 Natural Resources Conservation Service


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Construction and Maintenance of a Manure Pond:


Standards

Bill Reck, P.E.
National Environmental Engineer
USDA NRCS

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Typical liquid manure storage



Water Retention Pond


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What is a Conservation Practice Standard?

- Conservation practice standards establish the minimum acceptable level of quality in planning, designing, installing, operating, and maintaining conservation practices.

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Conservation Practice Resources

- National Practices Website
 - <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/cp/ncps/>
- States 


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Example Standards

- Waste Storage Structure (313)
- Pond Sealing or Lining (521 a-d)
- Waste Separation Facility (632)
- Nutrient Management (590)

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Waste Storage Structure (313)



- Manure storage structure design criteria
- Specifications for liner systems (compacted clay, concrete, and synthetic)
- Minimum storage capacity (State-specific)
- Evaluation of existing structures


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521 Pond Sealing or Lining

- a - Flexible Membrane
- b - Dispersant Treatment
 - (polyphosphates or soda ash)
- c - Bentonite Treatment
- d - Compacted Clay Treatment
- * Concrete


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Why have a liner?

- Protect groundwater resources
 - Filter solids such as manure organics and pathogens
 - Limit the movement of soluble material such as ammonium


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Nitrogen Transformation Under Manure Storage

The diagram illustrates the nitrogen cycle in a manure storage pond. At the top, a trapezoidal pond contains NH_4^+ . An arrow points down from NH_4^+ to 'Ammonium NH_4^+ '. From 'Ammonium NH_4^+ ', three arrows branch out: one to the left to 'Clay Minerals', one down to 'Nitrate NO_3^- ', and one up and to the right to 'Nitrogen Gas N_2 '. The arrow to 'Nitrate NO_3^- ' is labeled 'Nitrification'. From 'Nitrate NO_3^- ', an arrow points down to 'Leaching'. From 'Nitrate NO_3^- ', a curved arrow points up and to the right to 'Nitrogen Gas N_2 ', labeled 'Denitrification'.


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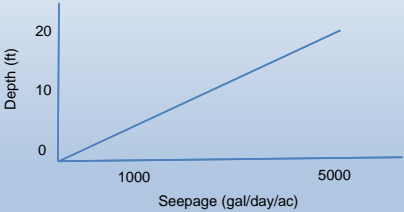
Clay Liner Design Seepage

- Based on AWMFH Appendix 10D
 - Design for initial seepage rate to be 5,000 gallons per acre per day
 - Seepage $\sim 1 \times 10^{-7}$ cm/s after manure sealing


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Seepage – Depth Relationship



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Evaluation of Existing Structures



- Test borings and laboratory testing program
- Monitoring wells
- Water balance

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