

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
<http://ndep.nv.gov/bwpc/>
Phone: (775) 687-9418

ANIMAL WASTE STORAGE IMPOUNDMENTS

WTS-38

August 2014

This document provides general assistance regarding the construction of new waste storage impoundments (aka lagoons or ponds) operated at animal management facilities including Division-permitted CAFOs (Concentrated Animal Feeding Operations) or commercial slaughterhouses. Discharge permit eligibility for such facilities is listed in Nevada Administrative Code (NAC) 445A.228.

1. **Submittal:** Plans, drawings and technical specifications submitted to this office must be prepared by a Nevada-licensed Professional Engineer (P.E.) in accordance with the Nevada Administrative Code (NAC) 625.611. Please allow a thirty (30) day period for agency review and comment. A permit from the Division must be issued before the construction or modification of any regulated waste storage impoundment in accordance with the Nevada Revised Statutes (NRS) 445A.585.
2. **CAFOs:** Design of new storage impoundments for NDEP-permitted CAFOs shall incorporate a minimum thickness of a 60-mil geomembrane liner (HDPE, LLDPE or EPDM) and be designed and constructed in accordance with:
 - *NRCS Conservation Practice Standard Code 313, Waste Storage Facility*, October 2003 or more recent;
 - *NRCS Conservation Practice Standard Code 317, Composting Facility*, October 2003 or more recent;
 - and/or, *NRCS Conservation Practice Standard Code 359, Waste Treatment Lagoon*, October 2003 or more recent, as appropriate.

NDEP may require CAFO waste impoundments to be furnished with leak detection.

3. **Slaughterhouses:** Design of new storage impoundments for NDEP-permitted slaughterhouses shall incorporate a minimum thickness of a 60-mil geomembrane liner (HDPE, LLDPE or EPDM) and be designed and constructed in accordance with NDEP WTS-37: *Guidance Document for the Design of a Lined Wastewater Holding Pond (Surface Impoundment)*. NDEP may also require slaughterhouse waste impoundments to be furnished with leak detection.

4. Clay Liners: New CAFO storage impoundments lined with a compacted bentonite clay liner (12 inch min. thickness) or a Geosynthetic Clay Liner (GCL) shall be limited to the storage of screened stormwater runoff with low nutrient content discharged from an area of the facility where manure has not been stored or accumulated. Clay liners shall meet an in-place hydraulic conductivity of 1×10^{-7} cm/sec. Clay liners should be maintained free of desiccation damage and periodically resealed with fresh borrow clay material to repair any holes, cracks or loss of liner materials from erosion or weathering.
5. Groundwater Separation: Minimum groundwater separation distance between the bottom of the proposed storage impoundment and the seasonal high groundwater table shall be 4 ft. or the design shall incorporate a liner ballast measure to protect liner uplift from high water table.
6. Floodwater: Plans for protection of the storage impoundment from floodwater erosion must be presented. The impoundment construction must be designed to withstand the run-off generated by the 24-hour storm event with a 100-year recurrence interval. The pond should remain operational after such an event, with no structural damage.
7. Floodplain: In accordance with NAC 445A.285, storage impoundments shall not be located within a 100-year floodplain unless protected from floodwaters and groundwater intrusion (uplift) to the satisfaction of the Division.
8. Water Balance: A water balance demonstration to properly size the storage impoundment must include adequate storage capacity for the maximum anticipated process wastewater flow events and the inflow (incident precipitation) from the 25-year, 24-hour storm event. A minimum freeboard of 2-feet is required for all CAFO storage impoundments unless it can be determined that wave action will not be a problem based upon a wave fetch analysis using local wind (meteorological) data. Surface evaporation loss for the water balance demonstration shall be applicable to the design location.
9. Cleaning: Storage impoundments shall be cleaned as needed, and maintained on a regular basis to maintain adequate storage capacity, freeboard requirements and liner integrity. Liners must be suitably protected when the impoundments are cleaned to remove manure, accumulated sludge and other debris. The liner inspections should record any repair or replacement activities before the impoundment is placed back into service. Disposal of solid wastes, including manure composting for public distribution, is under the authority of the NDEP Bureau of Waste Management (BWM). Please contact the BWM office at (775) 687-9462 for further information regarding solid waste disposal.
10. Irrigation/Fertilization: Irrigation with effluent and land application of manure at CAFOs shall be conducted be in accordance with the Division-approved Comprehensive Nutrient Management Plan (CNMP). Other permitted land application sites shall be operated in accordance with the Division-approved Operations and Maintenance (O&M) Manual. Provision for adequate storage capacity in impoundments must be provided in the non-growing season (e.g. winter)

to prevent groundwater degradation from the application of effluent when forage crop growth is dormant.

11. Gas Control: When used for high-strength (e.g. BOD₅ or FOG) waste pre-treatment or the storage of gas (methane) production, appropriate covering and gas storage measures must be considered to limit the emission of malodorous (e.g. hydrogen sulfide) or flammable (e.g. methane) gases from anaerobic waste storage impoundments.
12. Aesthetics: The storage impoundment design shall consider good neighbor aesthetics including odor and vector (e.g. flies, mosquito) control. Impoundments creating a general public nuisance will not be allowed. The engineer's design must include a plan for achieving effluent limits, maintaining proper oxygen levels (e.g. aerobic digestion) and/or providing general odor control.
13. Security: Storage impoundments shall be adequately gated, fenced and posted to deter livestock or wildlife intrusion and prohibit unauthorized public access. Emergency egress features shall be incorporated for geomembrane liners (i.e. limited traction) or other impoundments posing a drowning hazard based on the design operating depth. It is strongly recommended that geomembrane liners be textured on the exposed side for personnel slip prevention
14. Monitoring: Effluent nutrient (nitrogen and phosphorus) levels and groundwater depth separation will be assessed by the Division in the decision to require or waive groundwater monitoring requirements at waste storage impoundment facilities. A typical groundwater monitoring network will include a minimum of one (1) up-gradient and two (2) down-gradient monitoring wells installed in accordance with guidance document WTS-4. Prior to drilling, the Nevada State Engineer's office shall be contacted at (775) 684-2800 for approval of any new monitoring wells.
15. OSDS: Commercial septic systems (Onsite Sewage Disposal System or OSDS) are prohibited from receiving CAFO or slaughterhouse process wastewater flows in accordance with the Division's OSDS regulations. Review and approval of a facility's commercial septic systems shall be made through application to the NDEP-BWPC Permits Branch. The website link for the NDEP-BWPC OSDS Program is: http://ndep.nv.gov/bwpc/uic_lcinfo.htm
16. Dam Safety Permit: Construction of dams in the State requires filing an application form with the Nevada Division of Water Resources ((775) 684-2800). Any surface impoundment storing a movable material with berm depth greater than 20 feet or storing a volume more than 20 acre-feet (AF) also requires a dam safety permit. The website link for the State's Dam Safety Permitting Program is: <http://water.nv.gov/programs/dams/>

List of Acronyms:

BOD ₅	5-Day Biochemical Oxygen Demand
BWPC	Bureau of Water Pollution Control
BWM	Bureau of Waste Management
CAFO	Concentrated Animal Feeding Operation
CNMP	Comprehensive Nutrient Management Plan
Division	Nevada Division of Environmental Protection
EPDM	Ethylene Propylene Diene Monomer (synthetic rubber)
FOG	Fats, Oils & Grease
GCL	Geosynthetic Clay Liner
HDPE	High Density Polyethylene
LLDPE	Linear Low Density Polyethylene
NAC	Nevada Administrative Code
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Service
NRS	Nevada Revised Statutes
O&M	Operations & Maintenance
WTS	Water Technical Sheet