

BIOFUEL RESIDUES AND WASTE FAQs

Biofuel production is a growing industry. Following are frequently asked questions (FAQs) about waste and by-products generated by ethanol plants. At this time this FAQ does not cover corn wet mills, cellulosic operations, or facilities using glycerine by-products from biodiesel plants to produce ethanol. FAQs will be added to this guidance relating to [biodiesel production](#) and [anaerobic digesters](#) in the future.

These materials may have requirements under the following regulations overseen by the Waste and Hazardous Materials Division:

- [Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 P.A. 451, as amended, \(Act 451\) and administrative rules](#) (referenced as Part 115)
- [Part 111, Hazardous Waste Management, of Act 451 and administrative rules](#) (referenced as Part 111)
- [Part 121, Liquid Industrial Waste Management, of Act 451](#) (referenced as Part 121)
- [Act 138 of 1998, Hazardous Materials Transportation Act](#) (referenced as Act 138)

Other regulations include:

- [Part 31, Water Resources Protection, of Act 451](#) and [administrative rules](#). Referenced as Part 31 and overseen by the Water Bureau.
- [Part 55, Air Pollution Control of Act 451 and administrative rules](#). Referenced as Part 55 and overseen by the Air Quality Division.

Links to state laws and administrative regulations can be found at www.michigan.gov/deq and select Laws and Rules in right column under DEQ Quick Links.

I.Q1. What types of residuals or other wastes are generated from the production of ethanol?

A. Typical residuals generated in the dry mill production of ethanol that can be used for other purposes include:

- Distillers grains (DGs) or sometimes called mash. A typical 100 MMgy plant produces 320,000 tons of distillers grains annually.
- Syrup which may also be called evaporated thin stillage. It is the liquid that was separated from the mash during the distilling process which has been partially dehydrated. When it is added back to DGs, it creates distillers dried grain with solubles (DDGS). DGs, DDGS, and syrup can be used as animal feed if economic to transport and used appropriately.



Other wastes may be generated from:

- Routine tank and pipe cleaning wastes
- Routine facility operations and cleaning wastes
- Process upsets
- Water treatment wastes e.g. reverse osmosis or softener reject water
- Off test material that can not be used as product
- Cooling waters
- Sanitary wastewater (from bathrooms/breakrooms)
- Office related wastes
- Carbon dioxide



I.Q2. How are distillers grains and syrups regulated under Michigan's solid waste regulations?

A. Both of these materials are regulated as a solid waste under Part 115 unless they meet the exemption listed in I.Q3.

I.Q3. Are there any exemptions under Part 115 that would allow for the beneficial reuse of DGs or syrup?

A. Section 11506 of Part 115 exempts food processing residuals from being a solid waste if they are fed to animals, land applied under the Generally Accepted Agricultural Management Practices (GAAMPs), or composted and land applied pursuant to the GAAMPs. The GAAMPs can be found at www.michigan.gov/mda/0,1607,7-125-1567_1599_1605---,00.html.

- The DEQ considers DGs to be a food processing residual and the material may be used for these purposes.
- The syrup is a food processing residual for the purpose of feeding to animals but it can not be land applied or composted and land applied under this exemption.

In addition to the exemption contained in the statute, a site/source separated exemption was issued that would allow the syrup to be used as a feedstock in an anaerobic digester. The exemption can be found at www.michigan.gov/documents/deq/deq-whm-stsw-ETHANOL_213606_7.pdf.

I.Q4. Are there any possibilities for land applying the syrup?

A. The syrup can only be land applied at a concentrated animal feeding operation (CAFO) that has an NPDES permit that allows for the land application of residuals from the farm or at a farm that has a Groundwater discharge permit authorizing the land application. Part 31 can be found at: http://www.michigan.gov/deq/0,1607,7-135-3313_4117-9765--,00.html.

Some potential surface water pollutants that would be of concern include, but not limited to:

- Chlorides
- Sulfates
- Dissolved metals
- pH
- Total suspended solids (TSS)
- BOD
- Conductivity

Potential groundwater pollutants that would be of concern include, but not limited to:

- Total dissolved solids
- Chlorides
- Nitrates
- Sulfates

I.Q5. What would be required if we want to use any by-products for dust control?

A. The Water Bureau would need to approve this use and the material would need to meet the exemption requirements of Part 31 under Rule R.324.2210(b) in the Part 22 groundwater discharge rules. However, the rule also says you have to meet the conditions listed in R 324.2204, which states you cannot create a facility as would be defined by Part 201. Since DEQ is not a service/testing organization, the Water Bureau is not aware of any test data, if it exists, to see what application rates should be, or if the material has been used for that purpose elsewhere. The rules are written (Rule R 324.2206) such that the applicant must provide information for us to make a permit decision.

I.Q6. Are there any other reuse/disposal options for the syrup?

A. There are many other options available, which include:

- The syrup may be burned for energy recovery. The syrup would not be considered to be a solid waste as long as it is burned in a boiler, industrial furnace, or power plant that has a permit from the Air Quality Division under Part 55. The permit must authorize the facility to burn the syrup.
- The syrup could be solidified and disposed at a licensed landfill.
 - a. If solidified at the site of generation with a material that is not a regulated solid waste, no permits or licenses would be required.
 - b. If the syrup is solidified using a solid waste, a facility would need to obtain a permit and license as a processing plant or have the waste designated a site/source separated material.
- The syrup could be disposed at a publicly owned treatment works (POTW) with that facility's approval. The POTW may limit the amount of syrup that they will accept due to the high BOD (e.g. 400,000 mg/l) associated with the syrup.
- The syrup would be an ideal material to use in a research, development, and demonstration project (RDDP) at a licensed landfill to increase the generation rate of methane. Any landfill undertaking a RDDP would have to obtain written approval from the DEQ. See Part 115 Section 324.11511b and discuss projects with the WHMD solid waste engineer.

I.Q7. What are the requirements for storing the syrup or DG prior to land application?

A. The syrup must be stored in a tank or container specifically built to be compatible with the syrup that would limit the possibility of the syrup leaking onto the ground or in a manure lagoon that conforms to Part 31 specifications. Placing the DG and DDGS on a pad does not provide protection from precipitation runoff.

I.Q8. Are there requirements to haul the by-products to another location?

A. If the by-products are being hauled for use as animal feed there are no licensing requirements by the DEQ. If the by-products are hauled for any other purpose and they contain free liquids (according to the paint filter test) they must be hauled by a permitted and registered liquid industrial waste (LIW) transporter. Both the biofuel production facility and transporter have to meet the management requirements under Part 121 and Act 138. Transporter information, including a list of registered transporters, is at www.michigan.gov/deqwaste "Hazardous and Liquid Industrial Waste Transporters."

I.Q9. Are there concerns about using DGs as a feed source?

A. The DEQ does not regulate the use as a feed source. Contact the Michigan Department of Agriculture at 517-373-0946. The federal Food and Drug Administration (FDA) has voiced three primary concerns about antibiotic residues in distillers grains:

1. Potential to transfer antibiotic residues from distillers grains into animal tissues.
2. Potential for harm to humans that eat tissues containing antibiotic residues
3. Potential for harm to the animal's health from antibiotic residues in distillers grains

See the article "[Antibiotic Regulatory Considerations for Distillers Grains](#)" posted in the [Distillers Grains Quarterly Fourth Quarter 2007](#) for more information.

There is ongoing research to determine if DGs could be used as a human food source.

I.Q10. Are any wastes regulated as hazardous waste?

A. The facility needs to determine if any of the waste they generate is hazardous waste. Some wastes may meet exemptions listed in the Part 111 rules. See the [Waste Characterization](http://www.deq.state.mi.us/documents/deq-ess-p2tas-wastecharacterization.pdf) guidance at www.deq.state.mi.us/documents/deq-ess-p2tas-wastecharacterization.pdf for more information. Following are some wastes that may be hazardous

- Fluorescent lights and other lighting
- Batteries
- Aerosol cans
- Parts washer solvents, sludges, and filters
- Rags and other textiles not being cleaned and reused
- Still bottom sludges
- Sludges from floor drains, sand pits, oil/water separators, etc.
- Wastewater treatment sludges
- Paint wastes to include spent paint solvents
- Electronics including computers
- Spent oils not managed as used oil
- Fusel oil and related distillation compounds that do not meet the comparable/syngas fuel exclusion or are not byproducts exhibiting a hazardous waste characteristic being reclaimed
- Spent solvents or wastewater from azeotropic distillation processes
- Strong acids or bases (For example; acids used to balance the pH in DGs or sulfuric acid and sodium hydroxide used as cleaning products. There have been known situations where large amounts of caustic waste was created from cleaning tanks due to process upsets or between batches. For example three 10,000 gallon tanks had to be cleaned out and the residue had a high pH (i.e. 13.7). Or corrosives used for cleaning boilers and reaction vessels.

The specific hazardous waste management requirements will depend on the biofuels production facility generator status which is based on how much hazardous waste is generated in a calendar month. Waste guidance documents can be found at www.deq.state.mi.us/pubcenter.

I.Q11. Can an ethanol plant adjust the pH of their waste?

A. In Michigan, a generator can treat their waste without obtaining a hazardous waste treatment permit if they meet the conditions listed in [R 299.9503 of Part 111](#). Normally “frac tanks” are managed as hazardous waste tanks instead of being considered a portable container since they can’t be moved when full. For additional tank requirements, see the respective [Small Quantity Generator Tank System Inspection Form](#) or the [Generator Tank Inspection Form](#) for Large Quantity Generators.

If the treated waste will be discharged to a wastewater treatment system, then the facility needs to have an employee who has had training and holds a [wastewater operator certification](#) for clarification, chemical clarification, and neutralization. Contact the Environmental Science and Services Division Operator Training Unit at 517-241-7199 for more information.

This document was developed in September 2008 by the Waste and Hazardous Materials and Environmental Science and Services Divisions. Reliance on information from this document is not usable as a defense in any enforcement action or litigation. Refer to the regulations or discuss your requirements with the regulating agency staff.

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