

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

POND SEALING OR LINING – SOIL DISPERSANT TREATMENT

(No.)
Code 521B



DEFINITION

A liner for a pond or waste storage impoundment consisting of a compacted soil-dispersant mixture.

PURPOSE

To reduce seepage losses from ponds or waste impoundments for water conservation and environmental protection.

CONDITION WHERE PRACTICE APPLIES

This practice applies where:

- Soils are suitable for treatment with dispersants.
- Ponds or waste impoundments require treatment to reduce seepage rates and/or to impede the migration of contaminants to within acceptable limits.

CRITERIA

General Criteria Applicable to All Purposes

Specify dispersant treated soil liners to comply with all Federal, state, and local laws, rules, and regulations.

Evaluate and avoid or minimize impact to cultural resources, wetlands and Federal and state protected species to the extent practicable during planning, design and implementation of this conservation practice in accordance with established National and Florida policy, General Manual (GM) Title 420-Part 401; Title 450-Part 401, Title 190-Parts 410.22 and 410.26, National Planning Procedures Handbook (NPPH) Florida Supplements to Parts 600.1 and 600.6, National Cultural Resources Procedures Handbook (NCRPH), National Food Security Act Manual (NFSAM), and the National Environmental Compliance Handbook (NECH).

Specify dispersant treated soil liners to be filter-compatible with the sub-grade on which they are compacted to prevent loss of the liner soil into larger openings in the sub-grade material. The National Engineering Handbook (NEH), Part 633, Chapter 26 – Gradation Design of Sand and Gravel filters, provide criteria on filter compatibility.

Specify the dispersant to be used to be tetrasodium pyrophosphate (TSPP), sodium tripolyphosphate (STPP), or soda ash unless laboratory tests using other dispersant types are used in the design.

When laboratory permeability tests are required to determine application rates, perform the tests using dispersant of the same quality and fineness as that proposed for use.

For protection against dispersant dust, require personnel on site during dispersant application and mixing to wear mask and goggles.

Liner Construction. Use methods described in NEH Series, Part 651, Agricultural Waste Management Field Handbook (AWMFH), Chapter 10, Appendix 10D for liner construction.

Liner Protection. Protect the liner against the effects of water surface fluctuations, desiccation and cracking, wave action, surface erosion,

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

rainfall during periods when the liner is exposed, erosion from pipe inlets, agitation equipment, solids and sludge removal activity, animal activity, penetrations through the liner, and any other activity capable of causing physical damage to the liner.

Include in the design measures to protect against damage to the dispersant treated soil liner due to uplift water pressures if a seasonal high water table occurs at a level above that of the lowest potential level of liquid in the impoundment. Examples of protective design measures are the use of perimeter drains to lower the water table, maintaining minimum liquid depth in the impoundment, and using liners thick enough to resist uplift water pressures.

Protection of the finished liner from the effects of desiccation during periods when the pond or impoundment is low or empty is advisable. A protective soil cover may be considered. Specify the soil cover to be of a soil type, thickness, and density that is resistant to erosion and desiccation.

Side Slopes. Specify the side slopes of ponds or waste storage impoundments to be 3H: 1V or flatter to facilitate mixing of the dispersant when the bathtub method of construction as described in Appendix 10D, AWMFH, is used. Slopes as steep as 2H: 1V can be considered if the stair-step method of construction as described in Appendix 10D to the AWMFH is used.

Criteria Applicable to Ponds

Design. Design dispersant treated soil liners for ponds not storing animal waste to reduce seepage to rates that will allow the pond to function suitably as intended.

Application Rate. For ponds, in the absence of laboratory tests or field performance data on soils similar to those to be treated, follow Table 1 for the minimum application of dispersant per 6-inch thickness of constructed liner.

Table 1 - Minimum Application Rate

Dispersant Type	Application rate (lb./ 100 ft ²)
Polyphosphates	7.5
Soda Ash	15.0

Liner Thickness. In the absence of more detailed testing and analyses, specify liner thickness in accordance with Table 2.

Table 2 - Minimum Liner Thickness Criteria for Ponds

Water Depth (feet)	Liner Thickness (inches)
8 or less	6
8.1 – 16	12
16.1 – 24	18
24.1 - 30	24

Criteria Applicable to Waste Impoundments

Design. Design dispersant treated soil liners for waste impoundments to reduce specific discharge (unit seepage) to rates recommended in the NEH Series, Part 651, Agricultural Waste Management Field Handbook, Chapter 10, Appendix 10D and/or rates mandated in state regulations if they are more restrictive. Lower specific rates may be used at the discretion of the designer.

Liner Thickness. Specify the minimum thickness of the finished compacted liner to be the greater of:

1. that required to achieve a specific discharge (unit seepage) design value selected by the designer,
2. that required by state regulations, or
3. that given in the Table 3. The water depth to be used in the table is the normal full pool storage depth in the impoundment.

Table 3 - Minimum Liner Thickness Criteria for Waste Impoundment

Water Depth (feet)	Liner Thickness (inches)
16 or less	12
16.1 – 24	18
24 or greater	24

CONSIDERATIONS

Consider using a flexible geomembrane or synthetic clay liner for sites that have water depths greater than 24 feet.

Consider a protective compacted soil cover for protecting the soil-dispersant liner for ponds.

Consider maintenance requirements when selecting a side slope.

Consider the stair-step method of construction as outlined in Appendix 10D in lieu of slope flattening.

Consider flattening the slopes of ponds or waste impoundments to facilitate compactive efforts during construction.

Consider alternatives to compacted soil dispersant treated liners for poor foundation conditions such as karstic bedrock, joints or other discontinuities of the underlying bedrock

PLANS AND SPECIFICATIONS

Describe the requirements for applying the practice to achieve its intended purpose in the plans and specifications for dispersant treated soil liners for ponds and waste impoundments.

As a minimum, include the following in the plans and specifications:

- Location map
- Plan view of system layout
- Foundation preparation
- Type and application rate of dispersant to be used
- Method of installation
- Method to protect liner
- Structural details
- Quantity of material
- Temporary erosion control measures during construction
- Vegetative requirements or other measures to stabilize the area
- Location of utilities and notification requirements.

OPERATION AND MAINTENANCE

Maintenance activities required for this practice consist of those operations necessary to prevent damaging the treated soil liner. The O&M plan shall include, but not limited to, the following:

- Exclusion of animals and equipment from the treated area
- Repair damage to the liner that occurred from erosion during initial filling; erosion resulting from wave action after the impoundment fills, and erosion caused by agitation, pumping operations, as well as activities involved in removal of solids and sludge
- Prevent damage that might be caused by roots from trees and large shrubs by removing such vegetation at first appearance
- If the liner is damaged, repair any disturbed or eroded areas to restore the liner to its original thickness and condition.

REFERENCES

- General Manual
 - Title 420-Part 401
 - Title 450-Part401
 - Title 190-Parts410.22 and 410.26
- National Engineering Handbook
 - Part 633, Chapter 26
 - Part 650, Agricultural Waste Management Field Handbook, Chapter 10, Appendix 10D
- National Cultural Resources Procedures Handbook
- National Environmental Compliance Handbook
- National Food Security Act Manual
- National Planning Procedures Handbook
 - Florida Supplements to Parts 600.1 and 600.6