Heuser Public Comment Letter Tipton East CAFO
April 17, 2018

Mr. Greg Caldwell
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102

Dear Mr. Caldwell,

Thank you for the opportunity to provide a public comment on the proposed Tipton East Concentrated Animal Feeding Operation (CAFO). As a rural resident of Moniteau County, I am concerned about the targeting of Missouri by out-of-state corporations for animal factory installations, which, if permitted, increase the potential of environmental contamination and community health problems in the state. Swine waste contains numerous pollutants, which can enter the waters of the state through both land application and spills. A recent study showed that swine waste spills "can have unequivocal effects on microbiological and chemical water quality, are an underappreciated pathway for delivery of livestock-derived contaminants to streams, and have dramatic and persistent consequences (Haack 2015)."

The "export only" provision for swine waste management in the permit application exacerbates the pollution potential. It removes liability from the parent company for the waste, eliminates the Missouri Department of Natural Resources (MDNR) from approving the land application area, and makes use of MDNR's *Nutrient Management Technical Standard* voluntary. Each one of these items contributes to an increased potential for swine waste contamination. The price of pork for the consumer does not reflect the true costs associated with community health deterioration and environmental pollution that can result from CAFO contamination (Schmidt 2009).

Between 2005 and 2014 in Illinois, swine waste caused more pollution than any other industry. Half of the one million fish killed in water pollution incidents during that period were from swine waste and resulted in the impairment of 67 miles of the state's waters (Jackson 2016). I fear Missouri is next in line for such damage.

Swine Waste Contaminants

The National Association of Local Boards of Health believes the most pressing public health issue associated with CAFOs stems from the amount of manure they produce and the variety of potential contaminants in it (table below). Improperly managed, swine waste can result in numerous environmental and human health problems (Hribar 2010).

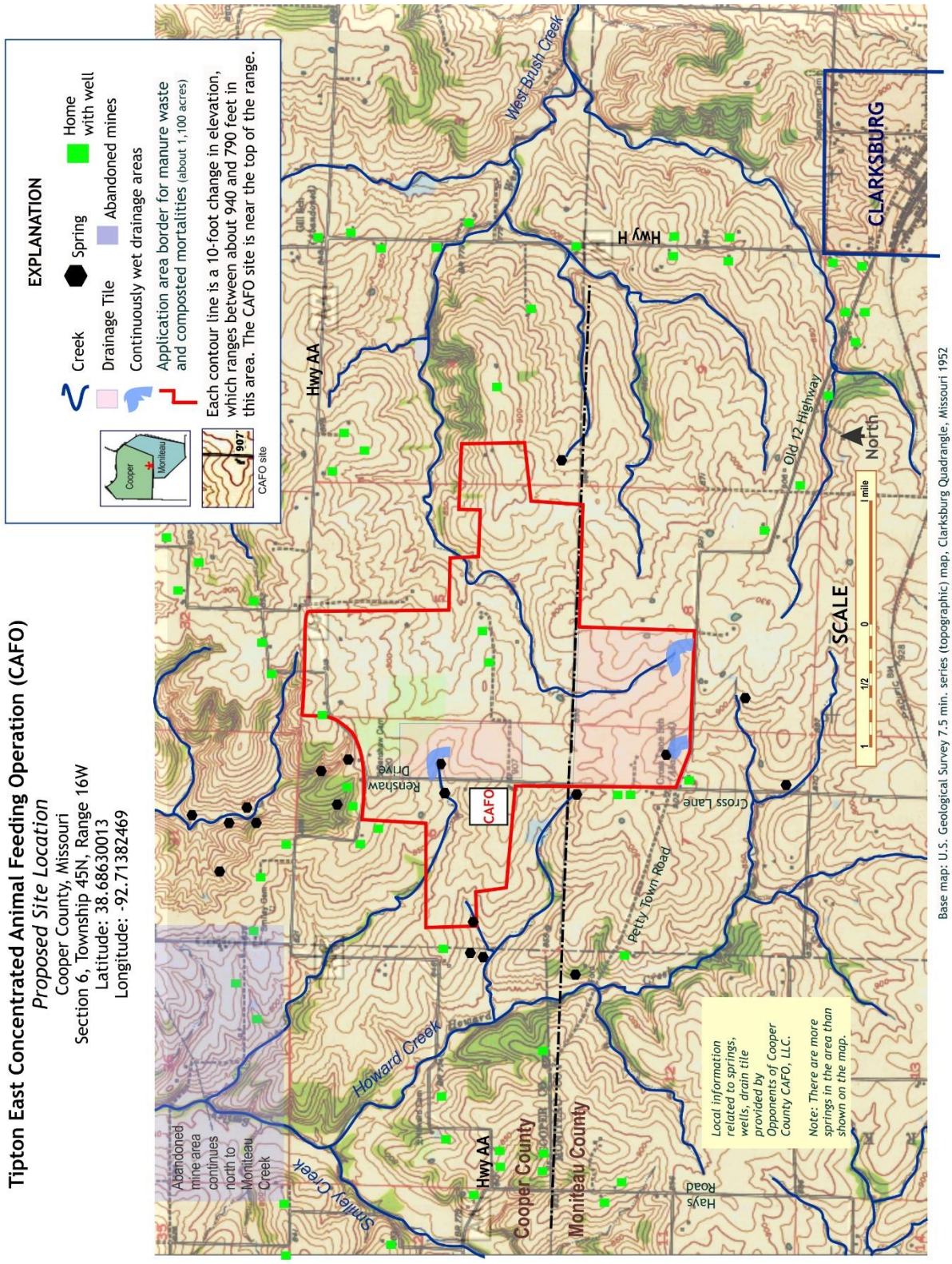
Key Pollutants from Livestock Operations and Animal Manure

(Conerly 2013)

Pollutant	Description of Pollutant	Pathways to the Environment	Potential Impacts
Nitrogen	Organic forms (e.g., urea) and inorganic forms (e.g., ammonium and nitrate) in manure may be assimilated by plants and algae.	• Overland discharge • Leachate into ground water • Atmospheric deposition as ammonia	• Eutrophication and harmful algal blooms (HABs) • Ammonia toxicity to aquatic life • Nitrate linked to methemoglobinemia
Phosphorus	As manure ages, phosphorus mineralizes to inorganic phosphate compounds that may be assimilated by plants.	• Overland discharge • Leachate into ground water (water soluble forms)	• Eutrophication and HABs
Potassium	Most potassium in manure is in an inorganic form available for plant assimilation; it can also be stored in soil for future plant uptake.	• Overland discharge • Leachate into ground water	• Increased salinity in surface water and ground water
Organic Compounds	Carbon-based compounds decomposed by micro-organisms. Creates biochemical oxygen demand because decomposition consumes dissolved oxygen in the water.	• Overland discharge	• Eutrophication and HABs • Dissolved oxygen depletion, and potentially anoxia • Decreased aquatic biodiversity
Solids	Includes manure, feed, bedding, hair, feathers, and dead livestock.	• Overland discharge • Atmospheric deposition	• Turbidity • Siltation
Salts	Includes cations (sodium, potassium, calcium, magnesium) and anions (chloride, sulfate, bicarbonate, carbonate, nitrate).	• Overland discharge • Leachate into ground water	• Reduction in aquatic life • Increased soil salinity • Increased drinking water treatment costs
Trace Elements	Includes feed additives (arsenic, copper, selenium, zinc, cadmium), trace metals (molybdenum, nickel, lead, iron, manganese, aluminum), and pesticide ingredients (boron).	• Overland discharge • Leachate into ground water	• Aquatic toxicity at elevated concentrations
Volatile Compounds Including Greenhouse Gases	Includes carbon dioxide, methane, nitrous oxide, hydrogen sulfide, and ammonia gases generated during manure decomposition.	• Inhalation • Atmospheric deposition of ammonia	• Eutrophication • Human health effects • Climate change
Pathogens	Includes a range of disease-causing organisms, including bacteria, viruses, protozoa, fungi, prions and helminths.	• Overland discharge • Potential growth in receiving waters	• Animal, human health effects
Antimicrobials	Includes antibiotics and vaccines used for therapeutic and growth promotion purposes.	• Overland discharge • Leachate into ground water • Atmospheric deposition	• Facilitates the growth of antimicrobial-resistance • Unknown human health and aquatic life effects
Hormones	Includes natural and synthetic hormones used to promote animal growth and control reproductive cycles.	• Overland discharge • Leachate into ground water	• Endocrine disruption in fish • Unknown human health effects
Other Pollutants	Includes pesticides, soaps, and disinfectants.	• Overland discharge • Leachate into ground water	• Unknown human health and ecological effects • Potential endocrine disruption in aquatic organisms

Adapted from USEPA (2002a) Exhibit 2-2.

Proposed Tipton Site CAFO Site Location (described on page 4)



Location Inappropriate for CAFO

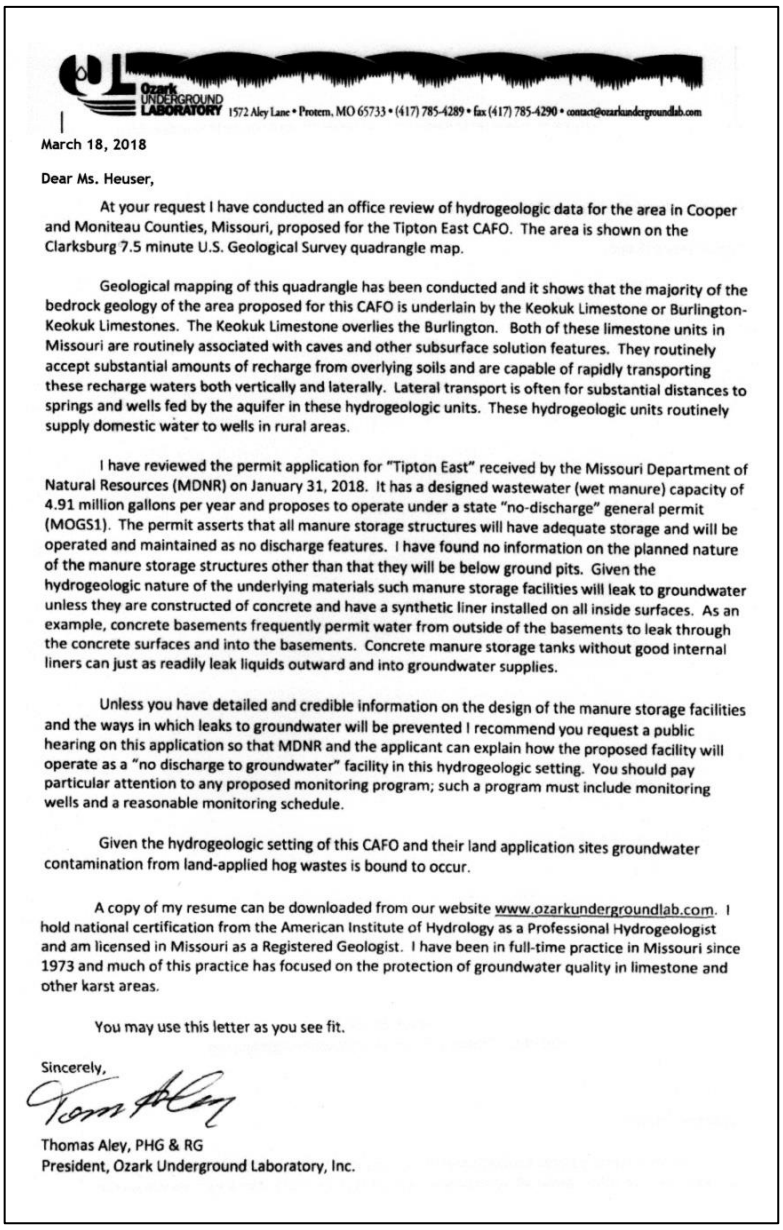
The CAFO site location map on page 3 shows springs, homes with wells for drinking water, and the headwaters of creeks including Howard, Smiley, and West Brush, which flow north to Moniteau Creek. These streams are all located in the Moniteau Creek Watershed, which flows into the Missouri River, a major drinking water source in the state. The quality of the water in the watershed is good enough to provide one of only two habitats remaining in Missouri for the endangered Topeka shiner (Harrington 2018).

The map also shows an estimated swine waste application area. Since the CAFO permit application does not designate where this location will be, the local residents estimated the area by identifying which farmers had signed an agreement with the company to acquire the swine waste (Fennewald 2018).

Thomas Aley, a professional hydrogeologist, provided an office review of the area's hydrogeological data, using the "estimated" land application area (box to right). In the review, he stated the area "has bedrock geology underlain by the Keokuk and Burlington Keokuk limestones, which are routinely associated with caves and other subsurface solution features (Aley 2018)."

Contaminants entering through sinkholes and springs in this karst bedrock can travel one-mile a day compared to a few feet per year in non-karst areas. Travel time is exceptionally variable, which is one reason when groundwater is contaminated, cleanup is slow, difficult, expensive, and seldom totally successful (Aley 2010). Areas within the estimated 1,100-acre swine waste application area have numerous continuously-wet and drainage-tile areas, which can accelerate and funnel contaminant-surface runoff west to Howard Creek, east to West Brush Creek, and into the groundwater (Fleming 2002).

Tom Aley stated in his letter, "Given the hydrogeologic setting of this CAFO and their land application sites, groundwater contamination from land-applied hog wastes is bound to occur."



Ozark Underground Laboratory 1572 Aley Lane • Protem, MO 65733 • (417) 785-4289 • fax (417) 785-4290 • contact@ozarkundergroundlab.com

March 18, 2018

Dear Ms. Heuser,

At your request I have conducted an office review of hydrogeologic data for the area in Cooper and Moniteau Counties, Missouri, proposed for the Tipton East CAFO. The area is shown on the Clarksburg 7.5 minute U.S. Geological Survey quadrangle map.

Geological mapping of this quadrangle has been conducted and it shows that the majority of the bedrock geology of the area proposed for this CAFO is underlain by the Keokuk Limestone or Burlington-Keokuk Limestones. The Keokuk Limestone overlies the Burlington. Both of these limestone units in Missouri are routinely associated with caves and other subsurface solution features. They routinely accept substantial amounts of recharge from overlying soils and are capable of rapidly transporting these recharge waters both vertically and laterally. Lateral transport is often for substantial distances to springs and wells fed by the aquifer in these hydrogeologic units. These hydrogeologic units routinely supply domestic water to wells in rural areas.

I have reviewed the permit application for "Tipton East" received by the Missouri Department of Natural Resources (MDNR) on January 31, 2018. It has a designed wastewater (wet manure) capacity of 4.91 million gallons per year and proposes to operate under a state "no-discharge" general permit (MOGS1). The permit asserts that all manure storage structures will have adequate storage and will be operated and maintained as no discharge features. I have found no information on the planned nature of the manure storage structures other than that they will be below ground pits. Given the hydrogeologic nature of the underlying materials such manure storage facilities will leak to groundwater unless they are constructed of concrete and have a synthetic liner installed on all inside surfaces. As an example, concrete basements frequently permit water from outside of the basements to leak through the concrete surfaces and into the basements. Concrete manure storage tanks without good internal liners can just as readily leak liquids outward and into groundwater supplies.

Unless you have detailed and credible information on the design of the manure storage facilities and the ways in which leaks to groundwater will be prevented I recommend you request a public hearing on this application so that MDNR and the applicant can explain how the proposed facility will operate as a "no discharge to groundwater" facility in this hydrogeologic setting. You should pay particular attention to any proposed monitoring program; such a program must include monitoring wells and a reasonable monitoring schedule.

Given the hydrogeologic setting of this CAFO and their land application sites groundwater contamination from land-applied hog wastes is bound to occur.

A copy of my resume can be downloaded from our website www.ozarkundergroundlab.com. I hold national certification from the American Institute of Hydrology as a Professional Hydrogeologist and am licensed in Missouri as a Registered Geologist. I have been in full-time practice in Missouri since 1973 and much of this practice has focused on the protection of groundwater quality in limestone and other karst areas.

You may use this letter as you see fit.

Sincerely,

Tom Aley

Thomas Aley, PHG & RG
President, Ozark Underground Laboratory, Inc.

Permit Application Questions

In addition to the lack of specific location information for the swine waste application area, the permit application for the Tipton East CAFO leaves numerous questions unanswered:

- Why is the facility classified as "No Discharge"[A] when the drag-line, which will pump swine waste from the storage pits to the land, is an obvious "discernible, confined and discrete conveyance," or "source-point" of pollution, which requires a National Pollutant Discharge Elimination System (NPDES) permit?
- Where is the definition for "agricultural stormwater" in the state statutes or rules?
- Why is there no hazardous waste spill plan when there are certainly enough hazardous materials used in these buildings to require a plan for emergencies?
- What is the connection between the Pinnacle Group in Iowa Falls, IA and PVC Management II, LLC?
- Why did the Pinnacle Group: 1) provide inaccurate information in the *Landowner Notice Letter* dated January 8, 2018, which stated, "The site will consist of three buildings, all of which have below building manure storage pits" when the Farrowing building does not have a pit, but drains into the Gestation structure, and 2) mislead the neighbors in the Letter by omitting mention of the Mortality Composting Facility?
- Shouldn't the underground pits have a liner to compensate for their siting on Clafork soil, which has a "severe" problem with shrink-swell and wetness in buildings, especially those with basements as defined in the 1998 USDA Soil Survey? Tom Aley suggested in his review that such a liner is needed to protect groundwater resources from contamination. (Aley 2018)
- Why is the company building swine waste storage capacity for 1,149,892 cubic feet when their needs for the required 365 days of storage are only 656,700 cubic feet?
- Will any of the pathogens in the swine waste stored in the pits be destroyed prior to land application or will it be considered, for all intents and purposes, untreated?
- What is the management plan for the human waste generated from toilets, showers, etc. in this facility?

(Pathogen chart on right from Conerly 2013)

Selected Key Pathogens Associated with Livestock

Pathogen	Cattle	Poultry	Swine
E. coli O157:H7	X		X
Salmonella spp.	X	X	X
Campylobacter spp.	X	X	X
Yersinia entercolitica			X
Listeria spp.			X
Cryptosporidium parvum	X		
Giardia lamblia	X		X
Rotavirus	X		X
Norovirus	X		X
Hepatitis E virus			X

[A] 10 CSR 20-6.300(1)(B)15. A CAFO is considered no-discharge if the operation is designed, constructed, operated, and maintained in a manner such that the CAFO will not discharge to wasters of the state. A discharge of agricultural storm water is a non-point source and therefore not included within this definition.

"Export Only" Waste Management Inadequate

It is my understanding that the "export only" waste management system relieves PVC Management II, LLC of responsibility and liability for its waste. Instead, an applicator is hired to apply the waste to the land, and a nearby farmer(s) accepts the waste for his or her land. The company is not required to: 1) include its *Nutrient Management Plan* in the application, and, 2) comply with a waste management system that requires use of MDNR's *Nutrient Management Technical Standard* (NMTS).[B] The company's only responsibilities for the waste are to: 1) maintain records of the date and amount of swine waste that leaves the facility and the name and address of the receiving farmer, and, 2) provide the farmer an annual nutrient analysis of the swine waste and a copy of the NMTS, though the farmer is <u>not</u> required to follow these standards.

- Where in the state statutes or code of regulations is the concept of an "export only" waste management system defined or explained?
- Why is the NMTS not required to be used with "export only"?
- Will the local residents have access to information about where land application is occurring?
- Who <u>specifically</u> is liable for pollution resulting from the swine waste: the Pinnacle Group, PVC Management II, LLC, the unidentified land applicator, the farmer who uses it, or some other entity?
- Why do non-"export only" facilities require training and certification of land application operators, while training certification is not required for the applicators and recipients in "export only"?
- What is the probability that the 3-mile long drag-line will rupture and spill? (Fennewald 2018)
- How will the drag-ling maneuver over roads, other people's property, and land that has a variation of 150-feet in topography with steep slopes near the streams.
- Doesn't the land application method of knifing the waste into the soil, which blocks sunlight from destroying pathogens, exacerbate the pathogen risk to the environment, especially with how long pathogens can live in manure (table on right)?
- Isn't there a problem with overwhelming the absorptive capacity of the soil by land applying five million gallons of unprocessed waste to 1,100 acres year after year?

Survival of Selected Bacterial and Parasitic Pathogens found in Manure, Soil, and Water
(Conery 2013)

Pathogen	Survival (days)*		
	Soil	Water	Manure
Bacteria			
Salmonella spp.	16 - 196	35 to >186	20 to 250
E. coli 0157:H7	2 to >300	35 to >300	50 to >300
Campylobacter sp.	7 to 56	2 to >60	1 to 56
Yersinia enterocolitica	10 to >365	6 to 448	10 to >365
Listeria sp.	<120	7 to >60	>240
Protozoa			
Cryptosporidium spp.	28 to >365	70 to >450	28 to >400
Giardia	< 1 to 28	< 1 to 77	< 1 to 77

**The range shows the shortest and the longest survival time the organisms can survive at different temperatures for all types of manure (cattle, swine and poultry) and water (surface, ground, and drinking water). References: Rogers and Haines 2005, and Bowman 2009.*

[B] The *Nutrient Management Technical Standard* (NMTS) provides guidance on land applying the nutrients, such as nitrogen and phosphorous, in the proper balance to reduce contamination from their under-or over-application. It also provides many set-back requirements around streams, sink holes, wells, etc., designed to help protect the waters of the state from contamination.

Permit Denial Request

The MDNR is unable to provide Missouri citizens with protection from potential contamination from CAFOs prior to its occurrence. After pollution occurs, MDNR can conduct an enforcement action. This backwards method of water protection makes me agree with the evaluation of hydrogeologist Tom Aley that there is more than a reasonable certainty the swine waste from the Tipton East CAFO will contaminate the waters of the state, an unlawful act in RSMo 644.051.1(1).

This pollution is likely to occur through mismanagement of the "export-only" waste system combined with the myriad of water contaminants in the swine waste and the inappropriate location for both the facility and the land application area. Therefore, I request the denial of the permit application for the proposed Tipton East CAFO.

Should this petition fail and MDNR issues the permit, it is imperative that a groundwater monitoring program be established based on a geohydrological evaluation. The potential to contaminate a drinking water aquifer due to soil permeability, bedrock, distance to aquifer, etc. makes monitoring a necessity as defined in 10 CSR 20-8.300(12). This action might provide some assurance to the area residents and other Missouri citizens concerned about the CAFO contaminating surface water and groundwater.

Thank you for considering my suggestions. Jeanne Heuser, Jamestown, Missouri

Works Cited

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