

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

WASTE FACILITY COVER

(No.)

CODE 367

DEFINITION

A fabricated rigid, semi-rigid, or flexible membrane over a waste treatment or storage facility.

PURPOSE

To cover a waste facility for:

- water quality improvement
- air quality improvement
- capture of biogas for energy production

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where:

- Exclusion of precipitation from an animal waste storage or treatment facility will improve management of an existing or planned system.
- Capture and controlled release or flaring of emissions from an existing or planned agricultural waste storage facility will improve air quality.
- Bio-treatment of emissions from an existing or planned waste storage or treatment facility will improve air quality
- Biogas production and capture for energy are components of an existing or planned animal waste system.

CRITERIA

General Criteria Applicable to All Purposes

Laws and Regulations. All planned activities shall comply with all federal, state, and local laws and regulations. The Alabama Department of Environmental Management (ADEM) Rules require owners/operators of animal feeding operations and associated waste management systems to fully

implement and regularly maintain effective best management practices (BMP's) that meet or exceed NRCS technical standards and guidelines to prevent discharges and to ensure groundwater and surface water quality.

All construction activities must implement adequate construction BMP's. In addition, to comply with the National Pollutant Discharge Elimination System rules, all construction activities involving one acre or more of land disturbance shall have and follow a construction best management practices plan prepared by a qualified credentialed professional until construction is complete and all disturbed areas are stabilized. All construction activities related to waste contact or containment, including design, installation, modification, and closure are to be certified by a professional engineer licensed in the state of Alabama.

Cultural Resources. Ground disturbing activities such as excavation and site preparation for animal waste facilities have the potential to affect significant cultural resources. A cultural resources review shall be completed prior to ground disturbing activities to assure that existing cultural resources will not be adversely impacted.

Service Life. The cover and appurtenances shall be designed to provide a service life of not less than 10 years.

Materials. The type, thickness and material properties of the cover and any supporting members shall account for all loads and stresses due to operational, environmental, and climatic conditions.

Flexible membrane materials, used for fabrication of inflated and floating covers, shall be certified by the manufacturer as suitable for the intended application.

The cover manufacturer and/or installer shall warrant the cover for the intended use and design life, certify that the cover is properly installed, and provide maintenance instructions.

Loads. Where applicable, the membrane cover and support system shall be designed to resist snow and wind loads as specified in American Society of Civil Engineers (ASCE) Standard 7-02, Minimum Design Loads for Buildings and Other Structures.

Biogas Emissions. The cover system shall provide for managing the biogas emissions according to one of the following methods:

- **Capture and Control.** The cover system shall be designed to capture biogas emissions and transfer to point of discharge without mixing with air. The point of discharge shall be equipped with a flare or utilization equipment as appropriate.
- **Bio-reduction and Direct Release.** The cover shall be fabricated of a permeable composite membrane designed to promote biological treatment of gaseous emissions. Gaseous emissions pass through the membrane for direct release to the atmosphere.
- **Contain and Release.** The cover system is designed for rainfall exclusion and not to specifically capture biogas. Therefore special handling or treatment of biogas emissions is not required except as necessary to prevent undue safety hazards.

Anchorage. The cover anchorage system shall be designed in a manner to resist internal gas pressures, corrosive environment, wind loads or other forces as appropriate to the cover system.

Repair. New and aged flexible cover materials shall be readily repairable by solvent, adhesive, or thermoplastic welding. Semi-rigid cover material shall be repairable by sectional replacement.

Precipitation. Impermeable covers shall direct precipitation to collection points for removal by pumping or by controlled release to suitable grassed or otherwise stabilized areas for discharge.

Access. Covers shall be removable or otherwise provided with suitable equipment access as necessary for normal operation and maintenance of the waste facility.

Safety. The cover shall include safety features, including fences and warning signs as appropriate to prevent undue hazards.

As a minimum all impermeable covers shall have "Warning Flammable Gas" and "No Smoking" signs posted on all sides.

Where biogas is captured, the gas collection and control system shall be designed in accordance with standard engineering practice for safely handling a flammable gas.

Flares shall be located a minimum distance of 95 feet from the biogas source and grounded or otherwise protected to minimize the chance of lightning strikes.

A flame trap device shall be provided in the gas line between the flare and the waste facility.

The location of underground gas lines shall be marked with signs to prevent accidental disturbance or rupture. Mark exposed pipe to indicate whether gas line or other.

Additional Criteria for Rigid Covers

Rigid covers shall meet the structural requirements of Alabama NRCS conservation practice standard Waste Storage Facility, Code 313.

The cover or cover vessel design shall include provisions for fail safe pressure relief. Maximum pressure shall not exceed 12 inches water column.

Additional Criteria for Inflated Covers

Covers inflated and supported by forced air from mechanical means shall be:

- Equipped with a warning system to notify operator of blower failure
- Provided with a support system to limit cover collapse in the event the blower fails and for access of equipment
- Provided with a suitable access port for normal maintenance equipment

Additional Criteria for Floating Covers

Permeable floating covers shall be, as a minimum, non-woven, non-heat bonded, needle punched geotextile with a minimum weight of 8 ounces per square yard and a minimum grab tensile strength of 200 pounds. An alternative type of permeable floating cover may be used if its effectiveness has been documented in similar applications.

Floating covers shall be supplemented with floatation materials as necessary for proper function, operation, and maintenance.

Minimum impermeable membrane or composite membrane thickness shall be 40 mils.

Impermeable floating covers shall be designed with a biogas collection, transfer and control system to control ballooning of the cover and convey biogas to a flare or release point. The system design shall account for the facilities seasonal emission rates.

Additional Criteria for Energy Production

The cover materials and all appurtenances such as weights and floats shall be designed to capture and convey biogas to the gas collection system. The cover design shall provide for the following:

1. **Air Infiltration.** The cover system and appurtenances, including perimeter soil slopes above the water line for in-ground digesters, shall be designed to exclude the entrance of air under all operating conditions.
2. **Material.** The minimum material thickness for flexible geomembrane covers shall be:
 - 40 mils for non reinforced material
 - 36 mils for reinforced materials
3. **Gas Collection, Control, and Utilization.** The collection of biogas and flaring or other end use shall meet the criteria in sections "Gas Collection, Transfer, and Control System" and "Gas Utilization" in Alabama NRCS conservation practice standard Anaerobic Digester - Ambient Temperature, Code 365.

CONSIDERATIONS

Animal waste storage facilities can release large amounts of biogas at certain times of the year. The cover and gas collection system should be designed for release of this gas.

Storage of biogas should be considered when installing flexible covers over storage impoundments (lagoons) to attenuate gas supply for end use or controlled release.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared in accordance with the criteria of this standard and shall describe the requirements for applying the practice to achieve its intended use.

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be developed that is consistent with the purposes of the practice, its intended life, safety requirements, and the criteria used for its design.

When gas storage is included in the system design, the plan shall contain instructions as to limits of cover ballooning and emergency procedures if control equipment fails.

The plan shall include provisions for monitoring the accumulation of solids in the liquid storage structure and a method for removing the solids when their maximum design level is reached.

REFERENCES

ADEM Administrative Code, Chapter 335-6-7, as amended

Alabama NRCS Conservation Practice Standards:
 Anaerobic Digester - Ambient Temperature, Code 365
[Waste Storage Facility, Code 313](#)
[Waste Treatment Lagoon, Code 359](#)

"Minimum Design Loads for Buildings and Other Structures," Standard 7-02, ASCE

[NRCS Cultural Resources Handbook](#)