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ARKANSAS public policy panel

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March 17, 2017

Katherine McWilliams
Office of Water Quality
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118

RE: Draft No-Discharge Permit Number 5264-W; AFIN 51-00164

Dear Ms. McWilliams:

Thank you for the opportunity to comment on Draft Permit number 5264-W (Draft Permit), for the storage and land application of liquid waste from C&H Hog Farms, Inc.

The Arkansas Public Policy Panel (Panel) is opposed to the issuance of the Draft Permit in the Buffalo National River watershed. The Draft Permit does not adequately take into consideration, address and mitigate the environmental, economic and public health risks a large concentrated animal feeding operation (CAFO) presents when located in the Buffalo National River Watershed and therefore should not be issued. The Panel understands that additional conditions have been placed on the permittee but does not find those conditions sufficient to mitigate the impacts and risks of a CAFO sited in the karst ecosystem of the Buffalo National River.

The Buffalo National River is a state and national treasure that provides economic, ecological and public health benefits. The unique geology that makes the Buffalo National River so spectacular and adored also makes the siting of a CAFO in the Watershed an inherit threat to the water quality. The Buffalo National River Watershed is not a responsible location for a CAFO. The Draft Permit does not mitigate potential threats to the Watershed to warrant being issued. A permanent moratorium on CAFO facilities in the Buffalo National River Watershed should be established.

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Comment 4: During the Arkansas Pollution Control and Ecology Commission third party rulemaking process on Regulations 5 and 6 initiated by the Panel and Ozark Society, the Panel along with the Ozark Society submitted thorough comments in regards to the environmental, public health, and economic risks associated with swine CAFOs in general and specific risks of siting CAFOs in karst terrain. The issues and concerns raised in those comments are relevant to this draft permit; I have attached them and request they be incorporated into this record.

Sincerely,

Anna Weeks
Environmental Policy Associate

Attachments (5)

[1] Agricultural Waste Management Field Handbook. Chapter 7 "Geologic and Groundwater Considerations" 651.0702 Engineering Geology Considerations in Planning, Part 1 Topography.

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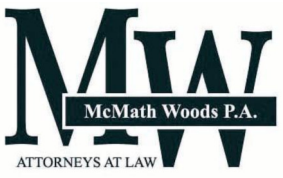

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VIA EMAIL ONLY

July 1, 2014

Dough Szenher
Arkansas Department of Environmental Quality
5301 Northshore Dr.
North Little Rock, AR 72118

Re: Public Comment-Reg. 5 and Reg. 6 Rulemakings

Mr. Szenher:

Thank you for accepting this comment in regards to APCEC rulemaking dockets 14-002-R and 14-003-R. I support both rulemakings. Large, concentrated, swine operations create a variety of public health risks. Many people in the Buffalo's watershed rely on groundwater, which is susceptible to surface pollutants, for drinking water supplies. Land applying hog waste in a watershed used for primary contact recreation, such as swimming, boating, and fishing, increases the public's exposure to water borne pathogens. Storing hog waste in lagoons near people's homes results in harmful exposure to airborne contaminants and creates a threat of a catastrophic release of waste. Limiting the size and location of medium and large swine operations benefits public and environmental health.

Drinking Water Supplies

The Buffalo River Watershed is home to many rural communities which rely on groundwater for their drinking water supplies. Large animal agricultural operations produce pathogens and other pollutants which reach surface and groundwater. [1] Case studies show that problems with CAFO pollution are exacerbated when, like the Buffalo River's watershed, karst topography is present. Researches in Wisconsin found that CAFOs above karst topography result in increased nitrate and bacterial counts in drinking water wells. [2] Nitrates and bacteria are both harmful pollutants which negatively impact drinking water wells in a region where residents may have few or no alternatives to their private wells. Limiting the size of swine operations in the Buffalo's watershed will protect drinking water supplies.

[1] EPA, *Detecting and mitigating the environmental impact of fecal pathogens originating from confined animal feeding operations*, 2005.
[2] Erb, K, and Stieglitz, R., *Final Report of the Northeast Wisconsin Karst Task Force*, 2007.

Noxious Air Emissions and Large Swine Operations

Large swine operations emit particulate matter in the form of dust, and noxious gases as a result of the decomposition of swine wastes. Air pollutants produced by such operations include ammonia, volatile organic compounds, and hydrogen sulfide. Studies show that regular exposure to CAFO emissions results in an increased risk of asthma in children[3] and farm workers. A 2011 review of EPA data on emissions from multiple studies found that ammonia concentrations in exhaust from swine barns exceeded National Institute for Occupational Safety and Health exposure recommendations for entire days, resulting in hazardous conditions after only a few minutes of worker exposure.[4] A group of researches in Iowa conducted a review of literature regarding the impacts of CAFO air emissions on communities, concluding that:

> While limited in number and scope, the currently published, peer reviewed, community-based studies of adverse health affects associated with CAFO exposures find an increased prevalence of similar symptom patterns, especially respiratory symptoms, and similar indicators of reduced quality of life. Taken together with other experimental and epidemiological observations of adverse health effects observed with low levels of exposures to chemical components (ammonia, hydrogen sulfide) of CAFO emissions, these findings support a conclusion that CAFO air emissions constitute a public health hazard, deserving of public health precautions as well as larger, well controlled, population-based studies to more fully ascertain adverse health outcomes and their impact on community health services.[5]

Particulate matter and air pollutants are harmful to public and environmental health. The Buffalo River watershed is home to people who are susceptible to such pollutants, and a tourism industry which relies on a high quality environment to sustain itself. The proposed regulations will protect air quality near the Buffalo River.

Public Exposure to Pathogens

Human contact with waters of the Buffalo is a regular occurrence. Recreational users of the Buffalo River swim, fish, and boat on the river. Water-borne pollutants from swine CAFOs can reach surface waters due to over application of manure, proximity to surface waters, high rainfall events, or misapplication of manure to steep, saturated, barren, or frozen fields.[6] EPA has attempted to categorize all known contaminants resulting from CAFO runoff, including bacteria, parasites, and viruses,[7] but the full array of pollutants, including endocrine disruptors

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[3] Sigurdarson,S.T. & Kline, J.N., *School proximity to concentrated animal feeding operations and prevalence of asthma in students*, 2006, Retrieved from http://journal.publications.chestnet.org/article.aspx?articleid=1084481.
[4] Environmental Integrity Project, *Hazardous Pollution From Factor Farms: An Analysis of EPA's National Air Emissions Monitoring Study Data,* 2011.
[5] Iowa State University and the University of Iowa Study Group, *Iowa Concentrated Animal Feeding Operations Air Quality Study, Final Report,* p. 138, 2002.
[6] Hodne, C., *Concentrating on Clean Water: The Challenge of Concentrated Animal Feeding Operations, Executive Summary,* p. 3, 2005.
[7] EPA, *Literature Review of Contaminants in Livestock and Poultry Manure Implications for Water Quality,* 2013.

and carcinogens, contained in swine runoff is not known, and additional categorization is needed.[8] A spill, or concentrated runoff, in the Buffalo River watershed could expose thousands of recreation users to bacteria and other harmful pollutants, including parasites.[9] The resulting recreational contact bans on the Buffalo would wreak economic devastation in the area, and result in a lasting stigmatization of currently high quality water.

CAFO pathogens can also spread by air from land application sites. Many bacteria in large CAFO operations are antibiotic resistant due to the practice of feeding animals antibiotics as a growth promoter.[10] A recently published study found that Iowa residents who lived within one mile of a farm housing 2,500 or more pigs were nearly three times more likely than the general population to carry methicillin-resistant Staphylococcus aureus (MRSA).[11] Exposure to MRSA is a public health issue that must be take seriously. Young and old populations are particularly susceptible to such infections.

I have attached several of the articles cited herein. Please accept these reports as part of this comment. As shown by those reports, the public environmental health impacts of large swine operations are greater than what a single public comment can encompass. However, the rulemakings at hand will establish protections necessary to prevent adverse environmental impacts to recreational users and residents of the Buffalo River Watershed.

Sincerely,

/s Ross Noland

Ross Noland

Att.

[8] Burkholder, J. *et al.*, *Impacts of Waste from Concentrated Animal Feeding Operations on Water Quality*, (2007).
[9] Hribar, C., *Understanding Concentrated Animal Feeding Operations and Their Impact on Communities*, p. 9, 2010.
[10] West, B. *et al.*, *Antibiotic Resistance, Gene Transfer, and Water Quality Patterns Observed in Waterways near CAFO Farms and Wastewater Treatment Facilities*, (2009).
[11] Carrel, M. *et al., Residential Proximity to Large Numbers of Swine in Feeding Operations Is Associated with Increased Risk of Methicillin-Resistant Staphylococcus aureus Colonization at Time of Hospital Admission in Rural Iowa Veterans,* 2014.

July 1, 2014

Mr. Doug Szenher
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, Arkansas 72118

Re: Public Comment—Regulation 5 and Regulation 6 Rulemaking

Subject: Water Quality Issues Relating to CAFOs in the Buffalo River Watershed

Dear Mr. Szenher,

We support the proposed amendments to the Arkansas Pollution Control and Ecology Commission's Regulation 5 and Regulation 6.

In this letter "CAFO" will be used to mean a medium or a large swine confined feeding operation as it relates to both Regulation 5 and Regulations 6. I have included several documents in support of this comment.

It is essential to maintain high water quality in the Buffalo River watershed, not only of the Buffalo River, but of its tributaries, of all surface water, groundwater, springs, and wells. The probability of one CAFO degrading water quality is unacceptably high and if more and more CAFO's are constructed in the watershed, degradation becomes almost a certainty.

The Buffalo River has been designated as an "Extraordinary Resource Water", the highest level for protection of a stream in Arkansas. The maximum contamination levels for certain constituents are laid out in APCEC Regulation 2. In our case the most important specified maximum contaminant levels are for nutrients and E. coli and Fecal Coliform but maximum levels are also given for turbidity, several toxic chemicals, dissolved heavy metals, and oil and grease. A maximum for turbidity is given and a minimum level for dissolved oxygen.

We will discuss which components of hog waste would degrade water quality, the routes they could take to reach water sources, and the likelihood that contamination would occur.

Components of Hog Waste That Would Degrade Water Quality

How would the Buffalo River and other surface water be degraded? It would be degraded by several classes of components found in untreated hog manure and urine, i.e., nutrients and pathogens (including antimicrobials and hormones).

The primary nutrients in question are phosphorus and nitrogen compounds. If they reach the Buffalo River or local tributaries, lakes, or ponds, a number of detrimental effects will take place (1). While nutrients are necessary for all biological growth, these excess nutrients from hog waste will result in eutrophication in aquatic ecosystems. This would mean algae growth and algae blooms that could lead to fish kills, changes to or death of other aquatic life due to lack of sufficient oxygen, water discoloration, unpleasant odors, animal health impacts, and human health impacts.

Degradation of all waters in the Buffalo River basin would also take place due to pathogens, antimicrobials, and hormones. These will have a severe detrimental effect on public health but they will also be harmful to animals and aquatic life (1). Pathogens can cause sickness and death of animals, fish, and other aquatic life; antimicrobial contamination can cause harmful effects; hormones can interrupt the reproductive cycle of fish and shellfish. All of these compounds hang around for some period of time after leaving the hogs as manure or urine. They are stable in waste ponds. They have variable stability in soil and aquatic environments but some have half lives of up to a year (1)

Routes from Hog Farms to Water Sources

How would the untreated hog waste reach the streams, other surface waters, springs, wells, and the Buffalo River? We can answer that question by looking at the type of waste treatment system used by a CAFO. The typical system consists of a concrete tank beneath the barn where the hogs are housed that receives the waste that is the rinse water that every few days is used to wash down the floor and the pens of the hogs. From this tank the waste is pumped or flows to the first pond of a two-pond system. When the first pond is full, the overflow goes to a second pond. From the ponds the waste is piped or taken by tanker to fields where hay or other crops are growing. There it is applied to the surface, usually by spraying. The rate of application is governed by a required "nutrient management plan" that, in concept, applies waste at a rate that permits the nutrients to be taken up and utilized by the growing crops. It is important to understand one of the construction details of the waste ponds. ADEQ allows a leakage rate through the sides and bottom of a pond of up to 5000 gallons per day per acre of surface area. A rate not higher than this can usually be achieved by using compacted soil as a liner for the ponds. The justification for using this relatively high number is a statement in the Agricultural Waste Management Field Handbook (2) that after some unspecified period of time the rate of leakage will be reduced by a half order of magnitude due to plugging of the pores of the liner by manure solids. For a liner with an initial rate of 5000 gallons per acre per day, the resulting rate would be 1000 gallons per acre per day (365,000 gallons

per acre per year)—a rate still quite high, particularly in a ecologically-sensitive watershed, such as that of the Buffalo River.

Likelihood of Contamination

We can now look at how, with this setup, contamination of water can take place and consider the likelihood that it would occur. There are several possible routes to water contamination by a CAFO in the Buffalo River watershed. They are: leakage through the clay liner of the waste holding ponds; infiltration from the spray fields; runoff from the spray fields; severe rainstorms or flooding of the spray fields causing soil erosion; more catastrophic natural disasters, e.g., tornados that would cause rupture of the pond walls; vac-tanker accidents on the way to spray fields with discharge of contents to a drainage ditch or other pathway to a stream. While the growing crops in the spray fields would utilize a substantial part of the nutrients, nitrogen and phosphorus, uptake of the pathogens would be much more limited. The "nutrient management plan focuses on the uptake of the nutrients but the pathogens would be just as harmful to the Buffalo River, if not worse, and a significant portion of the pathogens could reach the Buffalo. Also, while winter application of waste of the fields is not recommended, it would be used, if cases where the holding ponds were approaching full capacity. Nutrients and pathogens would reach the Buffalo with winter application of waste. Several of these occurrences would be exacerbated due to the karst topography of the region, particularly leakage from the ponds or infiltration from the spray fields. It is even possible that the karst would lead to development of a sinkhole in a waste pond with the loss of all the contents and the subsequent contamination of the groundwater or the Buffalo or both.

While we recognize that the proposed amendments to Regulations 5 and 6 do not apply to C&H Hog Farms, we will use that facility as an example of what might happen, or what might be happening now, to cause water contamination. We believe that the most likely route to water contamination with the setup as described above is leakage from the waste ponds through the clay liner, infiltration to a karst sub-layer, flow to springs feeding Big Creek or to ground water and from there to the Buffalo.

There are two waste ponds at C&H, Pond 1 and Pond 2 (3). When Pond 1 is full, it overflows into Pond 2. Most of the manure solids in Pond 1 would settle so Pond 2 would have a significantly lower concentration of manure solids than Pond 1. They each have 18-inch thick clay liners constructed of compacted soil. C&H's consulting engineering firm, DeHaan, Grabs & Associates had the permeability of the compacted soil measured and using Darcy's Law, they calculated the initial leakage rate of Pond 1 to be 3,488 gal/acre/day and of Pond

2, 4,218 gal/acre/day if the ponds were full. We have checked their calculations and they were essentially correct (4). Since the area of Pond 1 is approximately 0.5 acre and of Pond 2, 0.8 acre, the total initial leakage rate would be 5,098 gallons per day if the ponds were full. We can only make an educated guess as to how the leakage rate of the ponds would change with time. We will estimate that after a few months the leakage rate of Pond 1 would be reduced due to manure solids plugging to 3488/5 or 700 gal/acre/day and that of Pond 2 would be reduced due to lesser manure solids plugging to 5098/2.5 or 2,040 gal/acre/day. The reduction would be less than the half order of magnitude because the manure would have settled in Pond 1 and the overflow would have a much lower concentration of manure solids. This would result in combined leakage of 1,982 gallons per day or 723,430 gallons per year if the ponds were full. This is still a significant rate of leakage. The mechanism would be leakage though the clay liner, infiltration though the underlying gravel/sand/soil/clay composite and into the underlying karst layer that is almost certainly there (See my companion letter on the subject of geology). For a period of time, perhaps a few weeks, there would be some holdup of some nutrients and pathogens on absorption sites in the composite structure but the sites would become fully saturated and then all of the nutrients, pathogens, antimicrobials, and hormones would pass through to the underlying karst. As was pointed out my Geology letter, karst has the characteristic that flow is rapid and there is no change in composition of the flowing liquid.

In a karst terrane all of the waters of the state in the watershed—the Buffalo River, the groundwater, the tributaries, the springs, and wells are interconnected. Of particular concern are the wells . While with the relatively high flow rate of the Buffalo River, a significant volume of hog waste would be needed to raise the E-coli level to the 126 CFU/100 ml level, the level at which the river would be closed for swimming and watersports, only a small amount of waste would make well water unfit for drinking and food uses. Note that in the Geology letter Dr. Brahana describes how dye was placed in shallow wells and then was detected miles away in springs and seeps. It would work the other way. Waste could reach the karst sub-layer due to infiltration from the ponds or the fields or due to runoff or erosion and contaminating a stream, a seep or a spring and then could reach the wells in the area.

The Threat of Numbers of CAFOs

What is the big issue of a number of CAFOs in the Buffalo River watershed? A CAFO having 2,500 sows and 4,000 pigs, the smallest "large' CAFO and the size of C&H Hog Farms, the waste holding ponds could contain up to 2.3 million gallons of untreated hog waste, sitting there a few miles from the Buffalo River. What if there were five such CAFOs with a total of 11.5 million gallons of waste.

Or what if Cargill built a CAFO the size of their Dalhart, TX facility, i.e. 66,000 hogs with23 million gallons of waste in the ponds. Or what if Smithfield builds a CAFO the size of their 88,000 hog facility in northern Missouri, 31 million gallons of waste. With so much waste sitting a few miles from the Buffalo River, an environmental tragedy could take place, either due to accident or to "legal" infiltration or leakage.

The number of CAFOs already in the watershed is not a factor in the current permitting process with Regulation 5 or 6.

Conclusion

We can't take that risk! We must ban CAFOs in the Buffalo River watershed!

Sincerely,

Robert Cross
President, Ozark Society
P.O. Box 145
Fayetteville, AR 72702

References:

(1) United States Environmental Protection Agency, *Literature Review of Contaminants in Livestock and Poultry Manure and Implications for Water Quality,* Office of Water (4304T) EPA 820-R-13-002 (July 2013)

(2) United States Department of Agriculture, Natural Resources Conservation Service, *Part 651 Agricultural Waste Management Field Handbook,* Chapter 10 Agricultural Waste Management System Component Design (August 2009)

(3) Letter of April 8, 2013 from Nathan A. Pesta of DeHaan, Grab & Associates, LLC to Stephen Hogan , ADEQ Re: Jason Henson, C & H Farms, Permit to Construct

(4) Calculations checked by Robert Cross, Professor Emeritus, Ralph E. Martin Department of Chemical Engineering, University of Arkansas, Fayetteville, Arkansas

From:	Anna Weeks
To:	Water Draft Permit Comment
Subject:	[BULK] Permit 5264-W
Date:	Friday, March 17, 2017 9:32:57 AM
Attachments:	Comments on 5264-W C&H Reg. 5 .pdf ATT00007.htm regs_5_and_6_comments_of_ross_noland_7-1-14.pdf ATT00008.htm regs_5_and_6_comments_of_robert_cross_and_ozark_society_7-1-14.pdf ATT00009.htm regs_5_and_6_comments_of_john_whiteside_7-1-14-2.pdf ATT00010.htm regs_5_and_6_comments_of_ozark_society_arkansas_public_policy_panel_and_ross_noland_7-1-14.pdf ATT00011.htm regs_5_and_6_comments_of_anna_weeks_and_arkansas_public_policy_panel_7-1-14.pdf ATT00012.htm

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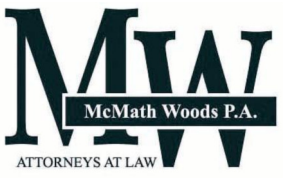

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Human contact with waters of the Buffalo is a regular occurrence. Recreational users of the Buffalo River swim, fish, and boat on the river. Water-borne pollutants from swine CAFOs can reach surface waters due to over application of manure, proximity to surface waters, high rainfall events, or misapplication of manure to steep, saturated, barren, or frozen fields.[6] EPA has attempted to categorize all known contaminants resulting from CAFO runoff, including bacteria, parasites, and viruses,[7] but the full array of pollutants, including endocrine disruptors

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[3] Sigurdarson,S.T. & Kline, J.N., *School proximity to concentrated animal feeding operations and prevalence of asthma in students*, 2006, Retrieved from http://journal.publications.chestnet.org/article.aspx?articleid=1084481.
[4] Environmental Integrity Project, *Hazardous Pollution From Factor Farms: An Analysis of EPA's National Air Emissions Monitoring Study Data,* 2011.
[5] Iowa State University and the University of Iowa Study Group, *Iowa Concentrated Animal Feeding Operations Air Quality Study, Final Report,* p. 138, 2002.
[6] Hodne, C., *Concentrating on Clean Water: The Challenge of Concentrated Animal Feeding Operations, Executive Summary,* p. 3, 2005.
[7] EPA, *Literature Review of Contaminants in Livestock and Poultry Manure Implications for Water Quality,* 2013.

and carcinogens, contained in swine runoff is not known, and additional categorization is needed.[8] A spill, or concentrated runoff, in the Buffalo River watershed could expose thousands of recreation users to bacteria and other harmful pollutants, including parasites.[9] The resulting recreational contact bans on the Buffalo would wreak economic devastation in the area, and result in a lasting stigmatization of currently high quality water.

CAFO pathogens can also spread by air from land application sites. Many bacteria in large CAFO operations are antibiotic resistant due to the practice of feeding animals antibiotics as a growth promoter.[10] A recently published study found that Iowa residents who lived within one mile of a farm housing 2,500 or more pigs were nearly three times more likely than the general population to carry methicillin-resistant Staphylococcus aureus (MRSA).[11] Exposure to MRSA is a public health issue that must be take seriously. Young and old populations are particularly susceptible to such infections.

I have attached several of the articles cited herein. Please accept these reports as part of this comment. As shown by those reports, the public environmental health impacts of large swine operations are greater than what a single public comment can encompass. However, the rulemakings at hand will establish protections necessary to prevent adverse environmental impacts to recreational users and residents of the Buffalo River Watershed.

Sincerely,

/s Ross Noland

Ross Noland

Att.

[8] Burkholder, J. *et al.*, *Impacts of Waste from Concentrated Animal Feeding Operations on Water Quality*, (2007).
[9] Hribar, C., *Understanding Concentrated Animal Feeding Operations and Their Impact on Communities*, p. 9, 2010.
[10] West, B. *et al.*, *Antibiotic Resistance, Gene Transfer, and Water Quality Patterns Observed in Waterways near CAFO Farms and Wastewater Treatment Facilities*, (2009).
[11] Carrel, M. *et al., Residential Proximity to Large Numbers of Swine in Feeding Operations Is Associated with Increased Risk of Methicillin-Resistant Staphylococcus aureus Colonization at Time of Hospital Admission in Rural Iowa Veterans,* 2014.

July 1, 2014

Mr. Doug Szenher
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, Arkansas 72118

Re: Public Comment—Regulation 5 and Regulation 6 Rulemaking

Subject: Water Quality Issues Relating to CAFOs in the Buffalo River Watershed

Dear Mr. Szenher,

We support the proposed amendments to the Arkansas Pollution Control and Ecology Commission's Regulation 5 and Regulation 6.

In this letter "CAFO" will be used to mean a medium or a large swine confined feeding operation as it relates to both Regulation 5 and Regulations 6. I have included several documents in support of this comment.

It is essential to maintain high water quality in the Buffalo River watershed, not only of the Buffalo River, but of its tributaries, of all surface water, groundwater, springs, and wells. The probability of one CAFO degrading water quality is unacceptably high and if more and more CAFO's are constructed in the watershed, degradation becomes almost a certainty.

The Buffalo River has been designated as an "Extraordinary Resource Water", the highest level for protection of a stream in Arkansas. The maximum contamination levels for certain constituents are laid out in APCEC Regulation 2. In our case the most important specified maximum contaminant levels are for nutrients and E. coli and Fecal Coliform but maximum levels are also given for turbidity, several toxic chemicals, dissolved heavy metals, and oil and grease. A maximum for turbidity is given and a minimum level for dissolved oxygen.

We will discuss which components of hog waste would degrade water quality, the routes they could take to reach water sources, and the likelihood that contamination would occur.

Components of Hog Waste That Would Degrade Water Quality

How would the Buffalo River and other surface water be degraded? It would be degraded by several classes of components found in untreated hog manure and urine, i.e., nutrients and pathogens (including antimicrobials and hormones).

The primary nutrients in question are phosphorus and nitrogen compounds. If they reach the Buffalo River or local tributaries, lakes, or ponds, a number of detrimental effects will take place (1). While nutrients are necessary for all biological growth, these excess nutrients from hog waste will result in eutrophication in aquatic ecosystems. This would mean algae growth and algae blooms that could lead to fish kills, changes to or death of other aquatic life due to lack of sufficient oxygen, water discoloration, unpleasant odors, animal health impacts, and human health impacts.

Degradation of all waters in the Buffalo River basin would also take place due to pathogens, antimicrobials, and hormones. These will have a severe detrimental effect on public health but they will also be harmful to animals and aquatic life (1). Pathogens can cause sickness and death of animals, fish, and other aquatic life; antimicrobial contamination can cause harmful effects; hormones can interrupt the reproductive cycle of fish and shellfish. All of these compounds hang around for some period of time after leaving the hogs as manure or urine. They are stable in waste ponds. They have variable stability in soil and aquatic environments but some have half lives of up to a year (1)

Routes from Hog Farms to Water Sources

How would the untreated hog waste reach the streams, other surface waters, springs, wells, and the Buffalo River? We can answer that question by looking at the type of waste treatment system used by a CAFO. The typical system consists of a concrete tank beneath the barn where the hogs are housed that receives the waste that is the rinse water that every few days is used to wash down the floor and the pens of the hogs. From this tank the waste is pumped or flows to the first pond of a two-pond system. When the first pond is full, the overflow goes to a second pond. From the ponds the waste is piped or taken by tanker to fields where hay or other crops are growing. There it is applied to the surface, usually by spraying. The rate of application is governed by a required "nutrient management plan" that, in concept, applies waste at a rate that permits the nutrients to be taken up and utilized by the growing crops. It is important to understand one of the construction details of the waste ponds. ADEQ allows a leakage rate through the sides and bottom of a pond of up to 5000 gallons per day per acre of surface area. A rate not higher than this can usually be achieved by using compacted soil as a liner for the ponds. The justification for using this relatively high number is a statement in the Agricultural Waste Management Field Handbook (2) that after some unspecified period of time the rate of leakage will be reduced by a half order of magnitude due to plugging of the pores of the liner by manure solids. For a liner with an initial rate of 5000 gallons per acre per day, the resulting rate would be 1000 gallons per acre per day (365,000 gallons

per acre per year)—a rate still quite high, particularly in a ecologically-sensitive watershed, such as that of the Buffalo River.

Likelihood of Contamination

We can now look at how, with this setup, contamination of water can take place and consider the likelihood that it would occur. There are several possible routes to water contamination by a CAFO in the Buffalo River watershed. They are: leakage through the clay liner of the waste holding ponds; infiltration from the spray fields; runoff from the spray fields; severe rainstorms or flooding of the spray fields causing soil erosion; more catastrophic natural disasters, e.g., tornados that would cause rupture of the pond walls; vac-tanker accidents on the way to spray fields with discharge of contents to a drainage ditch or other pathway to a stream. While the growing crops in the spray fields would utilize a substantial part of the nutrients, nitrogen and phosphorus, uptake of the pathogens would be much more limited. The "nutrient management plan focuses on the uptake of the nutrients but the pathogens would be just as harmful to the Buffalo River, if not worse, and a significant portion of the pathogens could reach the Buffalo. Also, while winter application of waste of the fields is not recommended, it would be used, if cases where the holding ponds were approaching full capacity. Nutrients and pathogens would reach the Buffalo with winter application of waste. Several of these occurrences would be exacerbated due to the karst topography of the region, particularly leakage from the ponds or infiltration from the spray fields. It is even possible that the karst would lead to development of a sinkhole in a waste pond with the loss of all the contents and the subsequent contamination of the groundwater or the Buffalo or both.

While we recognize that the proposed amendments to Regulations 5 and 6 do not apply to C&H Hog Farms, we will use that facility as an example of what might happen, or what might be happening now, to cause water contamination. We believe that the most likely route to water contamination with the setup as described above is leakage from the waste ponds through the clay liner, infiltration to a karst sub-layer, flow to springs feeding Big Creek or to ground water and from there to the Buffalo.

There are two waste ponds at C&H, Pond 1 and Pond 2 (3). When Pond 1 is full, it overflows into Pond 2. Most of the manure solids in Pond 1 would settle so Pond 2 would have a significantly lower concentration of manure solids than Pond 1. They each have 18-inch thick clay liners constructed of compacted soil. C&H's consulting engineering firm, DeHaan, Grabs & Associates had the permeability of the compacted soil measured and using Darcy's Law, they calculated the initial leakage rate of Pond 1 to be 3,488 gal/acre/day and of Pond

2, 4,218 gal/acre/day if the ponds were full. We have checked their calculations and they were essentially correct (4). Since the area of Pond 1 is approximately 0.5 acre and of Pond 2, 0.8 acre, the total initial leakage rate would be 5,098 gallons per day if the ponds were full. We can only make an educated guess as to how the leakage rate of the ponds would change with time. We will estimate that after a few months the leakage rate of Pond 1 would be reduced due to manure solids plugging to 3488/5 or 700 gal/acre/day and that of Pond 2 would be reduced due to lesser manure solids plugging to 5098/2.5 or 2,040 gal/acre/day. The reduction would be less than the half order of magnitude because the manure would have settled in Pond 1 and the overflow would have a much lower concentration of manure solids. This would result in combined leakage of 1,982 gallons per day or 723,430 gallons per year if the ponds were full. This is still a significant rate of leakage. The mechanism would be leakage though the clay liner, infiltration though the underlying gravel/sand/soil/clay composite and into the underlying karst layer that is almost certainly there (See my companion letter on the subject of geology). For a period of time, perhaps a few weeks, there would be some holdup of some nutrients and pathogens on absorption sites in the composite structure but the sites would become fully saturated and then all of the nutrients, pathogens, antimicrobials, and hormones would pass through to the underlying karst. As was pointed out my Geology letter, karst has the characteristic that flow is rapid and there is no change in composition of the flowing liquid.

In a karst terrane all of the waters of the state in the watershed—the Buffalo River, the groundwater, the tributaries, the springs, and wells are interconnected. Of particular concern are the wells . While with the relatively high flow rate of the Buffalo River, a significant volume of hog waste would be needed to raise the E-coli level to the 126 CFU/100 ml level, the level at which the river would be closed for swimming and watersports, only a small amount of waste would make well water unfit for drinking and food uses. Note that in the Geology letter Dr. Brahana describes how dye was placed in shallow wells and then was detected miles away in springs and seeps. It would work the other way. Waste could reach the karst sub-layer due to infiltration from the ponds or the fields or due to runoff or erosion and contaminating a stream, a seep or a spring and then could reach the wells in the area.

The Threat of Numbers of CAFOs

What is the big issue of a number of CAFOs in the Buffalo River watershed? A CAFO having 2,500 sows and 4,000 pigs, the smallest "large' CAFO and the size of C&H Hog Farms, the waste holding ponds could contain up to 2.3 million gallons of untreated hog waste, sitting there a few miles from the Buffalo River. What if there were five such CAFOs with a total of 11.5 million gallons of waste.

Or what if Cargill built a CAFO the size of their Dalhart, TX facility, i.e. 66,000 hogs with23 million gallons of waste in the ponds. Or what if Smithfield builds a CAFO the size of their 88,000 hog facility in northern Missouri, 31 million gallons of waste. With so much waste sitting a few miles from the Buffalo River, an environmental tragedy could take place, either due to accident or to "legal" infiltration or leakage.

The number of CAFOs already in the watershed is not a factor in the current permitting process with Regulation 5 or 6.

Conclusion

We can't take that risk! We must ban CAFOs in the Buffalo River watershed!

Sincerely,

Robert Cross
President, Ozark Society
P.O. Box 145
Fayetteville, AR 72702

References:

(1) United States Environmental Protection Agency, *Literature Review of Contaminants in Livestock and Poultry Manure and Implications for Water Quality,* Office of Water (4304T) EPA 820-R-13-002 (July 2013)

(2) United States Department of Agriculture, Natural Resources Conservation Service, *Part 651 Agricultural Waste Management Field Handbook,* Chapter 10 Agricultural Waste Management System Component Design (August 2009)

(3) Letter of April 8, 2013 from Nathan A. Pesta of DeHaan, Grab & Associates, LLC to Stephen Hogan , ADEQ Re: Jason Henson, C & H Farms, Permit to Construct

(4) Calculations checked by Robert Cross, Professor Emeritus, Ralph E. Martin Department of Chemical Engineering, University of Arkansas, Fayetteville, Arkansas

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June 30, 2014

Dough Szenher
Arkansas Department of Environmental Quality
5301 Northshore Dr.
North Little Rock, AR 72118

Re: Public Comment-Reg. 5 and Reg. 6 Rulemakings

Mr. Szenher:

I am writing in support of the proposed changes to Arkansas Pollution Control and Ecology Commission Regulations 5 and 6 to ban medium and large swine CAFOs in the Buffalo River Watershed. CAFOs impose community health risks that place citizens, especially those with increased susceptibility such children, the elderly, and those with preexisting health impairments in a vulnerable situation due to impaired air quality. All community members are at risk from lowered air quality, however children take in 20-50% more air than adults making them more susceptible to lung disease and health effects.[1]

Medium and large swine CAFOs expose citizens in the surrounding area to a "complex mixture of particulates, gases and vapors" that have been documented to cause "acute and chronic respiratory diseases."[2] It has been concluded that CAFO air emissions may constitute a public health hazard and that precautions should be taken to minimize both

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[1] Kleinman, M. (2000). *The health effects of air pollution on children*. http://www.aqmd.gov/docs/default-source/students/health-effects.pdf?sfvrsn=0

[2]Iowa Concentrated Animal Feeding Operations Air Quality Study. Iowa State University and the University of Iowa Study Group. February 2002 http://www.public-health.uiowa.edu/ehsrc/CAFOstudy/CAFO_1.pdf

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specific chemical exposures (hydrogen sulfide and ammonia) and mixed exposures (including odor) arising from CAFOs."[3]

The emissions from CAFOs of most concern are ammonia, hydrogen sulfide, odor, and particulate matter. The rulemakings will protect the residents and visitors of the Buffalo River Watershed from the negative health and environmental impacts that are inflicted by an increase in medium and large swine CAFOs.

Ammonia

Hazardous gases and vapors are emitted from swine barns, lagoons, manure storage piles and from sites of manure land application.[4] Many of these agents are sensory and respiratory irritants. One such toxin emitted by CAFOs is ammonia. Ammonia is a component of animal waste that is released in the waste treatment process. Ammonia is rapidly absorbed into the upper airways and can lead to sever coughing and mucous production and result in scarring of the upper and lower airways. It can also irritate eyes, sinuses, and skin.

Hydrogen Sulfide

Hydrogen sulfide is a potent neurotoxin that chronic exposure to even low ambient levels causes irreversible damage to the brain and central nervous system. Children are among

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[3] Iowa Concentrated Animal Feeding Operations Air Quality Study. Iowa State University and the University of Iowa Study Group. February 2002 http://www.public-health.uiowa.edu/ehsrc/CAFOstudy/CAFO_1.pdf

[4] Iowa Concentrated Animal Feeding Operation Air Quality Study. Iowa State University. 2003. https://www.public-health.uiowa.edu/ehsrc/CAFOstudy/CAFO_finalChap_3.pdf

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the most susceptible to this poison gas.[5] It smells like rotten eggs and is a prominent component of the odors released from CAFOs.

The location of CAFOs close to schools, neighborhoods and daycare facilities can have serious health impacts on the children. In one case a home-based day care center in Minnesota suffered hydrogen sulfide poisoning when winds blew from the south after two factory-scale hog farms opened less than a mile and half away. The facility had to be evacuated and seventeen children experienced diarrhea, nausea, headaches, vomiting, teary eyes, and stuffy noses.[6]

Odor

Odors are one of the most significant community concerns associated with CAFOs. "The chemicals that evoke these odors can be extreme nuisance and can induce adverse health effects with sufficient exposure."[7] The odors emitted by CAFOs are a combination of ammonia, hydrogen sulfide, and carbon dioxide, as well as volatile and semi-volatile organic compounds.[8] Studies conducted on the impact of odor experienced by

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[5] J Environ Sci Health B, 200003, 35: 2,245-58)

[6] Marks Robbin. Cesspools of Shame- How Factory Farm Lagoons and Sprayfields Threaten Environmental and Public Health. Natural Resource Defense Council and the Clean Water Network. July 2001. http://www.nrdc.org/water/pollution/cesspools/cesspools.pdf

[7] Iowa Concentrated Animal Feeding Operation Air Quality Study. Iowa State University. 2003. https://www.public-health.uiowa.edu/ehsrc/CAFOstudy/CAFO_finalChap_3.pdf

[8] Heederik, D., Sigsgaard, T., Thorne, P.S., Kline, J.N., Avery, R., Bønløkke, et al. (2007). Health effects of airborne exposures from concentrated animal feeding operations. *Environmental Health Perspectives, 115*(2), 298–302. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/ PMC1817709/pdf/ ehp0115-000298.pdf

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community residents living in proximity to CAFOs have found "negative mood states"[9] along with increased symptoms of "headache, runny rose, sore throat, excessive coughing, diarrhea, burning eyes and reduced quality of life."[10]

Particulate Matter

Bioaerosols, particulates of biological origin suspended in air, are a major component of the particulate matter from CAFOs. They can include "bacteria, fungi, fungal and bacterial spores, viruses, mammalian cell debris, products of microorganisms, pollens, and aeroallergens."[11] Such particulate matter can cause a direct inflammatory response to inhaled allergens and dust can also convey inflammatory and/or irritating gases or chemicals deeper in the lungs thereby enhancing their toxic effects.[12] CAFOs emit particulate matter and suspended dust, which is linked to asthma and bronchitis. An exposure to particulate over a long time period can lead to decreased lung function.[13]

Studies

Many scientific studies have been done on the impacts of the emissions from CAFOs. Here are highlights from a few of those studies:

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[9] Wing and Wolf. Intensive livestock operations, health, and quality of life among eastern North Carolina residents. Environ Health Perspect. Mar. 200; 108(3):233-238. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1637983/

[10] Wing and Wolf. Intensive livestock operations, health, and quality of life among eastern North Carolina residents. Environ Health Perspect. Mar. 200; 108(3):233-238. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1637983/

[11] Iowa Concentrated Animal Feeding Operation Air Quality Study. Iowa State University. 2003. https://www.public-health.uiowa.edu/ehsrc/CAFOstudy/CAFO_finalChap_3.pdf

[12] Iowa Concentrated Animal Feeding Operation Air Quality Study. Iowa State University. 2003. https://www.public-health.uiowa.edu/ehsrc/CAFOstudy/CAFO_finalChap_3.pdf

[13] Michigan Department of Environmental Quality Toxics Steering Group, 2006.

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"**A study on human health effects of living near industrial hog operations has found that people living near large hog farms suffer significantly higher levels of upper respiratory and gastrointestinal ailments than people living near other farming areas**. The study was done by the University of North Carolina, School of Public Health." (*Kansas Rural Papers,* May 1999)

"A Minnesota Pollution Control Agency study using a computer model found that hydrogen sulfide levels could be expected as far as five miles downwind from confinement sites." (Des Moines Register, 10-25-98)

Residents living within 2 miles of a 4,000 hog confinement reported significantly more respiratory problems than other residents. (Institute for Rural and Environmental Health, Univ. of Iowa, 1997)

Research from South Sioux City, Nebraska found reports of respiratory problems in children increased 20 to 40 percent when hydrogen sulfide levels in the air exceeded 30ppb (Agency for Toxic Substances and Disease Registry, 2002)

Researchers have found that the closer children live to a CAFO, the greater the risk of asthma symptoms.[14] Michigan Department of Environmental Quality Toxics Steering Group, 2006.

Increased Asthma Found Among Iowa Children Living On Hog Farms- Research conducted by investigators in the University of Iowa College of Public Health has found that the prevalence of asthma is elevated among children living on farms where swine are raised. Children living on swine farms where antibiotics are added to feed have a significantly higher prevalence of the respiratory disease, according to the UI study. (University of Iowa News Release, Dec. 9 2004)

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[14] Barrett, J.R. (2006). Hogging the air: CAFO emissions reach into schools. *Environmental Health Perspectives 114*(4), A241. http://ehp03.niehs.nih.gov/article/ info%3Adoi%2F10.1289%2Fehp.114-a241a

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Children who attend school near large-scale CAFOs may be at higher risk for asthma.[15] Sigudarson ST, Kline JN. 2006. School proximity to concentrated animal feeding operations and prevalence of asthma in students. *Chest.* Jun; 129 (6): 1486-91.

I have attached several of the articles cited herein. Please accept these as part of this comment. Research has demonstrated the public health impacts of CAFOs have grave consequences on communities nearby, especially children. The rulemakings will protect residents and visitors of the Buffalo River Watershed from these adverse impacts. I urge you to adopt the rulemakings.

Sincerely,

John Whiteside
Policy Director, Arkansas Public Policy Panel

[15] Sigudarson ST, Kline JN. 2006. School proximity to concentrated animal feeding operations and prevalence of asthma in students. *Chest.* Jun; 129 (6): 1486-91.

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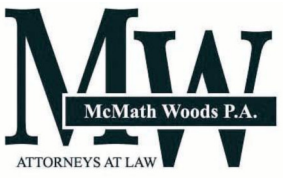

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VIA EMAIL ONLY

July 1, 2014

Dough Szenher
Arkansas Department of Environmental Quality
5301 Northshore Dr.
North Little Rock, AR 72118

Re: Public Comment-Reg. 5 and Reg. 6 Rulemakings

Mr. Szenher:

This comment is on behalf of myself, and my clients, the Ozark Society and the Arkansas Public Policy Panel ("petitioners"). Please apply this comment to the rulemaking dockets which seek to prohibit the Director of the Arkansas Department of Environmental Quality from issuing permits for certain confined animal operations pursuant to APCEC Reg. 5, and certain concentrated animal feeding operations ("CAFOs") pursuant to APCEC Reg. 6 ("the rulemakings"), in the Buffalo National River Watershed. The docket numbers for those rulemakings are 14-002-R and 14-003-R. This comment supports the rulemakings.

The Arkansas Pollution Control and Ecology Commission possess the legal authority to declare a moratorium on a certain category of permits by adopting a rule. Ark. Code. Ann. § 8-4-201(b)(4). The rulemakings request a moratorium on medium and large confined or concentrated swine operations within the Buffalo National River Watershed. The protections created by the rulemakings are consistent with the existing regulations and laws discussed below.

Medium and Large Swine Operations Definitions

The rulemakings propose a prohibition on further swine operations in the Buffalo National River Watershed which house 750 or more swine weighing 55 pounds or more, or 3,000 or more swine weighing less than 55 pounds. The petitioners drew these numbers from the definitions of medium and large swine concentrated animal feeding operations found in federal regulations. Ex. 1, 40 C.F.R. § 122.23(b)(4)(iv-v) and (b)(6)(i)(D-E). The Commission has adopted the same definition in past rulemakings. *See* APCEC Reg. 6.103(A)(adopting federal definitions) and APCEC Reg. 5.201.

The history of the medium and large swine thresholds begins with the Environmental Protection Agency's ("EPA") 1973 animal confinement regulations for feedlots, which imposed regulations on facilities with 2,500 or more swine over 55 pounds, for the stated reason that this threshold "will cover the facilities which present the greatest potential for pollution control while limiting the number of applications to a manageable quantity." Ex. 2, 38 Fed. Reg. 18,000. 1976 regulation changes retained the 1973 numbers because they were "justified by studies and data." Ex. 3, 41 Fed. Reg. 11,458. The 1976 regulations also introduced regulation of medium CAFOs with 750 or more swine weighing over 55 pounds. *Id.* at 11,460.

The definitions of medium and large CAFOs remained static until 2003 changes to the CAFO regulations introduced regulation of swine under 55 pounds. EPA stated that changes in the industry necessitated a new definition because "immature swine were not a concern in the past because they were usually a part of operations that included mature animals…in recent years, these swine operations have become increasingly specialized, increasing the number of large, separate nurseries where only immature swine are raised." Ex. 4, 68 Fed. Reg. 7,176, 7,192. EPA supported its regulatory CAFO thresholds with a Technical Development Document which analyzed manure production from swine CAFOs of the size now regulated. Ex. 5.

Utilizing known definitions and thresholds promotes consistency and certainty. The rulemakings do not target small farmers which do not qualify as medium or large CAFOs. Forty years of regulatory implementation and definition support the threshold numbers used here.

The Rulemakings are Consistent with Arkansas's Water Quality Standards

The Buffalo River enjoys heightened protection pursuant to Arkansas's water quality standards. *See* APCEC Reg. 2. Water quality standards contain three parts: designated uses, water quality criteria, and an antidegradation policy. The rulemakings comport with the water quality standards established for the Buffalo River in each of these parts.

The Buffalo River's designated use is that of an "Extraordinary Resource Water." APCEC Reg. 2, Appendix D-2. Extraordinary Resource Waters are those which have the chemical, physical, and biological characteristics to support "scenic beauty, aesthetics, scientific values, broad scope recreation potential and intangible social values." APCEC Reg. 2.302(A). This is the highest designated use available to an Arkansas waterway.

APCEC Reg. 2 sets minimum water quality criteria for all waters of the state for such values as color, taste and odor, solids, toxics, and oil and grease. APCEC Reg. 2.401, *et seq*. APCEC Reg. 2 also establishes specific water quality criteria by location and ecoregion. APCEC Reg. 2.501, *et seq.* The Buffalo River is in the Ozark Highlands and Boston Mountain Ecoregions. APCEC Reg. 2, Appendix A-3 and A-11. Streams in these ecoregions enjoy the most stringent limits on temperature, turbidity, pH, Dissolved Oxygen, bacteria, nutrients, and other pollutants, of all the ecoregions in the state.

The Buffalo River is a Tier III, "Outstanding Resource Water" for antidegradation purposes. APCEC Reg. 2.203. Tier III streams "shall be protected by (1) water quality controls, (2) maintenance of natural flow regime, (3) protection of instream habitat, and (4) encouragement of land management practices protective of the watershed." *Id.* APCEC Reg.

2.203 complies with federal regulations requiring states to adopt an antidegradation policy which provides the same level of protection as the federal antidegradation policy. 40 C.F.R. § 131.6(d). The federal Tier III regulation is 40 C.F.R. § 131.12(a)(3). *See* Ex. 6. EPA interprets 40 C.F.R. § 131.12(a)(3) as follows:

> EPA interprets this provision to mean no new or increased discharges to ONRWs and no new or increased discharge to tributaries to ONRWs that would result in lower water quality in the ONRWs. The only exception to this prohibition, as discussed in the preamble to the Water Quality Standards Regulation (48 F.R. 51402) permits States to allow some limited activities that result in temporary and short-term changes in the water quality of ONRW.

Ex. 7, EPA, *Water Quality Standards Handbook*, Chapter 4, Section 4.7; *see also* Ex. 8, 48 Fed. Reg. 51,400, 51,403 (clarifying that only temporary or short term degradation of Tier III waters is allowed).

Protecting the water quality of the Buffalo River by adopting the rulemakings will further the objectives and stated protections of Arkansas's water quality standards. Reduced threats from degraded water quality from runoff, and reduced threat of a catastrophic event, will protecting existing uses, water quality criteria, and honor the Tier III status of the Buffalo River.

CAFO Prohibitions and Regulations in Other States

Other states have successfully enacted rules or laws restricting swine operations. Indiana, Illinois, and Minnesota specifically restrict and regulate CAFOs in karst areas. The Buffalo River's watershed largely sits atop karst topography. Indiana prohibits the construction of confined animal operation waste management systems above karst topography unless it can be shown through site-specific information that the waste management system will protect the environment. 327 IAC 19-12-2. Illinois restricts both where CAFOs may be located above karst, and imposes design requirements to eliminate seepage and other modes of pollutant transport. Ex. 9, 35 Ill. Admin. Code 506.101 *et seq*. Minnesota requires an applicant seeking to store liquid animal waste to conduct a site specific investigation in karst areas of the topographic features and soil profile. Ex. 11, Minn. R. ch. 7020.2100 subp. 4, item A. Liquid waste storage is not allowed within a certain distance of some karst features, and the overall amount of waste stored is limited if certain features are present. *Id.* at subp. 2, item A and C. Regulations in these states demonstrate karst topography presents serious management obstacles and concerns when citing liquid animal waste storage lagoons associated with CAFOs.

Nebraska takes a different approach in an effort to protect its high quality streams. Nebraska's prohibits certain animal agricultural operations in "a watershed that feeds directly or indirectly into a cold water class A stream." Ex. 12, 130 Neb. Admin. Code 9-003. A Nebraska cold water class A stream is one of high quality, capable of supporting trout. R.R.S. Neb. § 54-2421. Nebraska class A stream designation is akin to Arkansas's Extraordinary Resource Water designation, and thus receives corresponding Tier III antidegradation protection. Nebraska affords its high quality protection against degradation which these rulemakings seek to provide the Buffalo River.

North Carolina prohibits issuance of permits for swine farms that use anaerobic lagoons and land application to manage swine manure. Ex. 13, N.C. Gen. Stat. § 143-215.10I(b). Permits to operate a swine operation in North Carolina may only be issued if such a facility is designed to eliminate direct discharge, seepage, runoff, atmospheric ammonia emissions, odor, disease transmitting vectors, nutrient contamination, and heavy metal contamination. *Id.*

The Rulemakings Are Consistent with Federal Designations

The Buffalo enjoys the highest legal protections afforded by federal law for rivers. The Upper Buffalo, which flows through Forest Service property, is a National Wild and Scenic River. 16 U.S.C. § 1274(a)(135). National Wild and Scenic Rivers display outstanding values, and are "preserved in free-flowing condition, and…protected for the benefit and enjoyment of present and future generations." 16 U.S.C. § 1271.

The Department of the Interior manages the remainder of the Buffalo River as a National Park. 16 USCS § 460m-12. The Park Service manages its parks to "conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." 16 U.S.C. § 1. The Buffalo River is our nation's first national river.

The Buffalo River watershed also contains several wilderness areas. The Arkansas Wilderness Act of 1984 designated Forest Service properties in the watershed above Boxley Valley as the Upper Buffalo Wilderness area, and created the almost 17,000 acre Leatherwood Wilderness Area along the lower stretches of the river. 98 Stat. 2349. The Leatherwood Wilderness is adjacent to Park Service properties managed as the Lower Buffalo Wilderness Area. *See* National Parks and Recreation Act of 1978, 92 Stat. 3489. The Leatherwood and Lower Buffalo Wilderness areas constitute one of the largest, if not the largest, wilderness area in the eastern United States.

The rulemakings are consistent with existing laws, Arkansas water quality standards, and further federal management objectives. The rulemakings will protect the integrity of the Buffalo River's water quality and aesthetic values. Thank you for accepting these comments. On behalf of myself and the petitioners, I request that the Commission adopt the rulemakings.

Sincerely,

/s Ross Noland

Ross Noland

Att.

From:	Anna Weeks
To:	Water Draft Permit Comment
Subject:	[BULK] Permit 5264-W
Date:	Friday, March 17, 2017 9:26:35 AM
Attachments:	Comments on 5264-W C&H Reg. 5 .pdf ATT00007.htm regs_5_and_6_comments_of_ross_noland_7-1-14.pdf ATT00008.htm regs_5_and_6_comments_of_robert_cross_and_ozark_society_7-1-14.pdf ATT00009.htm regs_5_and_6_comments_of_john_whiteside_7-1-14-2.pdf ATT00010.htm regs_5_and_6_comments_of_ozark_society_arkansas_public_policy_panel_and_ross_noland_7-1-14.pdf ATT00011.htm regs_5_and_6_comments_of_anna_weeks_and_arkansas_public_policy_panel_7-1-14.pdf ATT00012.htm