

APPENDIX C

Environmental Stewardship Assessment: Design and Construction

For each issue listed in the left column, read across to the right and circle the statement that best describes conditions on your farm. If any categories do not apply, leave them blank.

Issue	High Risk Risk 4	High to Moderate Risk Risk 3	Moderate to Low Risk Risk 2	Low Risk Risk 1
Soil and geology considerations for slurry or liquid manure storage				
Information available about geology below site?	No soil survey, well log, or soil boring information available.	USDA county soil survey information used to evaluate site.	Soil borings detailing soil characteristics to at least 4 ft below the storage available from nearby site of similar geology.	Soil borings detailing soil characteristics to at least 4 ft below the storage available from site on which storage is located.
Characteristics of soils used in construction of earthen liner (see Lesson 23, Table 23-2 for explanation of soil groupings)?	Group 1 Passing #200 sieve: < 20% Plasticity Index: < 5	Group 2 Passing #200 sieve: > 20% and Plasticity Index: < 15 OR Passing #200 sieve: < 20% and Plasticity Index: > 5	Group 3 Passing #200 sieve: > 20% Plasticity Index: 16-30	Group 4 Passing #200 sieve: > 20% Plasticity Index: > 30
Characteristics of soil, sediment, or bedrock below storage site?	Clean gravel (GP), clean sands (GW, SW, SP, SM), cavernous or karst limestone or similar topography, permeable basalts.	Fine sand, silty sand, and gravel mixes (SP, SM, GM, GW-GM, GP-GM, SW-SM, SP-SM) or limestone, dolomites, clean sandstone, and fractured igneous and metamorphic rocks.	Silt, clay, and sand-silt-clay mixes, organic mixes, organic silts, and organic clays (GM, GC, SM, SC, MH, ML, ML-CL, OL, OH, GW-GC, GC-GM, SW-SC, SP-SC, SC-SM) or interbedded and shales.	Clay (CL or CH) or unfractured bedrock.
Distance to high-risk geology (if high-risk geology noted in previous question)?	High-risk geology < 4 ft below storage bottom or depth unknown.		High-risk geology > 4 ft below storage bottom or depth unknown.	Impermeable layer of clay or unfractured bedrock between storage and high-risk geology.
Evidence of seepage into test holes or during construction?	Evidence observed.			No evidence observed.
Soil and geology considerations for dry manure storage				
Manure stacked in field (temporary storage on soil base)?	For more than 30 days OR On coarse-textured soils. ¹ Fractured bedrock or water table shallower than 20 ft OR Upslope surface water not diverted.	< 30 days, medium- or fine-textured soils. ¹ Water table deeper than 20 ft AND Upslope surface water diverted around pile.	< 30 days, medium- or fine-textured soils. ¹ Water table deeper than 20 ft AND Upslope surface water diverted around pile AND New location for pile each yr.	Never stacked on field or bare soil.
Stacked in outdoor feedlot or permanent site for dry manure storage?	Earthen surface with coarse-textured soils. ¹ Fractured bedrock or water table shallower than 20 ft.	Earthen surface with medium- or fine-textured soils. ¹ Water table deeper than 20 ft.	Earthen surface with medium- or fine-textured soils. ¹ Water table deeper than 20 ft.	Well-maintained concrete surface.

¹ Coarse-textured soils: Sand or sandy loam soils
Medium or fine-textured soils: Loam, silt loam, clay loam, or clay soils

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Issue	High Risk Risk 4	High to Moderate Risk Risk 3	Moderate to Low Risk Risk 2	Low Risk Risk 1
Soil and geology considerations for dry manure storage (continued)				
Stored in roofed animal housing on . . .	Earthen floor of coarse-textured soils ¹ and subject to surface water runoff. Water table or fractured bedrock shallower than 20 ft. or fractured bedrock.	Concrete floor or compacted earthen floor of medium- or fine-textured soils ¹ and subject to surface water runoff. Water table shallower than 20 ft.	Concrete floor or compacted earthen floor of medium- or fine-textured soils ¹ and protected from surface water runoff. Water table or fractured bedrock deeper than 20 ft.	Building has concrete floor protected from surface water runoff.
Storage liner (soil, membrane, or concrete) considerations				
Liner designed by . . . AND Installed by contractor . . . During first filling of storage, soil liner is protected from erosion resulting from (1) manure inlets, (2) waves, (3) agitation equipment, and (4) rainfall.	No one involved in liner design. Inexperienced in liner construction. Protection for more than one cause of erosion was not considered.	Construction contractor. All but one statement is true.		Professional engineer, engineer with NRCS or other appropriate agency, or other state-registered designer. Experienced in liner construction. All statements are true.
Liner testing to substantiate liner's compliance with design standards included . . .	No testing of liner seepage was completed.	Postconstruction seepage testing or construction monitoring testing was completed for storage bottom only.	Construction monitoring of liner moisture and density was completed for both liner sidewalls and bottom. OR Design engineer regularly inspected liner construction to ensure acceptability.	Postconstruction seepage testing of representative storage bottom and sidewall by a commercial lab or engineering service.
Permeability rate or seepage rate used to design liner (earthen-lined storage structures only)?	No evaluation of permeability rate or seepage rate was made during liner design OR Permeability > 10 ⁻⁶ cm/sec (seepage rate > 0.2 inches/day for 10 ft deep storage with 2 ft thick liner).		Permeability between 10 ⁻⁶ cm/sec and 10 ⁻⁷ cm/sec (seepage rate between 0.2 and 0.02 inches/day for 10 ft deep storage with 2 ft thick liner) AND Permeability < state standard.	Permeability < 10 ⁻⁷ cm/sec (seepage rate < 0.02 inches/day for 10 ft deep storage with 2 ft thick liner) AND Permeability < state standard.
Liner designed with bentonite or soil-dispersant additives?	No evaluation of permeability rate or seepage rate made during liner design OR Permeability tested with soil amendment > 10 ⁻⁶ cm/sec.		Permeability tested with soil amendment is between 10 ⁻⁶ cm/sec and 10 ⁻⁷ cm/sec. AND Permeability < state standard.	Permeability tested with soil amendment < 10 ⁻⁷ cm/ AND Permeability < state standard.

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Storage structure features				
Sufficient access for complete removal of liquid and settled solids (formed manure storage and earthen storage basins only)?	Existing facility: Solids are accumulating with time. OR New facility: Agitation equipment is not readily available or access locations are not provided for agitation.	Only limited access for agitation equipment is provided.		Existing facility: Solids are not accumulating with time. OR New facility: Access for agitation equipment is provided at least every 50ft of storage perimeter.
Manure inlets are located . . .	Above the liquid level.		Generally below the liquid level.	Below the lowest liquid level.
Outlet pipes pass through the wall or berm and . . .	Have 1 shutoff valve with no ability to lock valve closed.	Have 2 shutoff valves but no ability to lock 1 valve closed.	Have 2 shutoff valves with ability to lock 1 valve closed.	No outlet pipes exit through berm or wall below storage's maximum liquid level.
Pit ventilation fans (below barn storages)?	No pit ventilation fans installed.	Pit ventilation fan WITHOUT appropriately designed inlet plenum.		Pit ventilation fan WITH appropriately designed inlet plenum.
Management of liquids from dry manure storage?	No control of runoff from solid manure storage located near well, stream, major drainage, or other surface waters.	Runoff is directed toward crop land.	Runoff is directed to designed grass filter strip or constructed wetlands from which some runoff might escape.	Dry manure storage is roofed. OR Runoff is directed to holding pond, constructed wetland, or grass filter strip from which runoff is unlikely.
Fencing and appropriate signage for limiting storage access (outdoor storages)?	No	Warning signs only		Yes
An egress ladder for an individual falling into storage?	No		Yes, 1 ladder	Yes, 1 ladder on all four sides.
Warning signs of dangers of confined space entry (below barn storage)?	No			Yes