Koon, Nancy

From: Meredith Hawkins <merehawkins22@gmail.com>
Sent: Tuesday, April 5, 2022 4:29 PM
To: Water Draft Permit Comment
Cc: Chris Centofante
Subject: Fwd: Discharge Permit Number AR0053210, AFIN 60-0510

RE: Discharge Permit Number AR0053210, AFIN 60-0510
Paradise Valley sewage treatment facility on Roland Cutoff Road, Roland, AR

Dear Mr. Khan,

Please DENY the above referenced sewage treatment facility and hold a public hearing on the issues.

I have great concern about a sewage treatment facility being permitted on Mill Bayou in Pulaski County. Mill Bayou is often stagnant with very little flow. Pools of water remain in low areas, which can promote growth of algae blooms and cause the water to become toxic. The addition of a sewage treatment facility could potentially add to this problem and cause irreversible environmental harm in several other ways. The continuous rise and fall of waterways can create more pools of water with lethal levels of nitrogen and phosphorus.

This lethal combination depletes the oxygen level of the water, killing fish, other aquatic animals, and plant life. When these pools of water are dispersed due to flooding, the pollutants are spread to other areas causing a potential increase in contaminated areas. The process of a sewage treatment facility would also contribute additional chemicals such as chlorine and release suspended fecal solids to the waterway multiplying the health risk.

Contaminated water can create a domino effect. Birds, ducks, pets, livestock, and wildlife could drink the toxic water or eat the poisoned fish or plant life. Hunters and fishermen could unknowingly feed tainted game or fish to their families which could cause life threatening health issues.

The Arkansas Department of Health (ADH) conducts site inspections as part of the review process. These inspections identify potentially adverse public health impacts that might occur as a result of the treated sewage. Has this been done? Clearly defined receiving streams should be utilized. This tributary is an intermittent first-order stream and the smallest of the world's streams with little to no flowing water. Hazardous sewage and algae blooms will sit until the next storm. This is the equivalent of fitting a square peg into a round hole. Such an inappropriate and irresponsible placement of a sewage facility if ever there was one! The developer has other (much more responsible) options available! Why force this option?

Arkansas Energy & Environment has a management plan in place for Arkansas State Waters. It is called the 'Harmful Algal Bloom Management Plan.' The information below is taken from their website.

*One of the most problematic consequences of eutrophication is algal blooms, particularly cyanobacterial blooms, also known as harmful algal blooms (HABs) or "CyanoHABs." Although categorized as an algal bloom, cyanobacteria are actually plant-like bacteria that have the ability to photosynthesize. It can be difficult to visually distinguish true algae from cyanobacteria. In many cases, especially in lentic (slow or non-flowing) systems, cyanobacteria tend to be planktonic or suspended in the water column. However, there are some species of cyanobacteria that form filamentous mats. Although similar in appearance to true algae, one of the major distinctions is that cyanobacteria have the ability to produce toxic substances that can be harmful to wildlife, livestock, pets, and humans.

Cyanobacteria can be found in all water bodies to some extent; they are often part of the native flora. During certain conditions, cyanobacterial growth may increase drastically into a cyanoHAB. It is generally accepted that cyanoHABs are formed during periods of high temperatures and in water bodies that contain, have historically contained, and/or are receiving high nutrient loads (nitrogen and phosphorus, specifically). It is not understood how or under what specific conditions cyanoHABs produce toxins, and it is common for cyanobacterial blooms to occur with minimal to no detectable toxins.
Unfortunately, whether a bloom is toxic or not can only be determined by laboratory analysis or specialized field equipment. If you suspect that a water body is experiencing a cyanobacterial bloom, contact the Arkansas Division of Environmental Quality (DEQ), Arkansas Department of Health (ADH), Arkansas Water Resources Center (AWRC) or the local lake manager and avoid making contact with the water.

GRAND LAKE, OKLAHOMA (2011): High toxin levels led to a swimming advisory on Grand Lake at the height of a busy tourist season. Several people reported cyanoHAB-related illnesses to the Oklahoma State Department of Health. Toxin concentrations were 18 times greater than safe levels suggested by the World Health Organization (Grand Lake and harmful algal blooms – 2011, 2012).

TOLEDO, OHIO (2014): Lake Erie has become notorious for its nearly annual cyanoHABs, particularly in the western basin. The primary cause of blooms has been traced to dissolved phosphorus from surrounding watersheds. Toxins were so high in August 2014 that city officials banned use of city water, including bathing. The event affected 500,000 people and became so bad that the National Guard and the American Red Cross were brought in to manage water distribution centers after all bottled water in the city sold out (Wines, 2014). The economy was severely impacted both directly and indirectly as businesses and public services were temporarily closed. (Ho & Michalak, 2015).

CYANOBACTERIA

In most cases, freshwater harmful algal blooms come about by a dominance of a cyanobacterial species. There are several physiological adaptations of cyanobacteria that allow them to out compete other groups of non-toxin-forming algae. Some species of cyanobacteria contain specialized nitrogen-fixing cells called heterocysts. These cells allow for extraction of atmospheric nitrogen, which can be converted to usable forms, potentially reducing nitrogen limitation and increasing phosphorus limitation.

Many cyanobacteria contain gas vacuoles, which enable them to control their buoyancy throughout the water column. In the summer, it's typical for lakes in Arkansas to stratify or form layers of dissolved oxygen and temperature. For most algae, movement is restricted to currents and wind or density and temperature gradients. However, cyanobacteria with gas vacuoles can selectively float to the surface for more access to sunlight, thereby shading out competing species.

Despite these adaptations for establishing dominance, there are plenty of circumstances where algal blooms may consist of non-cyanobacterial species. Flowing waters are more prone to what is often referred to as "Nuisance Algae Blooms" (NABs), which are typically composed of non-toxin-forming filamentous green algae that can attach to substrata. Historically, flowing waters were thought to have less ideal conditions for cyanobacterial blooms, although many recent instances of riverine and benthic cyanoHABs have been identified and have resulted in illness and death in dogs.
Literature is not as extensive for benthic cyanobacteria, but researchers have been increasingly studying these kinds of cyanoHABs. Some of the most commonly implicated species of benthic cyanoHABs include Microseira spp. (formerly Lyngbya spp.) Cylindrospermum spp., Pseudanbaena spp., Geitlerinema spp., Phormidium spp., Tricholeus spp., and Microcoleus spp., which may appear as filamentous mats or slimes.

CYANOBACTERIAL TOXINS

Cyanotoxins will typically affect the nervous system (neurotoxins), skin (dermatoxins), or the liver (hepatotoxins). Several cyanotoxins have been isolated, and some of the more commonly known toxins include:
• Saxitoxin • Anatoxin • Lyngbyatoxin • Microcystin • Cylindrospermopsin

ANATOXIN

Anatoxin exposure routes include direct ingestion or consumption of contaminated water or food, bathing in contaminated water and inhalation. Anatoxins are neurotoxins that are considered highly toxic, although they are not found in the environment as frequently as other toxins. Anatoxins have resulted in rapid death in laboratory mice, but a lethal dose has not been identified in humans (EPA, 2015).

Human illness and multiple cases of wildlife and livestock death have been a result of anatoxin poisoning. Anatoxin was implicated in one human death after ingestion of lake water containing a bloom of Anabaena flos-aquae, but was never officially diagnosed (van der Merwe, 2015). Symptoms of anatoxin poisoning include loss of coordination, muscle twitching, convulsions, and respiratory failure.

LYNGBYATOXIN

Lyngbyatoxin is a dermotoxin produced by one of the few species of filamentous, macroalgal cyanobacteria, Lyngbya (now Microseira and Moorea) (see page 9). Typically referred to as "swimmers itch," lyngbyatoxin has been primarily associated with dermal affects. Consumption of contaminated meat has also led to gastrointestinal distress and common symptoms of food poisoning.
Recently, lyngbyatoxin has been identified as a tumor producer, which may make chronic exposure more of a concern for this toxin. (Jiang et al., 2014

MICROCYSTIN

One of the more intensively studied cyanotoxins is microcystin, a hepatotoxin. According to the Environmental Protection Agency's (EPA) National Lakes Assessments conducted in 2007 and 2012, microcystin was detected in 32 and 39 percent of lakes sampled, respectively (D'Anglada, 2016).

Microcystin binds primarily to proteins in the liver, but has also demonstrated negative kidney and reproductive effects (EPA, 2015b). Exposure is generally by ingestion. Symptoms of microcystin poisoning include headache, sore throat, vomiting, nausea, stomach pain, and liver failure. There have been numerous incidences of livestock and wildlife deaths as a result of consuming microcystin-contaminated water (CEPA, 2009).

Fifty-two human fatalities in Caruaru, Brazil resulting from liver failure have also been linked to microcystin-contaminated water used for dialysis (Azevedo, et al., 2002). In 2015, EPA released 10-day health advisories for microcystin in drinking water (Table 1). In June 2019, EPA released recommended criteria for recreational waters (Table 2).

CYLINDROSPERMOPSIN

Much like microcystin, many laboratory and field studies have focused on the toxicity of the hepatotoxin, cylindrospermopsin. Symptoms and effects of cylindrospermopsin are also similar in that the most heavily affected organs are the liver and kidneys, but absorption has also been witnessed in the spleen (EPA, 2015c).

Symptoms of cylindrospermopsin poisoning include fever, headache, vomiting, bloody diarrhea, an enlarged liver, and kidney damage. Exposure pathways consist of consumption of contaminated drinking water or food, dermal contact and inhalation.
In 2015, EPA released 10-day health advisories for cylindrospermopsin in drinking water (Table 1). In June 2019, EPA released recommended criteria for recreational waters (Table 2).

AVOIDING EXPOSURE

If you suspect that a water body is experiencing a harmful algal bloom, it is best to avoid contact. Generally, children are considered a more sensitive population given lower body weights on average and a higher rate of recreational exposure to water. Skin contact with harmful algal blooms can cause skin irritation along with irritation to mucous membranes, such as the eyes, nose, or throat. Incidental ingestion in children has been estimated at around 128ml (or 1 /2 cup) per hour. Rate of ingestion in children is about 4 times greater than adults (Dufour et al., 2017).

In many cases, cyanobacterial blooms will form scums that can concentrate along the shoreline where exposure is more common. Some of the symptoms experienced after ingestion of cyanotoxins include: • Headaches • Weakness • Shortness of breath • Vomiting • Diarrhea • Liver damage • Kidney damage • Abdominal pain

Another population that may arguably be the most susceptible to harmful algal bloom poisoning includes pets and livestock. Often, a contaminated water body may be the only water source available to the animal, especially in the case of livestock. Animals, such as dogs, are also likely to ingest toxins when cleaning their fur.

Operators of farms that contain livestock can work with their local University of Arkansas Cooperative Extension Service or Conservation District office to develop best management practices or plans for solutions such as alternative water sources for their animals. https://www.uaex.edu/counties/default.aspx https://aracd.org/default.htm.Citizens who are interested in long-term solutions to nutrient pollution in general are encouraged to work with the Arkansas Natural Resources Commission (ANRC), which oversees voluntary nonpoint management and pollution prevention in Arkansas. https://www.anrc.arkansas.gov/divisions/water-resources-management/arkansas nutrient-reduction-strategy/

PUBLIC EDUCATION

More than 1 million people per year visit some of the more popular reservoirs in Arkansas. Increased nutrient runoff and temperatures have been identified as contributors to an anticipated rise in harmful algal blooms. In order to protect public health and understand where and why these events occur, water resource managers rely on the public and local entities to report these occurrences. The HAB Workgroup recommends educating the public on site to prevent illness and increase reporting. It is recommended that water body managers place informational signs like the one found in Appendix 2 at boat ramps and swim beaches throughout the primary contact recreational season (May 1 – September 30) or whenever swimmers are present.

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Please Mr. Khan, we are counting on you and ADEQ to deny the WWTP permit. Do your due diligence for all Arkansas citizens who choose to reside in The Natural State. I appreciate your time and effort.

Sincerely,

Meredith Hawkins
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Roland, AR 72135