



Poultry Litter Storage Facility Operation and Maintenance Plan

Facility Information

Owner:	
Location:	
Constructed by:	
Date Constructed:	
Other:	

Purpose

This facility has been constructed for the temporary storage of poultry litter until land application or other beneficial use is available in accordance with Texas NRCS Conservation Practice Standard for Waste Storage Facilities. This facility aids in the protection of surface and ground water from the possible pollution through runoff of litter stored outside. This storage is necessary to allow the proper application of litter to cropland or pastureland as rainfall and growing conditions permit.

Responsibility by Owner

If the facility was constructed utilizing NRCS funding, such as EQIP, the owner is responsible for maintaining the structure and keeping it operational for a minimum of **15 years**. If the owner fails to keep the facility maintained and operational for its intended use, NRCS may seek recovery costs and reparation costs. Recommended maintenance and inspections are detailed later in this document. NRCS is not liable for any negligence on behalf of the owner or operator.

Operation

This facility is constructed to achieve a minimum lifespan of 15 years and with proper maintenance should achieve and possibly exceed this duration. It is **only** for the temporary storage of poultry litter and may be used for composting of poultry carcasses in the case of a catastrophic die-off.

Poultry litter shall be stacked in the storage facility with a maximum height of five feet on the sides and shall not exceed seven feet at any point. Litter from cake-outs and litter from total cleanouts shall be separated by at least one foot of space at the ground level to prevent combustion of the litter. Care should be taken to not mix litter that has different levels of moisture content. All poultry litter goes through a natural decomposition process that generates heat. This heat is minimized if the litter is stacked dry, to heights less than seven feet and is left loose and not compacted.

It is recommended that a three foot thermometer be purchased to monitor the temperature of the litter. These can be purchased for \$75 to \$100 and serve as an inexpensive way to protect your investment. Passive composting temperatures are typically 150 degrees Fahrenheit and should not exceed 160 degrees Fahrenheit to avoid spontaneous combustion. At 190 degrees, spontaneous combustion will likely occur.

The operator shall maintain records of the date, type, and quantity of litter placed and removed from the storage facility. A sample record form is included on the following page.

Visual Inspections

The facility should be visually inspected for potential holes in the roof or cracks in the sidewalls every time litter is placed or removed from the facility. If daylight can be seen through a small hole in the roof, immediate repairs shall be required for any opening in the roof. If litter gets wet, even from a small leak, it is very likely that the wet spot will cause a fire and could destroy the entire structure.

Inspections

The facility should be inspected after any major storms that may have caused damage and at least on an annual basis. These inspections shall check for cracks in the foundation, holes in the roof, gaps in the side walls, and the structural components. The annual inspection should occur when the structure is empty. Replace any wooden parts, hardware, or other replacement parts which are damaged or show excessive wear or decay. Roof structures should be examined for structural integrity. Poultry litter is extremely corrosive, so all cracks in the foundation and walls shall be sealed with appropriate adhesive or caulking. Even hairline cracks provide a conduit for the corrosion of the rebar inside the concrete. Any holes in the roof shall be patched immediately. The operator shall maintain records of inspections for this facility. A sample Inspection Record is included on a following page.

Caution

Wet litter may create a fire hazard. Also, mixing litter with different moisture contents is also a fire hazard. Use caution when adding new litter to existing stockpiles. Smoldering litter may burst into flames when exposed to air. Please refer to last two pages relating to fires at litter storage facilities.

Sample Inspection Record (minimum Annual)

Date of Inspection	Roof Inspection	Wall Inspection	Foundation Inspection	Other Comments
	<input type="checkbox"/> No holes or leaks <input type="checkbox"/> Repairs required Repairs completed on: _____	<input type="checkbox"/> No gaps <input type="checkbox"/> Repairs required Repairs completed on: _____	<input type="checkbox"/> No gaps or cracks <input type="checkbox"/> Repairs required Repairs completed on: _____	
	<input type="checkbox"/> No holes or leaks <input type="checkbox"/> Repairs required Repairs completed on: _____	<input type="checkbox"/> No gaps <input type="checkbox"/> Repairs required Repairs completed on: _____	<input type="checkbox"/> No gaps or cracks <input type="checkbox"/> Repairs required Repairs completed on: _____	
	<input type="checkbox"/> No holes or leaks <input type="checkbox"/> Repairs required Repairs completed on: _____	<input type="checkbox"/> No gaps <input type="checkbox"/> Repairs required Repairs completed on: _____	<input type="checkbox"/> No gaps or cracks <input type="checkbox"/> Repairs required Repairs completed on: _____	
	<input type="checkbox"/> No holes or leaks <input type="checkbox"/> Repairs required Repairs completed on: _____	<input type="checkbox"/> No gaps <input type="checkbox"/> Repairs required Repairs completed on: _____	<input type="checkbox"/> No gaps or cracks <input type="checkbox"/> Repairs required Repairs completed on: _____	
	<input type="checkbox"/> No holes or leaks <input type="checkbox"/> Repairs required Repairs completed on: _____	<input type="checkbox"/> No gaps <input type="checkbox"/> Repairs required Repairs completed on: _____	<input type="checkbox"/> No gaps or cracks <input type="checkbox"/> Repairs required Repairs completed on: _____	

Tips to Help Prevent Litter Storage Structures Fires

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Litter storage structures enable poultry farmers to store or stockpile poultry litter and land apply the litter at appropriate times. A danger associated with litter storage is the possibility of fire caused by heat generated within the litter pile. Spontaneous combustion in a litter stack can result from the buildup of combustible methane or the storage of wet and dry litter. Fires in litter storage structures can oftentimes be prevented if the storage site is properly located and maintained.

Common factors in litter storage fires include:

- moisture,
- caked litter,
- layering new litter over older litter,
- pile size ,
- and compaction.

Moisture – *Keep litter dry! Inspect for leaks and protect from blowing rain.*

Moisture is a critical factor in all litter storage fires. Perhaps the most common error made by poultry farmers is adding moist litter to a dry stack. Heating and the formation of methane gas begin as the dry litter absorbs moisture. Anaerobic bacteria generate about 50 to 65 percent methane, about 30 percent

carbon dioxide, and a smaller percentage of other gases. Therefore, if the moisture content of stored litter is more than 40 percent in a stack with little or no oxygen, conditions are right for anaerobic bacteria to grow and produce methane gas.

Heat generation and methane gas formation can be limited if litter is allowed to dry completely before it is applied to the stack. If the stack has adequate pore spaces, any methane that forms will escape into the atmosphere. Stacks exposed to wind-driven rain can accumulate moisture and become a fire hazard, so litter should be protected from blowing rain.

Cake Litter – *Do not mix old litter with new litter! Leave some space between the old litter and the new litter when stockpiling within the barn – do not let it touch.*

Cake litter cleaned out from underneath a waterer will have a higher moisture content and can also contribute to litter storage fires. Caked litter will be much higher in moisture than litter located throughout the rest of the house. Separate piles of high moisture caked litter from drier caked litter piles, and also from whole house piles.

Layering – *mixing different aged litter is not recommended. If litter must be layered make sure it is completely dry and both types are at the same moisture content.*

Layering new moist litter on top of old dry litter creates an insulated, heat-producing situation (creates a high risk potential for a fire). Litter should be completely dry before being added to a stack.

Pile Size – *limit height to no more than 7 feet.*

Pile size affects heat release. Pile height and width are more critical than pile length. Small piles provide greater surface area for heat release: large piles increase the chance for excessive heat or fire. A litter stack should be no more than 7 feet high.

Compaction – *Do not compact litter!*

Compacting litter will trap heat in the pile. Litter or moist cake should not be compacted. Compacting creates anaerobic conditions and prevents the natural venting of methane. Heat is not easily released from a compacted pile.

The following recommendations should help prevent litter storage fires.

1. Keep litter dry! Wetting litter will not prevent a fire; just the opposite may happen. Protect litter from blowing rain.
2. Store caked litter in a separate pile from dry litter.
3. Avoid compacting moist or dry litter.
4. Stack litter no more than 7 feet high.
5. Keep moist litter uncovered. Let litter piles vent naturally.

6. Allow new litter to dry completely before layering it on top of old litter.
7. Stack litter away from wooden walls or structural support posts.
8. Frequently monitor temperatures at various locations within the pile, and remove any materials that have temperatures greater than 180 degrees F. If temperatures exceed 190 degrees F or if the material is smoldering, notify the local fire department and get instructions for removing material from the building. Use extreme caution: a smoldering pile can burst into flame when exposed to air.

Smoldering Piles – smoldering litter may burst into flames when exposed to air!

1. Notify the local fire department
2. Use caution and remove ALL litter from the storage barn
3. Do NOT apply water!

After a fire

Have an engineer evaluate the facility for structural damage.

References:

Parsons, James; “Preventing Fires in Litter Storage Structures”; Agriculture & Food: Animal Agriculture; December 12, 2008; <http://sampson.ces.ncsu.edu/index.php?page=news&ci=ANIM+1>

Fairchild, Ace; USDA – NRCS, Gonzales, Texas; Personal communications and site visits; 2006 – 2009.

Schmidt, Al; USDA – NRCS, Nacogdoches, Texas; Personal communications and site visits; 2006 – 2009.