NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

WASTE STORAGE FACILITY
(No.)
CODE 313

DEFINITION

A waste storage impoundment made by constructing an embankment and/or excavating a pit or dugout, or by fabricating a structure.

SCOPE

Embankments are limited to an effective height of 35 ft or less and to hazard class (a). This standard does not apply to waste treatment lagoon.

PURPOSE

To temporarily store wastes such as manure, wastewater, and contaminated runoff as a storage function component of an agricultural waste management system.

CONDITIONS WHERE PRACTICE APPLIES

- where the storage facility is a component of a planned agricultural waste management system;
- where temporary storage is needed for organic wastes generated by agricultural production or processing;
- where the storage facility can be constructed, operated and maintained without polluting air or water resources;
- where site conditions are suitable for construction of the facility;
- to facilities utilizing embankments with an effective height of 35 feet or less, where potential damages resulting from failure would be limited to farm buildings, agricultural land, or township and country roads; and
- to fabricated structures including tanks, stacking facilities, and pond appurtenances.

CRITERIA

General Criteria Applying to All Waste Storage Facilities.

Laws and regulations. Waste storage facilities must be planned, designed, and constructed to meet all federal, state, and local laws and regulations.

Location. To minimize the potential for contamination of streams, waste storage facilities should be located outside of floodplains. However, if site restrictions require location within a floodplain, they shall be protected from inundation or damage from a 25-year flood event, or larger if required by laws, rules, and regulations. Waste storage facilities shall be located so the potential impacts from breach of embankment, accidental release, and liner failure are minimized; and separation distances are such that prevailing winds and landscape elements such as building arrangement, landforms, and vegetation minimize odors and protect aesthetic values.

Storage period. The storage period is the maximum length of time anticipated between emptying events. The minimum storage period shall be based on the timing required for environmentally acceptable waste utilization, which considers climatic and agronomic factors, soils, farm operations and equipment, and applicable regulations.

Design storage volume. The design storage volume shall equal the required storage volume, and shall consist of the sum of the following as appropriate:

(a) Manure, wastewater, and other wastes accumulated during the storage period;

(b) Normal precipitation less evaporation on the surface area (at the design storage volume level) of the facility during the storage period;

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 download it from the electronic Field Office Technical Guide for your state.

(c) Normal runoff from the facility's drainage area during the storage period;

(d) 25-year, 24-hour precipitation on the surface (at the required design storage volume level) of the facility;

(e) 25-year, 24-hour runoff from the facility's drainage area;

(f) Residual solids after liquids have been removed (A minimum of 6 inches shall be provided for tanks); and

(g) Additional storage required to meet management goals or regulatory requirements.

Inlet. Inlets shall be of any permanent type designed to resist corrosion, plugging, freeze damage and ultraviolet ray deterioration while incorporating erosion protection as necessary.

Emptying Component. Design shall include some type of component that allows for the storage facility to be emptied. Potentially feasible components include a gate, pipe, dock, wet well, pumping platform, retaining wall, or ramp. Features to protect against erosion, tampering, and accidental release shall be incorporated as necessary.

Accumulated solids removal. Provision shall be made for periodic removal of accumulated solids to preserve storage capacity. The anticipated method for doing this must be considered in planning, particularly in determining the configuration of ponds and type of seal, if any.

Safety. Design shall include appropriate safety features to minimize the hazards of the facility. Ramps used to empty liquids shall have a slope of 4 horizontal to 1 vertical or flatter. Those used to empty slurry, semi-solid, or solid waste shall have a slope of 10 horizontal to 1 vertical or flatter unless special traction surfaces are provided. Warning signs, fences, ladders, ropes, bars, rails, and other devices shall be provided as appropriate, to ensure the safety of humans and livestock.

Ventilation and warning signs shall be provided for covered waste holding structures as necessary, to prevent explosion, poisoning, or asphyxiation. Where gases have the potential to enter buildings or other confined spaces, pipelines shall be provided with a water-sealed trap and vent or similar device.

Ponds and uncovered fabricated structures for liquid or slurry waste with walls less than 5 feet above ground surface shall be fenced and warning signs posted to prevent children and others from using them for other than their intended purpose.

Erosion protection. Embankments and disturbed areas surrounding the facility shall be treated to control erosion.

Additional Criteria for Waste Storage Ponds

Seepage Control. Seepage-related criteria for siting, investigating, and designing liquid waste storage facilities are presented in Table 1. Additional information and guidance regarding seepage control of waste impoundments are found in the Agricultural Waste Management Field Handbook (AWMFH), Appendix 10D.

The target maximum specific discharge (unit seepage) shall be $1x10^{-6}$ $cm^3/cm^2/sec$. No credit shall be given for manure sealing. General sampling and soil mechanics testing requirements are summarized in Tables 1 and 2. Testing requirements vary depending on the relative vulnerability of the site to groundwater contamination, and on the potential impacts of seepage on designated uses of groundwater and hydraulically-connected surface water resources including drinking water supply and fisheries habitat.

The pond shall have a bottom elevation that is a minimum of 5 feet above the seasonal high water table.

Liners shall meet or exceed the criteria in NRCS Practice Standard 521, Pond Sealing or Lining

Seepage control criteria developed for the specially designated Chino Basin shall be used in lieu of the criteria described above.

Maximum Operating Level. The maximum operating level for waste storage ponds shall be the pond level that provides for the required volume less the volume contribution of precipitation and runoff from the 25-year, 24-hour storm event plus the volume allowance for residual solids after liquids have been removed. A permanent marker or recorder shall be installed at this maximum operating level to indicate when drawdown should begin. The marker or recorder shall be referenced and explained in the O&M plan.

Outlet. No outlet shall automatically release storage from the required design volume. Manually operated outlets shall be of permanent type designed to resist corrosion and plugging.

Table 1- Criteria for Siting, Investigation, & Design of Liquid Waste Storage Facilities

Vulnerability ↓ / Risk→	Very High	High	Moderate	Slight
	<1,500' from public drinking water supply wells; **OR** < 100' from any domestic well or Class 1 stream	Doesn't meet Very High Risk criteria; **AND** Recharge areas for Sole Source aquifers; **OR** 100' - 600' from unconfined domestic water supply well (or where degree of aquifer confinement is unknown) or Class 1 stream	Doesn't meet High Risk criteria; **AND** 600' - 1,000' from unconfined domestic well (or where degree of aquifer confinement is unknown) or Class 1 stream; **OR** < 600' from unconfined non-domestic water supply well (or where degree of aquifer confinement is unknown) or Class 2 stream	Doesn't meet Moderate Risk criteria; **AND** >1,000' from unconfined domestic well (or where degree of aquifer confinement is unknown) or Class 1 stream; **AND** > 600' from unconfined non-domestic water supply well (or where degree of aquifer confinement is unknown) or Class 2 stream
Very High Large voids (e.g. karst, lava tubes, mine shafts); **OR** Highest anticipated groundwater elevation within 5' of invert; **OR** < 600' from improperly abandoned well*	**Evaluate other storage alternatives** * (or properly seal well and re-evaluate vulnerability)	**Evaluate other storage alternatives** * (or properly seal well and re-evaluate vulnerability)		
High Doesn't meet Very High Vulnerability criteria: **AND** Bedrock (assumed fractured) within 2' of invert; **OR** Coarse soils/parent material (Permeability Group I soils as defined in AWMFH, always including GP, GW, SP, SW); **OR** Highest anticipated groundwater elevation is between 5' - 20' below invert; **OR** 600' - 1,000' from improperly abandoned well*		**Synthetic Liner Required** * (or properly seal well and re-evaluate vulnerability). No additional site characterization required	**Liner Required** * (or properly seal well and re-evaluate vulnerability). ~ Specific Discharge $\leq 1 \times 10^{-6}$ $cm^3/cm^2/sec$ ~ No manure sealing credit ~ Earthen liner design includes sampling and testing of liner material (Classification, Standard Proctor compaction, Permeability)	**Liner Required** * (or properly seal well and re-evaluate vulnerability). ~ Specific Discharge $\leq 1 \times 10^{-6}$ $cm^3/cm^2/sec$ ~ No manure sealing credit ~ Earthen liner design includes sampling and classification testing of liner material ~ Published permeability data and construction method specifications may be used.
Moderate Doesn't meet High Vulnerability criteria; **AND** Medium soils/parent material (Permeability Group II soils as defined in AWMFH, usually including CL-ML, GM, SM, ML); **OR** Flocculated or blocky clays (typically associated with high Ca); **OR** Complex stratigraphy (discontinuous layering); **OR** Highest anticipated groundwater elevation is between 21'- 50' below invert	**Evaluate other alternatives or Synthetic liner as allowed.** Local regulations may apply Consult with Area Engineer	**Further evaluate need for liner** ~ Specific Discharge $\leq 1 \times 10^{-6}$ $cm^3/cm^2/sec$ ~ No manure sealing credit ~ Earthen liner/no liner design includes sampling and testing of liner/ in-place material (Classification, Standard Proctor compaction/ in-place density, Remolded/ Undisturbed sample Permeability)	**Further evaluate need for liner** ~ Specific Discharge $\leq 1 \times 10^{-6}$ $cm^3/cm^2/sec$ ~ No manure sealing credit ~ Earthen liner/no liner design includes sampling and testing of liner/ in-place material (Classification, Standard Proctor compaction/ in-place density, Remolded/ Undisturbed sample Permeability)	**Further evaluate need for liner** ~ Specific Discharge $\leq 1 \times 10^{-6}$ $cm^3/cm^2/sec$ ~ No manure sealing credit ~ Earthen liner/no liner design includes sampling and classification testing of liner/in-place material + in-place density ~ Published permeability data and construction method specifications may be used.
Low Doesn't meet Moderate Vulnerability criteria; **AND** Fine soils/parent material (Permeability Group III and IV soils as defined in AWMFH, usually including GC, SC, MH, CL, CH); **AND** Highest anticipated groundwater elevation is >50' below invert		**Further evaluate need for liner** ~ Specific Discharge $\leq 1 \times 10^{-6}$ $cm^3/cm^2/sec$ ~ No manure sealing credit ~ Earthen liner/no liner design includes sampling and testing of liner/ in-place material (Classification, Standard Proctor compaction/ in-place density, Remolded/ Undisturbed sample Permeability) ~ Scarify and recompact surface to seal cracks and break down soil structure as appropriate	**Liner not required** ~ Specific Discharge $\leq 1 \times 10^{-6}$ $cm^3/cm^2/sec$ ~ Field classification and published permeability data may be used ~ Construction method specifications may be used ~ Scarify and recompact surface to seal cracks and break down soil structure as appropriate	

Table 1, continued
Criteria for Siting, Investigation, & Design of Liquid Waste Storage Facilities
Definitions

AWMFH. NRCS Agricultural Waste Management Field Handbook (210-VI-651). *Individual chapters online at http://www.info.usda.gov/CED/* .

Class 1 Stream. Watercourses that provide domestic supplies (including springs, on site and/or within 100 feet downstream of the operations area), and/or where fish are always or seasonally present onsite (including habitat to sustain fish migration and spawning). *Definition from California Forest Practice Rules, online at http://www.fire.ca.gov/php/rsrc-mgt_content/downloads/2005FPRulebook.pdf (Sections 916.5, 936.5, 956.5).*

Class 2 Stream. Watercourses where fish are always or seasonally present offsite within 1000 feet downstream; and/or aquatic habitat is available for nonfish aquatic species. Definition excludes Class III waters (no aquatic life present) that are tributary to Class 1 waters. *Definition from California Forest Practice Rules.*

Permeability Group (I through IV) Soils. Empirically-derived permeability classification of soils based on percent passing the 200 sieve and Plasticity Index (PI). *Specific criteria for each of the four classes are listed in Table 10D-1 of Appendix 10D of the AWMFH (http://www.info.usda.gov/CED/ftp/CED/neh651-ch10.pdf).*

Risk. Risk categories (very high, high, moderate, slight) are based on the potential impacts of seepage on designated uses of groundwater and hydraulically connected surface water resources. *Designated uses include drinking water supply, nondomestic water supply, and aquatic habitats including fisheries.*

Sole Source Aquifer. An EPA-administered program that requires EPA review of all Federal financially assisted projects which have the potential to contaminate officially designated Sole Source Aquifers *(http://www.epa.gov/safewater/ssanp.html). Currently there are four Sole Source Aquifer areas in California, including the Fresno aquifer (http://www.epa.gov/safewater/swp/ssa/pdfs/map_ssa_fresno.pdf).*

Unconfined Aquifer. An aquifer containing water that is not under pressure; the water level in a well is the same as the water table outside the well *(http://www.epa.gov/OCEPAterms/uterms.html). Compared to confined aquifers, unconfined aquifers tend to be close to the ground surface and lack a low permeability confining layer that reduces seepage of potential contaminants from surface sources.*

Vulnerability. Vulnerability categories (very high, high, moderate, low) are based on geologic and hydrogeologic conditions at the site that influence seepage rates from the surface to the aquifer. *Geologic and hydrogeologic conditions include the texture and plasticity of the soil and geologic material in the vadose zone; and the separation distance between the invert of the proposed storage facility and the water table. The presence of improperly abandoned water wells is also considered a potential vulnerability factor.*

Table 2 - Soil Mechanics Testing Requirements for Design of Waste Storage Ponds

Test		ASTM reference	Where test should be run	
			No liner alternative	Compacted earth liner alternative
Classification	Sieve Analysis	D 422	X[a]	X
	Hydrometer	D 422	X[a]	X
	Atterberg Limits	D 4318	X[a]	X
Compaction	(Standard Proctor)	D 698		X[b]
In-place density		D 1556; D 2922	X	
Permeability	Remolded	D 5084		X[b]
	Undisturbed and/or in-situ	D 5126	X	

[a] Field Classification of soil material may be used in lieu of laboratory-based classification where vulnerability is low *and* risk is slight or moderate

[b] Published permeability data and assumed compaction may be used in lieu of lab testing of remolded samples where risk is slight

Embankments. The minimum elevation of the top of the settled embankment shall be 1 foot above the waste storage pond's required volume. This height shall be increased by the amount needed to ensure that the top elevation will be maintained after settlement. This increase shall be not less than 5 percent.

The minimum top widths are shown in Table 3.

The combined side slopes of the settled embankment shall not be less than 5 horizontal to 1 vertical, and neither slope shall be steeper than 2 horizontal to 1 vertical unless provisions are made to provide stability. Lined ponds may require flatter inside slopes as described in Practice Standard 521, Pond Sealing and Lining.

Table 3 – Minimum Top Widths

Total embankment Height, ft.	Top Width, ft.
15 or less	8
15 – 20	10
20 – 25	12
25 – 30	14
30 – 35	15

Excavations. Unless supported by a soil investigation, excavated side slopes shall be no steeper than 2 horizontal to 1 vertical. Lined ponds may require flatter inside slopes as described in Practice Standard 521, Pond Sealing and Lining.

Emergency spillway. An emergency spillway shall be constructed if: 1) the pond includes an embankment with a maximum liquid elevation of one foot or more above natural ground; 2) the drainage area of the contributing watershed is five or more acres; and 3) the storm water inlet is uncontrolled. Spillways shall be designed to pass the peak flow rate resulting from a 25-year, 24-hour storm event and constructed to prevent erosion of the embankment.

Additional Criteria for Fabricated Structures

Foundation. The foundations of fabricated waste storage structures shall be proportioned to safely support all superimposed loads without excessive movement or settlement.

Where a non-uniform foundation cannot be avoided or applied loads may create highly variable foundation loads, settlement should be calculated from site-specific soil test data. Index tests of site soil may allow correlation with similar soils for which test data is available. If no test data is available, presumptive bearing strength values for assessing actual bearing pressures may be obtained from Table 4 or another nationally recognized building code. In using presumptive bearing values, adequate detailing and articulation shall be provided to avoid distressing movements in the structure.

Foundations consisting of bedrock with joints, fractures, or solution channels shall be treated or a separation distance provided consisting of a minimum of 1 foot of impermeable soil between the floor slab and the bedrock or an alternative that will achieve equal protection.

Table 4 - Presumptive Allowable Bearing Stress Values[1]

Foundation Description	**Allowable Stress**
Crystalline Bedrock	12000 psf
Sedimentary Rock	6000 psf
Sandy Gravel or Gravel	5000 psf
Sand, Silty Sand, Clayey Sand, Silty Gravel, Clayey Gravel	3000 psf
Clay, Sandy Clay, Silty Clay, Clayey Silt	2000 psf

[1] Basic Building Code, 12th Edition, 1993, Building Officials and Code Administrators, Inc. (BOCA)

Liquid tightness. Applications such as tanks, that require liquid tightness shall be designed and constructed in accordance with standard engineering and industry practice appropriate for the construction materials used to achieve this objective.

Structural loadings. Waste storage structures shall be designed to withstand all anticipated loads including internal and external loads, hydrostatic uplift pressure, concentrated surface and impact loads, water pressure due to seasonal high water table, and frost or ice pressure and load combinations in compliance with this standard and applicable local building codes.

The lateral earth pressures should be calculated from soil strength values determined from the results of appropriate soil tests. Lateral earth pressures can be calculated using the procedures in TR-74. If soil strength tests are not available, the presumptive

lateral earth pressure values indicated in Table 5 shall be used.

Lateral earth pressures based upon equivalent fluid assumptions shall be assigned according to the following conditions:

- **Rigid frame or restrained wall.** Use the values shown in Table 5 under the column "Frame tanks," which gives pressures comparable to the at-rest condition.
- **Flexible or yielding wall.** Use the values shown in Table 5 under the column "Free-standing walls," which gives pressures comparable to the active condition. Walls in this category are designed on the basis of gravity for stability or are designed as a cantilever having a base wall thickness to height of backfill ratio not more than 0.085.

Internal lateral pressure used for design shall be 65 lb/ft^2 where the stored waste is not protected from precipitation. A value of 60 lb/ft^2 may be used where the stored waste is protected from precipitation and will not become saturated. Lesser values may be used if supported by measurement of actual pressures of the waste to be stored. If heavy equipment will be operated near the wall, an additional two feet of soil surcharge shall be considered in the wall analysis.

Tank covers shall be designed to withstand both dead and live loads. The live load values for covers contained in ASAE EP378.3, Floor and Suspended Loads on Agricultural Structures Due to Use, and in ASAE EP 393.2, Manure Storages, shall be the minimum used. The actual axle load for tank wagons having more than a 2,000 gallon capacity shall be used.

If the facility is to have a roof, snow and wind loads shall be as specified in ASAE EP288.5, Agricultural Building Snow and Wind Loads. If the facility is to serve as part of a foundation or support for a building, the total load shall be considered in the structural design.

Structural design. The structural design shall consider all items that will influence the performance of the structure, including loading assumptions, material properties and construction quality. Design assumptions and construction requirements shall be indicated on standard plans.

Tanks may be designed with or without covers. Covers, beams, or braces that are integral to structural performance must be indicated on the construction drawings. The openings in covered tanks shall be designed to accommodate equipment for loading, agitating, and emptying. These openings shall be equipped with grills or secure covers for safety, and for odor and vector control.

All structures shall be underlain by free draining material or shall have a footing located below the anticipated frost depth. Fabricated structures shall be designed according to the criteria in the following references as appropriate:

- Steel: "Manual of Steel Construction", American Institute of Steel Construction.
- Timber: "National Design Specifications for Wood Construction", American Forest and Paper Association.
- Concrete: "Code Requirements for Environmental Concrete Structures, ACI 350", American Concrete Institute, National Engineering Handbook 6, Structural Design or Technical Release 67, Reinforced Concrete Strength Design.
- Masonry: "Building Code Requirements for Masonry Structures, ACI 530", American Concrete Institute.

Slabs on grade. Slab design shall consider the required performance and the critical applied loads along with both the subgrade material and material resistance of the concrete slab. Where applied point loads are minimal and liquid-tightness is not required, such as barnyard and feedlot slabs subject only to precipitation, and the subgrade is uniform and dense, the minimum slab thickness shall be 4 inches with a maximum joint spacing of 10 feet. Joint spacing can be increased if steel reinforcing is added based on subgrade drag theory.

For applications where liquid-tightness is required such as floor slabs of storage tanks, the minimum thickness for uniform foundations shall be 5 inches and shall contain distributed reinforcing steel. The required area of such reinforcing steel shall be based on subgrade drag theory as discussed in industry guidelines such as American Concrete Institute, ACI 360, "Design of Slabs-on-Grade".

When heavy equipment loads are to be resisted and/or where a non-uniform foundation cannot be avoided, an appropriate design procedure incorporating a subgrade resistance parameter(s) such as ACI 360 shall be used.

TABLE 5 - LATERAL EARTH PRESSURE VALUES[1]

		Equivalent fluid pressure (lb/ft^2/ft of depth)			
Soil		Above seasonal high water table[2]		Below seasonal high water table[3]	
Description[4]	Unified Classification[4]	Free-standing walls	Frame tanks	Free-standing walls	Frame tanks
Clean gravel, sand or sand-gravel mixtures (maximum 5% fines)[5]	GP, GW, SP, SW	30	50	80	90
Gravel, sand, silt and clay mixtures (less than 50% fines) Coarse sands with silt and and/or clay (less than 50% fines)	All gravel sand dual symbol classifications and GM, GC, SC, SM, SC-SM	35	60	80	100
Low-plasticity silts and clays with some sand and/or gravel (50% or more fines) Fine sands with silt and/or clay (less than 50% fines)	CL, ML, CL-ML SC, SM, SC-SM	45	75	90	105
Low to medium plasticity silts and clays with little sand and/or gravel (50% or more fines)	CL, ML, CL-ML	65	85	95	110
High plasticity silts and clays (liquid limit more than 50)[6]	CH, MH	-	-	-	-

[1] For lightly compacted soils (85% to 90% maximum standard density). Includes compaction by use of typical farm equipment.
[2] Also below seasonal high water table if adequate drainage is provided.
[3] Includes hydrostatic pressure.
[4] All definitions and procedures in accordance with ASTM D 2488 and D 653.
[5] Generally, only washed materials are in this category
[6] Not recommended. Requires special design if used.

CONSIDERATIONS

Waste storage facilities should be located as close to the source of waste and polluted runoff as practicable.

Non-polluted runoff should be excluded from the structure to the fullest extent possible except where its storage is advantageous to the operation of the agricultural waste management system.

Freeboard for waste storage tanks should be considered.

Solid/liquid separation of runoff or wastewater entering pond facilities should be considered to minimize the frequency of accumulated solids removal and to facilitate pumping and application of the stored waste.

Due consideration should be given to environmental concerns, economics, the overall waste management system plan, and safety and health factors.

Considerations for minimizing the potential for and impacts of sudden breach of embankment or accidental release from the required volume.

Features, safeguards, and/or management measures to minimize the risk of failure or accidental release, or to minimize or mitigate impact of this type of failure should be considered when any of the categories listed in Table 6 might be significantly affected.

The following should be considered either singly or in combination to minimize the potential of or the consequences of sudden breach of embankments when one or more of the potential impact categories listed in Table 6 may be significantly affected:

1. Additional freeboard;
2. Storage for wet year rather than normal year precipitation;
3. Reinforced embankment -- such as, additional top width, flattened and/or armored downstream side slopes;
4. Secondary containment.

The following options should be considered to minimize the potential for accidental release from the required volume through gravity outlets when one or more of the potential impact categories listed in Table 6 may be significantly affected:

1. Outlet gate locks or locked gate housing;
2. Secondary containment;
3. Alarm system;
4. Another means of emptying the required volume.

Table 6- Potential Impact Categories from Breach of Embankment or Accidental Release

1. Surface water bodies -- perennial streams, lakes, wetlands, and estuaries
2. Critical habitat for threatened and endangered species.
3. Riparian areas
4. Farmstead, or other areas of habitation
5. Off-farm property
6. Historical and/or archaeological sites or structures that meet the eligibility criteria for listing in the National Register of Historical Places.

Considerations for improving air quality

An anaerobic lagoon instead of a waste storage pond should be considered for sites located in rural areas where odors are a concern. This should be especially considered where odors would affect neighboring farms having enterprises that do not cause odors and/or neighbors who earn a living off-farm. The recommended loading rate for anaerobic lagoons at sites where odors must be minimized is one-half the values given in AWMFH Figure 10-22.

For sites located near urban areas practices such as the following should be considered to reduce odor emissions:

1. Covering the storage facility with a suitable cover;
2. Using naturally aerated or mechanically aerated lagoons;
3. Using composting in conjunction with a solid waste system rather than a liquid or slurry system;
4. Using a methane digester and capture system.

To reduce emissions of greenhouse gases, ammonia, and volatile organic compounds, other practices such as Anaerobic Digester – Ambient Temperature (365), Anaerobic Digester – Controlled Temperature (366), Waste Facility Cover (367), and Composting Facility (317) can be added to the waste management system.

Adjusting pH below 7 may reduce ammonia emissions from the waste storage facility but may increase odor when waste is surface applied (see Waste Utilization, 633).

Cultural Resources

NRCS policy is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice or associated practices in the plan could have an effect on cultural resources. The National Historic Preservation Act may require consultation with the California State Historic Preservation Officer.

http://www.nrcs.usda.gov/technical/cultural.html is the primary website for cultural resources information. The California Environmental Handbook and the California Environmental Assessment Worksheet also provide guidance on how the NRCS must account for cultural resources. The e-Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

Endangered Species

If during the Environmental Assessment NRCS determines that installation of this practice, along with any others proposed, will have an effect on any federal or state listed Rare, Threatened or Endangered species or their habitat, NRCS will advise the client of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the client selects one of the alternative conservation treatments for installation; or with concurrence of the client, NRCS initiates consultations concerning the listed species with the U.S. Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared in accordance with the criteria of this standard and shall describe the requirements for applying the practice to achieve its intended use.

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be developed that is consistent with the purposes of the practice, its intended life, safety requirements, and the criteria for its design.

The plan shall contain the operational requirements for emptying the storage facility. This shall include the requirement that waste shall be removed from storage and utilized at locations, times, rates, and volume in accordance with the overall waste management system plan. In addition, for ponds, the plan shall include an explanation of the permanent marker or recorder installed to indicate the maximum operating level. The plan shall include a strategy for removal and disposition of waste with least environmental damage during the normal storage period to the extent necessary to insure the pond's safe operation. This strategy is for the removal of the contribution of unusual storm events that may cause the pond to fill to capacity prematurely with subsequent design inflow and usual precipitation prior to the end of the normal storage period. Development of an emergency action plan should be considered for waste storage facilities where there is a potential for significant impact from breach or accidental release. The plan shall include site-specific provisions for emergency actions that will minimize these impacts.