

USDA
NATURAL RESOURCES
CONSERVATION SERVICE

DELAWARE CONSERVATION
PRACTICE STANDARD

WASTE FACILITY COVER

CODE 367
(Reported by No.)

DEFINITION

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

PURPOSES

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 will improve air quality.

- Bio-treatment of emissions from an existing or planned waste storage or treat facility will improve air quality.
- Biogas production and capture for energy are components of an existing or planned animal waste system.

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.

This practice has the potential to affect National Register listed cultural resources or eligible (significant) cultural resources. These may include archeological, historic, or traditional cultural properties. Care should be taken to avoid adverse impacts to these resources. Follow NRCS state policy for considering cultural resources during planning.

CRITERIA

Criteria Applicable to All Purposes

Laws and Regulations. Waste Facility Cover systems for animal waste facilities must be planned, designed, and constructed to meet all federal, state, and local regulations.

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

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

be certified by the manufacturer as suitable for the intended application.

Loads. Where applicable, the membrane cover and support system shall be designed to resist snow and wind loads as specified in ASAE EP288.5, Agricultural Building Snow and Wind Loads.

Biogas Emissions. The cover system shall provide for capture and control of biogas, bioreduction and direct release of gaseous emissions, or contain and release of gaseous emissions, as appropriate.

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 covers shall include the following:

1. "Warning Flammable Gas" and "No Smoking" signs shall be posted.
2. 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.
3. Flares shall be grounded or otherwise protected to minimize the chance of lightning strikes.
4. A flame trap device shall be provided in the gas line between the flare and the waste facility.
5. The location of underground gas lines shall be marked with signs to prevent accidental disturbance or rupture.

Additional Criteria for Rigid Covers

Rigid covers shall meet the structural requirements of Practice Standard 313, Waste Storage Facility.

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:

1. Equipped with a warning system to notify operator of blower failure.
2. Provided with a support system to limit cover collapse in the event the blower fails and for access of equipment.

3. Provided with a suitable access port for normal maintenance equipment.

Additional Criteria for Floating Covers

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

Minimum membrane or composite membrane thickness shall be 40 mils.

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:
 - a. 40 mils for non-reinforced material.
 - b. 36 mils for reinforced materials.
3. Gas Collection, Control and Utilization. The collection of biogas and flaring or other end use shall meet appropriate criteria in Practice Standard 365, Anaerobic Digester – Ambient Temperature.

SPECIFICATIONS

Plans and specifications for this practice shall be prepared in accordance with the previously listed criteria. Plans and specifications shall contain sufficient detail to ensure successful implementation of this practice. Documentation shall be in accordance with the section "Supporting Data and Documentation" in this standard.

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.

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

SUPPORTING DATA FOR DOCUMENTATION

The following is a list of the minimum data and documentation to be recorded in the case file:

1. Location the practice on the conservation map.
2. Assistance notes. The notes shall include dates of site visits, name or initials of the person who made the visit, specifics as to alternatives discussed, decisions made, and by whom.

Field Data and Survey Notes

The following is a list of the minimum data needed:

1. Plan view sketch.
2. Soil borings with depth to water table identified.
3. Type, size, and number of animals the structure is designed to serve.
4. Topographic survey as needed for the siting of the structure and its appurtenances.
5. Profile and cross-section of the site if a grading plan is needed.

Design Data

Record on appropriate engineering paper. For guidance on the preparation of engineering plans see Chapter 5 of the Engineering Field Handbook - Part 650. The following is a list of the minimum required design data:

1. Determine soil type and any special restrictions.
2. Determine the type of cover that will be constructed.
3. Design the cover in accordance with this practice standard or by other approved methods.
4. Show job class on the plan.
5. Include the Miss Utility notification statement.
6. Plan view sketch and final grading plan as required.
7. References to components supplied by others (blowers, flares, etc.).
8. Structural details of all components with dimensions and special requirements noted.
9. Special safety requirements.
10. Seeding, fertilizing, and mulching requirements.
11. Written Operation and Maintenance Plan.

Utilities Notification

1. Forms ENG-5 and ENG-6 can be used to assist in tracking utility notifications.
2. Document on CPA-6 initial discussion about his or her responsibility to notify Miss Utility.
3. Document on CPA-6 any information from the landowner about the existence and location of known utilities.

4. Document on CPA-6 assurances from the landowner that Miss Utility has been notified, including staking by the utilities.

Construction Check Data/As-Built Plans

Record on survey notepaper, NRCS-ENG-28, or other appropriate engineering paper. Survey data will be plotted in red on the as-built plans. Document approval by the designer of any changes from the drawings or specifications before implementation of the change.

The following is a list of minimum data needed for as-built documentation:

1. Documentation of site visits on CPA-6. The documentation shall include the date, who performed the inspection, specifics as to what was inspected, all alternatives discussed, and decisions made and by whom.
2. Check notes recorded during or after completion of construction showing dimensions and elevations of the structure, as appropriate.
3. Statement on seeding and fencing.
4. Final quantities and documentation for quantity changes. Materials certifications as appropriate.
5. Sign and date check-notes and plans by someone with appropriate approval authority. Include statement that practice meets or exceeds plans and NRCS practice standards.