C&H Hog Farms EA
C/O Cardno, Inc
501 Butler Farm Road
Suite H
Hampton, VA 23666

To whom it may concern:

Please accept these comments in regard to the Final Environmental Assessment for C&H Hog Farms, Newton County, Arkansas dated December 2015.

I would like these to be included as part of the legal record in regard to this assessment.

Sincerely,

Brian A. Thompson

cc:
Governor Asa Hutchinson
Governor's Office
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Little Rock, AR. 72201

Director Becky Keogh
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Comments on the Final Environmental Assessment For C&H Hog Farms, Newton Co. Arkansas

My name is Brian Thompson. I am retired from a 34 year career with a Fortune 100 protein producer. I am an avid supporter of the Arkansas farmer and the agricultural industry. The corporate culture of my former employer strongly emphasizes ethical behavior in all aspects of its business. I became interested in the issuance of this particular permit as a direct result of its sensitive location and the unusual way it was processed and approved outside of the public eye. I am not a scientist or an engineer, but a concerned Arkansas taxpayer.

Comments:

Page 3-2

Comment 1 The EA has this to say about flood plains as a concern in regard to the spreading fields:

> ***As part of the Class II EA process, both USDA Form RD 1940-20 and the NMP for C&H Hog Farms (ADEQ 2012a) documented that there were no floodplains present at the facility. Portions of the application fields may be located within the floodplain of Big Creek. There are no Federal Emergency Management Agency flood maps for the area. Application of manure will not occur within 100 feet of any downgradient surface waters in compliance with the NPDES General Permit setbacks. While some of the application fields may be within the floodplain of Big Creek, the Proposed Action would not alter the morphology or channel characteristics of the Big Creek floodplain.***

Dr. Michal Smolen's Sept 2015 testimony regarding the draft EA makes this comment about what spreading fields reside in flood plains:

> ***The Draft EA states there are no flood plains in the C&H waste disposal area (page 3-2). This is clearly in error, as the fields directly adjacent to Big Creek and specified for waste application (Fields 3, 5, 6, 7, 9, 12, and 16) are indicated in the soil survey as "occasionally flooded" (Draft EA page 3-22). Although not identified as flood plain, these fields are the flood plain of Big Creek, as indicated by their position on the landscape, their low slope, and the presence of buried gravel lenses and alluvial soils (see the University of Arkansas Big Creek Research and Extension Team (BCRET) Quarterly Report April-June 20147).***

The author of these comments can corroborate Dr. Smolens testimony as he has witnessed these fields fully flooded during typical yearly spring rain events.

Page 3-6

Comment 2 Below the writer acknowledges karst geologic features and notes that nitrate contamination could be coming from outside the watershed through springs.

> ***Mott and Laurans (2004) reported that nitrate concentrations tended to increase near the middle of the river and may be attributed to land use. However, only two monitoring sites near the headwaters of the river had a statistically supported increase in nitrate concentrations over time (between 1985 and 2001). Spring discharge may be contributing to increased nitrate levels at these sites on the Buffalo River. There is evidence to indicate that nitrate contamination may be coming from sources outside the river's surface water drainage area.***

The writer plants the seed of remote contamination but gives no explanation as to the evidence, the source, or reasoning as to why they have chosen to introduce this.

Page 3-7

Comment 3 The writer references water quality work by the National Park Service:

> ***Although the NPS water quality monitoring program may indicate chronic conditions or long-term trends, quarterly sampling for nutrients and bacteria is insufficient data to capture actual conditions in the dynamic stream system, particularly given the highly variable concentrations of nutrients and bacteria in relation to stream flow volumes (Usrey 2013).***

The writer concedes indications of "chronic conditions" but notes that sampling frequency by NPS is inadequate, perhaps to minimize any unfavorable narrative regarding Big Creek degradation. The writer goes on to say:

> ***Additionally, the entire Left Fork Creek sub-watershed (HUC 110100050301) encompassing approximately 38 square miles, empties into Big Creek above the sampling site. Therefore, land use and development occurring in these sub-watersheds (or portions of) are contributing to the concentrations of nutrients and bacteria sampled at the BUFT06 monitoring site.***

Although the writer initially discounts NPS sampling frequency, he goes on to direct our attention to the Left Fork of Big Creek and other sub-watersheds as possible sources for the degradation being

recorded. The writer then on page 3-8 notes that Left Fork is monitored by USGS as a "control" against which the main fork for will be monitored.

> ***In May/June 2015, an additional monitoring station was established in Left Fork as it enters Big Creek and the USGS has installed height gage at that location (USGS 07055792). Nutrient and bacteria concentrations from this location, which drains a watershed similar to Big Creek but does not contain a CAFO operation, can be compared to the concentrations sampled at the site downstream of the farm (BCRET 2015b).***

This is a somewhat mixed narrative. It calls into question the points the writer is making as well as the validity of the BCRET study.

Page 3-8

Comment 4 The EA discusses the composition of BCRET.

> ***An independent, in-depth case study of C&H Hog Farms is currently being conducted by scientists from the University of Arkansas System Division of Agriculture. The Big Creek Research and Extension Team (BCRET) is comprised of faculty and staff from the Division, USGS specialists, Newton County Extension agents, and several technicians. The team includes the region's foremost experts in the fields of agricultural impacts to water quality, livestock nutrient management, soil quality and sustainability, and ecosystems.***

BCRET is indeed a highly credentialed team, but the EA relies on BCRET results to the exclusion of all other sources. BCRET is composed of highly qualified individuals from the U of A Division of Agriculture who work on a daily basis in the support of farmers. By necessity, they have close working and financial relationships with members of the Farm Bureau and corporate agricultural interests. One need look no further than the name of their quarterly reports: *"Monitoring the Sustainable Management of Nutrients on C&H Farm in Big Creek Watershed"*. As the title implies, their job is to help the farmer be successful which is their typical role in support of the agriculture industry. The validity of their data is not in question, but their "independence" in regard to the design of the study itself is a clear concern. Dr. Tom Aley, a geologist licensed in the state of Arkansas with experience in this watershed, characterizes the BCRET study as follows:

> ***It is disappointing how little information relevant to an EA has resulted from the formation of BCRET. The apparent explanation for this is that the study is long-term academic research. It is not a gathering and assessment of***

information useful for determining the health and environmental impacts expected to result from this hog operation or for protecting the River and springs that feed it. It is certainly not what people concerned with the Buffalo National River had hoped for from this academic body.

Likewise, Professor JoAnn Burkholder Ph.D. described the BCRET activities in her testimony as follows:

The BCRET study design is seriously inadequate for characterizing impacts of the C&H CAFO on surface water quality.

Testimony from Michael Smolens Ph.D. notes the following:

The Draft EA presents water quality observations from the BCRET study as evidence that C&H Hog Farms has no impact on water quality of Big Creek or the Buffalo River. Although the BCRET study is very well instrumented, and the researchers are qualified to conduct the research they have undertaken, the results do not address the question at hand.

Comment 5 Other studies and professional resources who are not connected directly with agriculture and have specific expertise with the Big Creek watershed were for the most part ignored. These include:

- Kosic: *Sustainable Water Resources Management* Oct 27, 2015: http://link.springer.com/article/10.1007/s40899-015-0032-5/fulltext.html ,
- Hovis: *C&H Hog Farms: An Investigation Into The Permitting of a Concentrated Animal Feeding Operation In the Buffalo River Watershed* http://buffaloriverwatershedalliance.wildapricot.org/Resources/Documents/Hovis%20Thesis.pdf
- NPS 303(d) Letter of Oct 6, 2015: http://buffaloriverwatershedalliance.wildapricot.org/resources/Documents/NPS%20303(d)%20Letter.pdf
- Oklahoma ERI study 2015 is mentioned but results are not referenced: http://buffaloriverwatershedalliance.wildapricot.org/Resources/Documents/Ex.%206%20-%20OSU%20ER%20Report%202015.pdf
- Brahana: ongoing dye tracing and water sampling studies. Studies are mentioned but results are not referenced.
- Sept 2015 testimony of Michael D. Smolen, Ph.D. http://buffaloriverwatershedalliance.wildapricot.org/Resources/Documents/Ex%204%20-%20FINAL%20Smolen%20comments%20with%20CV.pdf

- Sept 2015 testimony of Steven B. Wing, Ph.D. http://buffaloriverwatershedalliance.wildapricot.org/Resources/Documents/Ex.%205%20-%20Wing%20declaration%20FINAL%20w%20Exhibits%20-%20reduced%20size.pdf
- Sept 2015 testimony on draft EA by Tom Aley a professional geologist licensed in the state of Arkansas. http://buffaloriverwatershedalliance.wildapricot.org/Resources/Documents/Tom%20Aley%20hog%20farm%20assessment.pdf
- Sept 2015 testimony on draft EA by Dr. JoAnn Burkholder Ph.D. http://buffaloriverwatershedalliance.wildapricot.org/Resources/Documents/Ex%202%20-%20FINAL%20Burkholder%20statement%20with%20CV.pdf

Consequently, this EA is extremely narrow and selective in regard to where it has chosen to find its guidance.

Page 3-10

The EA appears to say that in the Buffalo River watershed, underground karst flows beneath surface watershed boundaries do not occur:

> ***Groundwater flow in karst systems can cross the surface watershed boundaries, and may not correspond with surficial drainage basin divides (Soto 2014). Such conditions are not observed in the southern part of the Buffalo River watershed where the farm is located.***

Comment 6 The dye tracing studies by Dr. Van Brahanna (under peer review) demonstrate that this is not the case. The EA then goes on to say:

> ***In 1999, field observations and dye-tracer studies conducted in the Buffalo National River indicated that water discharged from some springs in the Buffalo River watershed originated in the Bull Shoals Lake watershed and traveled at velocities exceeding 640 meters per day (Murray and Hudson 2002). The Bull Shoals Lake Watershed is located northeast of the C&H Hog Farms."***

Comment 7 The above statement contradicts the earlier statement regarding flows between watershed boundaries. The writer continues:

> ***Because much of the Bull Shoals watershed is covered by agricultural land, consisting mostly of livestock operations, it is possible that nutrient contaminants from these agricultural activities reach the Buffalo River by interbasin transfer of groundwater (Murray and Hudson 2002).***

Comment 8 By making references to possible distant agricultural contamination outside the scope of this EA, the writer seems to be redirecting our attention away from the obvious concern of a large CAFO located a few hundred yards from Big Creek.

Page 3-11

Comment 9 The writer, who is not a licensed geologist in Arkansas makes assumptions regarding karst from examination of a map and ariel photos.

> ***Highly soluble conditions in certain areas of the Buffalo River watershed, distant from the site, including the western and north-central parts of the watershed, have produced pervasive occurrence of karst features, including caves, sinkholes, springs, and sinking streams (Hudson et al. 2001, Soto 2014). However, the C&H Hog Farms site and vicinity do not exhibit strongly developed karst landforms as demonstrated by a review of the Mt. Judea USGS 7.5 minute topographic quadrangle map and online aerial photograph information. The topographic and aerial photography review indicated that limited numbers of karst ponds are located on upper reaches of floodplains, where a separation of shallow perched groundwater in alluvial and epikarst (Hudson et al. 2001) from deeper groundwater in the Boone Formation may explain development of sinkhole ponds in overburden, due to dewatered secondary porosity in the underlying bedrock.***

Expert testimony given on 8/27/1015 by Dr. Tom Aley who is a professional licensed geologist specializing in karst in Arkansas makes the opposite conclusion:

> ***In karst areas the adjective "Dry" is commonly applied to streams and valleys where the proportion of surface water lost to the groundwater system is exceptionally great. The vicinity of the C&H Hog Farm is characterized by an exceptionally large proportion of the surface water being lost to the groundwater system as illustrated by the following:***
>
> - ***Dry Creek, a stream with a topographic basin of 7.23 square miles, is located along the southern margin of the hog farm operations. Three of the manure disposal fields (Fields 15, 16, and 17) are topographically tributary to Dry Creek.***
> - ***Dry Branch, a steam tributary to the Left Fork of Big Creek at a point 11,600 ft west of Field 5.***
> - ***Dry Branch, a northward flowing stream tributary to Big Creek. The small community of Mt. Judea is on the ridge between Dry Branch (to the east) and Big Creek (to the west) and roughly parallels Big Creek. Dry Branch is within 2200 ft of of Field 1 and is 3,500 to 6,100 feed from Fields 5,6,7,9, and 10.***
>
> ***The hog farm operation is bordered on the west, south, and east by streams named Dry Creek and Dry Branches. The hog farm operation is on the Mt.***

Judea 7.5 minute topographic quadrangle map. There are few if any other 7.5 minute quadrangle maps in the karst areas of north Arkansas that a have three separate streams with the adjective "Dry" in the name. The hog farm is clearly in the middle of a well developed karst area.

Page 3-12

Comment 10 The EA writer references below a study by Oklahoma State and vaguely recognizes that there is possible karst under at least several of the fields.

An electrical resistivity imaging (ERI) analysis of Fields 5a and 12 was initiated in December 2014 by the School of Geology, Oklahoma State University. The preliminary analysis showed that additional data were needed and a second field effort was conducted in May 2015 (BCRET 2014c, pers. comm. A. N. Sharpley 2015). For the second quarter of 2015, a preliminary report on the December 2014 analysis was completed. The results of the May surveys are not yet available. The 2014 ERI surveys confirmed the soil thickness, presence, extent, and depth of epikarst features and bedrock material. The average epikarst thickness underlying the two fields was found to be highly variable ranging from 6 to 75 feet thick. There appears to be a large doline feature, a closed topographic depression caused by dissolution or collapse of underlying rock or soil, within the weathered bedrock underlying Field 12. Additional analysis could enhance the delineation of possible karst features and further information is needed to have a more complete view of the field to understand connections between surface and groundwater (Fields and Halihan 2015).

The ERI analysis *WAS* available at the time this final EA was published. Had the writer bothered to reference it, he might have mentioned this from the Oklahoma ERI executive summary:

The potential for rapid transport pathways in the underlying bedrock as joints or potential karst features were observed as conductive electrical features in a resistive background.

The Oklahoma ERI corroborates expert testimony given on 8/27/2015 in regard to the draft EA by a local karst expert; Dr Tom Aley, Arkansas Professional Geologist #1646

that this entire hog farm operation and the associated manure disposal fields (with the exception of portions of Field 17) are located on top of a well developed karst aquifer within the Boone Formation and possibly other deeper geologic units. Were it not for the karst development in the region, there would be much more water on the surface of the land within the Big Creek topographic basin than is the case.

This notable testimony on the certainty of karst from a geologist actually licensed in the state of Arkansas with "boots on the ground"

experience in this particular watershed is not so much as mentioned in the EA.

Page 3-13

Comment 11 The EA writer provides geologic testing results making the point that karst was not detected near the facility:

> ***As part of the NPDES General Permit application, Geotechnical & Testing Services conducted a geologic investigation of the barn and pond locations. The geologic investigation bored test holes to depths ranging from 11.5 to 18.5 feet. No water was encountered in the boreholes. No limestone was encountered. The third boring encountered refusal at 11.5 feet, but characterization of the refusal as bedrock limestone was not provided. (ADEQ 2015a). The geotechnical investigation did not encounter karst features beneath the C&H Hog Farms facilities.***

The testimony of Tom Aley 8/17/2015, a karst expert, notes the inadequacy of these results:

> ***An appropriate investigation would have included many more borings. Furthermore, for an adequate investigation the borings should have extended to bedrock. Boring in areas especially prone to sinkhole collapse commonly encounter voids within the residuum and those voids are often near the contact between the residuum and underlying rock. The depth to rock in nearby borings is an import an parameter to record since substantial variations in depth are indicative of pinnacled bedrock and an elevated risk of sinkhole collapses. In-situ hydrologic testing of borings is highly desirable.***

This notable testimony from an Arkansas licensed geologist is not mentioned.

Comment 12 The EA writer discusses ambiguities regarding the interceptor trench:

> ***The BCRET study team has installed an interceptor trench below the ponds and is sampling water quality at that location to determine whether the holding ponds are leaking (BCRET 2014b, 2014c). There are few methods to accurately quantify potential pond leakage and the methodology is confounded given the small amount of potential leakage and variable evaporation and precipitation rates.***

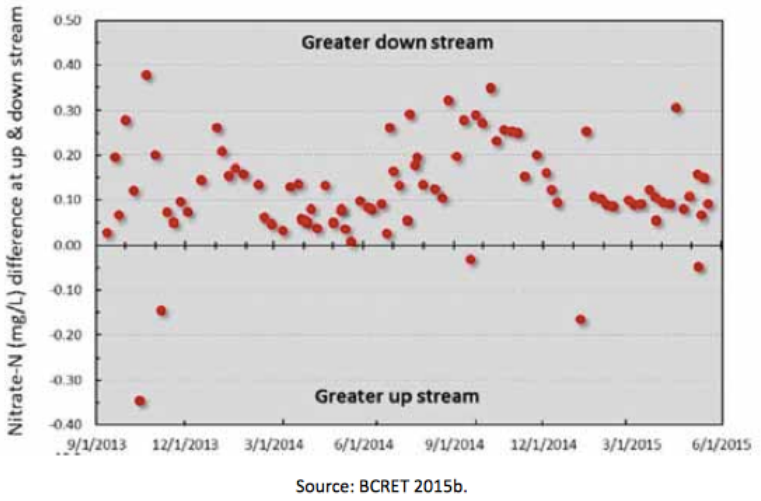
The interceptor trench was not part of the original BCRET study, but was added at the recommendation of a peer review group as a result of concerns regarding pond seepage. The Sept. 30, 2015 BCRET report provides evidence of E. coli and nitrate in the interceptor

trenches. It is reasonable to conclude that swine waste from pond leakage is the source of the E. coli.

Page 3-15

Comment 13 The EA notes that there have been no measurable results of water quality variances downstream in Big Creek:

Since C&H Hog Farms and the fields where wastes are applied are located along a waterway, it is reasonable to assume that there is localized recharge and discharge of surface and groundwater in the area. If the waste ponds were leaking, or nutrients or bacteria applied to fields were leaching into upper alluvial groundwater, any measurable contribution of those pollutants would be realized at the downstream water quality monitoring station or the field monitoring stations.



Source: BCRET 2015b.

Figure 3-4. Difference in nitrate-N concentrations in Big Creek downstream and upstream of C&H Hog Farms between September 15, 2013 and June 1, 2015

There are indeed measurable contributions of those pollutants being realized at the downstream station as evidence by BCRET's own nitrate measurements in Figure 3-4.

Page 3-17

Comment 14 The EA attributes the increased N to land use continuum.

As shown in Figure 3-4, nitrate concentrations are greater (0.1 mg/L) downstream from the application fields and the higher concentration is probably reflective of the land use continuum and historic management of the greater catchment area that drains into and is monitored at the downstream site.

This is challenged by Professor JoAnn Burkholder, Ph.D. in her testimony on the draft EA in Sept. 2015:

Yet, the EA authors tacitly refused to attribute the problem to contamination from the C&H CAFO. They instead vaguely attributed the significant increase

in nitrate at the downstream site (which they neglected to characterize as statistically significant) as "reflective of the land use continuum and historic management of the greater catchment area that drains into and is monitored at the downstream site." The inconsistency is glaring; no significant difference between the compromised "upstream" station and the buffered downstream station is an accepted finding, but higher levels of pollution at the downstream station supposedly should be attributed to a "watershed continuum" rather than the C&H CAFO. This CAFO is not the only source contributing to the degraded water quality of the downstream station on Big Creek, but it is a major source located immediately upstream from that sampling site.

Professor Burkholder's testimony is not mentioned. The BCRET study maintains that there is not a statistically significant problem, but the study does not bother to draw a line by defining at what level it WOULD be a problem. It is open ended. At a minimum, the very nature of the BCRET argument itself and its resulting lack of parameters indicate that the design of the study itself is flawed as there seems to be no basis on which the data may be evaluated.

Page 3-20

In the BCRET December 2014 quarterly report, the study found no statistically significant difference in E. coli or total coliform concentrations when comparing upstream to downstream monitoring sites.

Comment 15 E. coli has been detected in Big Creek by the National Park Service at low levels and also at unacceptably high levels which usually occur during storm events. The above statement in the EA mischaracterizes the nature of E. coli measurements as noted below in the testimony on the draft EA by Dr. JoAnn Burkholder:

The BCRET quarterly progress reports (e.g. the October 1 to December 31, 2014 report, p.2) maintain that "no consistent or prolonged trends in nutrients or bacteria concentrations were evident at or among any of the monitoring locations. In fact...geometric mean bacterial levels tend to be greater under storm than base flow conditions." As corrective information, the concentrations of a given parameter in receiving surface waters and groundwaters should not be expected to be consistent; that is the nature of CAFO-imparted water pollution. Parameter levels should, and do, vary depending on the location with respect to swine waste practices at the CAFO, storm/runoff conditions, and soil characteristics (U.S. EPA 1998, 2013a - pp. 22-24). Extreme spikes in pollutant levels commonly occur during storm/runoff events (e.g. U.S. EPA 2013, Mallin et al. 2014); they may or may not be detected depending on the sampling location and frequency relative to the runoff.

Page 3-22

Comment 16 The EA makes the point that the design of the ponds is sufficient:

> ***The amount of rainfall in a 100-year, 24-hour storm event would be approximately 8.48 inches (NOAA 2015). The 1 foot of freeboard above the 25-year, 24-hour storage level has a volume of greater than 425,000 gallons. Based on the total square footage at the top of the ponds, 1 inch of rainfall would equate to approximately 35,000 gallons. Therefore, including the freeboard, the ponds have sufficient storage to hold the volume generated by a 100-year, 24-hour storm event.***

According to the *Record of Climatological Observations* from the U.S. Department of Commerce, 7.4 inches of rainfall were received on 12/28/2015 in Jasper AR., less than one month from this comment. This certainly calls into question the appropriateness of 8.48 inches as a 100 year event mark. See photo of how the ponds appeared on 12/30, two days following this rain event. Considering this particular pond has a high downhill gradient on its north slope, there is not only real cause for concern for overtopping, but also for saturation and failure of this elevated northern berm. Physical evidence and actual events strongly dispute the conclusion of the EA regarding the sufficiency of pond design.

Page 3-23

Comment 17 The EA discusses the "upstream-downstream" design of the BCRET study:

> ***An intensive scientific study has been ongoing since September 2013 to determine if the C&H Hog Farms operation is adversely affecting surface water quality. Water quality samples are taken weekly and following storm events at eight locations on the farm, including three of the fields, nearby waterways, and a spring. The monitoring sites include sites on Big Creek upstream and downstream of the operation.***

Dr. Tom Aley disputes the adequacy of this design in his testimony regarding the draft EA in Sept 2015:

> ***Returning to the statement quoted from the EA in Comment 5 that states that potential point source impacts from C&H Hog Farms on water quality can be accurately measured by monitoring immediately upstream and downstream of the farm (this would be in Big Creek) and at the fields. This is clearly not true since the majority of the water containing contaminants derived from the manure will move downward into the karst groundwater system rather than overland to Big Creek. This is especially true since manure is not land applied (according to permit) when it is raining, when rain is pre diced within 12 hours, or on frozen ground.***

Furthermore, Dr. JoAnn Burkholder notes similar concerns in her Sept. testimony:

> ***Overall scrutiny of the BCRET study design shows that the surface water quality sampling sites (only 6-7, spanning a CAFO with 17 fields for realized or potential swine waste application that sprawls along Big Creek for approximately 3 river miles – including only one site downstream from the CAFO on Big Creek itself, and no sites on the Buffalo National River) are sparse for use in providing an overall assessment of the impacts of this CAFO on water quality. Thus, the rationale for site selection is especially critical to assessment of the efficacy of the study design. It is my opinion, as an expert on water quality impacts from swine CAFOs, that there is very high potential for major surface water degradation from the C&H CAFO. Furthermore, even the inadequate BCRET study has produced data indicating that the C&H CAFO is degrading the quality of surface waters.***

Neither of these expert opinions are mentioned in this EA.

Comment 18 The EA characterizes a pond discharge from a rainfall event as a minimal concern:

> ***Any discharge during a rainfall event would be restricted to an overflow minimizing the volume of discharge; the entire contents of the ponds would not be discharged. An overflow during a significant rainfall event could have short-term impacts to surface water quality since nutrients and bacteria concentrations would dilute or be available for biological uptake during downstream transport through the system.***

Dr. Michael Smolens describes concerns and risks for a discharge scenario:

> ***In addition, the waste system design assumes that overtopping can be avoided by pumping wastes from the waste storage ponds to a designated area, specifically Field 7. This plan is unrealistic, however, for two reasons. First, the farm does not appear to have a pumping system with sufficient capacity to pump down the waste storage ponds in an emergency (this is indicated by their request to use vacu-tankers for pumping down waste storage pond 2 in the Permit Modification Request), and second because the designated field, Field 7, is one of the worst places to use for emergency waste disposal***

because of its location directly adjacent to Big Creek and its high soil test P. Vacu-tankers or other wheel vehicles would not be suitable for waste application in extremely wet weather, and Field 7 is very likely to flood during such a period.

Comment 19 In addition, Dr. Smolens expresses concern regarding the steep slope of the ponds, a risk which the EA does not address:

The two waste storage ponds are situated on the side of a steep slope and designed to contain all waste, wash water, and rain water, including a 25-yr 24-hr design storm without discharging. The design meets the requirements of the CAFO permit and ADEQ, but does not consider the special nature of the Buffalo River. Because the waste pond design assumes there will be no discharge, the second pond in the series has no stabilized, emergency outlet. If the pond were to overtop the embankment due to a very large storm (much greater than the design storm) or a prolonged period of wet weather, or a combination of wet weather and extreme storm, there would be a danger of catastrophic failure of the embankment. Such failure could release as much as 2 million gallons of waste into the Buffalo River, a disaster not unlike the recent mine waste disaster in Colorado. In high risk areas, it is standard practice to include a stabilized outlet to allow discharge without failure of the embankment.

Page 3-24

In regard to pond seepage, the EA downplays the risk:

While the General Permit has a limit for potential seepage that does not necessarily mean the C&H Hog Farms waste ponds are seeping fluids at that rate or at any rate. To date there are no data available to determine whether the ponds are leaking at a measurable rate. The pre-construction geotechnical investigations boring logs encountered no karst features in the area where the buildings or holding ponds were constructed. Clays with variable and generally low chert or sand content beneath the ponds as indicated in the geotechnical report (ADEQ 2012a) would suggest low hydraulic conductivity and low propensity for vadose zone leaching of agricultural contaminants.

Comment 20 Dr. Tom Aley, a geologist actually licensed in the state of Arkansas disputes this as follows in his Sept 2015 testimony:

Leakage of raw hog manure out of the C&H ponds represents major environmental degradation that is not even identified much less discussed in the EA. Let me make some simple calculations: Given a combined surface are for both ponds of 1.23 acres and an allowable leakage rate of 5,000 gallons per day per acre of surface area, this equals 6,150 gallos of raw hog manure per day. The EA states that C&H went into operation in April 2013; that was about 882 days before our hearing today (Sept 2015). THE Arkansas Department of Environmental Quality (ADEQ) has allowed, by permit, leakage of hog manure out of the ponds totaling 5.42 million gallons during this period of operation. Give the hydrogeologic setting and the negligible subsurface investigation prior to pond construction, it is unlikely that the total leakage of

hog manure into the cars groundwater system and ultimately to the Buffalo National River is smaller than this volume. Unfortunately for the River it is likely to have been a lot bigger. In a giant omission, the EA does not even address where all this manure leakage has gone.

In addition, Dr. Michael D. Smolen, Ph.D. states:

The ADEQ permit provides minimal protection from storage pond leakage, allowing as much as 5,000 gal/acre per day to leak through the clay liner. C&H's clay liner was designed based on analysis of only one soil sample and there was no testing of the permeability of the final liner construction. The high shrink-swell potential of the liner materials have a tendency to crack when allowed to dry, increasing the potential for leakage during the cycle of filling and emptying the ponds. An EPA inspection conducted April 15-17, 2014 found that the upper edge of the clay liner were protected by erosion control fabric, but did not indicate any effort to prevent liner cracking.

Page 3-42

Comment 21 The writer of the EA discusses the Buffalo National River and its tourism benefits. He then concludes:

N***o significant impacts to the Buffalo National River are anticipated and no mitigation measures are required.***

The author of these comments contends that there are several clear and distinct risks to the Buffalo National River which include:

1. Gradual degradation through spreading fields, several of which are in the flood plain of Big Creek. Degradation occurring through both surface and ground water.
2. Gradual degradation through pond leakage.
3. Sudden catastrophic damage through over-topping (see Comment 16).
4. Sudden catastrophic damage through pond berm failure due to saturation (see Comment 19).
5. Sudden catastrophic damage through pond floor collapse into an underground cavity typical of geologic karst formations in that area.

Tom Aley, a licensed geologist in Arkansas and an expert in karst illustrates the concern of catastrophic risks by outlining what would be required to insure against them:

The waste ponds at the hog farm can store up to 2,2735,922 gallons of hog manure. A sinkhole collapse involving one or both of the ponds would be a major ecological and public health disaster for the Buffalo National River and would do major economic damage to the tourism economy in Arkansas and

nearby parts of Missouri. While sinkholes related to human activities may seem like rare events, they are not. That is why you can purchase insurance that covers damage from land subsidence and sinkhole collapses. In my 50 plus years of hydrogeology studies in karst areas I have investigated over 1,000 newly formed sinkholes that directly resulted from human activities. The issue is clearly of sufficient importance that it should have been included in an adequate environmental assessment for the C&H hog farm.

Aley goes on later to say:

Based on the resources at risk, an Environmental Risk Policy with a total payout limited to $50 million would be reasonable. This is part of the cost of doing risky operations in areas with extremely valuable resources.

As the river provided $56+ million in economic benefits to gateway communities (per National Park Service, 2014), $50 million in insurance would not be enough. Who would pay? The corporate integrator would separate themselves from liability via the fact that it is a contract operation. The C&H Farm itself would not have the resources and would declare bankruptcy. Tourism operators would ask for economic relief. In the end it would be the *Arkansas Taxpayer*. The EA does not discuss this from a genuine risk perspective.