The Scoop

Vol. 5 No. 3
May 2011

On Animal Agriculture and the Environment

Avert and prevent manure storage spills during this rainy season

Assess and monitor outdoor manure storage systems during this rainy season.

By Natalie Rector

Rain and outdoor manure storage are battling it out this spring. The more rain, the more freeboard disappears in the storage and the less opportunity to spread manure without getting stuck. What to do?

There are no simple solutions to the current situation, but thinking through your specific situation, and monitoring it daily can help prevent, or at least minimize, environmental risks and potential regulatory issues.

So, what should you do? Do anything you can to reduce liquid storages before they are dangerously close to overflowing. Even relieving a few inches off the top will buy some time and reduce stress on the storage system. Options may include transferring manure to another system, hauling to the driest field you have or assessing if you can get on any alfalfa field without getting stuck.

Don't make a bad situation worse. If land applied, be sure that the manure is not at risk of running off to surface waters. Tile drained fields provide another risk during wet times. Be cautious by taking appropriate steps to insure land applied manure does not reach surface inlets or tile drains.

Outside manure storages should be designed with freeboard to deal with exactly the weather we have been having. Slightly different requirements for freeboard exist for permitted and non-permitted farms. In general, an outside storage, especially a slope sided, earthen storage, should have at least 16 inches of freeboard. The late spring and excessive rains in some parts of Michigan may be causing the freeboard to be consumed by rain and runoff. As rain fills up this freeboard, it may put engineering stress on the integrity of the structure. If the stress results in a break or overflow of the storage, thousands of gallons could quickly exit the manure storage. A manure storage that captures runoff from around the farmstead, in addition to direct rainfall, obviously fills up even faster. Any clean water that can be diverted from reaching the manure storage would help now and in future rainy weather.

For all storage structures, especially earthen, cautiously walk the perimeter of the storage daily if necessary, based on your rainfall amounts, weather forecasts and storage situation. Recognize that berms for earthen storages, just like fields, may be water saturated and weakened.

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MICHIGAN STATE UNIVERSITY EXTENSION

Straw covers control odors and other emissions from manure storage structures

Straw covers are inexpensive and effective for reducing odors from manure storage structures.

By Gerald May

Odors and other gaseous emissions from livestock production (ammonia, hydrogen sulfide, volatile organic compounds) are associated with five different management areas; animals and housing, manure storage, feed and feed storage, mortality handling and land application. Four of the five all contribute to farmstead odors. Up to 50 percent of the odors from a livestock production site may be emitted from the manure storage structure. Therefore farms with exterior manure storages have the opportunity to reduce farmstead odors by implementing manure storage odor mitigation practices. Straw covers are an inexpensive practice for controlling the odor and other emissions from exterior manure storages structures.

Straw covers are included in a group of odor control practices called permeable covers. Permeable covers allow moisture into the manure storage structure while allowing gases to escape. Other permeable covers include natural forming crusts, air-filled clay balls, perlite - a naturally occurring siliceous rock and geotextile covers.

Effectiveness of straw covers

Research using small scale manure storages has shown that straw covers may provide limited odor relief or up to a 70 percent reduction in odors depending on the thickness and age of the cover. Field trials with straw covers have not confirmed the 70 percent reduction.

The University of Minnesota's Larry Jacobson and colleagues reported a 50 percent odor reduction for a straw cover that had been established on a manure

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Assess how solid the sides are, looking for low points or areas with lower structural integrity. EACH farm location has unique risks of manure reaching surface waters. ASSESS your risk, consider what the worst case scenario might be and think through a PLAN to address that situation. Knowing the down slope direction from the storage will help you think through what critical features are along that path and help you know how critical the risks could be. Know how to get earth moving equipment on site immediately and plan where potential berms would need to be built to divert the flow from reaching surface water, neighboring property or road ways. Even when there are not imminent risks to surface waters, have plans in place to contain, control and stop manure from moving overland.

For premitted farms, allowing manure to exceed te freeboard limit is a permii violation, even if a release does not occur. Contact your regional Michigan Department of Environmental Quality Staff and file a report. They will work with you to seek an emergency solution. If your farm already has a spill and release plan now is the perfect time to review that plan. Does the plan adequately address your current situation? If so follow it. If not, update the plan to reflect obvious needs. And if your farm doesn't have a written plan, you can learn how to do one on the MAEAP website, by clicking on MSU Extension bulletin E-2575, Emergency planning for farms.

Communicate precautions and plans with all farm employees and family members. Have phone numbers posted for emergency services and neighbors with equiptment that could assist.

In the event that a manure storage breaches and manure reaches surface waters, contact the Pollution Emergency Alerting System hotline immediately at the Depratment of Environmental Quality: (800) 292.4706 or the Michigan Department of Agriculture and Rural Development : (800) 405.0101 ■

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storage basin nine weeks earlier, but no odor reduction after 14 weeks. The Michigan OFFSET modeling tool uses an average of 50 percent odor reduction for straw covers. Comments from both neighbors and farm operators confirm that while straw covers reduce odors, some odor is still noticeable (Filson et al.).

The original depth of the straw cover impacts its effectiveness. Another Minnesota study reported a 63%, 78% and 83% odor reduction from straw covers when applied at depths of 3.9, 7.9 and 11.8 inches, respectively. Eight to 12 inches of straw is recommended as the starting depth of the cover though depth uniformity is a concern depending on the size of the structure. Straw covers are not suitable for large manure storage structures due to the difficulty in establishing and maintaining an even cover.

Straw covers are not a permanent solution. The straw cover needs to be reestablished each year before the weather warms and nearby residents are outside where livestock odors are more noticeable. Straw covers are more effective in dryer climates where there are fewer rain events to disturb the cover. Researchers in Minnesota report that the effectiveness of the straw covers in their trial decreased after several late summer rain events. In regions potentially impacted by summer rains, the effectiveness of straw covers may be improved by establishing the cover in the spring, anytime in May or early June, then adding fresh straw to restore the cover about half way through the summer.

Establishing the cover

One 800 lb bale of straw will cover approximately 500 ft2 at a 12 depth. Covering a one-acre storage will require about 87 round bales (70,000 lb) to achieve the desired depth of 12". Using the average current (2011) straw price ($0.05 ±$0.02 per lb) the material costs for a 12" cover would be about $0.08 per ft^2.

Concerns with fall manure application

Anytime you add material to a manure storage structure there is an increased concern with manure load out and application. There are no reported difficulties with the straw covers but a chopper pump is required for agitation and load out. Filson et al. reported polytwine is a concern and that operators want to insure all twine is collected while the straw is being applied.

Addressing odor and other gaseous emissions from manure storage structures addresses one of the four management categories where odors are generated on livestock farmsteads. Installing straw covers on exterior storages will not impact the odors from animals and housing, feed and feed storage and mortalities. Depending on the amount of odors generated by these other sources, the straw cover on the manure storage may be effective but the overall odor reduction may be less noticeable. Straw covers on exterior manure storages should be considered one practice in an overall odor reduction plan. ▪

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Establishing a straw cover in late June.

The same manure storage cover, seven weeks later.

Invite your neighbors to a Breakfast on the Farm

The perfect opportunity awaits you, your family and friends this summer at one of eight Breakfast on the Farm events scheduled for June through September. Kids of all ages – young and old alike – will experience a memorable outing to a modern-day Michigan farm.

Breakfast on the Farm is a free family-friendly program that gives consumers and farm neighbors a first-hand look at modern food production and the farm families who work hard to produce a safe, wholesome food supply for Michigan communities and the world. Michigan State University (MSU) Extension began organizing the statewide effort in 2009, and MSU works closely with county Farm Bureaus and farmer-hosts to recruit volunteers and promote the breakfasts. Visitors get to participate in self-guided tours, enjoy a delicious breakfast and meet local farmers.

Mary Dunckel, MSU Extension agricultural literacy educator and one of the organizers of the statewide events, says Breakfast on the Farm was created to help non-farm families learn about modern farms directly from the people who put food on their tables.

"Farmers are our best examples of what it means to be a steward of the land and their animals," she says. "Most Michigan farms are family-owned small businesses. What better way to learn the real story behind modern-day farming than by coming face to face with the people who are actually producing our food? That's what Breakfast on the Farm is all about."

Last year, more than 7,500 people attended four Breakfast on the Farm events in Clinton, Washtenaw, Isabella and Alpena counties. Attendees had the opportunity to learn how cows were milked, take wagon rides, sit on tractors, pet baby calves and eat ice cream. Farmers and industry professionals were able to answer questions and educate those who visited about their farm operations, the industry and food production.

Attendees also learned about proper animal care and operating farm equipment, all while enjoying a selection of Michigan-grown and Michigan-processed food at the complimentary breakfast.

Breakfast on the Farm is an excellent opportunity to spend quality time with your family while learning about the agriculture industry from the experts themselves, the farmers, through educational exhibits, a tour of the farm and open-question periods. Mark your calendars for these upcoming Breakfast on the Farm events:

- **June 18** hosted by Jeff and Patty Thelen, St. Johns (Clinton County)
- **June 25** hosted by Raymond and Stutzman Farm, Morenci (Lenawee County)
- **July 9** hosted by Circle K Farms Inc., West Branch (Ogemaw County)
- **July 16** hosted by Pasch Dairy, Mount Pleasant (Isabella County)
- **August 13** hosted by Daybreak Dairy LLC, Zeeland (Ottawa County)
- **August 20** hosted by S & M Dairy, Harbor Beach (Huron County)
- **September 17** hosted by Taylor Creek Farm LLC, Pickford (Chippewa County)
- **September 24** hosted by Benthem Brothers Inc., McBain (Missaukee County)

"I'm really excited about the quality and geographic diversity of all the farms that are hosting events," said Nancy Thelen, MSU Extension agricultural literacy educator. "They, and the volunteers who support each event, have an opportunity to tell agriculture's story to myriad people of all ages and backgrounds. It's really exciting."

There is no cost to attend the event or take the tour, but tickets are required for the free breakfast. ■

For more information about Breakfast on the Farm and a list of ticket locations, visit www.breakfastonthefarm.com.