



The Management of Distillers Grains

Understanding Environmental Requirements

Environmental permits are required by federal, state and sometimes local governments to ensure that business operations and construction activities minimize potential impacts on human health and the local environment. The specific environmental regulations and permits that could apply to the construction and operation of a facility may vary depending on the specific location, breadth of activities and potential pollutants emitted. Permits provide a range or maximum amount of pollution that may be emitted during a specific time frame and explain how the pollutants are to be managed.

What are Distillers Grains (DGs)?

Due to Kentucky's unique climate and geologic conditions, including limestone-filtered spring water, Kentucky produces 95 % of the world's bourbon. Many entities across the Commonwealth also produce a wide variety of other spirits which generate these grains. The spent grains are often referred to as distillers grains. Distillers grains (DGs) contain an increased concentration of nutrients after alcohol fermentation occurs.



Distiller Grains are Marketed in Several Forms

The major difference among the forms of DGs that are marketed is the moisture content. DGs can be marketed as wet, modified or dried.

1. Wet, or "thin stillage," is often 6% dry matter. Thin stillage is very perishable and becomes spoiled after only a day or two.
2. Modified, or "wet cake," contains approximately 28% - 50% dry matter. Decreasing the moisture content allows for a slightly longer shelf life of about one week.
3. Dried DGs, which are generally 85% - 95% dry matter, have an extended shelf life and can be transported longer distances. However, some feeding value may be lost in the drying process.

For more information on feeding DGs, see the University of Kentucky, College of Agriculture, Cooperative Extension Service publication "[Distillers Grain Coproducts for Beef Cattle](#)" (ASC-186).

Are Distillers Grains a Waste or a Product?

A waste is any material that is taken out of its intended use or discarded. DGs are a waste when generated from the distilling process as they are spent grains which can no longer be used for their intended purpose at the facility. Although, the spent DGs may be utilized by agriculture as a feed additive or product. There are many classifications of a waste that may require different handling and permitting requirements.

Distilleries Are An Industry

When DGs are determined to be a waste, it is considered an **industrial solid waste**, as it is generated from an industrial process and generally does not contain hazardous properties upon generation. A waste determination is to be made by the distillery prior to disposal to ensure proper management. The DG waste can be sold, disposed, or held on-site for a period of time.

Special Waste — Generation and Management



When DGs have been treated or partially treated in a lagoon or by other means of waste treatment, the subsequent sludge becomes a **special waste**. The difference between special wastes and other wastes is the volume and hazard of the wastes that are generated, although having a low hazard can still lead to potential human and environmental risk ([KRS 224.50-760\(1\)\(a\)](#)).

Some special wastes can be applied to the land as a benefit to the soil. However, unless the treatment lagoon is aerated and the material is stored for an extended period of time, the DGs and other wastes will not decompose completely. The incomplete decomposition leads to acidic waste that contains odorous compounds and has a very high demand for biochemical oxygen (i.e. it requires a lot of oxygen to completely breakdown the organic material). These conditions often remove the ability for the special waste to be applied to land due to the lack of beneficial reuse and potential damage to vegetation and waterways.

DGs retain an **industrial waste** classification and are not exempt as “manure, crops, crop residue or a combination thereof” when used as a fertilizer or a soil amendment ([KRS 224.1-010\(31\)](#)).

What is the Distillery’s Responsibility?

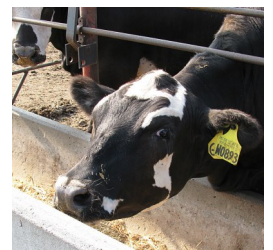
DGs are to be managed in accordance with Kentucky Environmental Performance Standards, as outlined in [401 KAR 47:030](#). The distilleries that produce DGs maintain responsibility for proper management of the material until consumed or final disposal ([KRS 224.1-010\(10\)](#)).

Distilleries should maintain records of the DGs from the time it leaves their possession, including, but not limited to, the amount of material and how it is managed. If being sold or given to another party, records of to whom, quantity, dates of transfer and intended management method, shall be maintained. Under [KRS 224.1-400](#), release of a pollutant or contaminant has the potential to become the responsibility of the generator of the product.

Management of Distillers Grains and Regulatory Implications

Consumption by Livestock

Although the nutritional content of DGs can vary, corn-based DGs have an average of 30% crude protein and 10-12% fat. These characteristics have led to the desirability and historical use of DGs as livestock feed amendments. When the DGs are consumed by livestock, there is no longer a material to manage.



Management of Distillers Grains and Regulatory Implications

Drying DGs as a Feed Additive

DGs may be sent to a grain processing facility or processed on-site to be completely dried and made into an animal feed additive.

Division for Air Quality (DAQ) Implications –

If installing new equipment on-site, an [air permit or authorization](#) must be obtained prior to construction and installation.

Management by Solid Waste Beneficial Reuse

DGs that are managed to maintain the classification of an industrial solid waste may be tested and applied to land as a beneficial reuse.

Division of Waste Management (DWM) implications –

Land application of any waste to land must have a beneficial use. Land application of DGs that are a solid waste may require a [Registered Permit-by Rule for Beneficial Reuse permit](#) to be obtained from DWM ([401 KAR 47:110](#)).

Management by Treatment

The unconsumed or spoiled DGs may be managed in a farm's liquid waste handling system or distillery wastewater treatment plant. When nonagricultural wastes, such as DGs, are treated or otherwise managed in a lagoon system, the characteristics of the combined waste may change.

Division of Water (DOW) Implications –

A lagoon, storage pond, or liquid manure waste handling system requires an [Agricultural Kentucky No Discharge Operational Permit](#). This type of permit is only available for animal waste handling systems.

In order to dispose of unconsumed or spoiled DGs, which are an **industrial waste**, the lagoon must obtain an [Industrial Kentucky No Discharge Operational Permit \(KNDOP\)](#) by submitting [Form ND](#) to the Division of Water. The fee for an Industrial KNDOP is \$1,200 every five years, plus associated monitoring costs.



If a farm accepts DGs and the excess is placed in a lagoon or storage pond (requiring an Industrial KNDOP) which then overflows, a [Kentucky Pollutant Discharge Elimination System \(KPDES\) permit](#) is required for subsequent discharges. The application includes [KPDES Form 1](#) and [KPDES Form SC](#). The fee for a KPDES permit ranges from \$2,200 to \$7,000 every five years, plus associated monitoring costs.

A distillery wastewater treatment plant is required to be permitted with a [Kentucky Pollutant Discharge Elimination System permit](#). The effluent must continue to meet requirements outlined in the facility's permit.

Contact the Surface Water Permits Branch at (502)564-3410 or SWPBsupport@ky.gov before putting distillers grains in a lagoon intended for animal manure waste.



Management of Distillers Grains and Regulatory Implications

Management by Treatment

Division of Waste Management Implications –

Storing DGs in a lagoon is considered a “treatment” of the material because the lagoon will digest or partially digest the DGs. Therefore, DGs stored in a lagoon are considered a **special waste** (as wastewater treatment sludge). Land application of special waste (the lagoon-stored DGs) requires a [Special Waste Registered Permit-by-Rule for Beneficial Reuse permit](#) to be obtained from DWM ([401 KAR 45:070](#)).

Feedstock for an Anaerobic Digester

There is limited data using only DGs or only distillery wastes as a feedstock in an aerobic digester. However, DGs can be disposed of in an anaerobic digester that mixes and incorporates other feedstocks. The gases generated by the anaerobic digester can be cleaned (through a gas stream cleaning device – such as a scrubber) and combusted in an engine or turbine to generate electricity. Distilleries or farms can use this power on-site or work with nearby electric companies and connect the power generation to the grid.



Division for Air Quality Implications –

An [air permit or authorization](#) must be obtained prior to construction and installation of an air emission source, including but not limited to, a stationary fuel combustion device. There are state and federal regulations that may be applicable for these types of units.

Division of Waste Management Implications –

Residual solids from a digester may be land-applied from time to time unless these solids are dewatered and disposed of at a permitted landfill. Land application of special waste (the digested DGs) requires a [Special Waste Registered Permit-by-Rule for Beneficial Reuse permit](#) to be obtained from DWM ([401 KAR 45:070](#)).

Contact the Division of Waste Management at waste@ky.gov or call (502)564-6716 before the land application of treated distillers grains.

Disposal at a Permitted Solid Waste Landfill

DGs will need to be dry or solidified prior to entering the landfill. Occasionally, solid waste landfills have the ability to solidify liquid wastes on-site.

Disposal at a Permitted Wastewater Treatment Plant

Disposing of DGs down the drain to a wastewater treatment plant requires prior authorization from the treatment plant. DGs raise the need for biologically available oxygen, or the Biological Oxygen Demand (BOD), during the treatment process. Treatment plants that accept DGs must account for this need and ensure ability to meet their KPDES permit limits.



Management of Distillers Grains and Regulatory Implications

Odor Standards

Kentucky has an odor standard that applies to outdoor or ambient air ([401 KAR 53:010](#)). When an [odor complaint](#) is received, Division for Air Quality staff will visit the site of the reported odor to investigate. An inspector will sample the air using a device known as a “nasal ranger” or “scentometer.” These devices mix one volume unit of ambient air with seven volume units of odorless (filtered) air. The resulting mixture must have no detectable odor in order to comply with the regulation. If an inspector detects an odor using one of these devices at a 7-to-1 dilution, a violation of the odor standard is documented.

Strong and steady odors are often required to document a violation of the Kentucky odor standard. Many odors not rising to the level of a violation are, nevertheless, corrected through cooperative efforts between the inspector and responsible party. For more information, call the Division for Air Quality at (502)564-3999 or email burnlaw@ky.gov.



Department for Environmental Protection Contacts		
Division for Air Quality Website: https://eec.ky.gov/air Phone: (502) 564-3999 Email: burnlaw@ky.gov	Division of Water Website: https://eec.ky.gov/water Phone: (502) 564-3410 Email: SWPBsupport@ky.gov	Division of Waste Management Website: https://eec.ky.gov/Environmental-Protection/Waste Phone: (502) 564-6716 Email: waste@ky.gov
Environmental Compliance Assistance Program Website: http://eec.ky.gov/ECAP Phone: (502) 782-6189 Email: envhelp@ky.gov		

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