Response to Comments
Final Permitting Decision

Permit No.: 5264-W

Applicant: C&H Hog Farms, Inc.

Prepared by: ADEQ Technical Staff

The following comments were received regarding the draft permit number above. The response to comments was developed in accordance with APC&EC Regulation 8, Administrative Procedures.

Introduction

The initial draft denial was published for public comment on September 17, 2018. The Arkansas Department of Environmental Quality (ADEQ or "Department") conducted two (2) public hearings: one at ADEQ Headquarters in North Little Rock on October 9, 2018, and one at the Jasper School Cafetorium in Jasper on October 16, 2018. The public comment period ended on October 24, 2018, after the Hearing Officer granted a seven (7) day extension during the public hearing in Jasper and prior to the original end of the comment period.

Acronyms

APC&EC	Arkansas Pollution Control and Ecology Commission
NMP	Nutrient Management Plan
API	Arkansas Phosphorus Index
ANRC	Arkansas Natural Resources Commission
BCRET	University of Arkansas Big Creek Research and Extension Team
AWMFH	Agricultural Waste Management Field Handbook
NRCS	United States Department of Agriculture Natural Resources Conservation Service
ERW	Extraordinary Resource Water
TMDL	Total Maximum Daily Load
NPS	United States Department of the Interior National Park Service

This document contains comments and summaries of comments that the ADEQ received during the public comment period. The Department has addressed several similar issues raised throughout the comments by grouping those similar comments together and providing one response to each comment group.

People or organizations that submitted comments to ADEQ during the public notice period and public hearing are listed beneath each comment and are available on the ADEQ website at the web address below.

https://www.adeq.state.ar.us/home/pdssql/p_permit_details_water_spb.aspx?AFINDash=51-00164&AFIN=5100164&PmtNbr=5264-W

Comment: I am a native, rancher, friend, and neighbor. I have been to most meetings, and have yet to be told by ADEQ a legitimate reason for denying this permit. I have a test field in the evaluation of the litter and there has been no adverse effects. I am 38 years old, and have been raised on Big Creek. This worry about the algae is a bs talking point. All my life in the summer there is algae. I bale the hay on some of the hay fields that are sprayed with the litter. As you well know there is a buffer between big creek and the litter spread. If you would take time to look there is an unmistakable line where the grass thrives, and the buffer that does very little to produce hay. That's tangible proof that runoff is not an issue. I have been in the application fields at the time of spreading, and during the summer months the litter is only wet for a matter of minutes. I am sorry that there are people who feel like this farm is a problem for the environment, but as someone who lives close, and has dealings with, it's just simply not a problem. I don't believe any decision based on emotion is a good decision, and I feel that is what has happened in this case. I feel that if ADEQ can not make a sound scientific decision, without basing it from the outcries of people with an agenda, then the folks of ADEQ need to be examined, and removed.

Commenter: Jake Moenning

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section

651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

> Algal blooms have, and continue to, cause concern on the Buffalo River. As part of the USNPS aquatic invertebrate sampling program, the percentage of the sampling grid with filamentous algae is recorded. Of the monitored locations, the downstream locations tend to have more filamentous algae. The greater occurrence of filamentous algae at the downstream locations may be a response to higher nutrient levels.[1]

ADEQ is working to support a collaborative study with the Arkansas Game and Fish Commission, US Geological Survey, and the National Park Service focused on the distribution and causation of the rapid expansion of filamentous algae in the Buffalo National River.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Comment: These photographs, taken by this writer, are graphic statements of why ADEQ should continue and forever deny C&H a Reg. 5 permit, and never issue a permit of any kind involving spreading of manure of any kind in the Buffalo River Watershed in general and Newton County and Boone County in particular. These images are taken in the summers of 2017 and 2018 at Top of the Rock Restaurant. They show the epikarst of the Boone Formation, which extends over all of this local area and the aforementioned Arkansas counties and well as a vast contiguous area of Missouri and Arkansas. The site viewed here was a tree covered hill just east of U.S. Hwy 65 at Ridge, Missouri about 2 miles north of the Arkansas state line. A pond of about 3 acres was created over the present “canyon” area about 2015. In 2017 it is documented that an edge of the pond collapsed into a suddenly forming sinkhole, and within a day all of the pond water drained into the sinkhole in a catastrophic collapse.

It is reported that muddy water flowed after the collapse from a cave approximately ¾ mile westerly (toward Table Rock Lake) . The sinkhole cavity has been undergoing archeological style careful excavation of the cherty clay residium by the property owner, John Morris of Bass Pro Shop, ever since. A truck haul road emerging from the canyon can be seen in the upper photo. As of the summer of 2018, excavation was still actively underway at a depth of 300 feet according to employees on the site.

When Boone limestone is dissolved by water, the red clay and chert are insoluble byproducts, or residium. This is the common residual in other limestones. These photos show the natural effects of water solution of limestone with the non-soluble residual materials excavated to leave the natural pinnacles of not yet dissolved limestone.

The second photo shows better detail of the approximately 30 feet thick red clay residium with high chert content overlying and filling the tremendous cutters (the result of solution of Boone limestone) and remaining pinnacles of limestone hundreds of feet high. THIS IS TYPICAL OF BOONE FORMATION EPIKARST (Upper layer of karst, typically very permeable and usually covered by a thin layer of humus soil) ACROSS THE OZARKS OF ARKANSAS (INCLUDING ALL OF NEWTON COUNTY). It is usually exposed by road cuts. This Top of the Rock site is a rare nearby opportunity to see epikarst exposed by simple removal of the residium, even among the cutters and pinnacles over an extensive area.

The second photo also shows the equipment used to transfer the medium truck loads being excavated from the collapsed sinkhole site to highway class dump trucks which I observed hauling loads off the visible premises.

This Boone limestone also underlies C&H buildings, and it also lies unseen under their sewage lagoons and manure spreading fields. The residium provides ubiquitous invisible pathways for unfiltered water/sewage/pathogens to enter the water table to contaminate wells, springs, and surface streams including the now polluted BUFFALO RIVER! Even ADEQ has finally conceded at last that the Buffalo has miles of ‘impaired (that means POLLUTED!) waters”. That springs in the Buffalo impaired area are fed by karst infiltration at C&H has been substantiated by highly credential groundwater hydrologists Tom Aley of Protem, Missouri, and others such as David Mott of Buffalon National River, and Dr. John Van Brahana, retired Geology Professor at U of A. Now the Arkansas Department of Health has at last warned people and even dogs of dangerous toxic effects and infection from the algae now super abundantly blooming grossly in the Buffalo, and over safe limit pathogens present in the water. IS THIS ENOUGH FOR ADEQ? OUR GOVERNOR? OR DO YOU WANT TO BE RESPONSIBLE FOR KILLING SOMEBODY? DENY THIS REG 5 PERMIT. RESCIND THEIR CURRENT OBSOLETE REG 6 PERMIT. NEVER PERMIT MANURE SPREADING IN THE BUFFALO DRAINAGE AGAIN.

Commenter: Duane Woltjen

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Comment: I support the decision to deny a permit to C&H Hog Farms. Please continue to deny permits to large animal feeding operations that want to locate near rivers, especially the Buffalo National River. The State of Arkansas should more effectively regulate water pollution from Animal Feeding Operations, including both those sources that are subject to regulation under the Clean Water Act (CWA), as well as sources that are exempted from CWA regulation pursuant to the agricultural storm water runoff exemption. Congress passed the CWA with the intent to end all pollution in navigable waters by 1985. To effectuate this goal, the CWA prohibits the discharge of pollutants from any "point source" into waters of the United States

unless the discharge is authorized pursuant to a permit that is issued by the EPA or a qualified state. The CWA was also supposed to end the myth that "dilution is the solution to pollution." However, the CWA fails to regulate pollution that is deemed to have been discharged from a "nonpoint source" because it is diluted via agricultural storm water runoff, including waste from livestock operations, leaving this to state regulation and management. Given that nonpoint source pollution accounts for almost half of all water pollution in the United States, it is highly troubling that many states do not seek to control nonpoint source water pollution with effective regulation. This is partly because agricultural runoff is the largest source of nonpoint source water pollution, and many states do not want to put their agricultural industry at a competitive disadvantage by regulating nonpoint source water pollution more than their neighbors. Thus, many states that have chosen to regulate nonpoint source water pollution have waited until water quality deteriorates to the point that it is obvious to the local population and politically untenable not to regulate. Arkansas should not make this mistake and wait until its rivers and lakes are heavily polluted to take action. In 1996, the Arkansas legislature officially adopted "The Natural State" as the official nickname for the State of Arkansas in order to highlight its "unsurpassed scenery, clear lakes, free-flowing streams, magnificent rivers, meandering bayous, delta bottomlands, forested mountains, and abundant fish and wildlife." In order to uphold its official nickname as "The Natural State," Arkansas should be proactive in protecting its state treasures, including the Buffalo National River and the many other smaller rivers and lakes that sustain wildlife and offer various recreational activities. Although farming is a large part of Arkansan culture, so is canoeing, kayaking, rafting, boating, swimming, fishing, and otherwise enjoying the rivers and lakes. Proactive and effective nonpoint source pollution regulation is needed to protect Arkansas' drinking water supplies, recreation, fisheries and wildlife. The Arkansas Natural Resources Commission currently has a Nonpoint Pollution Management Plan, which consists of promoting green infrastructure and development, watershed management, and restoration efforts. While beneficial, the plan essentially promotes voluntary Best Management Practices, and does not directly address nonpoint source pollution from agriculture, which is a major problem in Arkansas. Nonpoint source pollution caused by animal agriculture is a primary concern in three of Arkansas' four regions of the State. Thus, decisive regulation of nonpoint source agricultural pollution is needed in order to more effectively combat pollution by stopping it at its source, whether the source is discrete or diffuse.

Commenter: Andrew Cox

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Beautiful Buffalo River Action Committee (BBRAC) has been established for the purpose of addressing potential water-quality concerns throughout the Buffalo River Watershed and to protect the vitality of the Buffalo National River as a national, state, and local landmark. Governor Asa Hutchinson directed five agencies to develop an Arkansas-led approach to identify and address potential

issues of common concern in the watershed. A key priority of BBRAC was to initiate the development of a Buffalo River Watershed Management Plan. The nine-element watershed management plan was developed for the Buffalo River Watershed, and the final plan was submitted and accepted by EPA in June 2018. Watershed management plans are recognized by EPA as comparable, state-led management approaches expected to result in the attainment of water-quality standards.

Comment: I support ADEQs decision to deny C&H Hog Farm's Regulation 5 permit application. Tourism on Buffalo National River Creates $71.1 Million in Economic Benefits in 2017. We have one of the last great places for ecotourism which will bring far more money to the state than a lot of hog waste. The river has become more toxic than ever due to C&H hog farm and ADEQ needs to truly serve the public interest and not the corporate agribusiness interest. I strongly encourage all ADEQ employees and any other state employee to release any information relating to corruption and incompetence within ADEQ or any other state agency. We will protect you and help you find better employment if you are punished for being a true public servant. You can also tell me what information to FOIA so that I can release to the media/public. You can email me at jmingram@ualr.edu or reach me by phone at 501-749-2979.

Commenter: Jeff Ingram

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Consideration of tourism is not within the Department's regulatory authority.

The Arkansas Department of Health did not submit a comment regarding C&H Hog Farms, Inc., AFIN 51-00164, during the public comment period ending October 24, 2018.

Comment: The C&H facility was approved without public awareness or input. There was virtually no geologic investigation, and the engineering was inadequate and assumed that karst was not a concern. The spreading fields clearly exhibit karst features, and the three fields that were looked at by the Oklahoma State University geological team show thin soils, epikarst, karst as the point of refusal, and hidden karstic features such as sinkholes and gravel lenses. Clearly, with such a limited review, other fields, particularly the upland fields are of great concern in regard to their ability to handle the volumes of waste that are being applied. The facility and the ponds themselves were engineered at the exclusion of basic investigative steps that are recommended in the Agricultural Waste Management Field Handbook. It appears that the economy of the project was the over-riding concern, and not the Buffalo National River whose name did not even appear in ANY of the documentation submitted in the original permit

application. The operation owners and their backers are now using legal maneuvering to stall on closing this facility for as long as possible. It is extremely unfortunate that this family finds themselves in this position, though there were some conscious choices made on the front end that appear to have been made for the purpose avoiding scrutiny that might have headed all of this off. This permit needs to be denied. The facility needs to go through the proper closing procedure. A permanent moratorium on all future such facilities in the Buffalo River Watershed needs to be imposed. The Buffalo National River, the most important natural resource in the State of Arkansas, needs to be allowed to recover, which could take years.

Commenter: Brian Thompson

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

APC&EC Regulation 6 General Permit ARG590000 and the coverage (permit tracking number ARG590001) granted under the General Permit are outside the scope of the current permitting decision. The initial Notice of Intent and the corresponding NMP for coverage under the prior APC&EC Regulation 6 permit tracking number ARG590001 were available for public comment during the 30-day public comment period beginning on June 25, 2012.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table

5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

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Rule-making regarding a permanent moratorium is outside the scope of this permitting decision.

Comment: What proof does this department have that the C&H Hog Farm has caused any harm to the BNR? Have extensive tests been conducted on the Big Creek tributary, below the mouth of Big Creek on the BNR, above the mouth, above and below the mouth of Mill Creek, above and below the mouth of the Little Buffalo River? Just trying to see where the river is being affected the greatest. If extensive testing has not been on all or at least several points why has it not been? What impact does the high population of feral hogs have on the BNR? What impact does the annual flow of people have on the BNR? I think many things can have an impact on the river. I want it to remain as clean as possible but I'm having a very hard time understanding how this operation has any more or less contamination than any other activities or contact has? There are 2 tributaries which have sewer treatment facilities entering, farms on all tributaries, farms directly on the BNR at the upper end, numerous roadways intersecting the river and all of it's tributaries plus many other points of access to which contaminates can and more than like do enter the river. I am not in favor of denying anyone use without much more study on the matter of where the contaminates enter the flow.

Commenter: Jimmy Keys

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

ADEQ considers all readily available data to determine the status of water quality in Arkansas and to identify waterbodies that fail to meet standards defined in APC&EC Regulation 2. ADEQ recently completed water quality assessments for the development of a proposed 2018 303(d) List and 305(b) Integrated Report as required by the Clean Water Act. In the Buffalo River Watershed, four

Assessment Units (two segments of Big Creek and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.
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In the April 1 to June 30, 2018 Quarterly Report, BCRET presents data that documents a statistically significant increase of nitrate-N in the ephemeral stream (BC4) since 2014. However, BCRET notes that chloride, a conservative tracer, did not show a statistically significant increase. Four years of data also indicate a steady increase of geometric mean nitrate-N within the house well (W1) (BCRET

April–June 2018, Figure 24). Increased nitrate-N in both the ephemeral stream and the house well does suggest that these systems may be hydrologically connected to areas where farm activities take place.

Comment: I am very pleased that the State has decided to deny operation permit to the large scale hog farm within the watershed of the Buffalo National River. I have trouble imagining why this was ever an issue. I'm also having trouble understanding why even more public comment is necessary to follow through. It all seems like delay tactic, pro-business at any cost. So I am sending in this comment that I strongly agree the permit must be denied. I really am embarrassed that the government of our beautiful State feel it needs many many personal comments repeatedly to do the right thing. It should have been a no-brainer to deny this facility from the get-go. Making it necessary for citizens to continually protest allowing this foul pollution of the national treasure entrusted to our care says a lot more about you than you may realize. In case I wasn't clear, please deny deny deny this permit and any others in the future. Show this State that you care about this State!

Commenter: Dana Bassi

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Comment: I have loved the Buffalo River most of my life. The permit must be denied to protect the river from the abuses of corporate agriculture. I have crawled through hundreds of caves in the Buffalo River Watershed. I have sampled water from numerous springs and streams. I have conducted several dye traces. The waste is and has been getting to the river from the CAFO. I believe the evidence is strong that the huge and persistent algae blooms the river has been subjected to the past three years are a direct result of the nutrients passing a tipping point. The 32 tons of phosphorus which C&H dumps on the ground every year is feeding the algae well. The ponds are leaking into the Karst. The waste disposal fields are underlain by Karst. The groundwater is now heavily polluted. The Buffalo River is impaired with E. coli for miles. Big creek near the CAFO is impaired for E. coli. Big Creek near the river is impaired by low dissolved oxygen. The Buffalo River is impaired by algae all the way down from the CAFO. I am glad ADEQ finally appears to have woken up and smelled the hog crap. Please do what is right and cast this abomination out of Paradise Thanks More data and comments to follow.

Commenter: Charles Bitting

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit

application, the public comments on the record, and other available and relevant data and information.

ADEQ considers all readily available data to determine the status of water quality in Arkansas and to identify waterbodies that fail to meet standards defined in APC&EC Regulation 2. ADEQ recently completed water quality assessments for the development of a proposed 2018 303(d) List and 305(b) Integrated Report as required by the Clean Water Act. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen.

> Algal blooms have, and continue to, cause concern on the Buffalo River. As part of the USNPS aquatic invertebrate sampling program, the percentage of the sampling grid with filamentous algae is recorded. Of the monitored locations, the downstream locations tend to have more filamentous algae. The greater occurrence of filamentous algae at the downstream locations may be a response to higher nutrient levels.[1]

ADEQ is working to support a collaborative study with the Arkansas Game and Fish Commission, US Geological Survey, and the National Park Service focused on the distribution and causation of the rapid expansion of filamentous algae in the Buffalo National River.
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Ground penetrating radar studies at Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504 (a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed investigations.

Seepage from waste storage ponds has the potential to pollute surface and ground water. The record included one recompacted permeability test that is insufficient to determine liner integrity. The necessary soil investigations including, but not limited to, percentage of fines and soil permeability characteristics, have not been

performed at this facility in accordance with the AWMFH 651 Table 10-4 and Appendix 10D. Plasticity index analysis was performed on one sample of the in situ clay material in boring 2. The variability in the regolith expected in this geologic setting coupled with the insufficient data creates additional concerns about the siting and soil sources for the clay liner. The required number of borings were not advanced within the pool areas in accordance with AWMFH 651.0704(b)(4); these additional borings would have provided more data for assessment of clay source material. Proper soil investigations for the liner material are necessary to determine the suitability and location of the clay source material and to consider any additional geotechnical testing to confirm material properties, which will reduce the potential for downward and/or lateral seepage of the stored wastes.

Comment: In light of the overwhelming evidence of water sampling results, spread overloads, and potential of ponds flooding, the state has made a huge mistake in allowing the hog operation in this area. The state of Arkansas should take responsibility and buyout this farm. The state is very negligent in not protecting all of our waterways and caving to pressure from the Farm Bureau. It is time for the governor and ADEQ to do their jobs and be the leaders in doing what is right and required by law in protecting our few waterways that are not totally ruined beyond restoration.

Commenter: Kirk Wasson

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Comment: I am writing as a concerned citizen. The opinions contained herein are solely my own. I do not represent any other organizations or individuals. It is my position that the application for the Regulation 5 permit for this CAFO be denied and that a permanent moratorium on all such facilities be immediately established in the Buffalo National River watershed. A final permit should be denied for the following reasons: ADEQ is Precluded Under 5.303 of Regulation 5 From Approv Lack of Compliance With AWMFH Notwithstanding the fact that Regulation 5 cannot be used to obtain point source permit, C&H's application does not comply with Regulation 5.402 which states, Designs and waste management plans shall be in accordance with this Chapter and the following United States Department of Agriculture Natural Resource Conservation Service technical publications: (1) Field Office Technical Guide, as amended. (2) Agricultural Waste Management Field Handbook [AWMFH], as amended. C&H did not comply with the AWMFH. Therefore C&H did not comply with guidance required under Reg. 5.402 and this permit should be denied. Among other items, the application/waste management plan: 1. Do not consider geologic (Karst) and groundwater conditions (Chapter7),

2. Applies waste in excess of agronomic needs, 3. Fails to consider the impact of breach or accidental release from storage lagoons 4. Contains no contingency or emergency plan in case of accidental release Failure to comply with the AWMFH is a violation of Regulation 5.402. Therefore this permit should be denied. Deficient Nutrient Management Plan(1) The Nutrient Management Plan is in error. For example: 1. Assumptions of forage production at 6 tons per acre are unrealistically high for the area 2. Waste is applied in excess of agronomic need as evidenced by most recent soil tests showing that a number of fields have "above optimum" levels of phosphorus and U of A recommends no additional phosphorus be applied. Winter waste applications when forage is dormant is contrary to agronomic need. 3. Hay is not harvested from all fields so the nutrients are not removed efficiently 4. Assumptions of rotational grazing are not correct. Grazing practices in the area are not as beneficial as projected, resulting in higher API than calculated. 5. Soil Test Phosphorus is rising on most fields increasing the long term impact on receiving waters. This is not well accounted for in the API Planner. 6. Some of the spreading fields have very high slopes and very thin soils that cannot meet the assumptions in the API. 7. The Arkansas Phosphorus Index does not adequately account for erosion of pasture. Erosion is very effective in transferring Phosphorus to receiving waters. 8. It appears that other nutrient sources (i.e.: poultry litter) are used in the area. These must be accounted for in the API planner. 9. Long-term waste application at rates indicated in the Planner will cause eutrophication in the receiving waters, specifically the Buffalo River. Based on these and other deficiencies in the NMP this permit should be denied. Adverse Economic Risks Greatly Outweigh Benefit According to a National Parks Service report issued in 2016, the Buffalo National River was visited more than 1.4 million times in 2015 resulting in an economic output of more than $72 million. Nearly 1,000 jobs exist because of this tourism. Conversely, C&H has generated approximately 10 jobs for family members of the owners. I know of no reasonably prudent person who would risk $72 million of economic value for 10 jobs. Violation of The Arkansas Water and Air Pollution Control Act The Arkansas Water and Air Pollution Control Act of 1949 makes it unlawful to "cause pollution...of any waters of this state," or to place any sewage, industrial waste or other wastes in a location where it is likely to cause pollution of any waters of this state." It is inevitable by locating point source animal waste lagoons and application fields so close to Big Creek that water pollution will occur (and in fact there is already evidence of discharge). Granting this permit would be in violation of The Arkansas Clean Water and Air Pollution Control Act and should be denied.

Commenter: Mark Richards

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

ADEQ considers all readily available data to determine the status of water quality in Arkansas and to identify waterbodies that fail to meet standards defined in APC&EC Regulation 2. ADEQ recently completed water quality assessments for the development of a proposed 2018 303(d) List and 305(b) Integrated Report as

required by the Clean Water Act. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.
[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Seepage from waste storage ponds has the potential to pollute surface and ground water. The record included one recompacted permeability test that is insufficient to determine liner integrity. The necessary soil investigations including, but not limited to, percentage of fines and soil permeability characteristics, have not been

performed at this facility in accordance with the AWMFH 651 Table 10-4 and Appendix 10D. Plasticity index analysis was performed on one sample of the in situ clay material in boring 2. The variability in the regolith expected in this geologic setting coupled with the insufficient data creates additional concerns about the siting and soil sources for the clay liner. The required number of borings were not advanced within the pool areas in accordance with AWMFH 651.0704(b)(4); these additional borings would have provided more data for assessment of clay source material. Proper soil investigations for the liner material are necessary to determine the suitability and location of the clay source material and to consider any additional geotechnical testing to confirm material properties, which will reduce the potential for downward and/or lateral seepage of the stored wastes.

Data supplied from the C&H Hog Farms, Inc. 2014–2017 annual reports document an increase of soil test phosphorus (STP) from 20 ppm to 68 ppm in Field 17 to a more significant increase in Field 1, which increased from 45 ppm to 173 ppm. As stated in University of Arkansas Division of Agriculture Soil Phosphorus: Management and Recommendations FSA1029[3], "Arkansas scientists agree that there is no agronomic reason or need for STP to be greater than about 50 ppm (Mehlich-3 extraction)." However, "with the move from agronomic to environmental concerns with P, soil P testing has been used to indicate when P enrichment of runoff may become unacceptable. A common approach has been to use agronomic soil P standards, following the rationale that soil P in excess of crop requirements is vulnerable to removal by surface runoff or leaching" (FSA1029). "A large amount of research between 1985 and 2000, showed that as STP (Soil Test Phosphorous) increased, especially in the top 2–4 inches of soil, so did the concentrations of soluble P in runoff (Figure 1)" (FSA1029).

As of the C&H Hog Farms, Inc. 2017 Annual Report, results of all soil test phosphorus were greater than 50 ppm. Despite a reported increase of soil test phosphorus in waste application fields, pursuant to NRCS Code 590, the Arkansas Phosphorus Index may still allow application of swine waste because of other factors including phosphorus source potential, transport potential, and best management practice multipliers. FSA9516[2] states that the phosphorus index approach is most appropriate as it accounts for multiple risk factors and provides a better risk assessment of P loss in runoff.

Geotechnical investigations at all land application sites in accordance with AWMFH 651.0504 (a)–(n) and Table 5-3 are necessary to ensure the efficacy of the API and demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River by rapid infiltration through highly permeable or thin soils.

[2] https://www.uaex.edu/publications/PDF/FSA-9516.pdf

[3] https://www.uaex.edu/publications/pdf/FSA-1029.pdf

Based on data submitted by USGS for the 2018 303(d) list, ADEQ proposed listing Big Creek (AR_11010005_022) as impaired for dissolved oxygen.

Groundwater can greatly influence seasonal ionic composition, specific conductance, nutrient concentration, and dissolved oxygen [4](Kresse et al. 2014, Cox et al. 2007, Soulsby et al. 2009, Robertson, et al. 2013, Justus et al. 2016). In 2016, the USGS completed an evaluation of continuously collected dissolved oxygen data from five USGS Boston Mountain ecoregion stations. Land use and base flow nutrient concentration were combined to develop a disturbance index for each site. Big Creek was considered moderately disturbed with the combined nutrient and land use index. Big Creek dissolved oxygen was negatively correlated with conductivity, which suggests groundwater influence. Dissolved oxygen variability and percent of exceedances of dissolved oxygen criterion (APC&EC Reg. 2.505) increased with land use and nutrient index disturbance index.

[4] Kresse, T. M., P. D. Hays, K. R. Merriman, J. A. Gillip, D. T. Fugitt, J. L. Spellman, A. M. Nottmeier, D. A. Westerman, J. M. Blackstock, and J. L. Battreal. 2014. Aquifers of Arkansas—Protection, Management, and Hydrologic and Geochemical Characteristics of Groundwater Resources in Arkansas. U.S. Geological Survey Scientific Investigations Report 2014–5149.

Cox, M.H., Su, G.W. and Constantz, J., 2007. Heat, chloride, and specific conductance as ground water tracers near streams. Ground Water, 45(2), pp.187-195.

Justus, B. G., D. R. L. Burge, J. M. Cobb, T. D. Marsico, and J. L. Bouldin. 2016. Macroinvertebrate and diatom metrics as indicators of water-quality conditions in connected depression wetlands in the Mississippi Alluvial Plain. Freshwater Science 35:1049–1061.

Robertson, W.D., D.R. Van Stempvoort, D.K., Solomon, J. Homewood, S.J. Brown, J. Spoelstra, and S.L. Schiff. 2013. Persistence of artificial sweeteners in a 15-year-old septic system plume. Journal of Hydrology, 477, pp.43-54.

Soulsby, C., I. A. Malcolm, D. Tetzlaff, and A. F. Youngson. 2009. Seasonal and inter-annual variability in hyporheic water quality revealed by continuous monitoring in a salmon spawning stream. River research and applications 25:1304–1319.

Consideration of tourism and revenue is not within the Department's regulatory authority.

Rule-making regarding a permanent moratorium is outside the scope of this permitting decision.

Comment: The Arkansas Department of Environmental Quality ("ADEQ") recently provided public notice of a denial (for the second time) of C & H Hog Farms, Inc. ("C & H") application for an Arkansas Pollution Control and Ecology Commission Regulation No. 5 permit. More about C & H here. The reasons given by ADEQ for denying the permit as stated in Section 8 of the "Statement of Basis" of the Public Notice are summarized as follows: Deficiencies in the Geological Investigation: ADEQ's findings confirm the presence of Karst hydrogeology at the C & H site and surrounding area which allows ground water to flow through interconnected underground fissures and cracks and into aquifers which are extremely vulnerable to contamination. Water Quality Issues: ADEQ's findings confirm two segments of Big Creek in Newton County and two segments of the Buffalo National River are now impaired due to the presence of pathogens and low levels of dissolved oxygen. Dye tracing has documented that underground streams which may be hydrologically connected to C&H activities have allowed residential water wells to be contaminated. Our members continue to see massive algal blooms in the Buffalo National River which are confirmed to include dangerous cyanotoxins. The presence of these algal blooms and related toxins are not only a threat to public health but are also a threat to the $70 million contribution the Buffalo National River provides to Arkansas's economy and in particular to those counties which border the river. Sound science supports the permit denial and reaffirms the position of tens of thousands of concerned citizens dedicated to the protection of the Buffalo National River.

Commenter: Cynthia Peterson

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

> Algal blooms have, and continue to, cause concern on the Buffalo River. As part of the USNPS aquatic invertebrate sampling program, the percentage of the sampling grid with filamentous algae is recorded. Of the monitored locations, the downstream locations tend to have more filamentous algae. The greater occurrence of filamentous algae at the downstream locations may be a response to higher nutrient levels.[1]

ADEQ is working to support a collaborative study with the Arkansas Game and Fish Commission, US Geological Survey, and the National Park Service focused on the distribution and causation of the rapid expansion of filamentous algae in the Buffalo National River.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed

makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.
[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

The Department did not receive any comments during the comment period ending on October 24, 2018, from the Arkansas Department of Health.

Consideration of tourism and revenue are not within the Department's regulatory authority.

Comment: Is there a property ownership trail for the property on which the existing hog farm rests? I and others want to know who benefitted from this site being selected versus a site that is not near the Buffalo or other fragile ecosystem site. Second, is this the only place in all of AR for an additional, profitable hog operation? Third, while the legal process is delayed, over and over,

the damages(factual science) from the hog operation continue and the cost to remedy damage will mount. Whatever happened to NIMBY?

Commenter: Douglas Isanhart

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Comment: Dear sirs, I would like to offer these 7 points of interest concerning the C&H Hog Farms as comments. Please consider the following statements. 1.C&H Hog Farms has been in business for more than five years with NO environmental violations. 2.Changing the rules of their permit requirements AFTER the permit is issued is unfair and damaging to small businesses of any type. 3.The introduction of "karst topography" as a reason to deny an operational permit potentially brings 30 percent of all farmland in Arkansas into regulatory question, as karst covers much of north and southwest Arkansas. 4.The use of the Animal Waste Management Field Handbook are recommendations and not requirements. 5.Out of 2,243 agriculture applications received by the ADEQ, C&H is the first and only permit application to be denied. 6.Allow sound science, and not emotion, to drive decisions concerning Arkansas' environmental standards. 7.Listen to the scientists who have spent their lives studying water-quality issues, and not the citizen vigilantes whose sole intent is to shut down this farm.

Commenter: Mark Weathers

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Applications for Regulation 5 permits are evaluated according to Regulation 5 requirements. The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department

acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.
[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Comment: C&H Hog Farms has been in business for more than five years with NO environmental violations; Changing the rules of their permit requirements AFTER the permit is issued is unfair and damaging to small businesses of any type; The introduction of "karst topography" as a reason to deny an operational permit potentially brings 30 percent of all farmland in Arkansas into regulatory question, as karst covers much of north and southwest Arkansas; The use of the Animal Waste Management Field Handbook are recommendations and not requirements. Out of 2,243 agriculture applications received by the ADEQ, C&H is the first and only permit application to be denied. Allow sound science, and not emotion, to drive decisions concerning Arkansas' environmental standards. Listen to the scientists who have spent their lives studying water-quality issues, and not the citizen vigilantes whose sole intent is to shut down this farm. It is ridiculous to deny C&H Hog farm their rightfully due permit.

Commenter: Ken and Virginia Hulsey

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Department has noted violations during its inspections of the C&H facility near Mt. Judea, Arkansas. However, those violations have not led to a formal enforcement action by the Department against C&H.

The requirements set forth in APC&EC Regulation 5 have not changed.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

The Department relied upon data from BCRET in making this permitting decision.

Comment: As a life long supporter of agricultural endeavors in our beautiful state of Arkansas, I feel strongly compelled to weigh in on this issue. My concern is that any regulatory decision concerning C&H could negatively impact our farmers and ranchers in the future. Over the past months I have been weighing both sides of this issue in order to draw a reasonable conclusion. As a result, I think it would be in the best interest of our farmers and the ADEQ if a few key points were considered. 1. Using karst topography as a reason to deny a permit is very concerning, as karst covers a significant portion of the state. 2. C&H has committed zero environmental violations. 3. Changing the rules after a permit is issued is questionable. 4. C&H is the only permit application to be denied out of 2,243 ag applications. 5. True water quality scientists should be consulted on the issue instead of citizens intent on shutting down the farm. My final statement has to do with point number 5 above. It appears that Big Creek and 14 miles of the Buffalo has been declared impaired. I would like to point out in addition to C&H the number of feral hogs that are in this area. This is a variable that can only be estimated. Also, another variable to consider is the amount of human contact the rivers and streams are exposed to. What I mean by that is the amount of human waste and excrement that end up in the river from tourists whether they be floating the river, fishing, hiking or hunting. That is a very long stretch of river without a lot of options for rest rooms. Yes the river can be tested for pollutants, but it will be very difficult to pinpoint a source considering C&H is certainly not the only possible contributor. I love the Buffalo River and I spend a lot of time up there hiking. I want the river to be as clean as possible and for people to enjoy it when I am gone. C&H is a family operation that has absolutely no desire to see harm come to the natural resources around them. In my own experience with farmers and ranchers they tend to be the best stewards of the water and land we enjoy. I would ask the ADEQ to consider the record of C&H in this case and the lack of concrete evidence to their operation having a negative impact on the Buffalo River.

Commenter: Joey Rhoda

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

ADEQ does not regulate all types of farming operations. The Department's permitting decision for this APC&EC Regulation 5 Individual No Discharge permit application pertains only to this individual permit application for a liquid

animal waste management system, not all farming operations. Applications for Regulation 5 permits are evaluated according to Regulation 5 requirements.

The Department has noted violations during its inspections of the C&H facility near Mt. Judea, Arkansas. However, those violations have not led to a formal enforcement action by the Department against C&H.

Consideration of tourism is not within the Department's regulatory authority.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.
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The Department considered all available scientific data and information from, but not limited to, BCRET, United States Geological Survey, University of Arkansas Department of Agriculture, and ADEQ in making this permitting decision.

Comment: Commission Members: I am not an activist. I am a lifetime Arkansas, citizen of North Little Rock and business owner. The Buffalo River is very important in our family life. My wife and I own land adjacent to the National Park Service in Marion County. We spend our weekends and holidays at the Buffalo River. Many of our friends are farmers in the area of the Buffalo River water shed. The first time I became fully aware of CAFOs was when I heard the news about the CAFO permit in Newton County on NPR. I immediately began searching for successes and failures, reading both sides of the case, reading NPS objections and talking with my friends in the farming community. Being a fellow business owner I feel the applicant deserves the right to earn money with his 650 acres. He deserves to put his money to work to feed his family. The last thing any of us want is more government regulation. When a business plan requires distributing waste over a large area and cannot be confined or destroyed by the business, where the outcome cannot be guaranteed and bonded by the business this is where regulation is required to protect the common good. Being a proud Arkansas I am totally against any CAFO that has a nature defined, direct path to the Buffalo River. Furthermore the surrounding terrain is a geologic formation known as Karst which is in essences distributes liquids like pouring through swiss cheese. Aside from Big Creek, there are many unknown paths to the river via the Karst. 1. I know isolation from flooding is said to be above the last 100 year flood predictions. There has been so much change in the weather that I have seen over the last 50 years I don't believe the legacy data should be fully trusted for future events. 2. In researching successes and failures in other states there are many instances that indicate a CAFO could be a significant risk to the Buffalo River. I have found no data saying a CAFO will have a neutral or positive impact. Check out recent and long term behaviors in North Carolina. 3. The National Park Service was against the construction but were given no legal voice. We pay and trust the NPS as civil servants to look out for our public assets. I feel they should be fully trusted by Sate and Federal Government and have full support in matters where they are most qualified. 5. The approval process was unprofessional. There should have been no family relationship between anyone submitting the application and anyone approving the application. There were other shady business practices and they can be found in the public record. 6. We have seen what other honorable and reputable food manufacturers have done to our natural streams. They beg forgiveness, attempt a cleanup, pay a fine, apologize and return to normal operations. No amount of money or "I am sorry" will undo a spill into the Buffalo River. If a worst case scenario happens we will all pay with our recreational freedom. Some will lose there tourism based businesses. Instead of America's First National River we will have American's First National River that was destroyed by poor regulation, lobbying and political favoritism. 7. The federal government took the land of those that once occupied what is now the park. The USA did this for the benefit of our nation. Those people sacrificed to allow us this national treasure. We as Arkansas should now do our part to be good stewards of the reserve. Our families and businesses can benefit from this preservation for generations. Risking the park for corporate profits cheapens all of the sacrifice and investment that has been made. 8. Folks on the other side of the

issue will say that tourists relieving themselves in the river is a bigger threat. This is simply not true. If you consider the liquid waste of 4000 hogs being suddenly discharged into the river via a sink hole there would be very few things that could generate this destructive capacity. Even comparing the slow continuous leaching of hog waste through the Karst with visitors it is unlikely the visitors are on the same high scale of risk as the CAFO. We cannot reasonably control tourists relieving themselves in the river. We can certainly control the presence of a CAFO within kill distance of the river. 9. Some will say that the lack of rainfall is the root of the current algal blooms. They are certainly a factor. When there is a lot of water some of the excess nutrients will be washed down to the White River. When there is low water the excess nutrients will feed the algal blooms and degrade the river. We cannot control the rainfall. We can certainly control the risk that a business places on the welfare of a national and state treasure. 10. The CAFO will benefit one family, small group of families or corporation. It has the potential to damage or destroy a centerpiece of tourism and beauty for our state and nation. There are attributes of a CAFO that are not conducive to tourism. There are times that only the government can protect us from misguided and business profit based decisions. The precautionary principle should be applied. The CAFOs cannot prove that they are not a clear an present risk to the public good and therefore they should not exist. Please act in the public interest and ban this CAFO and future manufacturing facilities that discharge waste into the watershed. I am for family farms. I am totally against CAFOs and similar manufacturing facilities in the Buffalo Watershed.

Commenter: Jay Stanley

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section

651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

> Algal blooms have, and continue to, cause concern on the Buffalo River. As part of the USNPS aquatic invertebrate sampling program, the percentage of the sampling grid with filamentous algae is recorded. Of the monitored locations, the downstream locations tend to have more filamentous algae. The greater occurrence of filamentous algae at the downstream locations may be a response to higher nutrient levels.[1]

ADEQ is working to support a collaborative study with the Arkansas Game and Fish Commission, US Geological Survey, and the National Park Service focused on the distribution and causation of the rapid expansion of filamentous algae in the Buffalo National River.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Consideration of tourism is not within the Department's regulatory authority.

Comment: To Ms Becky Keogh, I fully support the decision by ADEQ to deny the permit for C&H Hog Farm. I have felt like, from the first time I knew the hog farm was being built and would soon have hogs, the risk in placing this facility so close to The Buffalo was too high. And now Big Creek and parts of The Buffalo are officially on the impaired list. Miles and miles of the river are choked with algae. People and pets are warned the river isn't safe to swim in. I feel like ADEQ should do everything in their power to stop, to attempt to reverse, what is happening. But that isn't your track record. I know the issue is complicated. I know much denial is made, that these conditions exist because of the hog farm. But it exists because of surplus nutrients and the

hog farm supplies surplus nutrients in a karst region. Please continue to deny this permit. I want to be able to have a healthy river again. To keep taking my grandchild there to take in the splendor of The Buffalo. I can only do that now above Carver. That it is no ok! This is appalling.

Commenter: Glenda Allison

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Arkansas Department of Health did not submit a comment regarding C&H Hog Farms, Inc., AFIN 51-00164, during the public comment period ending October 24, 2018.

> Algal blooms have, and continue to, cause concern on the Buffalo River. As part of the USNPS aquatic invertebrate sampling program, the percentage of the sampling grid with filamentous algae is recorded. Of the monitored locations, the downstream locations tend to have more filamentous algae. The greater occurrence of filamentous algae at the downstream locations may be a response to higher nutrient levels.[1]

ADEQ is working to support a collaborative study with the Arkansas Game and Fish Commission, US Geological Survey, and the National Park Service focused on the distribution and causation of the rapid expansion of filamentous algae in the Buffalo National River.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Comment: I'm not sure where this subject is at this time but my thoughts lean toward the river. I think any existing farm should be left alone. However, no expansion should be allowed and no new waste or toxins should be allowed into the river. I hate it for the farm owner but the beauty and revenue from the river has to come first. It is just a beautiful gem of Arkansas and is worth protecting!

Commenter: Jeffrey Wyborny

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit

application, the public comments on the record, and other available and relevant data and information.

ADEQ considers all readily available data to determine the status of water quality in Arkansas and to identify waterbodies that fail to meet standards defined in APC&EC Regulation 2. ADEQ recently completed water quality assessments for the development of a proposed 2018 303(d) List and 305(b) Integrated Report as required by the Clean Water Act. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen.

APC&EC Regulation 5 requires the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. ADEQ has determined that a detailed geological investigation of the facility is required because karst includes highly permeable foundations with the associated potential for groundwater contamination and potential for sinkholes to open up with collapsing ground or cause differential settlement. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies, i.e. karst, that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. Additionally, ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of two segments of Big Creek and two segments of the Buffalo National River as impaired further illustrates the need for these detailed studies.

Consideration of revenue is not within the Department's regulatory authority.

Comment: I am writing in absolute support of the denial of a reg. 5 permit for C&H Hog Farms. Large and spreading algal blooms have been documented over the past three years on our country's first national river, the Buffalo River in Northwest Arkansas. In 2016 and 2017, algae growth covered at least 20 river miles. This year, 2018, blooms were documented extending

along seventy or more miles of the river, with the heaviest blooms occurring downriver of the Carver access, which is directly across from the confluence with Big Creek. An algal expert from West Virginia examined the river in September and said that by EPA Region 3 standards, the Buffalo River below Gilbert and all the way to Rush (and no doubt beyond, but he exited the river at Rush) would be considered recreationally impaired because algae covered in excess of 40% of that portion of the river. Even those of us who have been active in opposing the placement of a hog CAFO in this watershed have been astonished at the rapidity with which the river has been overwhelmed by algal growth. But in retrospect, it is not surprising. In the initial permit application for C&H Hog Farms Inc., the majority of 600 acres proposed to receive hog waste were already designated as being 'above optimum', with the recommendation that they 'receive 0 additional application of P.' Clearly there is something wrong with a system in place to protect water quality when such fields were approved by your agency anyway, and then continuously used to dispose of phosphorus-rich waste for years, far in excess of any agronomic need. Carroll County and much of NW Arkansas has already been designated as an excess nutrient area where application of litter is regulated to correct previous over-application that has left the region with legacy nutrients that will continue to impact waterways and reservoirs into the future. It is insane to support a regulatory system that only reacts to degradation rather than taking every available measure to prevent it. Currently Arkansas has only a limited narrative standard for algae. Existing standards are inadequate, vague and ambiguous, and certainly not protective of the waters of the state or the health of the humans who may wish to fish, swim or float our waterways. Reg. 2.509 Nutrients (A) Materials stimulating algal growth shall not be present in concentrations sufficient to cause objectionable algal densities or other nuisance aquatic vegetation or otherwise impair any designated use of the waterbody. While it is wonderful news that ADEQ now acknowledges that it erred in allowing C&H its initial permit and is denying a new Reg. 5 permit, we are still left with a very sick river. Please describe how your agency plans to address the fact that legacy phosphorus will continue to leach from the soils where 14 million gallons of waste have been deposited over the past five years. Is there any reason not to designate this watershed as a nutrient-excess area? Will your agency advocate for that? One argument heard often around the issue of algae growth in the Buffalo River is that all rivers in our Ozark region in late summer have algae in them. I floated the Kings River in mid-September 7 miles above the Hwy. 62 bridge and we saw only one place where there was a limited algal bloom of note. The rest of that stretch above and below that one spot was absolutely devoid of floating mats and long strings that have changed the nature of the Buffalo River and will continue to impact it as a recreational resource for years to come. Both the Kings River and the Buffalo begin in the same area of the Boston Mountains and traverse very similar terrain, fields, pastures, chicken houses and cattle ranches. Both are popular with floaters, swimmers and fishermen and see heavy use in summer months. Berryville and part of Eureka Springs are in the watershed, and there are a number of homes along the river. Yet it has retained its health and beauty.

Commenter: Lin Wellford

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit

application, the public comments on the record, and other available and relevant data and information.

> Algal blooms have, and continue to, cause concern on the Buffalo River. As part of the USNPS aquatic invertebrate sampling program, the percentage of the sampling grid with filamentous algae is recorded. Of the monitored locations, the downstream locations tend to have more filamentous algae. The greater occurrence of filamentous algae at the downstream locations may be a response to higher nutrient levels.[1]

ADEQ is working to support a collaborative study with the Arkansas Game and Fish Commission, US Geological Survey, and the National Park Service focused on the distribution and causation of the rapid expansion of filamentous algae in the Buffalo National River.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Data supplied from the C&H Hog Farms, Inc. 2014–2017 annual reports document an increase of soil test phosphorus (STP) from 20 ppm to 68 ppm in Field 17 to a more significant increase in Field 1, which increased from 45 ppm to 173 ppm. As stated in University of Arkansas Division of Agriculture Soil Phosphorus: Management and Recommendations FSA1029[3], "Arkansas scientists agree that there is no agronomic reason or need for STP to be greater than about 50 ppm (Mehlich-3 extraction)." However, "with the move from agronomic to environmental concerns with P, soil P testing has been used to indicate when P enrichment of runoff may become unacceptable. A common approach has been to use agronomic soil P standards, following the rationale that soil P in excess of crop requirements is vulnerable to removal by surface runoff or leaching" (FSA1029). "A large amount of research between 1985 and 2000, showed that as STP (Soil Test Phosphorous) increased, especially in the top 2–4 inches of soil, so did the concentrations of soluble P in runoff (Figure 1)" (FSA1029).

As of the C&H Hog Farms, Inc. 2017 Annual Report, results of all soil test phosphorus were greater than 50 ppm. Despite a reported increase of soil test phosphorus in waste application fields, pursuant to NRCS Code 590, the Arkansas Phosphorus Index may still allow application of swine waste because of other factors including phosphorus source potential, transport potential, and best management practice multipliers. FSA9516[2] states that the phosphorus index approach is most appropriate as it accounts for multiple risk factors and provides a better risk assessment of P loss in runoff.

Geotechnical investigations at all land application sites in accordance with AWMFH 651.0504 (a)–(n) and Table 5-3 are necessary to ensure the efficacy of the API and demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River by rapid infiltration through highly permeable or thin soils.

[2] https://www.uaex.edu/publications/PDF/FSA-9516.pdf
[3] https://www.uaex.edu/publications/pdf/FSA-1029.pdf

The water quality standards set forth in APC&EC Regulation 2 are outside the scope of this permitting decision.

Comment: I would like to ask A.D.E.Q. two questions. What is the difference between chicken liter and hog litter. You do not have any restriction on chicken litter.Its my understanding that it is used on park food plots. I know of no violation, citation, or fines against C.H. Why would you deny their permit. Jasper Arkansas, sewer system and the three park sewer systems are all on the river bank. If these are safe why cannot this same old technology be used by C&H? #2. My second question to you, how many people have refused to float the river because of C.& H. Real numbers. No estimates please.

Commenter: Mitchell Mccutchen

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Chicken litter is regulated by the Arkansas Natural Resources Commission.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity

assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

The Department has noted violations during its inspections of the C&H facility near Mt. Judea, Arkansas. However, those violations have not led to a formal enforcement action by the Department against C&H.

Consideration of tourism is not within the Department's regulatory authority.

Comment: I fully support the decision by the Arkansas Department of Environmental Quality (ADEQ) to deny Regulation 5 permit No. 5264-W, AFIN 51-00164. My support is based on the conclusive technical data and supporting documentation. In addition to ADEQ's "Statement of Basis", the following links provide additional scientific insight that support grounds for denial of this permit: https://buffaloriveralliance.org/resources/Documents/Reg 5 BRWA Denial Comments.pdf https://www.adeq.state.ar.us/water/bbri/c-and-h/pdfs/2018-09-17/Expert Report Aley.pdf

Commenter: John Murdoch

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Comment: ADEQ Please use sound scientific evidence from unbiased U of A study, When making the decision about C&H hog farm reg5 permit and not the opinion of environment elitist. PLEASE EXTEND THE COMMENT PERIOD. Thank You

Commenter: Betty Eddings

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The public comment period was extended seven (7) calendar days until October 24, 2018.

Comment: To the ADEQ Regarding Its Denial of C&H Hog Farm's Regulation 5 Permit Application: I am submitting these comments via email to voice my concern regarding the permitting process for C&H Hog Farm's Regulation 5 permit. These rural farm families, the Henson's and Campbell's, have been operating their family farm operation for more than 5 years with no environmental violations. They are providing needed jobs and tax revenue to the Mt Judea school district in one of the most economically depressed counties in Arkansas. They submitted everything that was requested of them during their first permitting process for the Regulation 6 General CAFO (CAFO) permit as is evidenced by the Department's previous approval of that permit. They originally sought coverage under both the CAFO permit and the Regulation 5 permit; however, after assuring the owners of C&H they would renew the CAFO permit the ADEQ decided to not renew it which left C&H which only its Regulation 5 (Reg 5) permit application. As a tax payer and a life long resident of this great state I do not understand why the ADEQ is changing the rules after their CAFO permit was been granted and the farm constructed. This is unfair and not to the standards that we hold our state agencies and state government workers too. These rural farm families that own and operate C&H Hog Farm have not had any issues that would cause their Reg 5 permit to be denied. They have gone above and beyond in their operation to follow all the requirements requested by the ADEQ. They allowed the drilling of a test hole on their private property to prove that their holding ponds are sound and are built to your standards. These drilling results showed the ponds are not leaking. They worked with the owner of EC Farms, via your permitting process, to obtain additional acres allowing them to land apply their natural fertilizer to even more area which reduces the environmental impact. They attempted to comply with every request for additional information during your review of the response to comments. I understand that some citizens are concerned about Karst topography. Karst topography underlays all of northwest and north central Arkansas from the Arkansas/OKlahoma boarder to the Black River in northeast Arkansas and down to just north of the Arkansas River Valley. Karst topography also exists in several southwest Arkansas counties near the Oklahoma boarder. If Karst topography is going to be used as an "excuse" to deny C&H's Reg 5 Permit then the US National Park Service's (NPS) permit for its sewage treatment

plant's spray field at the Tyler Bend Visitor Center should be revoked as well. That field is underlain by Karst and is mere hundreds of feet from the banks of the Buffalo River. The NPS's NPDES permits at the Buffalo Point Camp Grounds should also be revoked. They actually discharge directly into the Buffalo River and no account exists detailing what they do with the sludge. The cities of Jasper and Marshall also operate WWTPs in the Buffalo River watershed. Maybe those permits should be reconsidered as well. Throughout north central and northwest Arkansas there are potentially hundreds of municipal sewage treatment plants that either use spray irrigation as treatment or discharge directly into "environmentally sensitive" creeks, streams and rivers used by tourists. What do these municipalities do with their WWTP sludges? Do they land apply it? To fields that are underlain by Karst topography? Those permits should be given serious reconsideration as well. Furthermore, at one point there were literally dozens of hog farms, dairies and maybe a few poultry houses with Reg 5 permits in the Buffalo River watershed and hundreds more across northwest and north central Arkansas. Is the Department now saying that they would not issue permits to these farms based on the presence of Karst? What ADEQ has done is bowed down to a small group of very vocal special interest groups, mainly irrational environmentalists and wealthy plutocrats, that say that C&H is "harming the Buffalo. These so called "citizen scientists" have conducted their "own" studies using what should be considered highly questionable sampling protocols, considering their publicly stated agenda of shutting down C&H, in an effort to intentionally slant the results to match their cause. If these so called "citizen scientists" are that concerned with the health and viability of the Buffalo River then they really should care about the environmental impacts caused by the human poo and urine that 1.7 million deposited directly by tourists into the Buffalo River. These deposits no doubt contributed greatly to the summer algae blooms. To address this issue, the Department should use its position of authority on the Beautiful Buffalo River Action Committee to propose that the NPS place limits on the number of individuals allowed to visit the national park and float the Buffalo River. Title 36 of the Code of Federal Regulations gives the NPS superintendent the authority to impose such limits. Implementing a lottery system to allow only a very small portion of these 1.7 million visitors/floaters to the Buffalo River National Park would greatly reduce the nutrient load from canoeists and floaters relieving themselves either in the river, on the banks of the river, in a "cathole" away from the river, or in the very limited number of NPS outhouses. The NPS should also adopt the "red can" policy. It is not a fair allegation or comparison to say that C&H spreading their natural fertilizer over several hundred acres including grass pastures and hay fields that are located several miles away from the main stream of the Buffalo Riverat rates recommended by their nutrient management plan which is based on the Arkansas P-Index (the 2010 revision of which the Department was a participant) is harmful to the Buffalo River. I strongly encourage the Department to allow the Big Creek Research & Extension Team to continue its work and rely on this work rather considering and incorporating questionable data produced by "citizen scientists" with a publicly stated agenda of shutting down C&H. I again request that the ADEQ reconsider its denial and issue a Reg 5 permit to this hog farm which has been operating for 5 years without violations or impact to the Buffalo River. These farmers are just trying to provide a decent living for their families and their workers in a very rural and economically depressed area. Denying C&H this permit sets a precedent that all other Reg 5 permits operating inside the state could be subject to, i.e. the denial of an operating permit when special interest groups don't like what a private land owner/farmer/rancher is doing

on his/her farm. I want to thank the ADEQ for the opportunity to allow public comment on C&H's permit. These are good rural farm families that are doing the right things to provide for an honest living and making a bright future for these multi generational Arkansans.

Commenter: Bob Shofner

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Department has noted violations during its inspections of the C&H facility near Mt. Judea, Arkansas. However, those violations have not led to a formal enforcement action by the Department against C&H.

Consideration of tourism and tax revenue is not within the Department's regulatory authority.

The prior permit issued under APC&EC Regulation 6 General Permit ARG590000 and the coverage under that permit tracking number ARG590001 are outside the scope of the current permitting decision. The initial Notice of Intent and the corresponding NMP for coverage under the prior APC&EC Regulation 6 permit tracking number ARG590001 were available for public comment during the 30-day public comment period beginning on June 25, 2012.

The requirements set forth in APC&EC Regulation 5 have not changed.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section

651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Although the analytical data from the C&&H Drilling Study did not indicate a leak at the borehole drilling location at the time of the sampling, the Study does not support the conclusion that there is not any leakage from the ponds.

Seepage from waste storage ponds has the potential to pollute surface and ground water. The record included one recompacted permeability test that is insufficient to determine liner integrity. The necessary soil investigations including, but not limited to, percentage of fines and soil permeability characteristics, have not been performed at this facility in accordance with the AWMFH 651 Table 10-4 and Appendix 10D. Plasticity index analysis was performed on one sample of the *in situ* clay material in boring 2. The variability in the regolith expected in this geologic setting coupled with the insufficient data creates additional concerns about the siting and soil sources for the clay liner. The required number of borings were not advanced within the pool areas in accordance with AWMFH 651.0704(b)(4); these additional borings would have provided more data for assessment of clay source material. Proper soil investigations for the liner material are necessary to determine the suitability and location of the clay source material and to consider any additional geotechnical testing to confirm material properties, which will reduce the potential for downward and/or lateral seepage of the stored wastes.

Pursuant to the Memorandum of Agreement between the Board of Trustees of the University of Arkansas System for and on behalf of the University of Arkansas System-Division of Agriculture and the Arkansas Department of Environmental Quality, the study performed by BCRET is being carried out for the use and

benefit of ADEQ; however, the study shall be funded and conducted independently of ADEQ and shall meet the requirements of an independent study conducted by professionals in the field of water quality.

Pursuant to Ark. Code Ann. § 8-2-202, ADEQ administers an environmental laboratory accreditation program so that laboratories that submit data and analyses to the Department may be accredited by the Department as having demonstrated acceptable compliance with laboratory standards so that the validity of scientific data submitted to the Department may be further assured. All consulting laboratories performing analyses for which results are to be submitted to the ADEQ are required to obtain a laboratory accreditation through ADEQ's Environmental Laboratory Accreditation Program. Ark. Code Ann. § 8-2-206(a)(1)(A)(i). ADEQ's Environmental Laboratory Accreditation Program ensures that data submitted for regulatory, planning, permitting, or other functions will be of acceptable quality.

Pursuant to 40 C.F.R. § 130.7(b)(5), ADEQ assembles and evaluates all existing and readily available water quality data and information, from ADEQ and outside entities, to make water quality standard attainment decisions. Data are evaluated for use by determining adherence (or not) to data quality considerations outlined in the 2018 Assessment Methodology[2], Sections 3.3 and 6.0 and subsections thereof. The primary data used in the assessment of Arkansas's water quality are generated as part of ADEQ's water quality monitoring activities, described in the State of Arkansas's Water Quality Monitoring and Assessment Program, Revision 5 (ADEQ 2013). Additionally, local, state, and federal agencies, and other entities are solicited by ADEQ to provide water quality data that meets or exceeds ADEQ's or USGS' QA/QC protocols. Any entity may submit water quality data to ADEQ without solicitation. All data received will be evaluated for use by determining adherence (or not) to data quality considerations outlined in the 2018 Assessment Methodology.

Data sets that meet all Phase I[3] and Phase II[4] data quality requirements can be used for attainment decisions. Phase I Data Quality Requirements are as follows:

- ► Be characteristic of the main water mass or distinct hydrologic areas. For example, not taken within a mixing zone, side channel, tributary, or stagnant back water, etc.
- ► Be reported in standard units recommended in the relevant approved method and that conform to APC&EC Regulation 2 or can be directly compared or converted to units within APC&EC Regulation 2.
- ► **Have been collected and analyzed under a QA/QC protocol equivalent to or more stringent than that of ADEQ or the USGS**. Data collection protocols should either be readily available or accompany the data. This includes *in situ* data.

- **All laboratory analyzed parameters (not *in situ*) must be analyzed pursuant to the rules outlined in the Environmental Laboratory Accreditation Program Act, Ark. Code Ann. §§ 8-2-201 *et seq.*** The name and location of the laboratory should either be readily available or accompany the data.
- **Be accompanied by precise collection metadata such as time, date, stream name, parameters sampled, chain-of-custody, and sample site location(s)**, preferably latitude and longitude in either decimal degrees or degrees, minutes, seconds.
- Be received in either an Excel spreadsheet or compatible format not requiring excessive formatting by ADEQ
- Have been collected within the period of record for the current assessment cycle.

(emphasis added)

All data used in the 2018 Assessment of the State's water quality met the Phase I and Phase II data quality requirements.

[2] https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/final-2018-assessment-methodology.pdf
[3] pages 13–14, 2018 Assessment Methodology
[4] pages 14–15, 2018 Assessment Methodology

Comment: Thank you for the opportunity to comment on the denial of the Regulation 5 permit to C&H Hog Farms. I support ADEQ's "Statement of Basis" in the denial of this permit. I would like to provide additional supporting information to the "statement of basis". "Under Reg. 2.509 Nutrients (A) Materials stimulating algal growth shall not be present in concentrations sufficient to cause objectionable algal densities or other nuisance aquatic vegetation or otherwise impair any designated use of the waterbody. Impairment of a waterbody from excess nutrients is dependent on the natural waterbody characteristics such as stream flow, residence time, stream slope, substrate type, canopy, riparian vegetation, primary use of waterbody, season of the year and ecoregion water chemistry." During the past three years, the Buffalo National River has experienced significant algal blooms primarily downstream of the confluence of the Big Creek at Carver on the Buffalo. I have videotaped these large blooms and posted them on the following You Tube URLs: https://www.youtube.com/watch?v=nSwFXzCBXr0&t=45s https://www.youtube.com/watch?v=sDf02aDFTvI These videos document "objectionable algal densities and other nuisance aquatic vegetation" that should be incorporated into the current "statement of basis" and future ADEQ 303(d) assessments. The videos identify that the Buffalo National River is not meeting the designated use and river impairment is likely due to nutrient contributions from C&H Hog Farms. From 2013-2017, the C&H Hog Farms annual reports noted that almost 14 million gallons of hog waste was deposited in the Big Creek valley. No other source of nutrients in the Buffalo River watershed comes close to the amount of nutrients produced by C&H Hog Farms. In sum, C&H Hog Farms Regulation 6 permit should never have

been approved by ADEQ in 2012. Fortunately, ADEQ has recently analyzed much of the scientific information in denying C&H Hog Farms Regulation 5 permit. Medium and large hog CAFO operations are not sustainable nor compatible in the Buffalo River watershed due to the karst geology and the designated recreational use and Extraordinary Resource Waters status. Please continue on this path of examining the peer reviewed and creditable science by denying any current and future permits for C&H Hog Farms and EC Campbell Farms. Please close this operation immediately. It is unacceptable that C&H Hog Farms has been allowed to continue operating under an almost two-year-old expired Regulation 6 permit. The science is in and this operation is destroying the Buffalo National River, American's first national river. Can't Arkansas do a better job to preserve its natural environment for the health of the river, its people, and its tourism revenue?

Commenter: Teresa A. Turk

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

> Algal blooms have, and continue to, cause concern on the Buffalo River. As part of the USNPS aquatic invertebrate sampling program, the percentage of the sampling grid with filamentous algae is recorded. Of the monitored locations, the downstream locations tend to have more filamentous algae. The greater occurrence of filamentous algae at the downstream locations may be a response to higher nutrient levels.[1]

ADEQ is working to support a collaborative study with the Arkansas Game and Fish Commission, US Geological Survey, and the National Park Service focused on the distribution and causation of the rapid expansion of filamentous algae in the Buffalo National River.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH,

a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

The prior permit issued under APC&EC Regulation 6 General Permit ARG590000 and the coverage under that permit tracking number ARG590001 are outside the scope of the current permitting decision. The initial Notice of Intent and the corresponding NMP for coverage under the prior APC&EC Regulation 6 permit tracking number ARG590001 were available for public comment during the 30-day public comment period beginning on June 25, 2012.

ADEQ evaluated total phosphorus concentrations in Big Creek according to the 2016 Assessment Methodology[2] and the 2018 Assessment Methodology[3]. For the 2016 assessment cycle, Big Creek (BUFT06, AU 11010005_020) mean total phosphorus and total nitrogen were 0.026 mg/L and 0.33mg/L, respectively. The assessment methodology for APC&EC Reg. 2.509 screens the monitoring station's mean total phosphorus and total nitrogen concentration to the 75th percentile for a given ecoregion for the assessment cycle period of record. Screening values for the Boston Mountain ecoregion for 2016 total phosphorus and total nitrogen were 0.036 mg/L and 0.46 mg/L, respectively. The 2018 screening values were 0.036 mg/L and 0.55 mg/L for total phosphorus and total nitrogen. The mean values for 2018 for BUFT06 were 0.028 mg/L total phosphorus and 0.297 mg/L total nitrogen. All mean total phosphorus and total

nitrogen for Big Creek were below the Boston Mountain ecoregion 75th percentile. At this time, neither the Buffalo National River nor Big Creek have been identified as impaired for phosphorus based on the EPA-approved Assessment Methodology.
[2] https://www.adeq.state.ar.us/water/planning/integrated/assessment/pdfs/2016-assessment-methodology-draft-04apr16-305b.pdf
[3] https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/final-2018-assessment-methodology.pdf

Consideration of tourism is not within the Department's regulatory authority.

Comment: One thing that really concerns me is the lack of evidence that lead to the denial of this permit. Big Creek was proposed to be placed on the 303(d) list as a result of high contamination levels. My question is who took this sample, and Why is it so much higher than the samples taken by The Big Creek Research Team? Did this sample go through the same scrutiny and peer review of their testing methods as others? This is a dangerous precedent to set. Can I walk the 1/2 mile from my house to the creek and take samples? Should my samples be used to make decisions when there are peer reviewed and heavily scrutinized researchers that are collecting data?

Commenter: Dustin Cowell

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Pursuant to Ark. Code Ann. § 8-2-202, ADEQ administers an environmental laboratory accreditation program so that laboratories that submit data and analyses to the Department may be accredited by the Department as having demonstrated acceptable compliance with laboratory standards so that the validity of scientific data submitted to the Department may be further assured. All consulting laboratories performing analyses for which results are to be submitted to the ADEQ are required to obtain a laboratory accreditation through ADEQ's Environmental Laboratory Accreditation Program. Ark. Code Ann. § 8-2-206(a)(1)(A)(i). ADEQ's Environmental Laboratory Accreditation Program ensures that data submitted for regulatory, planning, permitting, or other functions will be of acceptable quality.

Pursuant to 40 C.F.R. § 130.7(b)(5), ADEQ assembles and evaluates all existing and readily available water quality data and information, from ADEQ and outside entities, to make water quality standard attainment decisions. Data are evaluated for use by determining adherence (or not) to data quality considerations outlined

in the 2018 Assessment Methodology[1], Sections 3.3 and 6.0 and subsections thereof. The primary data used in the assessment of Arkansas's water quality are generated as part of ADEQ's water quality monitoring activities, described in the State of Arkansas's Water Quality Monitoring and Assessment Program, Revision 5 (ADEQ 2013). Additionally, local, state, and federal agencies, and other entities are solicited by ADEQ to provide water quality data that meets or exceeds ADEQ's or USGS' QA/QC protocols. Any entity may submit water quality data to ADEQ without solicitation. All data received will be evaluated for use by determining adherence (or not) to data quality considerations outlined in the 2018 Assessment Methodology.

Data sets that meet all Phase I[2] and Phase II[3] data quality requirements can be used for attainment decisions. Phase I Data Quality Requirements are as follows:

- Be characteristic of the main water mass or distinct hydrologic areas. For example, not taken within a mixing zone, side channel, tributary, or stagnant back water, etc.
- Be reported in standard units recommended in the relevant approved method and that conform to APC&EC Regulation 2 or can be directly compared or converted to units within APC&EC Regulation 2.
- **Have been collected and analyzed under a QA/QC protocol equivalent to or more stringent than that of ADEQ or the USGS**. Data collection protocols should either be readily available or accompany the data. This includes *in situ* data.
- **All laboratory analyzed parameters (not *in situ*) must be analyzed pursuant to the rules outlined in the Environmental Laboratory Accreditation Program Act, Ark. Code Ann. §§ 8-2-201 *et seq.*** The name and location of the laboratory should either be readily available or accompany the data.
- **Be accompanied by precise collection metadata such as time, date, stream name, parameters sampled, chain-of-custody, and sample site location(s)**, preferably latitude and longitude in either decimal degrees or degrees, minutes, seconds.
- Be received in either an Excel spreadsheet or compatible format not requiring excessive formatting by ADEQ
- Have been collected within the period of record for the current assessment cycle.

(emphasis added)

All data used in the 2018 Assessment of the State's water quality met the Phase I and Phase II data quality requirements.

[1] https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/final-2018-assessment-methodology.pdf
[2] pages 13–14, 2018 Assessment Methodology

[3] pages 14–15, 2018 Assessment Methodology

Comment: Thank you for the opportunity to comment on the draft denial for permit application #5264-W. I support ADEQ's proposed decision to deny C & H Hog Farms' permit application after determining that the record lacks necessary and critical information to support granting of the permit, and the record contains information that the operation of this facility may be contributing to water quality impairments of waters of the state. ADEQ's proposed decision to deny the permit application, which incorporates but is not limited to the science-based information contained in the expert reports, expert depositions, and Big Creek Research and Extension Team (BCRET) data, indicates the following with regard to the C & H Hog Farm facility: • karst-highly permeable foundations- at the site of the C & H Hog Facility • increased nitrate-N in both the ephemeral stream and the house well, which suggests hydrological connections to areas where farm activities take place • BCRET study does not qualify in any regard as a geologic study • potential for groundwater contamination • void/fracture beneath the ponds • a liner does not protect against a collapse in the event of a large void in karst • potential for sinkholes to open up with collapsing ground or cause differential settlement • seepage is the same thing as a leak • a leak could occur when the pond is pumped down periodically to remove the waste and get the solids • C & H facility may be contributing to water quality impairments of Big Creek and the Buffalo National River ADEQ states that the ultimate aim of the Arkansas Pollution Control and Ecology Commission (APC&EC) and the Animal Waste Management Field Handbook (AWMFH) is that pollutants are not being released from the facility and its operations, into waters of the State. ADEQ's inclusion of the waterbody impairment issue with respect to the existing point source facility and its operations has brought the ARG590001 permit into full scope of the draft denial decision for permit application 5264-W. Therefore, to achieve the ultimate aim that pollutants are not being released from the facility and its operations into waters of the state, I urge that ADEQ not only to take immediate action with regard to a thorough geologic investigation as outlined in the Statement of Basis, but that it adhere to its legal obligation and conduct an immediate and thorough investigation to identify any and all unauthorized illegal discharges from C & H Hog Farm - NPDES Permit ARG590001- to impaired waterbodies.

Commenter: Dane Schumacher

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Issues related to ARG590001 are outside the scope of this permitting decision.

Each permit applicant is responsible for submitting all information in support of its application, including any required geologic investigations.

Comment: I am writing in support of ADEQ granting a permit to C&H Hog Farm. As a Reg 5 permit holder with a dairy in Arkansas, I feel that I have a grasp of what it takes to obtain a permit. It is a necessary process that not everyone is willing to endure. The dairy industry is suffering all over, but Arkansas has lost 90% of its farms in the last 15 or so years. With under 50 left in the state we have become a milk deficit area. This has created extra strain on our state's dairy farmers because the cost of importing milk to meet supply has fallen on our shoulders without any avenue to make up for those costs. You may wonder why this is relevant to a permit for a hog farm a few counties away. More dairies in our state would help alleviate the milk deficit which would keep us from shipping out of state milk into our area, relieving us from extra shipping costs that we are forced to carry. As of late there have been dairy farmers from Georgia, Texas and New Mexico that have considered relocating to Arkansas. After researching and seeing how ADEQ has handled C&H's Reg 5 permit, they have decided to stay put or have chosen another state; in the most recent case, Missouri. It has been said that this "reinterpretation" of requirements won't affect other farms, but it already has. It has deterred growth and development that would have alleviated some pressure on an already strained dairy industry. Floating goal posts are a game nobody wants to gamble their livelihoods on. ADEQ knows the history of this family and this farm. You are aware of the many generations of famers that have competently cared for their land. They have passed down the land and the farms to their family with full confidence that they would do what is best for the land and the surrounding treasures. They have exceeded that expectation. I am beyond saddened by what this family has endured in the name of "environmentalism" and people who are only fueled by feelings while being completely immune to scientific facts and results of intense environmental studies. These families care for their surroundings. The proof is in the way they went above and beyond to secure their state of the art facility. You are fully aware of the fiery hoops they have and continue to jump through. It is a waste of time and resources to have this cycle continued over and over. I could write a novel on the facts. I could also appeal to your feelings when it comes to this farm. At the end of the day this decision will come down to doing what is right or wrong for our state's agricultural community, economy, and residents. Agriculture is a huge contributor to Arkansas' economy. We have proven our ability to be conservationists and farmers. We have tried to bring in new farms that stimulate the economy and provide jobs. I can assure you, not allowing this farm to move forward with what their family has spent generations building, will cause harm to the future of agriculture, not only already established farms, but most certainly to anyone looking to build in this state. This will, without a doubt, set precedence that will alter the future of agriculture. Our society has resorted to allowing a loud minority to dictate what is and is not allowed. We have quit using what is real and solid and replaced it with what ifs and bad feelings. Continuing down that path will lead to the destruction of what many before us sacrificed everything to build. We have to be able to use real life, science, and facts to make decisions. There is no doubt that this decision has more players than any of us can imagine. You have pressure from every angle, but someone has to hold on to doing the right thing. Protests fade, focus shifts, the noise dies down, the river is and will continue to be cared for, but stealing from these farmers what many generations have built for the future of their family, based on the feelings of a few who have nothing to lose, will not only steal a legacy, but any faith the

agricultural community has in the organizations that are supposed to help and guide us. Please don't be overwhelmed by the amount of comments. Don't be shaken by the politics. Don't allow the credibility and respect that has been built between agriculture and ADEQ relationships be crumbled. You know how you eat an elephant? One bite at a time. Take this case apart, once more. Look at every piece. Look at the family, their dedication, their farm plan, the engineering, the science and facts that have come from studies beyond what anyone else has ever submitted to, look at how this has already affected agriculture in our state, and come to a conclusion. Then, factor comments based on facts vs feelings. Give credit where it is due and disregard what isn't relevant. Pull out the politics and the pressure. Please, consider this from a standpoint of facts, real life, and economic impact. Your decision will not alter the fate of the Buffalo River, we've already proven this farm poses no risk, but it will alter the future of Arkansas agriculture as well as your relationship with it, and the life of a family that has given many generations of conservation efforts to preserve their heritage as well as a treasured river.

Commenter: Cassie Davis

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Consideration of the economy is not within the Department's regulatory authority.

ADEQ does not regulate all types of farming operations. The Department's permitting decision for this APC&EC Regulation 5 Individual No Discharge permit application pertains only to this individual permit application for a liquid animal waste management system, not all farming operations. Applications for Regulation 5 permits are evaluated according to Regulation 5 requirements.

The Department has noted violations during its inspections of the C&H facility near Mt. Judea, Arkansas. However, those violations have not led to a formal enforcement action by the Department against C&H.

ADEQ must follow its regulations. ADEQ cannot issue a permit if the permit application does not meet the requirements of the applicable regulation. APC&EC Regulation 5 requires the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. ADEQ has determined that a detailed geological investigation of the facility is required because karst includes highly permeable foundations with the associated potential for groundwater contamination and potential for sinkholes to open up with collapsing ground or cause differential settlement. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies, i.e. karst, that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm

integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. Additionally, ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of two segments of Big Creek and two segments of the Buffalo National River as impaired further illustrates the need for these detailed studies.

Comment: 1.) What are the current nitrate levels and historic nitrate levels over the last 46-47 years since designation of the Buffalo River as a National River? 2.) Could it have been the rain event of 2017 followed by the dry period of 2018? Are there any barriers preventing decomposing material from entering waterways? 3.) Have we seen an uptick in nitrate and phosphate levels as a result of increased ecotourism since the declaration of the Buffalo River as a national river? Are there any containment zones preventing pollutants from surface runoff as a result of ecotourism? 4.) Have we seen hard evidence that C&H Hog Farms is producing any elevated levels of nitrates and phosphates? 5.) Have we really looked at all the contributing factors in the watershed or are we harassing one entity based on the emotion of fellow citizens that dont have a full and accurate understanding of the history behind the livelihoods that were an integral part in the management of the pristine land and waters associated with all the settlements along the Buffalo River? Are there any containment zones and prevention measures being taken to prevent excess levels of nitrates through surface runoff? 6.)Why is C&H Hog Farms the only entity in the spotlight?

Commenter: Pam Schmick

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Beautiful Buffalo River Action Committee (BBRAC) has been established for the purpose of addressing potential water-quality concerns throughout the Buffalo River Watershed and to protect the vitality of the Buffalo National River as a national, state, and local landmark. Governor Asa Hutchinson directed five agencies to develop an Arkansas-led approach to identify and address potential

issues of common concern in the watershed. A key priority of BBRAC was to initiate the development of a Buffalo River Watershed Management Plan. The nine-element watershed management plan was developed for the Buffalo River Watershed, and the final plan was submitted and accepted by EPA in June 2018. Watershed management plans are recognized by EPA as comparable, state-led management approaches expected to result in the attainment of water-quality standards.

In the April 1 to June 30, 2018 Quarterly Report, BCRET presents data that documents a statistically significant increase of nitrate-N in the ephemeral stream (BC4) since 2014. However, BCRET notes that chloride, a conservative tracer, did not show a statistically significant increase. Four years of data also indicate a steady increase of geometric mean nitrate-N within the house well (W1) (BCRET April–June 2018, Figure 24). Increased nitrate-N in both the ephemeral stream and the house well does suggest that these systems may be hydrologically connected to areas where farm activities take place. APC&EC Regulation 5 requires the design and waste management plans for liquid animal waste management systems be in accordance with the AWMFH. ADEQ has determined that a detailed geological investigation of the facility is required because karst includes highly permeable foundations with the associated potential for groundwater contamination and potential for sinkholes to open up with collapsing ground or cause differential settlement. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies, i.e. karst, that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. Detailed geologic investigations, including a groundwater flow direction study, are necessary to determine that the ephemeral stream and house well are not influenced by the waste storage holding ponds, on-farm activities, or waste management practices.

BCRET data document that nitrate-N is variable; however, Figure 12 of the April 1 to June 30, 2018 BCRET Quarterly Report demonstrates that nitrate-N is higher downstream (BC7) than upstream (BC6). Chlorides and nitrates follow similar seasonal fluctuations in that they are higher during summer and autumn months when stream discharge is most influenced by groundwater. ADEQ reviewed Jim Petersen's May 31, 2018 expert report, which presents an analysis of temporal trends among nitrate-N and E. coli from January 2014–December 2017 at BC6 and BC7. Mr. Petersen's analysis presents decreasing trends of ammonia and chlorides and increasing concentrations of E. coli at BC6. Yet, increasing concentrations of nitrate-N were observed downstream at BC7. The conflicting temporal analysis prompted Mr. Petersen to further review trends upstream to downstream. By analyzing paired concentration data (collected same day) at BC6 and BC7 from January 2014 through December 2017, Mr. Petersen reports significant increases in total nitrogen, ortho-phosphorus, and chlorides, but non-

significant changes in E. coli and nitrate-N. The significant increase of nitrate-N in the house well and ephemeral stream does correspond to increases of total nitrogen at BC7. Mr. Petersen's analysis illustrates the complexities of evaluating water chemistry in karst systems.

Data supplied from the C&H Hog Farms, Inc. 2014–2017 annual reports document an increase of soil test phosphorus (STP) from 20 ppm to 68 ppm in Field 17 to a more significant increase in Field 1, which increased from 45 ppm to 173 ppm. As stated in University of Arkansas Division of Agriculture Soil Phosphorus: Management and Recommendations FSA1029[2], "Arkansas scientists agree that there is no agronomic reason or need for STP to be greater than about 50 ppm (Mehlich-3 extraction)." However, "with the move from agronomic to environmental concerns with P, soil P testing has been used to indicate when P enrichment of runoff may become unacceptable. A common approach has been to use agronomic soil P standards, following the rationale that soil P in excess of crop requirements is vulnerable to removal by surface runoff or leaching" (FSA1029). "A large amount of research between 1985 and 2000, showed that as STP (Soil Test Phosphorous) increased, especially in the top 2–4 inches of soil, so did the concentrations of soluble P in runoff (Figure 1)" (FSA1029).

As of the C&H Hog Farms, Inc. 2017 Annual Report, results of all soil test phosphorus were greater than 50 ppm. Despite a reported increase of soil test phosphorus in waste application fields, pursuant to NRCS Code 590, the Arkansas Phosphorus Index may still allow application of swine waste because of other factors including phosphorus source potential, transport potential, and best management practice multipliers. FSA9516[1] states that the phosphorus index approach is most appropriate as it accounts for multiple risk factors and provides a better risk assessment of P loss in runoff.

Geotechnical investigations at all land application sites in accordance with AWMFH 651.0504 (a)–(n) and Table 5-3 are necessary to ensure the efficacy of the API and demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River by rapid infiltration through highly permeable or thin soils.

[1] https://www.uaex.edu/publications/PDF/FSA-9516.pdf
[2] https://www.uaex.edu/publications/pdf/FSA-1029.pdf

Consideration of tourism is not within the Department's regulatory authority.

Comment: I'd like to start by saying: I am not for/nor against the C&H farm, because I do not feel informed well enough to make a decision. Ridicule me if you must, but I hope this farm and the heated discussion serve as a testament to the importance of agricultural communicators. I

grew up in Newton County, went away to college, and have returned to serve our community through the Cooperative Extension Service. I am conscious of the employment challenges of our area, and share the farmers' desire to keep our livelihood close to home. I am also conscious of the karst geology of this area, and the challenges related to tracking the underground passages. I love our natural resources and the preservation of such for generations to come... I would like to see an objective portrayal of the C&H hog farm issue and attached ideals. What is the fight about? The first commercialized farm in a county recognized for un-manned beauty? The fear of compromising our water system(s)? The addition of hog waste to soils of hay fields and pastures? Although I am a native (somewhat) to this area – I have not followed this issue closely. I have been busy working to learn the methods of agricultural communicators and extension educators. Where are the objective communicators and educators for this issue? I see/hear the polarities associated with the issue, but why isn't there information available to the common person without the added heat? Where is the common ground? Where is the desire to draw consumers closer to farmers rather than spreading fear and uncertainty? Where is the protection of the public with respect to farming practice and awareness? At this point, I feel I would need to conduct a rigorous research project to track down information related to this issue to develop a summary. And, thereby, develop an educated opinion. Why is the common person responsible for scratching up resources to learn about a topic so close to home? I believe the responsibility for the public to become educated about agricultural topics is an added quake in the fractured connection between growers and consumers. Also in this case, local stakeholders.

Commenter: Fawn Kurtzo

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Statement of Basis for this permitting decision is located at https://www.adeq.state.ar.us/water/bbri/c-and-h/pdfs/20180917-statement-of-basis.pdf.
The following sources were used in the development of the Statement of Basis:
1. APC&EC Regulation No. 8, Administrative Procedures, as amended.
2. APC&EC Regulation No. 9, Fee System for Environmental Permits, as amended.
3. APC&EC Regulation No. 5, Liquid Animal Waste Management Systems, as amended.
4. Water and Air Pollution Control Act, Ark. Code Ann. § 8-4-101 et seq.
5. Application for permit No. 5264-W received April 7, 2016.
6. NMP dated April 6, 2016.
7. Additional information received on June 29, 2016.
8. Additional information received on December 6, 2017.
9. Additional information received on December 26, 2017.
10. Additional information received on December 29, 2017.

11. C&H Drilling Study report by Harbor Environmental and Safety, Inc. dated December 2016, as amended.
12. Agricultural Waste Management Field Handbook, as amended.
13. Additional resources at the following link:
https://www.adeq.state.ar.us/home/pdssql/p_permit_details_water_spb.aspx?AFINDash=51-00164&AFIN=5100164&PmtNbr=5264-W

Comment: The board of the Pope County Conservation District appreciates the opportunity to make a public comment in support of the C&H Hog Farm regarding the denial of the Regulation 5 permit. Being located in an adjacent county that is a direct route to the Buffalo River, we are aware of the impact that could affect our tourism dollars in Pope County if the Buffalo River was to become an undesirable and unusable recreation site. The Buffalo River is a great tourist attraction with a large number of visitors, and their pets, floating the river without the benefit of sanitary facilities, using campgrounds that rely on septic systems for disposal for human waste, the lodging/cabins and other agriculture interest. All of these things can and do add to the pristine condition of the streams and rivers. Have these things been considered and balanced in the equation? We have watched with great interest the proceedings, comments, accusations and meetings concerning this farm. It would appear that the owners of C&H have gone above and beyond to meet the requirements as they knew them to be when they initially applied for the Reg 5 permit. It also appears that, due to certain groups, the process has changed along the way at great expense to the owners The Board of the Pope County Conservation District respectfully requests that ADEQ reconsider the denial of this permit and work with the owners to eliminate any known, scientifically proven issues that exist, leaving behind the emotionally charged "what if's" and theoretical possibilities that are not based on data that has been required of agriculture users in the past. Please accept this correspondence of our unanimous support of C&H Hog Farm and the issuance of their permit.

Commenter: Pope County Conservation District

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

APC&EC Regulation 5 requirements, specifically the requirements in APC&EC Regulation 5.402, have not changed. The application submitted for this permit, including supplemental information, did not satisfy the requirements of APC&EC Regulation 5.

Consideration of tourism is not within the Department's regulatory authority.

ADEQ must follow its regulations. APC&EC Regulation 5 requires the designs and waste management plans for liquid animal waste management systems to be

in accordance with the AWMFH. The permit application record lacks the requisite information to evaluate the permit application for compliance with APC&EC Regulation 5. ADEQ cannot issue a permit when the permit application does not meet the requirements of the applicable regulation.

Comment: I respectfully ask that you honor the work of scientific experts, follow the facts, and protect the Buffalo National River by issuing the final denial of C&H Hog Farm, Inc.'s application for a Regulation 5 Permit. Arkansas Department of Environmental Quality (ADEQ) has done its work. Now it is up to you! ADEQ has determined that the application C&H filed for a Regulation 5 Permit fails to provide detailed and critical information required by the State's Liquid Animal Waste Management Systems. The state of Arkansas can take a giant step in protecting the health of the Buffalo River and the health of thousands of visitors and residents who enjoy America's first national river. Please stand by the state's preliminary decision and deny C&H's application for a Regulation 5 Permit once and for all. Thank you for the opportunity to submit comments to help protect the Buffalo.

Commenter: NPCA; Individual comments are available in file 5264-W_NPCA Group Comment on Draft Denial_2018 under https://www.adeq.state.ar.us/home/pdssql/p-response-20181116.aspx

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Department considered all available scientific data and information from, but not limited to, BCRET, United States Geological Survey, University of Arkansas Department of Agriculture, and ADEQ in making this permitting decision.

Comment: As a concerned citizen who cares about the water quality of the Buffalo River, I am writing to express my support for ADEQ's draft decision to deny C&H Hog Farm's Regulation 5 permit application. I believe that the permit application should be denied for the following reasons: 1. The Buffalo River is home to at least four species of wildlife that are listed as endangered or threatened. The excess nutrient runoff from C & H Farm and the resulting disruption of the aquatic ecosystem are a serious threat to all Ozark wildlife and especially those species that are already in trouble. 2. There is now clear scientific evidence of a negative environmental impact to the Buffalo River Watershed. The damage is attributable to nutrient overloading within the last few years. ADEQ has established its proposed 2018 impaired waterbodies list, and has placed four impaired Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) as impaired waterbodies. 3. C&H Hog farm has not complied with requirements, especially those that pertain to karst locations, and this has increased the impairment of the Buffalo National River and its tributary,

Big Creek, along which C&H is located. 4. The presence of karst makes the location of this hog factory particularly troublesome. Dye trace studies have shown that a maze of interconnected pathways exist in the area where C&H is located. Only one core sample was obtained at the site of the facility when at a minimum three were recommended by experts. The one core sample that was taken strongly suggests the possible presence of voids under the hog waste storage ponds. I support the ADEQ denial of the C&H Hog farm permit. The proposed listing of Big Creek and the Buffalo National River as impaired waterbodies, the statistically significant increase of nitrate-N in the ephemeral stream and house well, and the increase of STP in all land application fields receiving waste further illustrate the need for the C&H Hog CAFO to be denied a permit to operate in the Buffalo National River watershed.

Commenter: Cody Hughes

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Department acknowledges the following statements from the Buffalo River Watershed-Based Management Plan dated May 22, 2018, regarding threatened and endangered species in the Buffalo River watershed:

> The Buffalo River and its tributaries are considered high quality water resources. The Buffalo River and its tributaries support over fifty (50) species of fish and over twenty (20) species of mussels. Portions of the Buffalo River have been designated critical habitat for the threatened Rabbitsfoot mussel, *Quadrula cylindrical cylindrical* (State/Federal Status: Endangered/Threatened, respectively). The watershed also includes important habitat for endangered bat species: Gray Bat, *Myotis grisescens* (State/Federal Status: Endangered); Indiana Bat, *Myotis sodalis* (State/Federal Status: Endangered); Ozark Big-eared Bat, *Corynorhinus townsendii ingens* (State/Federal Status: Endangered); and Northern Long-eared Bat, *Myotis septentrionalis* (State/Federal Status: Endangered/Threatened, respectively). Cave and other karst features in the Buffalo River watershed are important habitats for all of the protected bat species.[1]

However, the Department did not receive any comments during the comment period ending on October 24, 2018, regarding endangered or threatened species and their associated habitats from Arkansas Game & Fish Commission, Arkansas Natural Heritage Commission, or U.S. Fish and Wildlife Service.

ADEQ considers all readily available data to determine the status of water quality in Arkansas and to identify waterbodies that fail to meet standards defined in APC&EC Regulation 2. ADEQ recently completed water quality assessments for the development of a proposed 2018 303(d) List and 305(b) Integrated Report as required by the Clean Water Act. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

The Department does not have a clear understanding regarding your statement about core samples, and thus, cannot provide a response.

The Department acknowledges the statements made that reiterate statements in the Statement of Basis.

Comment: See Attached: BRWA

Commenter: Buffalo River Watershed Alliance

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Rule-making regarding a permanent moratorium is outside the scope of this permitting decision.

ADEQ considers all readily available data to determine the status of water quality in Arkansas and to identify waterbodies that fail to meet standards defined in APC&EC Regulation 2. ADEQ recently completed water quality assessments for the development of a proposed 2018 303(d) List and 305(b) Integrated Report as required by the Clean Water Act. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. ADEQ has determined that a detailed geological investigation of the facility is required because karst includes

highly permeable foundations with the associated potential for groundwater contamination and potential for sinkholes to open up with collapsing ground or cause differential settlement. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Seepage from waste storage ponds has the potential to pollute surface and ground water. The record included one recompacted permeability test that is insufficient to determine liner integrity. The necessary soil investigations including, but not limited to, percentage of fines and soil permeability characteristics, have not been performed at this facility in accordance with the AWMFH 651 Table 10-4 and Appendix 10D. Plasticity index analysis was performed on one sample of the *in situ* clay material in boring 2. The variability in the regolith expected in this geologic setting coupled with the insufficient data creates additional concerns about the siting and soil sources for the clay liner. The required number of borings were not advanced within the pool areas in accordance with AWMFH 651.0704(b)(4); these additional borings would have provided more data for assessment of clay source material. Proper soil investigations for the liner material are necessary to determine the suitability and location of the clay source material and to consider any additional geotechnical testing to confirm material properties, which will reduce the potential for downward and/or lateral seepage of the stored wastes.

Additionally, NRCS, in Appendix 10D of the AWMFH, indicates that special design measures are necessary where agricultural waste storage ponds are constructed in soils with high calcium content (BCRET Quarterly Report for October 2016 to December 2016, Table 10, page 71) or highly unfavorable geologic conditions, such as karst formations.

C&H Hog Farms, Inc. submitted an Emergency Action Plan to the Department on October 23, 2018. The Emergency Action Plan did not address possible failure of the liner resulting from potential damage, such as pumping and agitation, liner desiccation, or any other site-specific operational risks are not addressed, in accordance with AWMFH 651.0204(a), (b).

The Department reviews all buffers to ensure that the applied buffers are in accordance with the buffer distances proscribed in APC&EC Regulation 5.406(D).

NRCS's Web Soil Survey provides a general guide to soil characteristics and ground-truthing is necessary to confirm those soil characteristics. Walking the fields cannot provide the data necessary to evaluate the fields in accordance with AWMFH 651.0504 (a)–(n) and Table 5-3. The ground penetrating radar studies[2] at Fields 1, 5, and 12 indicated that land application to those fields should be limited in accordance with AWMFH 651.0504 (a)–(n) and Table 5-3. The ground penetrating radar studies suggest that these fields have characteristics identified in AWMFH 651.0504 (a)–(n) and Table 5-3, such as areas of higher permeability, thin soils of less than twenty (20) inches (see excerpts from the ERI Study below), and soils with a significant fractions of rock fragments preventing some soils samples from being taken. The limitations for land application sites based on these soil characteristics are part of the AWMFH with the purpose of preventing contamination of ground water. Geotechnical investigations of the land application fields are necessary to account for the soils characteristics that require limitations on animal waste application.

[2] As part of the BCRET study, USDA, NRCS conducted Ground Penetrating Radar (GPR) Surveys for Fields 1 and 5 in November of 2013 and Field 12 in April of 2014.

Field 5a exhibits average soil thicknesses of 0.5 to 4.5 meters (1.5 to 14.75 feet). Field 12 is a low-lying grazing area with low relief and an uneven topsoil surface. Field 12 exhibits similar average soil thicknesses at 0.7 to 4 meters (2.25 to 13 feet). Field 1 shows an average soil thickness of 0.5 meters (1.5 feet) determined from the ERI surveys and soil sampling. Field 1 has thinner and rockier soils than either Fields 5a or 12. In Field 12, there appears to be a large doline feature (a closed topographic depression caused by dissolution or weathering of underlying rock or soil) within the bedrock, approximately 61 meters (200 feet) across at the

top of the feature, starting 8 meters (26 feet) below the land surface and extending 23 meters (75 feet) vertically downward.[3] Geotechnical investigations of the land application fields are necessary to account for the soils characteristics that require limitations on animal waste application.

[3] Jon Fields and Todd Halihan, Electrical Resistivity Surveys of Applied Hog Manure Sites, Mount Judea, AR (2015).

Data supplied from the C&H Hog Farms, Inc. 2014–2017 annual reports document an increase of soil test phosphorus (STP) from 20 ppm to 68 ppm in Field 17 to a more significant increase in Field 1, which increased from 45 ppm to 173 ppm. As stated in University of Arkansas Division of Agriculture Soil Phosphorus: Management and Recommendations FSA1029[4], "Arkansas scientists agree that there is no agronomic reason or need for STP to be greater than about 50 ppm (Mehlich-3 extraction)." However, "with the move from agronomic to environmental concerns with P, soil P testing has been used to indicate when P enrichment of runoff may become unacceptable. A common approach has been to use agronomic soil P standards, following the rationale that soil P in excess of crop requirements is vulnerable to removal by surface runoff or leaching" (FSA1029). "A large amount of research between 1985 and 2000, showed that as STP (Soil Test Phosphorous) increased, especially in the top 2–4 inches of soil, so did the concentrations of soluble P in runoff (Figure 1)" (FSA1029).

As of the C&H Hog Farms, Inc. 2017 Annual Report, results of all soil test phosphorus were greater than 50 ppm. Despite a reported increase of soil test phosphorus in waste application fields, pursuant to NRCS Code 590, the Arkansas Phosphorus Index may still allow application of swine waste because of other factors including phosphorus source potential, transport potential, and best management practice multipliers. FSA9516[5] states that the phosphorus index approach is most appropriate as it accounts for multiple risk factors and provides a better risk assessment of P loss in runoff.

Geotechnical investigations at all land application sites in accordance with AWMFH 651.0504 (a)–(n) and Table 5-3 are necessary to ensure the efficacy of the API and demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River by rapid infiltration through highly permeable or thin soils.

[4] https://www.uaex.edu/publications/PDF/FSA-9516.pdf

[5] https://www.uaex.edu/publications/pdf/FSA-1029.pdf

ADEQ evaluated total phosphorus concentrations in Big Creek according to the 2016 Assessment Methodology[6] and the 2018 Assessment Methodology[7]. For the 2016 assessment cycle, Big Creek (BUFT06, AU 11010005_020) mean

total phosphorus and total nitrogen were 0.026 mg/L and 0.33mg/L, respectively. The assessment methodology for APC&EC Reg. 2.509 screens the monitoring station's mean total phosphorus and total nitrogen concentration to the 75th percentile for a given ecoregion for the assessment cycle period of record. Screening values for the Boston Mountain ecoregion for 2016 total phosphorus and total nitrogen were 0.036 mg/L and 0.46 mg/L, respectively. The 2018 screening values were 0.036 mg/L and 0.55 mg/L for total phosphorus and total nitrogen. The mean values for 2018 for BUFT06 were 0.028 mg/L total phosphorus and 0.297 mg/L total nitrogen. All mean total phosphorus and total nitrogen for Big Creek were below the Boston Mountain ecoregion 75th percentile. At this time, neither the Buffalo National River nor Big Creek have been identified as impaired for phosphorus based on the EPA-approved Assessment Methodology.
[6] https://www.adeq.state.ar.us/water/planning/integrated/assessment/pdfs/2016-assessment-methodology-draft-04apr16-305b.pdf
[7] https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/final-2018-assessment-methodology.pdf

The prior permit issued under APC&EC Regulation 6 General Permit ARG590000 and the coverage under that permit tracking number ARG590001 are outside the scope of the current permitting decision. The initial Notice of Intent and the corresponding NMP for coverage under the prior APC&EC Regulation 6 permit tracking number ARG590001 were available for public comment during the 30-day public comment period beginning on June 25, 2012.

In the April 1 to June 30, 2018 Quarterly Report, BCRET presents data that documents a statistically significant increase of nitrate-N in the ephemeral stream (BC4) since 2014. However, BCRET notes that chloride, a conservative tracer, did not show a statistically significant increase. Four years of data also indicate a steady increase of geometric mean nitrate-N within the house well (W1) (BCRET April–June 2018, Figure 24). Increased nitrate-N in both the ephemeral stream and the house well does suggest that these systems may be hydrologically connected to areas where farm activities take place. APC&EC Regulation 5 requires the design and waste management plans for liquid animal waste management systems be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies, i.e. karst, that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. Detailed geologic investigations, including a groundwater flow direction study, are necessary to determine that the ephemeral stream and house well are not influenced by the waste storage holding ponds, on-farm activities, or waste management practices.

BCRET data document that nitrate-N is variable; however, Figure 12 of the April 1 to June 30, 2018 BCRET Quarterly Report demonstrates that nitrate-N is higher downstream (BC7) than upstream (BC6). Chlorides and nitrates follow similar seasonal fluctuations in that they are higher during summer and autumn months when stream discharge is most influenced by groundwater. ADEQ reviewed Jim Petersen's May 31, 2018 expert report, which presents an analysis of temporal trends among nitrate-N and E. coli from January 2014–December 2017 at BC6 and BC7. Mr. Petersen's analysis presents decreasing trends of ammonia and chlorides and increasing concentrations of E. coli at BC6. Yet, increasing concentrations of nitrate-N were observed downstream at BC7. The conflicting temporal analysis prompted Mr. Petersen to further review trends upstream to downstream. By analyzing paired concentration data (collected same day) at BC6 and BC7 from January 2014 through December 2017, Mr. Petersen reports significant increases in total nitrogen, ortho-phosphorus, and chlorides, but non-significant changes in E. coli and nitrate-N. The significant increase of nitrate-N in the house well and ephemeral stream does correspond to increases of total nitrogen at BC7. Mr. Petersen's analysis illustrates the complexities of evaluating water chemistry in karst systems.

While no losing/gaining study has been performed to date on Big Creek between BC6 and the confluence with the Buffalo National River, BCRET notes seasonal dryness and rewatering between these two sites. Thomas Aley notes in his expert report of May 24, 2018, that "Big Creek also goes dry during much of the year where it passes over the Boone Formation near C&H Hog Farms." Dye studies performed by Brahana et al. (2016, 2017)[8] and hydrologic studies by Murdoch et al. (2016)[9] in the Big Creek watershed identify potential confounding factors that make direct upstream to downstream comparisons difficult, particularly given the uncertainty that comes with the connectivity of karst hydrology. Groundwater upwelling can greatly influence ionic composition, nutrient concentration, and dissolved oxygen concentrations (Kresse et al. 2014, Cox et al. 2007, Soulsby et al. 2009, Robertson, et al. 2013, Justus et al. 2016).[10]

[8] Brahana, V., J. Nix, C. Kuyper, T. Turk, F. Usrey, S. Hodges, C. Bitting, K. Ficco, E. Pollock, R. Quick, and others. 2016. Geochemical Processes and Controls Affecting Water Quality of the Karst Area of Big Creek near Mt. Judea, Arkansas. Journal of the Arkansas Academy of Science 70:45–58.

Brahana, V., C. Bitting, K. Kosic-Ficco, T. Turk, J. Murdoch, B. Thompson, and R. Quick, 2017, Using fluorescent dyes to identify meaningful water-quality sampling locations and enhance understanding of groundwater flow near a hog CAFO on mantled karst—Buffalo National River, southern Ozarks: *in* Kuniansky, E.L., and Spangler, L.E., eds., U.S. Geological Survey Karst Interest Group Proceedings, San Antonio, Texas, May 19-23, 2017, U.S. Geological Survey Scientific Investigations Report 2017-5023, p. 147-160.

[9] Murdoch, J., C. Bitting, and J. Van Brahana. 2016. Characterization of the karst hydrogeology of the Boone Formation in Big Creek Valley near Mt. Judea,

Arkansas—documenting the close relation of groundwater and surface water. Environmental Earth Sciences 75:1160.
[10] Kresse, T. M., P. D. Hays, K. R. Merriman, J. A. Gillip, D. T. Fugitt, J. L. Spellman, A. M. Nottmeier, D. A. Westerman, J. M. Blackstock, and J. L. Battreal. 2014. Aquifers of Arkansas—Protection, Management, and Hydrologic and Geochemical Characteristics of Groundwater Resources in Arkansas. U.S. Geological Survey Scientific Investigations Report 2014: 5149.
Cox, M.H., Su, G.W. and Constantz, J., 2007. Heat, chloride, and specific conductance as ground water tracers near streams. Ground Water, 45(2), pp.187-195.
Justus, B. G., D. R. L. Burge, J. M. Cobb, T. D. Marsico, and J. L. Bouldin. 2016. Macroinvertebrate and diatom metrics as indicators of water-quality conditions in connected depression wetlands in the Mississippi Alluvial Plain. Freshwater Science 35:1049–1061.
Robertson, W.D., D.R. Van Stempvoort, D.K., Solomon, J. Homewood, S.J. Brown, J. Spoelstra, and S.L. Schiff. 2013. Persistence of artificial sweeteners in a 15-year-old septic system plume. Journal of Hydrology, 477, pp.43–54.
Soulsby, C., I. A. Malcolm, D. Tetzlaff, and A. F. Youngson. 2009. Seasonal and inter-annual variability in hyporheic water quality revealed by continuous monitoring in a salmon spawning stream. River research and applications 25:1304–1319.

On March 25, 2016, John Bailey, on behalf of ADEQ, sent a letter to C&H Hog Farms, Inc. notifying C&H that the requested modification to install a synthetic liner in both lagoons was approved and that the requested modification would expire after one year. Should C&H not install the liners within that one-year period, C&H would be required to resubmit plans and obtain a new approval from the Department. Mr. Bailey approved the installation of synthetic liners under the terms of the now expired General Permit ARG590000, tracking number ARG590001. Mr. Bailey's approval authorizing C&H to install the synthetic liners expired on March 25, 2017.

Although the analytical data from the C&H Drilling Study did not indicate a leak at the borehole drilling location at the time of the sampling, the Study does not support the conclusion that there is not any leakage from the ponds.

> Algal blooms have, and continue to, cause concern on the Buffalo River. As part of the USNPS aquatic invertebrate sampling program, the percentage of the sampling grid with filamentous algae is recorded. Of the monitored locations, the downstream locations tend to have more filamentous algae. The greater occurrence of filamentous algae at the downstream locations may be a response to higher nutrient levels.[1]

ADEQ is working to support a collaborative study with the Arkansas Game and Fish Commission, US Geological Survey, and the National Park Service focused on the distribution and causation of the rapid expansion of filamentous algae in the Buffalo National River.

The Arkansas Department of Health did not submit a comment regarding C&H Hog Farms, Inc., AFIN 51-00164, during the public comment period ending October 24, 2018.

The Department is actively engaged in developing an antidegradation implementation procedure to address the revision of 40 CFR § 131.12. The Department implemented 40 CFR § 131.12 in APC&EC Regulation 2 Chapter 2. As stated in APC&EC Regulation 2.203, it is not the intent of the regulation to dictate regulatory authority over private land within the watershed of an ERW, other than what exists under local, state, or federal law.

The Department acknowledges the following statements from the Buffalo River Watershed-Based Management Plan dated May 22, 2018, regarding threatened and endangered species in the Buffalo River watershed:

> The Buffalo River and its tributaries are considered high quality water resources. The Buffalo River and its tributaries support over fifty (50) species of fish and over twenty (20) species of mussels. Portions of the Buffalo River have been designated critical habitat for the threatened Rabbitsfoot mussel, *Quadrula cylindrical cylindrical* (State/Federal Status: Endangered/Threatened, respectively). The watershed also includes important habitat for endangered bat species: Gray Bat, *Myotis grisescens* (State/Federal Status: Endangered); Indiana Bat, *Myotis sodalis* (State/Federal Status: Endangered); Ozark Big-eared Bat, *Corynorhinus townsendii ingens* (State/Federal Status: Endangered); and Northern Long-eared Bat, *Myotis septentrionalis* (State/Federal Status: Endangered/Threatened, respectively). Cave and other karst features in the Buffalo River watershed are important habitats for all of the protected bat species.[1]

However, the Department did not receive any comments during the comment period ending on October 24, 2018, regarding endangered or threatened species and their associated habitats from Arkansas Game & Fish Commission, Arkansas Natural Heritage Commission, or U.S. Fish and Wildlife Service.

Consideration of tourism is not within the Department's regulatory authority.

The Department acknowledges all the documents referenced in the commenter's comments that are part of the permitting record.

Pursuant to the Memorandum of Agreement between the Board of Trustees of the University of Arkansas System for and on behalf of the University of Arkansas System-Division of Agriculture and the Arkansas Department of Environmental Quality, the study performed by BCRET is being carried out for the use and benefit of ADEQ; however, the study shall be funded and conducted independently of ADEQ and shall meet the requirements of an independent study conducted by professionals in the field of water quality.

Please refer to the Response to Comments for those individuals' or groups' comments which have been incorporated by reference into your comments.

Comment: Please accept my following comment letter that is in response to the ADEQ's decision to hold a public hearing for the denial of the C&H Hog Farm's permit (5264-W) at the ADEQ headquarters in North Little Rock on October 9, 2018. In addition to the already scheduled public hearing the Arkansas Pork Producers Association and its membership would like to request that an additional public hearing be scheduled in the permittee's local community. Public hearings should be scheduled in locations that make attending convenient for the permittee and the local community (i.e. the citizens of Newton County). There have been numerous public hearings over the past 5 years involving C&H Hog Farm and there has always been a hearing in Jasper or the surrounding area. These hearings have always been well attended by the public. The current scheduled public hearing that is schedule for 5:00 p.m. on Tuesday October 9, 2018 at your headquarters is not a convenient time for the public of Newton County. For the public to attend they will have to take a day off work and travel to North Little Rock. Please seriously consider this request and schedule another public hearing in Newton County.

Commenter: Arkansas Pork Producers Association

Response: A public hearing was held in Jasper, Newton County, Arkansas on October 16, 2018.

Comment: FNWR support ADEQ's findings in its proposed denial of the Reg 5 C&H and agrees with the ADEQ's positions as stated in Paragraph 8. "Basis for Permit Decision" pages 2 through 9 of ADEQ's "Statement of Basis". Deficiencies in the Geological Investigation: ADEQ's findings confirm the presence of karst hydrogeology at the C & H site and surrounding area which allows ground water to flow through interconnected underground fissures and cracks and into aquifers which are extremely vulnerable to contamination. Water Quality Issues: ADEQ's findings confirm two segments of Big Creek in Newton County and two segments of the Buffalo National River are now impaired due to the presence of pathogens and low levels of

dissolved oxygen. According to C&H annual reports to ADEQ, approximately 3 million gallons of untreated liquid hog waste have been sprayed on approximately 600 acres of pasture land each year for the past 4 to 5 years. This land is in the Big Creek and Buffalo National River watershed. Dye tracing also has documented that the underground streams which may be hydrologically connected to C&H activities have allowed residential water wells to be contaminated. FNWR believes sound science supports the permit denial and reaffirms the position of tens of thousands of concerned citizens dedicated to the protection of the Buffalo National River. Our members continue to see massive algal blooms in the Buffalo National River which are confirmed to include dangerous cynaotoxins. The presence of these algal blooms and related toxins are not only a threat to public health but are also a threat to the $70 million contribution the Buffalo National River provides to Arkansas's economy and in particular to those counties which border the river. FNWR fully supports ADEQ's position to deny the Reg 5 permit to C&H. Thank you for your consideration.

Commenter: Friends of the North Fork and White Rivers

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Comment: Hey everybody, I wasn't going to talk tonight but after hearing everybody I just felt like it was a good ideal. I am from Huntsville, that's where I went to High School and I went to College at Furman University where I got my Bachelors of Science Degree and so I just wanted to kind of address some of the things that I have analyzed scientifically while listening to you all, I don't know the families at the hog farm, you guys sound like good people I'm assuming you're over here because that's where everybody is looking when they talked about you, so I do feel sympathetic, however some of the science, like people are up here telling you not out emotion but out of facts they have studied, that they have been trained to studied it over the course of sequential years and mind you scientist don't paid a whole like by the way so I'm not getting paid to stand up here by any means. Somebody earlier said that this is the first farm to be denied and that sucks, however stakes are being raised around the world and around the Nation to make us more responsible to take care of the land that's around us so yes maybe you're one of the first people that's being denied because of this reason but you're not going to be the last. Everybody has to raise to these new standards we have to so that we can take care of our land and so that we can continue drink good water and you know farm good crops and all that good stuff. Another statement made was that families are going bankrupt and I just wanted to say, my sympathy, again I don't money I know what is like not to have money so I get it, but sometimes life sucks and you have to adjust and adapt and move forward and find something else to do. The other comment I heard was that water doesn't float up river. Technically this is correct, scientifically it is not correct, because the system of water is that is evaporates and then it condenses and then it rains and then it goes back to the river so this polluted water is going back up into the system and being redistributed in other areas so it does make a difference and so I

want to ask you guy, no I don't want you to be against people who have done these scientific studies because if you're not a scientist and I'm not saying I'm better than you this is just my area expertise. Who is a scientist here and if you're not that's okay but please be open to the ideal that there are fact out there you don't know and if you chose to understand those better then maybe we can help create better solutions together. And then the last thing I guess I want to say is that I do have marine biology experience so I do have experience with science and water and the facts of all sorts of stuff regarding that and then in Florida recently were I was living and doing these studies Red Tide was a huge deal. Did anybody hear about the Red Tide event that occurred recently in Florida? The Red Tide is a Algal Bloom that is affected by increasing heat and it's also affected by increased nutrients, now I don't know a ton about hog farming, but it is an influx of nutrients into the system and it just will make a difference it's just a fact of something that we have to accept and I'm just here to say this stuff as non-bias as I can because I care about people, so I hope that you all could open your minds a little bit and try to reach your hand across the aisle and shake them instead of turning your backs on one another. And that's all.

Commenter: Martha Robinson

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Comment: I'm Carol Bitting I live in Marble Falls (HC73 Box 182A) I shorten my seven (7) minutes as best I could. And I'm going to leave out a lot the history. But I'm going to say, I'm going to give you some information and if you want you can go on-line and you can look it up yourself because you all want to read the signs. In 2013 while we all in shock and in researching how C&H came about I begin to meet others around the community, my first stop was the ADEQ Office in Jasper, there I met three employees in shock. One of the NPDES permit writers for ADEQ was overwhelmed with grief that her prodigy had not informed her of the permit he was Orchestrating. John Bailey was a young ADEQ engineer in Little Rock and didn't converse with the experience in NPDES writer in one of the most protected and sensitive area of the State. He is now employed by Farm Bureau the corporation that's paying the attorney fees for C&H Hog Farms. In Jason Henson's deposition when asked why Farm Bureau is paying attorney fees he said because that's what Farm Bureau does it supports farmers. If that's the case then all farmers need to call Farm Bureau to represent them against this Ag. Farmers don't need permits, C&H is not a farm but instead an Industrial Producer of large amounts of waste and therefore a wastewater permit is required. In November of 2013 Dr. Bob Cross an engineer reported to Ryan Benefield of ADEQ the error of C&H Farms engineers calculations and ADEQ's permitting engineers oversight in a letter about the clay liners of the waste lagoons instead of using correct value and materials C&H and their engineers used material for allowing excess gallons of raw waste to seep daily from the lagoons. NPDES permits are not allow to discharge except during a 25 year storm event, this is the discharge and evidence in declining water quality and the extensive algae downstream of C&H Hog Farms. The same year my husband gave a talk at

Springfield Products, a younger women approached us after the meeting and told us that a Cargile Representative had just spoken to her Agri Hall. The rep told the class that if any (inaudible) given to the most sensitive area of the State, they have the Regs. of the State (inaudible) I had just been told by researcher from University of Arkansas that Big Creek was considered the most sensitive area of the State. To the most sensitive area of the State of Arkansas came on of the most devastating water polluting industry known around the world It separates families, friends, neighbors, and community, destroying physical and medical health, jobs and water quality. You want science? There is a website ADEQ. After C&H Hog Farms there is place call additional information and there are 16,000 pages of depositions, go there, you will see that the University of Arkansas Big Creek stream (inaudible bell going off) is one of the contributors of the scientific data that shows pollution to the Buffalo.

Commenter: Carol Bitting

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The prior permit issued under APC&EC Regulation 6 General Permit ARG590000 and the coverage under that permit tracking number ARG590001 are outside the scope of the current permitting decision. The initial Notice of Intent and the corresponding NMP for coverage under the prior APC&EC Regulation 6 permit tracking number ARG590001 were available for public comment during the 30-day public comment period beginning on June 25, 2012.

Seepage from waste storage ponds has the potential to pollute surface and ground water. The record included one recompacted permeability test that is insufficient to determine liner integrity. The necessary soil investigations including, but not limited to, percentage of fines and soil permeability evaluations, have not been performed at this facility in accordance with the AWMFH 651 Table 10-4 and Appendix 10D. Plasticity index analysis was performed on one sample of the in situ clay material in boring 2. The variability in the regolith expected in this geologic setting coupled with the insufficient data creates additional concerns about the siting and soil sources for the clay liner. The required number of borings were not advanced within the pool areas in accordance with AWMFH 651.0704(b)(4); these additional borings would have provided more data for assessment of clay source material. Proper soil investigations for the liner material are necessary to determine the suitability and location of the clay source material and to consider any additional geotechnical testing to confirm material properties, which will reduce the potential for downward and/or lateral seepage of the stored wastes.

Additionally, NRCS, in Appendix 10D of the AWMFH, indicates that special design measures are necessary where agricultural waste storage ponds are constructed in soils with high calcium content (BCRET Quarterly Report for October 2016 to December 2016, Table 10, page 71) or highly unfavorable geologic conditions, such as karst formations.

Comment: BRWA comments have already been submitted and tonight I'm speaking as an individual and I'd like to comment about the undue influence of Big Money special interests on this process, namely Arkansas Farm Bureau. - Over and over we keep hearing, base the permit decision on science not emotion. Well, BR W A submitted over 130 pages of comments based on regulations, facts and science. Many others did the same. Yet Farm Bureau posts slick videos of C&H based not on science but on emotion and invokes fear among supporters -telling them you're next, which of course is false and alarmist. This is about one facility in the wrong place, threatening the BNR. - They say ADEQ is "moving the goal posts" and "changing the rules midstream". That's not so. The rules were the same in 2012 as they are now. They just weren't properly enforced. A mistake in 2012 does not justify repeating that mistake now. -Let's go back to the beginning- when the public was first incensed by the lack of public notice when the C&H permit was issued, with no opportunity to object until it was too late. Why was there no public notice? Ask those lobbyists from special interests who helped craft the regulation back in 2011, including Butterball, Tyson, and Farm Bureau. If proper public notice had been provided the public would have made the same convincing arguments, insisting that the regs be followed, the permit would have been denied, and we wouldn't be here today. - FB and other special interest lobbyists helped create this problem and are making it worse by making C&H the poster child for "right to farm". The right to farm ends at the fencerow. When it crosses the fence and becomes a neighbors problem, or in this case a Nation's problem, that's not right at all. It's flat wrong. - FB claims to be the "voice of agriculture". They may speak for Big Ag like Cargill, Tyson or JBS, but they're not the voice of small farmers who are run out of business by the dozens every time they facilitate a CAFO like C&H. Here's a factoid: between 1980 and 2011, as CAPOs became the norm, the number of hog operations in the US dropped from 666,000 to 69,000 while the number of hogs sold remained the same. Concentration is the name of the game and small farmers are the losers. - FB helped create this mess. Now, if they really want to help farmers, instead of making it worse it's time they make it right. Stop obstructing ADEQ and take that money you're spending on lawyers and use it to help make the C&H owners whole.

Commenter: Gordon Watkins

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The prior permit issued under APC&EC Regulation 6 General Permit ARG590000 and the coverage under that permit tracking number ARG590001 are

outside the scope of the current permitting decision. The initial Notice of Intent and the corresponding NMP for coverage under the prior APC&EC Regulation 6 permit tracking number ARG590001 were available for public comment during the 30-day public comment period beginning on June 25, 2012.

Comment: See Attached: Carol Bitting

Commenter: Carol Bitting

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The prior permit issued under APC&EC Regulation 6 General Permit ARG590000 and the coverage under that permit tracking number ARG590001 are outside the scope of the current permitting decision. The initial Notice of Intent and the corresponding NMP for coverage under the prior APC&EC Regulation 6 permit tracking number ARG590001 were available for public comment during the 30-day public comment period beginning on June 25, 2012.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table

5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

> Algal blooms have, and continue to, cause concern on the Buffalo River. As part of the USNPS aquatic invertebrate sampling program, the percentage of the sampling grid with filamentous algae is recorded. Of the monitored locations, the downstream locations tend to have more filamentous algae. The greater occurrence of filamentous algae at the downstream locations may be a response to higher nutrient levels.[1]

ADEQ is working to support a collaborative study with the Arkansas Game and Fish Commission, US Geological Survey, and the National Park Service focused on the distribution and causation of the rapid expansion of filamentous algae in the Buffalo National River.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Pursuant to the Memorandum of Agreement between the Board of Trustees of the University of Arkansas System for and on behalf of the University of Arkansas System-Division of Agriculture and the Arkansas Department of Environmental Quality, the study performed by BCRET is being carried out for the use and benefit of ADEQ; however, the study shall be funded and conducted independently of ADEQ and shall meet the requirements of an independent study conducted by professionals in the field of water quality.

The Beautiful Buffalo River Action Committee (BBRAC) has been established for the purpose of addressing potential water-quality concerns throughout the Buffalo River Watershed and to protect the vitality of the Buffalo National River as a national, state, and local landmark. Governor Asa Hutchinson directed five agencies to develop an Arkansas-led approach to identify and address potential issues of common concern in the watershed. A key priority of BBRAC was to initiate the development of a Buffalo River Watershed Management Plan. The nine-element watershed management plan was developed for the Buffalo River Watershed, and the final plan was submitted and accepted by EPA in June 2018. Watershed management plans are recognized by EPA as comparable, state-led

management approaches expected to result in the attainment of water-quality standards.

Comment: There is a family farm at stake. If permit is not granted they are at risk of losing everything they own. At a minimum, the Dept. should allow a 20-day extension of the comment period per Reg. 8

Commenter: Evan Teague

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Department granted an extension of the public comment period for the C&H Hog Farms, Inc. APC&EC Regulation 5 draft permitting decision until 4:30 p.m. on October 24, 2018.

Comment: I firmly support the Arkansas Department of Environmental Quality's decision to deny C&H Hog Farms request for a Regulation 5 permit. I base my decision on the strong technical data reported in the depositions by Dr. Robert E. Blanz (ADEQ), Mr. Thomas Aley (, Mr. David Mott (National Park Service, retired; USGS, retired), and in the documents that I have previously provided to you on which I was an author. These dealt with groundwater studies we conducted, and include the following peer-reviewed studies:

Brahana, Van, Bitting, Carol, Kosic-Ficco, Katarina, Turk, Teresa, Murdoch, John, Thompson, Brian, and Quick, Ray, 2017, Using fluorescent dyes to identify meaningful water-quality sampling locations and enhance understanding of groundwater flow near a hog CAFO on mantled karst—Buffalo National River, southern Ozarks: in Kuniansky, E.L., and Spangler, L.E., eds., U.S. Geological Survey Karst Interest Group Proceedings, San Antonio, Texas, May 19-23, 2017, U.S. Geological Survey Scientific Investigations Report 2017-5023, p. 147-160.

Brahana, V., Nix, J., Kuyper C., Turk, T., Usrey. F., Hodges, S., Bitting, C., Ficco, K., Pollock, E., Quick, R., Thompson, B., and Murdoch, J., 2016, Geochemical processes and controls affecting water quality of the karst area of Big Creek near Mt. Judea, Arkansas: Journal of the Arkansas Academy of Science, v. 70, p. 45-58.

Murdoch, John, Bitting, Carol, Brahana, John Van, 2016, Characterization of the karst hydrogeology of the Boone Formation in Big Creek Valley near Mt. Judea, Arkansas—Documenting the close relation of groundwater and surface water: Environmental Earth Sciences, v. 75;1160, 16 p. (DOI 10.1007/s12665-016-5981-y)

Data in these depositions and these reports strongly support the hydrogeologic interpretation that groundwater in the vicinity of C&H and their spreading fields is being contaminated by the feces and urine from the C&H hog waste, and is moving through underground karst voids and conduits

to tributaries to the Buffalo National River, and degrading the quality of that river. Please deny the Regulation 5 permit. Thank you.

Commenter: John Van Brahana

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Comment: First, a little about my qualifications. I have bachelor and master degrees in forestry from Clemson U. and a PhD in geosciences from the U. of Arizona, with a concentration in watershed management. I have spent my academic career teaching in the environmental sciences and doing research on paleoclimate and climate change through dendrochronology. I am an associate of the members of the Geosciences Dept. who are closely involved with watershed management such as Dr. Van Brahana.
In my training in forestry, I was taught that many valuable things could be gotten from a forest. Often the most valued but least valuable thing was timber. Often the most valuable but least valued "product" of a forested watershed was clean, abundant water delivered in a controlled manner (without flooding).
The decision to put a CAFO in the Buffalo R. watershed on karst terrain was criminal, quite literally. The original plan did not call for impermeable liners for the waste ponds, but specified that there would be a certain amount of leakage from the holding ponds. Spraying waste on a few fields is inadequate. It guarantees continuing pollution of groundwater. So this CAFO has been polluting the watershed from day one. How do you explain the decision to allow that? Perhaps it was a product of corruption?
It will take a long time for the pollution already introduced into the groundwater to clear, even if the pollution were stopped today. But it is continuing. What is the first maxim of policy-making? "When you are in a hole, stop digging." Wastes should be trucked out of the watershed, beginning immediately, and the CAFO should be shut down. That would require the state to make the owners whole, but since it was the state that blundered in permitting the operation in the first place, the state should do the right thing. The continuing losses from impaired recreation in the National River when the NPS has to shut down access to the river because of contaminant loads will cost the state far more than getting rid of this CAFO.
I urge the ADEQ to contact the Attorney General to start an investigation of the way the permitting process was conducted. I strongly suspect that there was collusion between private interests, ADEQ personnel and federal employees to sneak the initial permit in under the radar. An NPS employee stated publicly that he inquired if something were going on, but was kept in the dark.

Commenter: Malcolm Cleaveland

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The prior permit issued under APC&EC Regulation 6 General Permit ARG590000 and the coverage under that permit tracking number ARG590001 are outside the scope of the current permitting decision. The initial Notice of Intent and the corresponding NMP for coverage under the prior APC&EC Regulation 6 permit tracking number ARG590001 were available for public comment during the 30-day public comment period beginning on June 25, 2012.

Comment: See Attached: Carol Bitting (2)

Commenter: Carol Bitting

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The API, (Strategy 2 in AWMFH 651.0015) is a risk-based approach for assessment of phosphorus loadings as it regards surface runoff. The Statement of Basis for ADEQ's draft denial of the permit discusses the severe and unknown limitations for many of the application fields as well as the field phosphorus build-up and the legacy phosphorus (see pages 4 of 9, 7 of 9, and 8 of 9) issues.

The Statement of Basis does not address the alleged discrepancy in the number of swine at the facility among the various Design Reports and applications.

> Algal blooms have, and continue to, cause concern on the Buffalo River. As part of the USNPS aquatic invertebrate sampling program, the percentage of the sampling grid with filamentous algae is recorded. Of the monitored locations, the downstream locations tend to have more filamentous algae. The greater occurrence of filamentous algae at the downstream locations may be a response to higher nutrient levels.[1]

ADEQ is working to support a collaborative study with the Arkansas Game and Fish Commission, US Geological Survey, and the National Park Service focused on the distribution and causation of the rapid expansion of filamentous algae in the Buffalo National River.

The prior permit issued under APC&EC Regulation 6 General Permit ARG590000 and the coverage under that permit tracking number ARG590001 are outside the scope of the current permitting decision. The initial Notice of Intent and the corresponding NMP for coverage under the prior APC&EC Regulation 6 permit tracking number ARG590001 were available for public comment during the 30-day public comment period beginning on June 25, 2012.

The Department acknowledges the following statements from the Buffalo River Watershed-Based Management Plan dated May 22, 2018, regarding threatened and endangered species in the Buffalo River watershed:

> The Buffalo River and its tributaries are considered high quality water resources. The Buffalo River and its tributaries support over fifty (50) species of fish and over twenty (20) species of mussels. Portions of the Buffalo River have been designated critical habitat for the threatened Rabbitsfoot mussel, *Quadrula cylindrical cylindrical* (State/Federal Status: Endangered/Threatened, respectively). The watershed also includes important habitat for endangered bat species: Gray Bat, *Myotis grisescens* (State/Federal Status: Endangered); Indiana Bat, *Myotis sodalis* (State/Federal Status: Endangered); Ozark Big-eared Bat, *Corynorhinus townsendii ingens* (State/Federal Status: Endangered); and Northern Long-eared Bat, *Myotis septentrionalis* (State/Federal Status: Endangered/Threatened, respectively). Cave and other karst features in the Buffalo River watershed are important habitats for all of the protected bat species.[1]

However, the Department did not receive any comments during the comment period ending on October 24, 2018, regarding endangered or threatened species and their associated habitats from Arkansas Game & Fish Commission, Arkansas Natural Heritage Commission, or U.S. Fish and Wildlife Service.

The Department is actively engaged in developing an antidegradation implementation procedure to address the revision of 40 CFR § 131.12. The Department implemented 40 CFR § 131.12 in APC&EC Regulation 2 Chapter 2. As stated in APC&EC Regulation 2.203, it is not the intent of the regulation to dictate regulatory authority over private land within the watershed of an ERW, other than what exists under local, state, or federal law.

C&H Hog Farms, Inc. submitted an Emergency Action Plan to the Department on October 23, 2018. The Emergency Action Plan did not address possible failure of the liner resulting from potential damage, such as pumping and agitation, liner desiccation, or any other site-specific operational risks are not addressed, in accordance with AWMFH 651.0204(a), (b).

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require

the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Consideration of tourism is not within the Department's regulatory authority.

Comment: I am both a recreational floater and a retired engineer who has had to deal with issues in a complex regulatory environment. I know the beauty and economic value of the Buffalo due to tourism, but I also know the difficulty of getting professionals to agree on how to interpret complex regulations, and I know the importance of a stable regulatory environment where the interpretations are not changed to suit the political leanings of the day. I have been floating the Buffalo since the 1960's, and the changes in the river and water quality are dramatic and having a very negative impact on the recreational value of this public resource. The extent of algae blooms in the river in the summers of 2017 and 2018, while not "new", have been noted by many to be far in excess of what has been historically observed, and without a doubt the current level of algal growth is degrading the recreational experiences that this river provides and will have negative economic impact on the tourism industry of the region. That said, these changes did not begin suddenly after December of 2013 when C&H first began spreading on local fields. But this comment period is not about every potential influence on water quality – it is about one specific facility, so I will return to that: As was noted in ADEQ's draft permit denial, the latest draft 303(d) list clearly documents that water quality in Big Creek and associated reaches of the

Buffalo River is now "degraded". I agree that is an issue that needs to be considered in reviewing the permit application, as the farm is very likely one of the factors impacting water quality in Big Creek. ADEQ has admitted in writing that their own review was sharpened following the unprecedented level of public comments. ADEQ should enforce regulations and provide rigorous, science-based reviews that protect water quality independent of whether or not the public provides numerous comments on the matter at hand. If it is the determination of ADEQ using peer-reviewed science that any significant portion of this degradation is being caused by the Hog Farm, then ADEQ should deny the permit application. If evidence is not sufficient at this time to deny the permit on the basis of degrading water quality, then the permit should be approved but with additional stipulations as needed to protect water quality in the future. Since it is unlikely that there will ever be agreement among the experts as to what borings would eliminate doubts about pond leakage, I believe that the new requirements should include addition of a synthetic liner. Further, as more data becomes available there must be a rigorous process for revising the Nutrient Management Plan (NMP) as needed in response to scientific data from soil samples, water samples, and any other changes that may impact key NMP inputs such as changes in land use.

Commenter: Harmon Chadbourn

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

ADEQ considers all readily available data to determine the status of water quality in Arkansas and to identify waterbodies that fail to meet standards defined in APC&EC Regulation 2. ADEQ recently completed water quality assessments for the development of a proposed 2018 303(d) List and 305(b) Integrated Report as required by the Clean Water Act. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen.

> Algal blooms have, and continue to, cause concern on the Buffalo River. As part of the USNPS aquatic invertebrate sampling program, the percentage of the sampling grid with filamentous algae is recorded. Of the monitored locations, the downstream locations tend to have more filamentous algae. The greater occurrence of filamentous algae at the downstream locations may be a response to higher nutrient levels.[1]

ADEQ is working to support a collaborative study with the Arkansas Game and Fish Commission, US Geological Survey, and the National Park Service focused

on the distribution and causation of the rapid expansion of filamentous algae in the Buffalo National River.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Consideration of tourism and revenue is not within the Department's regulatory authority.

Comment: I fully support ADEQ's draft Regulation 5 permit denial for C & H Hogfarm at Mt. Judea, Arkansas. Please see my attached comments as an individual and my request that the comments submitted by The Ozark Society, are incorporated by reference, word for word. Since 1971, I have canoed the beautiful, spectacular waters, high bluffs, the flora and fauna and peace of the Buffalo National River. The wildlife - birds, otters, deer, bobcats, mink waterfowl have enchanted me, along with watching the light change on the bluffs, now there is unbelievable volumes of algae clogging the channels of the Buffalo. There is compelling scientific evidence that excess nutrients from C & H Hogfarm's concentrated animal feeding operation, is polluting the Buffalo River, as well as it's tributary, Big Creek. Comments attached.
Commenter: Alice B. Andrews

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Arkansas Department of Health did not submit a comment regarding C&H Hog Farms, Inc., AFIN 51-00164, during the public comment period ending October 24, 2018.

The Department is actively engaged in developing an antidegradation implementation procedure to address the revision of 40 CFR § 131.12. The Department implemented 40 CFR § 131.12 in APC&EC Regulation 2 Chapter 2. As stated in APC&EC Regulation 2.203, it is not the intent of the regulation to dictate regulatory authority over private land within the watershed of an ERW, other than what exists under local, state, or federal law.

C&H has applied for an APC&EC Regulation 5 Individual No Discharge permit. APC&EC Regulation 5.303 prohibits point source discharges from any part of the liquid animal waste management system.

ADEQ considers all readily available data to determine the status of water quality in Arkansas and to identify waterbodies that fail to meet standards defined in

APC&EC Regulation 2. ADEQ recently completed water quality assessments for the development of a proposed 2018 303(d) List and 305(b) Integrated Report as required by the Clean Water Act. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Seepage from waste storage ponds has the potential to pollute surface and ground water. The record included one recompacted permeability test that is insufficient to determine liner integrity. The necessary soil investigations including, but not limited to, percentage of fines and soil permeability evaluations, have not been performed at this facility in accordance with the AWMFH 651 Table 10-4 and Appendix 10D. Plasticity index analysis was performed on one sample of the in situ clay material in boring 2. The variability in the regolith expected in this geologic setting coupled with the insufficient data creates additional concerns about the siting and soil sources for the clay liner. The required number of borings were not advanced within the pool areas in accordance with AWMFH 651.0704(b)(4); these additional borings would have provided more data for assessment of clay source material. Proper soil investigations for the liner material are necessary to determine the suitability and location of the clay source material and to consider any additional geotechnical testing to confirm material properties, which will reduce the potential for downward and/or lateral seepage of the stored wastes.

C&H Hog Farms, Inc. submitted an Emergency Action Plan to the Department on October 23, 2018. The Emergency Action Plan did not address possible failure of the liner resulting from potential damage, such as pumping and agitation, liner desiccation, or any other site-specific operational risks are not addressed, in accordance with AWMFH 651.0204(a), (b).

The Department acknowledges the following statements from the Buffalo River Watershed-Based Management Plan dated May 22, 2018, regarding threatened and endangered species in the Buffalo River watershed:

> The Buffalo River and its tributaries are considered high quality water resources. The Buffalo River and its tributaries support over fifty (50) species of fish and over twenty (20) species of mussels. Portions of the Buffalo River have been designated critical habitat for the threatened Rabbitsfoot mussel, *Quadrula cylindrical cylindrical* (State/Federal Status: Endangered/Threatened, respectively). The watershed also includes important habitat for endangered bat species: Gray Bat, *Myotis grisescens* (State/Federal Status: Endangered); Indiana Bat, *Myotis sodalis* (State/Federal Status: Endangered); Ozark Big-eared Bat, *Corynorhinus townsendii ingens* (State/Federal Status: Endangered); and Northern Long-eared Bat, *Myotis septentrionalis* (State/Federal Status: Endangered/Threatened, respectively). Cave and other karst features in the Buffalo River watershed are important habitats for all of the protected bat species.[1]

However, the Department did not receive any comments during the comment period ending on October 24, 2018, regarding endangered or threatened species and their associated habitats from Arkansas Game & Fish Commission, Arkansas Natural Heritage Commission, or U.S. Fish and Wildlife Service.

Rule-making regarding a permanent moratorium is outside the scope of this permitting decision.

Consideration of tourism is not within the Department's regulatory authority.

Comment: A public hearing to accept comments on the draft denial of C & H Hog Farms's Regulation 5 permit, Permit No. 5264-W, has been scheduled by ADEQ for October 9, 2018 at 5:00pm CT at ADEQ's North Little Rock office in Pulaski County, Arkansas. C & H Hog Farms feels it would be more appropriate for a public hearing to be held in the county in which the farm is located. Doing so will provide a better opportunity for residents of the county to make public comments. As such, C & H Hog Farms is requesting that ADEQ conduct a public hearing in Newton County, Arkansas.

Commenter: Jason Henson

Response: A public hearing was held in Jasper, Newton County, Arkansas on October 16, 2018.

Comment: We support the decision by ADEQ to deny the permit and have submitted 100+ pages of technical very technical information to support our position. But actually I want to talk about three things that are really sort of sociological in this meeting and it has to do with what most are urban or rural legends I guess, or rumors. One of them is that I think that we should have a technical team check out the possible impact of canoers and other recreations on water quality. The 2013/14 study by Stan Todd of Arkansas Game and Fish Commission and Sean Hodges of the Buffalo National River, give reasonably accurate estimates of yearly floater days but in fact only about 15% of visitors actually float. So there's a number floating around of about 2 million people or something, they are not all jumping in canoes and going down the river. The Health Department knows typical metabolic daily productions of nitrates in human urine and from that it is possible to deduce the maximum possible contribution to the yearly nitrate load from floaters. Even if all floaters peed in the river at every opportunity, only a small fraction of the nitrate load in the river actually comes from floaters. This can be documented and I think we have state agencies that can do it. my estimate, I'm a statistician mathematician, is that much less than 1% of the nitrate in that area comes from, could possibly come from floaters, period. And why is that? Well on any given day the farm animals in Newton County outweigh floaters by at least 400 to 1. I mean you can just total up the mass in the city. Floaters just don't have the capacity to out pee the farm animals and wildlife. Even if they were terribly irresponsible, which I hope they're not, I don't deny that the parks service should do a better job of informing and enforcing human problems there, but floaters aren't the main contributor even remotely close.

Second issue is feral hogs. Game and Fish people tell me that population estimates for feral hogs are very difficult and I don't doubt that. They're mobile. The only estimate I have seen in research papers is 4 feral hogs per square mile for the state, but this is unlikely to be accurate for the Buffalo River watershed. We know that, right? Eradication efforts as proposed by AR legislature need at least a 70% yearly kill rate in order to be of any effectiveness. So how do you know if you're getting a 70% kill rate if you don't know how many are there? So I propose that before money is invested in hog eradication in the Buffalo River watershed that Game and Fish, Agricultural Department, actually make a decent population estimate. A capture, recapture method using what's called a Peterson (that's not me) estimators might work in a restricted watershed like Big Creek. It should be done so you know where they are and what they are so there's an estimate of what damage that can be done. Then it's possible to generate a cost benefit estimate for controlling feral hogs. They should be controlled in some way but you need to know what you're talking about before you do it. And the third thing I want to discuss is drug resistance to staph and other bacterial infections. They're becoming an ever-growing problem in the US. Antibacterial drugs are no longer used in meat production to my knowledge, but the use of preventive antibacterial drugs on CAFOs have been linked to increased prevalence to resistant bacterial in nearby reservoirs. That's a non-trivial problem. Even restricting use of farm antibiotics to those not commonly used in humans does not solve the problem. The school children and the entire town of Mount Judea spend most of their day within several hundred yards of spread fields. I think it would be worthwhile to help the public to test these children and residents for abnormally high resistant bacterial counts. They can compare them to any place in the state of Arkansas. This would be a good voluntary project to reassure local parents if nothing is found, which would be the best result. But it would also improve health conditions if it's needed. Thank you.

Commenter: David Peterson

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Feral hog management is not within the Department's regulatory authority.

The Arkansas Department of Health did not submit a comment regarding C&H Hog Farms, Inc., AFIN 51-00164, during the public comment period ending October 24, 2018.

Comment: Please accept my comment on the draft regulation 5 swine waste permit denial for the C&H hog CAFO. I support the ADEQ decision to deny the permit based upon the points established in ADEQ's statement of basis for denial which I have included in my comments below. The presence of karst triggers additional considerations for siting and design as stated in the Animal Waste Management Field Handbook. It's inappropriate to site a CAFO like C&H in

karst. And especially with the hydrogeology that occurs connecting it to the Buffalo National River as evidenced in Professor Van Brahana's dye trace studies. ADEQ has identified karst at the site and the Big Creek research team reported that the core sample from the Harber drilling study had a calcium content of 382 176 mg/kg of soil at a depth of 25 ft. Epikarst serves as a conduit for liquids to travel through karst terrain. The Big Creek research extension team has documented an increase in nitrate near the facility. A ground monitoring flow direction study has not been performed. Increase in nitrate in both the ephemeral stream and the house well suggest that these systems may be hydrologically connected to areas where farm activities take place. Pond construction quality assurance is a real issue since the C&H record included only one recompacted permeability test. That single test is insufficient to determine liner integrity. The necessary soil investigations including but not limited to percentage of fines in soil permeability evaluations have not been performed at this facility in accordance with AWMFH. And I wanted to read a couple of comments from two Norwegian visitors at the park. One of them, Elsa Kobe, said "to preserve the Buffalo River is so important. Every visit every time we come to the United States we come to the Buffalo River." And Harold Kobe said "The Buffalo River is not only a historical interest as a national park, it is a special place that makes us come whenever visiting this part of the US. Preserve it for future generations." So I just wanted to read those because this is not just a Newton County issue, an Arkansas State issue, or I mean, it's a national park that people from all over the world visit and love and I think that says something about how wonderful it is and how Arkansas needs to protect it.

Commenter: Marti Olesen

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Department acknowledges the commenter's statements that reiterate the Department's statements in the Statement of Basis.

Comment: I live on Bear Creek in Northern Boone County. When we have large rain events, more than 8" of rain in 3 days, the creek floods at levels 10' to 15' above normal. When truly catastrophic rain levels occur as has happened recently with hurricanes Harvey, Florence, and Michael, it is not possible to design holding ponds that will not overflow/breech and contaminate all areas downstream. This has recently occurred in the Carolinas with devastating effects on watersheds and human populations. Reports indicate that affected areas will be contaminated for years and may never return to pre-flood conditions. It is a near certainty that our area will be subject to such flooding events at more frequent intervals, possibly as offend as every 10 -15 years. In my career in the nuclear power industry, locating a plant where such obvious hazards exist would constitute a complete dereliction of duty. Similarly, permitting C&H Hog Farm (and others which will surely follow) in the Buffalo National River watershed constitutes a complete

abdication of the responsibility of ADEQ to protect our region from such obvious environmental hazards.

Commenter: Edward Proctor

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

ADEQ must follow its regulations. APC&EC Regulation 5 requires the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. The permit application record lacks the requisite information to evaluate the permit application for compliance with APC&EC Regulation 5. ADEQ cannot issue a permit when the permit application does not meet the requirements of the applicable regulation.

Comment: As someone who has been focused on the presence of a hog CAFO that was sited within the Buffalo watershed, from the beginning it was clear that this operation had been rushed into place to avoid adverse public reaction. Now, in reading through the depositions of many of those involved, it is clear that our suspicions about whether due diligence had been sacrificed in the haste to get the CAFO built were correct. I now know that an out-of-state engineer erred in how he used software designed to calculate the amount of nutrients that could be safely applied to the fields. Whether it was unintentional or deliberate, misusing the program allowed C&H to dump manure on fields far in excess of what the grasses could uptake. And no one in our state agencies noticed. Andrew Sharpley testified that plans to use equipment designed to measure subsurface flow was damaged by the flooding of the fields where the devices had been deployed. Why worry about what's happening under the field when Big Creek is washing over the top of the field, carrying away all the excess P in the ground due to over application? I also read about Jason Henson's practice of stirring or agitating the main waste pond to keep the solids from filling it up too fast, and in the process, changing the makeup of the slurry so that it was more potent in terms of nutrients.
I resent that as an Arkansas citizen, I am paying for the BCRET study that refused to focus on monitoring trends and instead has spent years gathering data but not doing the analysis that would show that tons of excess nutrients were being applied while at the same time, the Buffalo River was undergoing a rapid change from a beautiful recreational and natural resource to an algae stuffed, highly objectionable travesty that can hardly be called our state's crown jewel. Anyone who floated the river below Carver this last summer, and more so below Gilbert, likely found themselves swatting biting flies, swarms of them that weren't there before. An algae specialist explained that when algae mats cover large surface areas, they cause the water temps to rise. Warmer water attracts these biting flies who breed in warm waters. The ecosystem changes in ways large and small when humans abuse the watershed and put it out of balance. What humans do on the land ends up in the water. This in an inconvenient truth for those promoting

the growing of thousands of large mammals in metal sheds in an area where thin soils cover porous substrate. Now that there is many years worth of excess phosphorus in the ground surrounding Big Creek, will Farm Bureau and the Pork Producers step up to help clean up the mess they helped create?
I stand with ADEQ in their belated attempt to make this right. How does ADEQ plan to help heal this waterway? Will ADEQ advocate for a nutrient surplus designation within the watershed?

Commenter: Lin Wellford

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The prior permit issued under APC&EC Regulation 6 General Permit ARG590000 and the coverage under that permit tracking number ARG590001 are outside the scope of the current permitting decision. The initial Notice of Intent and the corresponding NMP for coverage under the prior APC&EC Regulation 6 permit tracking number ARG590001 were available for public comment during the 30-day public comment period beginning on June 25, 2012.

Pursuant to the Memorandum of Agreement between the Board of Trustees of the University of Arkansas System for and on behalf of the University of Arkansas System-Division of Agriculture and the Arkansas Department of Environmental Quality, the study performed by BCRET is being carried out for the use and benefit of ADEQ; however, the study shall be funded and conducted independently of ADEQ and shall meet the requirements of an independent study conducted by professionals in the field of water quality.

The Beautiful Buffalo River Action Committee (BBRAC) has been established for the purpose of addressing potential water-quality concerns throughout the Buffalo River Watershed and to protect the vitality of the Buffalo National River as a national, state, and local landmark. Governor Asa Hutchinson directed five agencies to develop an Arkansas-led approach to identify and address potential issues of common concern in the watershed. A key priority of BBRAC was to initiate the development of a Buffalo River Watershed Management Plan. The nine-element watershed management plan was developed for the Buffalo River Watershed, and the final plan was submitted and accepted by EPA in June 2018. Watershed management plans are recognized by EPA as comparable, state-led management approaches expected to result in the attainment of water-quality standards.

Comment: To ADEQ Decision Team: Decisions of this nature often bring with them many different political pressures. Often pushing the deciding team to be exposed to undue stresses. None the less, this particular issue about the potential of the Buffalo National River receiving excess contaminants is a rather significant one. Many times environmental agencies are faced with these important topics. I too, have been around similar decisions and seen the outcomes. In the end, it's impossible to please all parties to their utmost satisfaction. However, almost everytime a decision is made, it is possible to reach a compromise that touches aspects of each party's interests while still maintaining sound and environmentally safe operations. With that I would like you to think about the following alternative decision with rationale behind it. First, the ADEQ must make an environmentally safe decision about the operation of a large swine production facility within a popular and rather sensitive watershed. All the while, maintaining support from all interest groups to streamline future decisions made by ADEQ. Maintaining support from all groups will aid the department in the future by ensuring Arkansas citizens that honest, trustworthy decisions are being made that lookout for the best interest of everyone and not just one particular group. It is my experience that severe lop-sided decisions will only gain support from one side and in this case will rapidly increase the resentment of either interest group that sees themselves in a losing outcome. Future decisions will be appealed and lead to many more tax payer dollars being spent in litigation and lawsuits rather than important monitoring protocols in all the other sensitive water bodies in Arkansas. In some cases, individuals have been sued when they didn't dot all the i's and cross their t's. So please do what's best for everyone in the name of civility. Next, a decision in complete favor of C&H Hog Farms continuance of operations with no mitigations addressing the environmental concerns brought forward from groups like the BRWA will definitely leave their interest groups in total disarray and will eventually lead to more appeals and litigations where more and more tax payer dollars would be spent instead of important water quality studies in other water bodies of Arkansas. We, the people of Arkansas, depend on sound professionals from within ADEQ to maintain environmentally safe decisions by implementing logical scientific practices and monitoring protocol of all streams, reservoirs, watersheds, etc. When you spend your budget focusing more and more on litigation within one watershed, many others are being neglected. This leads to distrust from farmers and many others such as what we are seeing now. With that being said, BRWA wants a no operation decision. Would this ensure that C&H Hog Farms never contributed pollutants into the waters of the Buffalo River watershed? Sure it would! Do we all know that the waters within the Buffalo River watershed will still have pollutants if C&H never runs another pig through their facility? Sure we do. We're not all hydrology experts like the ones we depend on within ADEQ Division of Water Quality but we are intelligent enough to know that C&H is not the only potential pollutant to the watershed. Also, will ADEQ be finished when they issue a denial? No, they will be appealed by supporters of all types of farm operations within Arkansas and the department will lose the trust of many people. Will the department be at risk of more lawsuits? Sure they will. There is a strong farm base in Arkansas. At the same time, many small farms are afraid of "being next." We ask ADEQ to support all parties because we really do depend on your professionals to guide us in an environmentally safe manner while maintaining the highly productive agricultural economy Arkansas is known for. Therefore, in conclusion, we the supporters of all farming operations including C&H Hog Farms would like to propose that the operation of hog farming continue and to allow these hardworking families to

provide jobs and revenue for our small community. Due to the location of C&H hog facility within the sensitive Buffalo River watershed, the potential amount of waste produced, and because there have been no current findings of contributions of pollutants into the watershed from the hog facility; we would like ADEQ Division of Water Quality to address the concerns of pollution by developing monitoring protocol to mitigate the potential for any negative impacts caused by C&H operations. In response to the potential of negative impacts caused by excessive leaching of fertilizer, there can be action plans in place as to the restriction of timing on fertilizer applications to prevent excessive leaching of nitrogen, the amount of fertilizer to be applied per acre will be limited to ?? Dry tons/acre or ?? Liquid gal/acre. In an effort to address the concerns of the leakage of manure holding ponds, when monitoring determines pollutants are reaching unsafe depths below surface then C&H must cease all storage and remove manure until remedies can be applied to prevent potential contamination of ground water. In the event that C&H fails to comply with monitoring program and prevention plans, all permitted operations will be suspended until conditions are met. Setup control streams where there is nothing but nutrient byproducts of natural decomposition being added to the stream so people know for sure that the data is not skewed to fit the interests of one group. You're the experts we depend on!!! In the end, we depend on ADEQ to make decisions that will be of the best interests of all Arkansas residents; not just farmers and not just environmental groups. We all have a job to do and want to make a difference so let's make a difference for everyone involved. Keep it safe and keep it running! I SUPPORT C&H!!!

Commenter: Stuart Brasel

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Pursuant to the Memorandum of Agreement between the Board of Trustees of the University of Arkansas System for and on behalf of the University of Arkansas System-Division of Agriculture and the Arkansas Department of Environmental Quality, the study performed by BCRET is being carried out for the use and benefit of ADEQ; however, the study shall be funded and conducted independently of ADEQ and shall meet the requirements of an independent study conducted by professionals in the field of water quality.

ADEQ does not regulate all types of farming operations. The Department's permitting decision for this APC&EC Regulation 5 Individual No Discharge permit application pertains only to this individual permit application for a liquid animal waste management system, not all farming operations. Applications for Regulation 5 permits are evaluated according to Regulation 5 requirements.

ADEQ must follow its regulations. APC&EC Regulation 5 requires the designs and waste management plans for liquid animal waste management systems to be

in accordance with the AWMFH. The permit application record lacks the requisite information to evaluate the permit application for compliance with APC&EC Regulation 5. ADEQ cannot issue a permit when the permit application does not meet the requirements of the applicable regulation.

Comment: Denial of this permit is not only unfair, but is an affront to sound science. C&H has jumped through all the hoops you have asked, with no violations against them. It is unfair to change the rules without them getting the opportunity to provide response. Dept of interior removed access to restroom facilities on the Buffalo River, causing people to use sandbars and stream banks for their toilets, suppose that could be the source of the E.coli in the river? Need to allow good science to determine when a problem occurs, rather than some do gooder enviromental group. Arkansas Agriculture depends on fair treatment from regulators in order to function in our society. Might want to ask God to solve the problems, instead of man made unfair laws and rules governed with emotion.

Commenter: Charles Denver

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Department has noted violations during its inspections of the C&H facility near Mt. Judea, Arkansas. However, those violations have not led to a formal enforcement action by the Department against C&H.

Consideration of tourism is not within the Department's regulatory authority.

ADEQ must follow its regulations. ADEQ cannot issue a permit if the permit application does not meet the requirements of the applicable regulation. APC&EC Regulation 5 requires the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. ADEQ has determined that a detailed geological investigation of the facility is required because karst includes highly permeable foundations with the associated potential for groundwater contamination and potential for sinkholes to open up with collapsing ground or cause differential settlement. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies, i.e. karst, that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section

651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. Additionally, ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of two segments of Big Creek and two segments of the Buffalo National River as impaired further illustrates the need for these detailed studies.

The Department considered all available scientific data and information from, but not limited to, BCRET, United States Geological Survey, University of Arkansas Department of Agriculture, and ADEQ in making this permitting decision.

Comment: I strongly urge you to deny the permit for the future operation of the C&H Hog Farm (CAFO) near Big Creek, West of Mt. Judea, in Newton County, Arkansas. I personally have a strong attachment to the Buffalo National River. My family and I have been canoeing and hiking on the Buffalo National River every year since 1972, when it was designated the first National River in the USA. Our children and grandchildren have grown up canoeing and hiking on the Buffalo River. The C&H Hog Farm Concentrated Animal Feeding Operation (CAFO) dumps millions of gallons of hog urine and feces each year into giant waste lagoons just a few miles from the Buffalo National River. That waste is then sprayed onto fields that are adjacent to Big Creek, a major tributary flowing into the Buffalo National River. That waste is already resulting in the serious pollution of the Buffalo National River. The Buffalo National River is the Crown Jewel of Arkansas, and draws visitors from across the nation and around the world. A new National Park Service report shows that there were 1,463,304 visitors to Buffalo National River in 2015, and they spent $62,243,200 in communities near the park. That spending supported 969 jobs in the local area and had a cumulative benefit to the local economy of $72,009,000. All of that enormous benefit to the people of Arkansas will be in jeopardy if the C&H Farm permit is not denied. I strongly urge you to deny the C&H Hog Farm permit due to lack of compliance with the Agricultural Waste Management Field Handbook (AWMFH). The specific reasons for this denial are the following
1. The failure to acknowledge the presence of karst and follow the subsequent requirements for a detailed geologic investigation (Chapter 7), 2. Application of waste in excess of agronomic need (Ch 2-3), 3. Failure to perform a "substantive evaluation of the impact of sudden breach or accidental release from waste impoundments" (Ch 2-14), 4. Failure to "develop an emergency action plan which should be considered for waste impoundments where there is potential for significant impact from breach or accidental release" (Ch 2-15), 5. Inability to comply with guidance regarding waste application on flood prone and sloping (8-15%) fields. Guidance recommends injection or incorporation which is impractical in this terrain, requiring those fields

be removed from the NMP (601.0504(f) and (m)), 6. Failure to account for proximity of a waste impoundment to sensitive groundwater areas or to investigate groundwater flow direction, especially the failure to identify the presence of an improperly abandoned hand dug well located less than 600 feet downgradient from the ponds. (651.0703 and 651.0702).
Commenter: Francis Millett

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information. The Department's basis for this permitting decision is detailed in the Statement of Basis located at https://www.adeq.state.ar.us/home/pdssql/p_permit_details_water_spb.aspx?AFINDash=51-00164&AFIN=5100164&PmtNbr=5264-W .

Consideration of tourism and revenue is not within the Department's regulatory authority.

Comment: See Attached: Eric Fleming

Commenter: Eric Fleming

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The prior permit issued under APC&EC Regulation 6 General Permit ARG590000 and the coverage under that permit tracking number ARG590001 are outside the scope of the current permitting decision. The initial Notice of Intent and the corresponding NMP for coverage under the prior APC&EC Regulation 6 permit tracking number ARG590001 were available for public comment during the 30-day public comment period beginning on June 25, 2012.

ADEQ considers all readily available data to determine the status of water quality in Arkansas and to identify waterbodies that fail to meet standards defined in APC&EC Regulation 2. ADEQ recently completed water quality assessments for the development of a proposed 2018 303(d) List and 305(b) Integrated Report as required by the Clean Water Act. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen.

> Algal blooms have, and continue to, cause concern on the Buffalo River. As part of the USNPS aquatic invertebrate sampling program, the percentage of the sampling grid with filamentous algae is recorded. Of the monitored locations, the downstream locations tend to have more filamentous algae. The greater occurrence of filamentous algae at the downstream locations may be a response to higher nutrient levels.[1]

ADEQ is working to support a collaborative study with the Arkansas Game and Fish Commission, US Geological Survey, and the National Park Service focused on the distribution and causation of the rapid expansion of filamentous algae in the Buffalo National River.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the

Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Data supplied from the C&H Hog Farms, Inc. 2014–2017 annual reports document an increase of soil test phosphorus (STP) from 20 ppm to 68 ppm in Field 17 to a more significant increase in Field 1, which increased from 45 ppm to 173 ppm. As stated in University of Arkansas Division of Agriculture Soil Phosphorus: Management and Recommendations FSA1029[3], "Arkansas scientists agree that there is no agronomic reason or need for STP to be greater than about 50 ppm (Mehlich-3 extraction)." However, "with the move from agronomic to environmental concerns with P, soil P testing has been used to indicate when P enrichment of runoff may become unacceptable. A common approach has been to use agronomic soil P standards, following the rationale that soil P in excess of crop requirements is vulnerable to removal by surface runoff or leaching" (FSA1029). "A large amount of research between 1985 and 2000, showed that as STP (Soil Test Phosphorous) increased, especially in the top 2–4 inches of soil, so did the concentrations of soluble P in runoff (Figure 1)" (FSA1029).

As of the C&H Hog Farms, Inc. 2017 Annual Report, results of all soil test phosphorus were greater than 50 ppm. Despite a reported increase of soil test phosphorus in waste application fields, pursuant to NRCS Code 590, the Arkansas Phosphorus Index may still allow application of swine waste because of other factors including phosphorus source potential, transport potential, and best management practice multipliers. FSA9516[2] states that the phosphorus index approach is most appropriate as it accounts for multiple risk factors and provides a better risk assessment of P loss in runoff.

Geotechnical investigations at all land application sites in accordance with AWMFH 651.0504 (a)–(n) and Table 5-3 are necessary to ensure the efficacy of the API and demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River by rapid infiltration through highly permeable or thin soils.

[2] https://www.uaex.edu/publications/PDF/FSA-9516.pdf

[3] https://www.uaex.edu/publications/pdf/FSA-1029.pdf

Comment: I would like to thank you for the opportunity for the Arkansas Pork Producers Association (APPA) to comment on the C & H Draft permit (5264-W). The APPA would like to ask that the permit denial be reversed and approve the draft permit. C & H has been in operation

for the past 5 years and has been the most inspected facility in the history of pork production in Arkansas. They have never had a violation recorded against their operation (Regulation #6). It is one of the best if not the best operated Pork Production facility in the state. C & H has always worked with ADEQ to comply with the exceedingly extra burdens of the going the extra mile to try to satisfy public concerns that were unfounded. They agreed to the BCRET study on Big Creek. This study has been very comprehensive and has yet to show that C & H is impacting the water quality of Big Creek or the Buffalo River. They agreed to the Harbour Drilling study that proved their is not leakage coming from the holding ponds. It was quite evident at the recent public hearing in Jasper (October 16, 2018) that the citizens of the Mount Judea area are very supportive of C & H Hog Farm. For the most part the opposition are outsiders who are extreme activists that have a political agenda that is much more far reaching than C &H Hog Farm. The real truth of the matter is that the attitude from ADEQ to C & H changed somewhere in about November of 2017. The communication and working relationship changed between ADEQ towards C & H. ADEQ kept asking for more information that has never been asked of a Reg. 5 permit applicant in the past. C & H submitted the extra final information to ADEQ on December 29, 2017, they asked in an email if there was anymore information needed. ADEQ responded back that the application was complete only to find out this permit application was denied because there was more information needed. Never in the history of Reg 5 has a producer been held to a higher standard than C and H. The APPA and its members believe this permit denial has been politically motivated. C & H permit decision should be based off of their application not a moving target that is controlled by politics. The APPA would like to ask for a reversal on the current decision and allow C & H to work with ADEQ to supplement the record.

Commenter: Arkansas Pork Producers Association

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Department has noted violations during its inspections of the C&H facility near Mt. Judea, Arkansas. However, those violations have not led to a formal enforcement action by the Department against C&H.

The prior permit issued under APC&EC Regulation 6 General Permit ARG590000 and the coverage under that permit tracking number ARG590001 are outside the scope of the current permitting decision. The initial Notice of Intent and the corresponding NMP for coverage under the prior APC&EC Regulation 6 permit tracking number ARG590001 were available for public comment during the 30-day public comment period beginning on June 25, 2012.

Pursuant to the Memorandum of Agreement between the Board of Trustees of the University of Arkansas System for and on behalf of the University of Arkansas System-Division of Agriculture and the Arkansas Department of Environmental

Quality, the study performed by BCRET is being carried out for the use and benefit of ADEQ; however, the study shall be funded and conducted independently of ADEQ and shall meet the requirements of an independent study conducted by professionals in the field of water quality.

Although the analytical data from the C&H Drilling Study did not indicate a leak at the borehole drilling location at the time of the sampling, the Study does not support the conclusion that there is not any leakage from the ponds.

ADEQ must follow its regulations. ADEQ cannot issue a permit if the permit application does not meet the requirements of the applicable regulation. APC&EC Regulation 5 requires the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. ADEQ has determined that a detailed geological investigation of the facility is required because karst includes highly permeable foundations with the associated potential for groundwater contamination and potential for sinkholes to open up with collapsing ground or cause differential settlement. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies, i.e. karst, that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. Additionally, ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed investigations.

Comment: Dear Permits Branch of the Arkansas Department of Environmental Quality: I am writing to you on behalf of the Arkansas Audubon Society, a statewide organization committed to fostering a greater knowledge of the natural history of Arkansas and promoting conservation of our natural resources. We strongly support the draft denial of C&H Hog Farm's application for Arkansas Pollution Control and Ecology Commission Regulation 5 Permit 5264-W, AFIN 51-00164. As feared, mounting evidence links the farm to degradation of the Buffalo River watershed. This permit denial is a positive step towards addressing this threat. ADEQ's statement of basis for the draft denial highlights several alarming pieces of evidence that

demonstrate the threat of the C&H Hog Farm. First, though C&H Hog Farm has claimed the site contains no karst terrain, studies suggest otherwise. A karst landscape means that waste from the farm has the capacity to spread further and faster, particularly during high water events. Operation of such a facility on this landscape would require significantly more environmental assessment and protections take place than currently exist. Second, data from the area suggest unacceptable levels of nutrients such as nitrogen and phosphorous in surrounding waterways and soils, respectively. Sections of Big Creek and the Buffalo River in this region have recently been proposed as impaired by ADEQ based on measures of pathogens and dissolved oxygen, levels of which can be affected by said nutrients. Thus, the evidence strongly suggests that declines in environmental quality are linked to the hog farm operation. In a 2016 comment period, we encouraged ADEQ to think proactively instead of reactively regarding the conservation of the Buffalo River Watershed. The denial of C&H Hog Farm's permit demonstrates an effort to act before it is too late, and we applaud this move. We hope the decision will remain as written in order to protect this natural resource that is so important to citizens of Arkansas and the United States. Thank you for considering our comments.

Commenter: Audubon Society

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at

all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

ADEQ considers all readily available data to determine the status of water quality in Arkansas and to identify waterbodies that fail to meet standards defined in APC&EC Regulation 2. ADEQ recently completed water quality assessments for the development of a proposed 2018 303(d) List and 305(b) Integrated Report as required by the Clean Water Act. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen.

Data supplied from the C&H Hog Farms, Inc. 2014–2017 annual reports document an increase of soil test phosphorus (STP) from 20 ppm to 68 ppm in Field 17 to a more significant increase in Field 1, which increased from 45 ppm to 173 ppm. As stated in University of Arkansas Division of Agriculture Soil Phosphorus: Management and Recommendations FSA1029[2], “Arkansas scientists agree that there is no agronomic reason or need for STP to be greater than about 50 ppm (Mehlich-3 extraction).” However, “with the move from agronomic to environmental concerns with P, soil P testing has been used to indicate when P enrichment of runoff may become unacceptable. A common approach has been to use agronomic soil P standards, following the rationale that soil P in excess of crop requirements is vulnerable to removal by surface runoff or leaching” (FSA1029). “A large amount of research between 1985 and 2000, showed that as STP (Soil Test Phosphorous) increased, especially in the top 2–4 inches of soil, so did the concentrations of soluble P in runoff (Figure 1)” (FSA1029).

As of the C&H Hog Farms, Inc. 2017 Annual Report, results of all soil test phosphorus were greater than 50 ppm. Despite a reported increase of soil test phosphorus in waste application fields, pursuant to NRCS Code 590, the Arkansas Phosphorus Index may still allow application of swine waste because of other factors including phosphorus source potential, transport potential, and best

management practice multipliers. FSA9516[3] states that the phosphorus index approach is most appropriate as it accounts for multiple risk factors and provides a better risk assessment of P loss in runoff.

Geotechnical investigations at all land application sites in accordance with AWMFH 651.0504 (a)–(n) and Table 5-3 are necessary to ensure the efficacy of the API and demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River by rapid infiltration through highly permeable or thin soils.

[2] https://www.uaex.edu/publications/pdf/FSA-1029.pdf
[3] https://www.uaex.edu/publications/PDF/FSA-9516.pdf

Comment: See Attached: National Park Service

Commenter: National Park Service

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

ADEQ considers all readily available data to determine the status of water quality in Arkansas and to identify waterbodies that fail to meet standards defined in APC&EC Regulation 2. ADEQ recently completed water quality assessments for the development of a proposed 2018 303(d) List and 305(b) Integrated Report as required by the Clean Water Act. In the Buffalo River Watershed, four Assessment Units (two sections of Big Creek (Newton County) and two sections of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen.

NRCS's Web Soil Survey provides a general guide to soil characteristics and ground-truthing is necessary to confirm those soil characteristics. Walking the fields cannot provide the data necessary to evaluate the fields in accordance with AWMFH 651.0504 (a)–(n) and Table 5-3. The ground penetrating radar studies[1] at Fields 1, 5, and 12 indicated that land application to those fields should be limited in accordance with AWMFH 651.0504 (a)–(n) and Table 5-3. The ground penetrating radar studies suggest that these fields have characteristics identified in AWMFH 651.0504 (a)–(n) and Table 5-3, such as areas of higher permeability, thin soils of less than twenty (20) inches (see excerpts from the ERI Study below), and soils with a significant fractions of rock fragments preventing some soils samples from being taken. The limitations for land application sites

based on the above-referenced soil characteristics are part of the AWMFH with the purpose of preventing contamination of ground water. Geotechnical investigations of the land application fields are necessary to account for the soils characteristics that require limitations on animal waste application.
[1] As part of the BCRET study, USDA, NRCS conducted Ground Penetrating Radar (GPR) Surveys for Fields 1 and 5 in November of 2013 and Field 12 in April of 2014.

Field 5a exhibits average soil thicknesses of 0.5 to 4.5 meters (1.5 to 14.75 feet). Field 12 is a low-lying grazing area with low relief and an uneven topsoil surface. Field 12 exhibits similar average soil thicknesses at 0.7 to 4 meters (2.25 to 13 feet). Field 1 shows an average soil thickness of 0.5 meters (1.5 feet) determined from the ERI surveys and soil sampling. Field 1 has thinner and rockier soils than either Fields 5a or 12. In Field 12, there appears to be a large doline feature (a closed topographic depression caused by dissolution or weathering of underlying rock or soil) within the bedrock, approximately 61 meters (200 feet) across at the top of the feature, starting 8 meters (26 feet) below the land surface and extending 23 meters (75 feet) vertically downward.[2]
[2] Jon Fields and Todd Halihan, Electrical Resistivity Surveys of Applied Hog Manure Sites, Mount Judea, AR (2015).

Dye studies performed by Brahana et al. (2016, 2017)[3] and hydrologic studies by Murdoch et al. (2016)[4] in the Big Creek watershed indicate the connectivity of karst hydrology of the Boone Formation. Thomas Aley's May 24, 2018 expert report thoroughly explains karst geology and provides supporting evidence of the deficiencies of C&H Hog Farms, Inc.'s Regulation 5 application to address land application in karst topography.
[3] Brahana, V., J. Nix, C. Kuyper, T. Turk, F. Usrey, S. Hodges, C. Bitting, K. Ficco, E. Pollock, R. Quick, and others. 2016. Geochemical Processes and Controls Affecting Water Quality of the Karst Area of Big Creek near Mt. Judea, Arkansas. Journal of the Arkansas Academy of Science 70:45–58.
Brahana, V., C. Bitting, K. Kosic-Ficco, T. Turk, J. Murdoch, B. Thompson, and R. Quick, 2017, Using fluorescent dyes to identify meaningful water-quality sampling locations and enhance understanding of groundwater flow near a hog CAFO on mantled karst—Buffalo National River, southern Ozarks: *in* Kuniansky, E.L., and Spangler, L.E., eds., U.S. Geological Survey Karst Interest Group Proceedings, San Antonio, Texas, May 19-23, 2017, U.S. Geological Survey Scientific Investigations Report 2017-5023, p. 147-160.
[4] Murdoch, J., C. Bitting, and J. Van Brahana. 2016. Characterization of the karst hydrogeology of the Boone Formation in Big Creek Valley near Mt. Judea, Arkansas—documenting the close relation of groundwater and surface water. Environmental Earth Sciences 75:1160.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[5] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[5] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. A detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) including, but not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[5] Ground penetrating radar studies demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. Geotechnical investigations are necessary to demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[5] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

> Algal blooms have, and continue to, cause concern on the Buffalo River. As part of the USNPS aquatic invertebrate sampling program, the percentage of the sampling grid with filamentous algae is recorded. Of the monitored locations, the downstream locations tend to have more filamentous algae. The greater occurrence of filamentous algae at the downstream locations may be a response to higher nutrient levels.[5]

ADEQ is working to support a collaborative study with the Arkansas Game and Fish Commission, US Geological Survey, and the National Park Service focused

on the distribution and causation of the rapid expansion of filamentous algae in the Buffalo National River.

The API, (Strategy 2 in AWMFH 651.0015) is a risk based approach for assessment of phosphorus loadings as it regards surface runoff. The Statement of Basis for ADEQ's draft denial of the permit discusses the severe and unknown limitations for many of the application fields as well as the field phosphorus build-up and the legacy phosphorus (see pages 4 of 9, 7 of 9, and 8 of 9) issues. Likewise the commenter's discussion of the waste storage pond vulnerabilities and the lack of geological and liner investigation (page 3 of 9 and 5 of 9) in the Statement of Basis is ample justification for denial of the permit.

The Arkansas Department of Health did not submit a comment regarding C&H Hog Farms, Inc., AFIN 51-00164, during the public comment period ending October 24, 2018.

The Department acknowledges the following statements from the Buffalo River Watershed-Based Management Plan dated May 22, 2018, regarding threatened and endangered species in the Buffalo River watershed:

> The Buffalo River and its tributaries are considered high quality water resources. The Buffalo River and its tributaries support over fifty (50) species of fish and over twenty (20) species of mussels. Portions of the Buffalo River have been designated critical habitat for the threatened Rabbitsfoot mussel, *Quadrula cylindrical cylindrical* (State/Federal Status: Endangered/Threatened, respectively). The watershed also includes important habitat for endangered bat species: Gray Bat, *Myotis grisescens* (State/Federal Status: Endangered); Indiana Bat, *Myotis sodalis* (State/Federal Status: Endangered); Ozark Big-eared Bat, *Corynorhinus townsendii ingens* (State/Federal Status: Endangered); and Northern Long-eared Bat, *Myotis septentrionalis* (State/Federal Status: Endangered/Threatened, respectively). Cave and other karst features in the Buffalo River watershed are important habitats for all of the protected bat species.[5]

However, the Department did not receive any comments during the comment period ending on October 24, 2018, regarding endangered or threatened species and their associated habitats from Arkansas Game & Fish Commission, Arkansas Natural Heritage Commission, or U.S. Fish and Wildlife Service.

Comment: See Attached: Ozark Society

Commenter: Ozark Society

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Department refers the commenter to the Response to Comments dated September 17, 2018, regarding the commenter's restatement of their previous comments.

The Department acknowledges the resuscitations of facts and statements from information present in the permit application record including, but not limited to, inspection reports prepared by ADEQ, depositions, expert reports, and BCRET reports.

ADEQ considers all readily available data to determine the status of water quality in Arkansas and to identify waterbodies that fail to meet standards defined in APC&EC Regulation 2. ADEQ recently completed water quality assessments for the development of a proposed 2018 303(d) List and 305(b) Integrated Report as required by the Clean Water Act. In the Buffalo River Watershed, four Assessment Units (two sections of Big Creek (Newton County) and two sections of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section

651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two sections of Big Creek (Newton County) and two sections of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Consideration of tourism and the economy are not within the Department's regulatory authority.

Seepage from waste storage ponds has the potential to pollute surface and ground water. The record included one recompacted permeability test that is insufficient to determine liner integrity. The necessary soil investigations including, but not limited to, percentage of fines and soil permeability characteristics, have not been performed at this facility in accordance with the AWMFH 651 Table 10-4 and Appendix 10D. Plasticity index analysis was performed on one sample of the *in situ* clay material in boring 2. The variability in the regolith expected in this geologic setting coupled with the insufficient data creates additional concerns about the siting and soil sources for the clay liner. The required number of borings were not advanced within the pool areas in accordance with AWMFH 651.0704(b)(4); these additional borings would have provided more data for assessment of clay source material. Proper soil investigations for the liner material are necessary to determine the suitability and location of the clay source material and to consider any additional geotechnical testing to confirm material properties, which will reduce the potential for downward and/or lateral seepage of the stored wastes.

The API, (Strategy 2 in AWMFH 651.0015) is a risk-based approach for assessment of phosphorus loadings as it regards surface runoff. The Statement of Basis for ADEQ's draft denial of the permit discusses the severe and unknown limitations for many of the application fields as well as the field phosphorus build-up and the legacy phosphorus (see pages 4 of 9, 7 of 9, and 8 of 9) issues

mentioned in the comment. Likewise, the commenter's discussion of the waste storage pond vulnerabilities and the lack of geological and liner investigation (page 3 of 9 and 5 of 9) of the Statement of Basis is ample justification for denial of the permit. The Statement of Basis does not address the alleged discrepancy in the number of swine at the facility among the various Design Reports and applications.

Pursuant to the Memorandum of Agreement between the Board of Trustees of the University of Arkansas System for and on behalf of the University of Arkansas System-Division of Agriculture and the Arkansas Department of Environmental Quality, the study performed by BCRET is being carried out for the use and benefit of ADEQ; however, the study shall be funded and conducted independently of ADEQ and shall meet the requirements of an independent study conducted by professionals in the field of water quality.

Comment: See Attached: C&H Hog Farms, Inc.

Commenter: C&H Hog Farms, Inc.

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The case styled C&H Hog Farms, Inc. vs. Arkansas Pollution Control & Ecology Commission, 51-CV-18-58, filed in Newton County, Arkansas, is outside the scope of this permitting decision. ADEQ is not a party in the aforementioned matter.

Per the Rules of Arkansas State Board of Registration for Professional Geologists Sections 4-1 and 5-2 (Sections 21 and 27 (a) of Act 701 of the 1987 Regular Session):

> *"Each registrant under this Act, upon issuance of a certificate of registration, may purchase from a source approved by the Board a seal of such design as is authorized by the Board, bearing the registrant's name, the name of this State, and the legend "Registered Professional Geologist" or "Certified (sub-specialty) Geologist". All drawings, reports, or other geologic papers or documents involving the practice of geology, which shall have been*

> *prepared or approved by a registered geologist or a subordinate employee under his direction for the use of or for delivery to any person or for public record within this State shall be signed by him and impressed with the Seal provided for in this section or the seal of a nonresident practicing under this Act, either of which shall indicate his responsibility for them."*
> *"It shall be unlawful for any person other than a registered geologist, a registered certified specialty geologist, or a subordinate under the direction of one of the above to prepare any geologic plans, reports, or documents in which the performance is related to the public welfare or safeguarding of life, health, property, or the environment."*

The proposed work plan submitted for comment does not bear the signature and impression of the Seal of a professional geologist registered in the state of Arkansas. Additionally, this proposed work plan does not bear the seal of an engineer licensed in the state of Arkansas.

The applicant was previously granted coverage under an APC&EC Regulation 6 general permit. The prior permit issued under APC&EC Regulation 6 General Permit ARG590000 and the coverage under that permit tracking number ARG590001 are outside the scope of the current permitting decision.

The applicant submitted an application for an APC&EC Regulation 5 individual no-discharge permit. While the applicant may have styled the application as an administrative change, the Department does not have any available statutory or regulatory mechanism to administratively change the coverage issued pursuant to an APC&EC Regulation 6 general permit to an individual permit under APC&EC Regulation 5.

The Statement of Basis does not address the alleged discrepancy in the number of swine at the facility among the various Design Reports and applications.

The Department cannot issue a permit based upon the proposed work plan, as submitted. This proposed work plan does not contain adequate data and conclusions to inform the implementation and execution of a proposed work plan.

The author of the proposed work plan has failed to fully include the description provided for the Boone by McFarland (2004)[1]. In this description, it is also noted that "The Boone is well known for dissolution features such as sinkholes, caves, and enlarged fissures." This information is vital to the characterization and understanding of the local hydrogeologic setting.
[1] McFarland, J.D., 2004, Stratigraphic Summary of Arkansas (Information Circular 36). Arkansas Geological Commission. Little Rock, AR.

C&H has not performed the necessary borings within the pool area to demonstrate there are no large voids, solution channels, or fractures. The borings advanced at the C&H facility are not sufficient to meet the requirement of five (5) borings within the pool area in accordance with AWMFH 651.0703(b)(4). The proposed work plan submitted by Terracon, on behalf of C&H, does not provide for additional borings in the pool area to meet the requirements set forth in AWMFH 651.0703(b)(4). Without this essential geologic assessment, C&H has not demonstrated that its facility is not in a "very high" risk area. ADEQ has determined that a detailed geological investigation of the facility is required because karst includes highly permeable foundations with the associated potential for groundwater contamination and potential for sinkholes to open up with collapsing ground or cause differential settlement. AWMFH 651.0702(l). In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies, i.e. karst, that includes, but is not limited to, borings within the pool areas to ascertain the foundation of earth-filled structures and to rule out the presence of large voids in karst. AWMFH 651.0703(b)(4); AWMFH 651, Table 10-4.

The borings advanced by GTS, Inc., in May 2012, are not sufficient to meet the requirements of the geologic investigations required by APC&EC Regulation 5 and the AWMFH. Additionally, those borings were not allowed to stand open for the 24 hours as discussed in AWMFH 651.0704(b)(2) and necessary to determine the water table level at each boring location.

The three groundwater monitoring wells proposed for the groundwater assessment are not sufficient for the hydrogeologic setting and cannot adequately characterize the groundwater flow through the highly complex karst system. Groundwater flow within this region is complex, often exhibiting radial flow paths and unexpected flow direction when compared to slope of the land.

AWMFH 651.0703(b) Groundwater Flow Direction:

> *"**A desirable site for a waste storage pond or treatment lagoon is in an area where groundwater is not flowing away from the site toward a well, spring, or important underground water supply**. The direction of flow in a water table aquifer generally follows the topography, with lesser relief. In most cases, the slope of the land indicates the groundwater flow direction. In humid regions, the shape of the water table is a subdued reflection of surface topography. Unconfined groundwater moves primarily from topographically higher recharge areas down gradient to discharge areas. Lower areas serve as discharge points where groundwater rises and merges with perennial streams and ponds, drainage ditches, or flows as springs. Radial flow paths and **unusual subsurface geology can too often invalidate this assumption**. **Consider the case where secondary porosity governs the flow**. A common example is bedrock in upland areas where the direction of groundwater flow is strongly controlled by the trend of prominent joint sets or fractures. Fracture patterns in the rock may not be parallel to the slope of the ground surface. **Thus, assuming that groundwater flow is parallel to the topography can be misleading in terrain where flow is controlled by bedrock fractures."***

In karst settings groundwater flow is often governed by secondary porosity. The C&H Drilling Study performed by Harbor Environmental identified several features that are indicative of karst, including but not limited to potential voids, epikarst, and evidence of dissolution. Fractures and fracture zones were also identified at various depth intervals. These findings are consistent with McFarland's Stratigraphic Summary of Arkansas.[1]

This proposed work plan does not appear to take into consideration high permeability zones such as the location of conduits or fractures and the epikarst/soil-bedrock interface in the proposed groundwater assessment. Recent dye trace studies by Brahana et al. (2016, 2017)[2], which were relied upon by Dr. Sharpley, and hydrologic studies by Murdoch et al. (2016)[3] in the area indicate groundwater flow within this region is complex.

[2] Brahana, V., J. Nix, C. Kuyper, T. Turk, F. Usrey, S. Hodges, C. Bitting, K. Ficco, E. Pollock, R. Quick, and others. 2016. Geochemical Processes and

Controls Affecting Water Quality of the Karst Area of Big Creek near Mt. Judea, Arkansas. Journal of the Arkansas Academy of Science 70:45–58.
Brahana, V., C. Bitting, K. Kosic-Ficco, T. Turk, J. Murdoch, B. Thompson, and R. Quick, 2017, Using fluorescent dyes to identify meaningful water-quality sampling locations and enhance understanding of groundwater flow near a hog CAFO on mantled karst—Buffalo National River, southern Ozarks: *in* Kuniansky, E.L., and Spangler, L.E., eds., U.S. Geological Survey Karst Interest Group Proceedings, San Antonio, Texas, May 19-23, 2017, U.S. Geological Survey Scientific Investigations Report 2017-5023, p. 147-160.
[3] Murdoch, J., C. Bitting, and J. Van Brahana. 2016. Characterization of the karst hydrogeology of the Boone Formation in Big Creek Valley near Mt. Judea, Arkansas—documenting the close relation of groundwater and surface water. Environmental Earth Sciences 75:1160.

The proposed work plan references to soil survey data are insufficient and fail to address available data and other documented concerns. The proposed work plan does not include a comprehensive field reconnaissance of the operation area and associated land application areas to identify and evaluate geologic features. Due to the complexity of the sites, detailed field investigations to identify the location of springs, sinkholes and doline features, and other karst features and conclusive site-specific geotechnical information of the land application fields to account for the characteristics that limit application rates, are needed.

AWMFH 651.0704 states that:

> ***"The purpose of a detailed geologic investigation is to determine geologic conditions at a site that will affect or be affected by design, construction, and operation of an AWMS component."***

The proposed work plan makes no provisions for determining the possible presence of voids beneath the constructed ponds. The proposed scope of work makes no provisions for determination and characterization of high permeability zones, which may transport groundwater (and any leakage from the ponds).

The proposed work plan does not include data or other information to resolve the deficiencies in the permit application record regarding berm construction. Pursuant to AWMFH 651.0704(b)(4), borings are required in the embankment centerline of the berms as part of the detailed geologic investigation. Neither the as-built plans nor the proposed work plan provide data to demonstrate that the

berms were constructed in compliance with APC&EC Regulation 5 and the AWMFH. The C&H Drilling Study cannot satisfy the requirements of the AWMFH as the bore hole was not within the pool area or berm centerline.

The proposed work plan indicates the size of the excavation area for the pond and pond liner material. The information provided is insufficient to identify the mineral, structural, and hydraulic characteristics of the soil and rock materials. Additionally, a soil balance was never provided to quantify that the appropriate materials were available to construct the berms and clay liners.

AWMFH 651.0704(b)(2) states that:

> *"**During a geologic investigation, all soil and rock materials at the site or in borrow areas are identified and mapped.** From an engineering standpoint, a mappable soil or rock unit is defined as a zone that is consistent in its mineral, structural, and hydraulic characteristics and sufficiently homogeneous for descriptive and mapping purposes."*

Additionally, AWMFH 651.0704(b)(4) states that:

> ***"Borrow areas for embankment type structures and clay liners should be located, described, and mapped. Locate at least 150 percent suitable borrow of the required fill volume."***

Maps of soil and rock materials, both at the site and in the borrow area, have not been provided by the applicant previously, or in this proposed work plan. The previous submittals and the proposed work plan are insufficient to demonstrate that materials of appropriate quality and quantity were available and used during construction, adding additional concerns regarding the berm construction and clay liner integrity.

The proposed work plan proposed the installation of a synthetic liner to address the deficiencies related to liner integrity. The proposed design of the synthetic liner is inadequate. The technical information and drawing provided regarding the installation of a synthetic liner are insufficient to address the known and potentially unknown conditions at the site, such as compatibility with the existing liner material including the potential for puncture from large, angular rocks. The Department notes that the synthetic liner proposed in the comment submitted on

October 23, 2018, is less robust than the synthetic liner proposed previously on July 7, 2015.

As a result, additional information in response to potential deficiencies in liner integrity are still needed. The record included one recompacted permeability test that is insufficient to determine liner integrity. The necessary soil investigations including, but not limited to, percentage of fines and soil permeability characteristics, have not been performed at this facility in accordance with the AWMFH 651 Table 10-4 and Appendix 10D. Plasticity index analysis was performed on one sample of the *in situ* clay material in boring 2. The variability in the regolith expected in this geologic setting coupled with the insufficient data creates additional concerns about the siting and soil sources for the clay liner. The required number of borings were not advanced within the pool areas in accordance with AWMFH 651.0704(b)(4); these additional borings would have provided more data for assessment of clay source material. Proper soil investigations for the liner material are necessary to determine the suitability and location of the clay source material and to consider any additional geotechnical testing to confirm material properties, which will reduce the potential for downward and/or lateral seepage of the stored wastes.

Additionally, NRCS, in Appendix 10D of the AWMFH, indicates that special design measures are necessary where agricultural waste storage ponds are constructed in soils with high calcium content (BCRET Quarterly Report for October 2016 to December 2016, Table 10, page 71) or highly unfavorable geologic conditions, such as karst formations.

Substantial groundwater flow can occur at the soil bedrock interface or within the epikarst zone. However, these zones may not be continually saturated. A portion of the pond depth appears to be located within the epikarst zone, with only the clay liner separating the waste from this potentially highly permeable zone. The location of the epikarst zone and its unknown ground water flow and potential for voids, which causes stability concerns, coupled with the insufficient data necessary to demonstrate liner integrity further establishes the need for detailed geotechnical investigations at the facility.

The Environmental Assessment dated December 2015 is outside the scope of this permitting decision.

Scientists studying the Savoy Swine Facility have taken great efforts to conduct geologic investigations and have collected a large amount of data to demonstrate that there is very little leakage from the waste holding ponds and settling basin at the Savoy Swine Facility, which is not a CAFO.[4] University of Arkansas scientists conducted a karst inventory in the area of the Savoy Swine Facility to gain a better understanding of the ground-water system prior to sampling point selection and well drilling.[4] The interceptor trench installed at the Savoy Swine Facility extended to the bedrock surface to allow collection of lagoon leachate moving down-gradient from the waste lagoon after a storm event.[4]

A groundwater flow study has not been submitted to the Department for review. The Department has no knowledge of any groundwater studies that may have informed the placement of the interceptor trenches. The information on the interceptor trenches provided in the BCRET Quarterly Report for July 1 to September 30, 2014 is not sufficient to determine the appropriateness of the placement of the interceptor trenches for the purpose of monitoring leakage from the waste storage ponds. At this time, the Department does not have sufficient information to comment on the appropriateness of placement of the trenches or on the sufficiency of those trenches as a monitoring system for the waste storage ponds.

[4] Christopher M. Hobza, David C. Moffit, Danny P. Goodwin, Timothy Kresse, John Fazio, John V. Brahana, and Phillip D. Hays, 2005, Ground-Water Quality Near a Swine Waste Lagoon in a Mantled Karst Terrane in Northwestern Arkansas, U.S. Geological Survey Karst Interest Group proceedings, Rapid City, South Dakota, September 12-15, 2005: U.S. Geological Survey Scientific Investigations Report 2005-5160, p. 155-162.

The proposed work plan does not address the Department's concerns regarding the suitability of the land application sites. The ground penetrating radar studies[5] at Fields 1, 5, and 12 indicated that land application to those fields should be limited in accordance with AWMFH 651.0504 (a)–(n) and Table 5-3. The ground penetrating radar studies suggest that these fields have characteristics identified in AWMFH 651.0504 (a)–(n) and Table 5-3, such as areas of higher permeability, thin soils of less than twenty (20) inches, and soils with significant fractions of rock fragments preventing some soil samples from being taken. The limitations for land application sites based on these soil characteristics are part of the AWMFH with the purpose of preventing contamination of ground water. Conclusive site-specific geotechnical information of the land application fields is

necessary to account for the soil characteristics that require limitations on animal waste application.

[5]As part of the BCRET study, USDA, NRCS conducted Ground Penetrating Radar (GPR) Surveys for Fields 1 and 5 in November of 2013 and Field 12 in April of 2014.

C&H Hog Farms, Inc. submitted an Emergency Action Plan to the Department on October 23, 2018. The Emergency Action Plan did not address possible failure of the liner resulting from potential damage, such as pumping and agitation, liner desiccation, or any other site-specific operational risks are not addressed, in accordance with AWMFH 651.0204(a), (b).

Comment: See Attached: Arkansas Farm Bureau

Commenter: Arkansas Farm Bureau

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

It is the applicant's responsibility to design its own liquid animal waste management systems in accordance with state laws and APC&EC Regulation 5. It is then the Department's charge to evaluate the proposed systems for compliance with state laws and APC&EC Regulation 5.

C&H has not addressed all concerns regarding the necessity of a directional groundwater flow study; studies by Brahana, et al. [1], [2] indicate the uncertainty of groundwater flow direction at this facility and thus the necessity for those studies. C&H has not demonstrated that groundwater does not flow away from the site toward a spring or important underground water supply, such as underground water that supplies surface waters. AWMFH 651.0703(b). C&H has only provided documentation that all wells located in the proximity of the lagoons have been properly closed. Because no groundwater flow direction study has been performed, the Department has relied upon the studies performed by University of Arkansas scientists that demonstrate that groundwater flows from C&H towards and ultimately into Big Creek and the Buffalo National River. A study of precipitation, water levels in wells, and water levels in streams in Big Creek Valley upstream from its confluence with the Buffalo National River demonstrate the interconnectedness of groundwater to surface water and the rapid water-level

response following precipitation onset.[2] Detailed geologic investigations, including a directional groundwater flow study, are necessary to determine that groundwater, and thus Big Creek and the Buffalo National River, are not influenced by the waste storage holding ponds, on-farm activities, or waste management practices.

[1] Brahana, V., J. Nix, C. Kuyper, T. Turk, F. Usrey, S. Hodges, C. Bitting, K. Ficco, E. Pollock, R. Quick, and others. 2016. Geochemical Processes and Controls Affecting Water Quality of the Karst Area of Big Creek near Mt. Judea, Arkansas. Journal of the Arkansas Academy of Science 70:45–58.

Brahana, V., C. Bitting, K. Kosic-Ficco, T. Turk, J. Murdoch, B. Thompson, and R. Quick, 2017, Using fluorescent dyes to identify meaningful water-quality sampling locations and enhance understanding of groundwater flow near a hog CAFO on mantled karst—Buffalo National River, southern Ozarks: *in* Kuniansky, E.L., and Spangler, L.E., eds., U.S. Geological Survey Karst Interest Group Proceedings, San Antonio, Texas, May 19-23, 2017, U.S. Geological Survey Scientific Investigations Report 2017-5023, p. 147-160.

[2] Murdoch, J., C. Bitting, and J. Van Brahana. 2016. Characterization of the karst hydrogeology of the Boone Formation in Big Creek Valley near Mt. Judea, Arkansas—documenting the close relation of groundwater and surface water. Environmental Earth Sciences 75:1160.

C&H has not performed the necessary borings within the pool area to demonstrate there are no large voids, solution channels, or fractures. Without this essential geologic assessment, C&H has not demonstrated that its facility is not in a "very high" risk area. ADEQ has determined that a detailed geological investigation of the facility is required because karst includes highly permeable foundations with the associated potential for groundwater contamination and potential for sinkholes to open up with collapsing ground or cause differential settlement. AWMFH 651.0702(l). In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies, i.e. karst, that includes, but is not limited to, borings within the pool areas to ascertain the foundation of earth-filled structures and to rule out the presence of large voids in karst. AWMFH 651.0703(b)(4); AWMFH 651, Table 10-4. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

The Department has noted violations during its inspections of the C&H facility near Mt. Judea, Arkansas. However, those violations have not led to a formal enforcement action by the Department against C&H.

The Department acknowledges Farm Bureau's statement that the necessary geologic investigations were not performed with the original application. The

Department is unaware of any investigations performed by FTN & Associates at the C&H facility. The investigations performed by BCRET, ADEQ, and Harbor Environmental and Safety are not sufficient to meet the requirements of the geologic investigations necessary to understand complex geologies as required by APC&EC Regulation 5 and the AWMFH, as amended.

On March 25, 2016, John Bailey, on behalf of ADEQ, sent a letter to C&H Hog Farms, Inc. notifying C&H that the requested modification to install a synthetic liner in both lagoons was approved and that the requested modification would expire after one year. Should C&H not install the liners within that one-year period, C&H would be required to resubmit plans and obtain a new approval from the Department. Mr. Bailey approved the installation of synthetic liners under the terms of the now expired General Permit ARG590000, tracking number ARG590001. Mr. Bailey's approval authorizing C&H to install the synthetic liners expired on March 25, 2017.

Seepage from waste storage ponds has the potential to pollute surface and ground water. The record included one recompacted permeability test that is insufficient to determine liner integrity. The necessary soil investigations including, but not limited to, percentage of fines and soil permeability characteristics, have not been performed at this facility in accordance with the AWMFH 651 Table 10-4 and Appendix 10D. Plasticity index analysis was performed on one sample of the in situ clay material in boring 2. The variability in the regolith expected in this geologic setting coupled with the insufficient data creates additional concerns about the siting and soil sources for the clay liner. The required number of borings were not advanced within the pool areas in accordance with AWMFH 651.0704(b)(4); these additional borings would have provided more data for assessment of clay source material. Proper soil investigations for the liner material are necessary to determine the suitability and location of the clay source material and to consider any additional geotechnical testing to confirm material properties, which will reduce the potential for downward and/or lateral seepage of the stored wastes.

Additionally, NRCS, in Appendix 10D of the AWMFH, indicates that special design measures are necessary where agricultural waste storage ponds are constructed in soils with high calcium content[3] or highly unfavorable geologic conditions, such as karst formations.
[3] BCRET Quarterly Report for October 2016 to December 2016, Table 10, page 71.

NRCS's Web Soil Survey provides a general guide to soil characteristics and ground-truthing is necessary to confirm those soil characteristics. Walking the fields cannot provide the data necessary to evaluate the fields in accordance with AWMFH 651.0504 (a)–(n) and Table 5-3. The ground penetrating radar

studies[4] at Fields 1, 5, and 12 indicated that land application to those fields should be limited in accordance with AWMFH 651.0504 (a)–(n) and Table 5-3. The ground penetrating radar studies suggest that these fields have characteristics identified in AWMFH 651.0504 (a)–(n) and Table 5-3, such as areas of higher permeability, thin soils of less than twenty (20) inches (see excerpts from the ERI Study below), and soils with a significant fractions of rock fragments preventing some soils samples from being taken. The limitations for land application sites based on the above-referenced soil characteristics are part of the AWMFH with the purpose of preventing contamination of ground water. Geotechnical investigations of the land application fields are necessary to account for the soils characteristics that require limitations on animal waste application.
[4] As part of the BCRET study, USDA, NRCS conducted Ground Penetrating Radar (GPR) Surveys for Fields 1 and 5 in November of 2013 and Field 12 in April of 2014.

Field 5a exhibits average soil thicknesses of 0.5 to 4.5 meters (1.5 to 14.75 feet). Field 12 is a low-lying grazing area with low relief and an uneven topsoil surface. Field 12 exhibits similar average soil thicknesses at 0.7 to 4 meters (2.25 to 13 feet). Field 1 shows an average soil thickness of 0.5 meters (1.5 feet) determined from the ERI surveys and soil sampling. Field 1 has thinner and rockier soils than either Fields 5a or 12. In Field 12, there appears to be a large doline feature (a closed topographic depression caused by dissolution or weathering of underlying rock or soil) within the bedrock, approximately 61 meters (200 feet) across at the top of the feature, starting 8 meters (26 feet) below the land surface and extending 23 meters (75 feet) vertically downward.[5]
[5] Jon Fields and Todd Halihan, Electrical Resistivity Surveys of Applied Hog Manure Sites, Mount Judea, AR (2015).

C&H Hog Farms, Inc. submitted an Emergency Action Plan to the Department on October 23, 2018. The Emergency Action Plan did not address possible failure of the liner resulting from potential damage, such as pumping and agitation, liner desiccation, or any other site-specific operational risks are not addressed, in accordance with AWMFH 651.0204(a), (b).

APC&EC Reg. 22 is not applicable to an APC&EC Reg. 5 permitting decision. While APC&EC Regulation 22 may not preclude the issuance of landfill permit coverage, it does require additional studies for landfills located in karst topography, just as APC&EC Regulation 5, through the AWMFH, requires additional studies for liquid animal waste facilities located in karst. Additional and more robust design elements are also required for facility design and construction. Relevant excerpts from APC&EC Regulation 22 are provided below.

Reg.22.102- Definitions

Karst terrains means areas where karst topography, with its characteristic surface and subterranean features, is developed as the result of dissolution of limestone, dolomite, or other soluble rock. Characteristic physiographic features present in karst terranes include, but are not limited to, sinkholes, sinking streams, caves, large springs, and blind valleys.

Unstable area means a location that is susceptible to natural or human-induced events or forces capable of impairing the integrity of some or all of the landfill structural components responsible for preventing releases from a landfill. Unstable areas can include poor foundation conditions, areas susceptible to mass movements, and Karst terranes.

Reg.22.407- Unstable Areas

(a) Applicability - Owners or operators of new units, existing units, and lateral expansions located in an unstable area must demonstrate that engineering measures have been incorporated into the unit's design to ensure that the integrity of the structural components of the unit will not be disrupted. The owner or operator must place the demonstration in the operating record, notify the Director that it has been placed in the operating record, and provide the demonstration to the Director for approval. The owner or operator must consider the following factors, at a minimum, when determining whether an area is unstable:

(1) On-site or local soil conditions that may result in significant differential settling;

(2) On-site or local geologic or geomorphologic features; and

(3) On-site or local human-made features or events (both surface and subsurface).

(b) For purposes of this section:

(1) Unstable area means a location that is susceptible to natural or human-induced events or forces capable of impairing the integrity of some or all of the landfill structural components responsible for preventing releases from a landfill. Unstable areas can include poor foundation conditions, areas susceptible to mass movements, and Karst terrain.

(2) Structural components means liners, leachate collection systems, final covers, runon/run-off systems, and any other component used in the construction and operation of the facility that is necessary for protection of human health and the environment.

(3) Poor foundation conditions means those areas where features exist which indicate that a natural or man-induced event may result in inadequate foundation support for the structural components of an solid waste unit.

(4) Areas susceptible to mass movement means those areas of influence (i.e., areas characterized as having an active or substantial possibility of mass movement) where the movement of earth material at, beneath, or adjacent to the municipal solid waste landfill unit, because of natural or man-induced events, results in the down slope transport of soil and rock material by means of gravitational influence. Areas of mass movement include, but are not limited to, landslides, avalanches, debris slides and flows, soil fluction, block sliding, and rock fall.

(5) Karst terrain means areas where karst topography, with its characteristic surface and subterranean features, is developed as the result of dissolution of limestone, dolomite, or other soluble rock. Characteristic physiographic features present in karst terrain include, but are not limited to, sinkholes, sinking streams, caves, large springs, and blind valleys.

Reg.22.425- Landfills In Boone and St. Joe Formations

(a) Applicability - The following are minimum design standards for Class 1 landfills that are located within the outcrop area of the Boone and St. Joe Formations. The design phase of a project must neutralize all limitations noted in the site characterization study through engineering modification or operating methods. The design of the containment structure must meet or exceed the minimum standards listed in these regulations.

(b) Separation Requirements -

(1) A minimum separation of ten (10) feet must be maintained between the bottom of the bottom liner system and the seasonal high water table surface.

(2) A minimum vertical separation of ten (10) feet must be maintained between the bottom liner and the highest point of the bedrock or pinnacles.

(3) All fill structures and operations must be above the one hundred (100) year flood elevation.

(c) Liner System -

(1) The minimum slope on the bottom liner must insure positive drainage of leachate after maximum loading and maximum expected strain.

(2) All bottom liner systems must consist of a double composite separated by a leak detection system. Each composite liner shall consist of an upper geomembrane liner (60 mil minimum thickness) directly overlying a low permeability soil layer, as described in Reg. 22.424(b).

(3) The soil and synthetic components of the composite liner must meet the requirements of Reg. 22.428.

(d) Leachate Collection System - The double composite liner system must have a leachate removal system directly overlying the upper composite liner. In addition to the requirements of Reg.22.429, the leachate collection and removal system must meet the following standards:

(1) The system must be designed such that leachate head above the primary composite liner does not exceed one foot under the most severe conditions anticipated.

(2) The drainage material must be free of organic and carbonate material, contain less than five percent (5%) by weight which passes the #200 sieve, have a minimum hydraulic conductivity of 1 x 10-3 and be a minimum of twenty-four (24) inches in thickness. Equivalent drainage nets or fabric may be used in lieu of the twenty-four (24) inch drainage layer provided a substitute protective layer is provided and the system provides an equivalent hydraulic conductivity to the twenty-four (24) inch layer.

(3) Leachate collection pipes must be incorporated into the drainage layer to convey liquid out of the landfill to storage tanks or a treatment system. The pipes must be a minimum of six (6) inches in diameter and must be chemically compatible with the leachate generated at the landfill and be structurally capable of supporting the maximum static and dynamic load anticipated from the overlying fill material and construction equipment.

(e) Leak Detection System - The double composite liner system must have a leak detection system located between the upper composite and the lower composite liners. The leak detection system must conform to the following standards:

(1) The minimum thickness of the coarse grained material must be 1 foot;

(2) Leak detection systems shall meet the standards for leachate collection system design and construction. A minimum hydraulic conductivity of 1 x 10-3 cm/sec must be obtained in the leak detection system material.

(3) An action leakage rate must be developed for the design and approved by the Department. If leakage rates exceed the action leakage rate, fill operations must cease and the Department must be notified. A written contingency plan must be developed for the facility which outlines steps and measures to be taken if the action leakage rate is exceeded.

(4) Daily records of fluid accumulation in the leak detection system must be maintained by the owner or operator.

(j) Alternative Designs - The Department may approve alternative designs proposals if determined by the staff to meet or exceed the minimum standards set forth above.

(k) Quality Assurance and Quality Control - A Quality Control and Quality Assurance Plan for liner and final cover construction must be developed in accordance with the requirements of Reg.22.428.

(l) Quality Assurance - The permittee shall employ a third party engineering firm to insure proper construction of each component of the containment structure in accordance with the requirements of Reg.22.428.

Reg.22.1101- General Requirements

The purpose of the geotechnical and hydrogeological site investigation is to thoroughly characterize all aspects of the property which may directly or indirectly affect the design, construction, operation or monitoring of the solid waste containment structure.

Reg.22.1102- Class 1 And Class 3 Landfills

(e) Boone-St. Joe Aquifer Of Northern Arkansas - Proposed landfills located within the outcrop area of the Boone or St. Joe Formations of Northern Arkansas, which will receive municipal solid waste or waste with a high potential for adversely impacting surface or ground water quality (Class 1 or Class 3), may be required to perform additional studies (i.e., in addition to the requirements under Reg.22.1101, Reg.22.1102(a) through (d) and (f), and Reg.22.1103) in order to adequately characterize the site. At a minimum, the additional studies will include:

(1) A detailed surface mapping of all karst features including, but not limited to, sinkholes, springs, loosing stream segments, caves, and dolines;

(2) A subsurface exploration program which consists of core drilling at a minimum spacing of one boring per one acre;

(3) A down-hole video log and/or a geophysical log, obtained by one of the methods under Reg.22.1102(c)(4)(vi), must be conducted for each boring; and

(4) A ground water dye trace study shall be performed to test the accuracy of the sites conceptual hydrogeologic model. The dye study methodology must be approved by the Department and shall consists of a sufficient number of monitoring locations, which will include wells/piezometers, streams, and springs.

APC&EC Regulation 5 requires a site-specific geologic investigation. Site characterizations of the Savoy Swine Facility are not applicable to the C&H facility because each facility must be evaluated independently. The composition of the Boone formation at the C&H facility differs from the composition of the Boone formation at the Savoy Swine Facility, and thus, it is difficult to draw parallels between the two facilities. University of Arkansas scientists conducted a karst inventory in the area of the Savoy Swine Facility to gain a better understanding of the ground-water system prior to sampling point selection and well drilling.[6] The interceptor trench installed at the Savoy Swine Facility extended to the bedrock surface to allow collection of lagoon leachate moving down-gradient from the waste lagoon after a storm event.[6] Additionally, in constructing the compacted clay liner at the Savoy Swine Facility, sieved native soil (clay) was used to ensure adequate compaction.[6] C&H has neither performed such detailed karst inventories to determine placement of wells and trenches nor sieved the clay soil to remove rocks from the clay liner soil to ensure adequate compaction. Scientists studying the Savoy Swine Facility have taken great efforts to conduct geologic investigations and have collected a large amount of data to demonstrate that there is very little leakage from the waste holding ponds and settling basin at the Savoy Swine Facility, which is not a CAFO.[6] C&H has not taken such efforts.

[6] Christopher M. Hobza, David C. Moffit, Danny P. Goodwin, Timothy Kresse, John Fazio, John V. Brahana, and Phillip D. Hays, 2005, Ground-Water Quality Near a Swine Waste Lagoon in a Mantled Karst Terrane in Northwestern Arkansas, U.S. Geological Survey Karst Interest Group proceedings, Rapid City, South Dakota, September 12-15, 2005: U.S. Geological Survey Scientific Investigations Report 2005-5160, p. 155-162.

The Department followed the 2018 Assessment Methodology[7] in its assessment of the State's water quality. The 2016 and 2018 Assessment Methodologies and the resulting assessments of the State's water quality are outside the scope of this permitting decision.

[7] https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/final-2018-assessment-methodology.pdf

Pursuant to Ark. Code Ann. § 8-2-202, ADEQ administers an environmental laboratory accreditation program so that laboratories that submit data and analyses to the Department may be accredited by the Department as having demonstrated acceptable compliance with laboratory standards so that the validity of scientific data submitted to the Department may be further assured. All consulting laboratories performing analyses for which results are to be submitted to the ADEQ are required to obtain a laboratory accreditation through ADEQ's Environmental Laboratory Accreditation Program. Ark. Code Ann. § 8-2-206(a)(1)(A)(i). ADEQ's Environmental Laboratory Accreditation Program

ensures that data submitted for regulatory, planning, permitting, or other functions will be of acceptable quality.

The Department acknowledges that the dissolved oxygen (DO) data from the continuous monitoring in 2013 resulted in 528 violations out of 1131 sample points. The discreet data collected during the period of record (2012–2016) includes 15 violations out of 43 samples during the critical season meaning that 35% of the samples during the critical season exceeded the DO criteria during the period of record.

TMDLs for waters of the state of Arkansas are outside the scope of this permitting decision.

In the April 1 to June 30, 2018 Quarterly Report, BCRET presents data that documents a statistically significant increase of nitrate-N in the ephemeral stream (BC4) since 2014. However, BCRET notes that chloride, a conservative tracer, did not show a statistically significant increase. Four years of data also indicate a steady increase of geometric mean nitrate-N within the house well (W1) (BCRET April–June 2018, Figure 24). Increased nitrate-N in both the ephemeral stream and the house well does suggest that these systems may be hydrologically connected to areas where farm activities take place. APC&EC Regulation 5 requires the design and waste management plans for liquid animal waste management systems be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation to characterize and understand sites with complex geologies, i.e. karst, that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. Detailed geologic investigations, including a groundwater flow direction study, are necessary to determine that the ephemeral stream and house well are not influenced by the waste storage holding ponds, on-farm activities, or waste management practices.

BCRET data document that nitrate-N is variable; however, Figure 12 of the April 1 to June 30, 2018 BCRET Quarterly Report demonstrates that nitrate-N is higher downstream (BC7) than upstream (BC6). Chlorides and nitrates follow similar seasonal fluctuations in that they are higher during summer and autumn months when stream discharge is most influenced by groundwater. ADEQ reviewed Jim Petersen's May 31, 2018 expert report, which presents an analysis of temporal trends among nitrate-N and *E. coli* from January 2014–December 2017 at BC6 and BC7. Dr. Petersen's analysis presents decreasing trends of ammonia and chlorides and increasing concentrations of *E. coli* at BC6. Yet, increasing concentrations of nitrate-N were observed downstream at BC7. The conflicting temporal analysis prompted Dr. Petersen to further review trends upstream to downstream. By analyzing paired concentration data (collected same day) at BC6

and BC7 from January 2014 through December 2017, Dr. Petersen reports significant increases in total nitrogen, ortho-phosphorus, and chlorides, but non-significant changes in *E. coli* and nitrate-N. The significant increase of nitrate-N in the house well and ephemeral stream does correspond to increases of total nitrogen at BC7. Dr. Petersen's analysis illustrates the complexities of evaluating water chemistry in karst systems.

While no losing/gaining study has been performed to date on Big Creek between BC6 and the confluence with the Buffalo National River, BCRET notes seasonal dryness and rewatering between these two sites. Thomas Aley notes in his expert report of May 24, 2018, that "Big Creek also goes dry during much of the year where it passes over the Boone Formation near C&H Hog Farms." Dye studies performed by Brahana et al. (2016, 2017)[8], which were relied upon by Dr. Sharpley, and hydrologic studies by Murdoch et al. (2016)[9] in the Big Creek watershed identify potential confounding factors that make direct upstream to downstream comparisons difficult, particularly given the uncertainty that comes with the connectivity of karst hydrology. Groundwater upwelling can greatly influence ionic composition, nutrient concentration, and dissolved oxygen concentrations (Kresse et al. 2014, Cox et al. 2007, Soulsby et al. 2009, Robertson, et al. 2013, Justus et al. 2016).[10]

[8] Brahana, V., J. Nix, C. Kuyper, T. Turk, F. Usrey, S. Hodges, C. Bitting, K. Ficco, E. Pollock, R. Quick, and others. 2016. Geochemical Processes and Controls Affecting Water Quality of the Karst Area of Big Creek near Mt. Judea, Arkansas. Journal of the Arkansas Academy of Science 70:45–58.
Brahana, V., C. Bitting, K. Kosic-Ficco, T. Turk, J. Murdoch, B. Thompson, and R. Quick, 2017, Using fluorescent dyes to identify meaningful water-quality sampling locations and enhance understanding of groundwater flow near a hog CAFO on mantled karst—Buffalo National River, southern Ozarks: *in* Kuniansky, E.L., and Spangler, L.E., eds., U.S. Geological Survey Karst Interest Group Proceedings, San Antonio, Texas, May 19-23, 2017, U.S. Geological Survey Scientific Investigations Report 2017-5023, p. 147-160.
[9] Murdoch, J., C. Bitting, and J. Van Brahana. 2016. Characterization of the karst hydrogeology of the Boone Formation in Big Creek Valley near Mt. Judea, Arkansas—documenting the close relation of groundwater and surface water. Environmental Earth Sciences 75:1160.
[10] Kresse, T. M., P. D. Hays, K. R. Merriman, J. A. Gillip, D. T. Fugitt, J. L. Spellman, A. M. Nottmeier, D. A. Westerman, J. M. Blackstock, and J. L. Battreal. 2014. Aquifers of Arkansas—Protection, Management, and Hydrologic and Geochemical Characteristics of Groundwater Resources in Arkansas. U.S. Geological Survey Scientific Investigations Report 2014–5149.
Cox, M.H., Su, G.W. and Constantz, J., 2007. Heat, chloride, and specific conductance as ground water tracers near streams. Ground Water, 45(2), pp.187-195.

Justus, B. G., D. R. L. Burge, J. M. Cobb, T. D. Marsico, and J. L. Bouldin. 2016. Macroinvertebrate and diatom metrics as indicators of water-quality conditions in connected depression wetlands in the Mississippi Alluvial Plain. Freshwater Science 35:1049–1061.
Robertson, W.D., D.R. Van Stempvoort, D.K., Solomon, J. Homewood, S.J. Brown, J. Spoelstra, and S.L. Schiff. 2013. Persistence of artificial sweeteners in a 15-year-old septic system plume. Journal of Hydrology, 477, pp.43-54.
Soulsby, C., I. A. Malcolm, D. Tetzlaff, and A. F. Youngson. 2009. Seasonal and inter-annual variability in hyporheic water quality revealed by continuous monitoring in a salmon spawning stream. River research and applications 25:1304–1319.

ADEQ implements the applicable state and federal laws and regulations to protect waters of the state from pollution. Ark. Code Ann. § 8-4-101 *et seq.;* 33 U.S.C. § 1311 *et seq*.

The Department considered all available scientific data and information from, but not limited to, BCRET, United States Geological Survey, University of Arkansas Department of Agriculture, and ADEQ in making this permitting decision. The Department has no information to support the commenter's statement that this facility was designed, engineered, and constructed in accordance with APC&EC Regulation 5 and the AWMFH, as amended.

Comment: Any accident will contaminate the Buffalo River's pristine waters and critical habitat for endangered species, damaging the environment and adversely impacting tourism.

Commenter: Francie Bolter

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Department acknowledges the following statements from the Buffalo River Watershed-Based Management Plan dated May 22, 2018, regarding threatened and endangered species in the Buffalo River watershed:

> The Buffalo River and its tributaries are considered high quality water resources. The Buffalo River and its tributaries support over fifty (50) species of fish and over twenty (20) species of mussels. Portions of the Buffalo River have been designated critical habitat for the threatened Rabbitsfoot mussel, *Quadrula cylindrical*

> *cylindrical* (State/Federal Status: Endangered/Threatened, respectively). The watershed also includes important habitat for endangered bat species: Gray Bat, *Myotis grisescens* (State/Federal Status: Endangered); Indiana Bat, *Myotis sodalis* (State/Federal Status: Endangered); Ozark Big-eared Bat, *Corynorhinus townsendii ingens* (State/Federal Status: Endangered); and Northern Long-eared Bat, *Myotis septentrionalis* (State/Federal Status: Endangered/Threatened, respectively). Cave and other karst features in the Buffalo River watershed are important habitats for all of the protected bat species.[1]

However, the Department did not receive any comments during the comment period ending on October 24, 2018, regarding endangered or threatened species and their associated habitats from Arkansas Game & Fish Commission, Arkansas Natural Heritage Commission, or U.S. Fish and Wildlife Service.
[1] https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Consideration of tourism is not within the Department's regulatory authority.

Comment: This permit should have been denied years ago due to endangered species concerns as well as water quality issues. Deny the permit.

Commenter: Mitchell Wine

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Department acknowledges the following statements from the Buffalo River Watershed-Based Management Plan dated May 22, 2018, regarding threatened and endangered species in the Buffalo River watershed:

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> habitat for endangered bat species: Gray Bat, *Myotis grisescens* (State/Federal Status: Endangered); Indiana Bat, *Myotis sodalis* (State/Federal Status: Endangered); Ozark Big-eared Bat, *Corynorhinus townsendii ingens* (State/Federal Status: Endangered); and Northern Long-eared Bat, *Myotis septentrionalis* (State/Federal Status: Endangered/Threatened, respectively). Cave and other karst features in the Buffalo River watershed are important habitats for all of the protected bat species.[1]

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[1] https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Comment: Please remember the many biological species that depend on that river. As well as as the generations to come that will be able to enjoy the river if it's kept clean. I recommend that the permit be permanently denied to C&H Hog farm.

Commenter: Patty Hudgens

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Department acknowledges the following statements from the Buffalo River Watershed-Based Management Plan dated May 22, 2018, regarding threatened and endangered species in the Buffalo River watershed:

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> Big-eared Bat, *Corynorhinus townsendii ingens* (State/Federal Status: Endangered); and Northern Long-eared Bat, *Myotis septentrionalis* (State/Federal Status: Endangered/Threatened, respectively). Cave and other karst features in the Buffalo River watershed are important habitats for all of the protected bat species.[1]

However, the Department did not receive any comments during the comment period ending on October 24, 2018, regarding endangered or threatened species and their associated habitats from Arkansas Game & Fish Commission, Arkansas Natural Heritage Commission, or U.S. Fish and Wildlife Service.

[1] https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Comment: The Buffalo River is home to the endangered hellbender salamander. How many species have to go extinct before we realize the damage of altering these systems?

Commenter: Lori Monday

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Department acknowledges the following statements from the Buffalo River Watershed-Based Management Plan dated May 22, 2018, regarding threatened and endangered species in the Buffalo River watershed:

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> features in the Buffalo River watershed are important habitats for all of the protected bat species.[1]

However, the Department did not receive any comments during the comment period ending on October 24, 2018, regarding endangered or threatened species and their associated habitats from Arkansas Game & Fish Commission, Arkansas Natural Heritage Commission, or U.S. Fish and Wildlife Service.

[1] https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Comment: If there is even the slightest possibility that this farm will endanger the Buffalo River it must be denied. This River is a national treasure that is the habitat for many species.

Commenter: Ashley Henry

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Department acknowledges the following statements from the Buffalo River Watershed-Based Management Plan dated May 22, 2018, regarding threatened and endangered species in the Buffalo River watershed:

> The Buffalo River and its tributaries are considered high quality water resources. The Buffalo River and its tributaries support over fifty (50) species of fish and over twenty (20) species of mussels. Portions of the Buffalo River have been designated critical habitat for the threatened Rabbitsfoot mussel, *Quadrula cylindrical cylindrical* (State/Federal Status: Endangered/Threatened, respectively). The watershed also includes important habitat for endangered bat species: Gray Bat, *Myotis grisescens* (State/Federal Status: Endangered); Indiana Bat, *Myotis sodalis* (State/Federal Status: Endangered); Ozark Big-eared Bat, *Corynorhinus townsendii ingens* (State/Federal Status: Endangered); and Northern Long-eared Bat, *Myotis septentrionalis* (State/Federal Status: Endangered/Threatened, respectively). Cave and other karst features in the Buffalo River watershed are important habitats for all of the protected bat species.[1]

However, the Department did not receive any comments during the comment period ending on October 24, 2018, regarding endangered or threatened species and their associated habitats from Arkansas Game & Fish Commission, Arkansas Natural Heritage Commission, or U.S. Fish and Wildlife Service.
[1] https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Comment: The Buffalo National River has several unusual species that the National Park Service is bound by legislation to protect. Please keep hog farms away so my great-grandchildren may enjoy it the way my children have and my grandchildren are experiencing it.

Commenter: Gail Sears

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Department acknowledges the following statements from the Buffalo River Watershed-Based Management Plan dated May 22, 2018, regarding threatened and endangered species in the Buffalo River watershed:

> The Buffalo River and its tributaries are considered high quality water resources. The Buffalo River and its tributaries support over fifty (50) species of fish and over twenty (20) species of mussels. Portions of the Buffalo River have been designated critical habitat for the threatened Rabbitsfoot mussel, *Quadrula cylindrical cylindrical* (State/Federal Status: Endangered/Threatened, respectively). The watershed also includes important habitat for endangered bat species: Gray Bat, *Myotis grisescens* (State/Federal Status: Endangered); Indiana Bat, *Myotis sodalis* (State/Federal Status: Endangered); Ozark Big-eared Bat, *Corynorhinus townsendii ingens* (State/Federal Status: Endangered); and Northern Long-eared Bat, *Myotis septentrionalis* (State/Federal Status: Endangered/Threatened, respectively). Cave and other karst features in the Buffalo River watershed are important habitats for all of the protected bat species.[1]

However, the Department did not receive any comments during the comment period ending on October 24, 2018, regarding endangered or threatened species

and their associated habitats from Arkansas Game & Fish Commission, Arkansas Natural Heritage Commission, or U.S. Fish and Wildlife Service.
[1] https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Comment: I was born and raised on the headwaters of the Little Buffalo. Growing up, we received our drinking water directly from a spring. I know that many homes in Newton County get their drinking water this way. By concentrating sewage waste over fields in the area, many springs will be in the direct path of the sewage run off. There are many endangered plants and animals in close proximity to the Deer area that might not endure the extra insult caused by the swine waste and artificially high levels of phosphorus.

Commenter: Tasha Hudson

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Department acknowledges the following statements from the Buffalo River Watershed-Based Management Plan dated May 22, 2018, regarding threatened and endangered species in the Buffalo River watershed:

> The Buffalo River and its tributaries are considered high quality water resources. The Buffalo River and its tributaries support over fifty (50) species of fish and over twenty (20) species of mussels. Portions of the Buffalo River have been designated critical habitat for the threatened Rabbitsfoot mussel, *Quadrula cylindrical cylindrical* (State/Federal Status: Endangered/Threatened, respectively). The watershed also includes important habitat for endangered bat species: Gray Bat, *Myotis grisescens* (State/Federal Status: Endangered); Indiana Bat, *Myotis sodalis* (State/Federal Status: Endangered); Ozark Big-eared Bat, *Corynorhinus townsendii ingens* (State/Federal Status: Endangered); and Northern Long-eared Bat, *Myotis septentrionalis* (State/Federal Status: Endangered/Threatened, respectively). Cave and other karst features in the Buffalo River watershed are important habitats for all of the protected bat species.[1]

However, the Department did not receive any comments during the comment period ending on October 24, 2018, regarding endangered or threatened species

and their associated habitats from Arkansas Game & Fish Commission, Arkansas Natural Heritage Commission, or U.S. Fish and Wildlife Service.
[1] https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

The Arkansas Department of Health did not submit a comment regarding C&H Hog Farms, Inc., AFIN 51-00164, during the public comment period ending October 24, 2018.

Comment: The folks in North Carolina thought their manure pits were okay, too. We may not have a hurricane in our future, but there are too many things that could go wrong, given the geology of the region. https://www.usatoday.com/story/news/nation/2018/09/20/hurricane-florence-flooded-pig-poop-lagoons-threaten-north-carolina/1365984002/

Commenter: Steven Kopp

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. ADEQ has determined that a detailed geological investigation of the facility is required because karst includes highly permeable foundations with the associated potential for groundwater contamination and potential for sinkholes to open up with collapsing ground or cause differential settlement. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section

651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two sections of Big Creek (Newton County) and two sections of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Comment: I'm Jessie Green, I live in Harrison (P.O. Box 744) with such window of time for public comments let's not pretend. As we've seen that the intent of these hearings is anything other than just an opportunity to use a sounding board to vent our angst and aggression more than anything else. I here to talk to the community, I was going to ask for show of hands of those that are here in support of the Hog Farm but I thinks it's been clearly pointed out. For those of you that don't know me I'm your White River Water Keeper. And that include everyone in this room, I am your White River Water Keeper. If you don't know me then you also probably don't know that before I embarked on this endeavor. When I quit my job with ADEQ in the Water Division last year to start this non-profit. And I knowingly left my job as a senior ecologist just near months before pay raises kicked in, before receiving a bonus for an exceptional personnel review. I left my job at ADEQ because I wasn't allowed to let the science speak for itself. And was required to stick to the rhetoric supporting political agendas. I left my job that allowed me to spend over 50% of my time in the field the entire reason that I pursued a career in aquatic ecology, that's wasn't because I was bored, that wasn't because I felt that the work that I was going there wasn't meaningful it was, but it was controlled political agendas. I left my job because they desperately care about insuring Arkansan's have clean safe, fishable, swimmable and drinkable waters. I left because I was concerned about this polarizing divide that's growing in our State most of which could be attributed to the needs to pick a side related to where or not you are for or against C&H Hog Farm, and it's completely toxic. I left my job to start a non-profit because I thought it would be, I didn't leave because I thought it would be easier, I didn't leave because I thought it would require me to work fewer hours and certainly didn't leave because I thought that it would pay any better. I left because we can do better, I left because of whether you lived in an urban area or rural every one need and deserves access to clean water. Working against ourselves for the benefit of Corporations forcing rural farmers to buy into

industrial farming models because special interest control the free market, it doesn't benefit farmers, it doesn't protect our national resources for current and future generations and it doesn't benefit our communities and let's be perfectly honest the great scheme needs to be, has more to do with a 50 year old (thorn?) from the designation of the Buffalo River into the National Parks Service than it has to do with anything else. Special interest have capitalized on this deep root angst and used it to spread the "you're next" fear mongering and propaganda against Agriculture Communities. I support ADEQ denial of the Reg. 5 permit and I'll extend the same offer to anyone in this room as I extended to Jason Henson at a Quorum Court meeting in Marion County I will gladly sit down any time and explain the science and the rationale behind that decision to support the denial. To anyone who wants to know what else. Well I guess that's it, thank you.

Commenter: Jessie Green

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Comment: Over the past few decades, inhabitants of the region, including myself, have witnessed the negative impacts of overfarming, especially in lush environments. The Buffalo National River is no exception. Land conversion leads to habitat loss (when introducing non-native species), wasteful water consumption, soil erosion, degradation, and now harmful runoff which is polluting our waters. The Buffalo National River and Park has been a staple of the Ozark lands, and I wish to protect it at all costs. Please take this into consideration, and thank you for your time.

Commenter: Trae Pearce

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Comment: ADEQ, Thank you for your service and by the way I have flown also over the Bufflo and never saw any hogs but I have saw a lot of boulders.

Commenter: Earlene Edgemon

Response: This comment is outside the scope of this permitting decision.

Comment: It saddens me when people are fighting. When people have good will towards others, there are solutions to all problems. People can make a living farming, and our habitat can be protected. Both can be true. There is a way for hog farms and pristine rivers, to coexist. The best solutions are not be considered. Peace on Earth.

Commenter: Dennis Larson

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Comment: The error only exists on the mobile version of the site. I was able to use the full site version successfully. I hope you can fix the problem, so no commenter gets left out due to technology frustration. On Thu, Sep 20, 2018, 6:06 PM Robert Shingledecker > wrote: The form won't let me put my email in the email field... and of course you cannot submit your comment without the email address entered.

Commenter: Robert Shingledecker

Response: This comment is outside the scope of this permitting decision.

Comment: Thank you! On Sep 27, 2018 9:45 AM, "Water Draft Permit Comment" > wrote: The Department acknowledges the receipt of your electronic comment. Thank you.

Commenter: Rhonda Newton

Response: This comment is outside the scope of this permitting decision.

Comment: Dear Friends, I think there may be a problem with the form software - I've tried twice to comment, and it just grinds away indefinitely after I hit submit. Or maybe it's just me.

Commenter: Don House

Response: This comment is outside the scope of this permitting decision.

Comment: I have very little understanding of the technological way of communicating. I attempted to make my comment and was given CAPTCHA. I have no idea what I am do do although I would appreciate the opportunity to offer a comment on this extremely important issue. Thank you

Commenter: Nancy Garner

Response: This comment is outside the scope of this permitting decision.

Comment: The form won't let me put my email in the email field... and of course you cannot submit your comment without the email address entered.

Commenter: Robert Shingledecker

Response: This comment is outside the scope of this permitting decision.

Comment: There seems to be no ‘submit’ button. How do I know it has been accepted?

Commenter: Martha Sutherland

Response: This comment is outside the scope of this permitting decision.

Comment: Sent from Mail for Windows 10 ?????

Commenter: Margaret Lovell

Response: This comment is outside the scope of this permitting decision.

Comment: My self and several other people who are supporting the c&h farms are not able to leave comments and I'm reporting this to the Arkansas pollution control and ecology commission

Commenter: Brian Pruitt

Response: This comment is outside the scope of this permitting decision.

Comment: Why won’t the form accept my email address?

Commenter: Ed Hudnall

Response: This comment is outside the scope of this permitting decision.

Comment: After carefully filling out the form, I got a "oopsy, something went wrong" & can't figure out how to get past that. Maddening! Please help me get my comments in. Robert Bowker, tel. 870 499-5906, bowkerrg@ yahoo.com

Commenter: Robert Bowker

Response: This comment is outside the scope of this permitting decision.

Comment: Form does not appear to be allowing entry of an email address & subsequent submittal.

Commenter: Joe Payne

Response: This comment is outside the scope of this permitting decision.

Comment: I tried to submit my comment and when I click "continue", it does nothing.

Commenter: Rhonda Newton

Response: This comment is outside the scope of this permitting decision.

Comment: Sir/Madam: Thank you for the opportunity to provide comments asking the ADEQ to deny the CAFO permit for operation of a hog farm on the Buffalo River watershed. The previous permit was allowed with inadequate consideration of the damage resulting from such operations. I would like you to consider the letter I sent (copied below) on August 8, 2015, to the laboratory employed to prepare the original environmental assessment of the operation. There were many errors and omissions in that assessment. I didn't even receive an acknowledgement of my letter, and I assume it was ignored. I have moved to Tennessee since sending the letter, but I still ask you to consider my request to take actions in line with the well-being of the citizens of Arkansas and the proper stewardship of the environment. Please reject the placing of large hog farms in the watershed of our national river. Thank you.
Dear Sirs: Thank you for the opportunity to provide comments on the August 2015 Draft Environmental Assessment for C&H Hog Farms in Newton County, Arkansas. According to the "Notice of Availability" in Friday's (August 7, 2015) Arkansas Democrat Gazette, comments could be mailed to the above address. I hope these comments are helpful in your efforts to prepare the best possible final Environmental Assessment. While the draft EA contains helpful information, it fails to consider t groundwater supply that easily facilitates transfer to other sites. The karst formations in southern Missouri and northern Arkansas have been well known for this phenomenon. (See, for example,
http://geology.er.usgs.gov/eespteam/Midcontinent/Ozark_home/waterstudy.html.) The final EA surely should address this issue more carefully. p. 3-13 - "Most fecal pathogens from human and animal waste usually die very quickly. Two or three months is sufficient in most cases to reduce pathogens to negligible numbers once they have been excreted or land-applied in animal wastes." Besides the hedging here ("usually" and "most cases"), there is the obvious question of whether reapplication of waste will be done more frequently than every three months. If reapplication is more frequent, then a continual production of pathogens is assured. p. 3-13 - "All application areas receive application rates consistent with infiltration capabilities of the native soil such that there is no runoff into surrounding areas. Buffer strips (100 feet) are maintained . . . to prevent waste runoff into surrounding areas." The absence of a qualifier, such as "likely to be", and the use of the word "prevent" rather than "diminish" is notable. Is the author not familiar with the adage that "water runs downhill" (even through "buffer strips")? With the present wording, one

sees the draft EA as a promotional work, rather than an evaluative work. Options are listed for ways to address unexpected events leading to failure of the plan presented, but no mention is made of what would constitute a "tipping point" whereby any option is mandated. Later (p. 3-19), a "site-specific (NMP) plan" is mentioned, but its description includes the assertion that "[a]ll land application areas receive application at rates consistent with infilatration capabilities of the native soil such that there is no runoff to surrounding areas." That assertion is not given as a goal, but as a conclusion. The final EA surely will correct that. p. 3-14 through 3-16 - (Figures 3.2, 3.3, and 3.4) - The contrast between phosphorus concentration differences (downstream vs. upstream) and nitrate concentration differences begs two questions. What is the difference in mobility of nitrate and phosphate? And, what length of time would it take for any differences to appear? Phosphate is a much less soluble ion than nitrate, depending of course on pH and other factors, so it will initially be much less mobile than nitrate. The statement on p. 3-15, that "[n]o consistent differences in the trends in concentrations at the downstream site . . . compared with the upstream site were evident . . ." is incorrect (see Fig. 3.4), and it implies that such a concern can be dismissed. The EA should state that an increase in nitrate concentrations downstream from the CAFO is already detected (Fig. 3-4), and it is expected that phosphate concentrations downstream will increase when repeated application of manure to fields near Big Creek reaches the saturation point for the phosphate that the fields can hold. The phrase "seasonal variability" is inserted into the narrative here (p. 3-16). What is its purpose? Seasonal variability in measurements will be largely due to rainfall and temperature differences, and it is not in any way an explanation for the uniformly higher nitrate concentrations found downstream from the CAFO. I do appreciate the efforts made to predict what effects operations such as the CAFO might have on the environment. It is possible that reasonable predictions may indicate that the watershed may be able to accommodate the pollution that this CAFO alone may contribute, but the draft EA gives no encouragement that an impartial analysis is being conducted. p. 3-18 - "There are no data or other evidence to indicate that the [CAFO] is adversely affecting surface water quality." What about Figure 3.4 in the draft EA? (The point is not whether the current load of nitrate causes Big Creek to reach a eutrophic state, but whether the continued operation of the CAFO moves the stream in that direction.) Also, what about anecdotal evidence/complaints already given? Amazingly, the draft EA promotes the ". . . potential for improved water quality conditions . . .", as if to say this CAFO wouldn't be as bad as other options. Again, the draft EA conditions . . .", as if to say this CAFO wouldn't be as bad as other options. Again, the draft EA takes on the appearance of a promotional piece, rather than an objective analysis. p. 3-19 - "While it is highly unlikely, there could be a permitted discharge from the waste ponds should a 50-year or 100-year rainfall occur at a time when the ponds are at capacity." Consider this. If any pond is full and receives additional water, it overflows. It's not "unlikely". It will occur. Any body of water that is full is "full". Additionally, what is the hesitance to admit that a 50-year rainfall is likely to occur every fifty years? What is actually being admitted is that, statistically, a catastrophic pollution event will occur in the longer term. Also on p. 3-19, there are the statements, "There have been no consistent or significant differences in the concentrations of nutrients or bacteria between the upstream and downstream sites.", and, regarding such an event as an accidental discharge of waste, such an event ". . . would not result in long-term (chronic) or significant impacts to surface water quality." See above comments for pages 3-14 through 3-18. p. 3-20 - "There is no evident conduit for groundwater to reach surface water in the area." Did

the author mean, "There is no evident conduit for surface water to reach groundwater . . ."? Regardless, such an assertion would suggest that aquifers in the area aren't recharged by rainfall. Especially soluble nutrients, such as nitrates, are readily carried by surface and groundwater. (Consider the conflict regarding the elevated nitrate levels in the Illinois River entering Oklahoma from Arkansas. See the related article posted online by the Talequah Daily Press on January 29, 2015.) Additionally, the assertion that ". . . no nutrients are expected to leach into groundwater from the application of wastes to fields in the area." is just that, an assertion. (See above notes.) p. 3-37 - "No significant odor impacts are anticipated and no mitigation measures are required." The draft EA gives the impression that the "public commons" (environment shared by all) is relegated to a commodity to exploit, rather than a resource for which society is a steward. The draft EA fails to address adequately the destructive effects of this CAFO on the daily lives of its neighbors. Odor and flies might appear to be minor nuisances to those whose operation produce them or those who live farther away, but they can rob closer neighbors of the hope for a pleasant environment. The inclusion of sentences (p. 2-5) such as "[a] pesticide program is undertaken to control insects, if necessary . . ." and "[w]hen possible land application is downwind from residences . . ." don't adequately deal with this concern. The description that ". . . Arkansas' Right to Farm Law . . . protects farming operations from nuisance claims . . ." is not a justification for the assertion listed in the beginning of this paragraph. The final EA can include the description a farm can't be sued for flies or odors, but it can still acknowledge the damage to quality of life for neighbors. p. 3-41 (Sect. 3.8 Environmental Justice) - "There would be no effects to the . . . rest of the population in the Newton County." See previous paragraph. Thank you again for the opportunity to provide comments to the draft EA. I trust they will be helpful in developing a final EA.

Commenter: Michael Rapp

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The prior permit issued under APC&EC Regulation 6 General Permit ARG590000 and the coverage under that permit tracking number ARG590001 are outside the scope of the current permitting decision. The initial Notice of Intent and the corresponding NMP for coverage under the prior APC&EC Regulation 6 permit tracking number ARG590001 were available for public comment during the 30-day public comment period beginning on June 25, 2012.

The Environmental Assessment referenced in the comment is outside the scope of this permitting decision.

Comment: I agree that the current proposed C &H Hog farm permit should be denied. But if keeping the White River system pollution free is a priority I suggest you shut down the Norfork

National Fish Hatchery. The mass tonnage of trout waste they flush into the white river system seems to be above the law. Don't play favorites. You may wish to read the New York Times editorial below. https://www.nytimes.com/2015/04/11/opinion/the-cost-of-trout-fishing.html

Commenter: Bob Heine

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Trout farms are outside the scope of this permitting decision.

Comment: why do you let every confinement use earth dams to hold manure why can't they install a big storage tank and then dry the manure there is a market for that stuff for all the garden and flowers around the country

Commenter: Dale Zeimet

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

It is the applicant's responsibility to design its own liquid animal waste management systems in accordance with state laws and APC&EC Regulation 5. It is then the Department's charge to evaluate the proposed systems for compliance with state laws and APC&EC Regulation 5.

Comment: Say no to CAFO permit. The Buffalo National River is impaired. Stop further damage. Remove the swine factory. Objections: 1. Lack of written emergency environmental disaster plan. 2. Negative health impact on residents and tourists 3. Negative economic impact on Arkansas tourism industry. 4. Ark. Dept. of Environmental Quality failure in policy/procedure enforcement re geological site tests for the first permit and every permit application since. 5. Inhumane treatment of large animals. Look at the east coast States of Georgia N Carolina, S Carolina where disaster has left CAFOs and Chicken houses flooded which in turn has contaminated the rivers and ALL watersources for miles. A health catastrophe pending. Arkansas should end this recent agricultural experiment in confined feeding operations for large animals. Our water resources are more valuable than corporate feeding operations. Facts regarding this type of practice do not support claims regarding efficiencies. Arkansas should be a leader in agri industry not a follower of neighboring States with histories of disasters from CAFOs.

Commenter: Debbie Alexy

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

C&H Hog Farms, Inc. submitted an Emergency Action Plan to the Department on October 23, 2018. The Emergency Action Plan did not address possible failure of the liner resulting from potential damage, such as pumping and agitation, liner desiccation, or any other site-specific operational risks are not addressed, in accordance with AWMFH 651.0204(a), (b).

The Arkansas Department of Health did not submit a comment regarding C&H Hog Farms, Inc., AFIN 51-00164, during the public comment period ending October 24, 2018.

Consideration of tourism, economic impact, and animal husbandry are not within the Department's regulatory authority.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. ADEQ has determined that a detailed geological investigation of the facility is required because karst includes highly permeable foundations with the associated potential for groundwater contamination and potential for sinkholes to open up with collapsing ground or cause differential settlement. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in

Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Comment: https://www.facebook.com/69323601301/posts/10155804004846302/

Commenter: Delinda Mace

Response: Facebook posts are outside the scope of this permitting decision.

Comment: I would love to see the governing bodies in Arkansas care more about waterbodies in AR than they seem to care now. Not enough is done to ensure clean pure water for future generations. Risk of contamination, and tributaries already impaired are not taken seriously enough and that is not only sad, it is disturbing. Please deny C&H Hog Farm all hog operating permits. In addition, please stop letting water treatment facilities discharge treated liquids containing known carcinogen into Arkansas tributaries. Also, please fine violators. Not enough is being done to protect Arkansas water. Our government is dropping the ball on clean water in AR.

Commenter: Leora Hajek

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Comment: See Attached: Marti Olesen

Commenter: Marti Olesen

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Department acknowledges the resuscitations of facts and statements from information present in the permit application record including, but not limited to, inspection reports prepared by ADEQ, depositions, expert reports, and BCRET reports.

Please refer to the Response to Comments for those individuals' or groups' comments which have been incorporated by reference into your comments.

The Department acknowledges the following statements from the Buffalo River Watershed-Based Management Plan dated May 22, 2018, regarding threatened and endangered species in the Buffalo River watershed.

> The Buffalo River and its tributaries are considered high quality water resources. The Buffalo River and its tributaries support over fifty (50) species of fish and over twenty (20) species of mussels. Portions of the Buffalo River have been designated critical habitat for the threatened Rabbitsfoot mussel, *Quadrula cylindrical cylindrical* (State/Federal Status: Endangered/Threatened, respectively). The watershed also includes important habitat for endangered bat species: Gray Bat, *Myotis grisescens* (State/Federal Status: Endangered); Indiana Bat, *Myotis sodalis* (State/Federal Status: Endangered); Ozark Big-eared Bat, *Corynorhinus townsendii ingens* (State/Federal Status: Endangered); and Northern Long-eared Bat, *Myotis septentrionalis* (State/Federal Status: Endangered/Threatened, respectively). Cave and other karst features in the Buffalo River watershed are important habitats for all of the protected bat species.[1]

However, the Department did not receive any comments during the comment period ending on October 24, 2018, regarding endangered or threatened species and their associated habitats from Arkansas Game & Fish Commission, Arkansas Natural Heritage Commission, or U.S. Fish and Wildlife Service.

[1] https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

The Environmental Assessment referenced in the comment is outside the scope of this permitting decision.

ADEQ considers all readily available data to determine the status of water quality in Arkansas and to identify waterbodies that fail to meet standards defined in APC&EC Regulation 2. ADEQ recently completed water quality assessments for the development of a proposed 2018 303(d) List and 305(b) Integrated Report as required by the Clean Water Act. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. ADEQ has determined that a detailed geological investigation of the facility is required because karst includes highly permeable foundations with the associated potential for groundwater contamination and potential for sinkholes to open up with collapsing ground or cause differential settlement. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this

facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

Seepage from waste storage ponds has the potential to pollute surface and ground water. The record included one recompacted permeability test that is insufficient to determine liner integrity. The necessary soil investigations including, but not limited to, percentage of fines and soil permeability characteristics, have not been performed at this facility in accordance with the AWMFH 651 Table 10-4 and Appendix 10D. Plasticity index analysis was performed on one sample of the *in situ* clay material in boring 2. The variability in the regolith expected in this geologic setting coupled with the insufficient data creates additional concerns about the siting and soil sources for the clay liner. The required number of borings were not advanced within the pool areas in accordance with AWMFH 651.0704(b)(4); these additional borings would have provided more data for assessment of clay source material. Proper soil investigations for the liner material are necessary to determine the suitability and location of the clay source material and to consider any additional geotechnical testing to confirm material properties, which will reduce the potential for downward and/or lateral seepage of the stored wastes.

Additionally, NRCS, in Appendix 10D of the AWMFH, indicates that special design measures are necessary where agricultural waste storage ponds are constructed in soils with high calcium content (BCRET Quarterly Report for October 2016 to December 2016, Table 10, page 71) or highly unfavorable geologic conditions, such as karst formations.

C&H Hog Farms, Inc. submitted an Emergency Action Plan to the Department on October 23, 2018. The Emergency Action Plan did not address possible failure of the liner resulting from potential damage, such as pumping and agitation, liner desiccation, or any other site-specific operational risks are not addressed, in accordance with AWMFH 651.0204(a), (b).

The Department reviews all buffers to ensure that the applied buffers are in accordance with the buffer distances proscribed in APC&EC Regulation 5.406(D).

NRCS's Web Soil Survey provides a general guide to soil characteristics and ground-truthing is necessary to confirm those soil characteristics. Walking the fields cannot provide the data necessary to evaluate the fields in accordance with AWMFH 651.0504 (a)–(n) and Table 5-3. The ground penetrating radar studies[2] at Fields 1, 5, and 12 indicated that land application to those fields should be limited in accordance with AWMFH 651.0504 (a)–(n) and Table 5-3. The ground penetrating radar studies suggest that these fields have characteristics identified in AWMFH 651.0504 (a)–(n) and Table 5-3, such as areas of higher

permeability, thin soils of less than twenty (20) inches (see excerpts from the ERI Study below), and soils with a significant fractions of rock fragments preventing some soils samples from being taken. The limitations for land application sites based on these soil characteristics are part of the AWMFH with the purpose of preventing contamination of ground water. Geotechnical investigations of the land application fields are necessary to account for the soils characteristics that require limitations on animal waste application.

[2] As part of the BCRET study, USDA, NRCS conducted Ground Penetrating Radar (GPR) Surveys for Fields 1 and 5 in November of 2013 and Field 12 in April of 2014.

Field 5a exhibits average soil thicknesses of 0.5 to 4.5 meters (1.5 to 14.75 feet). Field 12 is a low-lying grazing area with low relief and an uneven topsoil surface. Field 12 exhibits similar average soil thicknesses at 0.7 to 4 meters (2.25 to 13 feet). Field 1 shows an average soil thickness of 0.5 meters (1.5 feet) determined from the ERI surveys and soil sampling. Field 1 has thinner and rockier soils than either Fields 5a or 12. In Field 12, there appears to be a large doline feature (a closed topographic depression caused by dissolution or weathering of underlying rock or soil) within the bedrock, approximately 61 meters (200 feet) across at the top of the feature, starting 8 meters (26 feet) below the land surface and extending 23 meters (75 feet) vertically downward.[3] Geotechnical investigations of the land application fields are necessary to account for the soils characteristics that require limitations on animal waste application.

[3] Jon Fields and Todd Halihan, Electrical Resistivity Surveys of Applied Hog Manure Sites, Mount Judea, AR (2015).

Data supplied from the C&H Hog Farms, Inc. 2014–2017 annual reports document an increase of soil test phosphorus (STP) from 20 ppm to 68 ppm in Field 17 to a more significant increase in Field 1, which increased from 45 ppm to 173 ppm. As stated in University of Arkansas Division of Agriculture Soil Phosphorus: Management and Recommendations FSA1029[4], “Arkansas scientists agree that there is no agronomic reason or need for STP to be greater than about 50 ppm (Mehlich-3 extraction).” However, “with the move from agronomic to environmental concerns with P, soil P testing has been used to indicate when P enrichment of runoff may become unacceptable. A common approach has been to use agronomic soil P standards, following the rationale that soil P in excess of crop requirements is vulnerable to removal by surface runoff or leaching” (FSA1029). “A large amount of research between 1985 and 2000, showed that as STP (Soil Test Phosphorous) increased, especially in the top 2–4 inches of soil, so did the concentrations of soluble P in runoff (Figure 1)” (FSA1029).

As of the C&H Hog Farms, Inc. 2017 Annual Report, results of all soil test phosphorus were greater than 50 ppm. Despite a reported increase of soil test

phosphorus in waste application fields, pursuant to NRCS Code 590, the Arkansas Phosphorus Index may still allow application of swine waste because of other factors including phosphorus source potential, transport potential, and best management practice multipliers. FSA9516[5] states that the phosphorus index approach is most appropriate as it accounts for multiple risk factors and provides a better risk assessment of P loss in runoff.

Geotechnical investigations at all land application sites in accordance with AWMFH 651.0504 (a)–(n) and Table 5-3 are necessary to ensure the efficacy of the API and demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River by rapid infiltration through highly permeable or thin soils.

[4] https://www.uaex.edu/publications/PDF/FSA-9516.pdf

[5] https://www.uaex.edu/publications/pdf/FSA-1029.pdf

ADEQ evaluated total phosphorus concentrations in Big Creek according to the 2016 Assessment Methodology[6] and the 2018 Assessment Methodology[7]. For the 2016 assessment cycle, Big Creek (BUFT06, AU 11010005_020) mean total phosphorus and total nitrogen were 0.026 mg/L and 0.33mg/L, respectively. The assessment methodology for APC&EC Reg. 2.509 screens the monitoring station's mean total phosphorus and total nitrogen concentration to the 75th percentile for a given ecoregion for the assessment cycle period of record. Screening values for the Boston Mountain ecoregion for 2016 total phosphorus and total nitrogen were 0.036 mg/L and 0.46 mg/L, respectively. The 2018 screening values were 0.036 mg/L and 0.55 mg/L for total phosphorus and total nitrogen. The mean values for 2018 for BUFT06 were 0.028 mg/L total phosphorus and 0.297 mg/L total nitrogen. All mean total phosphorus and total nitrogen for Big Creek were below the Boston Mountain ecoregion 75th percentile. At this time, neither the Buffalo National River nor Big Creek have been identified as impaired for phosphorus based on the EPA-approved Assessment Methodology.

[6] https://www.adeq.state.ar.us/water/planning/integrated/assessment/pdfs/2016-assessment-methodology-draft-04apr16-305b.pdf

[7] https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/final-2018-assessment-methodology.pdf

The prior permit issued under APC&EC Regulation 6 General Permit ARG590000 and the coverage under that permit tracking number ARG590001 are outside the scope of the current permitting decision. The initial Notice of Intent and the corresponding NMP for coverage under the prior APC&EC Regulation 6 permit tracking number ARG590001 were available for public comment during the 30-day public comment period beginning on June 25, 2012.

In the April 1 to June 30, 2018 Quarterly Report, BCRET presents data that documents a statistically significant increase of nitrate-N in the ephemeral stream (BC4) since 2014. However, BCRET notes that chloride, a conservative tracer, did not show a statistically significant increase. Four years of data also indicate a steady increase of geometric mean nitrate-N within the house well (W1) (BCRET April–June 2018, Figure 24). Increased nitrate-N in both the ephemeral stream and the house well does suggest that these systems may be hydrologically connected to areas where farm activities take place. APC&EC Regulation 5 requires the design and waste management plans for liquid animal waste management systems be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies, i.e. karst, that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. Detailed geologic investigations, including a groundwater flow direction study, are necessary to determine that the ephemeral stream and house well are not influenced by the waste storage holding ponds, on-farm activities, or waste management practices.

BCRET data document that nitrate-N is variable; however, Figure 12 of the April 1 to June 30, 2018 BCRET Quarterly Report demonstrates that nitrate-N is higher downstream (BC7) than upstream (BC6). Chlorides and nitrates follow similar seasonal fluctuations in that they are higher during summer and autumn months when stream discharge is most influenced by groundwater. ADEQ reviewed Jim Petersen's May 31, 2018 expert report, which presents an analysis of temporal trends among nitrate-N and E. coli from January 2014–December 2017 at BC6 and BC7. Mr. Petersen's analysis presents decreasing trends of ammonia and chlorides and increasing concentrations of E. coli at BC6. Yet, increasing concentrations of nitrate-N were observed downstream at BC7. The conflicting temporal analysis prompted Mr. Petersen to further review trends upstream to downstream. By analyzing paired concentration data (collected same day) at BC6 and BC7 from January 2014 through December 2017, Mr. Petersen reports significant increases in total nitrogen, ortho-phosphorus, and chlorides, but non-significant changes in E. coli and nitrate-N. The significant increase of nitrate-N in the house well and ephemeral stream does correspond to increases of total nitrogen at BC7. Mr. Petersen's analysis illustrates the complexities of evaluating water chemistry in karst systems.

While no losing/gaining study has been performed to date on Big Creek between BC6 and the confluence with the Buffalo National River, BCRET notes seasonal dryness and rewatering between these two sites. Thomas Aley notes in his expert report of May 24, 2018, that “Big Creek also goes dry during much of the year where it passes over the Boone Formation near C&H Hog Farms.” Dye studies performed by Brahana et al. (2016, 2017)[8] and hydrologic studies by Murdoch

et al. (2016)[9] in the Big Creek watershed identify potential confounding factors that make direct upstream to downstream comparisons difficult, particularly given the uncertainty that comes with the connectivity of karst hydrology. Groundwater upwelling can greatly influence ionic composition, nutrient concentration, and dissolved oxygen concentrations (Kresse et al. 2014, Cox et al. 2007, Soulsby et al. 2009, Robertson, et al. 2013, Justus et al. 2016).[10]

[8] Brahana, V., J. Nix, C. Kuyper, T. Turk, F. Usrey, S. Hodges, C. Bitting, K. Ficco, E. Pollock, R. Quick, and others. 2016. Geochemical Processes and Controls Affecting Water Quality of the Karst Area of Big Creek near Mt. Judea, Arkansas. Journal of the Arkansas Academy of Science 70:45–58.

Brahana, V., C. Bitting, K. Kosic-Ficco, T. Turk, J. Murdoch, B. Thompson, and R. Quick, 2017, Using fluorescent dyes to identify meaningful water-quality sampling locations and enhance understanding of groundwater flow near a hog CAFO on mantled karst—Buffalo National River, southern Ozarks: *in* Kuniansky, E.L., and Spangler, L.E., eds., U.S. Geological Survey Karst Interest Group Proceedings, San Antonio, Texas, May 19-23, 2017, U.S. Geological Survey Scientific Investigations Report 2017-5023, p. 147-160.

[9] Murdoch, J., C. Bitting, and J. Van Brahana. 2016. Characterization of the karst hydrogeology of the Boone Formation in Big Creek Valley near Mt. Judea, Arkansas—documenting the close relation of groundwater and surface water. Environmental Earth Sciences 75:1160.

[10] Kresse, T. M., P. D. Hays, K. R. Merriman, J. A. Gillip, D. T. Fugitt, J. L. Spellman, A. M. Nottmeier, D. A. Westerman, J. M. Blackstock, and J. L. Battreal. 2014. Aquifers of Arkansas—Protection, Management, and Hydrologic and Geochemical Characteristics of Groundwater Resources in Arkansas. U.S. Geological Survey Scientific Investigations Report 2014: 5149.

Cox, M.H., Su, G.W. and Constantz, J., 2007. Heat, chloride, and specific conductance as ground water tracers near streams. Ground Water, 45(2), pp.187-195.

Justus, B. G., D. R. L. Burge, J. M. Cobb, T. D. Marsico, and J. L. Bouldin. 2016. Macroinvertebrate and diatom metrics as indicators of water-quality conditions in connected depression wetlands in the Mississippi Alluvial Plain. Freshwater Science 35:1049–1061.

Robertson, W.D., D.R. Van Stempvoort, D.K., Solomon, J. Homewood, S.J. Brown, J. Spoelstra, and S.L. Schiff. 2013. Persistence of artificial sweeteners in a 15-year-old septic system plume. Journal of Hydrology, 477, pp.43–54.

Soulsby, C., I. A. Malcolm, D. Tetzlaff, and A. F. Youngson. 2009. Seasonal and inter-annual variability in hyporheic water quality revealed by continuous monitoring in a salmon spawning stream. River research and applications 25:1304–1319.

On March 25, 2016, John Bailey, on behalf of ADEQ, sent a letter to C&H Hog Farms, Inc. notifying C&H that the requested modification to install a synthetic liner in both lagoons was approved and that the requested modification would

expire after one year. Should C&H not install the liners within that one-year period, C&H would be required to resubmit plans and obtain a new approval from the Department. Mr. Bailey approved the installation of synthetic liners under the terms of the now expired General Permit ARG590000, tracking number ARG590001. Mr. Bailey's approval authorizing C&H to install the synthetic liners expired on March 25, 2017.

Although the analytical data from the C&H Drilling Study did not indicate a leak at the borehole drilling location at the time of the sampling, the Study does not support the conclusion that there is not any leakage from the ponds.

> Algal blooms have, and continue to, cause concern on the Buffalo River. As part of the USNPS aquatic invertebrate sampling program, the percentage of the sampling grid with filamentous algae is recorded. Of the monitored locations, the downstream locations tend to have more filamentous algae. The greater occurrence of filamentous algae at the downstream locations may be a response to higher nutrient levels.[1]

ADEQ is working to support a collaborative study with the Arkansas Game and Fish Commission, US Geological Survey, and the National Park Service focused on the distribution and causation of the rapid expansion of filamentous algae in the Buffalo National River.

The Arkansas Department of Health did not submit a comment regarding C&H Hog Farms, Inc., AFIN 51-00164, during the public comment period ending October 24, 2018.

The Department is actively engaged in developing an antidegradation implementation procedure to address the revision of 40 CFR § 131.12. The Department implemented 40 CFR § 131.12 in APC&EC Regulation 2 Chapter 2. As stated in APC&EC Regulation 2.203, it is not the intent of the regulation to dictate regulatory authority over private land within the watershed of an ERW, other than what exists under local, state, or federal law.

Consideration of tourism is not within the Department's regulatory authority.

Pursuant to the Memorandum of Agreement between the Board of Trustees of the University of Arkansas System for and on behalf of the University of Arkansas System-Division of Agriculture and the Arkansas Department of Environmental Quality, the study performed by BCRET is being carried out for the use and benefit of ADEQ; however, the study shall be funded and conducted

independently of ADEQ and shall meet the requirements of an independent study conducted by professionals in the field of water quality.

Summarized Comment: The following commenters provided comments supporting the Department's decision to deny the permit application due to air quality concerns including odor, airborne pathogens, and air pollution.

Commenters: Jeff Ingram, Nancy Baxter, Dorothy Walters, David Franks, Lynn Kidder, Cynthia Thiele, Rachel Henriques

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Air quality is outside the scope of this permitting decision.

Summarized Comment: The following commenters provided comments regarding algae in the Buffalo National River and Big Creek. Some commenters stated that the algae is a direct result of the facility operating, and that the algae has increased exponentially in the years following the construction and operation of the facility. Some commenters stated that there is no algae on Big Creek, and that the algae in the Buffalo National River has always been there.

Commenters: Jay Stanley, Eilish Palmer, Marilyn Masterson, Judy McCutcheon, Julann Carney, Kelly Olson, Laura Peach, Demaris Elkins, Chuck Smith, Virginia Hartnett, Dawn Stanley, Gary Fancher, Laura Bitting, Melinda Wylie, Jeannie Jones, Paula Bramlett, Frank Barton, Geral James, Tony Hilliard, Brian Pruitt, Julian Clark, Curtis Presley, Jan VanSchuyver, Barbara Turney, Carol Graham, James Wilcox, Curtis Semler, Robert Hornberger, Kim Bittle, Judi Nail, Robert Clay, Geoffrey Zahn, Angela Nichols, Janie Agee, Richard Crawford, Donald Campbell, David Pope MD, Tera Easter Short, Denice McMinn, Kelley Renard, Raymond Penick, Randall Hollenbeck, Carrie Harris, Marya McKee, Frank Barton, William Nipper, Marilyn Deese, Dick Lester, Judy Powell, Steve Singleton, Jerry Vartan, Marianne Black, Lawrence Ireland, Greg Kennedy, Nancy Baxter, Lisa Castellani, Andrea Moerman-Herzog, Linda Langer, Nicole Pope, Susan Gardner, Laykyn Rainbolt, Kriste Rees, Kenneth Smith, Brad Kohler, Brandon Baker, Mark Moore, Vivian Duncan, Bob Hill, Barbara Janke, John Creager, John Creager, John Creager, Jessica Luraas, John Creager, Alerha Tetterton, Heather Hudgens, Michael Jirka, Cindy Jetton, Shane Jetton, Sara White, Stacey Burnett, Jonathan Shoffit, Dean Castle, Daniel Lamping, Angela Koone, Dave Mcphail, Ashley Money, Sharon Robinson, Sam Whitlow, Melissa Knowlton, Philly Rains, Susan Robinson, Colleen Vollman, Bianca Armstrong, John Bouck, Brandon Bassett, Matt Horan, Caroline Hughed, Sarah Moss, Gordon Siggeman, Kerry Berger, Daniel Daugherty, T.A. Sampson, Don Shreve, Dorothy Walters, Robert Bowker, Nina Linn, Carol Wooten, Richard Crawford, Joellen Rosenquist, Abby Burnett, James Wise, Rickey Border, Tammy Decker, Alicoa Finch-McCastlai, Erika Brock Stolzer, Laura Herold, Bryon

Kelley, Joshua Janke, Lisa Swinford, Steven Roberts, Roxan Smith, Kenneth Pape, Taylor Shanks, James Cline, John Fritz, John Shore, Beth Barre, Stan Langley, Bob Morison, Gary Strain, Melinda Caldlwell, Cindy Majoros, Frank Keller, Sherry Clark, Larry Owens, Bonnie Jaeckle, Melissa Sunshine, Trish Hasenmueller, Joanne Vrecenak, Margaret Birdsong, Connor Schuman, Scott Yaich, Eileen Lenkman, Gaea Miller, Susan Leslie, Donald Campbell, Sandy Kapka, Keith Reeves, Toma Whitlock, Karen Hill, Julee Jaeger, Stephen Sims, Karen Tablish, Robyn Schaub, Ronald J. Doster, Roger Case, Tammy Calnan, Sandra Roerig, Elaine Nesmith, Sean Fletcher, David Harju, Janis Harju, Dorothy Bailey, Joe Love, Janice Peters, Nathan Pittman, Donnetta Wheeler, Barry Bryant, Amy Hazel, Gerald Weber, Kacy Forrester, Wes Craiglow, Nancy Miner, Denise Barton, Lillian Israel, David Alexander, Laura Timby, Steve Folkers, Robin Rumph, Ryan Sheffield, Charles Finch, Mike Richardson, Andrew Lee, Christy Tennant, Brandon ONeal, Cate Barnett, Dawn Kelly, Sean Stamm, Laura Brasel, Cindy Jetton, Alex Liles, kay fulton, Eddie Vollman, Tammy Jernigan, Teena Crabb, Emily Roberson, Rhon Reme, Terry Sutterfield, William Dark, Barbara DeChant, Richard Maxwell, Phil Wood, randy Jones, John Kelly, Erin Rains, Cindy Jetton, Kayden Rains, David Schisler, Ashley Campbell, Jeff Reddell, Sandra Avra, Danny Kelley, Robert & Cynthia Martin, Edith Stahl, Rel Corbin, Cynthia Jetton, Richard Williams, Brock Foster, Randy Carter, John Carter, Candace McGhee, Debbie Doss, Bruce and Susie Hibbs, Jeff Connole, Evelyn Mills, Kathy Downs, Andy McCutcheon, Bill Dark, Jared Wheeler, Kathy Downs, Brad and Diana Walpole, Gayle and Randy Teague

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

> Algal blooms have, and continue to, cause concern on the Buffalo River. As part of the USNPS aquatic invertebrate sampling program, the percentage of the sampling grid with filamentous algae is recorded. Of the monitored locations, the downstream locations tend to have more filamentous algae. The greater occurrence of filamentous algae at the downstream locations may be a response to higher nutrient levels.[1]

ADEQ is working to support a collaborative study with the Arkansas Game and Fish Commission, US Geological Survey, and the National Park Service focused on the distribution and causation of the rapid expansion of filamentous algae in the Buffalo National River.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Summarized Comment: The following commenters provided comments supporting the Department's decision to deny the permit application because the permit application fails to comply with the requirements set forth in APC&EC Regulation 5 and the AWMFH.

Commenters: Mike Masterson, Grant Scarsdale, Carolyn Shearman, Debbie Alexy, Robert Morgan, Greg Scharlau, Judy Eldridge, Harold Lacy, Rick Hale, Fay Knox, My Blue Heaven Cabin, Gerald Weber, Deborah Kitz, Mark Smith, William Dark, Ellen Corley, Brian Thompson, Bob Allen, Debbie Alexy

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. ADEQ has determined that a detailed geological investigation of the facility is required because karst includes highly permeable foundations with the associated potential for groundwater contamination and potential for sinkholes to open up with collapsing ground or cause differential settlement. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. Geotechnical

investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Summarized Comment: The following commenters provided comments in favor of the facility receiving a permit due to the applicant having gone above and beyond in providing all requested information to the Department. Some commenters raised concerns that the applicant was able to get an APC&EC Regulation 6 permit, but were denied an APC&EC Regulation 5 permit, and that the Department is following recommendations rather than requirements.

Commenters: Brandon Martin, Tammy Decker, Terance Middleton, Sharon Pierce, Michael Battenfield, Lemon Sharbrough, Gregory Smith, Bert Watson, Tad Huff, John Jones, Keith Kilbourn, Nathan Obryant, DeLana Shoemake, Charles Pridmore, Bill/Lois Willard, Kathy Martin, Martha Winnat, Austin Brown, Laura Smith, Kimberly Mefford, Janice Higgins, Brian Stoltze, John Crangle, Michelle Pass, Steven Hignight, John Moore, Jason Kaufman, Marcus Looney, Doug Baird, Brian Unruh, Amy Smith, Carla Vaught, Rosemary Faught, Amelia Bower, Bethaney Kent, Michelle Buchanan, Karen Edgmon, Joey Sample, Dan Wright, David Brown, Malcolm Farmer, Lillian Preddy, Randy Gibbins, Cassie Fisher, James Smith, Helen Griffin, Jane Ann Perry, Steve Barney, Libby Brasel, Martin Sims, Jennifer Cook, Libby Brasel, Linda Fortune, Jessica Wheeler, Kathy Morales, Kevin Flippin, Rick Casey, Jon Melton, Rona Cross, Kelly Ragland, Sam D. Cooke, Kevin Overholt, Dustin Cowell, Mike Richardson, Pam Grice, Michael Brotherton, Deanna Bohanan, Branda Swafford, Tammy Clark, Lavern Baughman, Charity Richardson, Teena Crabb, Jane Martin, Becky McAnulty, Nick Holt, Calvin Henry, Doug Miller, Carl Eggers, Carolyn Hambay, Thelma Ramsey, Dalton Bower, Amanda Drummond, Brad Doyle, Melissa Klipp, Debbie Peerce, Stephanie Ford, Donald Horton, Emilee Tucker, Ashley Campbell, Jack Boles, Jill Pierce Wilborn, James and Brenda Patton, Kason Knapp, Harlie Treat, Elliott Golmon, Doyle Smith, Janet Mathis, John Hamilton, Cathy Minor, Arlis Jones, Chuck Pridmore, Jerry Masters, Matt Heidersheidt

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The applicant was previously granted coverage under an APC&EC Regulation 6 general permit. The prior permit issued under APC&EC Regulation 6 General Permit ARG590000 and the coverage under that permit tracking number ARG590001 are outside the scope of the current permitting decision.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Summarized Comment: The following commenters provided comments supporting the Department's decision to deny the permit application due to the impairment of Big Creek and the Buffalo National River. Some commenters suggested that the Department list the streams as a Category 5 in the proposed 2018 ADEQ 303(d) list. The commenters believe that the facility is the source of impairment.

Commenters: Jay Stanley, Julann Carney, John Ritchey, Cheryl Luchin, Pamela Ellwood, Dewey Strode, Robert Steele, Valerie Hart, Richard Bishop, Laura McCarty, Hal Mitzenmacher, Carolyn Shearman, Martin Gallaher, Ellen Tate, Robert Richart, Mikki White, DeLynn Hearn, David Pope MD, Lucas Parsch, Debbie Alexy, Rebecca Shannon, Craig Gann, John Ray,

Theresa Brewer, Charles Steelman, Joseph D. LaFace, Robert Morgan, Linda Lewis, Benjamin Thompson, Arthur Evans, Kenneth Pape, Stacey Lochala, Margie Arens, Debbie Campbell, Barbara Dillon, Carolyn Di Santo, Melina Rikion, Mary Schlatterer, Steven Miller, Lesley Allen, My Blue Heaven Cabin, Elaine Nesmith, Craig Duffy, Sam D. Cooke, Mary Melissa Lee, Kay Fulton, Tom Thompson, Mark Smith, Tasha Hudson, Marti Olesen, Ellen Corley, Brian Thompson, Frances Dorough, Bill Pettit, Gayle Teague, Cynthia Mitchell

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

ADEQ considers all readily available data to determine the status of water quality in Arkansas and to identify waterbodies that fail to meet standards defined in APC&EC Regulation 2. ADEQ recently completed water quality assessments for the development of a proposed 2018 303(d) List and 305(b) Integrated Report as required by the Clean Water Act. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen.

The Department followed the 2018 Assessment Methodology[1] in its assessment of the State's water quality. The 2018 Assessment Methodology and the resulting assessment of the State's water quality are outside the scope of this permitting decision.

[1] https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/final-2018-assessment-methodology.pdf

Summarized Comment: The following commenters provided comments supporting the Department's decision to deny the permit application. The commenters believe that the facility applied for a permit to discharge waste to the Waters of the State.

Commenters: Donald Campbell, Jo Paulus, Ann Chitwood, Arlone Folkers, Andrew Lee, Anne Titus, Barbara Dillon, Becky Hauck-Brents, Charles Black, Carl Burd, Crescent Dragonwagon, Catherine Handley, Cece Hilliard, Calvin Wilson, Dan Clarke, Diana Danforth, Derrick Hartberger, David Jacobsen, David Kelley, Dustin Slaughter, Dylan Stith, Edward Downie, Jane Scroggs, Ellanorah Wilson, Frances Kulish, Guy Ames, Gary Johnson, Holli Hooten, Heather Huckeba, Homer Keys, Ian Shirley, Jeff Cordell, John Fritz, John Heringer, Jody Hughes, Jane Justus, Eileen Kelley, Joe Loman, Jefferie Renegar, Josh Sakon, Jan VanSchuyer, Jessica Walls, Jane Wenmok, John Wilson, Jacque Faubus, Jim Faubus, Kolt Burton, Kathy Cowherd, Kent Landrum, Keith Lewis, Kim Swepston, Lisa Hackman, Linda Komlos, Lauren Matlock, Lorenzo Otranto, Lynn Risser, Linda Stith, Mike Atkinson, Michael Daugherty, Michael de Buys, Misty Langston, Matthew Richardson, Mark Smith, Marthanne Squires, Mike Stith, Marion Tichenor,

Michelle Turberville, Mary Grace McCauley, Mary Lauren Wilson, Nancy Kahanak, Nan Loman, Penny Carroll, Paul Cromwell, Phyllis Head, Paula Matthews, Rebekah Brown, Rel Corbin, Robin Devine, Rebecca Ivey, Ramona Ladue, Steve Folkers, Sharon Keller, Scott Mashburn, Sarah Moore, Sydney Ripple, Sue Standefer, Susan Tinker, Susan Unger, Shari Withey, Terry Michaels, Tonia Squires, Virginia Hinterthuer, Victoria Lee, Wesley Booker, William Davis, William Kumpuris, William Smith, Norma Marshall, Kevin Williams, Kevin McKinnon, Robin Palculict, Carl Whittemore, Britta Morrison, Carol Shoup, Sharon Miller, Leah Simpson, Amy Thiele, Sandra Murray, Danny Smith, Legina Boswell, Frank Henry, Kathleen Lasar, Judith Matthews, Jett Moore, Jennifer Sterling, Jessica Winkleman, Kathryn Laurain, Margaret Blair, Mike Oglesby, Mark Pryor, Michael Pulfer, Patty Heller, Martha Falkenstien, Joyce Bunch, Diana Welch, Margaret Konert, Ginny Masullo, Patricia Mikkelson, Rita Benitez, Jeanie Wyant, Jeremiah Jennings, Becky Hauck-Brents, Parker Fiscus, Gena Pense, Thomas Mahaney, Jr., Rachel Huff, McKenzie Barnes, Michael Crane, Delaney Butler, Kasey Estes, Ellen Hoofard, Terry Layman, Catherine Sain, Holly Harper, Ken Muessig, Jennifer Cole, Melissa Daly, Anne Littell, Barbara Dillon, Robert Laurence, Sally Hunter, Susan James, Stella Keating, Stanley Lancaster, Sarah Matthews, Bayard Blain, Bayard Blain, Ryan Hartley, Betty Rowe, Brett Sterling, Damon Akin, Donald Hays, Doug Wallace, Elizabeth Cantwell, George Shelton, Heather Blair

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

C&H has applied for an APC&EC Regulation 5 Individual No Discharge permit. APC&EC Regulation 5.303 prohibits point source discharges from any part of the liquid animal waste management system.

Summarized Comment: The following commenters provided comments supporting the Department's decision to deny the permit application due to the lack of an emergency action plan that addresses overtopping, natural disaster, or other emergency discharge.

Commenters: Jay Stanley, Dale Anderson, Virginia Booth, Miranda Harrington, Bruce Petray, Charles Beavers, Debbie Alexy, Kenley Money, Lawrence Jackson, Steven Bonner, William Speer, Gerald Weber, Laura Timby, Gail Sears, Jacob Maris, Ellen Corley, Debbie Alexy, Judith Matthews, Jett Moore, Jennifer Sterling, Jessica Winkleman, Kathryn Laurain, Margaret Blair, Mike Oglesby, Mark Pryor, Michael Pulfer, Patty Heller, Margaret Konert, Ginny Masullo, Patricia Mikkelson, Rita Benitez, Jeanie Wyant, Jeremiah Jennings, Becky Hauck-Brents, Parker Fiscus, Gena Pense, Thomas Mahaney, Jr., Rachel Huff, McKenzie Barnes, Michael Crane, Delaney Butler, Kasey Estes, Ellen Hoofard, Terry Layman, Catherine Sain, Holly Harper, Ken Muessig, Jennifer Cole, Melissa Daly, Anne Littell, Barbara Dillon, Robert Laurence, Sally Hunter, Susan James, Stella Keating, Stanley Lancaster, Sarah Matthews, Bayard Blain, Bayard

Blain, Ryan Hartley, Betty Rowe, Brett Sterling, Damon Akin, Donald Hays, Doug Wallace, Elizabeth Cantwell, George Shelton, Heather Blair, Eddie Vollman, Steven Heye

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

C&H Hog Farms, Inc. submitted an Emergency Action Plan to the Department on October 23, 2018. The Emergency Action Plan did not address possible failure of the liner resulting from potential damage, such as pumping and agitation, liner desiccation, or any other site-specific operational risks are not addressed, in accordance with AWMFH 651.0204(a), (b).

Summarized Comment: The following commenters provided comments supporting the Department's decision to deny the permit application stating land application of liquid animal waste is not a viable method of waste disposal. The commenters raised concerns about the runoff from the land application of waste reaching the Waters of the State through surface runoff and subsurface geology. The commenters also commented on the amount of nutrients in the waste applied.

Commenters: Jay Stanley, John Taylor, Bruce Ehrman, Richard Grippo, Suzanne Barnes, John Ritchey, Ruby Molder, Virginia Booth, Mike Masterson, Laura McCarty, Tony Hilliard, Steve Crawshaw, Carolyn Shearman, Jeff Hood, Leah Childress, Rebekah Mize, David Pope MD, Diana Angelo, Virgil Duvall, Marya McKee, Ken Eastin, Robert Reed, Nancy Baxter, Ethel Simpson, Greg Manry, Linda Payne, Kenneth Smith, David Smith, Margaret Cameron, Joseph D. LaFace, Martha DeChant, Sharon Robinson, Lawrence Jackson, James Jones, Thomas Trigg, T.A. Sampson, Carol Percifull, Joe Neal, Terry Donohue, Bryan Signorelli, Mary Lightheart, Frank Sospenzi, Sherry Holden, Jim Spears, John Gunter, Keith Newton, Stan Langley, Chris Selby, Katheryn Walden, Lonnie Womack, Debbie Campbell, Barbara Dillon, Frank Keller, Melina Rikion, Charles and Janice Transue, Scott Yaich, Catherine Ross, My Blue Heaven Cabin, Virginia Evans, Sandra Roerig, Allison Nicholas, Shannon Gitchel, Laura Gocio, James Britt, Gerald Weber, Tom Holland, Sam D. Cooke, Rachelle Smith, PhD, Thomas Emerick, Eddie Vollman, Mark Smith, Rex Flagg, Terry Michaels, Craig Hull, Haley Lane, Ray Stahl, Brock Foster, John Carter, Candace McGhee, Bill Pettit, Rachel Henriques, Erin Yarrobino, Legina Boswell, Lucien Gillham, Anita Sawyer, Mark Corley, Faith McLaughlin, Vallie Graff

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Land application of liquid animal waste is an authorized method of disposal under APC&EC Regulation 5.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Summarized Comment: The following commenters provided comments supporting the Department's decision to deny the permit application. The commenters stated that the Buffalo National River should be accessible to everyone and be saved for future generations. The commenters stated that the farm should never have been built in its present location and that the farm is polluting the Buffalo National River. Commenters stated that the farm should be moved or bought out by the State and any pollution be cleaned up.

Commenters: Christy Lavely, Susann Walters, Deanne Mayer, Kevin Rawls, Ed Brocksmith, Save the Illinois River STIR, Greg Watkins, Dr. James Pagan, Rebecca Holden, Mary Jane Hickey, Jamie Causey, Michele Beasley, Gregory Merlino, Rick Milholen, Leonard Hankins, Clint Herrington, Gary Tombridge, Mary Gard, Michael McBroom, Drew Stephens, Pat Snyder, Phylis Allen, Thomas Neff, Denise Ritchey, Robert Smith, Martha Adams, Joe Hiryak, Hank van Rossum, Liz New, Chally Sims, Mark Burk, Julie Lanshe, Diane Newcomb, Emily Hartley, Andrew Fulkerson, Neil Pumford, Elaina Holcomv, Adam Schaffer, Virginia Carron, Paul Green, John Schmedeman, Thomas McCurdy, Tommy Allen, Dwayne Pratt, Richard Lancaster, Janelle McCann, Logan Pratt, Kelby Taylor, Kelly Franklin, Chris Davidson, Marcy Bujarski, Kenneth Jones, John Bomar, Hank Thompson, Robert Smith, Terrance Hill, Helen Smith, James Harmon Jr Smith, Steve Sitton, Jay Stanley, Sr, Kara McCarty, Paula Finch, Joe Rath, John Brown, Greg Watkins, Jane Aston, Steve Crawshaw, Tammy Knowles, Pam Floyd, Phil Milan, Charles Glasier, Vivian Doty, Michael Echols, Yates Phillips, Neil Collins, Samantha Dill, Allison Williams, Susan Fredrick, Sabrina Bradley, William Kumpuris, Norma Senyard, Gerald Toler, Lynn Phillips, Pattie Heitzman, Mark Heitzman, Ken Ackley, Lisa Orton, Barbara Fell, Cathy Leflar, Mike McMullin, Crystal Dore, Rita Caver, Roy Clinton, LaDonna Duncan, Jennifer Neill, Steve Hesse, Lisa Orton, John Goddard, Rodger Keesee, Kay Amos, Andrew Heinzelmann, Karen Anderson, Christine Sheldon, Angela Houser, Nancy Owens, Bettie Lu Lancaster, Judy McCune, Duane Curby, Stephanie Smith, Charles Carpenter, Helen Pounds, Sean Zupan, Greg Martin, Peter Curby, Dorothea Phillips, Debbie Billings, Jerilyn Nicholson, Renee Reed, Denise Brewer, Lori Marks, Ann Birge, Mary Langley, Janna Peters, Karen Thomas, Grimsley Graham, Cindy Baker, Margaret Johnson, Amy Garrett, Hugh Kincaid, Suzie Ridgley, Cloetta Annabel, Kyle Evans, Mary Jo Gover, Susan Fields, David Branscum, James Cummings, Kim O'Neill, Michael Harkey, Satah Kendrick, Cheryl Park, Stephanie Smittle, Isaac Tweeddale, Debbie Davis, Karen Seller, Dennis Moore, Jerrid Gelinas, Keith Warner, Judi Hart, Kori Turner, Carolyn Crook, Mika Nelson, Tammy Weaver, Mark Lawrence, Jann Bell, Jana Reid, Carolyn Banks, Mary Ann Holder, Beth Singley, Josey Humbert, Charles Davis, Charlie McGrew, Kelley Richardson, Frederic Short, Jana Jones, Gail Pianalto, Jan Ironside, Lindsey Rose, Marsha Ralph, Autumn Barrow, John Huff, Delayne Rushing, Pamela Fraim, Kenya Harbin, Jeannie Philpott, Rick Millard, Farris Bergant, Carolyn Ford, Brian Hardman, Beth Felton, Jennifer Zeck, Jay Clark, Donna Dowler, Randall Harness, Catherine D. Branch, John Mora, Casey Hook, Rachel Ward, John Langston, Michael Guidry, Ronnie Koons, Michael Wingo, Nathan Higgins, Janette Groves, Betony Weakley-Maringer, Danielle Nielsen, Karen Johnson, Jean Regina Nayga, Scott Coogan, Jody Zimmermann, Josh Rowden, Kim Emery, Kara Wise, Scott Swearingen, Roger Burke, Troy Ashmore, Jessica Brown, Adam Schaffer, Keith Merckx, Vanessa Jacky-Davis, Robert Boullester, Sheila Hettinga, Elaine Williams, Emma Boullester, Copeland Hughes, David Martinson, Heather Smith, Jaleta Boyd, Lindsay Pierce, Tom Watkins, Larkin Floyd, Randy Looper, Lisa Orton, Steve Stinnett, Sandy Kizer, Mike Brewer, Melissa Triplett, Douglas Horton, Cal Clark, David Mobley, Chelsea Jordon, Jeremy Holstead, Cindy Stinnett, Shelby Wahl, Valerie Core, Kayla Sapkota, Noah Moses, Valerie Allman, Richard Haff, Allison Groves, Hunter Woods, Elizabeth Yoder, Kathi Howard, Janet Jennings, William Thompson, Rob Poole, Mike Fick, Renee Farmer, Kyle Moppert, Gloria Elliott, Sonja Williams, John Hopper, Shirley Claypool, Annie Holmes, Polly Fricke, Christy Dablemont, Tammy Vanaman, Stacy Price, Larry Rehm, Linda Nolan, Paula Cannon, Margaret

Garland, Tim Holley, Brandon Wheeler, Tonia Spurlock, Vivien Lamb, Guy Knuth, Heather Graham, Monica Wingert, Lindsay Skinner, Joe Barrett, Bruce Jensen, Tim Crouch, Patrick Renee's Berry Garden (Ford), Kathy Prater, Will Larkin, Steven Zimmerman, Patricia McKeown, Hayden Walker, Marsha Crittenden, Kathy Thompson, David Childers, Mike Carron, Nicholas Boeddeker, Shanti Copeland, Ann Melero, Darrell Dougan, Carole Cimarron, Linda Rooney-Card, Michael Stoker, Lindi Criswell, Mary O'Shields, Kathy Pettigrew, Carmen Stephens, Chally Sims, Andrew Thompson, Adelia Kittrell, Andrew Gibbons, Lori Lemley, Michael Parks, Stacie Lake, Gene Reid, Lauren McCormick, Joan Philip, Tim Blair, Nancy Burton, Lynn Risser, John Pflasterer, Shana Tetuan, Donald Matt, Emily Harris, Luke Block, Bernie Reif, Amanda Duncan, Ricky Dye, David Martindale, Paula Breid, Tyler Anderson, Shannon Ingram, Margery Shore, MaryAnn Kahmann, Bobby Studnar, Ashley Denton, Michael C, Rita Johnson, Judi Richardson, Janet McMahon, Jeff Speak, Matthew Haygood, Darrell Lawrence, Dave Smith, Angela Barnett, Roger Taylor, Jeff Williams, Jimmie Thomas, Patrick S McKinney, David Davis, Ashleigh Fonte, Catherine Harvey, Tahya Taffar, Dalene Ketcher, Carl Bailey, Linda Chambers, Slater Corbin, Katherine Kennedy, Margaret Smith, John Erikson, Robert Loffler, Paul Taylor, Reva Stover, Mike Pryor, Suzy Dauphin, Debra Johnson, Stephen Bailey, Jacob Newman, Darren Dahle-Melsaether, Sean McGowan, Kathy Sutterfield, Cynthia Maurer, Lisa Orton, Eunice Millett, Terrie Martindale, Joyce Wilson, Jennifer Gregory, Joshua Pace, Ann Noland, Ray Balaster, David Barre, Jane Ray, Barry Martindale, Suzanne Sexton, Rebecca Harrison, Kirk Thompson, Stephanie Hyde, Bert Kell, Murray Harris, Linda Mann, Johnny Jacobs, Sherry Declerk, Kay Lewis, Bill DeClerk, Cary LeMaster, Douglas Bingham, Kyle Alexander, Capt. Glenn Jones, Arthur Bowie, Laura Fleetwood, Michelle Westfall-Edwards, Janet Atwood, Karan Freeman, Sherrie McIntyre, Harry Kiple, Doris Kiple, Susan Young, Sherrie Petersen, Laura Glaze, Herb Blount, Linda Macalik, Barbara Southerland, Del Heck, James Meinecke, Chuck Maize, E M, Barbara Johnson, Lenora Lohman, Kathleen G Glasgow Sparks, George Knight, Elizabeth Harness, Steven Ayers, James Cohea, Charles Olson, Liz Foster, Mary Wise, Elizabeth Keck, William Rosser, Janet Parsch, Janet Holman, William Johannesen, Gladys Tiffany, Andrew York, James McDonald, Corey Brady, Veronica Clarke, Ramey Moore, Deana Vickers, Linda Hancock, Jacque Alexander, Pat Sandlin, Shirley Womack, Stephen Grady, ted Spears, Bob Walker, Jillian Guthrie, Teresa Youngblood, Tammy Pack, Janet Robbins, Janet Nelson, Vivian Ireland, David Kuhne, Bryan Brewer, Billy Womack, Thomas Foti, Lenore Arent, Darlene Baker, Elizabeth Fletcher, Chuck Dudley, Bonnie Douglas, Don Castleberry, Francie Bolter, Brian Bolter, Don McCaskill, Rebecca Williams, Steven Booth, Charles Dudley, Ann Winters, Sondra Gordy, Robert Williams, Rick Davis, Carolyn Lee, Phillip Norris, John Slater, Paul Williamson, Linda Arnold, Terry Keefe, Kathleen Keefe, Clay Pearson, Dave Lay, Carol Phillips, Susan Frey, Rovetta Nodine, Rovetta Nodine, Ray Quick, Carolyn Quick, Mark Mccarroll, Patrick Hall, Rachel Townsend, Heather Hudgens, Barbara Birmingham, Charlotte Morris, Donald Poe, Claire Borroho, Don Stephens, Mark Burk, BreAnna Rhodes, Dennis W Wright, Susan Bennett, Suzie Ridgley, Richard Gray, James Stotts, Marvin Wilson, Lauri Porter, David Adams, Brenda Moreland, Steve Wilson, Jami West, Karen Doss, Larry Marcum, Stephanie King, Angie Russell, Jamie Rains, Dorothea Phillips, John Moore, DeAnn Blackard, Michele Mullins, John Fausett, Bonita Ouellette, Steve Davison, Dean Castle, Cathleen McAuliffe, James Loyd, Lyn Bowles, James Loyd, Ted Spears, Brady Carman, Kathy Madding, Rick Milner, Adam Black, Pam Harcrow, Rhonda Butler, Erica OBrien, Beth Singley,

James Loyd, Rob Uselton, Maggie Mouser, Debby Gwaltney, Tonya Smith, Jill Porto, Angela Wright, David Easley, Melody Keazer, Diane Easley, Kelly Stockman, Julia Schaap, Jon Wheeler, Kimberly Wallace, Kendra Bell, Michelle Lopez, Heather Alphord, Richard Spicer, Judith Levine, Kim Bennett, Diana Beaird, Donna Garden, Dennis Moore, Hannah Louise, Chris Brothers, Kelley Richardson, Robert Scott, Megan Carolan, Penny Manning, Shannon Hubanks, Ella McKinnon, Rachele Rhodes, Royce Jones, Lesa Otten, Laura Ball, Hank van Rossum, Stephanie Lewis, Helen Smith, Cheslea Harper, Brian Perry, Cheryl Matthews, Mark Hodge, C & F Christian, William Deese, Guy Knuth, Randall Pack, Josie Yerby, Jason Ashford, Steve Kirk, Beth Caldwell, Nicole Nichols, Mary Ford, Susan Starr, Gary Bivens, Gene Sparling, Michael Wingo, Janette Groves, Steve James, Joyce Ivy, Jenifer Williams, Tiffany Bewley, Carmen Tabor, Nazar Drani, Beth White, Stacy McEntarffer, Shanti Copeland, Teresa Gates, Julie Endsley, Ann Griffin, Leslie Tabor, Pamela Styles, Linda Eddings, Colleen Vollman, Edith Calaway, Diane Payne, Lisa Huff, Keith Owens, Marilyn Curry, Richard Morton, Dr & Mrs Greg Cothren, Lori Marks, Kevin Whaley, Margaret Collier, Matthew McClure, Jessica Cheval, Dena Dickinson, Connie Evans, Roger Pessa, London Sharp, Cindy Henley, Catherine Caldwell, LauraJo Smole, Jon Felker, Richard Hutchinson, Nona Dumas, David Vaughn, Hannah Snavely, Marc Hilden, Betsy Lundgren, Valerie Cops, Julie Cone, Joyce Tate, Jo Houser, Cherrie Widner, Alvin Thomas King, Linda Woods, Dan Coody, John Clayborn, Bruce Woods, Beth Ruddick, Lori Menichetti, Cyndi Smith, James Kent, Donna Park, Donna Hertlein, Autumn Robbins, Kim Smith, Tara Shrake, Cheryl Krock, Cale Hughes, Beverly Wright, Gretchen Hunt, Adrienne West, Mark Widder, Laura Doffitt, Natalia Chorew, Lorie McGeady, Philip Doyle, Jennifer Sieben, Ellen McLemore, Steven Wilson, Janet Trigg, Roy Coles, Ben Pittman, Jeanne Olson, Holly Basky, Amy Locke, Natalie Bourne, William Wimberly, Cristal McQuary, Leslie Moore, Sally Grace, Marcia Lux, Brenda Barnhill, Jason Lamar, Carol Ryan, Shawn Lorenzen, Sarah Weems, Shelley Rowan, Lee Wyman, Cornelia Sledge, Jan Buck, Darcy Foust, Robin Butler, Joel Nunneley, Elizabeth White, Dave Zucconi, Michael Koone, Stuart Reaves, Chris Koone, Amanda Echegoyen, Barry Swain, Carol Wallis, Joann Saraydarian, Kevin Breckenridge, Diane O Border, TR Smith, Thomas Rudolph, Heather Lawrence, Merrin Locke, Michael Overdorf, Rebecca Jeter, Chris Luckey, Brett Maguire, Stacey Lorenz-Mitchell, Rita Caver, Peggy Hill, Brenda Huber, Abigail Fryar, Kathleen Hess, Chally Sims, Dewayne Faulkner, Bettie Lu Lancaster, Marsha Havens, Dennis Sisson, Linda McCaskill, Carl Webb, Daryl Boles, Mary Fulk, Linda Nolan, Glenn Pickel, Jack Edwards, Jason Barr, Shannon Gayol, C Carter, Gwen Hoffmann, Julie Raines, Lewis Robinson, Renna Cothren, Katherine Weaver, Dereka Pedersen, Ruth Sampier, Jeff Rice, Wynne Waddell, Raymond Watts, Ashlee McCaskill, Janet Buss, Sally Wimberly, Wayne Stewart, Rose Hilliard, Malcolm Norman, Lane Phelps, James R. Few, Pam Chrisco, Linda Smith, Tim Mason, Kim Wilkinson, Amanda Cherry, Mary Hoffman, Rex Morris, Cynthia Adams, Melanie Sutton, Sandra Tedder, John Offutt, Michael Bellettiere, Elizabeth Foster, Sharon McGraw, Sherry Smith, Vivien Lamb, Patti Van Camp, Doug Vlastuin, Richard Quick, Mary Jane Hickey, Teresa Campbell, Lila McCauley, Kara Evans, Vicky Harvey, Michael Schwade, Kathleen Stanley, Robert Albrecht, Donna Muhollan, Dana Murdock Banks, Joe Trimble, Catherine Coffey, Donna McLaughlin, Jacqueline La Place, Mary Cole, Sherri Drzewiecki, Dian Williams, Frankie Jackson, Makenna Brennan, Sarah Myers, Jennifer Reed, Natalie Hobbs, Linda James, Ashley Knowlton, Kim Hinkle, Sonny Bell, Thomas Usher, John Cork, Julie Shelton, Alan Dougherty, Lea Ann Crisp, James McDonald, Emily Gintonio,

Stephen Spies, Mary Ann Guinn, Howard Aleshire, Debora Carpenter, Jeff Danos, Melissa Garrison, Dayna Enderson, Linda Bell, Jim Clark, Nicole Sagraves, Sandra Templeton, Crystal Ursin, Cay Miller, Carol McCutcheon, Darbi Blencowe, John Taylor, V Leland Sykes, Janalee Robison, Carly Marx, Kenneth L. Smith, Amanda Kennedy, Lauretta Richardson, Nancy Pierson, Marianne Bieker, David Franks, Katherine Murdock, Kim Hesse, Ed Nesbitt, Nan Lawler, Graham Gordy, Grant Nevill, Suzanne Kenward, Lorri Carter, Miles Janke, Roger Pyzocha, Hannah Janke, Sue Reynolds, Jason Thibodeaux, Joe Powell, Fletcher Smith, Kaye Clanton, Kaye Baskerville, Dan Clanton, Andrew LaGrone, Louise Halsey, Douglas Coppock, Christeen Kline, Noel Mays, Kathryn Martone, David Harper, Mary Droho, Becky Christenson, Douglas Lowrey, Cory Burbidge, Susan Jones, Martin Schaffer, Jana Fisher, Joseph Meyer, Thomas Dubois, Carroll Wesson, Julie Martin, Kerry Miller, Ruth Pianalto, Robert Burnett, Jerilyn Nicholson, Armilda McCormack, Frank Wait, Todd Parnell, Caroline Morgan, Clay Parton, Bryan Duncan, Grace Turley, Thomas Burroughs, Lila Gullick, Bryan Rupar, Wightman Harris, Ilene Powell, Suzanne Neal, Stuart Baer, Debbie King, John Hill, Donald Matt, Leon Alexander, Don Rottman, Judith A. Griffith, Leeann Whitlock, Melinda Burnette, Jay Shearer, Charles Faulkner, Stanley Gramling, Mitch LaGrone, George Wise, Rebeckah Koone, Randall Glenn, Lynn O'Toole, Robert Gillson, Mark Love, Karen Pope, Walter Coleman, Harriett Sisson, Norbert Delph, Julia Trecanao, Ray Templeton, Jesisica Camp, Peggy Mahurin, Terry Waldo, Maxwell Baldwin, Pam Herrington, Jan Robertson, Ann Chitwood, Allison Henry, Aaron Baldwin, Grace Brown is, Gregory O'Neal, Gail Brown, Cheryl Grey, Beverly Parkinson, Rhonda Smith, Justin Breland, Patricia Love, Vanessa Tomczak, Judy McNabb, Sharon Burnett, Gayle Teague, Steven Cherry, Connie Sedlacek, Andrea Matters, John Seymour, Donna Thompson, Susanne Roberts, Dimitri Harris, Reba Potee, Thomas Griffin, Dana Ward, Erin Jenkins, Susan Bryan, Gary Goeckerman, Pat Bates, Hunter LaTourette, Nancy Umiker, Don Matt, Troy Juzeler, David Prentice, Ron Griffin, Carey Blackwell, Frank Gianotti, Ronald Schneider, Sherry Johnson, Chynna Stipe, Anza Locke, Roy Golightly, Bob Sinclair, Rebecca Hartman, Sharrol Hardin, Donna Booth-Johnson, Leah Saffian, Carol McCorkle, Jackie Leatherman, Matt McQueen, Jim Delia, Barbara Dove, Judy Bearer, Ann Segura, Melissa Kelley, Arden Kate, Susan Blumreich, David Walton, David Crittenden, Jay Fulbright, Suzanne Sutherland, Amy Shafer, Mona Brown, Mark Hilleman, Dean Jansen, ME Vandergrift, Peg Obersto, Annonymous, Wanda Lindsey, Jenni Haughaboo, Charles Harper, Gresham Barnes, Jon Wellnitz, Sharon Ash, Charles Eubanks, Jerry Dorman, Jeff Trost, Paul Mitchell, Brad Morris, Mary Mitchell, Ed Loyd, Deborah Cromer, Roxanne Thompson, Penny Ellis, Jill Heath, Bev Taylor, Donna Danhauer, Cornelia McDaniel, David Hasenmueller, Kandice Blue, Charlotte Regennas, Ann Winters, Ryan Gray, Trish Pannell, James Lillis, Sheila Lamar, Brittany Nichols, Ed Brocksmith, Rebecca Heath, Stacie Smith, Tracy Tilley, Teton Back Country Horsemen, Marian Johnson, Margaret Johnson, Liam McMahon, Jimmie McKenzie, Ginny Storey, Cristal Messer, Aprille Kuder, Shannon Hays, Janette Groves, Hannah Davis, Glenda Lovett, Felicity Blanchard, Vicki Grisham, Hannah Hahn, Kendra Taylor, Terry Carson, Gail Robertson, Sheika Rowell, Phyllis Priddy, Daniel Nouguier, Rebecca Smith, Jin Brown, Tony Willmuth, James Hall, Wendy Jones, John Apel, Caleb Frazier, Mike Manion, Emily Buckthorpe, Rachelle Williams, James Bass, Lisa Huelle, Caren Robbins, Bonnie Laxton, Sandra Williams, Emily Graham, Heather England, Christy Spann, Paula Spitler, David Lamb, Sandra Jo Chandler, Steve Williams, Georgia James, Ashley Franz, Robin Norviel, Paul Vickers, Chris Harkins, Robin

Norviel, Dorothy Fincher, Dakota Thomas, Jason Singleton, Tara Sample, Karl Kent, Roberta Redburn, Steve Mahanay, Christine Sain, Jodie Gardisser, Cody Rudd, Erica Powell, Emma Hall, Misty Rowan, Amanda Zylowski, Amanda Bain, William Jeter, Sarah Croswell, Kathy Allen, Bradley McColey, Shane Henderson, Feleshia Hood, Mark Harper, Dustin Triebel, Joel Carr, Susan Jeter, Brandi Robertson, Charles Reid, Kassie Misiewicz, Leslie Harden, Robert Simmons, Marsha Hammond, David Bain, Amy Copelin, Steven Trulock, Joe Stephens, Skip Harris, Steve Middlekauff, Paula Breid, Spencer Mahan, Stacey Gregory, Pamela Price, Kelli Gilbert, Dave Hoffpauir, Polly Carter/White, Casey Gore, Traver Detras, Jeremy Walter, Tanya Hollifield, Lance Cockrum, Jared Davis, Mike Harvey, Dillon Halsted, Heather Harmon, James Brown, Jené Louviere, Robin McClellan, Keagan Snow, Jeff Clawges, Maria Troeger, Emily Myers, Jennifer Williams, Marsha Roach, Jacob Richardson, Susan Michaud, Jeff Henderson, Cliff Barnes, Seth Reeves, Judson Spillyards, Robin Killeen, Cody Moore, Mary Vancura, Cynthia Roberts, Tammy Roberson, Thomas Miller, Monica Ketchum, Thomas Powell, Lisa Peterson, Melinda Perceval, Gregory Snell, Justin Rhodes, Kerrie Turner, Mary Parks, Bailee Basinger, Erin Collier, Jason Moppin, Matthew Dickey, Shane Bruno, Matt Bretz, Bettye Ann Freeman, Meredith Hagan, Karen Hicks, Joseph Faught, Spencer Daly, Mary Phillips, Shawnda Caillouet, Terese Mountjoy, Ashley Henry, Shannon Givens, Jessica Wingler, Bill Chaffin, Meagan McClain, Craig Spears, Linda Higgins, Brandy Kinghorn, Kenton Cress, Matthew Marks, Willow Liebert, Cindy Scroggins, Jan Fletcher, Travis Powell, Nick Slagle, Gaye Bland, Susan Campbell, Richard Massey, Carla Weeks, Kristopher Kruger, Tinika Osborne, Ben Johnson, Tandy Weger, Andrew Pinkston, Carl McDaniel, Sandra Syphers, Mike James, Rebecca Low, Will Brand, Juli Braswell, James Crow, William Tranum, Vanessia Fletcher, Terry Ragsdale, Terri Williams, Shelley Smith, Michele Fay, McGeorge Caradine, Jack Low, Julie Furlow, Erica Ruble, Judy Brittenum, Jennifer Bradshaw, Judy White, Michelle Wilk, Ann Gordon, Lauren Murray, Jason Smith, Myron Putnam, Sammie Beaver, Chance Angelle, Chandra Rush, Tess Moody, Cindy Marckese, Dennis Marckese, Amy Bradshaw, Terri Glowe, Ted Porter, Tryphina Renz, Dana Niemann, Gregory Perceval, Anne Gonzalez, Angela Moppin, Lindsey Klebanoff, Calvin Smith, Lynn Warren, Elias Champagne, Robin Harris, Glynda McConnell, Isaac Szabo, Stephanie Krupka, Renita McDaniel, Kelly Hays, Meline Schaffer, Clay King, Shelia Mitchell, Robert Callans, Rachael Jones, Amy Ouchley, Martha Sharp, Wendy Clifton, Paige Crockett, Jackie Fliss, Hilda Ross, Michael LaTurno, Bill Jacksom, Janet Corley, Michelle Shoppach, Al King, Jennifer Smith, Sam Tobler, Dennis Gilliam, Christie Craig, Kelley Ferguson, Cynthia Howington, Nancy Harris, Andy Hawkins, Gaia So, Arthur Fent, Andrea Gonzales, Jennifer Rogers, Kristin Jones, Martha Gueringer, Robert Mahon, Alexis Burruss, Karen Fahrmeier, Carole Satterfield, Brian Chaisson, Jim Dunn, Ashley Harcrow, Lindie Landers, David Grimes, Warren Nelson, Shannon Darnold, Steve Poynter, Angel Crawford, Johnny Helwig, Joshua Albers, Polly Johnston, Shep Campbell, Hayne Begley, Abilyn Haase, Joe Hilliard, Alex Brady, Janie Mclane, Shelby Esry, Jorjanna Robinson, Connie Buller, Cicily Tubb-Warbington, Jalin Parry, Susan White, Brett Pittz, Shawn Moix, Serena Henderson, Aaron Kuder, Travis Gowin, April Price, Terri Johnson, Marjorie Watkins, Paula Martin, Jacob Achor, Teresa Huff, Angela Ward, Jean Strickert, Mark A. Ludlow, M D, Donette Boyett, Andy King, Suzanne Wasiluk, Denise Chai, Josh Reeves, Ruth Fissel, Adam Benzabeh, Sara Anderson, Courtney McNair, Laura Verwiebe, Joanna Bartle, Ashley Herrington, Amanda Ivy, Randi Passmore, Joel Ludford, Carla Koen, Phillip Freeman, Danny Mize, Scott Parson, Frankie Hart,

Joe Dupre, Candice Clay, Amanda Dewitt, Katherine Hudson, Mike Wiederkehr, Kelly Hitt, Armando Nelson, Michelle Swinford, Ben Goodwin, Martha Meenen, Margaret Peach, Kathryn Matchett, Dana Goodman, Lee Anne K Wiederkehr, Laura Stanley, Kristine Callahan, Paula Henry, Wallace Hattenhauer, Janis Mays, Morgan Gregory, Peggy Nabors, David Sewell, Richard Staton, Micah Szabo, Greg Lutz, Shirley Mccarley, Stefan Szabo, Christopher Curry, Marcel Slootheer, Beverly Belote, Holly Goff, John Collier, Alice Sorrells, Tyler Ehren, Ellen Turney, Tyler Meenen, Laci Embrey, Wesley Williams, Derek Yacoub, Luis Abadie, Janet Hall, Katie Murry, Spencer Watson, Lisa McDougal, Mark Judice, Cody Dalrymple, Dave Mathews, Gretchen Diegnau, William Murray, Judy Edwards Allen, Carol Chesser, Steve Blumreich, Wendy Ramsey, Richard Spicer, Carl Kimbro, Lisa Garrett, Tim Godfrey, Raymond Burks, Melissa Lee, Fran Deramus, Teresa Reddoch, Rachel Lyons, Holle Berg, Russell Babb, Ken Sutterfield, Kim Gullic, Gordon Williams, Sharon Boatright, Amy Morrow, Tara Harris, Kimberlee Jones, Kenn Young, Peri Doubleday, Denise Mecke, Brian Mitchell, Sally Smolich, Khandice Baldwin, Shelley Griffin, Sidney Wood, Kelly Carney, Travis Allen, Franklin Frederick, Matthew Corbello, Boyd Chitwood, Jane Winston, Marianne Estes, Matthew Levy, Sean Ronnau, Karen Murray, Bobbi Cauldwell, Jack Outlaw, Mike Roberts, Sierra Summers, Claudia Brigham, Janis Gregory, James Wright, Jordan Fila, L Henley, Leslie Pianalto, Martha Stanley, Nicole Pizzolato, Mary Holland, Katherine Cloud, Laney Laughlin, Bonnie Henson, Kimberly Fitzpatrick, Kathy Booher, Benjamin Diggins, Bryttani Bartlett, Kathy McAlister, Greg Banks, Tida Stocker, Jordan Haynes, Ambra Bruce, Pat McClelland, Tanna Feldman, James Rees, Robert Holt, Ann Chronister, Sherri Fryar, Emily Fletcher, Sharra Hampton, Karen Cron, Gordon King, Terri Huber, Heather Breen, Casey Jones, Jan Gaughan, Brandon Martin, Robert Baker, Joanna Gahr, Ashley Hudson, Ashley Havens, David Shipley, Stephen Swingle, Michael Broeg, Angela Huselton, Chris Wann, M Sanders, Kayla Denette, Allison Baker, Garry Brown, Allison Tucker, Susan Lovelace, Julie McClendon, Doug Wilson, Ashley Giannini, Charlie Hart, Sandy Walker, Michele Hughes, Margaret Chilton, Andy Sipes, Traci Lovell, Sandra Baker, Jason Throop, Gavin Mitchell, Katie Beck, Melinn Mitchell, Heather Pannitti, Ronald Sitton, Ed Daniel, Merideth McEntire, John Covey, John Gueringer, Deb Gilbert, Kyle Clifton, David Chance, Rebecca Ward, Heather Lancaster, Kaity Davis, Paula Stapleton, Sonya Warren, Dina Butler, Gary Woodward, Marilyn Fleder, Steve Thompson, Sherman Caldwell, Charles Jacob, Mary O'donovan, Dean Loos, JP Willis, Mary Overton, Judith Paz, Emily Davis, Nguyen Ly, Amber Brixie, Gary White, Zachary Herrick, Nancy Burris, Vicki Hill, Mike Koskoski, Matthew Martens, Elizabeth VanderStek, Jess VanderStek, Arlone Folkers, Lisa Martens, Gary Criglow, Mike Kobylinski, Sandra Hubbard, Gary Criglow, Patricia Sage, Janice Neville, Jonathan Jones, Mary Mahan, Jessica Bartnik, Gary Butler, Gail Pittman, Natalee Miller, Anna-Lee Pittman, Holly Robertson, Matt Foster, Deborah Haven, Ray White, William Moore, Mary Garmoe, Ellen Beeler, Kerin Smith, Lauren Trimble, David Finch, Kandy Jedlicka, Abby Nichols, Patrica Horn, Gina Drobena, David Moix, Scott Dupslaff, Steve Perry, Ann Southard, Mike Koger, Farar Rose, Mary Finsh, John Quint, James Burrow, Jack Barton, April Ambrose, Brandy Alcorn, Beth Key, Bridget Shelnut, James Savells, Alex No, Michael Tipton, Wanda Lock, Brian Crum, Jessica Botsford, Charles McFarlan, Katherine Winniford, Gina Pillow, Kelli Martin, Michael Cathey, David Sundin, Brandon Eidson, Talara Taylor, Pam Fowler, Annie Bekuhrs, William Wewers, Jennifer Wells, Rita Loucks, N Blades, Katy Campbell, Bethany Bates, Adam Maloof, Mac Weedman, Leonard Hyatt, Vikki Stefans, Susan

Linck, Jason Foitek, Cheryl Vincent, Jill Mcilroy, Catie Evenson, Missy Ishmael, Kurt Robinson, James McBryde, Theresa Hanacek, Annette Enderlin, Michelle Aquino, Mark Campbell, Wanda Evans, Meg Ryan, Tonja Hettinger, Debra Adams, April Scribner, Claudia Stevenson, Gay Certain, Karen Cockrum, Linda Liggett, Jenna Mosley, Wanda Medema, Breta Hauge, Ricky Russell, Angela Markell, Rebecca Funderburg, Oliver Williams, Beth Wiedower Jackson, Rachel Stripling, Kent Justus, Michelle Davis, Jean Horning, Michael Howell, George Linn, Mary Hughes, Mary Hughes, Neil Devine, Jennifer Walker, Mary Ulrich, Miriam Emerick, Marilyn Masterson, Skip Clemmons, Emily English, John Aquino, Ann Shoffit, Chris Conley, Freda White, Linda Poole, Susan Braswell, Susan Elms, Eva Riggs, George Anna Clark, Randy Riggs, Lori Sikes, Deanna Garretson, Shalann Boyce, Jessica Sheets, Fred Stumpf, Pierre Joubert, Bob Karr, Morris Voan, Barbara Chance, Richard Flinn, Richard Noel, Ann Fly, Amanda Willshire, Thomas Maly, Paul Stanley, Michael Mitchell, Doug Stanley, Megan Weatherford, Josh Self, Chris Werner, Kelly Robbins, Vern Berry, Kim Stanley, Melissa Clark, Mike McGowan, John Woodburn, Valerie McNee, Paul Young, Susan Wilson, Kristen Lassiter, Brad Weatherford, Kelly Pittman, Julie Lanshe, Brad Weatherford, Michelle Shellabarger, Kim Morris, Nancy Deisch, Karen Pitts, Kevin Christian, Will Branch, Victoria Bernal, Nancy Gore, Mandy Thomas, Cindy Strong, Charlie Mcgrew, Ann Birge, Kristina Pratt, Lisa Proctor, Mark Tew, Scotta James, Tyler Kappen, Marc Hirrel, Mary Hughes, Dee Hanson, Carl Reeves, Mandy Mooneyham, Sandra Withers, Wesley Kirk, Adam Day, Emily Babb, Margaret Nichols, J. Vincent Lague, Emma Baldwin, Sandra Baker, Derek Wood, Richard Baruch, Glenda Dean, Caitlin Young, Christopher Kunkle, Caleb Hennington, Michael Hildreth, David Eifling, Mahlon Maris, Ben Mooneyham, Robert Hagberg, Derek Linn, Chad Fisher, Anna Livengood, Lisa Hope, Julian Northway, clint ohara, Heather Knight, Gary Bongiovanni, Arlene Bongiovanni, Ken Harris, Melissa Thomas, James Lace, Kimberly Russell, Jazz Johnston, Laurence Collier, Dalton Rains, Nichole Atwell, Perry Hill, Joy Henson, Jessica McHugh, Louise Fitzgerald, Jerry Bratton, Maria Cortes, Shirley Emerson, Francine Heller, Marianne Lombari-Nelle, Michael Reilly, Christie Ison, Jacquelyn Hunter, Susann Crowell, Richelle Herron, Clarke Kappmeyer, Andrew Poor, Jan Liebert, Toby Slinkard, McKensey Flud, Frank King, Adam Willard, Mary Steele, Bryan Pinnell, Priscilla Stone, Tonda Oakes, Beth Price, Cole Miller, Patty Polster, Destiney Cameron, Debbie Moormann, Danielle Kling, Angela Madding, Felicity Moore, Brittany Thompson, Elyse Rucker, Paula Arnold, Donald Bearden, Susan Curtis, Kimberly Cheshier, Chloe Mims, Wes Moore, Sara Huddleston, Jennifer Thiele, Scott O'Kelley, Bethlyn Rooney, Kerri Garr, Christopher Baugh, Matthew Seaton, Tonita Taylor, Grace Anne Odom, Carly Squyres, Jake Pultro, Craig Jones, Jamie Mann, Lauren Crespin, Nicole Leonard, Rachael Crosby, Jordan Delling, Anita Gwatney, Carrie Crane, Deborah Howard, Katie Coffman, Abel Price, Adrianna Kennedy, Terry Michaels, Ronald Pollworth, Frances Scarborough, Jessica Myska, Colby Bostick, Lindsey Barber, Brendon Nickles, Skye Ansara, Shilah Molina, Waylon Steelman, Mabry Minton, Samantha Coble, Jacob Clayborn, Luis Contreras, Nicole Bax, David Finch, Brittney Owens Owens, Helen Wilson, Rheachel Hendricks, Matthew Anderson, Esther Heckmann, Robin Price, Sam Southerland, Paula Linder, Lynda Courtney, Helen Maringer, Oscar Jones, Greg Parker, Debi Ethridge, James Barrett, Haley Lane, Summer Stevens, Elizabeth Hancock, Zelma Murray, Christy Talley, Jeremy Lewno, Sarah Darnell, Mandi DeWulf, Kari Heuston, Justina Whitaker, Jim Heuston, Cynthia Jetton, Howard Umberson, Elaina Fouts, Christine DeMeo, Justin Callahan, Jean Evans, Sarah Peace, Marc Peace, Thomas Peace, Brian

Foster, Pauletta Browning, Taylor Bridges, Jan Allen, Brittney Karasek, Brian Stoltze, John St.hilaire, Holly Morgan, Clint Marshall, Tori Lamb, Straight outta Cotter -Arkansas, Christian Fregoso, Cindy Hill, Kellie Lindsay, Terri Estey, Matthew Photides, Christopher Selle, Mia Moon, Barry Smith, Melissa Luna, Mark Roberts, Cynthia Doffitt, Barbara Adams, Connie Walden, Beth DuVall, Timorhy Permenter, Joe Mckinney, Paul Dunn, KSuefarm and Carnahan Rentals, Regan Riser, Elita Caple, Tara Seely, Justin Hoover, Krystal Hoover, Frank Kelly, Carla Smith, Rebecca Waldschmidt, Steven Smith, Shelby Gonzales, Anne Greene, Kabrei Kilgore, Marcia Guffy, Mike Gavin, Nora Black, Janee Scroggs, Larry Price Price, Michael de Buys, Paula Matthews, Stephen Ballard, Shawn Porter, Shirley Graham, Kathleen Connole, Betty Harrison, Connie Sedlacek, Brenda Norsworthy, Terri Anderson, Daniel Barker, Charles Mullins, Kathleen Connole, Mike Harvey, Margaret Watson, James Pendergraft, Judy Smallwood, John Strickland, Kelly Quinn, Louis Jones, M. Leach, Oleta Gillean, Patti Kent, Nora Black, Chris Gal, James Binns, Elizabeth Keeling, Larry Olesen, Leslie Anderson, Shane Jetton, Jane Browning, Mary Olson, Cynthia Jetton, Cynthia Jetton, Carter Carrigan, Becky McCain, C.L. Kops, David Ford, Flarar Hunter, Frances Piercy, Grace Brown, Gladys Hambrick, Gary Westerman, Micki Houston, J.E. Caldwell, Betty Pullam

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Summarized Comment: The following commenters provided comments in favor of the applicant receiving a permit. The commenters stated that this facility has been treated differently by the Department, and that the denial of the permit will ruin the families that own the facility.

Commenters: Michaele Mcmillan, Heather High, Dwight Pierce, Kayla Kissel, Heath Holland, Amanda Standifer, John Gregson, Rhea Freeman, Ryan Crow, Duane Richey, Regina Tennison, Danielle Kitchens, Lesley Smith, Eddie Hendrix, Debbie Harris, Daniel Kitchens, Benjamin Vinson, Don Rainbolt, Rana Harding, Misty Dean, Marty Dean, Frank Higgins's, Holly Sisson, Nathan Stuart, Donna Chism, Michael Palmer, LaShell Turner, Melissa Stewart, Clara Greenhaw, Alice Willuams, Thomas Harrington, Brenton Richardson, Kyle Mcdonald, Glenda Young, Kevin Smith, Natasha Van Meter, Tina Byrd, Randy Byrd, Roberta Taylor, Shawn Long, Brenna Cannon, Rainey Yeager, Ashley Knapp, Don Rainbolt, B&W Auto Sales, Kallie Phillips, Preston Phillips, Pam Cannada, Starlinda Sanders, Patrick Sanders, Tamara Terherst, Roxanne Russell, Freda James, Candy Foster, Sarah Wilson, Alisha Martin, Rosie Campbell, Joe and Kathy Ricketts, Donna Bemis, Tracey Bemis, Janice Higgins, Patrick Walls, Wayne Kattner, Brittany Bower, Alex Fenton, Wade Edwards, Rusty Smith, Monty Bohanan, Doug Lowery, Garland Matlock, Robin Matlock, Shena Campbell, Doug Lowery, Robin Matlock, Garland Matlock, JR Butler, Suellen Butler, BJ Butler, Christopher Sanders, Laura Sanders, Brenda Napier, Julie Ann Campbell, Mike Middleton, Randy McCutcheon, Sue Campbell, Sharon Pierce

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal

Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

ADEQ must follow its regulations. ADEQ cannot issue a permit if the permit application does not meet the requirements of the applicable regulation. APC&EC Regulation 5 requires the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. ADEQ has determined that a detailed geological investigation of the facility is required because karst includes highly permeable foundations with the associated potential for groundwater contamination and potential for sinkholes to open up with collapsing ground or cause differential settlement. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies, i.e. karst, that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. Additionally, ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of two segments of Big Creek and two segments of the Buffalo National River as impaired further illustrates the need for these detailed studies.

Summarized Comment: The following commenters provided comments supporting the Department's decision to deny the permit application due to potential health risks and impact to waters of the state. The commenters raised concerns regarding algae and bacteria in the river and the adverse health impacts from the presence of liquid swine waste. Some commenters also stated that the adverse health impacts would negatively affect tourism.

Commenters: Michael Coleman, Melinda Wylie, Terry Karnes, Starlia Aubrey, Natalie Mannering, Ellis Gregory, Christina Day, Elizabeth Bainbridge, Michael Villines, Jill Fowler, Bobby Belote, Nancy Baxter, Debbie Alexy, Kriste Rees, Mary M. Smith, Gene Dunaway, Margaret Cameron, Betty Bradford, Jonathan Shoffit, Debra Holloway, Richard Taylor, Richard Taylor, Dorothy Walters, Thomas Ethridge, Jeff Montgomery, Susan Bolding, Gail Lee, Maria and Dave Smith, Jane Scroggs, Keta Kinard, Bonnie Files, Kelli Trickey, Michelle Murry, Libby Stewart, Jennifer Thompson, Carrie Harris, Helen Benefield, Olivia Powers, Gina Bird, Laura

Fout, Julie Mott, Laura Timby, Elizabeth Norton, Sheila Hellman, Cathy Joyce, Seth Howerton, Sean Adkins, Luis Contreras, Helen Wilson, Jeff Cumpston, Debbie Alexy, Judith Matthews, Jett Moore, Jennifer Sterling, Jessica Winkleman, Kathryn Laurain, Katherine Mendenhall, Margaret Blair, Mike Oglesby, Mark Pryor, Michael Pulfer, Patty Heller, Margaret Konert, Ginny Masullo, Patricia Mikkelson, Rita Benitez, Jeanie Wyant, Jeremiah Jennings, Becky Hauck-Brents, Parker Fiscus, Gena Pense, Thomas Mahaney, Jr., Rachel Huff, McKenzie Barnes, Michael Crane, Delaney Butler, Kasey Estes, Ellen Hoofard, Terry Layman, Catherine Sain, Holly Harper, Ken Muessig, Jennifer Cole, Melissa Daly, Anne Littell, Barbara Dillon, Robert Laurence, Sally Hunter, Susan James, Stella Keating, Stanley Lancaster, Sarah Matthews, Steve Blumreich, Bayard Blain, Bayard Blain, Ryan Hartley, Betty Rowe, Brett Sterling, Damon Akin, Donald Hays, Doug Wallace, Elizabeth Cantwell, George Shelton, Heather Blair

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Arkansas Department of Health did not submit a comment regarding C&H Hog Farms, Inc., AFIN 51-00164, during the public comment period ending October 24, 2018.

> Algal blooms have, and continue to, cause concern on the Buffalo River.
> As part of the USNPS aquatic invertebrate sampling program, the percentage of the sampling grid with filamentous algae is recorded. Of the monitored locations, the downstream locations tend to have more filamentous algae. The greater occurrence of filamentous algae at the downstream locations may be a response to higher nutrient levels.[1]

ADEQ is working to support a collaborative study with the Arkansas Game and Fish Commission, US Geological Survey, and the National Park Service focused on the distribution and causation of the rapid expansion of filamentous algae in the Buffalo National River.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Consideration of tourism is not within the Department's regulatory authority.

Summarized Comment: The following commenters provided comments supporting the Department's decision to deny the permit application citing negative impacts on tourism, recreation, revenue, property values, and local commerce in the Buffalo River Watershed.

Commenters: Jay Stanley, Joy Schaal, Eilish Palmer, Cheryl Ferendo, Jason Jacovelli, Marilyn Masterson, Julann Carney, Kelly Olson, Suzanne Barnes, Jules Carney, Cheryl Luchin, Jason Eaton, Matt Pope, Virginia Booth, Virginia Milan, Dawn Stanley, Joe Lavely, Jim Machen, Ron Cockmon, Kelly Franklin, Martha DeChant, Linda A. Stanley, Laura McCarty, Tony Hilliard, Kevin Ehemann, Travis Atwood, Channin Tacito, Michael Adelman, Jim Warnock, Jeff Ingram, Aleta Reed, Patricia Wyatt, Jessie Blevens, David Brewer, Trish Lopez, Martha Winnat, Hillary Moore-Brown, Jesse Edmondson, Janie Agee, Aidan Lawrence, Lonnie Myers, Marianna O'Dea, Jeannie Nicoli, Donald Campbell, Necia Parker-Gibson, Dennis McKinnie, James Treece, David Pope MD, Diana Angelo, Kathleen Trotter, Hal Mitzenmacher, Jeremy Moore, Martha DeChant, Amanda McCorkindale, Nathan Blanton, Barbara Jarvis, Waverly Walker, Jason Young, JL Titus, MD, Christine Graves, Jill Fowler, Douglas Shivers, Walter Dix, Linda Mays, Ellen Compton, Katherine Kersen, Lucas Parsch, Greg Kennedy, Jeff Williams, Ken Leonard, Elijah Virden, Bobby Belote, Casey Wyatt, Debbie Alexy, Ethel Simpson, Linda Langer, Greg Manry, Sean Duaine, Suzanne Poe, Greg Gorman, Mick Haven, Joel Emerson, Louise Mann, Donna Gail Leftwich, Kriste Rees, Mary Johnsey, Amanda Cabaniss, Janet Nye, Deb Bartholomew, Lowell Collins, Margaret Powell, Margaret Lonadier, Kim Smith, Gwen Bennett, Ricky Janke, Laurie Schuler, Karen Walls, Richard Rew, Kim Martin, Steven Heye, Francie Bolter, Maire Caverley, Mark Barre, Bob Hill, Anna Mathews, Chris Hankins, Leslie Oelsner, Jeremy Adams, Robert Morgan, Cindy Jetton, Shane Jetton, LaJuana Oswalt, Melissa Triplett, Martha DeChant, Carol Valbracht, Sara White, Susan Morrison, Jonathan Shoffit, Terri Allen, Katrina Mcclane, Robert Taylor, James Ulrich, Ashley Money, Angela Paradis, Envision Greatness, LLC, Casi Shanks, Jessica Goodman, Vanessa Liles, Carolyn Ford, Cindy Studer, Melissa Frederick, Lawrence Jackson, Kathleen (Katie) Deakins Deakins, Elizabeth Chabin, Stanley Doak, Mary Joe Morris, Scott Bennington, John Bouck, Pam Cash, Mary Ellen Hill, Barry Hughed, Clinton Marsh, Debbie Harris, Jessica Kibling, Susan Holmes, Ryan Loyd, David Randle, John Brooks, John Rankine, Richard Taylor, Richard Taylor, Dorothy Walters, Marie Langer, David Higgins, Donna Porter, Melissa Miller, Anne Wilson, Greg Spence, Brenda Lowe, Cary Quinney, Stan Allen, Tina Bradley, Joe Neal, Judy Stroope, Donna Thompson, Joanna Hanna, Cristie Donohue, Bryan Signorelli, Susan Bolding, Teresa DeVito, Mary Lightheart, Sharon Spurlin, Peter Ireland, Karen Granderson, Linda Owens, Nan DeVries, Bill Thomas, Pat Page, Mike Sommer, Bridget Cabibi-Wilkin, Amy Forbus, W. Burnetta Hinterthuer, Wendy Finn, Jeanmarie Mako, Nan Johnson, Marjorie Sullivan, Eve Agee, Susan vonGremp, Jennifer Golightly, Hunter Peterson, Ted Smith, Frank Keller, Penny Morris, Polly Fricke, Lynn Funge, Linda Lee, William Browner, Ryan Robb, Sandra Priest, Tammy Due, Jamison Atkiy, Laurie Gagne, Pamela Westerman, Antoinette Locke, Norman Vaden, Lloyd Halliburton, David Jones, Carol Wright, Rebecca Walker, Donnie Sneed, Michelle Winn, Scott Yaich, Sharon Wilson, Matt Cleveland, Jacob Jaggers, Gaea Miller, Myranda Callahan, Melissa Cady, Lynda Rogers, Donald Campbell, John Ruff, Maria Earls, John Barton, Craig Fox, Michael Reichert, Toma Whitlock, Kelby Ouchley, Rosie Bishop, Samantha Cockerham, Janet Richards, Tal Swicegood, Gary Speed, Jonathan

Mitchell, Dawn Nahlen, Jon Toburen, Aaron Mattix, Zachary Scheurich, Ryan Feero, Ironside Photography LLC, Rachael Rogillio, Kasey Licht, Karen Lee, Mike Hampton, Diane Keeter, Sandra Roerig, Jeannie Thrush, Clark Baldwin, Sean Fletcher, Rex McGill, Shannon Smith, Toni Newby, Rachel Ungar, Craig Duffy, Tabetha Holmes, Haley Nelson, Hilary Roberto, Janice Peters, Coreen Frasier, James Britt, Elizabeth Caldwell, Jay Shearer, Dana Steward, Nathan Pittman, Ashley Pinkard, Joshua Fout, Ashley Henry, Laura Fout, Ashley Pinkard, Gerald Weber, Randolph Haven, Pam Neal, Lillian Israel, Laura Timby, Steve Parsons, Steve Folkers, Hallroad Inc., Susan Day, Elizabeth Norton, Jacqueline Burgett, Whitney Foster, Julia Ramey, Pat Daly, Matthew Buie, James Lassiter, Peggy Moody, Kay Fulton, Lindsay Wilson, Debra Kuczek, Barbara DeChant, Ray Morris, Shayla Humble, Sheila Hellman, Jacob Maris, Richard Washburn, Carla Finch, Phil Wood, Jack Land, Cindy Jetton, Robert Olmstead, Robert Harris, Dianna Winters, Karen Bartle, Terri Hargrove, Danny Smith, William Anderson, Carol Auger, Jan Schaper, Brandi Smith, Cristy Karr, Ryan Brennell, Justin Keen, Abraham Hawkinson, Steve Fryar, Cynthia Jetton, Tim Permenter, Denise Pendergist, Edith Stahl, Rel Corbin, Cynthia Jetton, James Mott, Inez Young, Edd French, Rachel Henriques, Susan Parker, Debbie West, Evelyn Mills, Faith McLaughlin, Mary Weeks, Susan Siegele, Pat Rauls, Susan Segal, Cynthia Mitchell

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Consideration of tourism, revenue, local commerce, or property values is not within the Department's regulatory authority.

Summarized Comment: The following commenters provided comments supporting the Department's decision to deny the permit application due to the sensitive karst geology of the Buffalo River Watershed. The commenters stated that karst topography can be conduits for pollutants to enter groundwater and move to the Buffalo River Watershed. The commenters stated that liquid animal waste management systems should not be allowed in karst environments.

Commenters: Jay Stanley, David Gray, Cody Rankin, Lora Hamman, Adam Webb, Virginia Booth, David Dougan, Sharon Holladay, Janette Groves, Dewey Strode, Martha DeChant, James Norwood, Patricia Wyatt, James Wilcox, Jesse Edmondson, Richard Crawford, David Roberts, Annee Littell, Kenneth Carle, Hal Mitzenmacher, Jimmy Goff, Jeremy Moore, Kenny Teaster, Micheal Amos, Lawrence Ireland, Michael Sutton, Robert Walker, Bobby Belote, Mike Alexy, Nicole Pope, Kriste Rees, Janet Nye, Lowell Collins, Sheilah Roenfeldt, Kenneth Smith, John Ray, Gene Dunaway, Greg Van Horn, Raymond Herschend, Linda Vanblaricom, Kirsten Bartlow, Steven Heye, Francie Bolter, Thomas Nowlin, Nancy Paddock, Linda Lewis, Mo Elliott, Holly Pilgrim, Mary Joe Morris, David Tirpak, Thomas Trigg, Michael Johnson, Dorothy Walters, Audrey Weymiller, Gilbert Smith, Maryevelyn Jones, Joellen Rosenquist, Barry Stuart,

Kevin Brandtonies, Joe Neal, Daniel Smith, Bryan Signorelli, Mary Lightheart, Cindy Rimkus, Peter Ireland, Alisa Dixon, Evelyn Sammons, Annette Pettit, Stephen Driver, Kenneth Pape, Sue Lukens, Sharon Holladay, Nan Johnson, Marjorie Sullivan, Shelley Trost, James Nelson, Joanne Vrecenak, David Cooper, Antoinette Locke, Norman Vaden, Carol Wright, Gaea Miller, Will Swearingen, Gwen Walstrand, Michael Reichert, Sydney Rephan, My Blue Heaven Cabin, Ronald J. Doster, Elaine Nesmith, Kyra Wilk, Rebecca Russell, Tabetha Holmes, Bill Lord, Dana Steward, Hal Allen, David Neville, Jim Good, Teresa Neely, Laura Timby, Steve Parsons, Robin Rumph, Verna Rutledge, Connie Henshaw, Peggy Moody, Kay Fulton, Herbert Matthews, Mark Smith, Barbara DeChant, Tasha Hudson, Miranda Brewer, Edith Stahl, Claude Buckley, Debra Connor, Grant Scarsdale, Erin Yarrobino, Legina Boswell, Susan Parker, Frank Henry, Kathleen Hensley, Kathy Downs, Chuck Bitting, Laura Timby, Judith Duguid

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. ADEQ has determined that a detailed geological investigation of the facility is required because karst includes highly permeable foundations with the associated potential for groundwater contamination and potential for sinkholes to open up with collapsing ground or cause differential settlement. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table

5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. In the Buffalo River Watershed, four Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Summarized Comment: The following commenters provided comments in favor of the facility receiving a permit due to the facility having had no violations from neither the Department nor the EPA.

Commenters: Geral James, Doug Baird, Charles Pridmore, Andy McCutcheon, Dustin Riddle, Kari Holstex, Tony Taylor, Derek Gellerman, Lisa Smith, Michael Parish, Dan Wright, Roger Thompson, David Brown, Terry Laster, Clint Bowen, Sherry Clark, Bobby Craig, Susan Anglin, Cheryl McCutcheon, Steve Barney, Tessa Sparks, Brad Vines, Chrystal Willis, Jack Brasel, Judy Mallett, Lesley Ragland, Leketta Faught, Johnny Faught, Kassidy Dorrell, Danny Naegle, Alex Whitelaw, Steve Eddington, Emilee Tucker, Jason Keenom, Paul Gramlich, Jack Boles, Chad McCutcheon, Carla O'Neal, Sharon Pierce, William Wilborn, James and Brenda Patton, Mark Keaton, Elliott Golmon, Trent Dabbs, Janet Mathis, Kelly Woods, Cindy Creager, Johnny Faught, Matt Heidersheidt, Perry Hayes, James Widner

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Department has noted violations during its inspections of the C&H facility near Mt. Judea, Arkansas. However, those violations have not led to a formal enforcement action by the Department against C&H.

Summarized Comment: The following commenters provided comments regarding the original APC&EC Regulation 6 General Permit ARG590001 coverage. The commenters stated that the permit should never have been approved, and commented that the process in which it was approved was done incorrectly. The commenters stated that the Public Notice procedure was

improper. The commenters were otherwise in favor of the Departments decision to deny the permit application.

Commenters: Jay Stanley, Danny Smith, Chuck Smith, Ruby Molder, Virginia Booth, Joe Lavely, Danny Smith, Raymond DeSalvo, Joe Golden, Jana Brady, Jeremy Grigg, David Pope MD, Denice McMinn, Denise Lanuti, G. McFarland, Randall Hollenbeck, Kenny Teaster, Ellen Compton, Lucas Parsch, Nicole Pope, Joel Emerson, Susan von Gremp, Rebecca Laster, Ellen Mitchell, Stevan Vowell, T.A. Sampson, Dorothy Walters, Maryevelyn Jones, Edward Fugatt, Joe Neal, David Franks, Stephen Driver, Kenneth Pape, Rick Thomas, Sydney Rephan, Sandra Roerig, Elaine Nesmith, Lady Kunkle, Terry Sutterfield, Kathy Sutterfield, Beyond Reality Ozark Cabin, Brian Thompson, Candace McGhee, Debbie Alexy, Frank Henry, Kathleen Hensley, Barbara Valuski, Chuck Bitting, Gordon Watkins, Phyllis Head

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

APC&EC Regulation 6 General Permit ARG590000 and the coverage (permit tracking number ARG590001) granted under the General Permit are outside the scope of the current permitting decision. The initial Notice of Intent and the corresponding NMP for coverage under the prior APC&EC Regulation 6 permit tracking number ARG590001 were available for public comment during the 30-day public comment period beginning on June 25, 2012.

Summarized Comment: The following commenters provided comments supporting the Department's decision to deny the permit application, and requested that the temporary moratorium in APC&EC Regulation 5.901 be made permanent.

Commenters: Pamela Ellwood, Fay Knox, Deborah Kitz, Bob Allen

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Rule-making regarding a permanent moratorium is outside the scope of this permitting decision.

Summarized Comment: The following commenters provided comments in opposition to a separate pending APC&EC Regulation 5 No Discharge permit application, Permit No. 5305-W.

Commenters: Robert Shingledecker, Dawn Stanley, Sophia Scalise, Jeremy Adams, Sean Mahan

Response: The permit application for Permit No. 5305-W is outside the scope of this permitting decision.

Summarized Comment: The following commenters provided comments supporting the Department's decision to deny the permit application due to issues regarding the waste storage pond at the facility. The commenters raised concerns about allowable leakage and unintentional leakage from the clay liner seeping into karst.

Commenters: John Taylor, Deborah Keene, Steve Crawshaw, Douglas Barton, Richard Rew, Greg Jones, Robert Walker, Nancy Swearingen, Mike Hampton, Sandra Roerig, Gerald Weber, Misako Ishimura, Eddie Vollman, Mark Corley

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Seepage from waste storage ponds has the potential to pollute surface and ground water. The record included one recompacted permeability test that is insufficient to determine liner integrity. The necessary soil investigations including, but not limited to, percentage of fines and soil permeability evaluations, have not been performed at this facility in accordance with the AWMFH 651 Table 10-4 and Appendix 10D. Plasticity index analysis was performed on one sample of the in situ clay material in boring 2. The variability in the regolith expected in this geologic setting coupled with the insufficient data creates additional concerns about the siting and soil sources for the clay liner. The required number of borings were not advanced within the pool areas in accordance with AWMFH 651.0704(b)(4); these additional borings would have provided more data for assessment of clay source material. Proper soil investigations for the liner material are necessary to determine the suitability and location of the clay source material and to consider any additional geotechnical testing to confirm material properties, which will reduce the potential for downward and/or lateral seepage of the stored wastes.

Additionally, NRCS, in Appendix 10D of the AWMFH, indicates that special design measures are necessary where agricultural waste storage ponds are constructed in soils with high calcium content (BCRET Quarterly Report for October 2016 to December 2016, Table 10, page 71) or highly unfavorable geologic conditions, such as karst formations.

Summarized Comment: The following commenters provided comments in favor of the facility receiving a permit due to infringement on an individual's personal property rights and their right to farm.

Commenters: Darryl Treat, Judy McCutcheon, Kayla Kissel, Sherry Campbell, Patrick Frachiseur, Betty Ruckman, Mark Halsted, Darren King, James Cline, Michelle Buchanan, Pam Woods, Mark Halsted, Susan Nichols, Tommy Park, Chrystal Willis, Cassidy Jasper, Luke Alston, Frank Higgins, Kayla Cowell

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Individual property rights are outside the scope of this permitting decision.

Summarized Comment: The following commenters provided comments in favor of the applicant receiving a permit. The commenters questioned the source of data relied upon by the Department. The commenters believe that the Department should use scientific evidence from the University of Arkansas and United States Geological Survey data and research as the basis for the decision, rather than the opinions, emotions, and ideas of outside sources. The commenters also question the amount of proof linking any pollution specifically to the facility.

Commenters: Carla ONeal, Ricky Dodson, Sharon Pierce, Leann Duncan, Paula Smith, Randy McCutcheon, Judy McCutcheon, Todd Parker, Jefferson Miller, Dora Payne, Geral James, James Jones, Brittany Jones, Cheryl Clayborn, Nickie Casey, Carla Richardson, Greg Norton, Kennetha McClelland, Masen McCutcheon, Dustin Riddle, Lori Dabbs, Terry Dabbs, Thomas Dawson, Cynthia Brotherton, Laykyn Rainbolt, Kari Holstex, Jan Harris, Shawn Smith, Chris Wyatt, Keith Kilbourn, Nathan Stuart, Terrell Davis, Steven Hignight, Rachel Bearden, David Morgan, Tony Suit, Tommy Thompson, Jason Kaufman, Hannah Bell, Nate Bell, Jason Keenom, Aurelie Morren, Kathryn Miller, Joe Stuart, Cindy Keenom, Andrew Campbell, Amy Adams, Roxan Smith, Jason Keys, Brad Troutt, Randall Robinson, Cody Harrington, Renee McCutcheon, Michelle Buchanan, Lisa Smith, Glenda Young, Mike Ragland, James Simpson, Michael Parish, Roger Thompson, David Brown, Jared Wheeler, Terry Laster, William Phelps, Lacie Audeoud, Betty Campbell, Tosha Gellerman, Jack W Norton, Brian Keys, Christina Merle, Bobby Craig, James Keys, Katherine James, Kirby and Betty Doane, Cassie Fisher, Derek Helms, Susan Anglin, John Parker, Cheryl McCutcheon, Wesley Sisco, Jane Ann Perry, Tommy Park, Brenda Smyth, Matt Palmer, Karla Bettis, Rebecca Richardson, Brenton Richardson, Calvice Casey, Kendall Wallace, Ron Cothran, Kayce Villines, Lauren Cannon, Barbara Hefley, Kellie Smith Davis, Dustin Cowell, Dustin Cowell, Brandon ONeal, Jimmy Holt, Laura Brasel, Karen Brasel, Johnny Faught, Randy Wheeler, Kassidy Dorrell, Teena Crabb, Harold Brasel, Danny Naegle, Josh Campbell, Steve Eddington, Donald Moss, Mary Wheeler, Robert Balentine, Emilee Tucker, Paul Gramlich, Jack Boles, Carla O'Neal, Angela Sullivan, James and Brenda Patton,

Mark Keaton, Jeremy Miller, Elliott Golmon, Trent Dabbs, Janet Mathis, Kelly Woods, Emily Ruff, Kara Smith, Peggy Ransom, Paige Clary, Andrea Smith, Alice Williams, Ed Hudnall, Betty Eddings, Ken and Virginia Hulsey, Rusty Butler, Cindy Creager, Jack Brasel, Jack Brasel, Kelly Woods, Starlinda Sanders, Andy McCutcheon, Dustin Cowell, Kelly Woods, LaBecca Brasel, Leslie Keene

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

The Department considered all available scientific data and information from, but not limited to, BCRET, United States Geological Survey, University of Arkansas Department of Agriculture, and ADEQ in making this permitting decision.

Summarized Comment: The following commenters provided comments expressing their concern that if the Department were to deny this applicant a permit, then all farmers within the State of Arkansas would be affected.

Commenters: Janice Higgins, Ricky Gunn, Kayla Kissel, James Jones, Brittany Jones, Cheryl Clayborn, Kathy Martin, Hannah Bell, Nate Bell, Marcus Looney, Jason Keenom, Aurelie Morren, Kathryn Miller, Amelia Bower, Cody Harrington, Betty Smith, James Simpson, Michael Parish, William Phelps, Sherry Clark, Susan Nichols, Helen Griffin, Steve Balloun, Steve Barney, Libby Brasel, Karla Bettis, Tammi Dickson, Ryan See, Dustin Cowell, Deanna Bohanan, Joseph Harrah, Mary Wheeler, Emilee Tucker, James and Brenda Patton, Kendra Dodson, Janet Mathis, Kelly Woods, Kara Smith, Paige Clary, Dustin Cowell, Tom Jones

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

ADEQ does not regulate all types of farming operations. The Department's permitting decision for this APC&EC Regulation 5 Individual No Discharge permit application pertains only to this individual permit application for a liquid animal waste management system, not all farming operations. Applications for Regulation 5 permits are evaluated according to Regulation 5 requirements.

Summarized Comment: The following commenters provided comments in favor of the applicant receiving a permit due to the facility not being the source of the impairments in the

watershed. The commenters stated that any impairment affecting the river is from the increase in tourism in the area, the abundance of feral hogs, and other unregulated farmers.

Commenters: Terance Middleton, Sharon Pierce, Kenny Tomasich, Michael Battenfield, Randy McCutcheon, Jack Boles, Gregory Smith, Malcolm Farmer, Geral James, James Jones, Brittany Jones, Robb Hulsey, Kassidy Dorrell, Brandon Johnson, DeLana Shoemake, Cheryl Clayborn, Angela Nichols, Dustin Riddle, Laykyn Rainbolt, Mark Halsted, John Creager, Barbara Foster, Charles Copeland, James Reynolds, Michelle Pass, Derek Gellerman, Rachel Bearden, David Morgan, Bryon Kelley, Jason Kaufman, Brian Unruh, Bonnie Cook, Jason Keys, James Cline, Renee McCutcheon, Glenda Young, Dan Wright, Jared Wheeler, Sherry Clark, Tosha Gellerman, Nathan Stuart, Crystal Ramsey, Larry Dilday, Christina Merle, Kirby and Betty Doane, Lillian Preddy, Elaine Waters, Susan Nichols, Cheryl McCutcheon, Tim Provencio, Brenda Smyth, Brad Vines, Makaela Burdine, Kathy Morales, Judith Murphy, Donnetta Wheeler, Jennifer Lewis, Kelly Ragland, Cindy Wyatt, Michelle Mitchell, Pam Grice, Jack Brasel, Judy Mallett, Laura Brasel, Kassidy Dorrell, Lavern Baughman, Teena Crabb, Becky McAnulty, Carl Eggers, Taylor Hefley, Ryan Pyszka, Libby Robinson, Sharon Pierce, Kendra Dodson, Keelin Baggs, Kelly Woods, Andrea Smith, Betty Eddings, Cindy Creager, Arlis Jones, Andy McCutcheon, Cheryl Clayborn, John Creager, Leslie Keene, Matt Heidersheidt

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

Consideration of tourism is not within the Department's regulatory authority.

Feral hog management is not within the Department's regulatory authority.

Comment: The following commenters provided comments by form letter that stated:

Please accept my comment on the draft Regulation 5 swine waste permit 5264-W, AFIN 51-00164 for the C&H Hog CAFO. I support the ADEQ decision to deny the permit based upon the points established in ADEQ's Statement of Basis for denial which I have included in my comments below.
1. There is now clear scientific evidence of a negative environmental impact to these streams attributable to nutrient overloading within the last few years. ADEQ has established its proposed 2018 impaired waterbodies list, and has placed four impaired Assessment Units (two sections of Big Creek (Newton County) and two sections of the Buffalo National River) as impaired waterbodies
2. C&H Hog Farm has not complied with requirements, especially those that pertain to karst locations, and this has increased the impairment of the Buffalo National River and its tributary, Big Creek, along which C&H is located.

3. The presence of karst triggers additional considerations for siting and design as stated in the Animal Waste Management Field Handbook (AWMFH).
4. Pond Construction Quality Assurance is a real issue since the C&H record included only one Recompacted permeability test.
5. C&H has not performed acceptable field Assessments of High-Risk Areas of Land Application Sites including all of the characteristics listed in A WMFH.
6. An adequate Operations and Maintenance Plan for the pond levee, including an inspection schedule and plan document, or an emergency plan were not included in the record.
7. The Buffalo River is home to at least four species of wildlife that are listed as endangered or threatened. The excess nutrient runoff from C & H Farm and the resulting disruption of the aquatic ecosystem are a serious threat to all Ozark wildlife and especially those species that are already in trouble.
I support the ADEQ denial of the C&H Hog farm permit. The proposed listing of Big Creek and the Buffalo National River as impaired waterbodies, the statistically significant increase of nitrate-N in the ephemeral stream and house well, and the increase of STP in all land application fields receiving waste further illustrate the need for the C&H Hog CAFO to be denied a permit to operate in the Buffalo National River watershed.
I agree with Governor Hutchinson that we must rely on the science as he stated: "My love for our state and my passion to protect our water compels me to ensure that the studies are scientific and impartial. The studies on which ADEQ bases its decisions are and will continue to be scientifically and environmentally sound."

Commenters: Jerry Harrison, Justin Holstead, Jacob Idec, Josh Kester, K.C. Larson, Kathleen Marleneanu, Kristine Patel, Kennith Wheetley, Lydia Bradshaw, Lezlie Douglas, Lynn Farr, Lacie Scott, Mya Aung, Mark Elrod, Maribeth Garrison, Myesha Logan, Olivia Eddings, Patsy Miller, David Malm, Gregory and Joyce Polus, Ann Taylor, Linda Bryant, Denise Dore, Jeff Ingram, Jean Whalen, Bill Lord, Kathryn Tomlinson, Vallie Graff, Craig Tomlinson, Heidi McLaughlin, Janie Traywick, , James Findley, Else Kobbe, Harald Kobbe, Philip Wanzer, Rebecca McMath, Sarai Brock, Sarah Henry, Stephanie Odom, Savannah Pelley, Samuel Pettit, Taylor Bridges, Tony Marleneanu, Zac Owens, Anna Holstead, April Lane, Alexa Shipp, Andrea Vanaman, Cassandra Bennett, Bethany Nelson, Calvin Rezac, Duane Nelson, Emily Lane, Fred Thessing, Jerry Bratton, J. Douglas Vanaman, Jackie Fliss

Response: The Department has made the permitting decision to deny issuance of Permit No. 5264-W in accordance with state laws and APC&EC Regulation 5, Liquid Animal Waste Management Systems and upon consideration of the submitted permit application, the public comments on the record, and other available and relevant data and information.

ADEQ considers all readily available data to determine the status of water quality in Arkansas and to identify waterbodies that fail to meet standards defined in APC&EC Regulation 2. ADEQ recently completed water quality assessments for the development of a proposed 2018 303(d) List and 305(b) Integrated Report as required by the Clean Water Act. In the Buffalo River Watershed, four

Assessment Units (two segments of Big Creek (Newton County) and two segments of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen.

Karst features in the Buffalo River watershed are associated primarily with the Boone Formation.[1] The karst geology present in the Buffalo River watershed makes exchanges between surface water and groundwater common in the watershed, and dye tracer studies have shown that there are areas in the watershed where infiltration of rainfall from the surface to groundwater occurs rapidly through sinkholes, faults, and existing solution channels.[1] The Department acknowledges that C&H Hog Farms, Inc. is located in the Boone Formation. While APC&EC Regulation 5 does not prohibit liquid animal waste management systems or associated land application from being located in karst, it does require the designs and waste management plans for liquid animal waste management systems to be in accordance with the AWMFH. In accordance with the AWMFH, a detailed geologic investigation is necessary to characterize and understand sites with complex geologies (i.e. karst) that includes, but is not limited to, groundwater flow direction studies, borings in the pool areas, berm integrity assessment, pond construction quality assurance, and assessment of high-risk areas of land application sites. The necessary geotechnical investigations have not been performed at this facility in accordance with the AWMFH Section 651.0704(b)(4), Section 651 Table 10-4, and Appendix 10D. The karst geology of the area makes groundwater more susceptible to contamination resulting from activities on the land surface.[1] Ground penetrating radar studies performed in Fields 1, 5, and 12 demonstrate the necessity of full geotechnical investigations at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. The necessary geotechnical investigations have not been performed at all land application sites in accordance with AWMFH 651.0504(a)–(n) and Table 5-3. Geotechnical investigations are necessary and may help demonstrate that this facility is not contributing to water quality impairments of Big Creek and the Buffalo National River. The proposed listing of Big Creek and the Buffalo National River as impaired further illustrates the need for these detailed studies.

[1] Buffalo River Watershed-Based Management Plan, May 22, 2018, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf

Seepage from waste storage ponds has the potential to pollute surface and ground water. The record included one recompacted permeability test that is insufficient to determine liner integrity. The necessary soil investigations including, but not limited to, percentage of fines and soil permeability characteristics, have not been performed at this facility in accordance with the AWMFH 651 Table 10-4 and Appendix 10D. Plasticity index analysis was performed on one sample of the in situ clay material in boring 2. The variability in the regolith expected in this

geologic setting coupled with the insufficient data creates additional concerns about the siting and soil sources for the clay liner. The required number of borings were not advanced within the pool areas in accordance with AWMFH 651.0704(b)(4); these additional borings would have provided more data for assessment of clay source material. Proper soil investigations for the liner material are necessary to determine the suitability and location of the clay source material and to consider any additional geotechnical testing to confirm material properties, which will reduce the potential for downward and/or lateral seepage of the stored wastes.

C&H Hog Farms, Inc. submitted an Emergency Action Plan to the Department on October 23, 2018. The Emergency Action Plan did not address possible failure of the liner resulting from potential damage, such as pumping and agitation, liner desiccation, or any other site-specific operational risks are not addressed, in accordance with AWMFH 651.0204(a), (b).

The Department acknowledges the following statements from the Buffalo River Watershed-Based Management Plan dated May 22, 2018, regarding threatened and endangered species in the Buffalo River watershed.

> The Buffalo River and its tributaries are considered high quality water resources. The Buffalo River and its tributaries support over fifty (50) species of fish and over twenty (20) species of mussels. Portions of the Buffalo River have been designated critical habitat for the threatened Rabbitsfoot mussel, *Quadrula cylindrical cylindrical* (State/Federal Status: Endangered/Threatened, respectively). The watershed also includes important habitat for endangered bat species: Gray Bat, *Myotis grisescens* (State/Federal Status: Endangered); Indiana Bat, *Myotis sodalis* (State/Federal Status: Endangered); Ozark Big-eared Bat, *Corynorhinus townsendii ingens* (State/Federal Status: Endangered); and Northern Long-eared Bat, *Myotis septentrionalis* (State/Federal Status: Endangered/Threatened, respectively). Cave and other karst features in the Buffalo River watershed are important habitats for all of the protected bat species.[2]

However, the Department did not receive any comments during the comment period ending on October 24, 2018, regarding endangered or threatened species and their associated habitats from Arkansas Game & Fish Commission, Arkansas Natural Heritage Commission, or U.S. Fish and Wildlife Service.

[2] https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf