

**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.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies where:

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

**CRITERIA**

**General Criteria Applicable to All Purposes**

Dispersant treated soil liners shall comply with all federal, state, tribal, and local laws, rules, and regulations.

Dispersant treated soil liners shall 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, Part 633, Chapter 26-Gradation Design of Sand and Gravel Filters, provides criteria on filter compatibility.

The minimum thickness of the finished

compacted liner shall be 6 inches. The liner material shall be placed in layers not over 9 inches thick before compaction.

In addition to the treated blanket, at least 2 feet of fine-grained soil shall be placed over fractured rock outcrops or other highly permeable material.

The dispersant shall 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, the tests shall be performed using dispersant of the same quality and fineness as that proposed for use.

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

**Criteria Applicable to Ponds**

**Design.** Dispersant treated soil liners for ponds not storing animal waste shall be designed 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, the minimum application of dispersant per 6-inch thickness of constructed liner shall be:

Dispersant Type	Application rate (lb./ 100 ft <sup>2</sup> )
Polyphosphates	7.5
Soda Ash	15

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact your Natural Resources Conservation Service [State Office](#), or visit the [Field Office Technical Guide](#).

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**Liner Thickness.** In the absence of more detailed testing and analyses, liner thickness shall be according to the following table:

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

### **Criteria Applicable To Waste Impoundments**

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

**Liner Thickness.** The minimum thickness of the finished compacted liner shall 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 following table. The water depth to be used in the table is the normal full pool storage depth in the impoundment.

Water Depth (feet)	Liner Thickness (inches)
≤ 16	12
16.1 – 24	18
> 24	24

**Liner Construction.** Use methods described in Appendix 10D to the AWMFH for liner construction.

**Liner Protection.** Dispersant treated soil liners shall be protected against damage caused by the effects of water surface fluctuations, desiccation and cracking, wave action, rainfall during periods when the liner is exposed, water falling onto the liner from pipe outlets, 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.

Design will include 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.

The soil cover shall be of a soil type, thickness, and density that is resistant to erosion and desiccation. For waste impoundments, at least 6 inches of soil cover shall be placed over the soil-dispersant liner.

**Side Slopes.** The side slopes of ponds or waste storage impoundments should 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. Maintenance requirements should also be considered when selecting a side slope.

### **CONSIDERATIONS**

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

A protective compacted soil cover should be considered for protecting the soil-dispersant liner for ponds.

Alternatives to compacted soil dispersant treated liners should be considered for poor foundation conditions such as karstic bedrock, joints or other discontinuities of the underlying bedrock.

### **PLANS AND SPECIFICATIONS**

The following list of Construction Specifications is intended as a guide to selecting the appropriate specifications for a specific project. The list includes most, but may not contain all, of the specifications needed for a specific project:

IA-1	Site Preparation
IA-3	Structural Removal
IA-11	Removal of Water
IA-21	Excavation
IA-23	Earthfill
IA-24	Drainfill
IA-27	Diversions
IA-45	Plastic (PVC, PE) Pipe
IA-92	Fences

Plans and specifications for dispersant treated soil liners for ponds and waste impoundments shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. Plans and specifications shall include such drawings, specifications, material requirements, quantities, construction requirements,

equipment requirements, and other documents as necessary to describe the work to be done.

### **OPERATION AND MAINTENANCE**

Maintenance activities required for this practice consist of those operations necessary to prevent and/or repair damage to the dispersant treated soil liner. This includes, but is not limited to; excluding animals and equipment from the treated area; repairing damage to the liner occurring 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. Damage that might be caused by roots from trees and large shrubs should be prevented by removing such vegetation at first appearance. If the liner is damaged, any disturbed or eroded areas should be repaired to restore the liner to its original thickness and condition.

### **REFERENCES**

- USDA-NRCS, National Engineering Handbook (NEH), Part 633, Chapter 26
- USDA-NRCS, National Engineering Handbook (NEH), Part 651, Agricultural Waste Management Field Handbook (AWMFH)