantity can provide evidence if CAFOs are suspected of affecting private water supplies. Boards of health can also monitor exposure incidences that occur in emergency rooms to determine if migrant or farm workers are developing any adverse health conditions as a result of their work environments. Establishing these programs benefit both members of the community and provide information to future animal farm operators, and local boards of health should recommend them if they've been receiving complaints about CAFOs.

Policy Development: Boards of health in many states can adopt health-based regulations about CAFOs, however, they may be met with some resistance. Humbolt County, Iowa, adopted four health-based ordinances concerning CAFOs that became models for regulations in other states, but the Iowa Supreme Court ruled the ordinances were irreconcilable with state laws. Boards of health that choose to regulate CAFOs can also be subject to pressure from outside forces, including possible lawsuits or withdrawal of funding. Boards of health should also consider working with other local officials to institute regulations on CAFOs, such as zoning ordinances.

Assurance: Boards of health can execute the assurance function by advocating for or educating about better environmental practices with CAFOs. Board members may receive complaints from the public about CAFOs, and boards can hold public meetings to receive complaints and hear public testimony about farms. If boards of health are not capable of regulating industrial farms in their communities, they can still try to collaborate with other local agencies that have jurisdiction. Board of health members can educate other local agencies and public officials about CAFOs and spread awareness about the environmental and health hazards. They can request a public hearing with the permitting agency of the



CAFO to express their concerns about the potential health effects. They can also work with agricultural and farm representatives to teach better environmental practices and pollution reduction techniques.

In many states, boards of health are empowered to adopt more stringent rules than the state law if it is necessary to protect public health. Board of health members should examine their state laws before they take any action regarding CAFOs to determine the most appropriate course of action. Any process should include an investigative period to gather evidence, public hearings, and a time for public review of draft policies.

Board of Health Case Studies

Tewksbury Board of Health, Massachusetts

Locals have complained about Krochmal Farms, a pig farm, for many years, but complaints have increased recently. The addition of a hog finishing facility to the farm coincided with the time that community member complaints grew. Most complaints are centered on the odor coming from the farm. The complaints were originally just logged when phone calls were received; however, the health department added a data tracking system as the number of complaints increased. After a complaint is received, the sanitarian or health director does a site visit to investigate.

The health director in Tewksbury filed an order of prohibition against the farm, which is allowed under Massachusetts law 111, section 143, for anything that threatens public health. The order of prohibition was appealed and the matter was taken to the board of health for a grievance hearing. The board of health hearing included months of testimony about the pig farm. The board of health is also doing a site assignment, which determines if a location is appropriate for treating, storing, or disposing of waste, including agricultural waste. The site assignment process includes both the Department of Environmental Protection (DEP) and the local board of health. The board of health holds a public hearing process, while the DEP reviews the site assignment application. The board of health grants the site assignment only if it is concurrently approved by the DEP.

The health director in Tewksbury points out that the only laws the board of health is able to regulate the farm under are nuisance laws. There have been efforts by the community to do a home rule petition to address the air quality and pest management complaints. The home rule petition is currently working its way through the Massachusetts state house. The status of the petition is unknown.

The board of health has tried to work directly with the pig farm to manage complaints. The farm contains manure composting facilities and the health district has requested advance notice to warn the community before manure is treated or applied to the soil. The farm has adopted a new manure management system. This system uses Rapp technology to control odors and reduce ammonia and hydrogen sulfide levels. However, questions still remain as to whether this addition will fully solve the odor issue. Typically, systems using Rapp technology include an oil cap that floats on manure holding pools and helps seal odors inside. These techniques have been researched and proven to reduce odors. However, the Tewksbury farm did not install the oil cap, and it is unknown whether the exclusion of the cap will hinder the technology's ability to reduce odors.

The complaints about the farm primarily concern the odor that emanates from the farm. The complaints do include mention of health side effects, including nausea and burning eyes. The health director has also heard concerns about potential environmental effects from the pig manure. Community members are

worried the manure runoff is entering and contaminating Sutton Brook, since there has been flooding in that area. There has been no confirmation of this occurring. The board of health is aware that the farm has a nutrient management plan, but they are not allowed to request and find out what is incorporated in that plan.

The Tewksbury piggery is technically not classified as a CAFO, though it is believed to be the largest pig farm in the commonwealth of Massachusetts. The area around it has become densely populated and the community members state that they just want to live peacefully with the farm. The board of health has submitted multiple grant applications to study the health effects associated with the farm. After the site assignment process is complete, the board of health will decide how it will regulate the farm. At the beginning of 2010, the board of health was still working on drafting regulations for the pig farms.

Wood County Board of Health, Ohio

Wood County, Ohio, contains two existing large dairy farms, both of which were proposed in 2001 to be expanded to over 1500 cows each. It is also the site for three other proposed dairy farms. There is a large community effort that supports restricting the operation and expansion of these farms, mainly represented by the community group Wood County Citizens Opposed to Factory Farms. The Wood County Board of Health became involved in investigating these dairy farms through this community group and other local officials. The Trustees of Liberty Township requested assistance from the Wood County Board of Health in supporting a moratorium on factory farm operations until local regulations were in effect. The trustees believed that manure runoff from the farms could contaminate local waterways, lower the ground water table, increase the presence of insect vectors, and devalue local properties.

The Wood County Health Director, in cooperation with the board of health, contacted nearby counties to determine what actions they had taken against farms in their communities. While the health director and board of health investigated action in the form of a nuisance regulation against the farms, they were advised that nuisance lawsuits filed against farms in Ohio were held to a tough standard, and they would be forced to demonstrate with scientific proof that the farms have a substantial adverse effect on health. They found that no other board of health in Ohio had opted to regulate farming operations and relied on the enforcement of existing state laws.

The board of health held a public forum to hear public opinion regarding the industrial farms. Ultimately, the Wood County Board of Health took actions other than regulations to help protect the health and environment of its community. They helped community members protect the safety of their water wells by offering free and low cost water well testing and inspections. They tested area ditch and water ways for fecal coliform bacteria, phosphorous, and nitrates to monitor the impact of farm runoff. They also purchased fly traps to monitor and count fly types to determine if the farms have caused an increase in insect vectors. Board of health members also met with state officials from the Ohio EPA in an effort to facilitate cooperation regarding the factory farms. While the Wood County Board of Health and Health Department chose not to institute any local regulations, they continue to monitor the situation and respond to community complaints.

Cerro Gordo County Board of Health, Iowa

Officials in Cerro Gordo County, Iowa, began looking into regulating animal feeding operations after the number of hog farms in Iowa started to grow. Floods in North Carolina and new regulations in Colorado meant that many hog farms began relocating to Iowa. Many citizens had concerns over the effects of

CAFOs, and the Iowa State Association of Counties wanted to review air quality issues. Officials in Cerro Gordo County originally began working on a regulation that required inspections and was based on public health concerns, since farms were already exempt from any regulations related to zoning. However, Iowa state senators soon introduced legislation that passed and prevented any animal feeding operations from being regulated from a public health angle as well.

As Iowans were now prevented from regulating animal feeding operations in terms of zoning or public health, officials in Cerro Gordo County decided to place a moratorium on the construction of new animal feeding operations in that county. They wanted to temporarily stop the growth of animal feeding operations until they could get better science about their effects. Cerro Gordo County Ordinance #40, the “Animal Confinement Moratorium Ordinance,” went into effect on May 14, 2002. Since the moratorium did not address public health or zoning, officials were able to get around the rules and still have a way to temporarily control animal feeding operation growth in their county. The ordinance placed “a 1-year moratorium on any new construction, expansion, or activity occurring on land used for the production, care, feeding, or housing of animals.” The ordinance also afforded “local public health officials adequate time to appropriately assess health and environmental concerns that may be related to confined animal feeding operations and concentration of animals; establish objective measurable standards of enforcement; exercise the Board of Health’s responsibility to protect and improve the health of the public; refrain from impacting farm operators unfairly; and provide penalties for violations of the provisions hereof pursuant to Chapter 137, Code of Iowa” (Cerro Gordo County, 2002).

The moratorium was first adopted by the Cerro Gordo County Board of Health. It was then presented to the county board of supervisors by the health director on behalf of the board of health. Before the board of health adopted the moratorium, they held an investigative meeting in which representatives from the Iowa Farm Bureau and other industry spokespeople exchanged opinions on the issue of animal feeding operations. The moratorium was created through a collaboration between local and county officials—health department staff, the board of health, and the board of supervisors. The moratorium did not receive any help or backing from state officials, who were concerned about the political nature of the ordinance. However it did receive backing from a *Globe Gazette* editorial.

The moratorium was immediately met with resistance from state officials. The Cerro Gordo County Board of Supervisors was contacted by a local legislator, and the Iowa Farm Bureau stated they would challenge the county budget. The Iowa Farm Bureau threatened to take the county to court. There were concerns over the cost of a court trial, which was estimated to be as high as \$60,000. The county attorney doubted the legality of the moratorium and ultimately recommended removing it. The moratorium was in effect until June of 2005, when it was repealed by the county board of supervisors.

Since the moratorium was repealed there have been a few hog farms built in Cerro Gordo County, but the decline in pork prices has prevented any large growth of hog farms. Health officials believe that if the county had not implemented the animal confinement moratorium, there would have been many more farms built in their county, since many hog farms were built in counties south of Cerro Gordo County. There is now a process for siting new animal confinement operations in Iowa that uses a Master Matrix scoring system. The Cerro Gordo County Board of Supervisors tracks the Master Matrix system, but so far no animal feeding operations in Iowa who have applied using this system have been denied the right to build.

Conclusion

Concentrated animal feeding operations or large industrial animal farms can cause a myriad of environmental and public health problems. While they can be maintained and operated properly, it is important to ensure that they are routinely monitored to avoid harm to the surrounding community. While states have differing abilities to regulate CAFOs, there are still actions that boards of health can and should take. These actions can be as complex as passing ordinances or regulations directed at CAFOs or can be simply increasing water and air quality testing in the areas surrounding CAFOs. Since CAFOs have such an impact locally, boards of health are an appropriate means for action. Boards of health should take an active role with CAFOs, including collaboration with other state and local agencies, to mitigate the impact that CAFOs or large industrial farms have on the public health of their communities.

Appendix A: Regulatory Definitions of Large CAFOs, Medium CAFOs, and Small CAFOs

Animal Sector	Size Thresholds (number of animals)		
	Large CAFOs	Medium CAFOs ¹	Small CAFOs ²
Cattle or cow/calf pairs	1,000 or more	300-999	Less than 300
Mature dairy cattle	700 or more	200-699	Less than 200
Veal calves	1,000 or more	300-999	Less than 300
Swine (over 55 pounds)	2,500 or more	750-2,500	Less than 750
Swine (under 55 pounds)	10,000 or more	3,000-9,999	Less than 3,000
Horses	500 or more	150-499	Less than 150
Sheep or lambs	10,000 or more	3,000-9,999	Less than 3,000
Turkeys	55,000 or more	16,500-54,999	Less than 16,500
Laying hens or broilers ³	30,000 or more	9,000-29,999	Less than 9,000
Chickens other than laying hens ⁴	125,000 or more	37,500-124,999	Less than 37,500
Laying hens ⁴	82,000 or more	25,000-81,999	Less than 25,000
Ducks ⁴	30,000 or more	10,000-29,999	Less than 10,000
Ducks ³	5,000 or more	1,500-4,999	Less than 1,500

Data: Environmental Protection Agency

¹ Must also meet one of two “method of discharge” criteria to be defined as a CAFO or must be designated.

² Never a CAFO by regulatory definition, but may be designated as a CAFO on a case-by-case basis.

³ Liquid manure handling system

⁴ Other than a liquid manure handling system

Appendix B: Additional Resources

American Public Health Association. *Precautionary moratorium on new concentrated animal feed operations*. <http://www.apha.org/advocacy/policy/policysearch/default.htm?id=1243>

Center for a Livable Future. <http://www.livablefutureblog.com/>

Environmental Health Sciences Research Center. *Iowa concentrated animal feeding operation air quality study*. <http://www.public-health.uiowa.edu/ehsrc/CAFOstudy.htm>

Environmental Protection Agency. *Animal feeding operations*. http://cfpub.epa.gov/npdes/home.cfm?program_id=7

Food and Water Watch. <http://www.foodandwaterwatch.org/>

Impacts of CAFOs on Rural Communities. http://web.missouri.edu/ikerdj/papers/Indiana%20-%20CAFOs%20%20Communities.htm#_ftn1

Land Stewardship Project. <http://www.landstewardshipproject.org/index.html>

Midwest Environmental Advocates. <http://www.midwestadvocates.org/>

National Agriculture Law Center. *Animal feeding operations reading room*.
<http://www.nationalaglawcenter.org/readingrooms/afos>

National Association of Local Boards of Health. *Vector control strategies for local boards of health*.
<http://www.nalboh.org/publications.htm>

Pew Charitable Trusts. *Human health and industrial farming*. <http://www.saveantibiotics.org/index.html>

Pew Commission on Industrial Animal Farm Production. <http://www.ncifap.org/>

Purdue Extension. *Concentrated animal feeding operations*. <http://www.ansc.purdue.edu/CAFO/>

State Environmental Resource Center. <http://serconline.org>

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The National Association of Local Boards of Health has publications available in the following public health programs:



For a complete listing of all available NALBOH publications, please visit www.nalboh.org.



From: [REDACTED]
Sent: Wednesday, September 19, 2012 5:36 AM
To: Baumann, Dan G - DNR; Anderson, Russell A - DNR
Subject: Saratoga CAFO question

Dear Mr. Baumann, and Mr. Anderson,

I was at the DNR meeting in Saratoga and had lots of questions and wrote them down at each station. I have a few more questions to add for the EIS.

If the farms get the water permits, is it possible to put flow meters on the pumps or are they already required to do so?

If the farms come, will a digester be required to be up and running before they start the operation, or will we have to wait a year or so like other area's had to?
Can we require them to have a digester before they bring in the cows?

Thank you.

Sincerely,

[REDACTED]

Wis. Rapids, WI 54494

From: [REDACTED]
Sent: Wednesday, September 19, 2012 7:38 PM
To: Anderson, Russell A - DNR
Subject: Proposed CAFO in the Town of Saratoga

Dear Mr. Anderson -

We are writing this letter to express our concerns regarding the proposed CAFO that the Wysocki family is proposing to build in the Town of Saratoga.

We own approximately 4 acres on Hollywood Road, which is less than 1/2 mile from the proposed CAFO farmland and proposed wells. The Seven Mile Creek runs directly through our property, we own land on both sides of the Seven Mile Creek. This is a spring fed trout creek and it is bad enough that the cranberry marsh takes the water table down, if these 49 high capacity wells go in, we believe our Seven Mile creek is going to be totally gone.

We have a sand point for our water. Due to the high volume of water that these wells are going to draw from their owned land and all the surrounding land, this is going to greatly affect the water table. Who will pay for us to have a drilled well if and when our well goes bad? Is Wysocki going to pay for a drilled well for us? We have read calculations on the draw down of water that the high capacity wells will take 7 billion gallons of water per year and Nepco Lake holds 1.5 billion gallons. How can this be allowed?

How will the contaminated water and nitrates issue be addressed? This is a residential area.

How can it be allowed for Wysocki to build this CAFO in a residential area? Drawing down our water table? This is forest land that is all going to be clear cut, thereby removing wildlife habitat, hunting land, recreational land, it will be gone for good. This destruction of the forest land is wrong. Wysocki family is purchasing almost every piece of public land in the Town of Saratoga, public land that is all surrounded by homes.

Please, as the DNR, please protect our environment and the people of the Town of Saratoga and do not allow this to go through. It is a travesty.

Thank you for reading this.

[REDACTED]
[REDACTED]
Nekoosa, WI 54457
[REDACTED]

From: [REDACTED]
Sent: Wednesday, September 19, 2012 8:14 PM
To: larua.chern@wisconsin.gov
Cc: Anderson, Russell A - DNR; Baumann, Dan G - DNR
Subject: Fw: Fw: Fw:

We are currently working on data about the nitrates in saratoga. All the well samples received back to date show very low nitrates all well below the DNR standard in the Nitrate in Drinking Water PUB-DG-001. The information will be given soon unable to meet the early request. Also of concern is the Pesticides in Drinking Water DNRPUBL.WS-007 which states pesticides can be absorbed through the skin and lungs as well as by drinking water. [REDACTED]

From: [REDACTED]
Sent: Wednesday, September 19, 2012 9:38 PM
To: Anderson, Russell A - DNR
Subject: Concerns for Golden Sands Dairy EIS

Russell,

Below are questions/concerns from a Saratoga resident that they would like included in the EIS:

- How much soil material is between the aquifer and the bottom of the manure pits?
- What is the purposed leakage rate of the manure pits? (peer reviewed research of Parker, Schulte, Ham, Benson, and others state a leakage rate of 1,000 gallons per acre per day is to be expected if this is a compacted clay lined manure pit.)
- What testing has been done / will be done about the impact of that leakage of the manure pits on the local aquifer?
- The DNR is cumulatively considering the impact of the 49 proposed wells by GSD, but what about the other high-capacity wells within a 10-mile radius of these wells (such as Plainfield, Bancroft, etc.)? Does all that water come from the same aquifer?
- If the GSD cumulative annual water usage is 7.2 billion gallons of water and less than 50% of the water used for irrigation returns to the soil, how can the groundwater be replenished?
- Can the permit be written to insist that manure pits be drained and inspected every five years? Can they be clay lined and double lined?
- Will the manure pit withstand a 100 year flood event?
- Will the manure pit be covered?
- What testing will be done to determine the impact of that number of wells on the aquifer?
- Can the permit be written so that high capacity wells are inspected annually?
- Can the permit insist that they have test wells per every well to check for issues of contamination?
- Can the permit require meters on high capacity wells to be inspected every 3 months?
- Can a list of hazardous materials & Volatile organic compounds used by the GSD be made public?

- Can the permit require GSD to pay for the HAZMAT TRAINING for area departments to deal with these hazardous materials in case of an emergency?
- Can the DNR deny any spraying of liquid manure onto fields due to air quality contamination issues?

Thank you for inclusion of these concerns in the EIS.



From: [REDACTED]
Sent: Wednesday, September 19, 2012 4:37 PM
To: McLennan, Robin - DNR; [REDACTED]
Subject: 10 Mile Creek Data and Projected Wysocki CAFO Milk Production

Hello Robin,

[REDACTED] asked me to pass along the following information about 10 Mile Creek flow rates and I did some calculations on projected Wysocki milk production. This information can be found in the attachments.

[REDACTED]

19-Sep-12



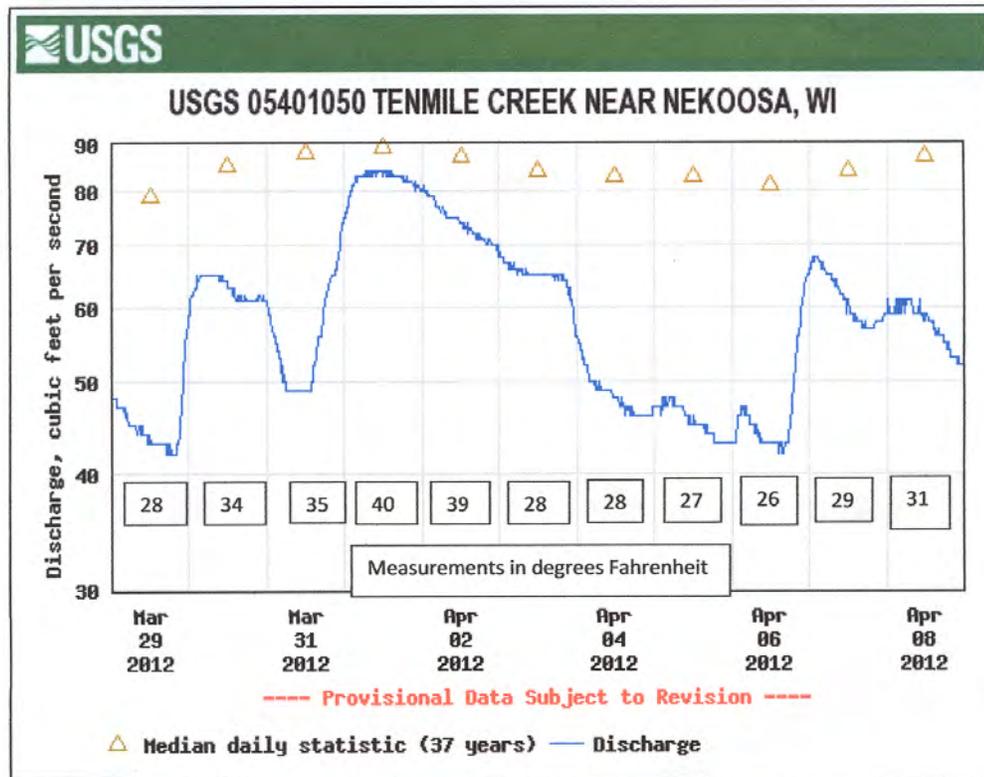
Projected milk production at Wysocki CAFO

3500 Number of milked cows
20,000 average production per cow per year in lbs
55 lbs/day per cow
6.6 average gallons/day/cow
22995 gallons/day for the dairy

Tank trucks generally range in capacity from 5,000 gallons to 9,000 gallons

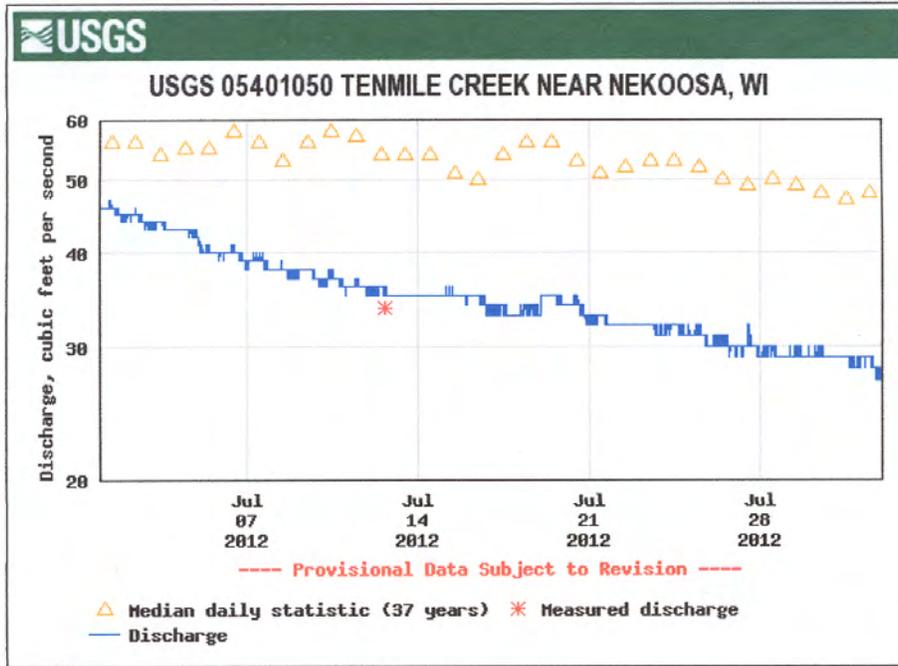
so the number of tank trucks/day for the Wysocki operaton is projected to be:

4.6 all 5000 gallon trucks
2.6 all 9,000 gallon trucks



This graph represents the early spring time stress on the ten mile creek and the effect on the water shed. Wildlife including: nesting waterfowl and the fish habitat will be greatly affected by summer time draw downs due to heavy irrigation. This water shed is already under large amounts of stress from the cranberry marshes at the head waters filling reservoirs and beds and then discharging at a high rate back into this stream. We know and understand the seeded state laws that protect the cranberry industry. We would like for you to look at the extreme fluctuation of the creek flow on the 29th and 31st of March and also the 7th of April. The average creek flow from 2009 to 2012 was 47 cubic feet per second. Dramatic changes in flow from 43 CFS to 65 CFS in less than a eight hour period on the 29th. This was followed by even a greater change that went from 49 CFS to 84 CFS in just a ten hour period on the 31st of March. Yet another fluctuation was recorded April 7th. his greatly affects ground nesting waterfowl, which I have put a considerable amount of effort into preserving their habitat. This process of drawing and releasing high amounts of water has been going on for years and has been reported to the DNR office in Wisconsin Rapids with no response. We request that you consider not allowing ANY high capacity wells on this water shed that we desperately try to preserve and protect.

Respectfully, Ten Mile Creek resident



ter than most

tives of the local leaders
istry Health last week to
sin Media consin has in
state's eco-

m, slightly at health care
p called the d Quality, or
ient than the proportion of
Our health care

care here is tes that ser-
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re in Wisconsin nly will be-
nd residents as age.

discussed with ministrators:
system was care law
w Obamacare.

Dairy water use calculated

Armed with a calculator and the Internet, I found alarming statistics on proposed water usage for a new "Saratoga dairy farm" facility. What I found should make every citizen of southern Wood County and northern Adams County take notice.

To sustain the agricultural portion of land used, 49 high-capacity wells would be needed, pumping 1,000 gallons of water per minute each (according to speakers at informational meetings) or 2,940,000 per hour or 70,560,000 gallons per day. This is 2,116,800,000 in 30 days, or 8,467,200,000 in a 120-day growing season.

If the shape of an acre

STEVEN BORNBACH
MY VIEW



were 100 feet by 436 feet, that acre would contain 325,853 U.S. gallons of water, so the farm would consume 332,585 acre feet of water in 120 days. This is a volume of water one foot deep by 100 feet wide by 14,207,060 feet long or 100 feet multiplied by 2,691 miles.

To put this into perspective, a four-lane superhighway is approximately 48 feet wide. A four-lane highway the distance from New York City to Los Angeles is 2,776 miles. In other

words, the amount of water used would be one foot deep and the size of a superhighway running from New York City to Los Angeles — and back.

Where is the Department of Natural Resource's environmental impact study for this project? Those guys run around protecting snail darters, spotted owls, Karner blue butterflies — guys so anal they will fine you for possession of an eagle feather.

For the average — yes average — citizen, it is illegal to disturb wetlands in any way, shape or form; yet the DNR is willing to allow a farm project of such monumental magnitude. They are willing to allow the potential irreparable damage of depleting

water supplies in streams and recreational lakes, and let's not forget the slow depletion of underground aquifers.

Aside from a potential lack of drinking water and the environmental fish and aquatic damage, what about the damage to the local economy? Who wants to live by lakes with little, if any, water, reeking of dying fish and decaying vegetation?

Since the DNR obviously prefers to remain passive about the issues they were created to protect, perhaps someone needs to contact a national office of the Environmental Protection Agency. Remember, once the damage is done, there is no turning back.

Steven Bornbach lives in Wisconsin Rapids.

Churches fight to feed homeless

From: [REDACTED]
Sent: Monday, September 17, 2012 4:45 PM
To: Baumann, Dan G - DNR
Subject: CAFO - Saratoga

Just wondering if the Wysocki's will be responsible for buying our property for what it is worth today without all the odor and poisoned/lack of water? Please let me know. We planned on retiring here, and our kids (right now) say they don't ever want to leave! No one will want to live here if Wysocki Farms comes into the picture and our land is polluted and has no water and the air quality is too bad to go outside. We then would like them to buy our land for what it was worth (without all the pollution), not for what it would be worth after all they ruin our way of life now.

Thanks,

[REDACTED]

To Whom It May Concern:

Subject: Concerned about Saratoga Water & Air Quality

I have a couple of issues that I would like to have clarified. I would like to know who would be the party responsible and liable if the people of the Town of Saratoga have issues with Golden Sands Dairy. Such as water levels going down, contamination of our water, air quality, and stream levels. Someone should be held liable and responsible if these issues occur. Would it be the WI .DNR for issuing these permits or Golden Sands Dairy?

I have not seen where anyone will take the responsibility and be open to any law suits that may occur if these issues happen. I would like to see a reply from the WI .DNR and Golden Sands Dairy on these issues. I would also recommend the people of the Town of Saratoga have their water levels and water tested before these permits are issued.

Respectively,

[Redacted signature]

[Redacted signature]

CC: WI. DNR
Golden Sands Dairy
Gov. Scott Walker
State Sen. Julie Lassa
State Rep. Amy Sue Vruwink
State Rep. Scott Krug



[Redacted signature]

Wisc Rapids, WI 54494-8575

RECEIVED
SEP 4 2012
AIR MANAGEMENT

From: [REDACTED]
Sent: Friday, August 24, 2012 10:02 AM
To: Anderson, Russell A - DNR
Subject: CAFO in Town of Saratoga

I am writing this to voice our opposition to the proposed CAFO farm in the Town of Saratoga. We live at [REDACTED] Wisconsin Rapids. The Ten Mile Creek runs along our property. In the 30 years we've lived here, I have never seen it this low. I am sure the drought is part of the problem. If the CAFO farm was operating it would be completely dry. We bought this land because of the Ten Mile. Our property value would tank if it did dry up. Let alone our 20 ft. well. CAFOs ruin the water and air quality. Our health and way of life are in jeopardy. Please help us save this beautiful area.

[REDACTED]

From: [REDACTED]
Sent: Thursday, August 09, 2012 4:04 PM
To: Anderson, Russell A - DNR
Subject: CAFO in Wisconsin

Please acknowledge that i am totally opposed to this CAFO , an acronym for factory farming.

Thank you,

[REDACTED]

From: [REDACTED]
Sent: Friday, August 24, 2012 10:55 AM
To: Anderson, Russell A - DNR
Subject: CAFO

MR. ANDERSON,

WE ARE AGAINST THE CAFO IN SARATOGA. WE MOVED TO THIS AREA BECAUSE OF THE RECREATIONAL OPPORTUNITIES HERE. THE CAFO MIGHT ADD A FEW JOBS, BUT IT WILL ALSO NEGATIVELY AFFECT THE LIVES OF ALL THE SURROUNDING AREA IF WE HAVE NO WATER. OUR PROPERTIES WILL DECREASE IN VALUE IF OUR WELLS RUN DRY OR IF THE WATER LEVELS IN THE LAKES IS LOWERED OR LOST TOTALLY.

AS A RETIRED COUPLE (WHICH ALOT OF THE RESIDENTS HERE ARE) WE WOULD LOSE A MAJOR PART OF OUR INVESTMENTS IN OUR RESIDENCES.

PLEASE DON'T ALLOW THIS CAFO TO AFFECT SO MANY PEOPLE NEGATIVELY.

SINCERELY,

[REDACTED]
NEKOOSA 54457



Saratoga Town Hall Public Listening Session

Issues Identification Comment Form

For the Proposed

Golden Sands Dairy

August 23, 2012 Meeting

Public information gathering for the Environmental Impact Statement (EIS). Please clearly state the issue(s) you feel should be addressed by WI Department of Natural Resources in the EIS:

Who would do the monitoring of the effect on our water and how often? An article in an Iowa paper says the dairy there has not done the testing they had committed to.

There is a federal Clean Water Act which protects America's streams, wetlands, and rivers from the impacts of Concentrated Animal Feeding Operations.

I am also concerned about the air we breathe if planes will dust the fields so close to so many people! Has the air quality been tested?

I am a very concerned citizen who feels this is a democracy and all our voters on this dairy should be considered.

Completion of this form and inclusion of personal information is voluntary. We will use your contact information to seek clarification of your comments, if necessary. All comments subject to Wisconsin's Open Records Law.

Name: _____

Contact Information: _____



Saratoga Town Hall Public Listening Session

Issues Identification Comment Form

For the Proposed

Golden Sands Dairy

August 23, 2012 Meeting

Public information gathering for the Environmental Impact Statement (EIS). Please clearly state the issue(s) you feel should be addressed by WI Department of Natural Resources in the EIS:

I live on the 10 mile creek next to your lot on Silver Creek Trail. Please come over to my house and take a good look at the creek from my deck. The nice deep hole that used to be a great spot for fishing is just mud. Where did the water go?

Madison Operates with 23 deep wells with 838 million of water minus that provides water service to more than 62,000 locations in city & town of Madison, Shorewood Hills, Maple Bluff, Blooming Grove, and Town of Burke.

The dairy company wants 49 wells - Why? It takes 2,000 gallons of water to produce 1 gallon of milk. What in the world would happen to our water table?

Completion of this form and inclusion of personal information is voluntary. We will use your contact information to seek clarification of your comments, if necessary. All comments subject to Wisconsin's Open Records Law.

Name:

Contact Information:

From: [REDACTED]
Sent: Friday, August 10, 2012 4:02 PM
To: Anderson, Russell A - DNR
Cc: [REDACTED]
Subject: Dairy Farm/Wysocki's CAFO.

Mr Anderson
3911 Fish Hatchery Road
Fitchburg, WI 53711
608-275-3467

I own a property on Lake Camelot. I have several concerns on opening the Dairy/crop farm.

1. The air quality will change just as it did when the paper mill was running. There will be an increase in dust from the 6400 acres of cropland and decreased air quality due to animal emissions from the 5300 to 6130 proposed cows. I realize they plan to replant cropland immediately after harvest, but plants take a few weeks to grow in. Dust will fly. Having asthma, I am genuinely concerned about this impact to my health and all others with various respiratory problems. Who will be responsible for increased medication usage, potential emergency room visits and decline of overall respiratory health over time? Symptoms do not always occur on day 1. The impact comes over time.

2. The digging of 49 high capacity wells seems problematic for the entire area. The runoff from the use of fertilizers and other chemicals will have a negative effect on our lakes and streams. This is a place to enjoy Wisconsin lakes, fishing, boating, water skiing and other sports. For many, it's how their living is made and others invested in lake property to enjoy the area. Lakes in Rome, downstream from Saratoga, already have excessive algae growth. What will happen when manure and fertilizers from the dairy increase the nitrates and other pollutants in the water?. What about increased cancer risks due to increased use of chemicals and fertilizers ? Would this farm go organic??? Lake Petenwell already has high amounts of nitrates and the Tri-Lakes of Rome have a high level of nitrates and phosphorus. This problem alone has already tripled my water bill. What about the effects on personal water wells? What happens when they go dry? Who will pay for the filtration system that eliminates farm nitrates out of the water? I do not feel like having my bill go even higher to pay for the farm problems.

3. Tax wise, the farm is paying for 40 acres what I have to pay for less than one acre? Is that fair?????? Who plans to make up the difference? From the time I purchased my Camelot property, my property taxes have more than tripled. Now I have to worry about another increase due to this farm and its impact on the environment?

From the concerns I have listed above, this potential farm will lower the water quality and quantity, and decrease property values. Who will want to purchase a property that continually smells from cattle emissions? We property owners have a right to clean air and water. We have been here paying high taxes and trying to keep going. Now to loose all, just because of this farm is grossly unfair to me. Appears to me that this

company came through the "back door" to try and open their farm without any concern for any of their new neighbors. Not a good way to start any potential relationship.

[REDACTED]

Nekoosa WI

[REDACTED]

From: [REDACTED]
Sent: Friday, August 10, 2012 7:17 AM
To: Anderson, Russell A - DNR; ; [REDACTED]; Baumann, Dan G - DNR
Cc: [REDACTED]
Subject: EIS for sole source aquifer

hello. Sierra Group found out we have a sole source aquifer. We are to request of you and the USCPA to have an EIS on the aquifer as soon as possible. [REDACTED]

From: [REDACTED]
Sent: Tuesday, July 24, 2012 7:28 PM
To: Baumann, Dan G - DNR
Subject: central sands dairy

have any yearly soil test been done at central sands dairy it is documented that yearly soil test data is available to us. Where also water test data the Nauda reports were supposed to be available to us a few weeks ago. where do we find those. all we are seeing is a 1981 suggestion in the project plans on hydrology. thanks [REDACTED]

From: [REDACTED]
Sent: Monday, August 27, 2012 7:37 PM
To: Baumann, Dan G - DNR
Subject: Fw: Demands?

----- Original Message -----

From: [REDACTED]
To: [REDACTED]
Cc: [REDACTED] 4:11 PM
Subject: Demands?

1.4 Proposed Development –

30,000,000 gallon concrete liquid manure storage basin (290' x 315' bottom) s/b \$40,000,000
 Two concrete manure solids storage pads - sand 82' x 176' and manure solids 172' x 200'

Storage Liner: The liner for the storage basins will consist of a concrete liner in accordance with NRCS 313 - Table 5 Concrete Liner Criteria for Impoundments. —Water Tight Concrete with waterstops.

Demand clay liner to surround - letter – these need to be put correctly and someone s/b on site to implement

1.5 section

Waste Characterization: The proposed dairy will have 3,400 milk cows, 600 dry cows, 300 heifers and 1000 calves. Bedding for cows is planned to be sand. The manure from the animals, except the calves, will enter a sand separator prior to entering a digester (once Phase II is implemented). The bedded calf manure will be land spread when the pens are cleaned or stored on the manure solids pad. Digested manure solids will be separated with mechanical separators and the liquid portion of the manure will be stored in the proposed basin. Separated manure solids will be stacked on site prior to land application. The processed liquid manure in the basin (once phase II is implemented) will be irrigated to cropland to be developed adjacent to the dairy. Until Phase II is implemented, manure will be land applied and incorporated. Manure application will be based on crop nutrient needs. The nutrient management plan is being completed by Frese Crop Consulting.

So what happens with the S--- until phase II – we do not even know if there will be a phase II

Once Phase II is implemented, manure from the sand separator will go through an anaerobic digester. The digested manure will be separated using mechanical separators. The solid portion will be temporarily stored on a contained concrete pad and the liquid portion will be pumped to a storage basin. Manure will be field applied in accordance with a nutrient management plan prepared by others.

What is model # etc of the digester? Who else in CAFO business uses one?

Odor, Aesthetics & Animal Health: The site is located over ¼ mile from the nearest property owner or house. State Highway 13 forms the east boundary of the Dairy, a 200 foot setback from the east end of the barns is included in the design. As cows to stock the barn are initially brought in, the manure will be stored in the manure basin. Once the facilities are at 90% capacity, the facility plans to operate a sand removal and digester system to process the manure. The solids will be removed and land spread during the growing season. The separated liquid will be applied by irrigation.

Expansion Considerations: Expansion is not being considered at this time.

Do not believe the ¼ mile is correct and the setback s/b farther than 200'

Flood plain areas are not believed to be in or adjacent to the construction area. This is supported by the Wisconsin DNR Water Viewer Map.

The map from 1921? What map

2.0- section

Silage will be covered with plastic --- how is this secured?

Phase II will begin once arrangements have been made for financing, regulatory approvals, and construction plans have been prepared and approved. The digester is expected to be operable before the facility is 90 % of design capacity.

What if he runs out of \$\$ --

From: [REDACTED]
Sent: Sunday, August 12, 2012 6:36 PM
To: Anderson, Russell A - DNR; Baumann, Dan G - DNR
Subject: Fw: Emailing 20120725-wisconsin_phosphorus.pdf
Attachments: 20120725-wisconsin_phosphorus.pdf; ATT00022.txt

Dan, Russell this EPA Region 5 Revised phosphorus rules along with the article ADVOACTES PRAISE NEW POSPHORUS REGULATIONS <http://m.wisconsinrapidstribune.com/news/article?a=2012308120245&f=504> Phosphorus pollution.....such as Petenwell and Castle Rock Stewards have been working to address the issue. All should help us on the WPDES side of the Permits. Petenwell is just a short distance away and where the 7 and 10 mile creeks drain in the WisconsinRiver. Also the 7 and 10 mile creeks are classified by the DNR as EXCEPTIONAL WATER WAYS. [REDACTED]



United States Environmental Protection Agency
Regional Administrator
Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3590
JUL 25 2012

Cathy Stepp, Secretary
Wisconsin Department of Natural Resources
Post Office Box 7921
Madison, Wisconsin 53707-7921

Dear Ms. Stepp:

I am pleased to inform you that the U.S. Environmental Protection Agency has approved the *Wisconsin Administrative Code* Chapter NR 217, Subchapter III, "Water Quality Based Effluent Limitations for Phosphorus." This Subchapter, which Wisconsin adopted in 2010, pertains to the development of Wisconsin Pollutant Discharge Elimination System permits to implement the State's approved water quality criteria for phosphorus.

EPA reviewed Subchapter III as a revision to Wisconsin's National Pollutant Discharge Elimination System (NPDES) program and conducted the review under 40 C.F.R. §§ 123.25(a) and 123.62. As Regional Administrator, I have the authority to approve revisions to Wisconsin's NPDES program. An enclosure to this letter explains the basis for approval of the Subchapter.

During its review of Subchapter III, EPA recommended that WDNR and EPA create a new addendum to the NPDES Memorandum of Agreement between our agencies through which WDNR would commit itself to certain conditions as it implements Sections NR 217.14(2) Concentration Based Limits and 217.18 Watershed Adaptive Management Option. The conditions will ensure that permits issued consistent with the Sections also meet the requirements of 40 C.F.R. §§ 122.44, 122.45(d), 122.47, 122.62, 124.8, and 124.56. WDNR signed the addendum in April. Enclosed is a copy of the addendum with both WDNR and EPA's signatures.

Tribal Consultation

EPA consulted with Wisconsin tribes on EPA's review of Subchapter III. The Bad River Band of Lake Superior Tribe of Chippewa Indians (the Bad River Tribe) provided comments to EPA that we want to share with you.

The Bad River Tribe asks whether under Section NR 217.14(1) a mass limit will be included in permits for phosphorus discharges when the receiving water or downstream water is designated as an Exceptional Resource Water (ERW) or Outstanding Resource Water (ORW) by the Tribe. Section NR 217.14(1) states that a mass limit shall be

included in a permit for discharges of phosphorus to receiving or downstream waters that are an ORW or ERW. In a January 19, 2012 letter to WDNR, Wisconsin's Attorney General wrote that in Wisconsin provisions allowing WDNR to establish water quality-based effluent limitations necessary to protect downstream waters, "downstream waters" includes navigable waters of the U.S. that are protected by state and tribal water quality standards. Accordingly, we understand Section NR 217.14(1) to require that mass limits be included in permits for sources that discharge phosphorus into receiving or downstream waters on tribal land that a Tribe has designated as an ORW or ERW. However, we ask that WDNR confirm this in its implementing guidance.

Secondly, the Bad River Tribe asks to be involved in the watershed adaptive management option described in Section NR 217.18 if and when Wisconsin approves this approach for a watershed affecting or having the potential to affect the waters flowing within the boundaries of its Reservation. We ask that WDNR encourage parties developing adaptive management plans to involve tribes during development of such plans if the plans will cover a watershed which affects tribal waters. Although tribes will be able to comment on draft NPDES permits that are based on adaptive management plans under the public notice and comment provisions of Wisconsin Statutes Chapter 283, we encourage you to involve tribes during plan development. The Bad River Tribe also requests that WDNR define the scale of a watershed to which the adaptive management option may apply.

Finally the Bad River Tribe asks that WDNR clarify the method it will use to determine an appropriate "similar location" under Section NR 217.13(2)(d). This provision, which addresses calculation of water quality-based effluent limits, states that "the representative upstream concentration shall be either a concentration derived by the Department based on data from the specific stream or from a similar location." The provision does not explain how WDNR will determine what is an appropriate "similar location" when data are not available from the specific stream. WDNR should be able to clarify the method in its guidance.

Reservation of Rights

EPA reserves the right to initiate a subsequent revision to the Wisconsin program under 40 C.F.R. § 123.62 if, among other things, a Wisconsin court strikes down or limits the State's authority to administer the NPDES program including, but not limited to, the legal authority on which our approval of the present revision is based. Moreover, EPA retains authority to review and object to specific proposed and draft permits in accordance with Section 402(d)(2) of the Clean Water Act, 33 U.S.C. § 1342(d)(2), for any of the grounds set forth in 40 C.F.R. § 123.44(c), even if Wisconsin developed the permit in accordance with State law or our Memorandum of Agreement, including any aspects of State law that EPA has approved as part of Wisconsin's NPDES program. EPA also retains authority to take action as appropriate under 40 C.F.R. §§ 123.63 and 123.64.

Nutrients, including phosphorus, are among the most significant remaining causes of water pollution in Wisconsin and the nation. EPA commends Wisconsin for being the first state in the Region to establish numeric water quality criteria for phosphorus in all of the State's surface waters. We also commend Wisconsin for the significant innovation in the watershed adaptive management section of Subchapter III.

If you have any questions about this approval or the Bad River Tribe's comments, please do not hesitate to contact me at (312) 886-3000.

Sincerely,

A handwritten signature in black ink, appearing to read "S Hedman". The signature is fluid and cursive, with a long horizontal stroke at the end.

Susan Hedman
Regional Administrator

Enclosures

cc: Kenneth Johnson, WDNR

Enclosure

Revision to the Wisconsin NPDES Program
for Effluent Standards and Limitations for Phosphorus

Wisconsin amended its Chapter NR 217 “Effluent Standards and Limitations for Phosphorus” by adding Subchapter III, NR ss. 217.10-217.19 “Water Quality-Based Effluent Limitations for Phosphorus” in 2010. Except for s. NR 217.19, the U.S. Environmental Protection Agency reviewed these regulations for consistency with 40 C.F.R. § 123.25(a). In addition, EPA reviewed the compliance schedule authorizing provisions in ss. NR 217.17 and 217.18 under section 303(c) of the Clean Water Act (CWA), 33 U.S.C. § 1313.

EPA review of NR 217, Subchapter III, Wisconsin Administrative Code

Wisconsin added the following provisions in Chapter NR 217, Subchapter III:

217.10	Applicability
217.11	Definitions
217.12	General
217.13	Calculation of water quality based effluent limitations for phosphorus
217.14	Expression of limitations
217.15	Determination of necessity for water quality based effluent limitations for phosphorus
217.16	Relationship of WQBELs and TMDL based limitations
217.17	Schedules of compliance
217.18	Watershed adaptive management option
217.19	Variations for stabilization ponds and lagoon systems

EPA addressed s. NR 217.19 and the compliance schedule authorizing provision in s. 217.17 on December 30, 2010 as part of its approval of the phosphorus water quality criteria. EPA approves ss. NR 217.10, 217.11, 217.12, 217.13, 217.14, 217.15, 217.16, 217.17, and 217.18 as discussed below. EPA is approving ss. NR 217.14(2) and 217.18 based, in part, on an addendum to the National Pollutant Discharge Elimination System (NPDES) Memorandum of Agreement (“MOA”) between the Wisconsin Department of Natural Resources (“WDNR” or “the Department”) and EPA concerning implementation of these provisions, as discussed below. Finally, EPA approves the compliance schedule authorizing provisions in s. NR 217.18(3) under CWA § 303(c) based on the fact that compliance schedules, including those established under s. NR 217.18(3), are subject to s. NR 217.17, 40 C.F.R. § 122.47, and the signed MOA Addendum.

Prior to this approval, EPA consulted with the Wisconsin tribes on the draft MOA and WDNR’s NPDES rules. On May 4, 2011, EPA issued its Policy on Consultation and Coordination with Indian Tribes. While EPA is in a transition period of determining when it is appropriate to consult under this Policy, and working with tribes as part of this process, EPA Region 5 decided in this instance to consult with tribes on its pending decision concerning

Wisconsin's NPDES rules for the new phosphorus water quality criteria, rather than wait until the process for implementing the policy is more developed. EPA participated in conference calls with the tribes and provided an opportunity for the tribes to comment. The tribes were overall supportive of the NPDES rules implementing the phosphorus water quality standards. The Bad River Band of Lake Superior Tribe of Chippewa Indians had comments which are included in the cover letter.

EPA Approval

1. s. NR 217.10 Wis. Adm. Code: Applicability. This section contains the applicability statement for Chapter NR 217, Subchapter III. It specifies that the Subchapter is applicable to four specified categories of point sources, including, but not limited to, publicly and privately owned wastewater facilities or treatment works. EPA asked WDNR to clarify that point sources not covered under s. NR 217.10 may still be subject to a requirement for a water quality-based effluent limitation (WQBEL) for phosphorus under Wis. Stat. section 283.13(5), which provides that WDNR shall establish more stringent effluent limitations if these limitations are necessary to meet applicable water quality standards, or any other state or federal law or regulations. WDNR added a footnote to clarify this point. Thus, this provision makes clear that other point sources may need phosphorus WQBELs in permits to meet the criteria in s. NR 102.06, even if they are not subject to Subchapter III, Chapter NR 217.

EPA approves s. NR 217.10 Wis. Adm. Code.

2. s. NR 217.11 Wis. Adm. Code: Definitions. This section contains definitions that apply solely for carrying out Subchapter III. WDNR added a definition of "new discharger" which, unlike EPA's definition of new discharger in 40 C.F.R. § 122.2, does not exclude new sources from the definition. However, the lack of an exclusion for new sources is not consequential given the narrow applicability of the term "new discharger" as well as its use in Subchapter III.

In addition, WDNR added a definition of "privately owned treatment works" to address EPA's concern that this term, as used in s. 217.10, could be interpreted to exclude commercial and industrial sources which discharge process wastewater. WDNR's definition makes clear that the term as used in Subchapter III includes industrial and commercial sources which discharge process wastewater.

EPA approves s. NR 217.11 Wis. Adm. Code.

3. s. NR 217.12 Wis. Adm. Code: General. This section contains the Department's authority to establish WQBELs for phosphorus. WDNR revised its proposed regulation to address EPA's comments that, to match the language in EPA's regulations at 40 C.F.R. § 122.44(d)(1)(i) and (ii), Wisconsin should revise ss. NR 217.12(1)(a), 217.15(1)(a) and 217.15(1)(c) to provide that WQBELs for phosphorus shall be included in a permit whenever

WDNR determines that the discharge from a point source contains phosphorus at concentrations which will cause, have a reasonable potential to cause, or contribute to an excursion above the phosphorus water quality criterion. WDNR did this. Section NR 217.12(a) states that the Department shall set WQBELs for discharges that will cause, have the reasonable potential to cause or contribute to an exceedance of the criteria in s. NR 102.06 in either the receiving water or downstream waters.

Regarding downstream waters, 40 C.F.R. § 122.4(d) prohibits issuance of permits when the imposition of conditions cannot ensure compliance with the applicable water quality requirements of all affected states.¹ Section NR 217.12(a) is not clear on its face that it means downstream waters in other states, as well as Wisconsin waters. However, Wisconsin has authority to take downstream impacts in affected states into account in calculating effluent limits. Wis. Stats. sections 283.31(3) and (5) provide WDNR authority for applying 40 C.F.R. § 122.4(d) if necessary to ensure compliance with water quality requirements of all affected states. Wisconsin has confirmed it has this authority. In a January 19, 2012 letter to WDNR, Wisconsin's Attorney General stated that in Wisconsin provisions allowing the Department to establish WQBELs necessary to protect downstream waters, "downstream waters" includes navigable waters of the U.S. that are protected by state and tribal water quality standards. EPA expects WDNR to take the potential for downstream impacts into account and retains the authority to object to a permit if the permit does not ensure compliance with applicable water quality requirements of affected states and tribes.

Based on the foregoing discussion, EPA approves s. NR 217.12 Wis. Adm. Code.

4. s. NR 217.13 Wis. Adm. Code: Calculation of water quality-based effluent limitations for phosphorus. This provision provides procedures for calculating a WQBEL for phosphorus for discharges to streams and rivers, inland lakes and reservoirs, and the Great Lakes. Several paragraphs are discussed below.

Section NR 217.13(4) provides that WDNR will establish WQBELs for discharges directly to the Great Lakes consistent with near shore or whole lake model results approved by WDNR. Sections NR 217.12 and 217.15 make clear that WDNR must determine whether a discharger will cause, have a reasonable potential to cause, or contribute to an excursion beyond the applicable phosphorus water quality criterion. These sections also make clear that WDNR is required to set a WQBEL when the Department determines that a discharge will cause, have the reasonable potential to cause, or contribute to an excursion above the phosphorus water quality criterion. Thus, Wisconsin is required by ss. 217.12 and 217.15 to identify a model with which it will calculate WQBELs for discharges into the Great Lakes, and actually establish such limits when required under ss. NR 217.12 and 217.15.

¹ 40 C.F.R. § 122.2 defines the term "state" to include Indian Tribes.

Section NR 217.13(8) provides that a new discharger will not be able to discharge phosphorus in a phosphorus impaired water unless, among other things, the discharge will “improve water quality in the phosphorus impaired segment.” In response to comments on this provision, WDNR said that “New dischargers could improve water quality in a receiving water in a number of ways. For example, a large effluent volume with a very low phosphorus concentration--well below the applicable criterion--would improve water quality. The department will make this determination on a case-by-case basis.” To show an “improvement” in water quality, EPA expects that the permittee will demonstrate that its discharge will result in a decrease in the phosphorus concentration or loading in the receiving water.

Section NR 217.13(8) also provides an exception for a new discharger if it can demonstrate that the new phosphorus load will be offset through a phosphorus trade. Section NR 217.17(3)(f) also addresses pollutant trading. EPA has developed guidance on pollutant trading that sets out necessary terms and conditions of a trade. See “The Water Quality Trading Policy” and “The Water Quality Trading Toolkit for Permit Writers” (2007, EPA-833-R-07-004, and <http://water.epa.gov/type/watersheds/trading/WQTToolkit.cfm>). Generally, EPA recommends that trade programs include several elements to ensure credibility and compliance with water quality standards. These elements include:

- Applying CWA regulations and established state law provisions to provide legal authority for administration of water quality trade programs.
- Clearly defining a common unit of trade.
- Generating credits before or during the same time period they are to be used to comply with permit limits.
- Including methods for managing uncertainty such as using trading ratios, modeling, and best management practice efficacy estimates.
- Ambient water quality monitoring, in addition to effluent monitoring requirements in NPDES permits. Samples should be collected at strategic locations to ensure progress in meeting water quality standards.
- Compliance and enforcement mechanisms, including a combination of record-keeping, certifications, inspections, and reporting.
- Provisions for adequate public notice through, for example, the TMDL and permit process and a public website.
- Trade programs should be evaluated in order to modify and make improvements to the program.

Sections 217.13(8) and 217.17(3)(f) do not include anything that is inconsistent with EPA’s trading policy. In particular, s. NR 217.13(8) says that the offset through a phosphorus trade must be implemented prior to the new discharge, and the note to s. NR 217.14 states that trades must be incorporated into the permit and approved by the Department prior to

implementation.² EPA understands that WDNR is currently working on promulgating trading provisions.

EPA approves s. NR 217.13 Wis. Adm. Code.

5. s. NR 217.14 Wis. Adm. Code: Expression of limitations. Section NR 217.14(1) requires that limits be expressed as a concentration, and as a mass limit for certain identified waters, including outstanding resource waters (ORWs) and exceptional resource waters (ERWs). WDNR may establish mass limitations in permits for any other discharges of phosphorus where an increase in phosphorus load is likely to result in adverse effects on water quality in the receiving water or downstream water. Under 40 C.F.R. §122.45(f) mass limits must be included in permits except when the applicable standard is expressed in other units of measurement. Here, the phosphorus water quality criteria in s. NR 102.06 are expressed in terms of concentration, so EPA's regulations do not mandate mass limitations. The Bad River Tribe, in its comments to EPA, asked for confirmation that WDNR will include a mass limit in permits for phosphorus discharges when the receiving water or downstream water is designated as an ERW or ORW by the Tribe. As noted earlier, Wisconsin concludes that its provisions allowing the Department to establish WQBELs necessary to protect downstream waters includes authority to protect waters protected by other state and tribal water quality standards. EPA asks WDNR to confirm in guidance or by letter to EPA that the Section 217.14(1) requirement concerning mass limits applies to receiving and downstream waters on tribal lands designated by a tribe as ORW or ERW. If the confirmation is included in guidance, please provide EPA a copy of the revised guidance.

Section NR 217.14(2) and (3) provides that the Department will express effluent limits as a monthly average in permits, except for concentrations of less than or equal to 0.3 milligrams per liter (mg/L) where limitations may be expressed as annual averages. The CWA section 402(c)(2) specifically requires NPDES permits to include all the conditions that are required under 40 C.F.R. § 122.45 (made applicable to state NPDES programs by 40 C.F.R. §123.25(a)(16)). Section § 122.45(d) provides that for continuous dischargers, all effluent limitations necessary to achieve water quality standards shall, unless impracticable, be stated as maximum daily and average monthly discharge limitations for all dischargers other than publicly-owned treatment works (POTWs) and average weekly and average monthly discharge limitations for POTWs.

Based on discussions with EPA, WDNR developed a Justification Paper for use of averaging periods for expression of WQBELs for phosphorus other than the averaging periods in 40 C.F.R. § 122.45(d). WDNR set out the basis for impracticability of weekly and daily limits,

² In approving Subchapter III, EPA's approval does not extend to the notes to s. NR 217.14 or to notes in any other section.

and also, when the phosphorus wasteload allocation (WLA) is 0.3 mg/L or less, that monthly limits may be impracticable. WDNR explains that its phosphorus criteria were developed based on correlations between median growing season phosphorus concentrations and biotic indices, and that this is consistent with EPA guidance for nutrient criteria development. WDNR evaluated several studies on the response of fresh waters to phosphorus. Further, WDNR relied on a March 3, 2004 memorandum from James Hanlon, Director of EPA's Office of Wastewater Management, "Annual Permit Limits for Nitrogen and Phosphorus for Permits Designed to Protect Chesapeake Bay and its Tidal Tributaries from Excess Nutrient Loading under the National Pollutant Discharge Elimination System." In this 2004 memorandum, EPA concluded that annual average limits were appropriate for nitrogen and phosphorus in the Chesapeake Bay and that it was impracticable in that case to express such limits as daily/weekly/monthly average values. WDNR noted that the EPA memo indicates that the nature of the water quality problem can be used to determine impracticability.

WDNR then relied on the information above to support its conclusion that due to the nature of phosphorus loadings and the manner in which its phosphorus water quality standards were derived, daily and weekly limits were impracticable. Further, that monthly limits may be impracticable when the WLA is 0.3 mg/L or less, as is recognized in Wisconsin s. NR 217.14(2). For rivers, streams, reservoirs and lakes with residence time of less than one year, where the WLA is 0.3 mg/L or less, the Justification Paper provides that WDNR may establish a monthly average or six-month average limit. When it sets a six-month average limit, the Justification Paper provides that WDNR will also set a monthly limit of 3 times the WLA. For lakes and reservoirs with a residence time of one year or more, where the WLA is 0.3 mg/L or less, the Justification Paper provides that WDNR may establish a six-month average or annual average limit along with a monthly limit of 3 times the WLA. WDNR signed an addendum to the EPA-WDNR NPDES MOA confirming that WDNR will implement 217.14(2) in this manner. EPA expects the State will have to modify its Enforcement Management System to describe the way in which it will manage seasonal and annual average phosphorus limits in its compliance evaluation and enforcement program.

EPA approves s. NR 217.14 Wis. Adm. Code.

6. s. NR 217.15 Wis. Adm. Code: Determination of necessity for water quality-based effluent limitations for phosphorus. This section requires WDNR to determine when WQBELs are required for phosphorus. Sections 301 and 402 of the CWA require NPDES permits to include effluent limitations as needed for discharges to meet water quality standards. The regulation at 40 C.F.R. § 122.44(d) requires the permit-issuing agency to: (1) determine whether point source discharges will cause, have a reasonable potential to cause, or contribute to an excursion beyond applicable water quality criteria; and (2) when the agency makes an affirmative determination, set WQBELs that are derived from and comply with water quality standards. Section NR 217.15 requires a WQBEL where the Department makes an affirmative

determination on reasonable potential. It establishes procedures for the Department to make this determination.

In response to a comment from EPA to address the situation where phosphorus data are not available, WDNR revised its rule to provide that where phosphorus data are not available, it may require phosphorus sampling as part of a permit application or use effluent data from similar point sources to make a determination as to whether the point source discharge will cause, have a reasonable potential to cause, or contribute to an excursion beyond the phosphorus water quality criterion. This addressed the concern raised by EPA on the proposed rule.

EPA approves s. NR 217.15 Wis. Adm. Code.

7. s. NR 217.16 Wis. Adm. Code: Relationship of WQBELs and TMDL based limitations. Section NR 217.16 provides WDNR authority to establish a WQBEL consistent with the waste load allocation and assumptions of an EPA approved TMDL that is designed to achieve water quality standards for the waterbody. EPA expects that a limit based on a TMDL will be derived from, and comply with, the applicable phosphorus criteria in NR 102 Wis. Adm. Code in order to be in conformance with 40 C.F.R. § 122.44(d)(1)(vii)(A). Additionally, pursuant to s. NR 217.16(4) if the WQBEL based on an approved TMDL is more stringent than the WQBEL calculated under s. NR 217.13, the Department must include the more stringent TMDL based limitation in the permit. Thus, Wisconsin has the authority to issue permits consistent with the assumptions and requirements of a TMDL's wasteload allocation and is required to do so by s. NR 217.16(4).

EPA expressed a concern that the proposed rule at NR 217.16(3) appeared to allow the state to modify or reissue the permit to include a less stringent limit based on an approved TMDL. WDNR revised its rule to clarify that if a phosphorus WQBEL calculated under s. NR 217.13 has already taken effect in a permit, the Department may replace the limit with a less stringent TMDL-based limit only if allowed pursuant to antidegradation procedures in ch. NR 207. In a July 2011 letter, EPA told WDNR that Wisconsin's NPDES program does not have a provision that conforms to 40 C.F.R. § 122.44(l) (antibacksliding). This regulation is applicable to states under 40 C.F.R. § 123.25(a)(15). In an October 2011 reply letter, WDNR said that it will amend the Wisconsin Administrative Code or seek a statutory amendment to establish antibacksliding provisions for the Wisconsin NPDES program. Until Wisconsin establishes antibacksliding provisions, the Department cannot replace a limit calculated under s. NR 217.13 with a less stringent TMDL-based limit unless the replacement conforms to 40 C.F.R. § 122.44(l). EPA retains its authority to review and object to a permit that contains a limit which is less stringent than contained in the prior permit.³

³ EPA's approval does not extend to the note inserted at the end of s. NR 217.16(3).

Section NR 217.16 (2) provides that WDNR may include a schedule of compliance to achieve a TMDL-based limit, if the department determines a schedule of compliance is necessary. All of the compliance schedule provisions set out in s. NR 217.17, including the required findings that a schedule of compliance will lead to compliance with the WQBEL as soon as possible and that a compliance schedule is appropriate and necessary, apply to any compliance schedule developed under s. NR 217.16. EPA retains its authority to review and object to a permit if it contains a compliance schedule that is not in conformance with 40 C.F.R. § 122.47.

Based on the foregoing discussion, EPA approves s. NR 217.16 Wis. Adm. Code.

8. s. 217.17 Wis. Adm. Code: Schedules of compliance. This section sets out the conditions under which WDNR may provide a schedule of compliance for a WQBEL, and the criteria for WDNR making a determination as to whether a compliance schedule is appropriate. It also provides the terms and conditions for schedules of compliance. EPA reviewed this provision, within the context of current Wisconsin law, for consistency with the CWA section 502(17) and 40 C.F.R. § 122.47. Section 502(17) defines a schedule of compliance as “a schedule of remedial measures including an enforceable sequence of actions or operations leading to compliance with an effluent limitation, other limitation, prohibition, or standard.” Wisconsin defines the term using identical language. *See* Wis. Stat. section 283.01(15) and s. NR 205.03(32) Wis. Adm. Code. Under 40 C.F.R. § 122.47, permits can include compliance schedules when appropriate, and must require compliance with the WQBEL as soon as possible. In granting a compliance schedule in a permit, WDNR must make a finding, supported by the administrative record and described in the fact sheet that a compliance schedule is appropriate and that the discharger cannot immediately comply with the WQBEL upon the effective date of the permit. Such finding should set out the basis for its determination that a compliance schedule is appropriate and that the discharger cannot immediately comply with the WQBEL. WDNR should not presume that a compliance schedule be based on the maximum time period allowed in s. NR 217.17(2). The permittee must establish the need for a compliance schedule and for how much time is necessary to achieve compliance. Where such schedules exceed one year, permits must set forth interim requirements and the dates for achievement of the interim requirements. 40 CFR § 122.47(a)(3).

Wis. Stats. section 283.01(15) and ss. NR 205.03(32) and 217.17 Wis. Adm. Code include provisions that conform to the CWA section 502(17) and 40 C.F.R. § 122.47. If a NPDES permit is issued with a compliance schedule that extends past the expiration date of a permit, then the permit must include the final effluent limitations and any interim or final requirements that apply after permit expiration must be enforceable. Interim and final requirements must be expressed in terms of actions or operations leading to compliance with the WQBEL. To the extent WDNR writes guidance implementing s. NR 217.17, WDNR should

ensure such guidance conforms to Wis. Stats. section 283.01(15), ss. NR 205.03(32) and 217.17, and 40 C.F.R. § 122.47.

Section NR 217.17(3)(f) provides that if a permittee chooses to use pollutant trading to achieve compliance with a WQBEL, then the terms and conditions related to the trade shall be incorporated into the permit. This section seems misplaced in s. NR 217.17. As previously noted, this provision does not contain any statements inconsistent with EPA's "Water Quality Trading Policy" (2003). Pollutant trading is allowed to meet a WQBEL. However, the details of the trade must be established prior to permit issuance and incorporated into the permit. If a permittee engages in pollutant trading to comply with a limit, it is not appropriate to allow a compliance schedule to give a discharger time to establish the terms of a trade. Trades must be established at the time of permit issuance or modification.

Based on the foregoing discussion, EPA approves s. NR 217.17 Wis. Adm. Code.

9. s. NR 217.18 Wis. Adm. Code: Watershed adaptive management option. Section NR 217.18 provides an option for permittees to request the issuance of an Adaptive Management NPDES permit as a means to achieve compliance with the water quality standard for the waterbody and the WQBEL. This option is based on the permittee implementing point source and nonpoint source net watershed-scale pollutant reductions that will result in certain Wisconsin waters achieving phosphorus water quality standards in s. NR 102.06 Wis. Adm. Code.

There are several key provisions to this option. Section NR 217.18(3)(e)(1) requires that the permit contain a final and enforceable WQBEL. Section NR 217.18(2)(d) requires the permittee to submit an adaptive management plan with the application for permit re-issuance, with said plan identifying specific actions to achieve the applicable phosphorus criteria through verifiable reductions of phosphorus from point and nonpoint sources. Such adaptive management actions with goals and measures must be included in the permit (s. NR 217.18(3)(b)) and the permit must include a statement that failure to implement any of the terms and conditions established under s. NR 217.18(3) is a violation of the permit. EPA will be reviewing permits issued under this option carefully.

Given that nonpoint sources may be significant contributors of phosphorus in surface water, the adaptive management approach with its focus on reducing nonpoint sources as well as point source loadings to meet the water quality criteria may be a workable solution for phosphorus pollution. This approach could result in achieving the phosphorus water quality criteria for the waterbody where the more traditional approach of relying solely on the permittee meeting its WQBEL may not.

EPA is approving s. NR 217.18 based on WDNR signing an addendum to the MOA with EPA, on April 30, 2012, agreeing to implement this provision in a manner that conforms to 40 C.F.R. §§ 122.44(d), 122.44(l), 122.47, and 122.62. More specifically, the initial permit issued

and all reissued or modified permits under the adaptive management provision will include the final WQBEL and identify the subset of adaptive management actions that offset the mass of phosphorus which corresponds to the difference between the interim effluent limitation and the WQBEL. Secondly, the initial adaptive management permits will include a complete compliance schedule that sets out all the actions in the approved adaptive management plan to achieve the phosphorus water quality criterion. The schedule can contain the interim effluent limitations, and must identify adaptive management actions that will result in verifiable pollution reductions that equate to the increment between the interim limit and the WQBEL. For all compliance schedules, WDNR needs to meet the requirements in Wis. Stats. section 283.01(15) and ss. 205.03(32) and NR 217.17 Wis. Adm. Code. In particular the record should support a determination that a compliance schedule is appropriate and necessary and will lead to compliance with the WQBEL and water quality standard as soon as possible.

**Addendum to the
National Pollutant Discharge Elimination System
Memorandum of Agreement between the
U.S. Environmental Protection Agency, Region 5
and the
Wisconsin Department of Natural Resources**

The U.S. Environmental Protection Agency (EPA), Region 5, and the Wisconsin Department of Natural Resources (WDNR) enter into this Addendum to their National Pollutant Discharge Elimination System (NPDES) Memorandum of Agreement to ensure that Wisconsin permits which implement ss. NR 217.14(2) and 217.18 *Wisconsin Administrative Code (Wis. Adm. Code)*, and the fact sheets that accompany such permits, are prepared in conformance with all NPDES requirements including 40 C.F.R. §§ 122.44(d), 122.45(d), 122.47, 124.8, and 124.56. EPA retains its authority to review and object to specific proposed and draft permits in accordance with Section 402(d)(2) of the Clean Water Act, 33 U.S.C. § 1342(d)(2), for any of the grounds set forth in 40 C.F.R. § 123.44(c).

I. Section NR 217.14(2) *Wis. Adm. Code* provides that: (a) concentration effluent limitations calculated under s. NR 217.13 shall be expressed as a monthly average in permits, except for concentrations of less than or equal to 0.3 milligrams per liter (mg/L) where limitations may be expressed as annual averages; and (b) if a concentration limitation expressed as an annual average is included in a permit, a monthly average concentration limitation equal to three times the water quality based effluent limitation calculated under s. NR 217.13 shall also be included in the permit. For continuous discharges, 40 C.F.R. § 122.45(d) provides that effluent limitations shall, unless impracticable, be expressed as average weekly and average monthly limitations for publicly-owned treatment works (POTWs) and maximum daily and average monthly limitations for other than POTWs. 40 C.F.R. § 122.44(d)(1)(vii) provides that water quality-based effluent limitations (WQBELs) shall be derived from, and comply with, water quality standards and shall be consistent with the assumptions and requirements of any wasteload allocation (WLA) approved by EPA under 40 C.F.R. § 130.7.

A. For the reasons explained in the attached April 30, 2012, paper entitled *Justification for Use of Monthly, Growing Season and Annual Averaging Periods for Expression of NPDES Permits Limits for Phosphorus Discharges in Wisconsin* (Justification Paper), EPA and WDNR agree that it is impracticable to express phosphorus WQBELs as maximum daily or average weekly values and, when the magnitude of the limit calculated in accordance with s. NR 217.13 *Wis. Adm. Code* is 0.3 mg/L or less, EPA and WDNR agree that it may be impracticable to express phosphorus WQBELs as average monthly values.

B. When the magnitude of the limit calculated in accordance with s. NR 217.13 *Wis. Adm. Code* is 0.3 mg/L or less, WDNR agrees to express the WQBEL over an applicable duration provided in the table on the first page of the Justification Paper provided, however, that the duration shall be consistent with the assumptions and requirements of any applicable EPA-approved WLA. In the atypical or uncommon situations contemplated in the Justification Paper, (e.g. discharges to small inland lakes) on a case-by-case basis WDNR may express a WQBEL over a duration other than a monthly average provided that the fact sheet for the draft permit sets

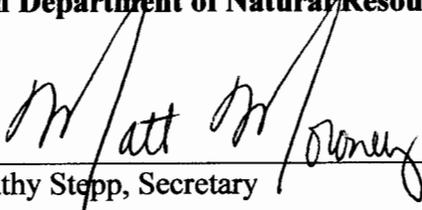
forth the facts which justify conclusions that: (1) it is impracticable to set the limit as a monthly average and (2) the draft limit was derived from and complies with the applicable phosphorus water quality criterion and is consistent with the assumptions and requirements of any applicable EPA-approved WLA.

II. Section NR 217.18(3) *Wis. Adm. Code* provides minimum terms and conditions for permits that include watershed adaptive management actions.

A. To conform to 40 C.F.R. § 122.44(d), WDNR agrees that the initial and any subsequent reissued, modified, or revoked and reissued permit issued to each point source under s. NR 217.18(3) will include the final water quality-based effluent limitation and identify the subset of adaptive management actions that offset the mass of phosphorus which corresponds to the difference between the interim effluent limitation under s. NR 217.18(3)(e) 2. or 3., as the case may be, and the water quality-based effluent limitation.

B. To conform to 40 C.F.R. § 122.47, WDNR agrees that the initial permit issued to each point source under s. NR 217.18(3) will include the s. NR 217.18(3)(b) and (e) 2., 3., and 4. compliance schedule in its entirety. 40 C.F.R. § 122.62(a) and (b) identify the causes for permit modification or revocation and reissuance, respectively. 40 C.F.R. § 122.44(l)(1) provides that interim effluent limitations, standards or conditions in a reissued permit must be at least as stringent as the previous permit unless the circumstances have changed and would constitute cause for permit modification or revocation and reissuance. Subject to 40 C.F.R. §§ 122.62, 122.44(l)(1), and s. 283.53 (2), Wis. Stats., as applicable, WDNR agrees that any reissued, modified, or revoked and reissued permit will include a continuation of the compliance schedule to meet the requirements established in the initial permit.

Wisconsin Department of Natural Resources

By: 
Cathy Stepp, Secretary

Date: 4/30/12

U.S. Environmental Protection Agency, Region 5

By: 
Susan Hedman, Regional Administrator

Date: July 12, 2012

**Justification for
 Use of Monthly, Growing Season and Annual Averaging Periods
 for Expression of WPDES Permit Limits for Phosphorus in Wisconsin**

Averaging Periods by Receiving Waterbody Type and Range of WQBEL Concentrations		
WQBEL	Rivers, streams, impoundments and lakes/reservoirs with average water residence times of less than one year	Lakes with average water residence times of greater than or equal to one year
Greater than 0.3 mg/L	Monthly average	Monthly average
Less than or equal to 0.3 mg/L	Monthly* or six month average (May 1 to October 31 and November 1 to April 30). When the WQBEL as a six-month average is included in the permit, a monthly average limit of 3 times the calculated concentration limit in ss. NR 217.13 and NR 217.14, shall also be included in the permit.	Monthly* or six month average (May 1 to October 31 and November 1 to April 30) or annual average. When the WQBEL as a six-month average or annual average is included in the permit, a monthly average limit of 3 times the calculated concentration limit in ss. NR 217.13 and NR 217.14, shall also be included in the permit.
For approved TMDLs, the expression of limits must be consistent with the assumptions and requirements of the TMDL, but not greater than the periods expressed above.		
* Atypical or uncommon situations will be addressed on a case-by-case basis. These include discharges to small inland lakes with water residence times of less than one year where it is possible that a six month averaging period may not be appropriate and a monthly average limit calculated under ss. NR 217.13 and NR 217.14 may instead be necessary.		

Pertinent Federal Regulation

Section 40 CFR 122.45 (d) of Federal Regulations, requires NPDES permits, including delegated state permits, to express water quality based effluent limits for continuous dischargers, including those for phosphorus, as average weekly and average monthly limitations for POTWs and maximum daily and average monthly limitations for other than POTWs, unless impracticable. Federal regulations do not describe criteria for determining when limits are impracticable, nor does EPA provide guidance on how to make a determination of impracticability.

EPA has made a finding for Chesapeake Bay that impracticability can be based on the nature of the water quality problems. For Chesapeake Bay, EPA determined that daily maximum, weekly average and monthly average effluent limits are impracticable due to the nature of nutrient related water quality problems in the bay. In making this determination, EPA concluded that annual averaging periods were practicable for Chesapeake Bay. This does not automatically infer that annual averaging periods are practicable elsewhere. It merely states that the nature of the water quality problem can be used to determine impracticability.

Principles

- Averaging periods should be consistent with the technical analysis and rationale supporting the adopted phosphorus water quality standards criteria. The Wisconsin phosphorus criteria were developed based on correlations between median growing season phosphorus concentrations and biotic indices.
- Averaging periods should be consistent with EPA guidance for nutrient criteria development.
- The averaging period must take into account critical conditions in the receiving water or downstream water.
- Averaging periods should be compatible with tools, such as models, used to manage the lake, reservoir, stream or river.
- Shorter averaging periods should be used where the frequency, duration or magnitude of the difference between the limit and water quality standards criterion is greater. Longer averaging periods may be used where the difference is less, especially as the discharge limit is the same as the water quality criterion.

Technical Justification

A. Streams and Rivers

Conclusions:

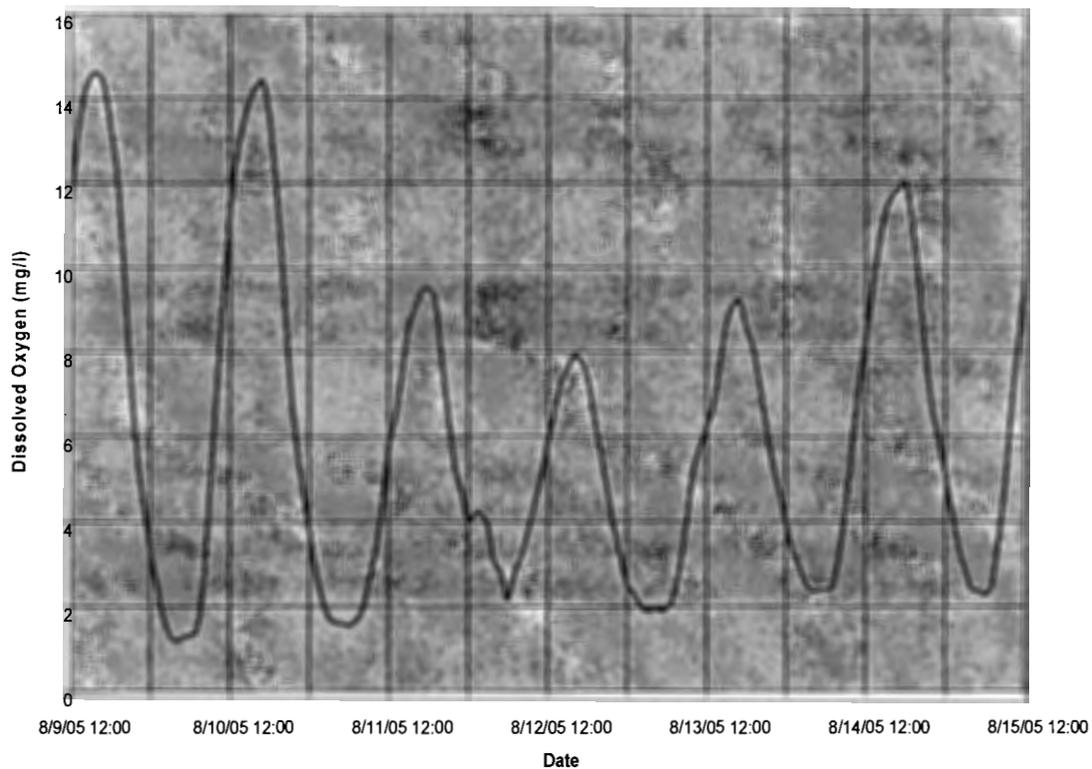
1. It is impracticable to establish maximum daily and average weekly phosphorus limits under 40 CFR 122.45(d) due to the way waterbodies respond to phosphorus loading and due to the manner in which phosphorus water quality standards criteria for Wisconsin were derived.
2. Due to the manner in which the Wisconsin phosphorus criteria were derived, it may be impracticable to establish average monthly limits under 40 CFR 122.45(d) when the magnitude of the calculated water quality based effluent limit is 0.3 mg/L or less.
3. Based on available literature and the judgment of national experts, EPA criteria development guidance clearly calls for states to use seasonal or annual mean or median values in development of nutrient criteria.
4. Wisconsin's wadeable streams exhibit conditions similar to those described in EPA guidance.
5. Wisconsin's approved criteria for both wadeable streams and nonwadeable rivers were derived using correlations between growing season median phosphorus concentrations and community biotic indicators.
6. Although nonwadeable streams exhibit higher concentrations of suspended algae and suspended algae may be more responsive to changes in phosphorus concentrations, acute conditions, such as low dissolved oxygen concentrations, are not exhibited.
7. If averaging periods for WPDES permits should reflect methods and data used to develop phosphorus criteria, generally a growing season averaging period is warranted.
8. Since the risk of impact increases with nutrient concentrations (as well as frequency and duration), it is prudent that permits with higher concentration limits should have shorter averaging periods. Similarly, discharges with lower limits that are set at the water quality criterion concentration could have longer averaging periods taking the background concentration and available dilution into account.

EPA Guidance

EPA's "Nutrient Criteria Technical Guidance Manual: Rivers and Streams" (EPA, July 2000) based on the knowledge and experience of many experts and reviews of the scientific literature, makes numerous references and suggestions to use of seasonal or annual mean or median values in deriving nutrient criteria. For example, in Chapter 6 of the guidance manual, explicitly identifies use of annual mean nutrient concentrations in developing relationships with the 75th percentile of mean algal biomass (page 60). EPA cites work by Biggs (1995 and 2000) as justification for use of this approach and the use of the annual mean values. Also, EPA guidance suggests water quality sampling procedures and data analysis approaches based on seasonal monitoring.

For macrophyte dominated streams the EPA guidance and scientific literature infer that seasonal or even annual analyses may be appropriate. In section 3.3, EPA discusses impacts of large diurnal dissolved oxygen fluctuations due to photosynthesis/respiration by dense macrophyte masses. Later in the guidance EPA describes rooted macrophytes taking up phosphorus from interstitial waters of bottom sediments; largely uncoupling macrophyte growth with short-term fluctuations of phosphorus concentrations in water columns. Mace et. al, Wisconsin DNR researchers, found a high correlation between late-summer biomass and mean summer phosphorus concentrations in macrophyte dominated streams (WDNR 1984).

Turtle Creek at Pounder Rd. , Walworth Co. – Dissolved Oxygen in Low Flow Conditions



The methods and processes used by benthic algae to take up phosphorus vary with the type of benthic algae. Filamentous algae with greater exposure to the water column may be more responsive to short-term changes in phosphorus concentrations than the more prostrate forms. Regardless of the type or processes for uptake, the primary impact relates to the mass of the accumulated algae and the factors of scour and grazing relate to time and rate of accrual (growth minus scour and grazing). High flow velocities associated with rainfall scour benthic algae and reduce the accumulated biomass.

Biggs (2000) empirically expresses the mean monthly biomass as a function of the days of accrual and the nutrient supply. This, of course, takes a very complex set of interactions involving a number of factors, including light, temperature, periodic sloughing losses, grazing by invertebrates and fish, and presents a simplified relationship. Specifically, Biggs' relationship is as follows:

$$B^* = k_1 d_a + k_2 n + c,$$

Where:

B^* is the mean monthly biomass of benthic algae;

d_a is days available for biomass accrual;

n is a measure of nutrient supply;

k_1 and k_2 are coefficients; and

c is a constant.

A consequence of the Biggs relationship is that to achieve the same biomass, streams with lower concentrations of nutrients will have a shorter accrual period of time and vice versa. Biggs concludes that the frequency of high biomass events sufficient to create eutrophic conditions (200 mg/m^2) increases greatly when the days of accrual exceed 50 days. Again, the number of days varies with the nutrient concentration. Biggs' conclusions were based on unshaded streams. Streams with partial shading will have a longer number of accrual days. Biggs also did his research on streams with gravel or cobble substrata. His model will overestimate benthic algae mass for streams with silt or sand substrata. Thus, longer accrual periods may be pertinent to streams with silty or sandy substrata.

Wisconsin Situation and Phosphorus Criteria Development

The waterbody types and common nutrient related situations for Wisconsin rivers and streams are summarized on the attached table. Wisconsin wadeable streams with high phosphorus concentrations – at least those not shaded or very turbid – tend to exhibit a

phosphorus response similar to the conditions and assumptions contained in EPA's technical guidance. That is, they tend to exhibit a nutrient response as rooted macrophytes, benthic algae or a mix of the two. Generally light will penetrate through much of the water column or even to the bed of the stream to provide conditions suitable for rooted macrophyte or benthic algae growth. Relatively few of Wisconsin's wadeable streams have high suspended algae concentrations.

This situation is best documented by the study of more than 240 Wisconsin streams used to develop nutrient criteria, "Nutrient Concentrations and Their Relations to Biotic Integrity of Wadeable Streams in Wisconsin" (USGS Professional Paper 1722). Appendix 2 of this report shows the extent of benthic algae and rooted macrophyte growth in the study streams. Not unexpectedly, this study also found relatively low suspended chlorophyll a concentrations. The median growing season suspended chlorophyll-a concentrations were 1.0 to 1.7 ug/L and the upper 95-percent confidence limit were 1.6 to 2.2 ug/L, depending on the phosphorus zone within the state. (USGS Professional Paper 1722, Table 22). Only nine of 240 wadeable streams had chlorophyll a concentrations exceeding 10 ug/L, and of those nine, two had sample sites immediately downstream of eutrophic impoundments and one is more appropriately considered as a non-wadeable stream.

Given the recommendations contained in EPA's guidance and a review of the available response information, the Wisconsin phosphorus criteria were developed based on correlations between median growing season phosphorus concentrations and biotic indices. The statistical analysis of the nutrient concentrations and their correlation with selected biotic indices is discussed at great length in the USGS Professional Paper 1722.

The companion study of 42 sites on Wisconsin non-wadeable streams and rivers found greater concentrations of suspended algae and a strong correlation between the median growing season total phosphorus and suspended chlorophyll-a concentrations. For much of these rivers, the water depth is great enough to prevent sufficient light penetration to the bed of the river and benthic algae samples were not taken. Eighteen of these 42 sites had suspended chlorophyll-a concentrations of greater than 10 ug/L. Of these 18 sites, 11 had median concentrations of more than 20 ug/L. While these higher algae concentrations may raise a concern, in these larger river systems we tend not to see the minimum dissolved oxygen concentrations that tend to be seen in wadeable streams. For example, diurnal swings in smaller streams may have a minimum dissolved concentration of 2 mg/L as shown for Turtle Creek in the figure below. For rivers, it is believed that the minimum dissolved oxygen concentrations tend to be 4 mg/L or higher, similar to what was found in Minnesota. In a study of 34 rivers, MPCA found only one site where the minimum diurnal concentration of dissolved oxygen fell below 4.0 mg/L (Figure 10, MPCA 2010).

B. Lakes and Reservoirs

Conclusions:

1. It is impracticable to establish maximum daily and average weekly phosphorus limits under 40 CFR 122.45(d) due to the way waterbodies respond to phosphorus loading and due to the manner in which phosphorus water quality standards criteria for Wisconsin were derived.
2. Due to the manner in which the Wisconsin phosphorus criteria were derived, it may be impracticable to establish average monthly limits under 40 CFR 122.45(d) when the magnitude of the calculated water quality based effluent limit is 0.3 mg/L or less.
3. Based on available literature and the judgment of national experts, EPA criteria development guidance clearly calls for states to use seasonal mean concentrations to assess in-lake conditions.
4. Some measure of water residence time, water retention time, flushing rate or some similar factor are used in all or nearly all lake models used in Wisconsin and those described in EPA guidance to relate phosphorus loading to in-lake conditions.
5. For lakes with long water residence times, the impact of phosphorus loads from the entire year will be exhibited in the growing season.
6. Wisconsin's approved criteria were derived using correlations between growing season mean phosphorus concentrations and a variety of growing season response indicators.

EPA Guidance

Chapters 5, 6 and 7 of EPA's "Nutrient Criteria Technical Guidance Manual: Lake and Reservoirs" (EPA, 2000) clearly suggests to states that in-lake response conditions should be assessed using mean seasonal concentrations. Generally, this is viewed as a "growing" season and in northern states, such as Wisconsin, the growing season of May through September is typically used.

As described in Chapter 9 of EPA's guidance, various models may be used to quantitatively relate the timing and amount of phosphorus loading to in-lake conditions. Many, if not all, use some measure of water residence time, flushing rate or similar parameter to account for mixing of phosphorus inputs within the lake, and, more importantly, settling of phosphorus. That is, the longer the residence time, the less variability of in-lake responses to phosphorus loadings and the greater the settling of phosphorus within the lake. For deeper, seasonal stratified lakes, the in-lake response

relates to annual or multi-year loadings. At the other extreme, conditions within lakes or reservoirs with short residence times may relate to seasonal loadings. For example, early spring loadings may flush through a reservoir with a relatively short residence time and have relatively limited impact on growing season in-lake response conditions.

Wisconsin Situation

Wisconsin's phosphorus criteria for lakes are based primarily on:

- Minimizing nuisance (less than 5% risk) and severe nuisance (less than 1% risk) algal conditions;
- Minimizing the shift of aquatic plant communities in shallow lakes from macrophyte dominated to algae dominated;
- Maintaining balanced fish communities.

In addition, there is a stated intent to prevent harmful aquatic bloom conditions. However, this was a lack of quantitative information to derive numerical criteria.

Critical Condition. Generally, the mid-growing season, July and August, is considered the critical period for nuisance algae conditions in most Wisconsin lakes and reservoirs. The presence of phosphorus, warm water temperatures and abundant light combine to favor the mid-to-late growing season as the critical period. This doesn't mean that discharges prior to or after this critical condition are unimportant. On the contrary, there is a lag time between the time phosphorus reaches the lake or reservoir and when the nuisance conditions are exhibited. For lakes with very long water residence times, such as more than one year, there is substantial mixing within the lake water column resulting in relatively little difference in response between phosphorus loads entering the lake in January versus those entering in June. For lakes with short residence times, the time of the year may be very important. Some form of water residence time or lake flushing rate is an important factor in nearly all lake models used in Wisconsin.

Technical Basis. Wisconsin's phosphorus water quality standards criteria for all lake types were developed using the mean or average condition is the growing season. Water quality samples are routinely collected in June through September or June or June through August depending on the parameter. The sample results are averaged over the growing season and, where possible, averaged over a number of growing seasons. Thus, both the basis for the criteria and routine use of tools for management programs base conditions on what responses will likely occur for given phosphorus conditions, but not the statistical outlier condition that is likely to occur very infrequently.

References

“Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs”, EPA, April 2000.

“Nutrient Criteria Technical Guidance Manual: Rivers and Streams”, EPA, July 2000.

Robertson et. al. “Nutrient Concentrations and Their Relations to the Biotic Integrity of Wadeable Streams in Wisconsin”, USGS Professional Paper 1722, 2006

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“Impacts of Phosphorus on Streams”, WDNR, April 1984.

Biggs, Barry, J. F., “Eutrophication of Streams and Rivers: Dissolved Nutrient-Chlorophyll Relationships for Benthic Algae”, Journal of North American Benthological Society, 2000.

Heiskary et. al., “Minnesota River Nutrient Criteria Development”, Minnesota Pollution Control Agency, November 2010.

Summary of Waterbody Types, primary nutrient related impacts, extent found in Wisconsin and comments related to averaging period.

Waterbody Type	Primary concerns	Extent in Wisconsin	Comments Related to Averaging Period
Streams and Rivers ¹			
Stream – rooted macrophyte dominated	Low diurnal dissolved oxygen levels (e.g. 2 mg/L) near dawn in mid summer (generally non-lethal) habitat degradation due to sediment capture	Very common; may be most common situation in wadeable streams Focus of Wisconsin DNR study report “Impacts of Phosphorus on Streams”, 1984	Since rooted macrophytes receive phosphorus from interstitial waters of bottom sediments, not responsive to short-term fluctuations in water column phosphorus Growing season means or medians generally used to assess rooted macrophyte dominated streams
Stream – benthic algae, including filamentous algae and attached algae	Low diurnal dissolved oxygen in mid summer; loss of habitat for certain aquatic insects; loss of visibility for sight-feeding fish	Common throughout state Focus of Wisconsin DNR study report “Impacts of Phosphorus on Streams”, 1984	Subject to scour during periods of high velocities; periods of accrual before critical conditions occur; Biggs (2000) suggests 50 day accrual period. Growing season means of median generally used to assess
Stream – floating macrophytes (duckweed)	Floating algae restricts surface water re-aeration	Found, but uncommon in wadeable streams	Not well understood; no accepted sampling protocol

¹ Many Wisconsin wadeable streams do not exhibit responses to phosphorus due to shading from trees or grasses or due to lack of light penetration due to turbid conditions. Downstream waters, however, may exhibit responses to phosphorus.