

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
WASTE TRANSFER

(No.)

CODE 634

DEFINITION

A system using structures, conduits or equipment to convey byproducts (wastes) from agricultural operations to points of usage.

PURPOSES

To transfer agricultural material associated with production, processing, and/or harvesting through a hopper or reception pit, a pump (if applicable), a conduit, and/or hauling equipment to:

- a storage/treatment facility,
- a loading area, and/or
- agricultural land for final utilization as a resource.

CONDITIONS WHERE PRACTICE APPLIES

The transfer component is a part of a planned waste management or comprehensive nutrient management system.

This practice applies where material is generated by livestock production or agricultural product processing and a conveyance system is necessary to transfer the byproducts from the source to a storage/treatment facility and/or a loading area, and/or from storage/treatment to an

area for utilization. This includes hauling nutrients from one geographical area with excess nutrients to a geographical area that can use the nutrients in an acceptable manner.

This practice does not include land application or other uses of manure. Criteria for land application of waste are included in the Indiana (IN) Field Office Technical Guide (FOTG) Standard (590) Nutrient Management or (633) Waste Utilization.

CRITERIA

General Criteria Applicable to All Purposes

Use of this standard will comply with all applicable federal, state, and local laws and regulations.

Structures. All structures, including those that provide a work area around pumps, must be designed to withstand the anticipated static and dynamic loading. Structures must be designed to withstand earth and hydrostatic loading according to IN FOTG Standard (313) Waste Storage Facility. Covers, when needed, must be designed to support the anticipated dead and live loads.

Reception pits must be sized to contain a minimum of one full day's production. For reception pits receiving runoff, sufficient storage must be provided to also contain the

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service State Office, or download it from the Field Office Technical Guide for your State.

volume of runoff from the 25-year, 24-hour storm plus any required freeboard and emergency storage.

Openings to structures to receive material from alley scrape collection must be a minimum of 9 square feet with one dimension no smaller than 4 feet. The opening must be equipped with a grate designed to support the anticipated loads.

When curbs are needed in conjunction with structures, they must be constructed of either concrete or wood (Chromated Copper Arsenate (CCA) or equivalent treatment). Curbs must be of sufficient height to ensure all materials flow into the structure and must be adequately anchored.

Pipelines. Design of pipelines must be in accordance with sound engineering principles considering the waste material properties, management operations, type of load on the pipe, exposure, etc. The minimum pipeline capacity from collection facilities to storage/treatment facilities must be the maximum peak flow anticipated.

The minimum pipeline capacity from storage/treatment facilities to utilization areas must ensure the storage/treatment facilities can be emptied within the time limits stated in the management plan for nutrient utilization.

Pipelines used for transferring material to an irrigation system must meet the requirements of IN FOTG Standard (430) Irrigation Pipeline.

All pipes must be designed to convey the required flow without plugging, based on the type of material and total solids content. To minimize settling of solids in the pipeline, design velocities must be between 3 to 6 feet per second. Fluid velocities must not exceed 5 feet per second if pipe is not buried or securely tied down.

Clean-out access must be provided for gravity pipelines at a maximum interval of 100 feet unless an alternative design is approved by the design engineer. Gravity pipelines must not have horizontal curves or bends except minor deflections (less than 10 degrees) in the pipe joints unless special design considerations are used.

In a gravity flow pipe system, a minimum head is required, depending upon the consistency of the material: 4 feet for heavily bedded manure, 2 feet for slurry or semi-solid manure, and 1 foot for liquids and liquid manure.

Gravity discharge pipes used for emptying a storage/treatment facility must have a minimum of two gates or valves, one of which must be manually operated.

Pipe used to transfer waste must meet or exceed the applicable specification listed in Table 1 below. Manufactured fittings and seal joints with solvent cement or elastometric O-rings must be used. Joints must be watertight.

Table 1. Pipe Specifications

Pipe Material	Applicable Specification
Polyvinyl chloride (PVC) Plastic	American Society for Testing and Materials (ASTM): D3034; D1785; D2241; F679; F794
High-Density Polyethylene (HDPE) Plastic	American Association of State Highway and Transportation Officials (AASHTO): M294 Type S
Concrete	ASTM: C76
Steel	ASTM: A52; A134; A135; A139

Pipelines must be installed with appropriate connection devices to prevent contamination of private or public water supply distribution systems and ground water. Pipes and channels going through liners, such as clay, concrete, polyethylene, or geosynthetic clay must be installed so the integrity of the liner is maintained.

- **Gravity Pipeline for Non-Bedded Waste.** The minimum pipe diameter for non-bedded material in a gravity system must be 6 inches with a minimum of 1.0% grade. Pipes for non-bedded manure must enter at least 3 feet above

the pond or tank bottom. For continuous flow systems, the minimum grade must be 1.0%.

Flush type systems, which accumulate waste in a hopper or temporary storage at the head of the system, can be designed with steeper grades though they must not exceed 10.0%. For pipes entering below the design volume elevation, a cleanout must be installed.

- Gravity Pipeline for Bedded Waste.**
 For pipelines carrying bedded manure in a gravity system, the minimum diameter must be 24 inches, and must not exceed 5% grade and 200 feet in length. Pipes for bedded manure must enter at the pond or tank bottom. The head on these pipes must be at least 5 feet from the loading hopper to the full level in the storage facility.

Other Conduits. Concrete lined ditches must be designed according to IN FOTG Standard (468) Lined Waterway or Outlet. A minimum design velocity of 1.5 feet per second must be used.

Pumps. Pumps installed for transfer must meet the requirements of IN FOTG Standard (533) Pumping Plant. Pumps must be sized to transfer material at the required system head and volume. Type of pump must be based on the consistency of the material and the type of solids. Requirements for pump installations must be based on manufacturer's recommendations. Pipe used with manure pumps must be consistent with the pump manufacturer's recommendations and sized to handle the maximum flow rate of the pump. Pumps must not be used for sand bedded operations without separation facilities.

Solid/liquid waste separation. A filtration or screening device, settling tank, settling basin, or settling channel used to separate a portion of solids from the manure or liquid waste stream will be designed according to NRCS National FOTG Standard (632) Solid/Liquid Waste Separation Facility.

Safety. The system design must consider the safety of humans and animals during construction and operation.

Open structures must be provided with covers or barriers such as gates, fences, etc. Ventilation and warning signs must be provided for transfer systems as necessary to warn of the danger of entry and to reduce the risk of explosion, poisoning, or asphyxiation.

Pipelines from enclosed buildings must be provided with a water-sealed trap and vent or similar devices where necessary to control gas entry into buildings.

Barriers must be placed on push-off ramps to prevent tractors or other equipment from slipping into waste collection, storage, or treatment facilities.

Biosecurity. Products from diseased animals must be handled in accordance with the recommendations of the State Veterinarian.

Equipment leaving the farm must be sanitized as appropriate to prevent the spread of disease.

Additional Criteria in Support of Agricultural Land for Final Utilization

Waste utilization. Nutrients must be applied to the utilization area in amounts, uniformity, rates, and at a time consistent with the requirements of IN FOTG Standard (590) Nutrient Management or (633) Waste Utilization, as appropriate.

Hauling equipment. Equipment used for hauling material from one geographical area to another area must be capable of hauling the material without spillage, leakage, or wind-blown losses during transport. Weight limits of roads used must be followed.

CONSIDERATIONS

General

Consider economics (including design life), overall manure management system plans, and health and safety factors.

Consider the timing and location of agitation and transfer activities to minimize odor formation and transport and to minimize the breeding of insects within the material.

Consider covering and/or minimizing the amount or number of times the material is

disturbed to reduce the likelihood of air emissions of particulate matter, volatile organic compounds, and ammonia air emissions formation and release.

Transfer Operations

In locating structures, use existing topography to the greatest extent possible to generate head on structures and reduce pumping requirements.

Consider the operating space requirements of loading and unloading of equipment in the vicinity of waste transfer components.

Consider the subsurface conditions, i.e., depth to bedrock, water table, etc., when locating and designing structures.

Pipelines used for transferring manure should be flushed with clean water after use.

When applicable and compatible, consider the joint use of waste transfer pipelines with irrigation system design requirements.

The pipe pressure rating required may need adjustment based on material temperature.

Consider corrosion resistance and water tightness in the selection of pipe material and joints.

Consider the potential for salt (struvite) deposits in smaller diameter pipes.

Consider the need for appropriate check valves, anti-siphon protection and open air breaks in all pipelines.

Provisions should be made for removing solids from conveyance conduits such as concrete lined ditches, etc.

Vehicles used to transfer waste material should be sized to reduce the danger of rollover.

Where material is to be spread on land not owned or controlled by the producer, a nutrient management plan is recommended, establishing environmentally acceptable utilization of the material.

Consider route selection and timing of waste transfer to minimize impact of nuisance odors on others.

Consider equipment type and covering of manure to minimize particulate matter

generation during transportation of the manure.

PLANS AND SPECIFICATIONS

Plans and specifications will be prepared for the practice site. Plans include, but are not limited to:

- Plan view of waste transfer layout.
- Profile and cross-sections (where applicable).
- Location and dimensions of waste transfer system.
- Details of pumps and other appurtenances (where applicable).
- Erosion and sediment control measures (where applicable).
- Seeding, fertilizing and fencing requirements (where applicable).
- Quantities and bill of materials.
- Specifications w/fill compaction requirements.

OPERATION AND MAINTENANCE

An operation and maintenance plan will be provided to and reviewed with the landowner. The plan must include the following items and others as appropriate.

The O&M Plan must provide specific instructions for proper operation and maintenance of each component of this practice and must detail the level of repairs needed to maintain the effectiveness and useful life of the practice. The plan must also address the operation to be able to empty the facility within the appropriate time periods.

The operation and maintenance plan must describe what actions will be taken to minimize flies and other insects during the transfer of material.

For the hauling of material from one geographical area to another, record keeping by the producer or his/her designated representative will be required and may include such items as:

- the type, nutrient content, and amount of waste transferred;
- the solids percentage of the material;
- the date of transfer;
- the name and address of the source and destination of the material; and
- the condition of the material as left at the destination (spread, stockpiled and covered, etc.)

REFERENCES

Agricultural Waste Management Field Handbook (AWMFH) – Part 651, National Engineering Handbook, USDA-NRCS, April 1992.

Indiana Confined Feeding Rules.

Midwest Plan Services (MWPS)
Publications:

MWPS – 1, Structures and Environment Handbook.

MWPS – 18, Livestock Waste Facilities Handbook.

MWPS – 36, Concrete Manure Storages Handbook.