

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

CLOSURE OF WASTE IMPOUNDMENTS

(No.)

CODE 360

DEFINITION

The closure of waste impoundments (treatment lagoons and waste storage ponds), that are no longer used for their intended purpose, in an environmentally safe manner.

PURPOSE

- To protect the quality of surface water and groundwater resources.
- To eliminate a safety hazard for humans and livestock.
- To safeguard the public health.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to agricultural waste treatment lagoons and waste storage ponds that are no longer needed as a part of a waste management system and are to be permanently closed or converted.

Where these impoundments are to be converted to fresh water storage and the original impoundment was not constructed to NRCS standards, this practice will only apply where the investigation, as required in [National Engineering Manual \(NEM\) Section 501.23](#), shows structural integrity.

CRITERIA

General criteria applicable to all purposes.

Federal, State, and Local Laws. All planned activities shall comply with all federal, state, and local laws and regulations. The Alabama Department of Environmental Management (ADEM) Rules require owners/operators of animal feeding operations (AFO's) and associated waste management systems to fully implement and regularly maintain effective best management practices (BMP's) that meet or exceed NRCS technical standards and

guidelines to prevent discharges and to ensure groundwater and surface water quality.

All construction activities must implement adequate construction activity BMP's. To comply with the National Pollutant Discharge Elimination System (NPDES) rules, all construction activities involving one acre or more of land disturbance shall have and follow a construction best management practices plan (CBMPP) prepared by a qualified credentialed professional (QCP) until construction is complete and all disturbed areas are stabilized. All construction activities related to waste contact or containment, including design, installation, modification, and closure are to be certified by a professional engineer licensed in the state of Alabama (PE).

All structures used to convey wastes to lagoons or waste storage ponds shall be replaced with compacted earth material or otherwise rendered unable to convey wastes.

Liquid and slurry wastes shall be agitated and pumped to the extent conventional pumping equipment will allow. Clean water shall be added as necessary to facilitate the agitation and pumping. All wastes removed from the waste impoundment during closure shall be managed to prevent seepage/runoff. All land application of wastes shall be according to guidelines in the closure plan and the requirements of Alabama NRCS conservation practice standard [Nutrient Management, Code 590](#). Sludge remaining on the bottom and sides of the impoundment may remain in place if it will not pose a threat to the environment and is consistent with the intended future use of the impoundment area. This can be determined if the following conditions can be met:

- measures are taken to remove as much of the sludge as practical that can be properly land applied

- the remaining sludge layer is no more than 1 foot thick
- the liner under the sludge can be certified by a QCP to have a specific discharge of 0.028 feet per day or less, or to have been installed according to NRCS specifications at the time of construction
- the finished surface will be mounded to provide positive surface drainage
- the final compacted layer on the finished surface will be constructed of clayey material and have a compacted thickness of at least 12 inches
- at least 4 inches of topsoil will be added to the surface if the final surface treatment is to be vegetation
- any rainfall runoff will be diverted from the closure area

If leaving the sludge in place would pose a threat or the sludge would be inconsistent with the planned future use, the sludge shall be completely removed. If this sludge is too wet for immediate land application, it must be stockpiled near the waste impoundment to dry. Seepage and rainfall runoff from the sludge must be controlled so that pollution of surface or groundwater does not occur. This may require installing a compacted clay pad or liner, sump pump, grass filter, and/or routing of drainage back to the impoundment. After the sludge has dried, the material may be land applied.

Land reclamation. Impoundments with embankments may be breached and excavated impoundments may be backfilled so that they will no longer impound water, and these areas may be reclaimed for other uses. Waste impoundments that have water impounded against the embankment are considered embankment structures if the maximum liquid operating level is three (3) feet or more above natural ground.

(1) Embankment Impoundments.

Wastewater and sludge shall be completely removed from the site before the embankment is breached. The slopes and bottom of the breach shall be stable for the soil material involved, however, the slopes shall be no steeper than three horizontal to one vertical (3:1). If the area is to be backfilled, follow the guidelines for excavated impoundments below.

(2) Excavated Impoundments. The backfill height shall exceed the design finished grade by 5 percent to allow for settlement. The final compacted layer shall be constructed of at least 12 inches of the most clayey material available and mounded to shed rainfall runoff. Add at least 4 inches of topsoil to the surface if the final surface treatment is to be vegetation. Any upslope rainfall runoff will be diverted from the closure.

If permitted by state and local regulations, waste storage structures may be demolished or disassembled to such an extent that no water can be impounded. Disassembled materials, such as pieces of metal and concrete, shall be temporarily stored until their final disposition in such a manner that they do not pose a hazard to animals or humans.

Demolished materials may be buried on-site or moved off-site to locations designated by state or local officials. If buried on-site, the materials are to be covered with a minimum one foot thick layer of compacted aggregate and earth, and the backfill be sufficiently mounded such that runoff will be diverted from the site after the backfill settles.

Conversion to fresh water storage. The converted impoundment shall meet the requirements of the appropriate Alabama NRCS conservation practice standard for the intended purpose (e.g. [Pond, Code 378](#); [Irrigation Regulating Reservoir, Code 552](#); or [Irrigation Storage Reservoir, Code 436](#)). This will require an investigation of the structural integrity of the impoundment according to [NEM 501.23](#), if not originally constructed with NRCS technical assistance.

Waste impoundments scheduled for conversion to fresh water use shall have the wastewater and solids completely removed and properly land applied. Sludge shall be removed until a firm soil surface remains. Stained firm soil need not be removed.

A depth to contain the 25-year/24-hour storm volume, or a minimum of 1 foot, shall be maintained between the maximum water surface and the overflow elevation during the conversion process. The pond shall not be allowed to discharge until certified for fresh water use, as described below, by a QCP.

A QCP can determine if the converted waste impoundment needs pipes and an auxiliary spillway installed to properly convert the impoundment into a farm pond. The

impoundment may then be refilled with fresh water and the dissolved oxygen (DO) monitored through one warm weather growing season (March - October) to determine if at least 3 mg/l of DO can be continually maintained without artificial or mechanical aeration. If so, the impoundment can be considered suitable for fresh water use. If not, the impoundment shall be treated or the contents shall be land applied and the impoundment refilled as many times as needed until the water quality will provide 3 mg/l of DO throughout a warm weather growing season without artificial or mechanical aeration. Fish may be introduced into the pond during this monitoring stage; however, some means of aeration shall be available in case the DO level falls below 3 mg/l.

DO shall be measured with test equipment with an accuracy of 0.2 mg/l or less, and water quality monitoring shall be performed as follows:

- measure water temperature at least weekly
- obtain DO sample at least one foot below the water surface
- follow manufacturer's instructions for using test equipment for determining DO
- sample DO at least monthly when the water temperature is less than 50° F
- sample DO at least every two weeks when the water temperature is 50° F to 70° F
- sample DO at least weekly when the water temperature exceeds 70° F
- sample DO immediately prior to daybreak to obtain the typical lowest level of the day
- 5-day biochemical oxygen demand (BOD₅) may be required as needed to verify the quality of pond discharges

The monitoring process and the results shall be certified by a QCP.

Safety. Precautions (fencing and warning signs) shall be used to ensure that the facility is not used for purposes incompatible with the current quality of water. When a waste impoundment is being converted to fresh water usage, precautions (fencing and warning signs) will be used to ensure that the impoundment is not used for incompatible purposes (such as swimming, livestock watering, fish production, etc.) until water quality is adequate for the intended purpose. Water quality sampling and

analysis shall be used to determine when the impoundment is safe for these uses.

Personnel shall not enter an enclosed waste impoundment without breathing apparatus or taking other appropriate measures.

Protection. All disturbed areas not returned to crop production shall be vegetated in accordance with Alabama NRCS conservation practice standard [Critical Area Planting, Code 342](#), or other suitable measures used to control erosion and restore the esthetic value of the site.

Measures shall be taken during closure to minimize erosion and pollution of downstream water resources. This may include such items as silt fences, hay bale barriers, temporary vegetation, mulching, etc.

CONSIDERATIONS

If the surface of the waste impoundment is covered by a dense mat of floating vegetation, it may be necessary to apply a herbicide to the vegetation and then burn the residue if the material is to be removed by pumping. Appropriate burning permits should be obtained.

Sludge from poultry lagoons can contain large quantities of ground oyster shells, lime, or other calcium sources. Other waste impoundments receiving runoff from cattle washing areas and open lots can contain excessive amounts of soil and other debris. These types of sludge will be difficult to remove by agitation and pumping, and alternate methods of sludge removal may be required.

When converting waste treatment lagoons and waste storage ponds to fresh water ponds, the effects on the water budget should be considered. A pond will reduce surface runoff, trap sediment, and reduce nutrients and pesticides leaving the land.

Consideration of climatic factors such as humidity, wind speed, and wind direction should be considered to determine the timing and method of applying the wastewater and sludge from the lagoon or waste storage pond.

If livestock will have access to a closed waste impoundment converted to a fresh water pond, consideration should be given to fencing or installation of a watering ramp where needed for safety.

Sludge which is allowed to dry will begin to decompose aerobically. This will result in a

release of nutrients from the sludge, which can last years depending upon the depth of sludge. For this reason, sludge which is left in place should be kept flooded to prevent this from occurring, or other measures taken to prevent this release of nutrients from becoming a source of surface or ground water contamination.

PLANS AND SPECIFICATIONS

Plans and specifications for closure of abandoned waste treatment lagoons and waste storage ponds shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. If the waste treatment lagoon or waste storage pond is converted to a fresh water pond, the pond shall be required to meet the NRCS conservation practice standard for the intended purpose. The plans and specifications will also be in keeping with the requirements of that standard.

OPERATION AND MAINTENANCE

The proper closure of a waste treatment lagoon or waste storage pond should require little or no operation and maintenance; however, if it has been converted to another use, such as a fresh water pond, operation and maintenance will be in accordance with the needs as set forth in the appropriate NRCS conservation practice standard applicable to the intended purpose.

REFERENCES

ADEM Administrative Code, Chapter 335-6-7, as amended

[ADEM/NRCS Buffer Distance Summary for Animal Feeding Operations](#)

Alabama NRCS Conservation Practice Standards:

[Critical Area Planting, Code 342](#)
[Irrigation Regulating Reservoir, Code 552](#)
[Irrigation Storage Reservoir, Code 436](#)
[Manure Transfer, Code 634](#)
[Nutrient Management, Code 590](#)
[Pond, Code 378](#)

Alabama NRCS Guide Sheets:

[Application Distances for Applying Animal Manure and Organic By-Products, AL 590](#)
[Renovation/Closure of Waste Impoundments, AL 360](#)
[Wastewater Irrigation, AL 634](#)

[NRCS National Engineering Manual, Section 501.23](#)

CONSTRUCTION SPECIFICATION

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SCOPE

This item shall consist of the measures necessary to close a waste impoundment that is no longer in service. Also included are measures necessary to properly remove the contents of a waste impoundment by agitating and pumping, dredging, or a combination of both. Construction operations are to be conducted in such a manner that erosion, air, water, and noise pollution will be minimized and held within legal limits established by state regulations.

All land application of wastes shall be according to guidelines in the closure plan and the requirements of Alabama NRCS conservation practice standard [Nutrient Management, Code 590](#).

WASTE REMOVAL

Agitation and Pumping

Removal of the contents of a waste impoundment by agitation and pumping is often done with rental type equipment and generally does not require construction measures. However, some operators may elect to install permanent pump and pipeline locations. If a pipeline is installed through or into the waste impoundment embankment, the construction techniques and methods shall be approved by a qualified credentialed professional (QCP).

Dredging

Sludge that is removed with excavation equipment may be temporarily stockpiled near the waste impoundment. If possible, the stockpile area shall slope slightly toward the waste impoundment. Uncontaminated rainfall runoff shall be diverted from the waste impoundment. A drainage fence or filtering device may be necessary to prevent solids from reentering the waste impoundment. In topographical locations in which positive drainage toward the waste impoundment cannot be obtained, a sump pump system may be required to return the liquid drainage to the waste impoundment. If the sludge has minimum drainage associated with the dredged material, a grass filter can be designed to treat the liquid in lieu of the sump pump system.

If the existing soils at the stockpile location are not adequate to prevent seepage from entering the groundwater, a 6-inch thick compacted clay pad or other equally impermeable liner is required beneath the stockpile. The perimeter of the stockpiled material shall be protected as needed with an earthen berm or other approved structure to exclude uncontaminated runoff and to ensure drainage of the dredged material returns to the waste impoundment, a sump pump, or an appropriate grass filter.

The stockpiled material should be allowed to dry, tested for nutrient content, and then land applied at recommended rates. After land application of the dried material, the temporary stockpile area shall be smoothed and vegetated according to the vegetation plan.

WASTE IMPOUNDMENT CLOSURE

Agitate and pump the waste impoundment contents and remove the unpumpable material in the bottom of the waste impoundment according to the closure plan.

If the waste impoundment is to be closed by filling with soil, the soil shall be placed in maximum 9-inch thick layers with each layer being compacted using two passes of the earthmoving equipment. Soil moisture content shall be maintained to ensure adequate compaction of the material. The filling process shall continue until the waste impoundment is overfilled 5 percent to allow for settlement. The final compacted layer shall have at least a 12-inch compacted thickness and be made with the most clayey material on site. The final surface shall be mounded so that any surface water will not collect. Potential rainfall runoff water upslope from the closed waste impoundment shall be diverted from the closure. If the final surface is to be vegetated, apply at least 4 inches of topsoil material, smooth, and vegetate the area according to the vegetation plan.

POLLUTION CONTROL

Waste removal, land application of the dry waste or wastewater, and all construction activities are to be conducted in such a manner that all pollution is minimized. Best management practices (BMP's) shall be utilized where needed.