



# Virginia Biodiesel Environmental Compliance Primer

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Virginia Department of Environmental Quality



Virginia Clean Cities



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## I. Executive Summary

The biofuels industry, which includes production and distribution of biodiesel, is growing nationwide and in Virginia. Increasing concerns about climate change, environmental impacts of fossil fuel extraction and use, and economic and national security aspects of dependence on imported petroleum are propelling demand for fuels derived from renewable resources. Virginia and other states also recognize that biofuels offer economic development opportunities for farmers and processors. Further, in the case of biodiesel, there is the prospect of turning used fats, greases, and oils from food and rendering industries into valuable commodities.

Within this primer, the Virginia Department of Environmental Quality (DEQ) aims to acquaint the reader with the environmental regulatory obligations concerning biodiesel fuel production<sup>1</sup>. Biodiesel fuel production, like other industrial processes, is subject to laws and regulations for protecting air, water, and land resources, assuring safe handling of hazardous materials, and proper disposal of wastes. Some of these requirements apply to small scale producers as well as to large commercial operations.

While the biodiesel industry is partly predicated on environmental benefits relative to petroleum fuels, numerous hazards and risks associated with biodiesel production exist. These include emissions of hazardous air pollutants, volatile organic compounds, and combustion products into the air; potential for water pollution, such as wastewater releases, stormwater runoff, and risk of leakage from storage tanks; and generation of solid and hazardous wastes. Biodiesel producers are obligated to assure safe handling of hazardous chemicals as well as abide by certain emergency response and public right-to-know requirements. Biodiesel producers are also obliged to meet fire code and occupational safety and health requirements. Water supply and facility siting requirements may be applicable in certain circumstances on sensitive lands.

The primer begins with a brief overview of the biodiesel production process, describing the most common production method—transesterification—and identifying the most common raw materials, products, and by-products. Subsequent sections within the primer are organized by regulatory program. Each section contains a brief discussion of the regulatory requirements for a particular program and how they may apply to biodiesel fuel production. Web addresses for additional information and various forms are provided. The last two sections refer the reader to other agencies with jurisdiction over occupational safety and health issues as well as licensing and tax responsibilities for motor fuel producers.

The primer is not intended to be a comprehensive review of the environmental regulatory requirements. Additional resources beyond the primer are identified within each section, and case-by-case permitting determinations may be required. If permits are needed, regulations require that the permits be obtained in advance of beginning any construction. Persons who have begun construction without first having determined if permits are needed should stop and consult DEQ as soon as possible. This is also the case for facilities in operation that have not previously had their regulatory status evaluated by DEQ.

A detailed review of the chemistry, engineering, economics, and business cases for biodiesel production, whether at small “home brew” scale or large industrial scale is beyond the scope of this primer. Numerous resources are available to assist potential producers with these aspects of the industry. Virginia Clean Cities ([www.hrccc.org/biodiesel.html](http://www.hrccc.org/biodiesel.html)) and the National Biodiesel Board ([www.biodiesel.org](http://www.biodiesel.org)) are two such resources.<sup>2</sup>

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<sup>1</sup> Virginia DEQ gratefully acknowledges the Ohio Environmental Protection Agency’s (Ohio EPA) “*Want to Start a Biodiesel Production Operation? Environmental Compliance Basics*” (April 2007) [www.epa.state.oh.us/ocapp/sb/publications/biodieselguide.pdf](http://www.epa.state.oh.us/ocapp/sb/publications/biodieselguide.pdf) as a model for this primer.

<sup>2</sup> DEQ does not endorse or warrant information provided by other organizations.

The DEQ strongly recommends that prospective biodiesel producers acquaint themselves with pertinent regulations early and meet with DEQ regional office staff well in advance of any construction or operation. A list of the DEQ regional offices along with contact information may be found at: [www.deq.virginia.gov/regions/homepage.html](http://www.deq.virginia.gov/regions/homepage.html)

## II. Biodiesel Overview

There is increasing interest in using vegetable oils and animal fats to make biodiesel fuels for several reasons, including rising petroleum prices, economic and national security aspects of dependence on imported petroleum, and environmental impacts (including climate change) from fossil fuel extraction and use. Vegetable or animal oils and fats consist of triglycerides. Biodiesel is produced from these sources by a process known as transesterification, in which the triglyceride molecules are broken into alkyl ester molecules (the biodiesel product) and glycerol (the by-product) by reaction with an alcohol in the presence of a catalyst. Methanol is the most commonly used alcohol, producing a biodiesel product which consists of methyl esters. Other alcohols, such as ethanol, may be used, but their use requires a modification in the production process. The reaction can be catalyzed by bases, acids, or enzymes. With soybean oils, sodium hydroxide and potassium hydroxide are the most commonly used base catalysts.

The glycerol by-product is typically about 50% pure and contains excess methanol and the catalyst. Due to the impurities, the glycerol by-product must generally be refined before use as a commercial glycerol product in other industrial sectors. Recovering the methanol leaves the glycerol at 80 to 90% pure and makes it more suitable as a marketable commodity. After methanol recovery, most commercial biodiesel manufacturing companies are able to send the glycerol to a glycerol recovery/refining facility. Pure grades of glycerol (99.7%) can be used as a raw material in other industrial sectors such as food products, cosmetics, toiletries, toothpaste, drugs, animal feed, plasticizers, tobacco, and emulsifiers.

While glycerol is useful for other applications, alcohol- and catalyst-contaminated glycerol by-product of biodiesel production can pose waste management challenges with significant economic and regulatory ramifications. Growth in biodiesel production has led to a market glut of glycerol, and consequently, significant research on alternative beneficial uses for glycerol is ongoing.

Most available literature suggests that methanol recovery following biodiesel production is an accepted and routine industry practice among commercial producers. Recovered methanol is typically returned to a raw material storage tank and reused for future fuel production. Small-scale producers should carefully consider the health and safety risks and hazards of methanol recovery as compared with the risks, hazards, and costs of off-site reclamation, hazardous waste disposal, or demonstrating other legal use or disposition of the by-product.

The initial biodiesel fuel product may contain small amounts of impurities. To remove the impurities, the biodiesel may be water washed or filtered to remove any residual catalyst and monoglycerides. The resulting water wash and filter cake are wastes which have little or no commercial value and must be managed appropriately.

Biodiesel fuel can be used pure or “neat” (called B100) or, more typically, blended with petroleum diesel fuel in 5% (B5) or 20% (B20) proportions before sale to the final user. The particular blend being produced or stored has significance when determining whether certain storage tank requirements apply.

### III. Air Pollution Requirements

The Clean Air Act (CAA) and its amendments sets limits on certain air pollutants, ensuring protection of human health and the environment from air pollution. The Clean Air Act gives EPA and individual states, like the Commonwealth of Virginia, the authority to limit emissions of air pollutants coming from industrial and manufacturing sources.

Following is a very basic guide for determining air permitting requirements for biodiesel production. Because of the complexity of the air regulations, the DEQ strongly recommends you contact the DEQ regional office covering the area in which you plan to produce biodiesel for guidance.

Potential sources of air pollution that may require a permit include:

Equipment	Air Permitting Requirements
Process equipment including, but not limited to reactors, separators, evaporators; evaporative emissions from material transfers, process vents, pump and valve leaks, condensers	Air permit is required if potential emissions exceed exemption levels in 9 VAC 5-80-1320 of state regulations. If the proposed facility is capable of producing more than 1,102 tons of glycerol per year, based upon design capacity and operating 8760 hours per year, then the equipment is subject to federal EPA rules and a permit is required. A system that can produce three million gallons or more of biodiesel per year can typically produce glycerolol in an amount exceeding 1,102 tons per year.
Process equipment for handling and extracting oil from soybeans	Air permit is required if potential emissions exceed exemption levels in 9 VAC 5-80-1320 of state regulations. If you plan to use a chemical extraction process, you should contact your regional DEQ office for guidance in determining permitting applicability.
Material storage tanks and transfer operation (air pollution from working and breathing losses)	Air permit may be required, unless the storage tank and transfer operations: <ul style="list-style-type: none"> <li>▪ involve a petroleum liquid with a vapor pressure less than 1.5 pounds per square inch absolute under actual storage or transfer conditions, <b>and</b></li> <li>▪ uses a tank that is 40,000 gallons or less.</li> </ul>
Boiler or process heater (air pollution from fuel combustion)	Air permit is required unless the fuel burning unit: <ul style="list-style-type: none"> <li>▪ uses solid fuel with a maximum heat input of less than 1,000,000 Btu per hour;</li> <li>▪ uses liquid fuel (on spec distillate or residual fuel oil) or liquid and gaseous fuel with a maximum heat input of less than 10,000,000 Btu per hour; or</li> <li>▪ uses gaseous fuel with a maximum heat input of less than 50,000,000 Btu per hour.</li> </ul> <p>Units with a 10,000,000 Btu per hour or larger rating are subject to the New Source Performance Standards for Small Industrial - Commercial - Institutional Steam Generating Units (40 CFR 60, Subpart Dc)</p>

Electrical generators	Air permit may be required, unless the unit is used for a) <b>emergency purposes only</b> , b) does not exceed 500 hours of operations per year and, c) the unit is a: <ul style="list-style-type: none"><li>▪ gasoline engine aggregate rated brake (output) horsepower of less than 910 hp; or</li><li>▪ diesel engine with an aggregate rated brake (output) horsepower of less than 1,675 hp.</li></ul>
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For units that require an air permit, you must obtain this permit prior to the construction and operation of any equipment. This permit is required before installing equipment. The terms and conditions of an air permit usually include emission limits, monitoring/operating conditions, and recordkeeping requirements. **Upon receiving the permit, it is very important that you read and understand the terms and conditions of your permit. If you have any questions, you should contact the permit writer.**

Equipment and process units that have low emissions may not need air permits. If you are exempt from the air permitting process, your facility may still be subject to registration and recordkeeping requirements.

- You may be subject to registration if you process 100 pounds per hour or more of feedstock.
- You must maintain documentation that your process equipment does not emit more than the exemption levels contained in 9 VAC 5-80-1320 of the Virginia Regulations for the Control and Abatement of Air Pollution. For a small biodiesel operation with closed-loop process equipment, you may qualify for an exemption for one or all of your air emission sources.
- A completed Form 7 application is required for registration and your facility would be subject to periodic inspection and annual emissions updates.

You can contact the DEQ regional office, covering the area in which you plan to operate your biodiesel facility, for help in determining if you qualify for an exemption. You may be asked to complete a Form 7 application to assist DEQ staff in evaluating whether or not you qualify for an exemption.

Note, if you are already operating your business and discover that you need an air permit, you must still complete and submit a Form 7 application for evaluation of your regulatory status by the DEQ.

## Online Resources

- Air Regulations: [www.deq.virginia.gov/air/regulations/airregs.html](http://www.deq.virginia.gov/air/regulations/airregs.html)
- Exemption levels in 9 VAC 5-80-1320: [www.deq.virginia.gov/air/pdf/airregs/806.pdf](http://www.deq.virginia.gov/air/pdf/airregs/806.pdf)
- Form 7: [www.deq.virginia.gov/air/justforms.html](http://www.deq.virginia.gov/air/justforms.html)
- DEQ Regional Offices: [www.deq.virginia.gov/regions/homepage.html](http://www.deq.virginia.gov/regions/homepage.html)

## **EPA Registration and the Renewable Fuel Standard Program**

EPA regulations (40 CFR Part 79) require motor vehicle diesel fuel producers, including biodiesel producers, to register their products before introduction into commerce. Regulations (40 CFR Part 80) also require such producers to register with EPA as refiners.

EPA also enacted Renewable Fuel Standard regulations (40 CFR Part 80 Subpart K) as required by the Energy Policy Act of 2005. These regulations implement a Congressional mandate that the nation's vehicle fleet use at least a certain volume of renewable fuels. The regulations require renewable fuel producers and importers of at least 10,000 gallons per year to assign Renewable Identification Numbers (RINs) to each batch of renewable fuel produced or imported and to abide by certain registration, reporting, and recordkeeping requirements. This program is administered by EPA, not by DEQ or other state agencies.

Please see the following sources for more information:

EPA Renewable Fuel Standard Program [www.epa.gov/otaq/renewablefuels/](http://www.epa.gov/otaq/renewablefuels/)

Guidance for Biodiesel Producers and Biodiesel Blenders/Users  
[www.epa.gov/otaq/renewablefuels/420b07019.pdf](http://www.epa.gov/otaq/renewablefuels/420b07019.pdf)

National Biodiesel Board Renewable Fuel Standard Implementation Information  
[www.biodiesel.org/news/RFS/default.shtm](http://www.biodiesel.org/news/RFS/default.shtm)

Companies needing assistance can call the EPA Renewable Fuel Standard Helpline at (202) 343-9755.



## IV. Water and Wastewater Requirements

Section 402 of the Clean Water Act established the National Pollutant Discharge Elimination System to limit pollutant discharges into streams, rivers, and bays. In the Commonwealth of Virginia, the DEQ administers the program as the Virginia Pollutant Discharge Elimination System (VPDES). Though DEQ requires VPDES permits for all point source discharges to surface waters, the U.S. Environmental Protection Agency (EPA) maintains authority to review applications and permits for "major" dischargers, a distinction based on discharge quantity and content.

Facilities engaged in biodiesel production may discharge pollutants either through contamination of stormwater, associated with the construction or operation of the facility, or through wastewater generated as a by-product of the process. Facilities may also manage pollutants associated with the production of biodiesel without discharging either to state waters or to a wastewater treatment facility located off-site. The following table summarizes permitting requirements for scenarios such as those listed above; detailed descriptions of pollutant sources can be found in the pages that follow:

Management of Pollutants	Water Permitting Requirements
Process wastewater recycled on site with no discharge	<b>A Virginia Pollution Abatement (VPA) permit may be required for process wastewater</b> , depending on whether there is a potential to discharge the recycled water (e.g., open tanks, lagoons etc.).
Process wastewater discharged to sanitary sewer for off-site treatment	No permit for process wastewater is required from DEQ; check with local sanitary sewer authority for requirements pertaining to indirect dischargers.
Process wastewater or sanitary wastewater (sewage) discharged to storm sewer or to surface waters	<b>An individual VPDES permit is required for wastewater discharges.</b> This permit will also cover any discharges of process or stormwater related to industrial activity.
Neither materials nor processes are exposed to stormwater	No permit for stormwater discharges is required, upon approval of " <b>no exposure certification</b> " by the appropriate DEQ regional office.
Materials, processes, or both are exposed to stormwater	<b>VPDES General Permit for Discharges of Stormwater Related to Industrial Activity is required</b> , provided no process wastewater discharge to storm sewers or surface waters is also occurring.

### Application Forms

The application forms for any of the pollutant management activities listed above may be found at the following site: [www.deq.virginia.gov/vpdes/permitfees.html](http://www.deq.virginia.gov/vpdes/permitfees.html). These forms should be submitted to the appropriate regional office.

### Stormwater

DEQ and the Department of Conservation and Recreation (DCR) coordinate separate state programs that regulate the management of pollutants carried by stormwater runoff. DEQ regulates stormwater discharges associated with "industrial activities"; more information can be found at [www.deq.virginia.gov/vpdes/stormwater.html](http://www.deq.virginia.gov/vpdes/stormwater.html). DCR regulates stormwater discharges from construction sites and from municipal separate storm sewer systems (MS4s); more information can be found at [www.dcr.virginia.gov/soil\\_&\\_water/stormwat.shtml](http://www.dcr.virginia.gov/soil_&_water/stormwat.shtml).

Production of biodiesel is classified under the major standard industrial classification (SIC) 28 (SIC 2869).

### **Process Wastewater**

Facilities producing alternative fuels may employ boilers, cooling water systems, or both, depending on the process in question. Blow down water from boilers and cooling water systems typically contains contaminants and is regulated by DEQ.

Runoff from raw materials storage also contains contaminants and is regulated by DEQ.

Wastewater contaminants from the production of biodiesel typically have a high pH (from use of hydroxide catalysts) and high Biochemical Oxygen Demand (or BOD) (from various organic compounds, including methanol, glycerol, and washwater containing free fatty acids).

The owners/operators of facilities proposing to discharge process wastewater from the production of biodiesel are encouraged to investigate technology for the recovery and reuse of contaminants such as those listed above.

### **Discharges of Wastewater to Municipal Systems**

Facilities discharging wastewater into a municipal sanitary sewer system (for treatment by an off-site wastewater treatment facility) should contact the owner/operator of the sanitary sewer system for further instruction. Due to the nature of some of the wastes (e.g., methanol, cyanides, hydrogen sulfide) and the hazards they may pose to workers maintaining the sanitary sewer system and the treatment works, the owner/operator may require some degree of pretreatment prior to discharge into the sanitary sewer system.

### **Source Water**

Water for boilers, coolers, or makeup for the process may be obtained from a public water supply, ground water wells or from surface water (ponds and streams). Withdrawal of surface and ground water is discussed in the “**Siting and Water Supply Requirements**” section of this document.

### **Online Resources**

- DEQ - Stormwater: [www.deq.virginia.gov/vpdes/stormwater.html](http://www.deq.virginia.gov/vpdes/stormwater.html)
- DCR - Stormwater: [www.dcr.virginia.gov/soil\\_&\\_water/stormwat.shtml](http://www.dcr.virginia.gov/soil_&_water/stormwat.shtml)
- DEQ Regional Offices: [www.deq.virginia.gov/regions/homepage.html](http://www.deq.virginia.gov/regions/homepage.html)

## V. Storage Tank Installation and Release Prevention

### Local and DEQ Storage Tank Requirements

The construction and operation of a biodiesel production facility requires the use of storage tanks for raw material and biodiesel product storage. The installation of aboveground and/or underground tanks and the associated piping must follow the engineering practices found in national and local codes and standards (e.g., Uniform Statewide Building Code and its required model codes and standards; National Fire Protection Codes; industry standards such as: Steel Tank Institute Standards and Recommended Practices; American Petroleum Institute Standards and Recommended Practices; Petroleum Equipment Institute Standards and Recommended Practices; and Underwriters Laboratory Standards).

Tank owners and operators should consult with their local building official and fire marshal for the required permits, installation requirements, and local codes and ordinances before construction begins. DEQ's "*Facility and Aboveground Storage Tank Regulation*" (9 VAC 25-91-10 et seq.) contains requirements applicable to aboveground storage tanks with a volumetric capacity of greater than 660 gallons and containing a liquid hydrocarbon product or mixtures of hydrocarbon product with other products, such as biodiesel. The DEQ's "*Underground Storage Tanks: Technical Standards and Corrective Action Requirements*" (9 VAC 25-580-10 et seq.) has requirements applicable to underground storage tanks with a capacity greater than 110 gallons and containing regulated substances, including petroleum, biodiesel mixtures containing petroleum, or hazardous substances. The DEQ, local building official, and fire marshal should be contacted before construction begins. More information on the DEQ storage tank programs may be obtained at [www.deq.virginia.gov/tanks/stortnks.html](http://www.deq.virginia.gov/tanks/stortnks.html).

### Federal Spill Prevention Control and Countermeasure (SPCC) Requirements

EPA "Spill Prevention Control and Countermeasure" (SPCC) plan requirements (40 CFR 112) apply if the aggregate aboveground storage capacity is 1,320 gallons or greater and the oil can reach navigable waters if a release occurs. The aggregate aboveground storage capacity of the facility is determined by adding the total volumetric capacity of all the tanks and containers storing oil (including vegetable oils) that are 55 gallons and greater. If the aboveground aggregate capacity reaches 1,320 gallons or more, then the facility must have a SPCC Plan approved by a Professional Engineer. For underground storage, an SPCC plan would be required only if the storage capacity is greater than 42,000 gallons of petroleum, not including any capacity stored in underground storage tanks (USTs) regulated under 40 CFR 280 at the facility. The SPCC plan must outline the measures you will take to control and respond to an oil release at the site. The SPCC program is administered under the federal regulations by the U.S. EPA. More information about the EPA program may be obtained at [www.epa.gov/reg3hwmd/oil/spcc/index.htm](http://www.epa.gov/reg3hwmd/oil/spcc/index.htm).

## VI. Emergency Planning and Community Right-to-Know Requirements

The Emergency Planning and Community Right-to-Know Act (EPCRA) is also called the Superfund Amendments and Reauthorization Act (SARA) Title III. This law requires that certain facilities inform local emergency response authorities about the storage of hazardous chemicals (Sections 311 and 312) and report environmental releases and discharges of certain regulated chemicals beyond threshold amounts (Section 304). EPCRA Section 313 and Virginia law also require certain facilities to file reports on their use, recycling and energy recovery, treatment and disposal, and emissions and releases of listed chemicals as part of federal and state Toxic Release Inventories.

### Community Right-to-Know Reporting Requirements (Sections 311-312)

EPCRA/SARA Sections 311 and 312 require facilities storing hazardous chemicals on-site to report this to local emergency authorities. A facility must submit a report when all of the following conditions are met:

1. The facility is subject to the OSHA Hazard Communication Standard;
2. The facility uses, produces, and/or stores a hazardous chemical and/or an extremely hazardous substance (EHS); and
3. The quantity of hazardous chemicals or extremely hazardous substances is in excess of the threshold quantity (TQ).

The definition for hazardous chemicals and the list of extremely hazardous substances, along with the reporting thresholds for each are in the Emergency Planning and Community Right-to-Know guidance available at <http://yosemite.epa.gov/oswer/Ceppoweb.nsf/content/epcraOverview.htm>.

Methanol, sodium hydroxide, potassium hydroxide and glycerol are considered hazardous chemicals. The threshold quantity (TQ) for hazardous chemicals under Sections 311- 312 is 10,000 pounds. This TQ is for each chemical, not for the combination of multiple chemicals.

### Emergency Release Notification (Section 304)

Facilities are required to report a release or discharge of a regulated chemical if it exceeds the chemical's reportable quantity (RQ) and crosses the facility property line. Substances subject to the release reporting requirements include:

- Extremely hazardous substances 40 CFR; Part 355; Appendix A and B;
- CERCLA hazardous substances 40 CFR Part 302; Table 302.4; and
- Oil.

Under Section 304, methanol has a reportable quantity (RQ) of 5,000 pounds.

For more information on release reporting requirements, see [www.deq.virginia.gov/sara3/304.html](http://www.deq.virginia.gov/sara3/304.html).

## Toxic Chemical Release Inventory Reporting (Section 313)

DEQ is required to establish an inventory of toxic chemical use, recycling and energy recovery, treatment and disposal, and releases and emissions from certain types of facilities. This inventory is called the Toxic Release Inventory (TRI). A facility must file a report under this section if all of the following conditions are met:

1. The facility has 10 or more full-time employees;
2. The facility has specific NAIC code(s); and
3. It manufactures/processes or otherwise uses listed toxic chemicals in more than threshold quantities. (For most listed chemicals this is 10,000 lbs. per year for use and 25,000 lbs. per year for manufacturing and processing.)

TRI reporting requirements apply to the manufacturing sector NAIC codes (corresponding to SIC codes 20-39) and other operations such as federal facilities, mining, utilities, and petroleum and chemical facilities.

Methanol is included on the list of chemicals subject to TRI reporting. If you are manufacturing, processing, or otherwise using this in excess of the threshold quantities, you are required to report. Smaller biodiesel operations will likely not be handling quantities that require TRI reporting. Larger facilities, however, may be required to report.

DEQ's SARA Title III office is responsible for the TRI program. For more information, visit the TRI web site at <http://yosemite.epa.gov/oswer/Ceppoweb.nsf/content/epcraOverview.htm>.

## VII. Waste Management Requirements

### Virginia DEQ Waste Regulations

Under the Virginia Solid and Hazardous Waste Management Regulations, all wastes generated from businesses must be evaluated to determine if they are solid wastes and whether they meet the definition of hazardous wastes. DEQ has adopted federal regulations promulgated under the Resource Conservation and Recovery Act (RCRA) and is an EPA authorized state program. RCRA describes how solid and hazardous waste must be identified, handled and disposed; this is commonly referred to as the generator's "cradle-to-grave" responsibility.

If you have a material that can no longer be used and cannot be sold as a product or legitimately recycled, the material is usually considered a solid waste, a RCRA regulatory term that is independent of the material's physical state. You must evaluate any solid waste before you dispose of it. Disposal includes discarding, abandonment, and land application. If the solid waste meets the definition of a hazardous waste based on its characteristics (e.g., ignitable, corrosive, reactive, or toxic) or is a "listed" waste, you must ensure that it is sent to a permitted hazardous waste disposal facility. Since biodiesel production does not typically involve generation of listed wastes, we will consider only the potential for wastes to exhibit hazardous waste characteristics. Solid wastes that are not hazardous shall be managed in accordance with the Virginia Solid Waste Management Regulations found at <http://leg1.state.va.us/000/reg/TOC09020.HTM#C0080>.

### Biodiesel By-product and Waste Evaluation

The glycerol by-product may contain enough methanol to meet the definition of an ignitable hazardous waste, which means the by-product has a flash point less than 140 degrees F. Hazardous wastes exhibiting the characteristic of ignitability cannot be discarded in a solid waste dumpster, burned (see further discussion below), discharged to a sanitary or storm sewer system, placed in holding ponds, evaporated, or placed on the land as fertilizer or compost. Hazardous waste must be recycled, reclaimed, treated or disposed only at a facility permitted to manage hazardous waste. Depending on whether you recover the methanol, your biodiesel production operations may not generate a hazardous waste but only solid wastes. You must maintain records on-site to demonstrate the wastes have been properly evaluated and are being managed appropriately.

#### ***Can I burn the by-product?***

In general, materials that are hazardous wastes may only be burned for energy recovery in units regulated and permitted under RCRA as boilers or industrial furnaces (BIFs) or incinerators. Hazardous waste brokers or transporters may be able to assist you in identifying appropriate facilities. Under certain circumstances a "comparable fuels determination" can be made to allow a fuel-like or fuel-derived waste or by-product to be used as a legitimate fuel exempt from hazardous waste requirement, see below.

The regulations contain provisions for burning used oil (e.g., engine crankcase oil – see 40 CFR Part 279) in space heaters but this section does not apply to the waste glycerol, by definition. Consequently waste glycerol, especially when the glycerol has not been de-methylated, cannot be burned in a space heater or boiler at your facility.

### ***Can I make a comparable fuels demonstration?***

Certain materials that are fuels, fuel-like, or derived from fuels may be burned for energy recovery under restricted circumstances. In order to burn an ignitable characteristic hazardous waste as a legitimate fuel that is exempt from hazardous waste management requirements, a facility would have to make a comparable fuel demonstration (40 CFR Part 261.38). This demonstration assures that any waste-derived fuel is similar in composition to commercially available fuel and, therefore, poses no greater risk than burning comparable commercial product fuels.

To make a comparable fuel demonstration, the facility must compare the physical and chemical properties of the by-product to the physical and constituent specifications found in 40 CFR 261.38(a)(1) and (2). In addition to the comparable fuel demonstration requirements, the burner operator would have to demonstrate compliance with the Clean Air Act (CAA) requirements and state-specific operating requirements for air emissions. A review of the literature shows that there are a number of issues surrounding the use of glycerol as a fuel, including the generation of hazardous air pollutants (HAPs), specifically acrolein. Please refer to the Air Pollution requirements beginning on page 3 of this document for further information.

### ***Can I land dispose the glycerol by-product?***

Land disposal, or use constituting disposal, is the direct placement of recycled materials, wastes, or waste-derived products on the land. Land disposal of hazardous wastes is specifically prohibited under RCRA without a full RCRA Part B permit. Such permits are extensive in scope and can be quite costly to obtain and maintain. Land disposal of bulk liquids as solid waste is also prohibited under the Virginia Solid Waste Management Regulations.

Some advocates have suggested the glycerol by-product may be used as a soil amendment or compost additive. DEQ does not currently have reference information indicating that land application is an acceptable practice. Waste generators making such claims may submit information for consideration, but the information must include a full regulatory analysis of any exclusion applicability and adequate demonstration that the material in question is an effective substitute for another material typically applied to land and in commercial use. Such demonstration would also need to include the Virginia Department of Agriculture and Consumer Services (VDACS) Office of Product & Industry Standards approval describing scenarios for acceptable soil amendment or fertilizer use and application rates. VDACS evaluation of the proposed use and approval would be essential prior to any DEQ review.

Land application under any allowable exemptions may not occur unless and until such demonstration has been successfully made by the facility and approved by the DEQ. However, glycerol containing significant methanol concentrations, exhibiting ignitability characteristic would unlikely qualify and could not be approved. Hazardous wastes cannot be used in a manner constituting disposal unless they meet the conditions of 40 CFR Part 261.2(c)(1) and Part 266 Subpart C.

### **On-Site Methanol Recovery**

Under the provisions of 40 CFR 261.2, Table 1, materials that are by-products exhibiting a hazardous waste characteristic (e.g., ignitability) are not solid wastes when reclaimed. On-site recovery and reuse of the methanol is considered a reclamation process excluded from most solid or hazardous waste regulations. Reclaimed methanol should be re-used in the biodiesel production process. Otherwise, it may require management as a hazardous waste if disposed unless it can be legitimately managed as a commercial chemical product.

If methanol is recovered for reuse, the facility will need to develop a management strategy for the remaining crude glycerol. A biodiesel producer should be aware of speculative accumulation requirements for the by-product and/or crude glycerol. To avoid exceeding speculative accumulation timeframes, the facility must reclaim at least 75% of the material within the calendar year following the generation event. If material is accumulated longer than the prescribed time period, it can lose its conditional exclusion as a recyclable material and become subject to applicable solid and/or hazardous waste management requirements.

### **Off-Site Reclamation of Glycerol or Methanol, or Use by a Glycerol Refinery**

In order to claim a regulatory exemption for off-site reclamation, the facility must maintain records demonstrating the material is being legitimately recovered for reuse and/or resale. As long as the recycling/reclamation process results in the recovery of commodity-like materials, the material may be conditionally excluded from regulation as a hazardous waste. Different states vary in their approval of such practices. Therefore, if you are sending materials or by-products to a facility in another state, you are responsible for verifying the facility is able to receive such materials under the other state's regulations.

If you claim a conditional exemption from regulation as a solid and hazardous waste, you must maintain documentation to support the claim. The claim may be in the form of analytical results, contracts with reclamation facilities, shipping documents, and so forth.

### **What about filters, spill residues, or other contaminated materials?**

The same general requirements to evaluate the glycerol by-product for RCRA hazardous waste characteristics also apply to filters, wash waters, filter cakes, cleaning materials, equipment maintenance materials, spill materials, off-specification batches of biodiesel, and any other wastes generated in your production process. Of primary concern are materials that exhibit an ignitable characteristic because of methanol presence, but since potassium hydroxide (KOH) and sodium hydroxide (NaOH) are also used in the production process, wastes characteristic for corrosivity (e.g., aqueous solutions with pH <2 or >12.5) may also be generated.

A detailed discussion of the waste management requirements may be found on the DEQ's Waste Programs web page: [www.deq.virginia.gov/waste/hazardous.html](http://www.deq.virginia.gov/waste/hazardous.html)

### **References**

U.S. Environmental Protection Agency. 2006. EPA RCRA Orientation Manual 2006: Resource Conservation and Recovery Act. [www.epa.gov/epaoswer/general/orientat/](http://www.epa.gov/epaoswer/general/orientat/). Office of Solid Waste / Communications, Information, and Resources Management Division.



## VIII. Siting and Water Supply Requirements

### Public Water Supply

Facilities planning to use public water supplies provided by local water utility companies or authorities should contact the relevant company or authority regarding its requirements and restrictions.

### Surface Water Withdrawal Permits

Virginia manages new surface water withdrawals through the Virginia Water Protection Permit Program. The Virginia Water Protection Permit Regulations, 9 VAC 25-210 et seq, can be found at <http://www.deq.virginia.gov/wetlands/>. Any new surface water withdrawal will require a permit unless it is specifically excluded by the regulations. These permits protect existing instream and offstream uses and may include limits on the amounts and periods of time that water can be withdrawn. For more information about the surface water withdrawals contact the Division of Water Resources at (804) 698-4072 or the water permit program of the local regional office in which the planned withdrawal is to take place.

### Ground Water Withdrawal Permits

Virginia manages ground water resources in declared Ground Water Management Areas or GWMA. Any area in Virginia can be declared a GWMA when there is a risk that the supply has been or will be overdrawn, water levels are declining, well interference is occurring or if adverse changes to water quality have occurred or are expected. Ground water withdrawals in excess of 300,000 gallons or more in any month of the year are required to seek approval of the State Water Control Board through a permitting process. For more information about the Ground Water Withdrawal Permitting Program and a map of the current Ground Water Management Areas, see <http://www.deq.virginia.gov/gwpermitting/>. You may also contact the Ground Water Withdrawal Program by calling (804) 698-4085.

### Impacts to Wetlands and Waters

Under State Water Control Law and the Virginia Water Protection (VWP) Permit Regulations, a VWP permit is required for dredging, filling, flooding, impounding, or discharging any pollutant into or adjacent to surface waters, or otherwise altering the physical, chemical, or biological properties of surface waters, including water withdrawal. The term “surface waters” includes wetlands.

In order to determine if surface waters will be impacted from site development, a delineation of surface water boundaries must be performed using the U.S. Army Corps of Engineers’ (“Corps”) 1987 Wetland Delineation Manual. The boundaries should be confirmed by the Corps prior to applying for a VWP permit. Visit [www.nao.usace.army.mil/technical%20services/Regulatory%20branch/varegions.htm](http://www.nao.usace.army.mil/technical%20services/Regulatory%20branch/varegions.htm) for contact information for the Corps.

If impacts or other alterations to surface waters are required to develop the site or operate the business, a Joint Permit Application must be submitted to the Virginia Marine Resources Commission (VMRC). The

VMRC will distribute the application to federal and state agencies that may require a permit for impacts to surface waters. These agencies may include, but may not be limited to, the U.S. Army Corps of Engineers, DEQ, the Habitat Division of the VMRC, and/or a local Wetlands Board. Each agency will independently review the application to determine what, if any, permit is required. The Joint Permit Application is online at [www.nao.usace.army.mil/technical%20services/Regulatory%20branch/JPA.asp](http://www.nao.usace.army.mil/technical%20services/Regulatory%20branch/JPA.asp).

Visit [www.deq.virginia.gov/wetlands](http://www.deq.virginia.gov/wetlands) for more information regarding the VWP permit process and regulations.

## **Brownfields**

Brownfields are idled, underutilized, or abandoned industrial or commercial properties where expansion or redevelopment is complicated by real or perceived environmental contamination. Examples include factories, railyards, landfills, dry cleaners, etc.

Nationally and locally, brownfields are being recognized like never before as excellent opportunities to rehabilitate existing sites into productive use. DEQ recognizes the importance of facilitating brownfield redevelopment projects and is actively assisting communities and businesses in these ventures through financial and technical assistance, liability protection, and reasonable cleanup objectives. Visit [www.deq.virginia.gov/brownfieldweb/](http://www.deq.virginia.gov/brownfieldweb/) for more information.

## **Other Requirements**

Certain construction activities are required to apply to the Virginia Department of Conservation and Recreation (DCR) for coverage under the VPDES General Permit for Discharges of Stormwater From Construction Activities. More information regarding DCR's permit process may be obtained at [www.dcr.virginia.gov/soil\\_&\\_water/vsmp.shtml](http://www.dcr.virginia.gov/soil_&_water/vsmp.shtml).

The locality in which the biodiesel operation is to be sited should be contacted to determine other restrictions or requirements. Local zoning may restrict construction or operation of a biodiesel facility in certain areas, and additional permits or approvals for construction or land disturbance may be necessary.

## IX. Safety and Health Issues

Biodiesel producers need to be mindful of requirements beyond those under the purview of the DEQ. Of primary concern is safety and health. Small-scale producers are especially reminded that biodiesel production is an industrial process fraught with acute hazards rather than a kitchen cooking exercise. The information provided below is not definitive but is meant to guide the reader to contact appropriate agencies.

### Safety and Health

Methanol is highly flammable and highly toxic. Ethanol as an alternative reagent also offers hazards and risks. Potassium and sodium hydroxides are caustic. Sodium methoxide (sodium methylate) used to enhance biodiesel production is also highly flammable and toxic. Oils, fats, greases, glycerol, and biodiesel fuel are also fire hazards.

Producers should pay close attention to Material Safety Data Sheets (MSDSs) provided with their chemicals to be familiar with hazards; safe handling practices; protective equipment requirements; fire suppression procedures; spill response and clean-up procedures; and regulatory aspects. Worker right-to-know regulations may also require employee access to MSDSs.

Heating operations, boilers, and engines can entail burn, fire, and explosion hazards. Biodiesel production facilities present slip, fall, electrical, and other safety hazards. Also, like other workplaces, worker-right-to-know, incident reporting, and other requirements apply to biodiesel production facilities.

Virginia facilities must abide by occupational safety and health regulations of the federal Occupational Safety and Health Administration (OSHA) and the Virginia Department of Labor and Industry (DoLI). DoLI offers voluntary safety and health consultations to help employers to identify and correct safety and health hazards.

DoLI also administers requirements for registration and inspection of boilers and other pressure vessels. More information and contacts for the DoLI occupational safety and health programs and the boiler and pressure vessel safety program can be found at <http://www.doli.virginia.gov/whatwedo/index.html>.

Facilities must also meet building and fire codes. In Virginia, the codes are under purview of the Department of Housing and Community Development but are implemented by localities. Current and prospective biodiesel producers should contact their local government for building and fire code requirements as well as zoning restrictions and local permits and licenses that may be applicable. The State Fire Marshal's Office webpage at <http://www.dhcd.virginia.gov/statefiremarshalsoffice/> provides contact information for local fire officials.

### Additional Resources

The following resources may be useful for biodiesel producers (however, DEQ does not endorse or warrant information provided by other organizations):

John van Gerpen (2004), "Business Management for Biodiesel Producers" (for the National Renewable Energy Laboratory) [www.nrel.gov/docs/fy04osti/36242.pdf](http://www.nrel.gov/docs/fy04osti/36242.pdf)

Methanex (2006), Technical Information & Safe Handling Guide for Methanol  
[www.methanex.com/products/technical.html](http://www.methanex.com/products/technical.html)

Virginia Clean Cities (2006), “Virginia Farmer & Small Producer Forum on Safe Biodiesel Production and Usage” [www.hrccc.org/biodiesel.html](http://www.hrccc.org/biodiesel.html)

The Collaborative Biodiesel Tutorial website includes safety as well as technical and business information [www.biodieselcommunity.org/](http://www.biodieselcommunity.org/)

## X. Business and Tax Issues

Biodiesel producers are also subject to business registration and licensing requirements, some of which are particular to motor fuel production and sales.

### Business and Tax Regulations

The Virginia Department of Motor Vehicles requires that motor fuel dispensers be licensed and that fuel taxes be paid. Please see the following for more information:

- Licensing, [www.dmv.virginia.gov/webdoc/commercial/taxact/license.asp](http://www.dmv.virginia.gov/webdoc/commercial/taxact/license.asp)
- Application, [www.dmv.state.va.us/webdoc/pdf/ft213.pdf](http://www.dmv.state.va.us/webdoc/pdf/ft213.pdf)
- Fuel Taxes, [www.dmv.virginia.gov/webdoc/commercial/taxact/payments.asp](http://www.dmv.virginia.gov/webdoc/commercial/taxact/payments.asp)

Also, check with local governments regarding local business licensing and taxation that may be applicable.

### Business Assistance

DEQ's Office of Small Business Assistance can provide regulatory and technical assistance, including confidential compliance assistance and site visits, to small businesses planning to or currently producing biodiesel fuels. The Office can be contacted by telephone at 1-800-592-5482 Ext. 4394 (in Virginia) or (804) 698-4394, or by e-mail at [osba@deq.virginia.gov](mailto:osba@deq.virginia.gov), or online at [www.deq.virginia.gov/osba/](http://www.deq.virginia.gov/osba/).

As warranted, the Office also makes referrals to other business assistance providers. Among these are the Virginia Department of Business Assistance (VDBA) and Virginia's network of Small Business Development Centers (SBDCs). The SBDCs provide business counseling, training, information, and other services. VDBA established the Virginia Business Internet Portal to provide information on starting and running a business in Virginia, including licensing and regulatory requirements, tax issues, and business, technical, and financial resources. The U.S. Small Business Administration is also a valuable resource for financial and other assistance. The Virginia Economic Development Partnership and local economic development agencies can also be valuable allies for businesses seeking to locate in or expand operations in Virginia.

### Online Resources

- John van Gerpen (2004): "Business Management for Biodiesel Producers" (for the National Renewable Energy Laboratory) [www.nrel.gov/docs/fy04osti/36242.pdf](http://www.nrel.gov/docs/fy04osti/36242.pdf)
- U.S. Small Business Administration: [www.sba.gov](http://www.sba.gov)
- U.S. SBA Small Business Planner: [www.sba.gov/smallbusinessplanner/index.html](http://www.sba.gov/smallbusinessplanner/index.html)
- Virginia Department of Business Assistance: [www.dba.state.va.us](http://www.dba.state.va.us)
- Virginia Small Business Development Centers: [www.vasbdc.org](http://www.vasbdc.org)
- Virginia Business Internet Portal: [www.business.virginia.gov](http://www.business.virginia.gov)
- Virginia Economic Development Partnership: [www.yesvirginia.org](http://www.yesvirginia.org)

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