

## SOIL CONSERVATION SERVICE

## WEST VIRGINIA

## ENGINEERING STANDARD

## POND SEALING OR LINING (No Soil Dispersant)

Definition

Installing a fixed lining of impervious material or treating the soil in a pond mechanically or chemically to impede or prevent excessive water loss.

Scope

This standard applies to the sealing of ponds with a soil dispersant.

Purpose

To reduce the seepage losses in ponds to an acceptable level and preserve or improve water quality.

Conditions Where Practice Applies

This practice applies where water loss from a pond through leakage is or will be of such proportion as to prevent the pond from fulfilling its planned purpose. This practice also applies where leakage will damage land and crops, cause waste of water or environmental problems.

Design Criteria

The design shall be based on adequate investigation and documentation of the leaking soil materials.

Ponds to be sealed shall be constructed to meet the SCS standards for irrigation pits or regulating reservoirs (552), irrigation storage reservoirs (436), ponds (378), waste treatment lagoons (359), waste storage ponds (425), or wildlife watering facilities (648), as appropriate.

Soil Properties

The soil shall have a significant clay fraction which will seal when the natural structure is broken by the dispersant. For chemical sealing, soils shall have properties approximating the following:

1. At least 50 percent finer than #200 sieve (the #200 sieve is about the smallest particle visible to the naked eye or 0.074 mm diameter).
2. At least 15 percent finer than 0.002 mm diameter (clay size fraction).
3. Less than 0.50 percent soluble salts (based on dry soil weight).

If the soil has properties outside the above limits, chemical sealing should not be attempted unless:

1. Laboratory tests indicate sealing will be successful
2. Previous job experience has proven the soil can be sealed by incorporating a dispersant.

#### Dispersant

Tetrasodium pyrophosphate (TSPP) and sodium tripolyphosphate (STPP) shall be used in preference to other polyphosphate salts. Commercial phosphatic fertilizer is not acceptable. Soda ash, technical grade, 99 to 100 percent sodium carbonate, may be used.

These dispersants shall be finely granular with 95 percent passing a #30 sieve and less than 5 percent passing a #100 sieve.

Standard commercial sodium chloride is satisfactory in the granulated form normally available.

Other dispersants may be used in the form found by local experience to be satisfactory.

#### Rate of Application

The rate of application and the kind of dispersant to use shall be based on laboratory tests unless sufficient data are available on the field performance of previously tested soils and they are similar texturally and chemically to the soil to be sealed.

In the absence of laboratory tests on the soils to be sealed, the minimum application shall be:

Sodium Polyphosphate - 5 to 10 lbs/100 sq.ft.

Sodium Chloride - 20 to 33 lbs/100 sq.ft.

Soda Ash - 10 to 20 lbs/100 sq.ft.

Other- as found by local experience to be adequate

#### Thickness of Treated Blanket

The finished treated blanket shall be at least 8 inches thick for water depths

up to 8 feet. For greater depths of water, the blanket thickness shall be 12 inches and treated in two 6-inch lifts. A minimum thickness of 12 inches is recommended for all areas in the vertical range of water surface fluctuation.

There shall be a minimum of 2 feet of fine grained soil compacted over fractured rock outcrops or other highly permeable materials. The treated blanket shall be in addition to the 2 feet of cover.

Plans and Specifications

Plans and specifications for sealing ponds with soil dispersants shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

Operation and Maintenance

An operation and maintenance plan shall be prepared which includes, as a minimum, the following items:

1. Treated areas shall be protected from puncture by animal trampling.
2. Areas near normal waterline and at points of concentrated surface inflow shall be protected against erosion.
3. Any area of the blanket found to be eroding, cracking, or damaged shall be immediately repaired
4. Sediment coagulating chemicals, such as gypsum or iron sulfate, shall not be used to clear the reservoir water after the dispersant has been installed.
5. The pond shall be used in such a way that prevents removal or penetration of the sealing layer.
6. Plant growth that would penetrate the treated layer shall be controlled.
7. Consistent with the purpose, the pond should be maintained at full pool after treatment to prevent weed growth, surface drying, and weathering damage to the treated layer.

<b>Approved</b> <b>By</b> _____ <b>Date</b> _____	<b>U.S. Dept. of Agriculture</b> <b>Soil Conservation Service</b> <b>Assisting</b> _____ <b>Soil Conservation</b> <b>District</b>	<b>Cooperator</b> _____ <b>Sheet</b> ____ <b>of</b> ____
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CONSTRUCTION SPECIFICATIONPOND SEALING OR LINING  
Soil Dispersant

The area to be treated shall be cleared of all vegetation and trash and all stones or other objects of a size to interfere with the operation of compaction equipment.

Cavernous or jointed limestone shall have plugs of adequate strength to bridge openings wider than 3 inches. Cavernous openings shall be plugged with a minimum of 2 feet of compacted fine-grained soil. Open gravel shall be blanketed with a minimum of 1 foot of compacted fine-grained soil before treatment.

The moisture content of the soil should be near optimum for compaction.

Sealing chemicals should be distributed evenly over the surface to be treated with a drill, seeder, fertilizer spreader, or by hand broadcasting. If broadcast by hand, the area should be staked or otherwise marked in grids of 100 square feet.

The chemicals should be thoroughly mixed into the 6- to 8-inch layer of soil being treated. Mixing should be with disk, rototiller, pulverizer or similar equipment. A second mixing should be carried out in a direction perpendicular to the first mixing.

Water should be added by sprinkling during the mixing operation if moisture is not adequate for maximum compaction. If moisture content is too high, the soil should be dried by disking or some other effective process.

Each treated layer of soil should be compacted to a minimum dry density of 90 percent of maximum standard Proctor density with soil near optimum moisture content.

Sealing by soil dispersant shall be done in a manner that erosion and air and water pollution are minimized. The completed job shall present a workmanlike finish.

**Planning considerations for water quantity and quality.**

*Quantity*

1. Effects upon components of the water budget, especially effects on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.
2. Variability of the practice's effects caused by seasonal or climatic changes.
3. Effects on downstream flows or aquifers that would affect other water uses or users.
4. Effects on the volume of downstream flow to prohibit undesirable environmental, social or economic effects.
5. Potential use for water management to conserve water.

*Quality*

1. Effects on the movement of sediment, pathogens, and soluble substances carried by seepage toward the groundwater.
2. Effects on the visual quality of the downstream water resources.
3. Short-term and construction-related effects of this practice on quality of the local and downstream water resources.
4. Effects on the movement of dissolved substances below the pool area and toward ground water.
5. Effects on wetlands or water-related wildlife habitats.