

NC Subsurface Water Pollution Control System Operator

Need-to-Know

May 12, 2023

Digester Biogas Reactor Needs to Know (NTKs)

1. Basics of Anaerobic Digestion (Module 1):

- 1.1. Explain the anaerobic digestion process.
- 1.2. Define digestate.
- 1.3. Define biogas.
- 1.4. List the gases produced in digestion.
- 1.5. Explain the hazards of gases produced in digestion.
- 1.6. Understand the factors that influence digester operations.
- 1.7. List the material that should not enter the digester and why.
- 1.8. Explain how an anaerobic digester impacts a farm's nutrient management plan.

2. Digesters and Gas Clean-up (Module 2):

- 2.1. List examples of digester design.
- 2.2. List the uses of biogas.
- 2.3. Explain the difference between biogas and renewable natural gas (RNG).
- 2.4. Understand why biogas is filtered before use.
- 2.5. List examples of unwanted biogas ingredients.

3. O&M Anaerobic Digesters (Module 3):

- 3.1. Know the permitted freeboard for the anaerobic digester.
- 3.2. How to determine freeboard in the digester
- 3.3. Know the design pressure for the digester and how that relates to cover volume (inflation) in inground digesters.
- 3.4. Know the minimum recommended distance between the digester and an open flame.

- 3.5. Understand the difference between water collected on digester cover and in the secondary lagoon.
- 3.6. Define manure foaming causes and risks.
- 3.7. List interventions to reduce foam occurrence.
- 3.8. Explain the importance of sludge removal for digester management and operation.
- 3.9. Explain how to sample digester influent, effluent, and digester content.

4. Preparing for Extreme events (Module 4):

- 4.1. Understand the risks of extreme weather conditions (high speed wind, extreme rainfall) to the digester system.
- 4.2. List the measures you can take to reduce risk of extreme weather to the digester system.

5. Protecting Environmental Quality (Module 5):

- 5.1. Describe how a digester can negatively impact air quality.
- 5.2. List potential water quality impacts of manure digesters
- 5.3. Describe pollution control systems appropriate for mitigating air quality impacts of anaerobic digesters.
- 5.4. Describe pollution control systems appropriate for mitigating water quality impacts of anaerobic digesters.
- 5.5. Explain how frequently sludge needs to be removed from a digester.

6. Personal Safety & Public Health & Biosecurity (Module 6):

- 6.1. Describe the potential health impacts associated with exposure to biogas.
- 6.2. Describe proper procedures for entering an area designated as a confined space.
- 6.3. Describe PPE and monitors recommended for operators working around digesters.
- 6.4. Describe potential sources of flammable gasses in a biogas digester and describe potential sources of explosion hazard.
- 6.5. List essential safety equipment necessary to control fire and explosion hazards.
- 6.6. Describe first aid measures associated with exposure to biogas hazards.