Operation & Maintenance Plan
Waste Storage Facility (Code 313)

Landowner/Operator: Date:

NRCS Service Center: Conservation District:

Practice Location: Tract/Field ID:

(Lat/Long or UTM Coord, or Sec/TS/R)

Expected Lifespan

The minimum expected lifespan of this practice is at least 15 years.

A properly operated and maintained **Waste Storage Facility** is an asset to your property. The purpose of this practice is to store manure, agricultural by-products, wastewater, and contaminated runoff in an environmentally sound manner to better manage agricultural nutrients. This practice does NOT apply to the storage of human wastes or animal carcasses. The estimated life span of this practice is **15 years**. The life of the practice can be assured and usually extended by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic operation and maintenance to maintain satisfactory performance. The following are some requirements to help you develop a good operation and maintenance program.

Safety

1. Exclude livestock and human access, provide fencing, gates and other barriers. Inspect fence and gates at least twice a year. Repair and/or replace damaged fences and gates as soon as possible. Keep gates closed at all times.
2. Inspect all warning signs to see that they are legible and properly mounted. Repair or replace as needed.
3. Waste storage facilities must be considered “High Hazard Areas”. The anaerobic biodegradation of waste forms noxious gases such as:
   - Methane (CH)
   - Hydrogen sulfide (H2S)
   - Ammonia (NH3)
   - Carbon dioxide (CO2)

   These gases can be fatal to both animals and human beings. Especially “Hydrogen Sulfide” which can paralyze the diaphragm and the victim will not be able to breath without the assistance of an Artificial Respirator, even after being removed from the location of the noxious gas. Thoroughly familiarize yourself with all potential gas problems, special wiring needs and ventilation needs.
4. In many cases, noxious gases displaces oxygen and people entering the reception pit succumb to the lack of oxygen as opposed to direct harmful effects of noxious gases.
5. Some gases (i.e. methane) can be explosive with the proper gas to air ratio. Use caution with open flames, welding equipment, electrical motors with brushes that spark (skill saws, electric drills, shop vacuums, etc.) when working near waste storage facilities. Never smoke near a storage facility and post “No Smoking” signs to warn others. Be sure the work area is well ventilated.
6. Agitation of liquid manure can release large volumes of these noxious gases. Special care must be taken to provide adequate ventilation during agitation and emptying of the storage facility. If there is a question regarding the adequacy of ventilation, the livestock should be evacuated from the building and the operator should wear an oxygen mask.

7. Operators should avoid working alone during agitating and emptying the facility.
8. Do not enter any reception pit, tank or other confined spaced used for the storage or transfer of manure because of the potential of harmful gases. When it is necessary for someone to enter a confined structure for repairs, hire a consultant who has the proper equipment, training and knowledge to work in confined spaces, especially when working around deadly gases. Take the following precautions anytime someone must enter a confined structure:
    a. Adequately ventilate the reception pit by the use of fans, blowers, etc.
    b. A minimum of two people should be present; one to remain on the outside and one to enter the facility.
    c. Persons entering the reception pit shall wear a proper harness and be properly tethered so person outside the reception pit can pull them out.
    d. Persons entering the reception pit shall wear a self-contained breathing apparatus. Gas masks cannot adequately remove harmful gases and should NOT be used.
    e. In manure facilities, the air has been displaced by the noxious gases and when the gases are removed by the gas mask, the wearer will suffocate because there is no air to breathe.
    f. Follow all OSHA rules and guidelines when working around a confined structure.
9. Keep all lids, gates, hatch covers, shields and safety grates in place to prevent any unauthorized entry of people and livestock. If necessary, provide a lock.
10. Never leave a ladder that stands against an above ground waste storage facility unattended.
11. All waste storage facilities must be posted with signs with the following or similar warning:
    "DANGER – DROWNING HAZARD, SURFACE MAY BREAK THROUGH", or

    "PROLONGED EXPOSURE MAY BE HAZARDOUS TO YOUR HEALTH"
12. When installing new wells, springs or other potable water sources, due consideration must be given to the distance, grade and location of the waste storage facility to the new water source. Consult Vermont DEC Environmental Protection Rules, Chapter 21 – Water Supply Rules for guidance regarding set back distances of newly drilled wells to existing waste storage facilities. Also consult the Vermont Department of Health and the Vermont Agency of Agriculture.

Filling the Storage Facility

1. Avoid adding frozen manure, wads of straw or hay, stones, twine or other bulky materials when filling the storage facility. These can make unloading the facility difficult and possibly cause damage to the unloading equipment.
2. Store frozen and solid manure at an approved stacking facility or haul to an approved field stacking location.
3. Do not dispose of animal mortality, greases, syringes, human waste, or other unapproved wastes in the waste storage facility.
4. The consistency of the manure varies depending upon the type and volume of bedding and the ration being fed to the livestock. Water may need to be added to improve the consistency and ability to pump the manure. Additions of milk house wastewater, barnyard runoff, or other liquid effluent can be used to make manure more "pumpable".
5. Never remove safety gates from a push-off ramps. If frozen or dry manure accumulates at the push-off ramp to the point where access can no longer be obtained, seek alternate methods of loading the facility. Consider field stacking manure, or hire an excavator to remove the buildup.
6. Do not load toxic substances into the storage facility.
7. Do not encroach into the freeboard of the waste storage facility (6" from the top for a fabricated structures, 12" from the top for an earthen facility).

When to Empty

1. Empty the storage facility at a time(s) specified in the nutrient management plan.

2. Operate system to minimize odors and air drift.
3. Avoid unloading the waste storage facility and spreading manure during weekends and holidays.

Agitation

1. Agitate the manure in the waste storage facility long enough to break up the crust and to carry all solids into suspension. When sand laden manure is agitated, pump manure out promptly to avoid sand separating and settling out.
2. If necessary, agitate the manure in the waste storage facility at multiple locations or use multiple pumps to continually agitate the manure while the waste storage facility is being unloaded.
3. For earthen facilities and facilities with synthetic liners, do not operate agitator or unloading pump too close to the bottom or side slopes. Only operate agitation and unloading equipment on concrete ramps and pads specifically designed to prevent erosion and damage to interior of the storage facility.
4. DO NOT direct the discharge from agitation or pumping equipment onto the side slopes of an earthen or synthetic lined facility.
5. Failure to agitate properly could result in the accelerated buildup of solid manure on the bottom of the facility.
6. If the facility is beneath the barn or other confined location, evacuate livestock and people from the building before beginning agitation and pumping or properly ventilate the building to prevent the buildup of noxious gases. See “Safety” section above.
7. Avoid long term operation of stationary tractors on inclined ramps greater than 7 horizontal to 1 vertical. Constantly monitor the tractor engine temperature and oil and coolant levels during the entire agitation and unloading process. Consult your tractor’s owner’s manual or dealer for proper tractor operating conditions.

Unloading

1. When unloading with pumps, keep spillage to a minimum. Plan the unloading area so any spillage can flow back into the waste storage facility. Otherwise, make provisions to contain small spills and to clean them up when unloading is complete.
2. For earthen facilities and facilities with synthetic liners, do not operate the unloading pump too close to the bottom or side slopes. Only operate the unloading equipment on concrete ramps and pads specifically designed to prevent erosion and damage to interior of the storage facility.
3. NEVER direct the discharge from the agitation pump onto the side slopes of an earthen or synthetic lined facility.
4. The methods of slurry loading of spreaders are rapid. Develop a procedure to avoid overtopping of the manure spreader and loss of wastes where they will cause additional work and/or pollute water. When unloading with conventional equipment (front end loader), excessive rainfall and water may need to be removed by pump and properly field applied according to the nutrient management plan.

Removal of Solids and Sand Bedding

1. Remove solid manure and sand bedding when the buildup exceeds 18” for earthen storages and 6” for concrete or glass lined storages. Field apply solid manure in accordance to the NMP.
2. Care must be taken not to damage or disturb the earthen or synthetic liner of the storage facility. If frequent solids and sand removal is anticipated, consideration should be given to installing a concrete liner.
3. In the absence of a concrete liner:
    a. Use extreme care not to damage or compromise the liner when removing buildup of sand and/or solid manure.
    b. Operate removal equipment such as an excavator from the top of the facility.
    c. Do not use teeth on the bucket of the removal equipment.

d. Do not disturb the bottom and side slopes.
e. Do not excavate any closer than one foot vertical to the final bottom grade of the storage facility to remove solid material.
f. Do not excavate any closer than five feet horizontal to the final grade of the side slopes of the storage facility to remove solid material.
g. If the synthetic liner is damaged, notify the manufacturer or supplier right away so repairs can be made.
h. If a soil liner is damaged, notify NRCS or the design engineer right away so provisions can be made to repair or replace the liner.
i. Do not resume filling of the waste storage facility until repairs to the damaged liner is made. Operating a waste storage facility with a damaged liner could result in polluting the ground water and possibly an on-farm or neighbor's well.

Transportation of Manure

1. Post traffic signs along the entire route to warn commuters of large spreading equipment on the road, especially at locations of ingress and egress to the road.
2. Only use tractors that are properly sized for the spreading equipment.
3. Test tractor brakes and maintain as needed.
4. Mount flashing warning or hazard lights on the tractor and spreader.
5. Be sure that all tires are properly inflated.
6. Do not operate spreading equipment without all safety shields and devices in place.
7. Avoid tracking mud and spilling manure onto roads and highways.
8. Plan turn off locations to allow following cars to pass.

Inspection and Maintenance

Inspection and maintenance is required to achieve the intended function, benefits, and life of the practice. The landowner/operator is responsible to establish and implement an inspection and maintenance program. Inspect the facility after each significant storm event and at least annually. Items to inspect and maintain include, but are not limited to, the following:

1. Check backfill areas around facilities for excessive settlement. Determine if settlement is being caused by consolidation, piping, wall or floor failure or other issues. Make necessary repairs as soon as possible. If necessary, consult your local NRCS office.
2. Check concrete walls and floor often for cracks and/or separations and make necessary repairs.
3. Check earthen berms and embankments for sloughing, erosion or settlement. Maintain embankment and backfill elevations as specified in the design. Visually inspect the inside of the embankment each time the facility is emptied. Maintain design elevation of the top of berms. If necessary, import additional earthfill and properly compact to maintain the proper top of berm elevation.
4. Inspect foundation drain outlets, keep outlets open and ensure no polluted water is draining. Inspect for signs of leakage such as excessively high flow rate, turbidity, discoloration, odors or other unusual characteristics of the flow. Excessive growth and accumulation of algae at the drain outlet could be another sign that nutrients are leaking from the facility. Check drain outlets each time after the facility is emptied and after each significant storm event. If leakage is detected, make the appropriate repairs as soon as possible. Consult your local NRCS office for guidance. Also, inspect for any obvious blockages in the drain. Make provisions to unblock the drain as soon as possible.
5. Inspect access roads and approaches to and from the storage facility frequently to determine need for additional stone or other stable materials. Repair roads as necessary.
6. Inspect all pipes, pumps, valves, gates, etc. twice a year to make sure they are properly functioning, structurally sound, and are not cracked, broken, or pose as a safety or environmental

hazard to the operator or livestock.

7. All fences and gates shall be inspected for damage at least twice a year. Damaged fences and gates shall be repaired and/or replaced as soon as possible. Gates shall be kept closed at all times.
8. Begin emptying or drawdown according to the schedule in the Nutrient Management Plan (NMP) or sooner if the contents of the storage facility reach the maximum operating level. The level of manure shall never encroach into the freeboard (6” from the top for structures, 12” from the top for earthen).
9. Inspect clean water diversions installed up gradient of the storage facility at least once a year. Ensure the channel has the adequate capacity and is protected from erosion. Clean out the channel or make other repairs as soon as possible. Keep equipment access to these channels to a minimum. Do not use the channel and berm as haul roads. Keep clean surface water away from the storage facility.

Maintenance

1. Follow the Comprehensive Nutrient Management Plan (CNMP).
2. Maintain a good vegetative cover on earthen berms and embankments. If the vegetative cover is damaged, repair and reseed as soon as possible. Mow vegetative cover at least twice a year to control weeds and encourage vigorous growth.
3. Check push off ramps, headwalls, retaining walls and other concrete appurtenances for cracks, spalls or other serious damage. Repair as necessary.
4. Immediately repair any damage to the waste storage facility caused by equipment, livestock or vandalism, including the surrounding area and/or any appurtenances.
5. Check frequently for burrowing animals. When found, remove the burrowing animals, fill holes and reseed.
6. Do not allow spillage and runoff from loading areas to flow into streams, road ditches or other water conveyance channels or practices.
7. Keep all pumps, agitators, piping, valves and all other electrical and mechanical equipment in good operating condition. Consult manufacturer’s specifications for guidance. Immediately remove any foreign debris that could damage pumps and agitators. Inspect grounding rods for all electrical equipment.
8. Repair or replace any rusted or damaged metal and paint.
9. Structures:
    a. Check backfill areas around concrete facilities for excessive settlement. Determine if settlement is being caused by consolidation, piping, failure of wall or floor, or other issues. Make necessary repairs as soon as possible. If necessary, consult your local NRCS office.
    b. Do not operate loaded feed wagon, trucks, manure spreaders, or other heavy equipment within five feet of the concrete walls.
10. Earthen Facilities:
    a. Keep equipment away from steep side slopes
    b. Keep equipment operators informed of all potential hazards.
    c. Remove any woody plants from the embankment as soon as possible.
    d. When the facility is emptied, inspect clay and synthetic liners for erosion, tears, or other anomalies.
11. Bedded Pack Facilities:
    a. Keep livestock confined to inside the bedded pack facility. Do not allow livestock to loaf, congregate, stand, etc. outside of the bedded pack facility at any time.
    b. Add adequate amounts of bedding in the form of hay, straw, saw dust, corn fodder, etc. to the “pack” on a daily basis to keep the “pack” firm for livestock to stand on and to keep the

livestock clean.

c. Any excess moisture in the bedded pack must be absorbed by the bedding material. If liquid is observed flowing, leaching or seeping from the facility; additional bedding must be added to the “pack” immediately.

d. Monitor watering facilities closely. Immediately repair any leaks or damaged components to the watering facility. Apply additional bedding material around watering facilities to help keep the pack dry.

Operation, Maintenance and Inspection Costs

1. It is estimated that the annual time to routinely inspect and make minor repairs to your Waste Storage Facility will be:
   a. Inspection = 6 hours/year
   b. Minor Repairs = 6 hours/year
   c. Mowing = 4 hours/year
   d. Removing Debris = 2 hours/year

   Major repairs to damage caused by major storm event will require extra time and materials.
2. Most minor repairs can be made by the operator using basic hand tools. However, major repairs to damaged concrete, pipe, fence, etc. may require hiring a professional experienced in these repairs and improvements.
3. Most maintenance, such as mowing, reseeding, debris removal, etc. can be accomplished using common farm machinery. Occasionally major damage may require heavy construction equipment to make repairs.
4. Unloading and field application costs:
   a. The estimated annual cost to agitate, pump, transport and field apply manure is $0.11/gallon. Tillage or incorporation costs not included. This cost assumes a custom applicator will be hired to empty the waste storage facility and properly apply the manure. Cost will vary depending upon the size of the storage facility and the distance the manure will have to be hauled to meet the applications rates in your Nutrient Management Plan. You should consult with a custom applicator and your nutrient management consultant to better estimate this cost.
   b. The cost to remove accumulated sand laden manure or solid manure from the waste storage that cannot be otherwise removed by traditional lagoon type agitation pump, will cost extra. The frequency at which sand and/or solid manure will need to be removed will vary depending upon the consistency of the manure; the size and shape of the waste storage facility; the type, amount and gradation of sand; how well the waste storage facility is agitated each time; volume of water added to the manure during unloading; etc.

Specific Requirements for Your Practice

1. _____

2. _____

3. _____

4. _____

5. _____

Specific Site Requirements

Clear Form