



May 2, 2022

Mr. Ramesh Ravella  
Division of Water Resources  
N.C. Department of Environmental Quality  
1636 Mail Service Center  
Raleigh, N.C. 27699-1636

**Re: Draft Swine Farm Digester General Permit**  
**Electronically accepted at: [PublicCommentsDWR@ncdenr.gov](mailto:PublicCommentsDWR@ncdenr.gov)**

Dear Mr. Ravella:

You have received sincere and significant comment from dozens of family farmers and other subject matter experts with credentials in technical specialties of environmental protection, nutrient and manure management, and engineering. They have provided helpful feedback and relevant information to ensure that DEQ helps North Carolina pig farmers continue to meet and exceed our shared responsibilities as outstanding environmental stewards while not being subjected to unnecessary burdens or undue cost under the forthcoming permit for farms with digester systems.

We share a common purpose of protecting the environment on and around our farms and in our communities. It is imperative that we have a regulatory framework that is reasonable and effective, not arbitrary or meaningless. You have heard farmers' voices throughout this process. And you have heard from experts who know how farms operate and perform. These North Carolinians have shared with you their knowledge and wisdom. They have names: Henry Faison, Lorenda Overman, Morris Murphy, Reggie Strickland, Marlowe Ivey, James Lamb, Chad Herring... and so many more. We ask that you give the oral and written comments from these farmers and experts the proper weight and credence they deserve.

Herein, we offer additional written comments on behalf of the thousands of family farmers, grain growers, veterinarians, nutritionists, livestock and feed haulers, processing plant team members and managers, equipment manufacturers and installers, grocers and retailers, restaurateurs, chefs and pit masters, and so

many other partners whose efforts produce beloved products and support more than 44,000 good jobs in communities across North Carolina. We are deeply committed to ensuring a sustainable pork industry. Indeed, the taxes, fees and economic activity generated by the state's profitable pork and pork processing sectors remains vital to the long-term success of North Carolina's economy and well-being, particularly in rural regions of the state. We value environmental stewardship as an inextricable part of that job.

## **I. Innovation and Continuous Improvement**

While no new farms have been opened since the moratorium, there have been significant changes and innovation in on-farm practices. A recent report by researchers at the University of Arkansas documented improvements in sustainability in the pork industry nationally and by farmers in North Carolina, who have demonstrated use of less water, less land and less energy in the production of pork products. In North Carolina, since 1980, our farmers are feeding a growing population while using 60.1 percent less land and 44.8 percent less water.<sup>1</sup>

Additional on-farm progress in innovation and practices have been substantial, and the regulatory framework has allowed for advances that no government agency could on its own dictate. For example, through selective breeding, pelletizing of feed, proper rationing, and other animal-care measures, the amount of feed used to produce a pound of gain has been dramatically reduced. Just three decades ago, prior to the current regulatory framework, roughly four pounds of feed were necessary to produce one pound of animal weight gain, with the difference factoring into manure output. Today, roughly 2.5 pounds of feed is used to generate one pound of gain, yielding a greater than 30 percent improvement in feed efficiency. This has led to a corresponding and substantial reduction in manure output from the animal. Separately, farming operations have – through the use of enzymes as well as age and sex-specific diets – substantially reduced output of phosphorous, a necessary component of feed, by as much as 50 percent.<sup>2</sup> Finally, the use of amino acids as a substitute for soybean meal has resulted in reductions in nitrogen in manure.

Pork producers have long embraced innovation and improvement in farming practices. In North Carolina, tens of millions of dollars have been invested in

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<sup>1</sup> Ben Putnam, Jacob Hickman, Prathamesh Bandekar, Marty Matlock and Greg Thoma, University of Arkansas, *A Retrospective Assessment of the U.S. Pork Industry, 1960 to 2015.* (July 7, 2018). Accessible at <https://bit.ly/2H1jja> and includes feed conversion data discussed on following page.

<sup>2</sup> See comments submitted to DEQ on the 2019 Swine General Permit by nutritionist Dr. Vernon Felts

evaluating emerging manure management technologies and innovative systems, with field trial projects built and tested on more than a dozen farms.

### **I(a). Benefits of Methane Digesters**

Renewable energy projects have been tested on swine farms in the state, and North Carolina producers are proud to be leading the nation in renewable sustainability approaches on the farm.<sup>3</sup> Such efforts continue as more farmers are lining up to add methane digesters to their manure management systems to capture greenhouse gases and utilize the renewable biogas as a power source.<sup>4</sup>

The benefits of methane digesters are well-documented. The North Carolina Clean Energy Technology Center highlighted these benefits in a March 2022 webinar.<sup>5</sup> Dr. Mahmoud Sharara, Assistant Professor and Extension Specialist at the NC State College of Biological and Agricultural Engineering, said RNG projects can reduce agriculture industry-based greenhouse gas emissions by capturing methane in an anaerobic digester.

“We really get a win-win related to anaerobic digestion because it accomplishes two goals – it reduces the greenhouse gas emissions from animal agriculture or waste management in general, but it also creates a renewable energy source,” he said. By avoiding “business-as-usual” disposal pathways in projects involving the anaerobic digestion of manure and organic wastes, RNG can achieve negative carbon footprints.

According to a recent report from North Carolina Agricultural and Technical State University, “Anaerobic digestion technology has been applied through the world. It has been shown to be an effective method to treat animal waste, while also producing biogas. This practice makes animal waste a renewable resource than can be used to produce energy for heat or electricity. It also contributes to the sustainability of livestock operations. The effluent that the anaerobic digestion process yields can be applied to cover crops that are grown to consume the excess nutrients from the previous harvest. This practice improves soil health for future crops and reduces the risks of nutrient loading and leaching into nearby water sources. The effluent can also be directly applied and incorporated into the soil.”<sup>6</sup>

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<sup>3</sup> See NC Pork Report, Winter 2017, accessed at [www.nxtbook.com/naylor/NCPQ/NCPQ0417/index.php#/0](http://www.nxtbook.com/naylor/NCPQ/NCPQ0417/index.php#/0), and also see NC Pork Report, Summer 2014, accessed at [www.nxtbook.com/naylor/NCPQ/NCPQ0214/index.php](http://www.nxtbook.com/naylor/NCPQ/NCPQ0214/index.php)

<sup>4</sup> Steven Mufson, Washington Post, *Companies launch plan to capture methane from hog manure lagoons*. (Nov. 27, 2018).

<sup>5</sup> [nccleantech.ncsu.edu/2022/03/30/renewable-natural-gas-a-primer-on-north-carolinas-biogas-resources](http://nccleantech.ncsu.edu/2022/03/30/renewable-natural-gas-a-primer-on-north-carolinas-biogas-resources)

<sup>6</sup> Nina Hollomon, Derrick J. Coble, *Lagoons and the Applications of Anaerobic Digestion in Renewable Energy and Sustainable Agriculture*. (April 26, 2022). On file at North Carolina Pork Council office.

Other benefits of methane digesters include lagoon covers that can reduce on-farm odors and minimize the potential for flooding during hurricanes and other severe weather events.

The U.S. Environmental Protection Agency's AgSTAR program, a partnership with the U.S. Department of Agriculture and the U.S. Department of Energy, highlights "odor reduction" as one of the primary benefits of biogas systems on livestock farms. On North Carolina farms that have installed lagoon covers, it's estimated that they block 85 percent of odor from the lagoons.

In addition, recent hurricanes (including Hurricane Matthew in 2016 and Hurricane Florence in 2018), raised concerns about the potential for flooding on hog farms. While North Carolina has closed hundreds of lagoons located in flood-prone areas over the past 20 years, lagoon covers provide additional protections. The covers keep rainwater out, helping maintain low lagoon levels and minimizing the potential for flooding.

Those are among the reasons that one Democratic legislator, Rep. Billy Richardson, said in 2018 that North Carolina should require lagoon covers on all hog farms. Rep. Richardson called it the "right thing to do," saying it would "give much needed relief to our environment, as well as to the folks who live next to these operations."

Liz Bowen, a senior project manager with the North Carolina Clean Energy Technology Center, said that North Carolina is perfect for RNG. "The gas could be made and used without leaving the state, which benefits the environment and helps expand the clean energy economy in N.C."<sup>7</sup>

The first North Carolina farm to generate renewable energy credits was the result of a partnership involving Duke Energy, Duke University and Google. When Loyd Ray Farms in Yadkinville began producing biogas in 2011, it was widely praised.

The North Carolina Sustainable Energy Association highlighted the project as "an example of how one farm has turned swine waste into something that can positively impact the community." A Duke Energy executive described the project as "a showcase for what others can do," and a Duke University official wrote that digesters "help communities, farms and the environment by reducing pathogens and odors, keeping waste out of floodwaters and reducing greenhouse gas emissions."

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<sup>7</sup> [nccleantech.ncsu.edu/2022/03/30/renewable-natural-gas-a-primer-on-north-carolinas-biogas-resources](https://nccleantech.ncsu.edu/2022/03/30/renewable-natural-gas-a-primer-on-north-carolinas-biogas-resources)

Those benefits remain true today.

The U.S. EPA's AgSTAR program and the State of North Carolina's Clean Energy Plan have both highlighted the benefits of digester systems that enable farmers to capture methane gases. AgSTAR is an outreach program that was specifically created to reduce methane emissions from livestock waste management operations by promoting the use of biogas recovery systems.

The North Carolina Clean Energy Plan was prepared in response to Executive Order 80, signed by Gov. Roy Cooper in October 2018. The executive order calls for a 40 percent reduction in statewide greenhouse gas emissions by 2025.

One of the primary goals of the Clean Energy Plan is to “accelerate clean energy innovation, development, and deployment to create economic opportunities for both rural and urban areas of the state.” Biogas projects on North Carolina hog farms do exactly that.

The Clean Energy Plan notes that “RNG can play an important role in reducing methane emissions, a potent GHG with global warming potential 25 times greater than carbon dioxide. Reducing methane emissions can have a larger impact on the environment than other carbon reduction initiatives.”

The plan says that North Carolina ranks third in the nation with the most biogas potential and explains that the RNG industry “can help our state realize the benefits of decreased carbon emissions, improved resiliency (through alternative fuel supply and microgrid applications during disaster), less reliance on imported energy fuels or sources that are weather dependent, and economic development in the most impoverished areas of the state.”

North Carolina residents have voiced strong support for renewable energy initiatives, including renewable natural gas. A poll of 500 registered voters across the state, conducted by the North Carolina Chamber in January 2021, found that 74 percent felt that North Carolina should be doing *more* to encourage the development of renewable and alternative energy sources.

When asked specifically about hog farms that were turning animal manure into renewable natural gas, voters were equally supportive. Seventy-three percent said they would be more willing to support farms were actively engaged in increasing renewable energy production.

Another poll, conducted in September 2021, found strong levels of support among residents of Duplin and Sampson County. A national research firm surveyed 500 registered voters in those two counties to gauge their opinion on issues related to agriculture.

The survey found overwhelming support for renewable natural gas projects — by a 6-to-1 margin, voters in Duplin and Sampson County support efforts by farmers to cover lagoons, capture gases and generate renewable energy.<sup>8</sup>

## **II. Additional information related to matters of other concern**

We appreciate that a period of comment and the permitting process has generated a wide range of information for DWR to consider. But throughout this process, we have seen and heard information shared that is outlandish, false and distorted, much of which does not merit or require response. We do wish to address some matters that have surfaced in previous written or oral comments, as well as during the debate and passage of the 2021 NC Farm Act which directed DEQ to establish this digester general permit.

### **II (a). Unfounded claims of health impacts**

Regrettably, some commenters have continued to raise unfounded, distorted claims of alleged health impacts from our swine operations. These claims continue to surprise and befuddle our farmers who live on their farms, drink the water from wells on their farms, breathe the air on their farms and have raised multiple generations of family on their farms. We have provided DEQ with extensive comment in the past about these ridiculous claims, so we do not intend to provide an in-depth examination of each of these claims here. But as expressed in previous comments submitted to DEQ, we urge the department to fully evaluate the data and methodologies used in any such reports that purport to establish those claims before believing such claims have credence. Upon examination of the methods and subsequent analysis of such work, you will find that they are – at best – exercises in creative writing.

One of the more popular pieces of propaganda is an article that appeared in the North Carolina Medical Journal (NCMJ) in 2018. Swine industry opponents inaccurately describe the article as showing that confined animal feeding operations cause increased risk of mortality in “communities” near those animal operations. The

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<sup>8</sup> [www.ncpork.org/duplin-sampson-residents-are-positive-about-local-community](http://www.ncpork.org/duplin-sampson-residents-are-positive-about-local-community)

study was funded by an avowed opponent of the commercial swine industry in North Carolina and should be viewed in that context.<sup>9</sup> Despite being funded by biased special interest, the study authors acknowledge they are unable to establish any causation between animal operations and mortality in surrounding communities. Further, and most importantly, the authors did not study “communities” around DEQ permitted swine operations. Instead, they merely examined mortality data from the Centers for Disease Control, from 2007 to 2013, at the ZIP code level in North Carolina and cross-reference that data with permitted swine operations.

Dr. Andres Perez, a veterinary epidemiologist at the University of Minnesota who has reviewed the study, concluded that it suffers from limitations in design and that it represents an “ecological fallacy.”<sup>10</sup> The study’s authors, for example, have previously presented on their work and described finding there is an association with HIV and confined animal feeding operations, for which there is no plausible biological foundation to suggest causation. Yet, that particular associated result was not reported in the NCMJ study. Perez concluded that the choice of a ZIP code level analysis has produced a “modifiable areal unit problem,” or MAUP, which is the name that, in ecological studies, is given to the limitations associated with the artificial increment in the number of observations (MAUP’s scale effect) and the arbitrary selection of boundaries (MAUP’s zoning effect). The authors did not discuss this potential limitation in the study.

In addition, the study relies on a crucial choice that a ZIP code with a “high density” of pigs is one with greater than 215 animals per square kilometer. A square kilometer – like a 3-mile radius – is likely difficult to comprehend to a lay person. A square kilometer is equal to 247 acres of land, thus making the study one that focused on ZIP codes that have from about 1 to perhaps 6 pigs per acre compared with those ZIP codes with fewer than that.

Perez’s review found: “It is not possible to demonstrate that hog operations cause any of the adverse health outcomes described in the manuscript. This limitation is acknowledged by the authors...a few times in the manuscript, although the conclusions and title, erroneously, seem to imply something different.”

Following Perez’s initial review of the study in 2018, he determined a more in-depth look at the methodology and conclusions from the 2018 study were warranted.

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<sup>9</sup> In multiple venues (including under the “Acknowledgements” section of the report, the NCMJ authors have thanked Fred Stanback of Salisbury, N.C., for funding their work. Stanback is a prolific political donor and funder of litigation and activist groups against the N.C. swine industry.

<sup>10</sup> Andres Perez, University of Minnesota, *Independent Assessment (of) Kravchenko et al.* (Oct. 2018).

That more in-depth review, entitled, *Importance of responsible interpretation of observational studies: Large hog farms unfairly blamed for mortalities in neighboring communities in North Carolina*, was completed in early 2022, and filed for peer review and publishing in March 2022. In it, Perez said, “An ecological study [the type conducted originally in 2018 for NCMJ] would not confirm or deny exposure over time nor indicate causation. Hence, we emphasize the importance of responsible interpretation of ecological studies that concern public health, agriculture...”<sup>11</sup>

The paper goes on to say, “A deep dive into a previous publication on mortalities and negative health outcomes in North Carolina residents living near hog CAFOs unveiled that the study approach was insufficient to assess the intended hypothesis of associations or support the causative assertions implied in media reports.”

Advocates are misusing the report, and are ignoring its own data, and we again urge caution.<sup>12</sup>

Other in-depth reviews of the studies used by opponents of animal agriculture have shown similar problems with how data is manipulated or cited irresponsibly. Dr. Annette M. O’Conner, a professor at Iowa State University, and a team of researchers in 2017 published a systemic review of the literature in which there were possible associations with animal feeding operations and health outcomes described, concluding that “no consistent dose response relationship between exposure and disease was observable.”<sup>13</sup>

## **II (a1). Alleged air quality impacts**

Complainants tend to point to similar studies, where no causation is determined and where the actual data and methodologies must be fully understood. For example, complainants in public settings and public comments<sup>14</sup> submitted to DEQ, have suggested that hog farms cause higher rates of asthma. They cite a study that purports to find an association with middle school student wheezing and farms. Again, the underlying data and methodology does not support the claim. The data in

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<sup>11</sup> Kaushi ST Kanankege, Isaac Traynor, Andres M Perez, *Importance of responsible interpretation of observational studies: Large hog farms unfairly blamed for mortalities in neighboring communities in North Carolina*. (2022).

<sup>12</sup> See *The Truth of the Matter - Health Claims Against Hog Farms Don’t Add Up*. Accessed at [www.ncporkreport-digital.com/ncpq/0420\\_winter\\_2020/MobilePagedArticle.action?articleId=1648280#articleId1648280](http://www.ncporkreport-digital.com/ncpq/0420_winter_2020/MobilePagedArticle.action?articleId=1648280#articleId1648280)

<sup>13</sup> Annette O’Connor, et al, Iowa State University. *Updated systematic review: associations between proximity to animal feeding operations and health of individuals in nearby communities*. (2017).

<sup>14</sup> Comment letter, *Re: Renewal of North Carolina State General Permits to Control Animal Waste...* dated December 6, 2013, submitted to Christine Lawson at DEQ from Earth Justice, the Waterkeeper Alliance and Southern Environmental Law Center.

the study itself shows that students within 2 miles of a CAFO had lower reports of wheezing than those in a zone farther away (from 2 miles to 3 miles). Students within 2 miles of a farm reported almost identical amounts of wheezing as the rest of the state. Additionally, data compiled at the state’s Center for Health Statistics and the N.C. Area Health Education Centers shows that incidences of asthma are not associated with the significant pig and hog producing counties.<sup>15</sup>

A new study that opponents have been citing over the last year is a national study regarding air pollution from the agricultural sector.<sup>16</sup> When referencing the paper, it is often claimed that the study, “attributes an astounding 95 premature deaths in Sampson County, and 83 premature deaths in Duplin County due to the emissions from hog operations every year.”<sup>17</sup>

We are confused as to how anyone could make such a claim given that the study does not explicitly break down any findings by county in North Carolina. Further, the study does not separate out hog farms. Using the study’s own language, they, “quantify the air quality–related health damages attributable to 95 agricultural commodities and 67 final food products, which encompass >99% of agricultural production in the United States.” Further, they note that they look at, “commodities that span the entirety of animal production, and cropland and grassland pastures captured in the 2014 US Department of Agriculture (USDA) Cropland Data Layer.”

Based on the information in the study, there is no way to know to which commodities they attribute these alleged deaths. We also have concerns about the study overall after a closer look at the authors and funding source for the work. At the time of writing, the lead author of the report was still working on her degree at the University of Minnesota and another one of the authors purports to “advocate for plant-based diets” on social media. Most concerning is that a major funding source for the work was the Wellcome Trust’s Livestock, Environment, and People-LEAP, a program promoting a plant-based diet and reduced meat intake, whose goal is to “test how changes in demand for animal-sourced food could be achieved.”<sup>18</sup>

But, DEQ does not have to look any further than their own study to ascertain any air quality-related impacts of the swine industry. A couple of years ago, a 15-

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<sup>15</sup> See *The Truth About ... Hog Farms and Asthma*. Accessed at <http://www.ncpork.org/truth-hog-farms-asthma/>

<sup>16</sup> Nina G. G. Domingo et al. *Air quality–related health damages of food*. 118 Proceedings of the National Academy Sciences. (May 2021).

<sup>17</sup> Letter sent to Sec. Elizabeth Biser from the NC Environmental Justice and Equity Board. Oct 22, 2021.

<sup>18</sup> [www.leap.ox.ac.uk](http://www.leap.ox.ac.uk). Accessed on May 2, 2022.

month study of an area with numerous swine farms by DEQ's Division of Air Quality concluded that the farms are not a source of concern about air quality.<sup>19</sup>

As you are already aware, DEQ focused its study on three pollutants of concern: particulate matter, hydrogen sulfide and ammonia. The measurements were all within 0.5 miles to 2.5 miles of hog farms. DEQ's monitors were able to detect two unrelated episodes of smoke from open burning in the region. But the study found no concern or exceedance related to hog farms, including in the measure of particulate matter. For hydrogen sulfide, DEQ's data shows that 24-hour average concentrations were consistently, throughout the study, 10 times lower than the acceptable "ambient" level. For ammonia, the acceptable level was never exceeded. And, there were very few events with even measurable concentrations — the largest being attributed to burning. DEQ concluded: "The results, in total, do not constitute a significant air quality issue in the study area for these pollutants. Therefore, (DEQ) does not intend to conduct additional air quality monitoring..."

We urge DEQ to look at their own findings and not be misled by the many instances where opponents attempt to misuse data and manipulate studies to line up with their already-drafted talking points and legal briefs.

## **II (b). Unfounded claims of odor**

Swine industry opponents continue to cling to a 2004 and 2008 paper as justification for allegations of unbearable odor impacts of swine farms on neighbors. But, as we have commented previously, these analyses are severely flawed and tainted by the activism of the researcher.<sup>20</sup>

There is always some odor associated with farming. But the odor from a swine operation is infrequent – not constant – and is most certainly not the debilitating odor that opponents allege. Further, many refuse to acknowledge the well-documented evidence that covering lagoons or installing anaerobic digesters can diminish odor significantly. In fact, a recent paper speaking to the observed impacts of covering the lagoons on a farm in Harnett County, noted that because of capping the lagoons, "neighbors only occasionally smell odors." What's more, county officials are

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<sup>19</sup> *Attachment F: Final Duplin County Air Monitoring Study Report*. May 4, 2020. [deq.nc.gov/media/15651/download](http://deq.nc.gov/media/15651/download).

<sup>20</sup> See *Truth of the Matter: Claims on air, odor, don't pass the smell test*. Accessed at [www.ncpork.org/wp-content/uploads/2020/05/Truth-of-the-Matter-Odor.pdf](http://www.ncpork.org/wp-content/uploads/2020/05/Truth-of-the-Matter-Odor.pdf)

developing a 1,000+-acre public park that, at its nearest point, will be only about .6 miles away from the hog farm.<sup>21</sup>

The September 2021 poll of 500 voters in Duplin and Sampson County also found that odor was not impacting their quality of life. Only 11 percent of residents living within two miles of a farm reported experiencing issues with odor. Among all respondents, 43 percent said they do not notice odor from farms, while an additional 20 percent categorized the odor as mild, and an additional 17 percent said that odor was rare. Only 10 percent of the respondents considered odor to be strong.<sup>22</sup>

## II (c). Water Quality

Many of the commenters in recent public hearings have falsely claimed that digesters make water quality worse. As DEQ is well-aware, if a farmer chooses to cover an existing lagoon and then apply the effluent directly to growing crops, the concentration of nitrogen will be greater. This draft permit acknowledges that fact in Condition II.25 where it directs that, *"If liquid effluent samples show that additional land will be necessary for application of nitrogen at agronomic rates, the Permittee will take immediate action which will require revision and/or recertification of the CAWMP..."*

We appreciate the inclusion of this condition and believe it is adequately protective of water quality.

Covering an existing lagoon will not be the only - or even the primary- method employed by swine farmers to capture methane. Most will construct new digesters and use the existing lagoons as secondary storage. In these cases, there will be no meaningful change in nitrogen.

Even more concerning than rhetoric about nutrient runoff, are those claims that adding methane digesters to a farm's manure management system will result in groundwater contamination. These claims are not just false – they are irresponsible.

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<sup>21</sup> Samantha Mosier, Guy Iverson. *Butler Farms: Ecologically Modernizing CAFO Production*. (2021). On file at NC Pork Council Office.

<sup>22</sup> [www.ncpork.org/duplin-sampson-residents-are-positive-about-local-community](http://www.ncpork.org/duplin-sampson-residents-are-positive-about-local-community)

One commenter at a recent public hearing testified, in part, that, “No one drinks the water in our community” and that it is “hard to trust that groundwater isn't being contaminated and seeping into our wells, many of which are shallow.”

Another Sampson County resident has testified many times that his church was forced to pay for the construction of a new well and has alleged that a nearby hog farm was to blame. In July 2021, the NC Pork Council attempted to reach out to this church leader to discuss these allegations. We do not believe that a hog farm was the source of the nitrate contamination of the church’s well as the closest hog farm (including the lagoon and sprayfields) is at a lower elevation than the church. Nevertheless, we offered to pay for a forensic study of the shallow groundwater flow in and around the church, including laboratory testing of the water from the former well. Such a study would outline likely contributors of the nitrate contamination and water tests could help reveal the actual source of the nitrates. And then in the unlikely event that swine was identified as the source, we offered to reimburse the church for the cost of the new well.

Unfortunately, we still have not heard back from that pastor.

The most likely scenario for the groundwater issues experienced at the church are exactly what the previously quoted commenter said at the recent public hearing in Clinton: shallow well construction.

This is not the first time that the swine industry has been blamed for contaminated wells in Sampson County. In 1995, state’s Department of Environment, Health, and Natural Resources (DEHNR) – now DEQ – offered free well testing to any citizen who shared a property line with any Intensive Livestock Operation (ILO), which included swine, turkey, chicken or cattle. Through the effort, 948 wells were tested in 50 counties. Of those, 89 wells (9.4 percent) indicated nitrate concentrations in excess of the drinking water standard. Sampson County – the second largest hog producing county in the state – had 47 of those 89 wells.

NCPC retained Law Engineering and Environmental Services to study those results. Law Engineering focused on the 30 wells in Sampson County with the highest levels of nitrates.<sup>23</sup> They were all located in or adjacent to the community of Keener,

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<sup>23</sup> Law Engineering and Environmental Services; *Nitrate Source Investigation Study Selected Wells in Sampson County, North Carolina*; April 15, 1997. On file at NC Pork Council Office.

midway between Newton Grove and Clinton. In the study area, there were at least 18 swine farms, 22 poultry farms, and many cultivated agricultural fields.

The study data showed that domestic septic systems were cross-gradient or upgradient from 14 of the 30 focus wells. At least half of the wells were improperly constructed, without grout surface seals or with wellheads installed below ground. Additionally, 28 of the 30 wells were less than 50 feet deep. All 30 of the wells were located within 500 feet of cultivated agricultural land, 20 were cross-gradient or downgradient from agricultural fields where poultry litter or synthetic fertilizer was applied. Finally, 16 of the wells were within 1,500 feet of an existing swine operation, 14 of which were upgradient of a swine farm. One of the wells was downgradient from a swine effluent application field.

In addition to looking at individual well construction information and the topography of each nitrate-contaminated well, N.C. State University scientists performed stable isotope testing on 29 of the 30 wells.<sup>24</sup> Each well tested had one or more of three primary sources of nitrates: synthetic fertilizers, septic system effluent, and naturally occurring soil organic nitrogen. Six of the wells had animal waste as a possible secondary source contributor.

In the testing of these targeted wells, N.C. State University did not note stable nitrogen isotope ratios indicative of a clear correlation with animal waste.<sup>25</sup> In other words, swine was not responsible for nitrate contamination in those wells where stable nitrogen isotope testing was performed (60% of the contaminated wells in Sampson County). The results of the stable nitrogen isotope analysis are provided in the table below.

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<sup>24</sup> “Stable nitrogen isotope geochemistry is a well-established methodology for identifying and differentiating the sources of nitrogen to aquatic systems.” See W.J. Showers, 1997, *Progress Report: Stable Nitrogen Isotopic Tracers of Excess Nitrogen Sources to the Neuse River Basin, Estuary, and Nearshore Waters*, Department of Earth and Atmospheric Sciences, North Carolina State University, p. 4.

<sup>25</sup> *Id.*

**TABLE 5**  
**SUMMARY OF MOST LIKELY NITRATE SOURCES**  
**CORRELATION OF TOPOGRAPHICALLY UPGRADIENT AND CROSS-GRADIENT**  
**SOURCES WITH STABLE NITROGEN ISOTOPE RESULTS**

Most Likely Source	Possible Secondary Influence	Number of Total Wells [out of 30 wells]	Number of Contaminated Wells [22 out of 30 wells]
Fertilizer	SON	14	10
Fertilizer	VMAN*	5	5
Septic	Fertilizer	4	3
SON	Fertilizer	3	0
Fertilizer	Septic	3	3
Septic	MAW**	1	1

SON = Soil Organic Nitrogen

\* VMAN = Very minor animal waste contribution. Animal sources include Poultry (4) and swine sprayfield/cattle manure.

\*\* MAW = Minor Animal Waste. Animal source is cattle manure.

NOTE: One result could not be obtained from stable nitrogen isotope analysis.

As a result, LAW utilized topographic considerations to identify the potential nitrate source.

## II (d). Biogas in other states

Comparisons with biogas projects in other states has also become a very popular talking point with opponents. One of these is the comparisons between manure management systems used on swine farms in North Carolina and Missouri. These are not only misleading but are also inapplicable due to the substantial differences in climate, average farm size, animal densities, and swine housing. There would be no appreciable environmental benefit to NC farms by implementing these Missouri-style systems.

There have also been comments about the negative outcomes with biogas projects in Colorado and Nebraska. Again, these comparisons are ridiculous as those systems were not at all similar to these smaller, on-farm systems in North Carolina.

Let us take a quick look at the systems that have been identified for comparison. The first is Heartland Biogas in La Salle, Colo. Heartland brought in food waste and dairy manure from off-site (no swine involved in the project). While it is true that there were many odor complaints from the surrounding community, nothing should be gleaned as relevant to the discussion about swine biogas in North Carolina. The new owners of Heartland Biogas acknowledged the many problems saying in a news article that, “the principal problem was processing food waste” and “not having the proper receiving and filtration processes in place.”<sup>26</sup>

The second comparison is to Big Ox Energy in Dakota City, Neb. According to EPA, Big Ox, “is an industrial facility that processes food waste and high-strength waste, along with industrial and residential wastewater to produce biogas energy.”<sup>27</sup> Note that there was no swine manure involved in this facility.

Big Ox had multiple fines from both the state and federal government for repeated violations of environmental rules. Last October, they agreed to pay a \$1.1 million fine in response to these violations. It is also important to note that Big Ox is an enormous facility capable of producing upwards of 1.3 billion standard cubic feet of biogas per year. In comparison, the Optima KV project in Kenansville, NC, which consists of five permitted swine farms, only produces around 80,000 standard cubic feet of biogas annually.

## **II (e). Environmental Justice**

Since 2014, you have received unfounded comments and characterizations about DEQ itself and its permitting process in the context of its obligations under Title VI of the Civil Rights Act of 1964. We believe it is important that the record be clear on this matter.

A complaint against DEQ was filed on Sept. 3, 2014, under Title VI of the Civil Rights Act of 1964 and the EPA nondiscrimination regulations. Complainants were the North Carolina Environmental Justice Network (NCEJN), Rural Empowerment Association for Community Help (REACH) and the Waterkeeper Alliance Inc. (WK). These groups receive funding from foundations and parties that oppose modern animal agriculture. Using those funds, they have engaged in a coordinated, multi-

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<sup>26</sup> [www.greeleytribune.com/2020/08/13/once-controversial-digester-facility-near-lasalle-working-to-reopen-with-new-ownership](http://www.greeleytribune.com/2020/08/13/once-controversial-digester-facility-near-lasalle-working-to-reopen-with-new-ownership). Accessed May 2, 2022.

<sup>27</sup> [www.epa.gov/ne/big-ox-energy-south-sioux-city-nebraska](http://www.epa.gov/ne/big-ox-energy-south-sioux-city-nebraska). Accessed May 2, 2022.

pronged attack on our farmers that includes the spread of false information. This includes the Title VI civil rights complaint.

The underpinning of that complaint was a disparate impact study authored by Steve Wing and conducted only for the purpose of supporting the Title VI complaint against DEQ. The complaint itself was filed a mere five days after the Wing report was authored. It is notable that Wing was himself a complainant – he was an officer of the board of directors at complainant NCEJN while he authored the analysis.<sup>28</sup> Wing, now deceased, was also a professor at UNC-Chapel Hill. Prior to his untimely death, Wing openly described his work and viewpoints, underscoring many efforts to “support” community groups such as NCEJN, REACH and WK while working as a professor at a state university that he sought to distance himself from.

Complainants and DEQ engaged in lengthy and private alternative dispute resolution, which was concluded on May 3, 2018, with a Final Settlement Agreement. In the Final Settlement Agreement, the parties affirmed that the Final Settlement Agreement is a full and final release of the prior complaints. The Final Settlement Agreement contains the provision that the Agreement “does not constitute an admission by DEQ or a finding of any violations of Title VI or 40 C.F.R. Part 7 in connection with the allegations in Complainants’ Title VI Complaints.” This conclusion – that there is no finding of a violation of Title VI in the permitting of swine operations – is correct.

Still, it is vital that the record be clear as it relates to the allegation of discrimination or Title VI violations, given complainants’ continued advocacy of this false claim for which a settlement has been agreed. The complainants’ allegation that DEQ permitting of hog farms is discriminatory relies on the conclusions reached in the Wing analysis. The Wing analysis is deeply flawed.<sup>29</sup> As such, neither DEQ nor EPA ECRCO can rely on the conclusions of the Wing analysis because it does not properly compare, for the purpose of determining disproportionality, the populations that are in proximity to hog farms in North Carolina.

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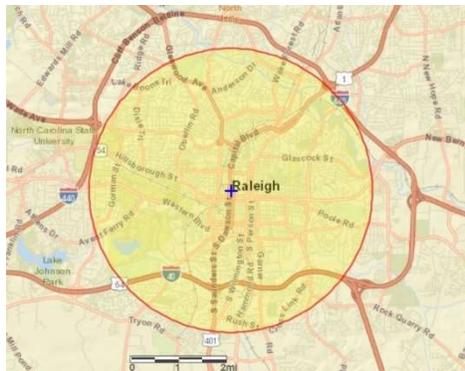
<sup>28</sup> In 2014 and 2015, Wing was board secretary for complainant organization NCEJN, devoting an average of 15 hours per week to the position, according to the organization’s IRS Form 990 for 2014 and 2015.

<sup>29</sup> For an in-depth analysis of Wing’s flawed study, see *The Truth of the Matter: The real story behind a complaint against the NC pork industry*. Accessed at [www.ncpork.org/wp-content/uploads/2018/05/The-Truth-of-the-Matter.pdf](http://www.ncpork.org/wp-content/uploads/2018/05/The-Truth-of-the-Matter.pdf)

## II (e1). The Wing ‘study’

In conducting his analysis, Wing made an important first choice: That people living within a 3-mile radius are “impacted” by a hog farm. Wing has stated that his choice of that distance was “arbitrary.” Indeed, it is not based on objective evidence. Three miles as a radius from a single point captures a large area of more than 28 square miles. For example, as shown at left, the Interstate 440 Beltline that encircles Raleigh is roughly a 3-mile radius around a point located in central Raleigh. In the case of hog farms in North Carolina, using a 3-mile radius includes more than 950,000 people within that radius – almost 1 of every 10 people in North Carolina. Nonetheless, Wing analyzed that population of people as potentially “affected” by the presence of a permitted farm. His report used the 2010 Census data, with block-level analysis. His analysis found that, within 3 miles of a hog farm, approximately 60 percent of the population is white non-Hispanic; approximately 28 percent of the population is African-American; approximately 9 percent is Hispanic; and approximately 3 percent to 4 percent is Native American.<sup>30</sup>

These data did not and do not establish evidence of discrimination. Failing to show discrimination at a 3-mile radius of North Carolina hog farms, Wing then established a comparison population “study area.” Wing’s study area is a creation from whole cloth. The created “study area” does not include some counties in the western portion of the state. It excludes the five largest cities, and only the five largest, with a stated justification that there is “no agriculture” in those cities (while leaving in every other city in the state). Wing also removed some hog farms from the “study area,” such as the N.C. State University farm on Lake Wheeler Road in Raleigh and the swine unit at N.C. A&T State University in Greensboro. These decisions established



<sup>30</sup> See Table 3 of Wing and Johnston reports

an amoeba-like study area of approximately 6.5 million people to be used for comparison purposes.

To complete the study, Wing then compares the population of nearly 1 million people within 3 miles of a hog farm as a proportion of the population of 6.5 million people within the created “study area” to reach a conclusion of disproportionality in how DEQ is permitting swine farms. It is only upon making these broad comparisons that Wing concluded that disproportionality is present – that is, there were a greater percentage of African-Americans within 3 miles of a farm than were in the created “study area.” The ratios at which Wing alleges disproportionality are 1.46 times for people of color and 1.50 for African-Americans.

The complainants rely on comparisons of very large and diverse geographical areas to reach their conclusion, effectively performing a state-level comparison where the demographics in the central Coastal Plain area of the state are compared with the demographics of the Piedmont and the Atlantic coast areas. This comparison demonstrates little about the specific location of permitted hog farms and their surrounding communities. As a result, neither DEQ nor EPA ECRCO could find that disproportionality exists in regard to DEQ permitted swine facilities.

The North Carolina Pork Council sought expertise in the field of disparate impact analysis to determine if there is an objective method for making population comparisons in assessing for the possibility of discrimination in a permitting process. Resolution Economics LLC (Resolution) and partner Dr. Paul White, who has previous experience with disparate impact analyses, advised NCPC that a series of concentric circle analyses would be an objective method.

NCPC engaged Resolution, which then performed these analyses, also using the same 2010 Census data at the block level. On Dec. 7, 2017, Resolution provided a report to NCPC, titled “Analysis of the Demographic Characteristics of the Population Surrounding North Carolina Department of Environmental Quality Permitted Hog Farms.” NCPC provided the report to DEQ on Dec. 20, 2017.

Resolution performed four different concentric circle analyses of hog farms in North Carolina. Interior focal areas were drawn at 0.5 miles, 0.75 miles and 1 mile. These focal areas were then also compared with an outer ring of 0.5 to 5 miles, 0.75 to 5 miles, 1 mile to 5 miles and 1 mile to 10 miles. Resolution reports that “this methodology allows for an analysis of groups that are more geographically similar to each other. It also ensures that the comparison groups are all explicitly within a certain distance of a permitted hog farm, and therefore in areas where there is an industry presence.”

The result of these data analyses is summarized as showing:

... that the representation of people of color groups is generally lower in the population living close to permitted hog farms than it is in the population living farther away within the same general geographic area. This is true for African Americans in all scenarios and for people of color and American Indians in the first three scenarios. For example, in the first scenario, African Americans make up 21.1% of the population living within 0.5 miles of a permitted hog farm (the focal groups) while they make up 30.4% of the population living more than 0.5 miles but less than 5 miles from a permitted hog farm (the comparator groups). In contrast, White non-Hispanics represent 61.5% of the population in the inner circles and 57.0% of the population in the outer rings. ...

African Americans are under-represented in areas near the farms when compared to the White non-Hispanic population. In all four scenarios, the areas close to the farms have proportionately fewer African Americans than areas farther away. In three of those four scenarios, areas

close to the farms have proportionately more White non-Hispanic residents than areas farther away. The exception is the last scenario, where the share of the population that is White non-Hispanic is slightly lower in the inner circle focal group than it is in the outer ring comparator group.

Resolution also studied each farm in isolation and in comparison with its surrounding population. Resolution summarizes this analysis, noting three important observations:

First, the table shows the number of farms that are surrounded by populations that are predominately White non-Hispanic. When the inner circle is defined as a 1.0 mile radius, there are 1,370 farms surrounded by census blocks that are 50% or more White non-Hispanic. In that same scenario there are 55 farms surrounded by census blocks that are 100% White non-Hispanic. In each distance scenario the largest group of farms is in a bracket with 80% or more White non-Hispanic population.

The second important observation is that farms are found in all of these White non-Hispanic categories. In other words, populations near a farm do not appear to have one particular demographic profile. For each scenario, farms are represented in all categories ... a pattern that would not be expected if farm locations were closely linked to a particular racial distribution. ...

The third important observation ... is that the White non-Hispanic and African American representations around the farms vary as the radius of the focal group changes from one scenario to another. That is, race and

ethnicity measures of the population change depending on the size of the specific geographical area being measured. However, (Wing’s) studies do not address this issue, as they present no measures to show the extent to which their results depend on their choice of a three-mile radius to define populations that are “near” a farm.

Resolution concluded, based on the same data used by Wing, that “the proportion of African Americans and people of color among the residents living near permitted hog farms is generally lower than the proportion of African Americans and people of color living farther away within the same general geographic area.” That is, there is no evidence of disproportionality in the DEQ permitting of swine facilities in North Carolina. It is notable that both Resolution and Wing rely on the same block level Census data from 2010, though Wing eliminated from consideration multiple government-operated DEQ permitted facilities from his 3-mile radius study without ample explanation.

Drawing from both the Resolution and Wing reports, NCPC provides below a summary of the demographics of populations in North Carolina in relation to proximity to the location of DEQ permitted hog farms at designated intervals – farms that have all been in place and operating for more than two decades.

<b>Category</b>	<b>0.5 Mile</b>	<b>0.75 Mile</b>	<b>1 Mile</b>	<b>3 Miles</b>	<b>5 Miles</b>	<b>10 Miles</b>
<b>White</b>	52,046	92,298	141,266	563,228	1,168,152	2,594,939
<b>African-American</b>	17,846	34,218	56,318	264,272	612,431	1,149,231
<b>Other</b>	14,706	26,146	39,768	133,389	261,596	540,413
<b>Total</b>	84,598	152,662	237,352	960,889	2,042,179	4,284,583

(Source: Resolution and Wing demographic analyses)

A cursory review of the above population data is illustrative of the orders of magnitude in differences between populations at 1 mile of a farm or less, where it is fewer than 250,000, and those at greater distances, such as an arbitrary 3 miles. The data can also be described in percentage terms, as follows.

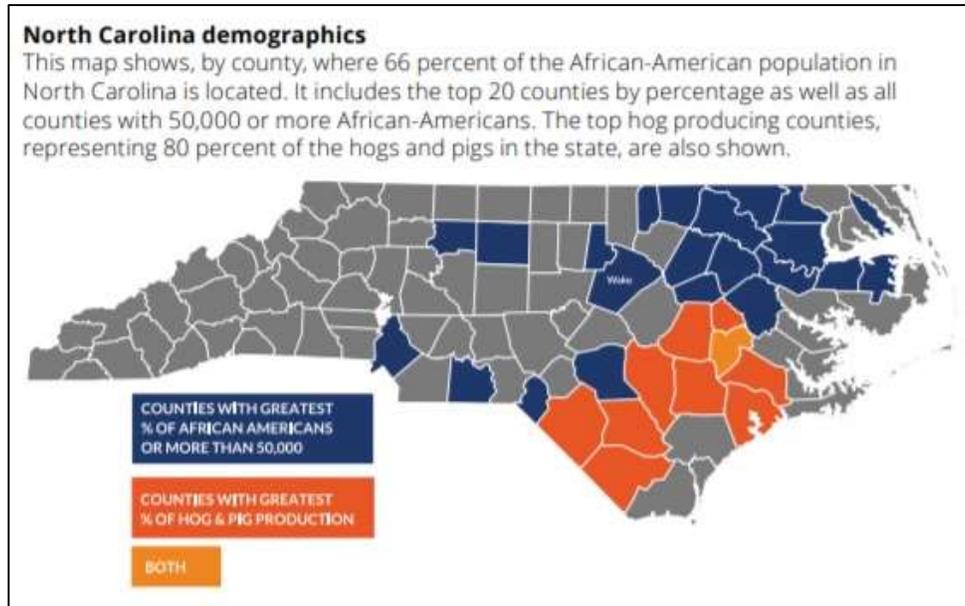
<b>Category</b>	<b>0.5 Mile</b>	<b>0.75 Mile</b>	<b>1 Mile</b>	<b>3 Miles</b>	<b>5 Miles</b>	<b>10 Miles</b>
<b>White</b>	61.5%	60.5%	59.5%	58.6%	57.2%	60.6%
<b>African-American</b>	21.1%	22.4%	23.7%	27.5%	30.0%	26.8%
<b>Other</b>	17.4%	17.1%	16.8%	13.9%	12.8%	12.6%

(Source: Resolution and Wing demographic analyses)

The data shows that the white population near hog farms is greatest, on a percentage basis, at 0.5 miles proximity. There, the white population is about 62 percent of the total population. This declines to 57 percent of the population at 5 miles of radius.

Likewise, the African-American population makes up 21 percent of the population at 0.5 miles proximity to hog farms. The African-American population increases as you move farther away from the hog farms. Within a 5-mile radius, the African-American population makes up approximately 30 percent of the population. This data shows that African-Americans and people of color are under-represented when compared with non-Hispanic whites in areas nearest hog farms. This is not evidence of disproportionate impact in DEQ permitting of swine facilities.

Additionally, a basic review of North Carolina county-level demographic data shows that the highest proportion African-American population, in terms of percentage share or in terms of highest population share, is not located in the significant pig and hog producing counties (representing 80 percent of the standing stock), as shown below.



(Source: NC OSBM and USDA NASS)

Should another Title VI Complaint be filed against DEQ after final adoption of this farm digester general permit, we would urge DEQ to look closely at the evidence offered to justify such a claim and to consider performing your own disparate impact analysis.

### III. Specified comments on the pending draft permit conditions

**Condition I.14** – *“Digester design must be in compliance with NC NRCS Standard 366 Anaerobic Digester and NC NRCS Standard 367 Roofs and Covers effective at the time of development/design and initial permit issuance.”*

USDA NRCS Standards are design guidelines, not law. While participants utilizing USDA funding programs are required to utilize the Standards to obtain

funding, they are not otherwise “required.” This wording should be edited such that these Standards are incorporated where applicable, rather than required. Further, it would also be more appropriate to replace the phrase “in compliance” with “in accordance.” Since any design would already require an engineer’s seal, it seems reasonable to allow flexibility in design standards so as to not bind an engineer unnecessarily to a standard that might not be applicable or that might result in being less protective of the environment.

**Condition I.15** – *“Upon completion of construction and prior to operation of a new Farm Digester System, as-built plans and specifications and the certification, signed and sealed by a Professional Engineer, must be submitted certifying that the permitted Farm Digester System has been installed in accordance with the submitted design, this General Permit, and best engineering practices.”*

Here, “best engineering practices” seems too subjective and could be open to different interpretations. Perhaps the word “best” could be replaced with “applicable” or “appropriate.” Or, perhaps by deleting the last clause in the sentence so that it reads, “...signed and sealed by a Professional Engineer” would be sufficient.

**Condition I.17** – *“The waste management system, including the Farm Digester System and the spray irrigation system, shall be effectively maintained and operated at all times so that there is no discharge to surface waters or any contamination of ground waters, which will render them unsatisfactory for normal use. In the event that the Farm Digester System **fails to perform satisfactorily**, including the creation of nuisance conditions or failure of the irrigation area to adequately assimilate the wastewater, the Permittee shall take immediate corrective actions including those actions that may be required by the Division.”*

What does “fails to perform satisfactorily” mean? This also seems too subjective and could be open to different interpretations. Does this mean that the system is not in compliance with the permit? If so, this condition seems redundant as this is already covered elsewhere in the permit (see Condition II.25). We would urge DEQ to evaluate whether this permit condition is even necessary. Either the farm is in compliance with the permit, or it is not.

Additionally, how is a “nuisance condition” defined? This also seems too subjective.

**Condition III.23** – *“The Permittee shall conduct annual biogas leak detection monitoring and repair along biogas gathering or collection lines on the permitted*

*facility using appropriate instrumentation (e.g. infrared cameras). Any leaks detected shall be repaired within a reasonable timeframe commensurate with the extent of the leak and the availability of the necessary personnel and materials to effectuate the repair. The Permittee shall document completion of the required leak detection monitoring on forms supplied by or approved by the Division.”*

This permit condition is both unnecessary and outside the jurisdiction of a water quality permit.

It is important to remember that biogas has tremendous value and there is a great deal of capital being expended to build these systems whose primary purpose is capturing that biogas. Leaks will rarely – if ever – occur but even if a leak were to take place, it would be detected quickly.

Additionally, the gathering/collection lines may - or may not - be owned by the permittee. But even if the gathering/collection lines are owned by the permittee, this is not appropriate for a permit issued by the Division of Water Resources. Such an annual assessment of the integrity of the gas lines will likely already occur outside of any permit requirement but again, this does not fall under the jurisdiction of a water resources permit and should be removed from this permit.

**Condition III.24** - *"The Permittee shall conduct wastewater sampling and analysis of both the influent and effluent of the digester for the following parameters quarterly. Quarterly tests of representative grab samples pursuant to an approved Sampling Plan shall be conducted once within each of the following windows with at least sixty (60) days between any two sampling events: Quarter 1: Jan-March; Quarter 2: April-June; Quarter 3: July-Sept; Quarter 4: Oct-Dec. Sample results shall be submitted to the Division's Central Office by the end of the month following sampling. Quarterly grab sampling shall begin no later than six months after submission of the Engineer's Certification as required by Condition I.13 and end after eight consecutive quarters of sampling."*

This proposed condition is problematic for a number of reasons. First, it is impossible to obtain a representative sample, as the influent fluctuates depending on the age or size of the animals, the time of year, the outside temperature, or even the specific system design.

We acknowledge that other wastewater permits issued by DEQ may require influent testing, but we believe that this may be intended to help system operators identify a potential issue early. This may be useful as these other systems are treating

or processing waste with unpredictable, highly variable constituents. But in the case of animal systems, although the influent fluctuates as outlined above, the input is the same because the diets of the animals are consistent. In short, there will be no “surprises” for system operators.

For these reasons, we do not believe that any meaningful data will be obtained by requiring a quarterly influent sample. Further, since a sample of effluent is already required within 60 days of land application, that information should be sufficient, as the primary objective is to know the composition of what will be applied to fields.

Finally, previously issued individual digester permits have not included influent testing. We are confused as to why this condition would be important to include in a general permit if such testing has not consistently been required across permittees.

## IV. Conclusion

The benefits of methane digesters on livestock farms are clear, beginning with the reduction of greenhouse gas emissions. The use of biogas to accomplish this objective and protect our environment is a stated goal of the U.S. Environmental Protection Agency, the State of North Carolina and North Carolina hog farmers. Other valuable benefits of digester systems include the reduction of on-farm odors and the flood protection covered lagoons provide. These are both issues of importance of the communities where our farms operate.

The evolution of manure management on North Carolina hog farms is the latest effort by our industry to continuously adapt and improve our operations, and it is imperative for DEQ to develop a general permit for farms with digester systems that is reasonable and practicable. As our written comments detail, the arguments against the use of digester systems on livestock farms ignore the proven benefits these systems offer and instead rely on false or misleading information.

Thank you for the opportunity to comment on these important issues.

Sincerely,

The North Carolina Pork Council <sup>31</sup>

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<sup>31</sup> The North Carolina Pork Council is a nonprofit North Carolina corporation established in 1962. A designated task force of NCPC members approved these submitted comments. The organization is a 501(c)(5) trade association with the mission to promote and educate to ensure a socially responsible and profitable North Carolina pork industry. The North Carolina Pork Council engages in public policy and advocacy efforts as well as research, producer education, promotion, and consumer information programs and services. The majority of the Board of Directors is elected by the full membership of the association. In addition to members directly engaged in the pork industry, the Board of Directors includes members representing allied industry and meat processors, national board representatives, and representatives of N.C. State University, N.C. A&T State University, and the N.C. Department of Agriculture.