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Verbal Comment Written Comment
Speaker # (Attached or back of card)

Hearing Location JARVIS

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My name is Jim Westbrook, PO 292 Jasper. I'm a board member of the Buffalo River Watershed Alliance. I have some prepared information to follow what's been prepared previously. The extent of the subsurface investigations and the nature of on-site materials used for the liners of the waste ponds might have been adequate for a minor facility in a rural area where the values of off-site resources were minimal. They are not adequate in view of the potential to adversely affect waters of the Buffalo National River. Electrical resistivity tomography tests conducted by Oklahoma State University revealed epikarst features on spray fields. No geophysical studies or related investigations were conducted to delineate any karst features, subsidence and/or sinkholes under the waste lagoons. The Boone-St. Joe is a karst hydrostratigraphic unit that is permeated with conduits, epikarst and other enhanced solution features. In other words, there's holes all over the place. It's Swiss cheese. Newton County has more caves which only form in limestone and dolomite than any other county in Arkansas. To our knowledge, retrofitting of liners in existing CAFO ponds has never been tried in Arkansas. This major modification is experimental in nature and poses several unknown risks in the fragile geologic environment. C&H's waste storage ponds have been used for manure storage for over two years and this use has likely destabilized the underlying geologic residuum. Further disturbance during construction may lead to further contamination of groundwater as well as destabilization capture of gases under the liner which could be a problem and result in professional negligence if failure occurs. 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. This is increasing the potential for leakage during the cycle of filling and emptying the ponds. An EPA inspection conducted April 15 to 17, 2014 found that the upper edge of the clay liner was protected by erosion control fabric but did not indicate any effort to prevent liner cracking. Retrofitting synthetic liners in existing waste storage ponds at the C&H facility is complex and technically demanding. All seams must be carefully sealed and tested and there must be no organic matter decomposing under the liner as a gas bubble would cause the liner to float leading to possible seam failure. No provision for incorporating leak detection technology has been included in the design. Significant design defects at C&H's waste storage ponds were overlooked in C&H's permitting process initially. Both ponds are situated on the side of a steep slope and the second pond in the two pond system has no stabilized emergency outlet. If the pond were to overtop the embankment due to a large 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. In light of expected climatic instability the 25-year, 24-year storm that the ponds are designed to withstand is projected to occur more frequently, about every 4 to 15 years and a similar increase in frequency is expected for 50 and 100 year storm events. C&H has been allowed to operate with as much as 500 gal per day leakage of waste from the waste storage ponds. Considering the cherty soils and karstic nature of the limestone bedrock, this leakage could be funneled directly into the river by means of surface and of course Big Creek. Despite the fact that C&H and ADEQ have repeatedly stated that the ponds were overbuilt and state of the art, the Big Creek Research and Extension Team's own Peer Review Panel recognized leakage from the two outside waste storage ponds as major potential treat to water quality associated with C&H Farms. The research team dug an interceptor trench to address pond leakage concerns. I appreciate very much the chance to speak on behalf of the Board of the Buffalo River Watershed Alliance.

Jack Stewart v.P. BRWA
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Buffalo River Watershed Alliance

Comments for ADEQ Public Hearing September 29, 2015

Re: C & H Modification Request to Install Pond Liners, Flare and Cover

The Buffalo River Watershed Alliance (BRWA) is grateful for the opportunity to present public comments on this proposed major modification. It should be noted that BRWA first requested this public hearing on July 17, 2015, during the designated comment period. C&H has requested numerous modifications, all of which included public hearings, yet this one, arguably the most significant to date, did not offer a public hearing. It was not until the comment period was closed and an official draft decision to approve this modification had already been reached that our request was finally approved. We are a bit perplexed as to why a public hearing would be held, at taxpayers' expense, if a decision has already been made. Nevertheless, please accept our comments for the record.

Please note the Alliance has submitted full statements to you from the following experts at the recent APC&E Commission meeting. BRWA references these statements today not to prove the inadequacies of the EA but rather to illustrate the critical points made by these experts that are relevant to ADEQ's review of this modification request:

- Dr. John Van Brahana, Ph.D., Professor Emeritus, Geosciences, University of Arkansas (statement attached as Exhibit 1)
- Dr. JoAnn Burkholder, Ph.D., William Neal Reynolds Distinguished Professor and Director of Center For Applied Aquatic Ecology, North Carolina State University (statement attached as Exhibit 2)
- James Gore, M.S. Candidate, Arkansas State University (report attached as Exhibit 3)
- Dr. Michael Smolens, Ph.D., retired Professor, Biosystems and Agricultural Engineering, Oklahoma State University (statement attached as Exhibit 4)
- Dr. Steve Wing, Ph.D., Associate Professor, Epidemiology, University of North Carolina Gillings School of Global Public Health (declaration attached as Exhibit 5)
- Tom Aley, President and Senior Hydrogeologist at the Ozark Underground Laboratory, Inc. (statement attached as Exhibit 6)

On May 7, 2015, C & H Hog Facility submitted a Major Modification Request to the Arkansas Department of Environmental Quality (ADEQ) to install 60 mil High Density Polyethylene (HDPE) liners over a geotextile material in the base of both waste ponds and to install an 80 mil polyethylene cover and methane flare system over Pond 1, noting that these modifications would reduce the potential for seepage of wastes into groundwater.

Analysis of the data from the Big Creek Research and Extension Team (BCRET) indicates the ponds are already contaminating groundwater, including the house well, interceptor trench, and ephemeral streams. BRWA contends that adding polyethylene liners on an area where, to date, no studies or related investigations have been conducted to delineate any karst features, subsidence and/or sinkholes is technically inappropriate. Unless and until a thorough subsurface investigation is done to ascertain what lies beneath the waste storage ponds at C & H Facility, conducted by independent experts with substantial experience dealing with karst within Arkansas and nationally, for example, Tom Aley and John Van Brahana, BRWA respectfully asks ADEQ to deny the request to install pond liners.

The following are our specific concerns:

- The evidence that the Boone Formation is a mantled karst has been well-established in the geologic literature. (See Brahana at pg. 2)
- Areas of karst are characterized by rapid groundwater flows through underground conduits and seamless interaction between surface and groundwater, as well as springs (i.e., release of groundwater at the surface of the land), sinkholes, sinking streams, and caves.
- Adding Polyethylene liners on a flawed design will not stop seepage in karst geology, or any type of geology. Photograph from ADEQ's July 2013 inspection report clearly displays large and small rocks, some sharp and angular, along with desiccation cracks incorporated in the liner. The interbedded rocks in the liner should have been separated prior to compacting them into the liner. This is standard operating procedure for the installation of a clay liner. There is no way the liner can meet design specifications of .0000001 cm/sec with rocks integrated into the initial liner.
- Adding Polyethylene pond liners overlying an area where typical solution features such as conduits and epikarst features in the Boone-St. Joe Formation which enhance groundwater flow velocities and directions that have been delineated in surrounding spreading fields through geophysical methodology is technically inappropriate.
- Three shallow six inch outside diameter borings completed in the regolith (i.e. vadose zone) prior to pond construction to ascertain geotechnical soil properties for construction of the two waste lagoons was thoroughly inadequate to delineate any karst features.
- The extent of the subsurface investigations and the nature of the on-site materials used for the liners of the waste ponds might have been adequate for a minor facility in a rural area where the values of off-site resources were minimal, they are not adequate in view of the potential to adversely impact waters of the Buffalo National River. (See Aley at pg. 8)
- Electrical Resistivity Tomography tests conducted by Oklahoma State University revealed epikarst features on spray fields. No geophysical studies or related investigations were conducted to delineate any karst features, subsidence and/or sinkholes under the waste lagoons. The Boone-St. Joe is a karst hydrostratigraphic unit that is permeated with conduits, epikarst and other enhanced solution features. Newton County has more caves, which only form in limestone and dolomite, than any other county in Arkansas.
- To our knowledge, retrofitting of liners in existing CAFO ponds has never been tried in Arkansas. This major modification is experimental in nature and poses several unknown risks in this fragile geologic environment.
- C & H's waste storage ponds have been used for manure storage for over two years and this use has likely destabilized the underlying geologic residuum. Further disturbance during construction may lead to further contamination of groundwater as well as destabilization, capture of gases under the liner, which would all could be a problem and result in professional negligence if failure occurs. (See Aley at pg. 12)
- 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 was protected by erosion control fabric, but did not indicate any effort to prevent liner cracking. (See Smolens at pg. 2)

- Retrofitting synthetic liners in existing waste storage ponds at the C & H facility is complex and technically demanding. All seams must be carefully sealed and tested, and there must be no organic matter decomposing under the liner as a gas bubble would cause the liner to float leading to possible seam failure. (See Smolens at pg. 2)
- No provision for incorporating leak detection technology has been included in the design.
- Significant design defects at C & H's waste storage ponds were overlooked in C & H's permitting process: both ponds are situated on the side of a steep slope, and the second pond in the two-pond system has no stabilized emergency outlet.
- If the pond were to overtop the embankment due to a large 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. (See Smolens at pg. 2)
- In light of expected climatic instability, the 25-year, 24-hour storm that the ponds are designed to withstand is projected to occur more frequently, about every 4 to 15 years, and a similar increase in frequency is expected for 50 and 100 year storms events. (See Burkholder at pg. 18)
- C & H has been allowed to operate with as much as 5,000 gal/acre per day leakage of waste from the waste storage ponds. Considering the cherty soils and karstic nature of the limestone bedrock, this leakage could be funneled directly into the river. (See Smolens at pg. 4)
- Despite the fact that C & H, Cargill and ADEQ have repeatedly stated that the ponds were overbuilt and state of the art, the Big Creek Research and Extension Team's own Peer Review Panel recognized leakage from the two onsite waste storage ponds as major potential threat to water quality associated with C & H Farms. The research team dug an interceptor trench to address pond leakage concerns.
- The data for Interceptor Trench 1 (South) are compiled from three BCRET quarterly progress reports dated October 1 to December 31, 2014; January 1 to March 31, 2015; and April 1 to June 30, 2015. The data for Interceptor Trench 2 (North) are compiled from two BCRET quarterly progress reports dated October 1 to December 31, 2014; and April 1 to June 30, 2015. The numbers are at excessive levels indicating pollution from the C & H CAFO waste holding pond. The project team implausibly has alluded to wildlife such as a bobcat as having contributed the total coliforms, but the consistently high nitrate instead indicates leakage from the waste holding pond. (See Burkholder at pg. 21-22)
- BCRET data from C & H's house well show that the well water is unsafe for human or animal consumption unless treated, as indicated by 1 or more total coliform bacteria or

Escherichia coli bacteria detected. The water also has commonly contained substantial densities of coliform bacteria, including Escherichia coli (see the April 1 to June 30, 2015 BCRET quarterly progress report). (See Burkholder at pg. 22)

- The BCRET reports offer no information about the potential for sources other than the C & H CAFO that could contribute to the contamination of the well water. The close proximity of the well to the animal holding units and the swine waste holding ponds, considered together with the data showing high leakage of the waste holding ponds, indicate that the C & H CAFO is a major contaminant source. (See Burkholder at pg. 23)
- With regard to the request to install flare to control odors- Though the housing yard and manure storage pits at CAFOs contribute to odor and air impacts, the vast majority of CAFO air emissions are associated with land application of waste. (Owen T. Carton & William L. Magette, Teagasc (Irish Agric. & Food Dev. Auth.), Land Spreading of Animal Manures, Farm Wastes & Non-Agricultural Organic Wastes, End of Project Report Part 1: Manure (and Other Organic Wastes) Management Guidelines for Intensive Agricultural Enterprises 3840 (1999), <http://goo.gl/7kJmjE>.)
- The odors and air pollutants emitted by swine CAFOs have deleterious effects on the health and wellbeing of surrounding communities. Liquid contaminants from hog CAFOs are released to the environment through leakage from animal waste pits, runoff from land application of liquid wastes, atmospheric deposition (e.g. through rainfall), and failure of the earthen walls of waste pits. Parasites, bacteria, viruses, nitrates, and other components of liquid hog CAFO waste pose threats to human health. 21 These findings are critical and must be considered, given the close proximity of the C & H facility to Mt. Judea K-12 School. (See Wing Declaration at pg. 4-5, and 10)

As the agency charged with protecting, enhancing, and restoring the environment for *all* Arkansans, we respectfully ask you to deny this permit modification with regard to C & H's waste storage ponds until a thorough karst investigation determines whether the geologic structure is suitable and stable for waste storage ponds and/or whether any contaminants have entered the groundwater below the ponds, Big Creek and the Buffalo River.

Per the Memorandum of Agreement between ADEQ and the University of Arkansas, the BCRET acts on your behalf. Please use your powers of regulation and enforcement to insure that our resources are properly protected, as you are obligated to do.