final draft NTK April 14, 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.

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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.