

## **MEMO**

To: Roberts Plan Commission  
From: Haily Sand  
Date: June 9, 2022  
Re: Nature Energy Digester Project

## **Nature Energy Responses Provided June 20, 2022**

### **Anaerobic Digestion**

- Carbon would be released in the processing of the anaerobic digestion.
  - Is the community worried about this carbon footprint?

**Nature Energy:** Unlike most digesters, all gases produced by the digestion process are collected. After separation from the CO<sub>2</sub> and H<sub>2</sub>S, the methane is sold as green natural gas. The CO<sub>2</sub> is cleaned and sold as food grade carbon dioxide and the H<sub>2</sub>S is added to the digestate that is returned to participating farmers.

- The digestate byproducts include being processed through a screw press which separates the solid from the liquid. A Generally Recognized as Safe (GRAS) polymer is proposed to be used to collect as much P out of the liquid fraction
  - I am assuming this polymer will remain in the solid fraction, but what threat does this pose to the local soils? Will this polymer build over time?

**Nature Energy:** A GRAS polymer is a polymer that is generally recognized as a safe polymer when used in food production.

### **Land Application**

- Raw manure is collected from the farm, hauled to NE-Roberts, mixed with turkey litter and food scrapes, put through the digest process (carbon dioxide and methane are pulled off), the digestate material is then analyzed (on a weekly basis for N, P, K, S and NH<sub>4</sub>) to 'ensure dairy farms are receiving the same amount of nitrogen (N) as they supplied with manure' (Section 1.6)
  - Snap Plus Nutrient management plans (NMPs) are phosphorus (P) based plans. Typically, we see P in manure less than or equal to the amount of N.
    - What happens if the digestate is higher in P? If P is higher relative to the N concentration, this could cause excessively high P levels in the soil
    - What if soils are already high in P? This means there is no economic response (plants won't necessarily use it, even if it is plant available) and there is no economic benefit to applying P where soil test P is already high

**Nature Energy:** A major benefit of dairy farms participating in the Roberts Nature Energy project is that their manure, which is a poorly balanced nutrient source for corn, is converted to nutrient water, an almost perfectly balanced nutrient source for corn silage and grass hay.

- The main nutrients of concern are:
  - Nitrogen: ground water issues, lost via leaching to groundwater or volatilization into the atmosphere
  - Phosphorus: surface water issues, lost via soil runoff in major rain events, for example, as phosphorus adheres to the soil particles
- *Recommendation:* NE should pay for analysis of raw manure on at least a monthly basis to guarantee an accurate manure analysis and therefore reimbursement of nutrients.

Nature Energy: We collect manure samples which are analyzed weekly.

- “Field application of digestate or derived product applications carry lower levels of unused nutrients than raw manure applications” (section 1.6)
  - Manure has nutrients that are readily available and nutrients that will become available (think of a slow-release fertilizer) and is subject to leaching and washing. Digestate will have majority, if not all, of the nutrients as readily available; therefore, prone to leaching or washing of available nutrients. What risk does this produce? Just because the digestate is in a more plant available form doesn’t mean the plant will take it up if there is already ample amount of nutrients in the soil.

Nature Energy: If there is already ample amount of nutrients in the soil, why would digestate be applied? Unlike manure which is often applied because it needs to be disposed of, digestate is more like commercial fertilizer that is applied to provide nutrients needed by the next crop.

- This is where nutrient management will be strongly suggested to be followed to prevent over supplying our soils. If it isn’t followed, do these farms get reported? If so, report to NE? to the county?

Nature Energy: Nature Energy will only partner with dairy farmers that agree to utilize NMPing and to report their applications to the appropriate government agency.

- What comes in verses out?
  - What comes in has to come out, just in a slightly different form and concentration
  - In = raw manure + food waste + turkey litter
  - Out = digested manure, food waste and turkey litter
    - Raw manure = a portion of nutrients are available, and a portion will become available (think slow-release fertilizer)
    - Digested manure = majority, if not all, nutrients are plant available from manure, food waste and turkey litter
  - What comes out is different than what went in

Nature Energy: This is precisely why dairy farmers are willing to participate in the Roberts

Nature Energy project. They are loaning their manure, which is highly variable in nutrient content, over to Nature Energy and receiving much more homogeneous digestate or nutrient water with a known nutrient content.

- Food scrapes: how does this affect nutrient concentrations

Nature Energy: Food scrapes will make up 5.2% of incoming biomasses and will have negligible effect on nutrient concentration. That effect will be reported to the participating farmers so that they can adjust their NMPs.

- Depends on the scrapes. Typically, there is less sugar in food scrapes, therefore producing a higher 'carbon' value to the digester system. NE has the potential to make money by taking this food scrap.

Nature Energy: The objective of every business is to make money. Nature Energy is making money by converting our waste into renewable natural gas and bio-fertilizer.

- Is contamination a worry
  - Yes, as nutrients are more plant available, farmers run a higher risk of loss, even if applied to an actively growing crop. However, typical manure applications are in spring and fall when there are no actively growing crops
    - *Recommendation:* require that cover crops are used by the grower and/or have NE reimburse grower for a portion of installation

Nature Energy: Nature Energy will encourage participating producers to put in cover crops.

- Based off Agronomist question 2: who will oversee collecting, analyzing and paying for analysis of manure and digestate materials?

Nature Energy: Nature Energy will collect samples of raw manure, digestate and nutrient water for analysis, and facilitate the analysis. NE pays for the analysis.

- How often will the manure be tested?

Nature Energy: Weekly.

- From each farm?

### **Nutrient Management Planning**

- Any farmers accepting NE by-product will be required to have a nutrient management plan
  - Nature Energy should keep a list of all growers accepting by-products and the loads that are hauled to and from each

Nature Energy: Yes, Nature Energy will keep complete records of how much manure is

collected from each farm, as well as how much digestate or nutrient water is returned to each farm.

- NMPs are required to be updated on an annual basis and filed to the county land and water conservation department or one of its affiliates.
  - Along with the NMP, soil testing needs to be updated every four cropping seasons in order to maintain compliance

**Nature Energy:** Soil testing every 4 years is a part of NMPing.

- If a farm accepts by-product and is new to NMPs, a NMP will have to be created and updated which will add to the workload of the county staff who already review these plans

**Nature Energy:** Nutrient management plans are in place to ensure nutrients are utilized for crop production in an optimal way which in turn benefits the environment. Nature Energy therefore considers bringing in more acres covered by an NMP to be a net benefit both agronomically and environmentally, despite county staff will have more plans to review.

**Ayres questions related to the land application and farm questions is:**

- Page 8 of 25, section 1.5, first paragraph – A for digestate, farms cannot spread during winter, what happens after 3 days, maybe stored on farms then?
  - Non-CAFO farms (under a general 590 NMP) are allowed to spread manure in the winter. CAFO operations are required to have an emergency spreading plan and are only allowed to spread in an emergency situation.

**Nature Energy:** Nature Energy returns digestate or nutrient water to participating dairy farms when they pick up the manure. CAFOs already have surplus exiting lagoon storage since returning 40-50% of their manure volume in digestate or nutrient water will return the nutrient content of their manure. CAFOs may be willing to rent their surplus storage capacity to non-CAFO dairy farms or to neighboring crop farmers.

- If NE does not have space for the digestate, these farms will have to make sure they have enough space to store until optimum application timings (spring or fall).

**Nature Energy:** Yes, this is correct.

- Page 8 of 25, section 1.6, second paragraph – what happens to digestate on farms in winter, any concerns with storage or storage process on the farms?
  - Nature Energy has expressed that these farms will already have existing facilities for storage. Whether they are up to date is on the farm or the farm's engineer to make sure all structures are up to code.

**Nature Energy:** The responsibility on the farmer for ensuring the storage facilities are up

to code is the same as when the storage facilities are used for manure storage.

- Page 8 of 25, section 1.6, fourth paragraph – concern with farmers being responsible for nutrient management plans
  - Nature energy has stated that each farm will be in charge of their own nutrient management plan and reporting/filing all appropriate documents on their own. This does present some concern as not every plan is uniform or updated on an annual basis, as they are supposed to be.

**Nature Energy:** As stated, Nature Energy will provide analysis of the digestate or nutrient water and participating farmers can access this information to ensure they have accurate information.

It is noted that delivering manure to Nature Energy will provide substantially better nutrient analysis information compared to the current system. Currently, dairies may collect their manure samples for analysis or use standard 'book' nutrient values which provides far less accurate information compared to delivering manure to Nature Energy, where Nature Energy will provide weekly digestate or nutrient water values.

- Nature energy would provide weekly digestate analysis, which all participating farmers would have access to via an online portal.
- Page 8 of 25, section 1.6, fifth paragraph – they note lower levels of unused nutrients, any need to get a range of numbers here?
  - I am guessing the 'unused nutrients' refers to manure in that nutrients are slowly converted to plant available. When manure is initially applied, there is a certain amount of nutrients available right away. Then, overtime, the microbes in the soil slowly convert more of the nutrients to plant available. This process can take up to a couple of years depending on the soil type, soil health, and organic matter.
- Page 9 of 25, section 1.8, first paragraph – any concern with no hauling on Sundays as farmers have to operate when the sun shines, 7 days per week or maybe adequate storage on farms
  - Non CAFO farms under a general 590 NMP are allowed to spread whenever. Restrictions they have are based off of soil type, slope, depth to bedrock, to name a few. CAFO facilities are not allowed to spread if there is a rain event that is equal to or greater than a 24-year, 24-hour rain event (NR 243).

**Nature Energy:** Participating dairy farms are required to have reception pits large enough to hold 1 ½ days of manure production so that Nature Energy employees are not picking up manure and delivering digestate or nutrient water on Sunday.

- Page 9 of 25, section 1.8, second paragraph – Who determines the "correct" amount of nutrients, is this the Nutrient Management Plan, if not done by Nature Energy, do all farms have to have a Nutrient Management Plan?
  - The NMP will designate the amount of digestate that can be land applied based on the amount of nitrogen or phosphorus. The restrictions of N or P will be farm specific (even down to the field), based off of previous crops, legume credits, previous manure

- applications, soil test P level, to name a few.
- Yes, it seems to be that all farms will have to have a NMP if they are accepting any digestate

**Nature Energy:** Nature Energy will only partner with dairy farmers that agree to utilize NMPing and to report their applications to the appropriate government agency.

### **Questions from the Agronomist**

- What is the concentration of the digestate compared to that of the manure?
  - This will tell us if the farm will be getting a greater **volume** returned or not
  - Greater volume means more manure storage, which some farms are already tight on (especially like this year with a later than normal spring)

**Nature Energy:** The amount of digestate or nutrient water needed to provide the same amount of nitrogen as his manure contained will require returning a volume of digestate or nutrient water equal to 40-50% of the volume of his manure.

- Should the farms be compensated? If so, how does NE propose this happen?
  - Pay farms on a per load removed basis
  - Pay farms on a per load returned basis
  - Pay farms on a per acre (NMP) basis

**Nature Energy:** The benefit to the dairy farms include: higher proportion of plant available N, lower volume digestate/nutrient water returned compared to raw manure supplied, better balance between N and P relative to crop needs, etc. There is no direct financial compensation.

- What permit(s) will NE have? As soon as industrial waste is added to the manure/digestate, there are different restrictions that need to be abided by. There is where it would be handy for someone from DNR to be able to facilitate questions.
  - What effluents will be handled when? Can you keep them separate, therefore manure is manure-digestate under NR243 Permit and the food water goes under the industrial waste permit
  - How are they to be labeled and handled once they leave the facility... all in one or separate?

**Nature Energy:** Nature Energy is in the process of securing the necessary permits from the Village and from the State of Wisconsin.

- With there be contracts with the farms? Annual? Multi-year?

**Nature Energy:** Yes, there will be contracts. These will be long-term contracts signed for five-year intervals.

- Are all responsibilities on the farmer once NE has dropped off the digestate? Is this legal?
- Who takes responsibility when? In transportation? Spills?

Nature Energy: This is specified in the contract between Nature Energy and the dairy farmers; Nature Energy is responsible for the manure when it is picked up and until it is delivered back in the tank on the farm. Nature Energy is responsible for the transport.

- What happens to the nutrient content once this digestate must sit for extended periods of time, on the farm, between optimum spreading timings?

Nature Energy: Just as manure slurry tends to segregate when stored, digestate will segregate to a lesser extent. This tendency to segregate is significantly reduced with nutrient water because the fiber fraction of the digestate has been removed. Provisions to mix the digestate prior to withdrawing from storage will need to be included in the management plan for the storage facility.