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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construction.

**Liner Protection.** The soil liner 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 should include measures to protect against damage to the compacted 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. The soil cover shall be of a soil type, thickness, and density that is resistant to erosion and desiccation. Under severe conditions, a protective soil cover may not adequately protect the liner from desiccation. For example a soil liner constructed with very high plasticity soils which are exposed to long periods of hot, low humidity conditions may constitute a severe condition. Additional design measures might be considered which includes installing a geomembrane in conjunction with a cover soil to protect the liner from desiccation adequately.

**Side Slopes.** The side slopes of ponds or waste storage impoundments should be 3H: 1V or flatter to facilitate compaction of soil on the slopes 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 side slopes.

**CONSIDERATIONS**

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

Alternatives to compacted clay liners should be considered for poor foundation conditions such as karstic bedrock, joints and other discontinuities of the underlying bedrock.

**PLANS AND SPECIFICATIONS**

Plans and specifications for compacted soil liners for ponds and waste storage 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, quality control 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 compacted 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.