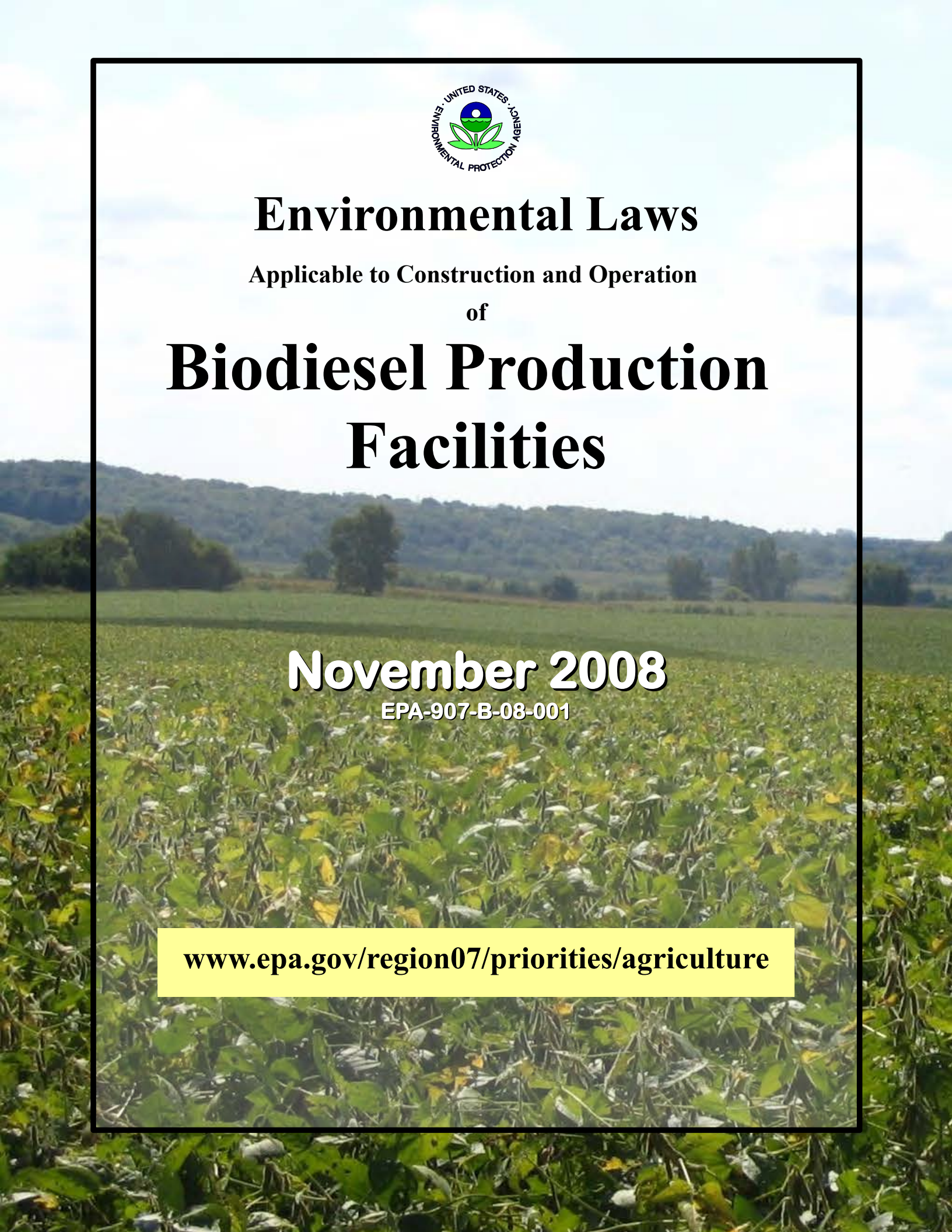

Environmental Laws

Applicable to Construction and Operation

of

Biodiesel Production Facilities

November 2008

EPA-907-B-08-001

www.epa.gov/region07/priorities/agriculture

WHAT IS THE PURPOSE OF THIS MANUAL?

This compliance assistance manual serves as a road map of information on federal environmental programs and federal, state, and local agency roles as they apply to parties interested in designing, building, and operating biodiesel manufacturing facilities. This manual emphasizes federal environmental laws and regulations implemented by the United States Environmental Protection Agency and its state partners. Air, water, hazardous waste, accident prevention and release reporting are examples of requirements that might apply. This manual, like a road map, does not contain all details of the federal and state statutes and regulations. Biodiesel facility operators need to review the applicable statutes and regulations.

There are many federal environmental requirements that apply to biodiesel production facilities. State and local environmental agencies may take the lead in implementing federal environmental programs and may have state requirements in addition to federal environmental requirements. The United States Environmental Protection Agency, state, and local environmental agencies work in partnership and are available to answer questions about applicability of environmental requirements to individual biodiesel production facilities. Our goal is to work with biodiesel facility operators to ensure that human health and the environment are protected as biodiesel production continues to increase in EPA's Region 7 (Iowa, Kansas, Missouri, and Nebraska).

This manual has been prepared by the U.S. Environmental Protection Agency Region 7 Biofuels Work Group.

DISCLAIMERS:

- This manual provides information to help the regulated community and the public understand biodiesel facility obligations under federal environmental laws and regulations.
- This manual is not a substitute for regulations, nor is it a regulation. It cannot impose legally binding requirements on EPA, states, or the regulated community. The reader must refer to federal and state laws and regulations for a complete understanding of all legal requirements.
- While every attempt has been made to provide readers with definitions/explanations of the terms used in this manual, readers who are unfamiliar with particular programs are encouraged to visit the EPA website at www.epa.gov or the Code of Federal Regulations at www.gpoaccess.gov/cfr/retrieve.html.
- This manual does not represent final agency action and may be updated in the future.
- This manual does not limit the otherwise lawful prerogatives of regulating agencies. Agencies may act at variance with this guidance based on facility-specific circumstances.
- The mention of trade names, commercial products, industry references, and technical resources does not constitute an endorsement or recommendation for use.
- The information in this document is current as of its publication date.

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INTRODUCTION

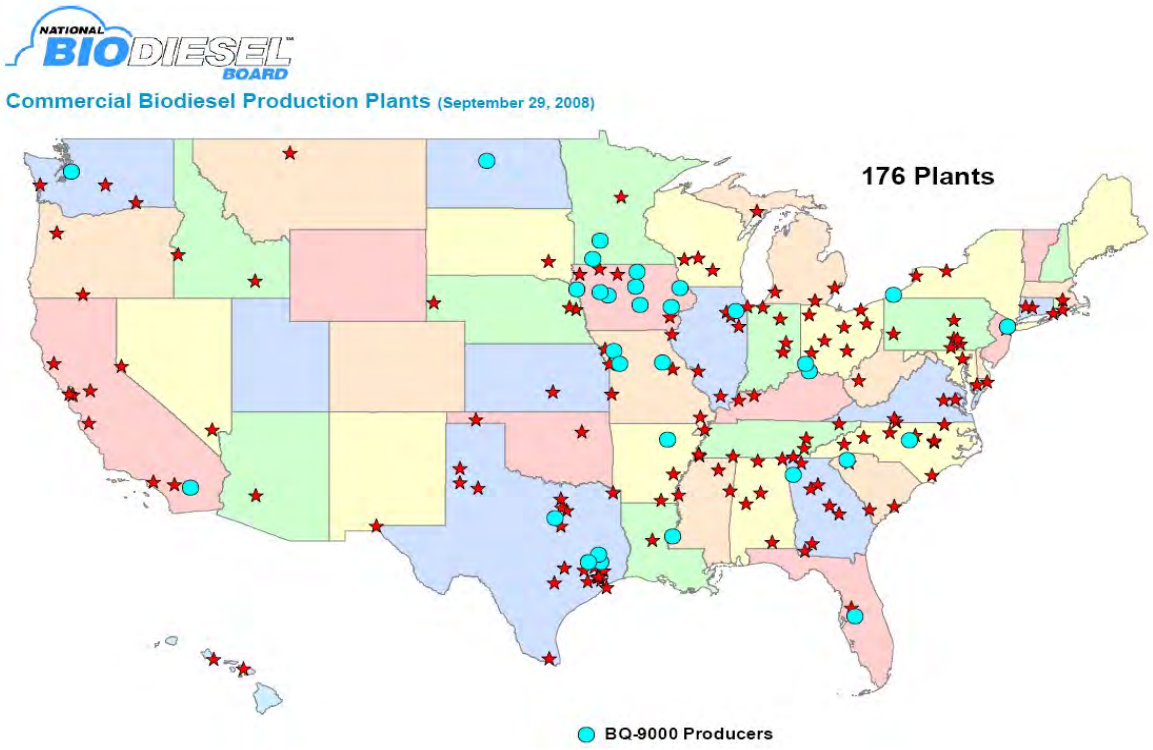
I.1 Requirement for Renewable Fuels

The Energy Policy Act of 2005 amended the Clean Air Act to establish a Renewable Fuel Standard (RFS) program. The RFS program, applicable for 2007 and beyond, is designed to encourage blending renewable fuels into our nation's motor vehicle fuel.

A renewable fuel is defined in the Energy Policy Act as a motor vehicle fuel that is produced from plant or animal products or wastes. Renewable fuels include biodiesel, ethanol and other motor vehicle fuels made from renewable sources.

About 4.7 billion gallons of renewable fuels were used in the United States in 2007 as motor vehicle fuel. The RFS program requires that this volume increase to at least 7.5 billion gallons by the year 2012 with a goal of using 36 billion gallons per year as motor vehicle fuel by 2022.

According to the National Biodiesel Board, as of September 2008, there were 176 biodiesel plants in operation nationwide with an annual production capacity of 2.61 billion gallons per year.



This document was developed in response to the increasing number of biodiesel production facilities, their potential environmental implications in Region 7, and our desire to help smooth our nation's transition to a renewable fuel source while maintaining a healthy environment.

I.2 Biodiesel Overview

Biodiesel is a clean-burning alternative fuel produced from renewable resources. It can be used pure or "neat" (called B100) or, more typically, blended with petroleum diesel fuel in 5% (B5), 20% (B20), or other proportions before sale to the final user.

BIODIESEL FUEL IS MADE FROM A RENEWABLE SOURCE, SUCH AS SOYBEANS

The use of biodiesel creates less environmental impacts than petroleum oils. When used in existing vehicles, it reduces emissions of carbon monoxide, particulate matter, and sulfates, as well as hydrocarbon and air toxics emissions. Biodiesel also provides significant greenhouse gas emission reductions.

According to a life cycle study performed by the United States Department of Agriculture and the Department of Energy, the production of biodiesel compared to the production of petroleum fuels generates 78% less carbon dioxide, 79% less wastewater, and 96% less hazardous waste. [1]

REGARDLESS OF WHAT FEEDSTOCK IS USED, BIODIESEL MUST MEET ASTM STANDARDS BEFORE SALE TO THE FINAL USER

Biodiesel has the highest energy balance (3.5) of any other fuel, meaning for every unit of fossil energy needed to produce biodiesel, 3.5 units of energy are gained. Since it is produced domestically, it can reduce the need for fossil fuel and improve the nation's energy security.

The technical definition of biodiesel is, "a fuel composed of mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats, designated B100, and meeting the requirements of ASTM International (ASTM) D6751."

1 National Renewable Energy Laboratory, "An Overview of Biodiesel and petroleum Diesel Life Cycles." NREL/TP-580-24772, May 1998

Biodiesel is typically made from vegetable or animal oils consisting of triglycerides, through a process known as transesterification. This process is where the triglyceride molecules are broken into alkyl ester molecules (the biodiesel product) and glycerin (the byproduct) by reaction with an alcohol in the presence of a catalyst. This document focuses on commercial biodiesel manufacturing using the transesterification process.

Methanol is the most commonly used alcohol, producing a biodiesel product which consists of methyl esters. Biodiesel produced using methanol is often called fatty acid methyl ester or FAME. 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.

The glycerin (also called glycerol) byproduct is typically contaminated with unreacted methanol and excess catalyst, which must be refined to recover methanol before it can be used commercially. Recovering the methanol leaves the glycerin at 80% or more pure and makes it more suitable as a marketable commodity. After methanol recovery, most commercial biodiesel manufacturing companies are able to send the glycerin to a glycerin recovery/refining facility. Pure grades of glycerin (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.

RESEARCHERS CONTINUE TO DISCOVER MORE COST-EFFECTIVE USES FOR THE GLYCERIN BYPRODUCT

While glycerin is useful for other applications, alcohol- and catalyst-contaminated glycerin can pose waste management challenges with significant economic and regulatory ramifications. The difference between marketable glycerin and determining glycerin to be a hazardous waste is the methanol content. Regardless of whether methanol is recovered, the producer must make a hazardous waste determination of the waste glycerin. If methanol is not recovered from the glycerin, then the producer should likely make a positive hazardous waste determination prior to disposal since the flash point of the mixture is likely less than 140°F. It is beneficial for an operator to recover methanol and thus avoid paying for hazardous waste disposal and the associated paperwork. Using a closed-loop system to recover the methanol prevents it from becoming a hazardous waste. See hazardous waste discussion in Chapter 2, Page 17 for more information.

Refining and finding a use for the glycerin byproduct is more desirable environmentally and economically than disposing it. Growth in biodiesel production has led to an increase in the amount of glycerin on the market. Significant research on alternative beneficial uses for glycerin is ongoing.

Most available literature suggests that methanol recovery from glycerin wash waters, and fugitive vapor emissions 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. 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 to avoid undesirable outcomes. For instance, there are documented cases of waste filter cake spontaneously igniting.

This document discusses the various federal environmental requirements that may apply to commercial biodiesel production facilities located in Iowa, Kansas, Missouri, or Nebraska that use the transesterification process. It also provides information on who to contact for additional information on these requirements. Note that state or local requirements may be more stringent than federal requirements and are outside the scope of this document.

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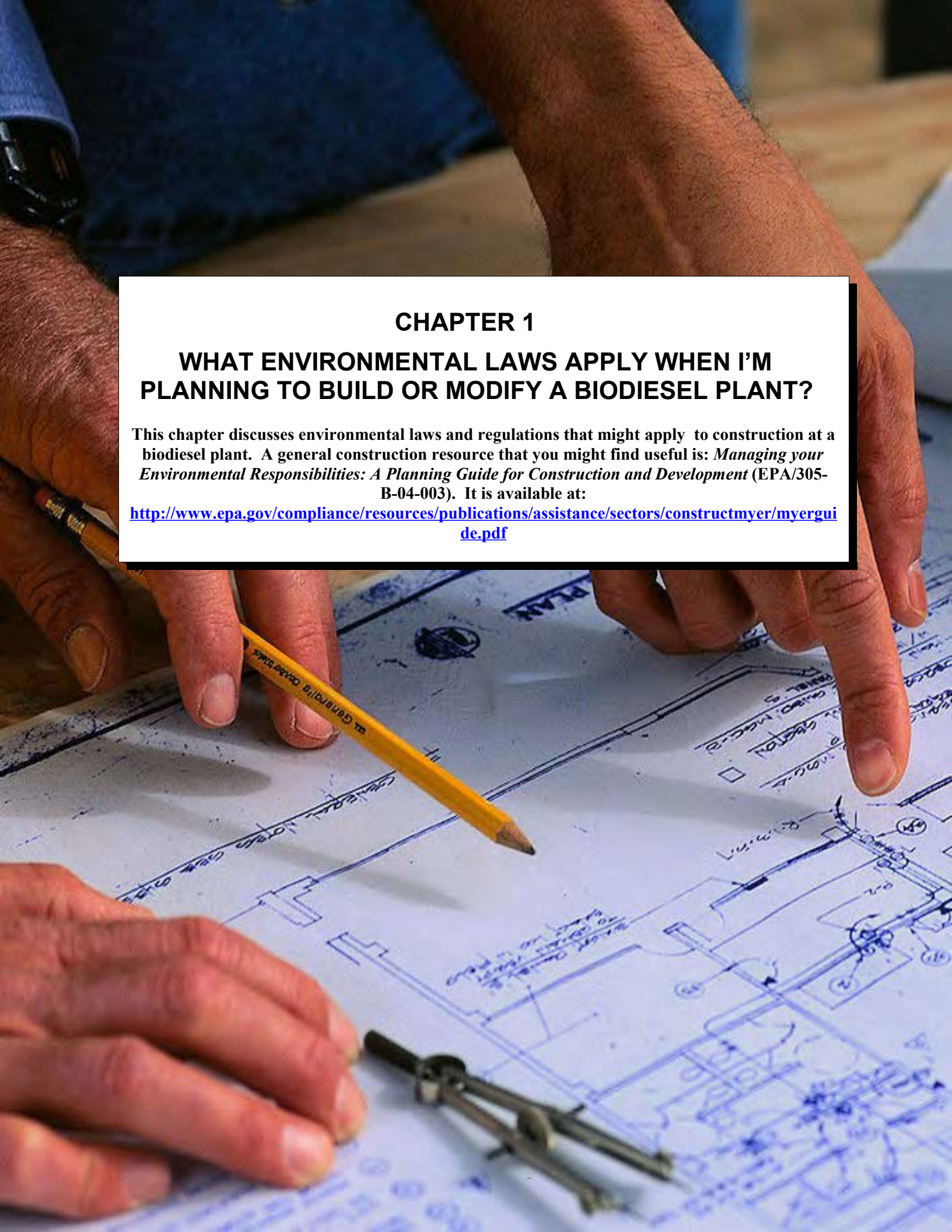


CHAPTER 1

WHAT ENVIRONMENTAL LAWS APPLY WHEN I'M PLANNING TO BUILD OR MODIFY A BIODIESEL PLANT?

This chapter discusses environmental laws and regulations that might apply to construction at a biodiesel plant. A general construction resource that you might find useful is: *Managing your Environmental Responsibilities: A Planning Guide for Construction and Development* (EPA/305-B-04-003). It is available at: http://www.epa.gov/compliance/resources/publications/assistance/sectors/constructmyer/myerguide.pdf

1.1 National Environmental Policy Act

If you are using federal money to construct a biodiesel plant or any associated facility, such as an access road or water supply, then your plant is subject to the National Environmental Policy Act (NEPA). NEPA requires federal agencies to incorporate environmental considerations in their planning and decision-making and to prepare a detailed statement assessing the environmental impact of activities and alternatives that significantly affect the environment.

A BIODIESEL FACILITY MAY BE REQUIRED TO EVALUATE ENVIRONMENTAL IMPACTS

The NEPA assessment for biodiesel plants should include all potential environmental and human health impacts. Resources such as wetlands, water quality, hazardous waste, and air quality are commonly analyzed. Biodiesel plants should also consider potential impacts to road and railway capacity; water supply and local municipal water systems; and handling and deposition of byproducts from the plant operation. Significant effects that are identified and determined to be unavoidable may require mitigation to reduce or minimize environmental or human health impacts.

Biodiesel production facilities contribute emissions to the air including volatile organic compounds, sulfur dioxide, nitrogen oxides, hazardous air pollutants and particulate matter, all of which are required to be controlled by applicable regulations. Selection of the plant location should focus on minimizing air quality impacts to downwind residents and consider other air emission sources in the area.

As part of the environmental evaluation, EPA recommends completing a thorough emissions accounting and air quality modeling analysis, including fugitive emissions from haul roads. We also recommend evaluating any projected capacity increase or phased construction approach to consider the total potential air impacts to the project area. More information about the NEPA process is in Appendix C of this manual. NEPA contact information is in Appendix A.

1.2 Clean Water Act

This section discusses regulations pursuant to the Clean Water Act that may apply during the construction or modification of a biodiesel plant.

COMPLYING WITH THE CLEAN WATER ACT HELPS KEEP OUR SURFACE WATERS CLEAN

Plant operators should be aware that many requirements that apply during plant operation require permit applications be submitted well in advance of plant startup, for instance, during the early planning phases prior to construction. While this chapter focuses on regulations that apply during plant construction and modification activities, operators should read and understand this entire document prior to commencing construction or modification of a biodiesel plant.

Dredge and Fill

Regulations developed under Section 404 of the Clean Water Act (404 Program, hereafter) address the discharges of dredged or fill material into waters of the United States. Generally, the 404 Program requires a permit before these materials may be placed in a "water of the U.S.", such as a wetland, stream, river, slough, lake, bay, etc., during construction activities. The U.S. Army Corps of Engineers administers the 404 Program, including issuance of permits, enforcement, and making determinations on what constitutes a “water of the U.S.” Should the U.S. Army Corps of Engineers decide that a section 404 permit is required, a 401 Water Quality Certification may be required from the state environmental agency.

If there is a potential for placing dredge or fill materials into a water of the U.S. during the construction or expansion of a biodiesel plant, then a 404 Program permit is required. The following types of activities are regulated through the permitting process:

- Water resource projects (such as dams, impoundments, and levees)
- Infrastructure development (such as highways and railways)
- Altering or dredging a water of the U.S.

The basic premise of the 404 Program is that no discharge of dredged or fill material may be permitted if: (1) a practicable alternative exists that is less damaging to the aquatic environment or (2) the nation's waters would be significantly degraded. "Practicable alternatives" include those that do not involve a discharge of dredged or fill material into waters of the U.S., or involve other significant environmental impacts. An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology and logistics.

When you apply for a permit, you must show that you have, to the extent practicable:

- Taken steps to avoid impacts to waters of the U.S.
- Minimized potential impacts on waters of the U.S.; and
- Provided compensation for any remaining unavoidable impacts.

DREDGE AND FILL ACTIVITES REQUIRE A PERMIT

Therefore, it is important to consider potential impacts to waters of the U.S. during the early planning phases of the project. This may include evaluating alternatives for plant design and operation in order to avoid impacts to waters of the U.S.

An *individual permit* is required for activities that can have potentially significant impacts. Individual permits are reviewed by the U.S. Army Corps of Engineers, which evaluates applications under a public interest review, as well as the environmental criteria set forth in the Clean Water Act Section 404(b)(1) Guidelines. Coverage under a general permit may be suitable for most discharges that will have only minimal adverse effects. General permits are issued on a nationwide, regional, or state basis for particular categories of activities. The U.S. Army Corps of Engineers should be contacted before placing any dredge or fill material into waters of the U.S.

You may need to get a permit for dredging and filling activities. If you are not sure whether you need a permit, contact your local Corps of Engineers Office. See Appendix A.

Stormwater Construction Permits

Land disturbance caused by construction, such as clearing, grading, and excavating, can lead to serious environmental harm in both nearby and downstream water bodies. To minimize the impact of site runoff on water quality, a storm water permit must be obtained for discharges to waters of the U.S. from any construction activity that disturbs one acre or more of land.

LAND DISTURBANCE CAN LEAD TO SEDIMENT RUNOFF

In Region 7, the state environmental departments issue general permits to cover these discharges. General permits require submission of a simplified application (typically identified as a Notice of Intent or NOI) and development and implementation of a plan, often called a storm water pollution prevention plan, to control discharges of sediment and other pollutants from the site during construction activities. Application due dates vary by state. The state and EPA Regional contacts for construction storm water permitting are listed in Appendix A. Further discussion of National Pollutant Discharge Elimination System storm water permits is provided at Chapter 2, Page 2.

Permit For Construction of a Wastewater Facility

If you will need to construct any type of wastewater treatment or holding system (including collection systems, pumping stations, storage units, etc.) to meet limits established in a wastewater disposal permit (See Section 2.1), you may be required to obtain a non-Clean Water Act construction permit from your state. The state will require you to submit plans and specifications for review and approval before any construction can begin on the treatment system. The treatment system and its appurtenances must be designed in accordance with the state's design standards which have been established to ensure adequate treatment prior to disposal. Please contact the person listed for your state in Appendix A, National Pollutant Discharge Elimination System (NPDES) Permits.

1.3 Safe Drinking Water Act

The Safe Drinking Water Act is the federal law that ensures the quality of drinking water for Americans. Congress originally passed the act in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources, such as rivers, lakes, reservoirs, springs, and ground water wells. The mandates of the act provide that the Public Water System Supervision program regulate the quality of public drinking water and the Underground Injection Control and Source Water Protection/Wellhead Protection programs protect drinking water sources.

COMPLYING WITH THE SAFE DRINKING WATER ACT HELPS KEEP OUR DRINKING WATER SAFE FOR CONSUMPTION

The Public Water System Supervision Program

The majority of Americans receive drinking water from public water systems. A public water system is defined as a system providing water for human consumption that has at least 15 service connections or regularly serves an average of 25 or more individuals daily at least 60 days of the year. This can include facilities such as industries, schools, mobile home parks, recreational areas and factories that have their own source of water which they make available for drinking purposes. Public water systems can be publicly or privately owned.

The Safe Drinking Water Act authorizes EPA to set national health-based standards for drinking water to protect against naturally occurring and man-made contaminants that might be found in drinking water.

Nationally, there are more than 170,000 public water systems with more than 11,000 of those systems in Region 7. EPA develops standards and testing requirements for the quality of drinking water provided by these systems. States and Tribes oversee the permitting, operation and compliance of public water systems, as well as establishing operator training and certification requirements and design and construction standards. It is the responsibility of the owners and operators of public water systems to comply with the standards and requirements in order to ensure a safe water supply.

Industrial facilities that have their own source of water, such as a well or stream, and provide drinking water to workers, visitors, or the public, are considered public water systems. A facility that uses drinking water from another source, such as a municipal water supply, is not regulated as a public water system.

A facility which meets the definition of a public water system must comply with the Federal and State regulations under the Public Water System Supervision program. States and Tribes (in some cases) can have additional requirements for backflow prevention, well siting and construction, water treatment process design and construction, operator training, and assessments of the capability to operate a system.

A public water system must obtain permits and approvals from the State before construction and operation and for any upgrades or modifications to the system.

Public water systems will be required to perform periodic testing of the water for a variety of potential contaminants, on schedules set by regulation. Testing is required for microbiological, radiological, synthetic organic, and inorganic contaminants in drinking water. These contaminants include lead, nitrates, coliform bacteria and disinfection byproducts. If contaminants are identified exceeding maximum contaminant levels, or the public water system fails to meet treatment technique requirements, the system is considered out of compliance and corrective actions must be taken. The State also periodically inspects public water systems to identify deficiencies, which must be corrected.

Every public water system must be operated by a trained and qualified operator who is responsible for the quality of the water and meeting regulatory requirements. States have programs for training and certifying operators at a level appropriate to the level of water treatment at the facility. It is the responsibility of the water system owner to have a certified operator in charge.

Even if you plan to use your own water source for just supplying cooling or industrial processing water, there are several state water-supply related permits that might be required. These include:

- **Water Use Permit -** Withdrawing or using water from a surface or underground source typically requires a water use permit, depending on the volume of water that will be used daily.
- **Well Construction Permit -** Drilling a new well or modifying an existing well requires a well construction permit.

It is important for facilities that plan to use their own water supply source(s) to make sure that all of the necessary permits are in place before proceeding. Check with the state environmental, health or natural resources office listed in the Public Water System Supervision section of Appendix A before building or modifying a water supply.

The Underground Injection Control Program

The subsurface environment has been used for centuries to dispose of liquid wastes; the philosophy was that waste out of sight was out of mind. Realizing that this type of waste disposal could contaminate ground water prompted the development of the Underground Injection Control (UIC) program. The UIC program was one of the first Safe Drinking Water Act provisions created specifically to protect underground sources of drinking water. An underground source of drinking water is defined as an aquifer or portion of an aquifer that supplies a public water system or contains sufficient quantity of ground water to supply a public water system, that contains less than 10,000 mg/L total dissolved solids and that is not an exempted aquifer.

UNDERGROUND INJECTION CONTROL WELL HEAD

The UIC program regulates wells where various municipal, agricultural, commercial and industrial users inject fluids underground for disposal, hydrocarbon production and storage, or mineral recovery. The UIC program defines an injection well as any bored, drilled or driven shaft or dug hole, where the depth is greater than the largest surface dimension of the well and is used to discharge fluids underground; or a subsurface fluid distribution system. This definition covers a wide variety of injection practices, ranging from technically sophisticated and highly monitored wells that pump fluids into isolated formations up to two miles below the Earth's surface, to the far more numerous on-site drainage systems, such as septic systems, cesspools, and storm water wells, that discharge fluids a few feet underground. The program requirements are designed to ensure that injected fluids stay within the wells and the intended injection zones and do not endanger underground sources of drinking water.

Injection practices not regulated by the UIC program include (1) individual residential waste disposal systems that inject ONLY sanitary waste and (2)

commercial waste disposal systems that serve fewer than 20 people that inject ONLY sanitary waste.

No injection is authorized without approval from the appropriate regulatory authority. Today, 36 states and territories have primacy for UIC programs and EPA directly implements 17 programs. These programs regulate more than 500,000 injection wells. The UIC program also oversees the disposal of up to 89 percent of all hazardous waste that is land-disposed in the U.S.
In Region 7, all states except Iowa have been granted primary enforcement authority to run the UIC program. In the case of Iowa, Region 7 directly implements that program. These programs regulate the activities of over 33,000 active injection wells in Region 7.

A biodiesel plant is subject to the requirements of the UIC Program if:

- It is disposing storm water, cooling water, industrial or other fluids into the subsurface via an injection well; or
- It has an on-site sanitary waste disposal system, for example a septic system, that serves or has the capacity to serve 20 or more persons; or
- It has an on-site sanitary waste disposal system that is receiving other than a solely sanitary waste stream regardless of its capacity; or
- It is undergoing a remediation process where fluids are being introduced into the subsurface via an injection well to facilitate or enhance the cleanup.

Facilities that discharge fluids to streams, ponds, lagoons, or treatment facilities are not subject to the provisions of the UIC program but could be regulated by the Clean Water Act.

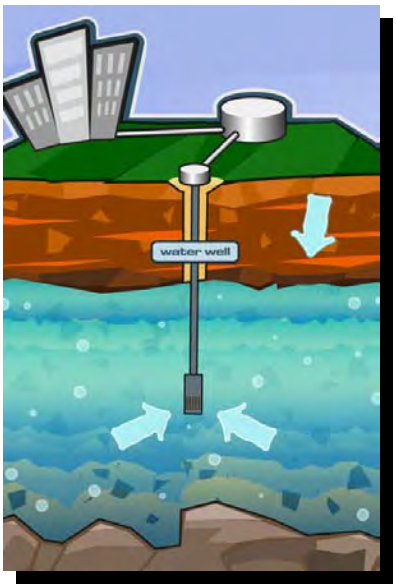
It is important that facilities planning to use an injection well check with the state environmental, health or natural resources office, listed in the UIC section of Appendix A, before constructing a new injection well or modifying their existing injection well to make sure that all of the necessary permits or approvals are in place before proceeding.

Ground Water/Source Water Protection Programs

Unlike other EPA environmental programs, there is no "National Ground Water Act" with congressionally mandated legislation to protect ground water on a national basis. Rather, EPA has chosen a two-prong approach:

1. Almost every EPA program has some measure of ground water protection written into its legislation. Therefore, by carrying out these programmatic responsibilities, each program office contributes to EPA's overall ground water protection effort.

2. Since formation of EPA's Office of Ground Water Protection in 1984, EPA has placed the primary responsibility for developing, implementing, and coordinating ground water protection programs with the states.



PROTECTING GROUND WATER FROM CONTAMINATION PROVIDES A CLEAN SOURCE OF DRINKING WATER

The following is a summary of the most significant ground water-related programs that might affect biodiesel plant operations:

Ground Water Protection Strategy - In 1984, EPA released its "Ground Water Protection Strategy" in which the Agency proposed a national program to protect ground water as a resource. Among its provisions was the principle that states are responsible for managing the ground water resources within their own borders. In response to the national strategy, each state developed its own ground water protection strategy.

Wellhead Protection Program - The Safe Drinking Water Act Amendments of 1986 contained a new ground water initiative, the Wellhead Protection Program. Congress directed that an area around every public water supply well be defined, managed, and protected from human-caused sources of contamination. All of the states in Region 7 have approved state wellhead protection programs.

Sole Source Aquifer Program - Some aquifers are so important as drinking water supplies that there are no reasonably available alternative sources if they should become contaminated. Under the provisions of the Safe Drinking Water Act, an individual or group may petition EPA to designate an aquifer as a sole source aquifer. EPA then has special authority to review projects that receive federal financial assistance and that could pose environmental hazards to water

quality. Region 7 currently has no sole source aquifers, however the potential for such delegations does exist.

Source Water Protection Program - The Safe Drinking Water Act Amendments of 1996 added another initiative, the Source Water Protection Program. The program goes beyond just protecting ground water, which previous legislation has created, to encompass protecting the source of every community's water supply, regardless of whether it is from ground water or surface water. All of the states in Region 7 have an approved state source water protection program.

It is important that facilities check with the state environmental, health or natural resources office listed in the Source Water Protection Program section of Appendix A prior to construction or modification to ensure that they will comply with any source water protection requirements before proceeding.

1.4 Clean Air Act

The Clean Air Act, which was last amended in 1990, requires EPA to set national ambient air quality standards for widespread pollutants from numerous and diverse sources considered harmful to public health and the environment. The Clean Air Act establishes two types of national air quality standards:


Photo courtesy of IBT, Inc.

1. Primary Standards, which set limits to protect public health, including the health of sensitive populations such as asthmatics, children and the elderly.
2. Secondary Standards, which set limits to protect public welfare, including visibility, animals, crops, vegetation, and buildings.

EPA has set national ambient air quality standards for six principal pollutants called "criteria" pollutants. Standards have been set for particulate matter, carbon monoxide, sulfur dioxide, nitrogen oxides, lead and ozone. Note, volatile organic compounds lead to the formation of ozone (smog). Areas that have air quality as

good or better than the standards for a criteria pollutant are classified as attainment areas for that pollutant. Areas that do not meet the standards for a criteria pollutant are classified as nonattainment areas for that pollutant. Consequently, an area may be an attainment area for one pollutant and a nonattainment area for another. The attainment/nonattainment designation may change over time. Attainment/nonattainment status can be determined from 40 CFR Part 81 or at:

www.epa.gov/oar/oaqps/greenbk

During the production of biodiesel, criteria pollutants are released into the air. If the oilseeds are processed at the plant, particulate matter (including tiny particulates less than 10 microns in diameter known as particulate matter or PM_{10}) are released during receipt and handling of the seeds. Particulate matter could also be released during the mechanical extraction process. During the chemical extraction process and oil pretreatment process, volatile organic compounds (VOCs) are released. Some of these organic compounds are known as hazardous air pollutants (HAPs), which include methanol and hexane.

The biodiesel reaction process units include reactors, decanters, wash tanks, stripper columns, and distillation columns. This process will emit VOCs, including hexane (when chemically extracted soybean oil is used), methanol and/ or ethanol (depending on the alcohol used in the reaction process). To control air emissions from this process, condensers, scrubbers, and process flares are generally used. The combustion process from boilers which provide the steam and energy to the process equipment, emergency backup equipment, and the flares generate combustion byproducts such as nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO_2), PM_{10}, $PM_{2.5}$ (particulates less than 2.5 microns in diameter), VOCs and HAPs.

Emissions may also result from other activities and equipment such as storage tanks, biodiesel and glycerin load out, (VOCs and HAPs), fugitive emissions from equipment leaks (VOCs and HAPs), and from cooling towers and haul roads (particulate matter).

Stationary sources are required to obtain a construction permit before the construction of a new facility or before modifying an existing source.

The Clean Air Act requires that certain permits be obtained to minimize air emissions and protect human health and the environment before construction begins on a biodiesel plant. These permits are described hereafter.

Air Construction Permits

The Clean Air Act established a pre-construction permitting program in order to preserve and protect the national ambient air quality standards and enhance air quality. It is known as the new source review program.

> Permits are legal documents which include requirements that the source must follow throughout the life of the facility.
> It is very important for facilities to be familiar with the requirements contained in their construction permits.

New source review permits are issued by state or local air pollution control agencies. In very rare circumstances, EPA might issue the permit. We recommend having pre-application meetings with the permitting agency for construction permits; this ensures your application is complete which helps speed up the permitting process.

There are two kinds of new source review pre-construction permits:

1. *Major Construction Permits*
2. *Minor Construction Permits*

The type of permit required depends on the facility's potential to emit pollutants and the location of the facility.

Major Construction Permits

There are two types of major construction permits under the new source review program:

- Prevention of Significant Deterioration permits, and
- Nonattainment New Source Review permits.

Prevention of Significant Deterioration Permits

Prevention of significant deterioration permits are required for a new major source or an existing major source making a major modification, in an attainment or unclassifiable area.

Under the prevention of significant deterioration program, a source is considered to be a major source if the facility has the potential to emit 100 tons per year or more of any regulated new source review pollutant if the source is one of the specific source categories listed in the prevention of significant deterioration regulations [40 CFR 52.21(b)(1)(i)(a)] or 250 tons per year of any criteria pollutant for sources not specifically listed in the prevention of significant deterioration regulations. The 100 tons per year major source threshold applies to most biodiesel plants.

PREVENTION OF SIGNIFICANT DETERIORATION PERMITS HELP MAINTAIN AIR QUALITY

A major modification is any physical change or change in the method of operation of an existing major stationary source that would result in a significant net emissions increase of any regulated new source review pollutant. The prevention of significant deterioration significance thresholds for the various regulated new source review pollutants are listed in 40 CFR 52.21(b)(23)(i). The significant thresholds for the criteria pollutants are:

- Carbon monoxide: 100 tons per year
- Nitrogen oxides: 40 tons per year
- Sulfur dioxide: 40 tons per year
- Particulate Matter
  - 25 tons per year of particulate matter emissions
  - 15 tons per year of PM_{10}
  - 10 tons per year of $PM_{2.5}$

  Note: On May 16, 2008, EPA promulgated the rule for the implementation of "New Source Review for Fine Particles." This rule is available at

  www.epa.gov/fedrgstr/EPA-AIR/2008/May/Day-16/a10768.pdf
- Ozone: 40 tons per year of VOCs or nitrogen oxide
- Lead: 0.6 tons per year

The prevention of significant deterioration program requires the following elements:

- Installation of the best available control technology,
- An air quality analysis,
- An additional impact analysis,
- Protection of Class I areas, and
- Public involvement.

Best Available Control Technology

Best available control technology considers energy, environmental, and economic impacts on a case-by-case basis. Best available control technology can be add-on pollution control equipment or modification of the production process or methods. This includes fuel cleaning or treatment and innovative fuel combustion techniques. Best available control technology may be a design, equipment, work practice, or operational standard if imposition of an emission standard is not feasible.

Best Available Control Technology (BACT) is an emissions limitation based on the maximum degree of control that can be achieved.

Air Quality Analysis

The main purpose of an air quality analysis is to demonstrate that new emissions emitted from a proposed major stationary source or major modification, in conjunction with other applicable emissions from existing sources, will not cause or contribute to a violation of any applicable national ambient air quality standard or prevention of significant deterioration increment. Generally, the analysis will involve:

- An assessment of existing air quality, which might include ambient monitoring data and air quality dispersion modeling results, and
- Predictions, using dispersion modeling, of ambient concentrations that will result from the applicant's proposed project and future growth associated with the project.

BIODIESEL PRODUCTION FACILITIES CAN IMPROVE AIR QUALITY WHEN USING BEST AVAILABLE CONTROL TECHNOLOGY

Prevention of significant deterioration increments generally keep the air quality in clean areas well below the concentration set by the national ambient air quality standard. The national ambient air quality standard is a maximum allowable concentration ceiling. The prevention of significant deterioration increment is the maximum allowable increase in ambient concentration that is allowed to occur above a baseline concentration for a pollutant. The baseline concentration is defined for each pollutant. In general, it is the ambient concentration existing at the time that the first complete prevention of significant deterioration permit application affecting the area was submitted. Significant deterioration is said to occur when the amount of new pollution, in addition to pollution changes since the baseline date, cause the change in air quality to exceed the applicable prevention of significant deterioration increment. It is important to note, however, that the air quality cannot deteriorate beyond the concentration allowed by the applicable national ambient air quality standard, even if not all of the prevention of significant deterioration increment is consumed.

Impacts Analysis

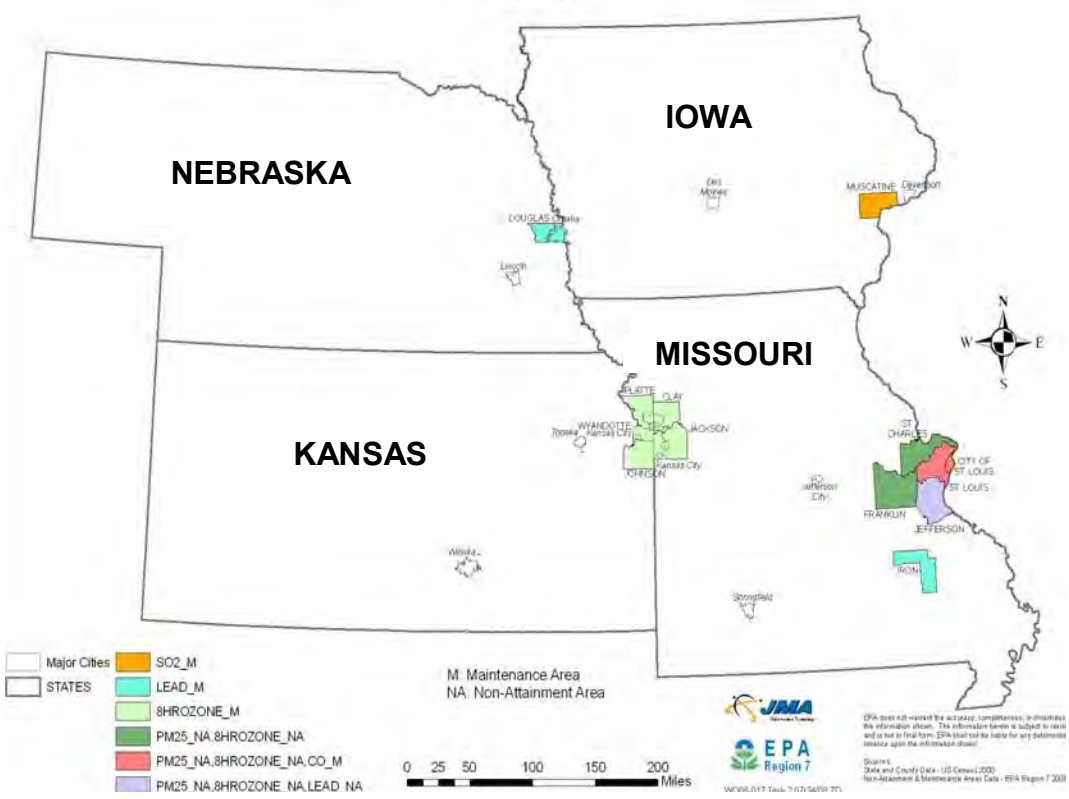
The additional impacts analysis assesses the impacts of air, ground, and water pollution on soils, vegetation, and visibility from any increase in emissions of any regulated pollutant from the source or modification under review and from associated growth. Associated growth is industrial, commercial, and residential growth that will occur in the area because of the source.

Public Involvement

The public will be offered an opportunity to comment and request a public hearing on the permit before it is issued. Comments are considered by the permitting agency and they may result in changes to the permit. The public may also appeal permits.

Nonattainment New Source Review Permits

Nonattainment new source review applies to new major sources or major modifications at existing major sources for pollutants where the source is in an area that is not in attainment with the national ambient air quality standards, also called a "nonattainment area." In a nonattainment area, any stationary pollutant source with the potential to emit 100 tons per year or more is considered a major source. Nonattainment new source review requirements are customized for the specific nonattainment area. The nonattainment areas in Region 7 are depicted in the graphic below.



Region 7 Nonattaimnent and Maintenance Areas
As of July 22, 2008

All nonattainment new source review programs require:

- Installation of the lowest achievable emission rate,
- Emission offsets, and
- Opportunity for public involvement.

The lowest achievable emission rate is the most stringent emission limitation derived from either of the following:

- The most stringent emission limit contained in the implementation plan of any state for such class or category of source, or
- The most stringent emission limit achieved in practice by such class or category of source.

The emissions rate may result from a combination of emissions limiting measures such as:

- Add-on pollution control equipment,
- A process modification, and/or
- A change in the raw material processed.

Offsets are emission reductions, generally obtained from existing sources in the vicinity of a proposed source that must offset the emissions increase from the new source or modification and provide a net air quality benefit. The purpose for requiring offsetting emissions decreases is to allow for some industrial growth in an area without interfering with progress toward attainment of the national ambient air quality standards.

Minor Construction Permits

Minor new source review is for pollutants from stationary source projects that do not require prevention of significant deterioration or nonattainment new source review permits. The purpose of minor new source review permits is to prevent accumulation of minor emissions increases that would interfere with attainment or maintenance of national ambient air quality standards or violate the control strategy in nonattainment areas. Minor new source review permits often contain permit conditions that will limit the source's emissions to avoid becoming subject to the prevention of significant deterioration or nonattainment new source review regulations. The permit conditions generally involve enforceable emission and/or operating limits that will ensure air quality protection. As a result, the permits usually contain record keeping, reporting, monitoring, and testing requirements to ensure compliance with the permit conditions.

MINOR CONSTRUCTION PERMITS HELP PREVENT AIR POLLUTION

A facility obtaining a minor new source review construction permit might, depending on the state's air permitting requirements, be required to conduct an air quality review using computer modeling to predict the effects that a facility might have on the ambient air. Whether or not a facility needs to model will depend on the rate of emissions increase, facility history, plant location, type of source, and emission point configurations, such as stack heights. A construction permit cannot be issued if the plant will cause or significantly contribute to predicted violations of any ambient air quality standard.

The public is given notice when a construction permit might be issued. Each state has different procedures for notification on minor new source review permits. Please check with the applicable state to verify the procedures.

New Source Performance Standards

New source performance standards establish technology-based standards that regulate criteria air pollutants from new or modified sources. These regulations were developed to assure that sources are installing the best-demonstrated technology to reduce emissions.

New source performance standards contain emission limits; control device or equipment requirements; and work practice, performance testing, monitoring, record keeping, notification, and reporting requirements. These regulations can be found in 40 CFR Part 60. For example, a work practice required under the new source performance standards subparts VV and VVa involves the implementation of a Leak Detection and Repair (LDAR) program. The purpose of the LDAR program is to reduce emissions of pollutants from equipment that is leaking (e.g., from valves, pumps, compressors, etc.). The LDAR program is designed to identify leaking equipment by requiring monitoring at specified regular intervals. Any leaking equipment must then be repaired or replaced within a specified time frame. Record keeping and reporting is also required by the LDAR program.

The following new source performance standards from 40 CFR Part 60 typically apply to biodiesel plants:

- **Subpart A – General Provision.** Sources subject to the requirements might be subject to all or only a portion of the general provisions.

- **Subpart Db – Industrial - Commercial - Institutional Steam Generating Units**
  - Units with a capacity more than 100 million Btu per hour (MMBtu/hr)
  - Includes boilers and thermal oxidizers/waste-heat recovery boilers
  - Built, reconstructed, or modified after June 19, 1984
  - Regulated pollutants
    - Nitrogen oxides, particulate matter, sulfur dioxide
    - Opacity

- **Subpart Dc – Small Industrial - Commercial - Institutional Steam Generating Units**
  - Units with a capacity of 10 MMBtu/hr or more and less than or equal to 100 MMBtu/hr
    - Includes boilers and thermal oxidizers/waste-heat recovery boilers
  - Built, reconstructed, or modified after June 9, 1989
  - Regulated pollutants
    - Particulate matter, sulfur dioxide
    - Opacity

- **Subpart Kb – Volatile Organic Liquid Storage Vessels**
  - Vessels with a capacity of 75 m^3 (approximately 19,800 gallons) or more
  - Built, reconstructed, or modified after July 23, 1984
  - Regulated pollutant
    - Volatile organic compounds

- **Subpart VV – Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry (SOCMI) for which Construction, Reconstruction, or Modification Commenced After January 5, 1981, and on or Before November 7, 2006**
  - Affected facilities in the synthetic organic chemicals manufacturing industry (note: glycerol is on the list of regulated synthetic organic chemicals)

- Built, reconstructed, or modified after January 5, 1981, and on or before November 7, 2006
- Regulated pollutant
  - Volatile organic compounds

- **Subpart VVa – Equipment Leaks of VOC in the Synthetic Organic Chemical Manufacturing Industry (SOCMI) for which Construction, Reconstruction, or Modification Commenced After November 7, 2006**
  - Affected facilities in the synthetic organic chemicals manufacturing industry (note: glycerol is on the list of regulated synthetic organic chemicals)
  - Built, reconstructed, or modified after November 7, 2006
  - Regulated pollutant
    - Volatile organic compounds

- **Subpart NNN – VOC Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations**
  - Affected facilities in the synthetic organic chemicals manufacturing industry (note: glycerol is on the list of regulated synthetic organic chemicals)
  - Built, reconstructed, or modified after December 30, 1983
  - Regulated pollutant
    - Volatile organic compounds

- **Subpart RRR – VOC Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes**
  - Affected facilities in the synthetic organic chemicals manufacturing industry (note: glycerol is on the list of regulated synthetic organic chemicals)
  - Built, reconstructed, or modified after June 29, 1990
  - Regulated pollutants
    - Volatile organic compounds

- **Subpart IIII – Stationary Compression Ignition Internal Combustion Engines**
  - Owners and operators of stationary compression ignition internal combustion engines that begin construction (for this regulation, the date that construction begins is the date the engine is ordered by the

owner or operator) after July 11, 2005 where the stationary compression ignition internal combustion engines are:
  - manufactured after April 1, 2006 and are not fire pump engines, or
  - manufactured as a certified National Fire Protection Association fire pump engine after July 1, 2006
- Owners and operators of stationary compression ignition internal combustion engines that modify or reconstruct their stationary compression ignition internal combustion engines after July 11, 2005.
- Regulated pollutants
  - Nitrogen oxides, particulate matter, carbon monoxide
  - Non-methane hydrocarbons (NMHC)
  - Sulfur oxides (through the use of lower sulfur fuels)

- **Subpart JJJJ – Stationary Spark Ignition Internal Combustion Engines**
  - Owners and operators of stationary spark ignition internal combustion engines that begin construction (for this regulation, the date that construction begins is the date the engine is ordered by the owner or operator) after June 12, 2006, where the stationary spark ignition internal combustion engines are manufactured:
    - On or after July 1, 2007, for engines with a maximum engine power greater than or equal to 500 HP (except lean burn engines with a maximum engine power greater than or equal to 500 HP and less than 1,350 HP):
    - On or after January 1, 2008, for lean burn engines with a maximum engine power greater than or equal to 500 HP and less than 1,350 HP;
    - On or after July 1, 2008, for engines with a maximum engine power less than 500 HP; or
    - On or after January 1, 2009, for emergency engines with a maximum engine power greater than 25 HP.
  - Owners and operators of stationary spark ignition internal combustion engines that begin modification or reconstruction after June 12, 2006.
  - Regulated pollutants
    - Nitrogen oxides, carbon monoxide and volatile organic compounds
    - Sulfur oxides (through the use of lower sulfur fuels)

Facilities should be aware of these rules during the planning stages of a new plant or modification. The New Source Performance Standards requirements may have influence over the equipment and control devices that will be installed.

National Emission Standards for Hazardous Air Pollutants

National emission standards for hazardous air pollutants regulate hazardous air pollutant emissions from stationary sources through technology-based standards, known as Maximum Achievable Control Technology (MACT) standards. MACT standards are designed to require that a given type of source install the best-demonstrated control technology available. New and existing facilities that fall within listed source categories and are major sources of hazardous air pollutants are subject to the MACT standards (although, there are a few MACT standards that include area sources). A major source of hazardous air pollutants has the potential to emit 10 tons per year of a single pollutant or 25 tons per year of a combination of pollutants. There are 187 regulated hazardous air pollutants. A list of them can be found at:

http://www.epa.gov/ttn/atw/orig189.html

MACT standards contain emission limits; control device or equipment requirements; and work practice, performance testing, monitoring, recordkeeping, notification, and reporting requirements. MACT standards can be found in 40 CFR Part 63. The following MACT standards might apply to biodiesel plants.

- **Subpart A –** **General Provisions.** Sources subject to MACT requirements might be subject to all or portions of the general provisions.

- **Subpart B –** **Case-by-Case MACT.** Major hazardous air pollutant sources that construct or reconstruct and are not already covered by a MACT must obtain a construction permit with a case-by-case MACT.

- **Subpart FFFF – Miscellaneous Organic Chemical Manufacturing**
  - Major hazardous air pollutant sources that operate miscellaneous organic chemical manufacturing process units.
  - Compliance date
    - Existing sources – May 10, 2008
    - New sources
      - Startup before November 10, 2003 – comply by November 10, 2003
      - Startup after November 10, 2003 – comply upon startup

Subpart GGGG – Solvent Extraction for Vegetable Oil Production

- Major hazardous air pollutant sources using an organic solvent, such as hexane, to extract vegetable oil from oil seeds such as soybean, corn germ, safflower etc.

- Compliance date
  - Existing sources – April 12, 2004
  - New sources
    - Startup before April 12, 2001 – comply by April 12, 2001
    - Startup after April 12, 2001 – comply upon startup

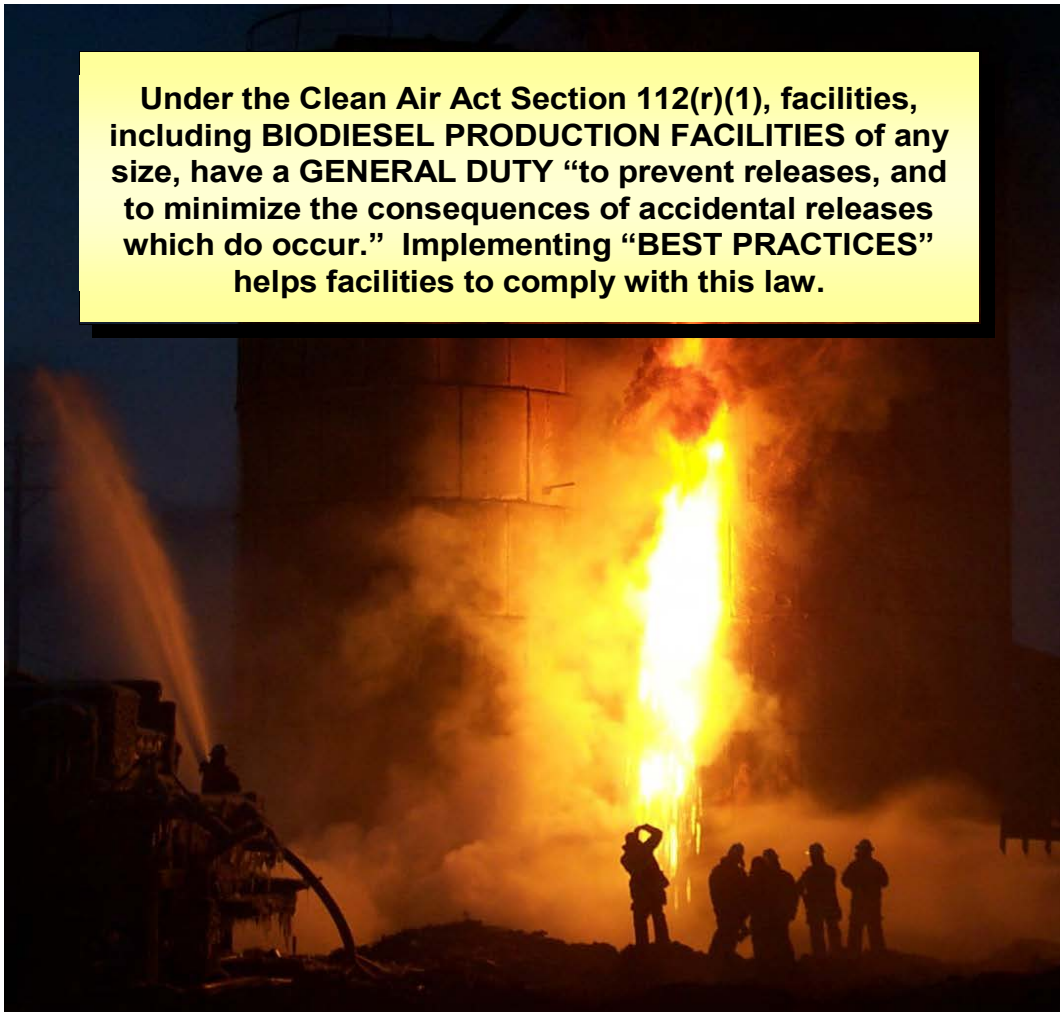
- **Subpart ZZZZ – Reciprocating Internal Combustion Engines**
  - An affected source is any existing, new or reconstructed stationary reciprocating internal combustion engine (RICE) located at a major or area (not a major) source of hazardous air pollutant emissions.
  - Major Sources
    - Compliance date
      - Existing stationary RICE greater than 500 brake horsepower (HP) located at a major source of HAP emissions – comply by June 15, 2007.
      - New or reconstructed stationary RICE greater than 500 brake HP located at a major source of HAP emissions which started up before August 16, 2004 – comply by August 16, 2004.
      - New or reconstructed stationary RICE greater than 500 brake HP located at a major source of HAP emissions which started up after August 16, 2004 – comply upon start up.
      - New or reconstructed stationary RICE less than or equal to 500 brake HP located at a major source of HAP emissions, which started up before January 18, 2008 – comply no later than January 18, 2008.
      - New or reconstructed stationary RICE less than or equal to 500 brake HP located at a major source of HAP emissions, which started up after January 18, 2008 – comply upon start up.
  - Area (not major) Source
    - Compliance date
      - New or reconstructed stationary RICE located at an area source of HAP emissions which started up before January 18, 2008 – comply by January 18, 2008
      - New or reconstructed stationary RICE located at an area source of HAP emissions which started up after January 18, 2008 – comply upon start up

- **Subpart DDDDD – Industrial, Commercial, and Institutional Boilers and Process Heaters**
  - This rule was vacated on June 8, 2007, by the U.S. Court of Appeals for the District of Columbia.

It is essential for a facility to be aware that MACT standards might apply to their plant prior to construction. Facility operators who construct after a rule is proposed that will apply to the facility must be in compliance with that rule by the time they begin operation of the plant.

Risk Management Program Considerations

The Risk Management Program is a requirement of 40 CFR Part 68 under the Clean Air Act Section 112(r). The purpose of this program is to prevent catastrophic accidents involving extremely hazardous chemicals. Consideration of these regulations during the planning and design of a biodiesel plant could save the facility from costly after-construction retrofits. See Chapter 2, Page 31, for more information about the Risk Management Program.



1.5 Resource Conservation and Recovery Act

CHECK THE REGULATIONS TO SEE IF A PERMIT IS REQUIRED FOR THE MANAGEMENT OF HAZARDOUS WASTE AT YOUR FACILITY

Section 3005 of the Resource Conservation and Recovery Act (RCRA) requires facilities that treat, store, or dispose hazardous waste to obtain an operating permit from the state agency or EPA. Recognizing this could be a long and costly effort for facilities that want only to properly manage their own hazardous waste, the EPA wrote regulations for hazardous waste generators that would exempt them from the permitting requirements yet ensure proper disposition of the hazardous wastes. These regulations, found at 40 CFR 262.34, place certain restrictions on the hazardous waste generator yet allow specific on site management of the hazardous waste. Compliance with the requirements of Section 262.34 allows facilities to safely manage their hazardous waste without obtaining a permit. Violating these standards is equivalent to managing hazardous waste without a permit.

These exemptions allow facilities to treat hazardous waste in limited circumstances and accumulate hazardous wastes for specific reasonable periods prior to shipping off site to a permitted treatment, storage and disposal facility (TSDF). Disposal remains limited to a permitted TSDF.

In addition to the exemptions, a facility that will generate (or accumulate in Missouri) hazardous waste in quantities greater than 100 kg in any calendar month (25 kg per month in Kansas) must notify the state and obtain a generator identification number. In the Region 7 State of Iowa, generators must contact the EPA rather than the state. The ID number will begin with the state abbreviation followed by a letter or numeral and then nine numerals; for example NED123456789. Such notification may be accomplished by submitting EPA Form 8700-12, Notification of Regulated Waste Activity. This form is available on the Internet at www.epa.gov/osw/inforesources/data/form8700/forms.htm.

The hazardous waste generator regulations are discussed in greater detail in Chapter 2, Section 2.3.

1.6 Pollution Prevention Act

Pollution prevention is the practice of eliminating or reducing waste at its source. Literally, the effort is to stop something from becoming waste in the first place. Pollution prevention includes these practices:

- Modify production processes
- Promote the use of non-toxic or less-toxic substances
- Implement conservation techniques; and
- Re-use materials rather than putting them into the waste stream

LOGO FOR EPA'S POLLUTION PREVENTION PROGRAM

The pollution prevention website, http://www.epa.gov/p2/ , identifies resources that will enable a business to strengthen the bottom line – producing better products and increasing profits.

Pollution Prevention On-Line
http://www.epa.gov/p2/

Where you live – Regional and state contacts for information and assistance

Grants and funding – Funds given to states and tribes that in turn provide support to local businesses

Laws and policies – Explanation of the Pollution Prevention Act of 1990 with links to supporting policies

Partnerships – EPA's voluntary programs that promote sustainable business practices, cleaner technologies/processes and safer products

Technical Assistance – Services, case studies and technical support that helps businesses enhance their pollution prevention programs

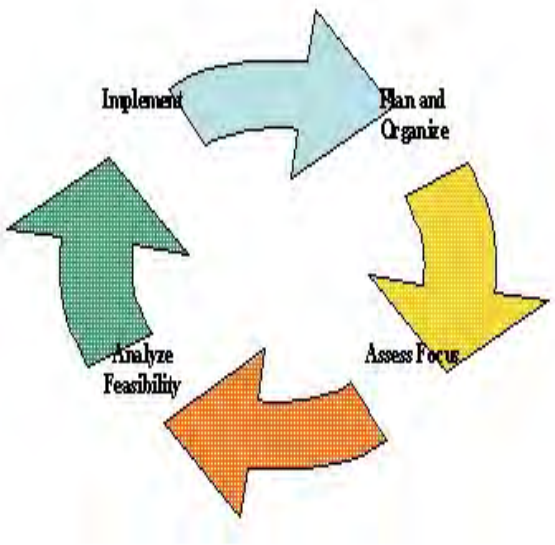
Tools – Databases, case studies measuring results and on-line calculators

Publications – Sources for fact sheets, case studies and activities

Pollution Prevention Opportunities

A pollution prevention program includes a systematic process that identifies ways to reduce or eliminate waste. The four process phases are:

1. Plan and Organize
2. Assess Focus
3. Analyze Feasibility, and
4. Implement



The first phase is plan and organize. This includes the careful review of a business' operations and non-product. The output of this phase is the selection of a particular unit operation or waste stream for further analysis.

The second phase is assess focus. During this phase, a number of options with the potential to minimize the waste are developed and screened. The output from this phase is specific activities for further analysis.

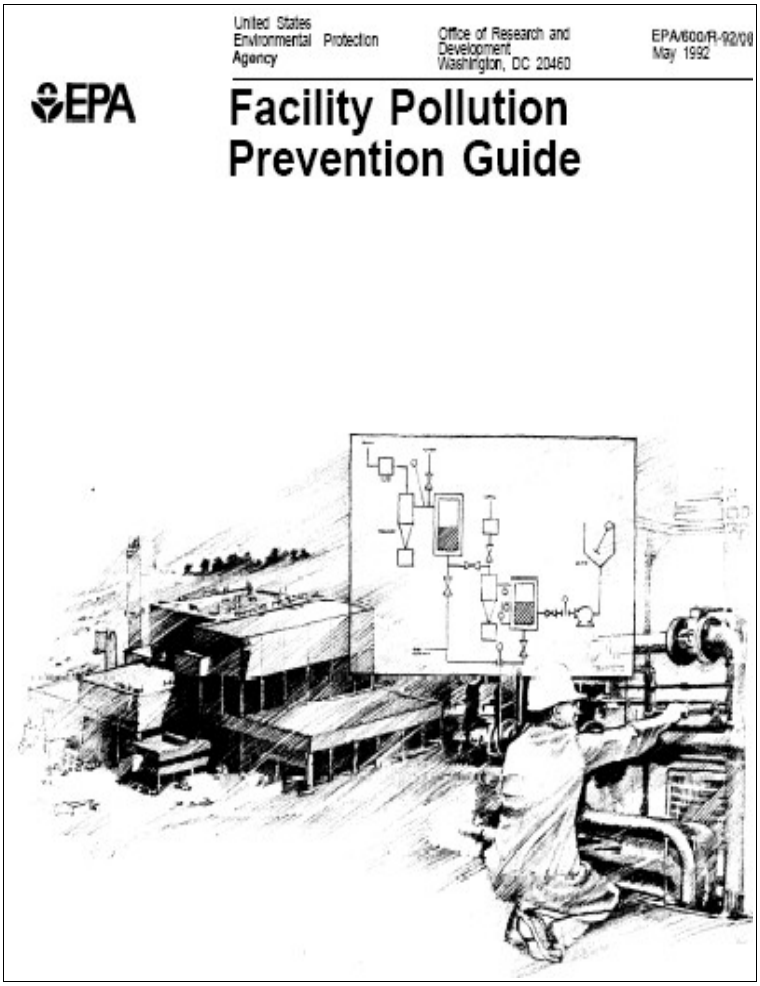
Technical and financial considerations are emphasized during the feasibility phase. The most promising options are selected for the final implementation phase.

Pollution Prevention Insights and Best Practices

EPA Region 7 tasked the expert researchers at the Pollution Prevention Resource Information Center (http://www.P2RIC.org) to provide updates on the science and best practices of biofuels production. Findings are summarized in Appendix G, and are intended to assist businesses with pollution prevention strategies.

More Pollution Prevention Information

The EPA's "Facility Pollution Prevention Guide" (publication number EPA/600/R-92/088) contains step-by-step directions and pollution prevention assessment forms to help businesses with this entire process.

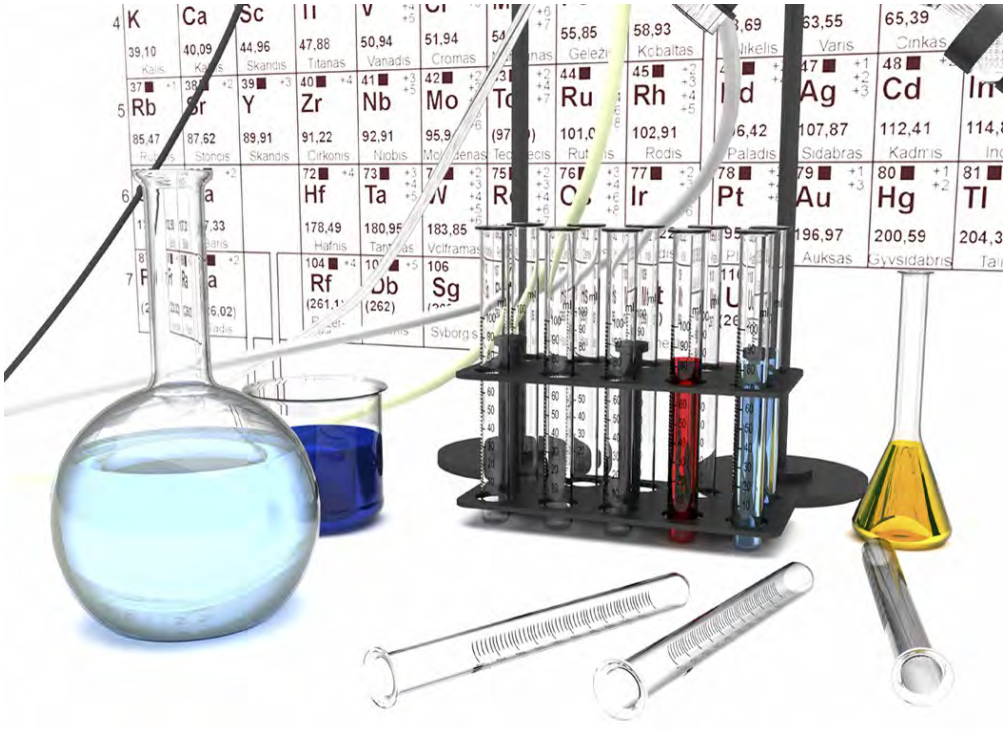


This guide is available on-line at http://www.p2pays.org/ref/01/00370.pdf . The P2Pays website is maintained by the North Carolina Department of Environment and Natural Resources.

1.7 Toxic Substances Control Act

The Toxic Substances Control Act (TSCA), enacted by Congress in 1976, gives EPA broad authority to identify and control chemical substances that may pose a threat to human health or the environment. EPA's New Chemicals Program, located in the Office of Pollution Prevention and Toxics, was established to help manage the potential risk from chemical substances [including genetically modified (intergeneric) microorganisms] new to the marketplace, and addresses this mandate under Section 5 of TSCA.

Under TSCA, EPA classifies chemical substances as being either "existing" or "new." To determine if a substance is a "new" chemical, consult EPA's Nonconfidential TSCA Chemical Substance Inventory -- commonly referred to as the Inventory, which lists "existing" substances. Potential submitters are advised to submit a bona fide notice of intent to manufacture or import a chemical substance to the Agency to determine if the chemical is listed on the confidential TSCA Inventory.



Anyone who plans to manufacture or import a new chemical substance for a non-exempt commercial purpose is required by Section 5 of TSCA to provide EPA with notice before initiating the activity. This premanufacture notice, or PMN, must be submitted at least 90 days prior to the manufacture or import of the chemical.

Some new chemical substances are not subject to PMN reporting. These substances are either (1) excluded from TSCA reporting or (2) exempt from all or part of PMN reporting because EPA has determined that they do not warrant review or require only a short review. EPA does not review new substances in the following product categories, which are excluded from TSCA authority at Section 3(2)(B) of the Toxic Substances Control Act: tobacco and certain tobacco products, nuclear materials, munitions, foods, food additives, drugs, cosmetics, and substances used solely as pesticides. These substances fall under the jurisdiction of other federal laws and are reviewed by other federal programs. Substances used solely as pesticides are reviewed by a separate EPA Pesticides Program.

In addition, the following are excluded from PMN reporting under certain conditions: naturally-occurring materials, products of incidental reactions, products of end-use reactions, mixtures (but not mixture components), impurities, byproducts, substances manufactured solely for export, nonisolated intermediates, and substances formed during the manufacture of an article. See 40 CFR Section Section 710.4(b) and 720.30(a)-(h) for more information about exclusions from PMN reporting.

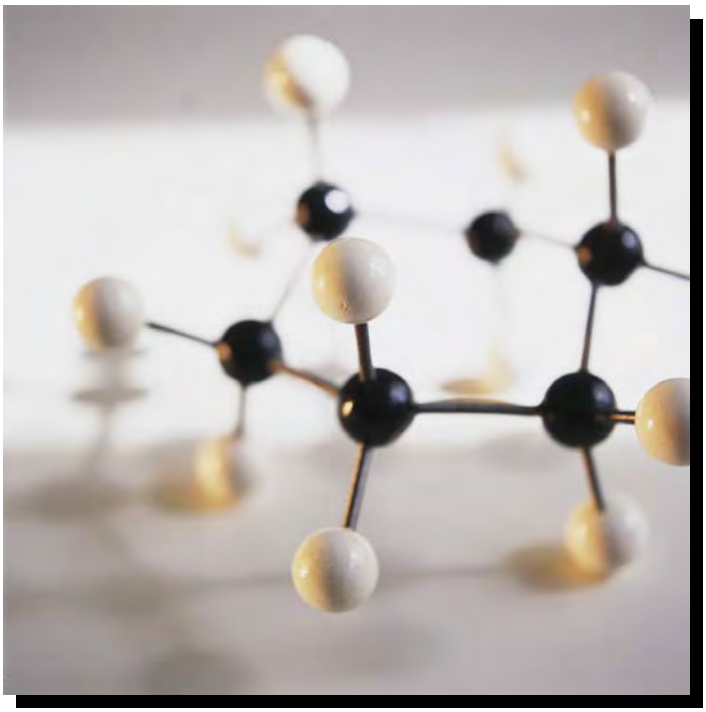
EPA has limited or no reporting requirements for new chemical substances in the following cases: low volumes (less than 10,000 kilograms per year), low releases and exposures, test marketing, polymers, research and development. See http://www.epa.gov/oppt/newchems/ for more information on these exemptions and on the TSCA new chemicals process, including the TSCA Inventory and whether a notice is required.

Naturally occurring chemical substances are implicitly included on the TSCA Inventory. Any chemical substance which is naturally occurring and which is unprocessed, processed only by 1) manual, mechanical, or gravitational means, 2) dissolution in water, 3) flotation, or 4) heating solely to remove water, or which is extracted from air by any means, will automatically be included in the Inventory. Examples of such substances are raw agricultural commodities; water, air, natural gas, and crude oil; and rocks, ores, and minerals.

New Genetically Engineered Microbes

Under a 1986 intergovernmental policy statement, intergeneric microorganisms are considered new chemicals under TSCA Section 5. A 1997 biotechnology rule sets forth the manner in which the Agency reviews and regulates the use of intergeneric microorganisms in commerce, or commercial research. Microorganisms subject to this rule are "new" microorganisms used commercially for such purposes as production of industrial enzymes and other specialty chemicals; agricultural practices such as biofertilizers, and breakdown of chemical pollutants in the environment.

The 1997 rule continues the interpretation of "new" microorganism first put forth by EPA in 1986. "New" microorganisms are those microorganisms formed by combining genetic material from organisms in different genera (intergeneric). A genus (pl. genera) is a level in a classification system based on the relatedness of organisms. EPA believes that intergeneric microorganisms have a sufficiently high likelihood of expressing new traits or new combinations of traits to be termed "new" and warrant review. Microorganisms that are not intergeneric would not be "new", and thus would not be subject to reporting under Section 5 of TSCA. These regulations create a reporting vehicle specifically designed for microorganisms, the Microbial Commercial Activity Notice (MCAN). Like the PMN, persons intending to use intergeneric microorganisms for commercial purposes in the United States would submit an MCAN to EPA at least 90 days before such use. EPA has 90 days to review the submission in order to determine whether the intergeneric microorganism may present an unreasonable risk to human health or the environment.



How Biodiesels Fit under TSCA

Biodiesels often vary with the source, and most biodiesels are processed in a way that they do not fit the "naturally occurring" criterion of the TSCA Inventory. Some biodiesels will be made using techniques, such as metabolic engineering, that require the use of intergeneric microbes, thus making the microbes subject to TSCA. Biodiesels generally would fit a classification called UVCB, or "Unknown or Variable compositions, Complex reaction products and Biological materials."

Substances on the TSCA Inventory are divided into two classes for ease of identification:

- Class 1 substances are those single compounds composed of molecules with particular atoms arranged in a definite, known structure. Examples of Class 1 substances include: acetone, iron, benzene and dimethylmercury. These substances have discrete molecular formulas and fully-defined structural diagrams

- Many commercial substances that are subject to TSCA are not Class 1 substances. They may have unknown or variable compositions or be composed of a complex combination of different molecules. These are designated Class 2 substances.

  Biodiesels fit into a subgroup of Class 2 substances, called UVCB. The UVCBs include substances that have no definite molecular formula representations and have either partial/indefinite structural diagrams or no structural diagrams. Each name for a UVCB substance includes more than one molecular entity: as such, each UVCB can be considered to be a category of molecules, often closely related.

See http://www.epa.gov/opptintr/newchems/pubs/invntory.htm for more information on the TSCA Inventory.

See http://www.epa.gov/oppt/biotech/index.htm for more information on the TSCA Biotechnology Program, and also "Microbial Products of Biotechnology; Final Regulation Under the Toxic Substances Control Act," Federal Register: April 11, 1997 (Volume 62, Number 70) pp. 17909-17958.

CHAPTER 2

WHAT ENVIRONMENTAL LAWS APPLY TO OPERATING A BIODIESEL PLANT?

This chapter discusses environmental laws and regulations that might apply to the operation of a biodiesel production facility.

Photo courtesy of Healy Biodiesel

2.1 Clean Water Act

A biodiesel production facility typically uses water for cooling and for washing the biodiesel product to remove impurities. Some small biodiesel operators may use resin instead of water to remove impurities, discussed in Pollution Prevention Appendix G of this manual. Those facilities using water will generate wastewater, which can include cooling tower blowdown, boiler blowdown, and water softener discharge. These wastewater streams are not concentrated wastes. The washwater contains glycerin, methanol, unreacted feed oils, and some biodiesel. The washwater is a high strength waste.

In addition, stormwater runoff from the facility may be contaminated from precipitation (rain or snow) coming in contact with facility operations and requires adequate control and management.

Wastewater Discharge Permits

Wastewater from a biodiesel facility can be disposed in various ways. The method of disposal determines what kind of permit is needed and what permitting authority will issue it. In general, there are three alternatives for the disposal of wastewater:

- Direct discharge to a receiving stream
- Discharge to a municipal wastewater treatment system
- Land application

Permits for Disposal Directly to a Water Body

Any discharge directly into a water body—for example, a stream, river, or lake; or by conveyance by a pipe or culvert to a water body, must be permitted prior to discharge. In Region 7, these permits are issued by the state in which the biodiesel facility will be located under the National Pollutant Discharge Elimination System (NPDES), the federal water pollution control program created by the Clean Water Act.

DIRECT DISCHARGE OF WASTE INTO A SURFACE WATER BODY CONTRIBUTES TO WATER POLLUTION

An NPDES permit regulates the amount of pollutants that can be discharged. The permit writer will establish limits in the permit that protect the water quality of the receiving water body. In addition to numeric effluent limitations, NPDES

permits will include monitoring, reporting, and record keeping requirements. Permits are required whether or not on-site treatment occurs.

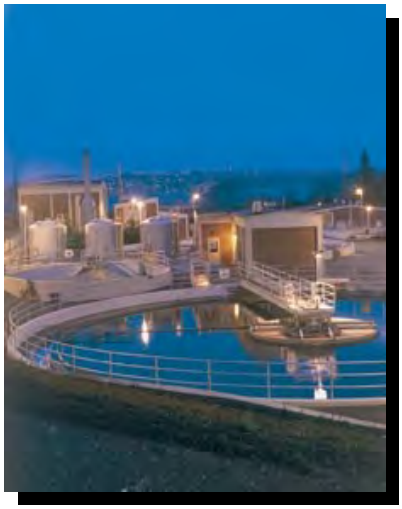
To receive an NPDES permit, a written application must be made with the respective state agency 180 days prior to commencing discharge. The application will consist of multiple forms covering different aspects of the discharge. In general, the application forms will include:

- General Information
- Existing Industrial Wastewater
- New Source and New Discharger Industrial Wastewater
- Non-Process Wastewater only
- Stormwater Discharges Associated with Industrial Activity

For further information, refer to the state contact information in Appendix A under CWA National Pollutant Discharge Elimination System (NPDES) Permits.

Permits to Discharge to a Municipal Wastewater Treatment System

Most of the larger cities in Region 7 (Iowa, Kansas, Missouri, and Nebraska) implement an EPA or state-approved pretreatment program to prevent wastewater discharges from having a deleterious affect on their treatment plant, collection system, and the water body into which they discharge. Cities with pretreatment programs issue permits to significant industrial users, which are those facilities that discharge a minimum of 25,000 gallons per day of wastewater, 5% of the receiving wastewater treatment plant's capacity, or have been determined by the city to have significant potential to affect their plant and its operations. The city will require a permit application be filed with the city pretreatment coordinator prior to discharge. The amount of time required for the permit application to be filed prior to discharge can vary but may be as long as 180 days. The pretreatment permit will contain numeric limits based on local treatment plant capabilities and environmental conditions. In addition, the permit will also contain monitoring, reporting, and record keeping requirements.



DETERMINE WHETHER PRETREATMENT PERMIT REQUIREMENTS APPLY TO YOUR FACILITY

To determine if your city has a pretreatment program, either contact the city's Public Works Department or contact the state pretreatment coordinator listed in Appendix A of this document. For discharges to cities that are too small to implement a pretreatment program, the state is the permitting authority. Depending on the state in which the facility is located, you may be required to obtain a discharge permit or enter into a treatment agreement with the municipality receiving the wastewater. To determine if you will be required to apply for a permit, contact the state pretreatment coordinator listed in Appendix A under CWA Pretreatment Program.

Biodiesel washwater and crude glycerin (with or without methanol recovery) have a very high Biochemical Oxygen Demand (BOD) and are considered a high strength waste if discharged to a municipal treatment plant. As an example, normal household wastewater has a BOD of 200 mg/L. Washwater containing small amounts of glycerin and methanol can have a BOD of 10-15,000 mg/L. Pure glycerin and methanol have a BOD of about 1,000,000 mg/L. Discharge of these wastes to a treatment plant with inadequate treatment capacity can crash the treatment process so that an entire community's waste goes untreated. Glycerin and methanol are highly biodegradable and, if properly equalized and loaded to a large enough plant with enough organic capacity, can be a treatable waste.

Most methanol left over from the biodiesel process is in the crude glycerin. EPA strongly encourages the recovery of methanol and the beneficial use of crude glycerin from biodiesel production. Regardless of whether methanol is recovered, the producer must make a hazardous waste determination on the waste glycerin. If methanol is not recovered from the glycerin, then the producer should likely make a positive hazardous waste determination prior to disposal since the flash point of the mixture is likely less than 140ºF. See the hazardous waste discussion on Chapter 2, Page 17, for more information.

Permits for Land Application for Wastewater Disposal

There are no federal regulations that apply to wastewater that is properly disposed by land application. However, land application of wastewater may be covered by an NPDES permit (stormwater or non-stormwater) where it is determined that pollutants run off the application site to a water of the U.S. In Region 7, states administer programs that establish proper land application

CHECK WITH YOUR STATE BEFORE APPLYING WASTEWATER TO LAND

procedures to ensure that wastewater is applied at agronomic rates, which are rates that plants assimilate the nutrients in the wastewater without pollutant loss through runoff. For more information about land application, contact the state officials that are listed in Appendix A under CWA National Pollutant Discharge Elimination System (NPDES) Permits. Land application of a hazardous waste is prohibited unless that waste water is discharged pursuant to a Clean Water Act permit. In addition, land application of crude glycerin (as opposed to wastewater) is environmentally risky.

See Appendix B of this document for more discussion of land application of glycerin.

Industrial Stormwater Permits

Industrial activity, by its very nature, can create pollution problems if not controlled. Therefore, industrial facilities must obtain stormwater permits during plant operation in addition to construction permits described in Chapter 1, Section 1.2.

BEFORE BEGINNING CONSTRUCTION, CHECK WITH YOUR STATE ABOUT STORMWATER PERMIT REQUIREMENTS

EPA's NPDES regulations require that a stormwater permit be obtained for discharges to waters of the United States from certain industrial activities including biodiesel manufacturing. These stormwater discharges may be covered under the NPDES permit issued for controlling process and other plant discharges, or they may be covered by a separate stormwater-only NPDES permit. Stormwater-only discharges are typically covered under a general permit issued by the state environmental department.

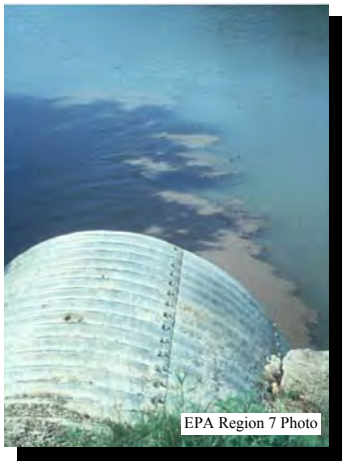
Similar to the stormwater construction permit, industrial stormwater general permits require submission of a simplified application, for example, a Notice of Intent. These permits also require development and implementation of a plan, often called a stormwater pollution prevention plan, to control discharges of pollutants from the facility during operation. In some instances, these general permits may include numeric effluent limitations and monitoring and reporting requirements. Stormwater controls are needed for areas of the facility exposed to precipitation, such as industrial plant yards, material and waste handling, storage

areas, shipping and receiving areas, and areas of the site where past materials/residuals still exist.

Permit application due dates vary by state in advance of commencement of discharge from these industrial activities. Individual stormwater applications are due at least 180 days prior to commencement of a stormwater discharge associated with industrial activity. The state and EPA Regional contacts for industrial storm water permitting are listed in Appendix A of this document.

Spill Prevention, Control and Countermeasure Regulations

The purpose of the Spill Prevention, Control and Countermeasure regulation is to prevent discharges of oil into navigable waters or adjoining shorelines. The regulation can be found at 40 CFR Part 112 and is implemented by the EPA.



DISCHARGED OIL INTO NAVIGABLE WATERS

A biodiesel facility is subject to this regulation if:

- It is non-transportation related
- It has a total above-ground oil storage capacity greater than 1,320 gallons or a completely buried oil storage capacity greater than 42,000 gallons; and
- There is a reasonable expectation of an oil discharge into or upon navigable waters of the U.S. or adjoining shorelines.

When calculating oil storage capacity, the facility is required to include:

- Storage capacity for oil of any kind in any form as defined in 40 CFR 112.2. This includes oils such as soybean oil, biodiesel, diesel, and animal fats.
- Oil storage and other oil-filled equipment, such as oil-filled transformers

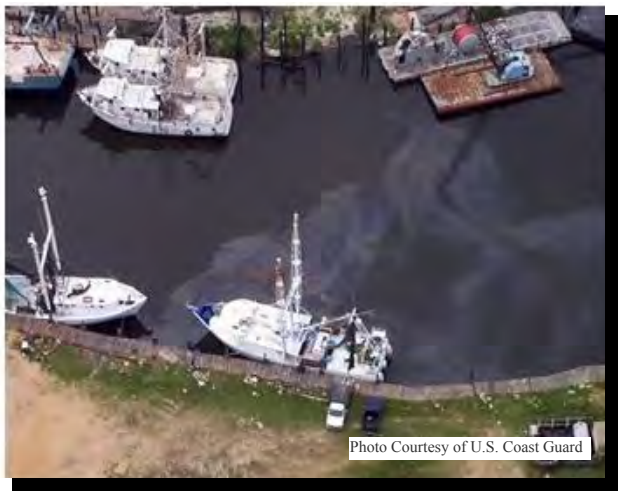
When calculating oil storage capacity, the facility should not include:

- Containers with a capacity of less than 55 gallons
- Completely buried tanks that are subject to all the technical requirements of the Underground Storage Tank Regulation (40 CFR Part 280), or technical requirements of a state underground storage tank program approved under 40 CFR Part 281

- Containers that are permanently closed, as defined in 40 CFR 112.2
- Parts of the facility used exclusively for wastewater treatment and not used to satisfy any requirements of 40 CFR Part 112; or
- Motive power containers, as defined in 40 CFT 112.2

A "reasonable expectation" that the facility could discharge oil into or upon navigable waters is based upon the location of the biodiesel plant. The plant's location relative to streams, ponds, ditches, storm or sanitary sewers, wetlands, mud flats, sand flats, or rivers should be considered. The distance to navigable waters, volume of materials stored, worst-case weather conditions, drainage patterns, land contours, soil conditions, etc., must be taken into account. Man-made features such as dikes, equipment or other structures which may serve to restrain, hinder, contain, or prevent an oil discharge may NOT be considered in the "reasonable expectation" determination [40 CFR 112.1(d)(1)(i).]

Facilities that are subject to the oil spill prevention regulation must prepare and implement a spill prevention plan. The owner or operator of a facility existing on or before August 16, 2002, must maintain and implement the current plan and amend and implement a plan revised to meet the 2002 rule amendments on or before July 1, 2009. The owner or operator of a facility that became operational after August 16, 2002, must prepare and implement a plan on or before July 1, 2009, or before beginning operations, whichever is later.



OIL SHEEN ON NAVIGABLE WATERS

A facility that transfers oil over water, to or from vessels, and has a total oil storage capacity of 42,000 gallons or more, and a facility that has a total storage capacity of 1 million gallons or more, might be subject to the Facility Response Plan requirements in 40 CFR 112, Subpart D. For additional information about Facility Response Plans, see Appendix F, "Do I need a Facility Response Plan?"

Reporting Oil Discharges

Oil discharges must be "immediately" reported to the National Response Center if they are in a quantity that "may be harmful" according to the Clean Water Act Section 311(b)(4) and 40 CFR 110.6.

OIL SHEEN ON NAVIGABLE WATERS

An oil discharge must be reported to the National Response Center if it:

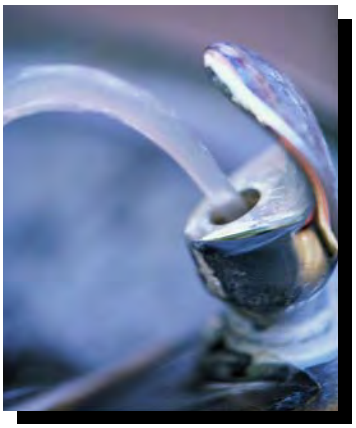
- Violates applicable water quality standards
- Causes a film or sheen upon or discoloration of the surface of the water or adjoining shoreline, or
- Causes a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shoreline

National Response Center Phone Number
800-424-8802

2.2 Safe Drinking Water Act

The Public Water System Supervision Program

If your facility uses its own water supply source to provide drinking water to 25 or more people per day for at least 60 days of the year, then you are required by the Public Water System Supervision Program to obtain permits for the construction/modification and operation of the water supply system. Even if you only use your own water source for supplying cooling or industrial processing water, there are several state-issued water-supply related permits that might be required. These include:



PERMITS MAY BE REQUIRED TO PROVIDE DRINKING WATER TO YOUR FACILITY

- **Water Use Permit -** Withdrawing or using water from a surface or underground source typically requires a water use permit, depending on the volume of water that will be used daily. Any increase in water withdrawal/use could require a modification to an existing water use permit.

- **Well Construction Permit -** Drilling a new well or modifying an existing well requires a well construction permit.

- **Operator Certification** – Every public water system must be operated by a trained and qualified operator who is responsible for the quality of the water and meeting the regulatory requirements. States have programs for training and certifying operators at a level appropriate to the level of water treatment at the facility. It is the responsibility of the water system owner to have a certified operator in charge.

- **Routine testing** – Your drinking water must be tested for compliance with all the federal and state drinking water standards. The cost of sampling and analysis is the responsibility of the water system owner. Standards are set for microbiological contaminants, man-made chemicals and pesticides, naturally-occurring inorganics, and contamination caused by human activity, such as lead and nitrates. There are also requirements for operational testing, record-keeping and reporting, correction of sanitary deficiencies, and notification of the public when problems occur.

It is important that facilities planning to develop their own water supply or modify their existing source(s) first check with the state environmental, health or natural

resources office listed in the public water system supervision section of Appendix A to ensure that all of the necessary permits are in place before proceeding.

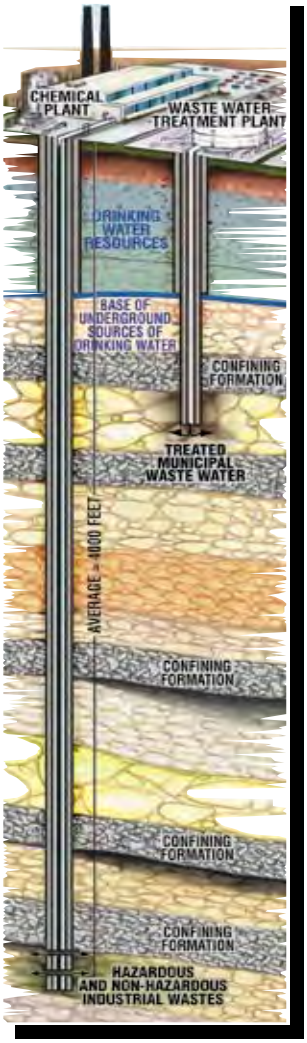
If your facility is using water from an existing water supply system such as a municipal water supply for your drinking water source, then the Public Water System Supervision Program does not apply. However, if you also plan to use this existing water supply as the source of cooling or industrial processing water, you should check with the system operator to make sure the system can provide a sufficient quantity of water for your needs. This is important for industries which need large quantities of water for manufacturing or processing.

The Underground Injection Control Program

The Underground Injection Control program regulates wells that are used by cities, agriculture, business and industry to inject fluids underground for disposal, hydrocarbon production and storage, or mineral recovery. The program defines an injection well as any bored, drilled or driven shaft or dug hole, where the depth is greater than the largest surface dimension of the well and is used to discharge fluids underground or a subsurface fluid distribution system. This definition covers a wide variety of injection practices that range from technically sophisticated and highly monitored wells that pump fluids into isolated formations up to two miles below the Earth's surface to the far more numerous on-site drainage systems, such as septic systems, cesspools, and storm water wells which discharge fluids a few feet underground. The program requirements are designed to ensure that injected fluids stay within the wells and the intended injection zones and do not endanger underground drinking water sources. No injection is authorized without approval from the appropriate regulatory authority.

Injection practices not regulated by the underground injection program include individual residential waste disposal systems that inject ONLY sanitary waste and commercial waste disposal systems that serve fewer than 20 persons that inject ONLY sanitary waste.

A biodiesel plant is subject to the requirements of the underground injection program if:



UNDERGROUND INJECTION IS REGULATED IN ORDER TO PROTECT UNDERGROUND DRINKING WATER SOURCES

- it is disposing of storm water, cooling water, industrial or other fluids into the subsurface via an injection well; or
- it has an on-site sanitary waste disposal system; for example, a septic system that serves or has the capacity to serve 20 or more people; or
- it has an on-site sanitary waste disposal system that is receiving other than a solely sanitary waste stream, regardless of its capacity; or
- it is undergoing a remediation process where fluids are being introduced into the subsurface via an injection well to facilitate or enhance the cleanup.

Facilities that discharge fluids to streams, ponds, lagoons, or treatment facilities are not subject to the provisions of the underground injection program but could be regulated by the Clean Water Act.

It is important that facilities planning on using a new injection well or modifying an existing one check with the state environmental, health or natural resources office listed in the underground injection section of Appendix A to make sure that all of the necessary permits or approvals are in place before proceeding.

2.3 Resource Conservation and Recovery Act – Solid and Hazardous Waste

The three "Rs" of resource conservation are: Reduce, Reuse, and Recycle. These are the most effective ways to not generate waste. When a facility is unable to do one of those things, it generates solid waste that might be a hazardous waste. Most biodiesel plants will probably generate some quantities of waste. Some of the waste will be considered a "solid waste" subject to Subtitle D of the Resource Conservation and Recovery Act (RCRA). Such waste is regulated by the state and local authorities with jurisdiction over the facility. Some of the solid waste could be "hazardous waste" subject to Subtitle C of RCRA. Hazardous waste will be regulated by the same state authorities and the EPA as well. In the states of Alaska and Iowa, only the EPA regulates hazardous waste.

EPA RECOMMENDS MINIMIZING WASTE GENERATION BY REDUCING, REUSING, AND RECYCLING WASTE

Definition of Solid Waste

The term "solid waste" is defined at 40 CFR 261.2(a)(1): "A solid waste is any discarded material that is not excluded by § 261.4(a) or that is not excluded by variance granted under §§ 260.30 and 260.31." A solid waste can include solid materials, liquids, and contained gases. The definition of discarded material includes:

- Abandoned material (including burned, disposed, or discarded materials)
- Recycled material (including accumulated, stored, or treated materials)[1]
- Inherently waste-like material (materials managed as wastes), and
- Military munitions, as defined

If a material meets the above definition, it is a solid waste; but there are many exclusions from this definition in the regulations. To determine if a material is a solid waste, the generator of that material must depend upon the regulations and not just a summary such as this. We will not delve into all the possible exclusions, but will discuss the exclusions that are pertinent to each waste stream that EPA has this far observed at biodiesel production facilities.

Solid wastes that are not "hazardous wastes" are regulated by state and local agencies. Each state has its own regulations for solid waste disposal.

Definition of Hazardous Waste

In order for a material to be a "hazardous waste" it first must be a "solid waste." Once it meets the definition of a solid waste, the generating facility is obligated by 40 CFR 262.11 to determine if the waste is hazardous. If a solid waste is listed by EPA or exhibits one of four different defined characteristics (ignitable, corrosive, reactive, or toxic), it is a hazardous waste. Each of the listed or characteristic hazardous wastes are identified with a waste code constituted by a letter followed by three numerals.

Listed Hazardous Waste

Listed wastes are wastes from generic industrial processes (F-listed), wastes from certain sectors of industry (K-listed), unused pure chemical products and formulations (U-listed), and acutely toxic unused pure chemical products and formulations (P-listed). Because these wastes are dangerous enough to warrant full Subtitle C regulation based on their origin, any waste fitting the narrative listing description is considered a listed hazardous waste.

[1]State agencies may regulate animal fats and used cooking oils and greases as solid waste. This could affect the status of glycerin and biodiesel as solid wastes under state regulations. Contact your state solid waste agency for more information.

There are three different criteria that EPA uses to decide whether or not to list a waste as hazardous. The three criteria are:

- The waste typically contains toxic chemicals at levels that could pose a threat to human health and the environment if improperly managed. Such wastes are known as toxic listed wastes.

- The waste contains such dangerous chemicals that it could pose a threat to human health and the environment even when properly managed. These wastes are fatal to humans and animals even in low doses. Such wastes are known as acute hazardous wastes.

- The waste typically exhibits one of the four characteristics of hazardous waste: ignitability, corrosivity, reactivity and toxicity.

In addition, EPA may list a waste as hazardous if it has cause to believe that, for some other reason, the waste typically fits within the statutory definition of hazardous waste developed by Congress.

Even if a waste is not listed, it can still be considered a hazardous waste if it has one of the four characteristics of being ignitable, corrosive, reactive, or toxic.

Ignitable Hazardous Waste

The ignitability characteristic identifies wastes that can readily catch fire and sustain combustion. Many paints, cleaners, and other industrial wastes pose such a hazard. Liquid and nonliquid wastes are identified differently within the ignitability characteristic.

Most ignitable wastes are liquid in physical form. EPA selected a flash point test as the method for determining whether a liquid waste is sufficiently combustible to require regulation as hazardous. The flash point test determines the lowest temperature at which the fumes above a waste will ignite when exposed to flame. Liquid wastes with a flash point of less than 60°C (140°F) in the specified closed-cup test are ignitable.

Many wastes in solid or nonliquid physical form, like wood or paper, can also readily catch fire and sustain combustion, but EPA did not intend to regulate most of these nonliquid materials as ignitable wastes. A nonliquid waste is considered ignitable only if it can spontaneously combust or catch fire through friction or absorption of moisture under normal handling conditions and can burn so vigorously that it creates a hazard. Unlike the specified flash point test for liquid wastes, the regulations do not require any specific test methods to definitively

ascertain if solid materials will spontaneously combust. EPA guidance document SW-846 provides various test methods relative to solid waste issues. Test methods 1030 and 1050 are recommended to help facilities determine if a solid phase, solid waste is ignitable. These test methods can be found at http://www.epa.gov/epaoswer/hazwaste/test/1_series.htm.

The October 20, 2003, *Federal Register (68 FR 59940)* provides questions for generators to consider when determining if their waste will spontaneously combust:

1. Have there been landfill or other fires attributable to disposal of the solid?
2. Have the solids been observed emitting smoke during any phase of waste management?
3. Have the solids been packaged or transported with a Department of Transportation (DOT) designation of pyrophoric or self-heating material?
4. Have the solids given a positive result in the DOT test for self-heating materials, 49 CFR 173.125(c)?

BIODIESEL FILTER MEDIA SPONTANEOUSLY COMBUSTING

5. Is there any information on an MSDS indicating the possibility of ignition due to friction, moisture absorption, or spontaneous ignition?
6. Have the solids ever been stored in special containers or under inert gas such as nitrogen?
7. Have the solids ever been stored in any other way so as to limit their exposure to the air, such as coating with oil or wetting with water?

Item number one above is sufficient by itself to indicate the material is a hazardous waste.

Certain compressed gases are also classified as ignitable. Finally, substances meeting the DOT's definition of oxidizer are classified as ignitable wastes. Ignitable wastes carry the waste code D001 and are among some of the most common hazardous wastes. The regulations describing the characteristic of ignitability are codified in 40 CFR 261.21.

Corrosive Hazardous Waste

The corrosivity characteristic identifies wastes that are acidic or alkaline (basic). Such wastes can readily corrode or dissolve flesh, metal, or other materials. They are also among some of the most common hazardous wastes. EPA uses two criteria to identify liquid and aqueous corrosive hazardous wastes. The first is a pH test. Aqueous wastes with a pH greater than or equal to 12.5, or less than or equal to 2, are corrosive. A liquid waste may also be corrosive if it has the ability to corrode steel under specific conditions. Physically solid, nonaqueous wastes are not evaluated for corrosivity. Corrosive wastes carry the waste code D002. The regulations describing the corrosivity characteristic are found in 40 CFR 261.22.

Reactive Hazardous Waste

The reactivity characteristic identifies wastes that readily explode or undergo violent reactions or react to release toxic gases or fumes. In many cases, there is no reliable test method to evaluate a waste's potential to explode, react violently, or release toxic gas under common waste handling conditions. Therefore, EPA uses narrative criteria to define most reactive wastes. The narrative criteria, along with knowledge or information about the waste properties, are used to classify waste as reactive.

A waste is reactive if it meets any of the following criteria:

- It can explode or violently react when exposed to water or under normal handling conditions
- It can create toxic fumes or gases at hazardous levels when exposed to water, or under normal waste handling conditions
- It can explode if heated under confinement or exposed to a strong igniting source, or it meets the criteria for classification as an explosive under DOT rules
- It generates toxic levels of sulfide or cyanide gas when exposed to a pH range of 2 through 12.5.

Wastes exhibiting the characteristic of reactivity are assigned the waste code D003. The reactivity characteristic is described in the regulations in 40 CFR 261.23.

Toxic Hazardous Waste

When hazardous waste is disposed in a land disposal unit, toxic compounds or elements can leach into underground drinking water supplies and expose users of the water to hazardous chemicals and constituents. EPA developed the toxicity characteristic (TC) to identify wastes likely to leach dangerous concentrations of toxic chemicals into ground water. The Toxicity Characteristic Leaching Procedure (TCLP) is used to determine if a waste will leach any of 40 different toxic chemicals in amounts above the specified regulatory levels. If the leachate sample contains a concentration above the regulatory limit for one of the specified chemicals, the waste exhibits the toxicity characteristic and carries the waste code associated with that compound or element. The regulations describing the toxicity characteristic are codified in 40 CFR 261.24 and the TC regulatory levels appear in Table 1 of that same section.

Typical Hazardous Wastes at a Biodiesel Production Facility

The following materials at a biodiesel plant may be hazardous. Each plant is responsible for determining if each waste stream is hazardous and managing it appropriately if it is hazardous.

Spent Filter Media

Spent filter media such as diatomaceous earth, filter aid, resins and socks can be ignitable (D001). EPA has observed that spent filter media with high moisture content (from oil or biodiesel) can spontaneously combust. It is the responsibility of the facility to operate their plant in a manner that will not generate ignitable waste filter media. This could include recovering more liquids from the filter media or mixing absorbents with the filter media prior to the

SPENT FILTER MEDIA FROM A BIODIESEL PLANT

point of generation. Treating a hazardous waste after it has been generated requires a RCRA permit.

The facility should explore options to prevent generation of ignitable hazardous waste. If the material is hazardous, the facility may manage the ignitable waste as a useful product and avoid RCRA regulation; but in order to maintain this exemption, the material may not be treated prior to use. Use as a fuel is not a legitimate use under the regulations unless the fuel is an actual product that results from the process. The facility may also dispose the ignitable filter media as a hazardous waste at a permitted treatment, storage, or disposal facility. Be aware that if it is a hazardous waste, the Land Disposal Restrictions (LDR) for underlying hazardous constituents, such as methanol, must be addressed. More on LDR on page 22 of this chapter.

If the generator (facility) determines the waste filter media is not hazardous, then the facility may manage it as a solid waste. Most states will not allow facilities to dispose liquids in solid waste landfills. The facility may use the paint filter test to determine if there are free liquids present in the waste. If waste filter media fails the paint filter test, that is there are free liquids present, it is likely an ignitable hazardous waste. More on paint filter test specifications may be found in EPA publication SW-846. Facilities are encouraged to explore the beneficial uses of filter aid media as an alternative to disposal.

Waste Methanol

Waste methanol is ignitable (D001). If the waste methanol is recycled into the process using a closed loop system, it is not a solid waste. If the waste methanol is collected in any way that is not in a closed loop, then it will be a hazardous waste and must be managed as such until it is recycled into the process. Once the facility returns the waste methanol to the system, it will no longer be designated a hazardous waste, but until that happens, it is a hazardous waste. Any collection, storage, or management of used methanol outside a closed loop system will be subject to the hazardous waste regulations. Therefore, it is advantageous for facilities to design and operate methanol recovery systems to avoid hazardous waste generation and disposal, which may include special storage and transportation requirements.

Waste Glycerin

Waste glycerin can be ignitable (D001) due to the low flashpoint of the methanol component. EPA has observed that sometimes waste glycerin will contain sufficient quantities of unrecovered methanol to make the waste glycerin ignitable, and therefore considered to be hazardous. Further refining of the crude glycerin as a product, or sale of the glycerin as a product will remove the material from regulation under RCRA. If the waste glycerin has hazardous characteristics and it is used as a fuel, it must be managed as a hazardous waste. The facility

should be aware if methanol levels in a glycerin product are high, because it will still be considered a hazardous material until the ignitable characteristic is addressed. Regardless of whether methanol is recovered, the producer must make a hazardous waste determination if the glycerin is disposed. Facilities benefit from producing high quality glycerin with non-hazardous characteristics for sale as feedstock for other industries.

GLYCERIN CAN HAVE ECO-FRIENDLY USES

Waste glycerin can be corrosive (D002). If the waste glycerin contains sufficient quantities of catalyst, it can have a pH greater than or equal to 12.5, or less than or equal to 2. Even if water is not present, the waste glycerin would be considered corrosive if it fails Test Method 1110A for corroding steel. When making a hazardous waste determination for waste glycerin, the facility should check for ignitability and corrosivity.

It should also be noted that glycerin has a very high biochemical oxygen demand. While this property does not make it a "hazardous waste," it does present a serious threat to streams and lakes if disposed upon the land or directly to waters. Management and beneficial uses of glycerin is discussed in greater detail in Appendix B of this manual.

Spent or Unused Catalyst

Catalysts (and catalyst neutralizers) used in biodiesel production are acidic or caustic and thus the waste is potentially corrosive (D002). Any spent catalyst (or other waste material) with a pH greater than or equal to 12.5, or less than or equal to 2, is a hazardous waste. Like waste methanol, waste catalyst is not subject to RCRA if it is returned to the process in a closed loop system, but it would be a hazardous waste outside a closed loop system until it was returned to the process. Corrosive hazardous wastes may be neutralized in a container or tank that complies with the RCRA container or tank standards.

Waste Water

Waste water disposed under the authority of a valid Clean Water Act (CWA) permit is not regulated under RCRA, but if waste water contains a listed hazardous waste or exhibits a hazardous characteristic, it must be managed as a hazardous waste until treated and/or disposed in the CWA permitted process. Biodiesel waste water could be hazardous if it has high or low pH from catalyst

disposed in the waste water, or if it contains high concentrations of methanol that would make it ignitable, or if it contains other listed or characteristic wastes.

Spent or Unwanted Laboratory Chemicals

A variety of chemicals are used in laboratories. If these chemicals are listed as a hazardous waste or meet the definition of a characteristic waste, they are considered hazardous wastes when disposed. Some unused chemicals destined for disposal may be P-listed, thus "acute hazardous wastes." When calculating monthly waste generation rates, one kilogram of P-listed wastes generated during a month will qualify the facility as a large quantity generator with increased regulatory requirements.

EPA CONTRACTOR ASSESSING LABORATORY CHEMICALS

Spent Parts Washing Solvents

Many solvents are ignitable and/or F-listed. The generator should examine what solvents they use and consider using solvents that when spent do not meet the definition of hazardous waste.

Aerosol Cans

Aerosol cans are considered reactive hazardous wastes (D003) because they can explode. To properly handle aerosol cans so that they are not considered hazardous waste, the facility should employ a can puncturing device that will collect the contents of the cans. The facility should then determine if the accumulated materials from the aerosol cans are hazardous. The empty, punctured cans may then be recycled to recover the metal.

Used Oil

The EPA regulation 40 CFR Part 279 address used oil separately from hazardous wastes. Part 279 applies to used, petroleum-based oils and greases, but not used vegetable oils and animal fats.

USED OIL MAY BE MANAGED SEPARATELY FROM HAZARDOUS WASTE

Used oil may be managed as a hazardous waste, but the used oil regulations assume the material will be handled separately from the hazardous wastes and thus recycled. All used oil is assumed to fail the contaminant specifications listed in the regulation, unless someone otherwise demonstrates that the used oil meets the specifications. A facility may burn its own used oil and do-it-yourself used oil in an on-site space heater. It may not burn used oil from other facilities or send its used oil to another facility to be burned unless the used oil burner is permitted to burn used oil or the used oil meets the specifications in 40 CFR 279.11. The regulations are written to encourage recycling used oil.

Universal Waste Lamps

Fluorescent lamps, chlorofluorocarbons, and some other types of lamps contain mercury and may fail the TCLP test. The facility may manage its lamps as hazardous waste or it may follow the Universal Waste regulations at 40 CFR Part 273. The universal waste regulations are designed to promote recycling by allowing less strict regulation of the material. The lamps should be managed in labeled, dated, and closed containers that are structurally sound. The lamps are then sent by approved transporters for recycling.

Universal Waste Batteries

Waste batteries may contain lead and other metals that would fail the TCLP test. There are universal waste regulations for batteries similar to the waste lamp regulation.

Hazardous Waste Management (Permit Exemption)

There would typically be no hazardous waste permitting requirements for a biodiesel plant that generates hazardous waste unless the facility violates the generator standards at 40 CFR 262.34 or it treats, stores, or disposes hazardous waste. These regulations provide exemption from permitting when the generator meets certain management requirements. The largest potential hazardous waste streams from a biodiesel plant are waste methanol, waste glycerin, and waste filter media, such as socks or diatomaceous earth.

USED FILTER SOCK CONTAINER

A hazardous waste generator must properly notify and obtain an identification number from the EPA or the applicable state environmental agency if the entire plant, including oil seed handling, extraction, and other processes contiguous to the biodiesel plant, generates hazardous wastes in quantities greater than 100 kg in any month. Hazardous wastes must be properly managed according to 40 CFR Part 262 until disposed at a permitted treatment, storage, or disposal facility (TSDF). If your biodiesel facility plans to have hazardous waste transported to a TSDF, your facility must use a hazardous waste manifest with your EPA identification number to document the shipment. The transporter must also have an EPA identification number.

Hazardous waste management requirements vary according to the amount of hazardous waste a plant generates in a given month. Facilities that generate less than 100 kg (220 pounds) of hazardous waste per month are called conditionally exempt small quantity generators (CESQG). The requirements for a CESQG are minimal. Primary among the applicable requirements, the facility must make a hazardous waste determination for each waste stream at the point of generation. This requirement applies to all solid waste generators. A CESQG must also ensure that its waste is disposed according to the regulations.

LABORATORY HAZARDOUS WASTE SATELLITE ACCUMULATION AREA

A small quantity generator (SQG) generates more than 100 kg of total hazardous wastes in any month, but less than 1000 kg (2200 pounds) and it accumulates at one time no more than 6000 kg (13,200 pounds) of all hazardous wastes. An SQG has more applicable hazardous waste management requirements than a CESQG but less than a large quantity generator (LQG). An LQG generates greater than 1000 kg of hazardous waste in one month. The generation calculation for generator status is a cumulative total of all hazardous wastes generated during that month. The EPA regulates generator management of hazardous waste at 40 CFR 262.34. Compliance with this section of the regulation exempts the facility from the general permitting requirements for treating, storing, and disposing hazardous waste.

Noncommercial hazardous waste generated by a homeowner is exempt from RCRA regulation, but the wise biodiesel hobbyist needs to find an environmentally sound method to dispose hazardous waste, such as a county or city household hazardous waste facility.

Land Disposal Restrictions

The Land Disposal Restrictions (LDR) program requires that hazardous wastes undergo fundamental physical or chemical changes so that they pose less of a threat to ground water, surface water, and air when disposed on land. Every hazardous waste, except under certain circumstances, must meet a specific treatment standard before it may be disposed. Once a generator identifies its waste as hazardous (either listed, characteristic, or both), the waste is assigned a waste code. EPA establishes a treatment standard for the waste code thus making the waste "restricted" and subject to the LDR requirements. Handlers of restricted waste must manage it in accordance with all the LDR requirements and may not dispose it on the land until it meets all applicable treatment standards.

The LDR requirements attach to a hazardous waste at its point of generation. In other words, once a waste has been generated, identified, and assigned a waste code, it must be treated in accordance with LDR requirements before being disposed. For purposes of the LDR program, a generator of a listed hazardous waste must determine if the waste also exhibits any hazardous waste characteristics. If it does, then the waste must be treated to meet both the listed and characteristic treatment standards before land disposal.

Both listed and characteristic hazardous wastes must meet LDR treatment standards before they are eligible for land disposal. There are, however, some unique situations that arise when dealing with characteristic wastes under the LDR program. The treatment standards for most characteristic hazardous wastes entail rendering the waste nonhazardous, decharacterizing the waste or removing the characteristic. However, some characteristic waste treatment standards have additional requirements. The regulated community must examine these wastes for underlying hazardous constituents. These constituents do not cause the waste to exhibit a characteristic, but they can pose hazards nonetheless. The underlying hazardous constituents must be treated in order to meet contaminant-specific levels referred to as the universal treatment standards (UTS). The UTS are listed in a table at 40 CFR §268.48. This is why some characteristic wastes that no longer exhibit a characteristic must still be treated to meet additional LDR requirements.

Once such characteristic hazardous wastes have been decharacterized and treated for underlying constituents, they may be disposed in a nonhazardous waste landfill. For example, if waste filter media is treated to remove the characteristic of ignitability, it must also be treated to meet the UTS for methanol. It is not permissible to dilute hazardous waste to circumvent proper treatment. Adding material to a waste to dilute it circumvents the intent of LDR because the total quantity of the underlying hazardous constituent would still enter the environment.

In order to properly track the hazardous waste that is generated, transported, treated, stored, and disposed, EPA imposes certain LDR notification, certification, and record keeping requirements on generators and treatment, storage, and disposal facilities (TSDFs). LDR notifications inform the next waste handler how the waste must be treated to meet the treatment standard or if it can be disposed without treatment. When wastes do not need to meet a treatment standard, or already meet the standard, EPA requires the handler to sign a statement certifying such a claim. Generators must send a notification with the initial shipment of every waste and keep a copy in their on-site files. If the waste, process, or receiving facility changes, another notification is required. Additional information about the LDR program can be found at www.epa.gov/epawaste/hazard/tsd/ldr.

Hazardous Waste Summary

It is important that biodiesel production facilities properly characterize, manage, and track each of their hazardous waste streams from the point of generation to the ultimate treatment, storage or disposal of the hazardous waste. RCRA places responsibility for a waste upon the generator "from cradle to grave." Even though the waste has been legally disposed at a permitted facility, the generator is still forever responsible for that waste. So, the best way to manage hazardous waste is to never generate it. Find ways to reduce, reuse and recycle. For more information on generation of hazardous waste, please link to the following user-friendly generator tool at www.epa.gov/epawaste/hazard/downloads/tool.pdf.

THE MOST COST- EFFECTIVE OPTION FOR MANAGING HAZARDOUS WASTES FROM A BIODIESEL PRODUCTION FACILITY IS TO PREVENT GENERATING THE WASTE IN THE FIRST PLACE

An excellent document that provides more detailed information about hazardous waste management is "Managing Your Hazardous Waste – A Guide for Small Businesses. EPA530-K-01-005." It is located at: www.epa.gov/epawaste/hazard/generation/sqg/handbook/k01005.pdf.

Underground Storage Tanks

Biodiesel facilities may have underground storage tanks. Underground storage tanks are regulated to prevent their contents from entering the environment. The greatest potential hazard from a leaking underground storage tank is that the petroleum or other hazardous substance can seep into the soil and contaminate ground water, the source of drinking water for nearly half of all Americans. A leaking underground storage tank can also present other health and environmental risks, including the potential for fire and explosion.

INSTALLATION OF AN UNDERGROUND STORAGE TANK

An underground storage tank is a single tank or a combination of tanks, including underground pipes connected to them, used to contain an accumulation of regulated substances. The volume of the tank(s), including the volume of underground pipes connected to them, is 10 percent or more beneath the surface of the ground.

The full definition of underground storage tanks, including exemptions, can be found in 40 CFR 280.12. The term "regulated substance" is defined in 40 CFR 280.12. It includes any substance defined in Section 101 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and also petroleum, including crude oil or any fraction thereof that is liquid at standard conditions of temperature and pressure. "Regulated substance" includes substances such as gasoline, diesel, fuel oils, petroleum solvents, and used oils. It does not include any substance regulated as a hazardous waste under subtitle C.

Each of the four states in Region 7 is approved to implement underground storage tank programs except for underground storage tanks on Indian reservations. More information about state programs can be found on their Web sites, as listed in Appendix A.

2.4 Renewable Fuel Standard Program

If your facility produces 10,000 gallons or more of renewable fuel per year, you must comply with the Renewable Fuel Standard (RFS) Program.

You are required to:

- Register
- Generate Renewable Identification Numbers (RINs)
- Transfer RINs with fuel
- Provide Product Transfer Documents
- Follow Blending Requirements
- Follow Exporting Requirements
- Follow Non-Road Use of Fuel Requirements
- Attest Engagements
- Keep records for 5 years, and
- Report quarterly; see http://epa.gov/otaq/regs/fuels/rfsforms.htm for forms.

A VARIETY OF FEEDSTOCK IS USED FOR PRODUCTION OF A RENEWABLE FUEL

Some producers may have additional requirements, if they sell or export renewable fuel, or create derived waste.

Facilities producing less than 10,000 gallons of renewable fuel per year are not subject to RFS requirements but may voluntarily opt-in to those requirements.

REMEMBER TO SEND IN YOUR FFARS REGISTRATION BEFORE YOUR PLANT IS READY FOR OPERATION.
(See next section for more information on FFARS.)

Registration

Before selling fuel, producers must register first with the Fuel and Fuel Additive Registration System (FFARS) program, then the RFS program. The FFARS program is completely separate from the RFS program, and each has its own separate registration process. More information about FFARS may be found at http://www.epa.gov/otaq/additive.htm. FFARS registration forms may be found at http://epa.gov/otaq/regs/fuels/ffarsfrms.htm.

For the RFS program, biodiesel producers must register their company and each facility at which they produce biodiesel [40 CFR 80.1150(b)]. The registration forms can be found at http://www.epa.gov/otaq/regs/fuels/fuelsregistration.htm.

Biodiesel producers are required to fill out one copy of form number 3520-20A for the company and one copy of form number 3520-20B for each facility. On form 3520-20A, biodiesel producers are required to select "RFS" for question 7 and "RIN Generator" for question 8. On form 3520-20B, biodiesel producers need to select "RIN generator." After the forms are received, EPA will provide the biodiesel producer with its Company and Facility IDs for the RFS program. (Bear in mind that the registration numbers discussed above for FFARS are not the appropriate registration numbers to be used in the RFS program and the generation of RINs, as discussed below.)

RIN Generation

RINs refer to Renewable Identification Numbers. Producers and importers of renewable fuel must generate RINs to represent all the renewable fuel they produce or import. The point in time when RINs must be generated is flexible, but no later than when the renewable fuel is transferred to another party [40 CFR 80.1126(e)(2)]. Total number of "gallon-RINs" that can be generated is determined from both the volume of fuel and its equivalence value. For biodiesel, the equivalence value is 1.5 [40 CFR 80.1115(b)(2)]. For other renewable fuels, the equivalence value is set forth in the RFS regulations, and reflects the difference in BTU value as compared to gasoline. For more information on the structure of a RIN, see 40 CFR 80.1125.

Transfer RINs: Moving RINs With Fuel and Selling Biodiesel

All renewable producers/importers that sell only the fuel that they create or import must transfer RINs with fuel to the next party at the equivalence value. For biodiesel, that is 1.5 RIN per gallon sold to the next party. RINs can only be transferred to parties registered for the RFS program. Therefore, renewable producers/importers that sell only the fuel they create or import can only sell to registered parties [40 CFR 80.1128(a)(6)].

Renewable producers and importers that sell a volume of renewable fuel in addition to their own may sell up to 2.5 RINs to any party [40 CFR 80.1128(a)(4)]. RINs may only be sold to registered companies, but any company may purchase biodiesel without RINs.

Product Transfer Documents

All parties that transfer renewable fuel must follow the Product Transfer Document (PTD) regulations per 40 CFR 80.1153. Every product transfer document must have the following information:

- Name and address of the transferor and transferee
- The transferor's and transferee's company registration number
- The volume of fuel transferred
- The date of transfer
- A list of RINs assigned to the volume [40 CFR 80.1153(a)(5)]; alternatively, assigned RINs may be transferred on a separate document to the same party on the same day. If a separate document is used to transfer the RINs, the PTD that transfers ownership of the fuel must state the number of "gallon-RINs" transferred and reference the document used to transfer the RINs.

DIESEL FUEL TRANSFER TANK

If no assigned RINs are being transferred with renewable fuel, the PTD which is used to transfer ownership of the fuel shall state "No RINs Transferred."

Blending

Blenders of renewable fuel that create motor vehicle fuel (for example, by blending biodiesel with diesel to produce B5 or B10, or any blend B80 or below), must separate RINs associated with the volume of renewable fuel [40 CFR 80.1129(b)(2), 80.1129(b)(5)]. It is unlawful to separate RINs on biodiesel blends above B80, including B99, except when the blend is going to be used directly in a motor vehicle engine as that blend [40 CFR 80.1129(b)(4)]. In addition, renewable fuel producers may, upon agreement with their customers, separate RINs from fuel in situations where customers are "splash blending." Blenders of

renewable fuel with assigned RINs, must separate the RINs and change the first digit (K code) of the RINs from 1 to 2 during the compliance quarter when the blending took place and before transferring those RINs to another party.

Exporting

Any company that exports renewable fuel in its neat form or blended with gasoline or diesel outside of the lower 48 states [40 CFR 80.1126(a)] (and after January 1, 2007, Hawaii) has a Renewable Volume Obligation (RVO). The RVO for exporters is determined by retiring RINs equal to the volume of fuel exported, times the equivalence value, plus any prior year deficit. A producer that exports renewable fuel must generate RINs for that volume, and upon export, separate those RINs [40 CFR 80.1129(b)(3)]. At the end of the compliance year, the exporter must determine its RVO [40 CFR 80.1130(b)]. In the event that an exporter does not have enough separated RINs to cover its RVO, it must acquire separated RINs to meet the RVO [40 CFR 80.1130(a)].

Non-Road Use of Fuel

EPA believes that most fuel that can be used as motor vehicle fuel, and which otherwise meets the definition of "renewable fuel" (such as biodiesel and ethanol), will ultimately be used as motor vehicle fuel. Therefore, producers and importers of such products can assume that they meet the definition of "renewable fuel" and can assign RINs to them without tracking their ultimate use.

IF RENEWABLE FUEL IS USED FOR NON-ROAD VEHICLES, GENERATING A RIN IS NOT REQUIRED.

However, if fuel with assigned RINs is actually blended into gasoline or diesel that is known to be destined for use in a non-road application, such as agricultural equipment, the presumption that led the fuel producer/importer to assign RINs to the product is no longer valid. Such fuel cannot be considered a motor vehicle fuel and thus is not in fact a "renewable fuel" that is valid for RFS compliance purposes. In such cases, the blender should treat the RINs associated with the blended fuel in the same way as for fuel with assigned RINs that is used in a heater or boiler.

If a producer/importer is transferring a volume of fuel to a party and knows the fuel is going off-road, then the producer/importer should not generate RINs for that volume.

Record Keeping Requirements

Renewable producers and importers, obligated parties and owners of RINs who are neither renewable producers/importers nor obligated parties have several record keeping requirements. For instance, 40 CFR 80.1151(e) requires records to be kept for five years.

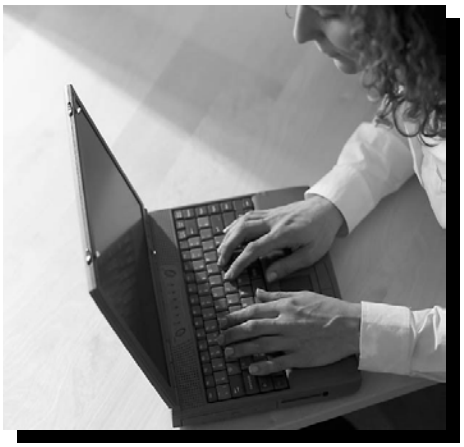
MANAGE RENEWABLE FUEL RECORDS IN ACCORDANCE WITH REGULATIONS

Reporting

Renewable producers and importers are required to report on a quarterly basis to the EPA (40 CFR 80.1152). The reporting templates are located at: http://epa.gov/otaq/regs/fuels/rfsforms.htm. All renewable producers and importers are required to fill out three of these reports quarterly; RFS Activity Report (RFS0100), RFS RIN Transaction Report (RFS0200), and RFS RIN Generation Report (RFS0400).

Exporters of renewable fuel and obligated parties must also use:

- The annual RFS Obligated Party Annual Compliance Report (RFS0300)
- RFS Activity Report (RFS0100)
- Two reports required quarterly. One report for attached RINs and one report for separated RINs. Producers must indicate how many RINs they generated in the quarter and how many they transferred, in addition to any other RIN activities that apply.
- RFS RIN Transaction Report (RFS0200); one report submitted per transaction; and
- RFS RIN Generation Report (RFS0400); one report submitted per batch.



FILE QUARTERLY REPORTS ON-LINE

All reports must be submitted via EPA's Central Data Exchange (CDX). CDX is an online portal that encrypts and sends reports to the EPA. In order for companies to use CDX they must register users well in advance of the reporting deadline.

CDX registration is based on individual users rather than corporate accounts. Responsible corporate officers of a company may register themselves or delegate the ability to submit reports to another person. Responsible corporate officers are still responsible for their delegates' submissions.

Attest Engagements

All producers must perform an "attest engagement" of the reports submitted to EPA. The attest engagements must be performed by a Certified Public Accountant or Certified Internal Auditor per regulations, and they must mail a copy to the EPA.

For more information about the Renewable Fuel Standard Program, please visit

http://epa.gov/otaq/renewablefuels/index.htm

2.5 Clean Air Act

Air Operating Permits

A biodiesel plant might need to obtain an air permit for day-to-day facility operations. There are two types of operating permits:

1. Major Source Title V Air Permits
2. Minor Source Air Permits

The potential emissions from the plant will determine whether a facility will obtain a major or minor operating permit.

CHECK TO SEE IF AN AIR PERMIT IS REQUIRED FOR YOUR FACILITY

Major Source Title V Air Permits

The federal operating permit program, known as the Title V program, was created by the Clean Air Act Amendments of 1990 and was designed to create a "one stop" permit. The Title V operating permit compiles all of the applicable state and federal regulatory requirements, existing construction permit provisions, record keeping, reporting, testing, and monitoring requirements into one permit. The intention behind listing everything in one permit is to help facilities maintain compliance. It is common for a facility to have several construction permits for several pieces of equipment, and it is difficult to keep track of all of the requirements in each permit. One permit with all of the facility's requirements is intended to make it easier to track the requirements.

Public notification is also an important aspect of the operating permit program. The public is notified when an operating permit is proposed and is given the opportunity to comment during the 30-day public notice period. This also gives the public an opportunity to learn about the effects the facility might have on the environment.

Unlike a construction permit that must be obtained prior to construction and is valid for the entire life of the emission unit, an operating permit must be applied for within some period (often 12 months) after the facility begins operation. The operating permit is generally issued for a specific period of time (usually for five years) rather than the life of the operating unit.

A biodiesel plant would need to obtain a Title V operating permit if the plant has potential-to-emit quantities greater than 100 tons per year of any criteria pollutant or is a major source of hazardous air pollutants. (See Chapter 1, Page 14)

Minor Source Air Permits

A biodiesel plant can limit the facility's potential to emit to less than the Clean Air Act major source thresholds by accepting operational limits in a minor source operating permit. However, minor sources have less operational flexibility because they must keep their emissions below the major source threshold. Minor operating permits are not subject to review by EPA.

Best Practices – Air Program

In order to reduce emissions of volatile organic compounds (VOCs) and hazardous air pollutants, and to reduce safety risks, biodiesel plants should vent process streams to a control device such as a flare whenever possible. Methanol vapors are very flammable and are considered to be both a VOC as well as a hazardous air pollutant under the Clean Air Act. It is recommended that at a minimum, process streams which contain methanol should be vented to a flare. Operators of storage tanks which have the potential to concentrate methanol vapors should take extra precautions to ensure that all manways are closed when not in use. In addition to reducing emissions of fugitive air emissions, this will help reduce the risks of creating explosive vapors. When possible, such storage tanks should be vented to a process flare.

PROCESS STREAMS CONTAINING METHANOL SHOULD BE VENTED TO A FLARE

Biodiesel plants which process feedstocks such as soybean oil generated from a chemical extraction process may contain traces of n-hexane. Under the Clean Air Act, hexane is considered to be a hazardous air pollutant. Biodiesel plants need to account for their hexane emissions as part of their major source determination status under the Air Toxics Program. In a similar fashion, fugitive emissions of hazardous air pollutants, like methanol and hexane, including leaking process equipment need to be included in the major source determination. In addition, fugitive emissions of criteria pollutants, like VOC from equipment leaks, particulate matter from haul roads, etc., need to be included in the major source determination under the New Source Review preconstruction permitting program was well as the Operating Permitting Program.

Prevention Program Requirements

Accident prevention is required by the Risk Management Program regulations, 40 CFR Part 68 under the Clean Air Act Section 112(r). An owner or operator of a facility (also called a "stationary source") that has more than the threshold quantity of a regulated substance in a process is required to implement a risk management program. A risk management program includes a hazard assessment (i.e., a five-year accident history and analysis of worst-case and alternative release scenarios), development and implementation of an accident prevention program, and implementation of emergency response requirements. A summary of this information is then compiled into a Risk Management Plan, or RMP, and provided to EPA.

The purpose of the Risk Management Program is to prevent catastrophic accidents involving extremely hazardous substances. Explosions or other chemical accidents can occur at biodiesel production facilities.

If you are not sure whether this rule applies to your facility, call the

EPA HOTLINE

at:

(800) 424-9346

or

(800) 553-7672 (TDD).

If one or more processes in a biodiesel production facility are subject to this rule, they will probably need to develop an accident prevention program and address emergency response issues. In order to develop the correct level of prevention program, facility personnel will need to determine whether it is subject to Program 1, Program 2, or Program 3. Appendix E will help you determine your program level and corresponding responsibilities.

2.6 Emergency Planning and Community Right-to-Know Act

Planning Requirements

Section 302 of the Emergency Planning and Community Right-to-Know Act requires facilities with regulated chemicals above threshold planning quantities to notify the state emergency response commission (SERC) and the local emergency planning committee (LEPC) within 60 days after they first receive a shipment or produce the substance on-site.

Section 303 of the Emergency Planning and Community Right-to-Know Act requires local emergency planning committees (LEPCs) to prepare comprehensive emergency response plans. These plans should identify all facilities subject to compliance with this section, including biodiesel facilities. These plans should also describe emergency response procedures, training schedules, and practice schedules, among other requirements.

Reporting Releases

Section 304 of the Emergency Planning and Community Right-to-Know Act requires "regulated facilities" (facilities regulated under this Act) to report a release of an extremely hazardous substance. Biodiesel production facilities are subject to spill reporting provisions if they release more than a reportable quantity of an extremely hazardous chemical. A list of extremely hazardous chemicals and their reportable quantities can be found at 40 CFR 302.4 and 355. Two examples of chemicals that might be spilled or released from a biodiesel production facility are methanol and hexane. Spills of such chemicals must be reported when quantities exceed 5,000 pounds per pollutant in a 24-hour period.

Initial notifications of a release can be made by telephone, radio or in person. Any person in charge is to immediately[1] report releases to the National Response Center at (800) 424-8802 [40 CFR 302.6(a)]. Reporting should include the following:

- Chemical name or identity of the released substance
- Indication of whether the substance is on the Comprehensive Environmental Response, Compensation, and Liability Act Section 302(a) list

[1] For EPCRA/CERCLA reporting purposes "immediately" is interpreted as "not to exceed 15 minutes after the person in charge has knowledge of the release." This interpretation is documented in A Legislative History of the Superfund Amendments and Reauthorization Act of 1986, Vol. 2, Oct. 1990.

- Estimated quantity of release
- Time and duration of release
- Medium or media into which the release occurred; and
- Whether release threatens waterways (reporting requirement of the Clean Water Act contained in 40 CFR 117.21)

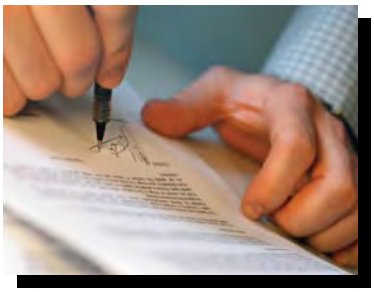
In addition, the owner/operator of a facility is required by 40 CFR 355.40 to immediately* report releases that are likely to produce off-site exposure and exceed the threshold limit to all affected local emergency planning committees and state emergency response commissions. This release report is to include:

- Chemical name(s) or identity of all substances involved in the accident
- Estimate of quantity of substances released to the environment; and
- Time and duration of release

The facility owner or operator is also required to provide a written follow-up emergency notice as soon as possible (and within seven calendar days) to their affected local emergency planning committee and state emergency response commission after a release that requires notification.

The written follow-up notice should include the following:

- An update of all previously provided information
- Actions taken to respond to the release
- Known or anticipated acute or chronic health risks associated with a release; and
- Advice regarding medical attention necessary for exposed individuals



PROVIDE A WRITTEN FOLLOW-UP EMERGENCY NOTICE WITHIN 7 DAYS OF A REPORTABLE RELEASE

Other Reporting Requirements

Section 311 of the Emergency Planning and Community Right- to-Know Act requires the facility to have material safety data sheets (MSDSs) on site for regulated chemicals that exceed certain quantities and to submit copies to their state emergency response commission, local emergency planning committee, and local fire department within three months of chemical receipt or production. This is a one-time submission that is updated only if new chemicals are stored and/or produced.

Reporting Hazardous Chemical Storage – Tier II Reporting

Chemical storage notification requirements under Section 312 of the Emergency Planning and Community Right-to-Know Act and 40 CFR 370 Subpart D establish reporting for any hazardous chemical or extremely hazardous chemical that is stored at a facility in excess of the designated threshold planning quantity. These reports are also known as the Tier II hazardous chemical inventory form. The Tier II reports are due to the fire department, state emergency response commission, and local emergency planning committee by March 1 each year. These reports include a minimum of the following information:

- The amount and the location of hazardous chemicals as defined in the Occupational Safety and Health Administration (OSHA) Hazardous Communication Standard
- Storage codes and storage location
- Physical and health hazards
- Average daily amount stored; and
- Number of days on-site

The purpose of the Tier II report is to provide emergency responders and the public with important information on the hazardous chemicals in their communities for the purpose of enhancing community awareness of chemical hazards and facilitating development of state and local emergency response plans.

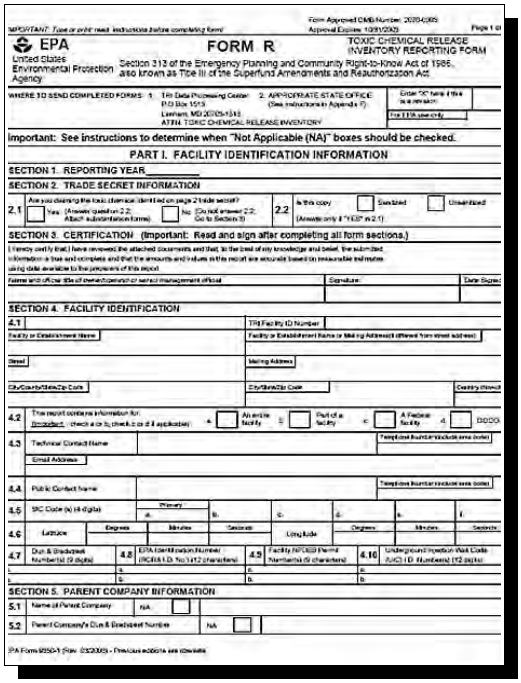
Practically all biodiesel production facilities need to file a Tier II report. A list of extremely hazardous chemicals and their threshold planning quantities can be found at 40 CFR Part 355. There is no formal list of hazardous chemicals, but a good rule of thumb is any chemical that has an OSHA Material Safety Data Sheet (MSDS) could be reportable if storage exceeds 10,000 pounds. Methanol and hexane are examples of chemicals for which a biodiesel production facility may be required to file a Tier II form.

Toxic Release Inventory Reporting – Form R

The Emergency Planning and Community Right-to-Know Act (EPCRA) Section 313 requires owners or operators of certain facilities that manufacture, process or otherwise use any listed toxic chemicals, or chemical categories in excess of threshold quantities, to report annually to the EPA and to the state in which such facilities are located. This collected information is called the Toxic Release Inventory. The purpose of the Toxic Release Inventory is to gather information so that the public and government can assess the hazards of toxic releases in a community.

The criteria for facilities that must report are those that are listed in manufacturing Standard Industrial Classification Code (SIC) 20-39 and which have 10 or more full-time employees. Most biodiesel production facilities meet these requirements and are required to report.

The annual information reported by facilities is presented on the "Toxic Release Inventory report form," also referred to as TRI Form R. The first function of the form is to notify EPA that the facility has exceeded the reporting threshold within the last calendar year. The second function of the form is to list any releases of the toxic chemical to the environment within the year. Another function of the form is to provide information in compliance with Section 6607 of the Pollution Prevention Act on quantities of toxic chemicals in waste streams and the efforts made to reduce or eliminate those quantities.



EPA
United States Environmental Protection Agency

FORM R
TOXIC CHEMICAL RELEASE INVENTORY REPORTING FORM

Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986, also known as Title III of the Superfund Amendments and Reauthorization Act

Important: See instructions to determine when "Not Applicable (NA)" boxes should be checked.

PART I. FACILITY IDENTIFICATION INFORMATION

SECTION 1. REPORTING YEAR

SECTION 2. TRADE SECRET INFORMATION

SECTION 3. CERTIFICATION (Important: Read and sign after completing all form sections.)

SECTION 4. FACILITY IDENTIFICATION

SECTION 5. PARENT COMPANY INFORMATION

The production of biodiesel generally results from the transesterification of fats or oils using methanol which is one of the listed toxic chemicals. Some facilities may be involved in the extraction of oils from oil seeds using hexane, another listed toxic chemical. A list of more than 600 regulated chemicals can be found in 40 CFR Part 372.

Biodiesel producers are encouraged to maintain accurate records for the purchases of methanol or other listed toxic chemicals in their production. If more than 25,000 pounds of methanol or any other listed toxic chemical is used, the facility is required to file a toxic release inventory report to the EPA and to the state.

The facility is encouraged to evaluate each step in the manufacturing process to determine the ultimate fate of the toxic chemical to help identify air emissions and losses in waste streams. These releases to the environment must be determined in order to include them in the report.

Toxic release inventory reports are due July 1 each year for the previous calendar year and are filed electronically. Assistance is available in the form of annual training provided by the regional EPA offices. For more information on toxic release inventory, please visit www.epa.gov/tri.

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APPENDIX A – SUMMARY OF LAWS PERTAINING TO BIODIESEL PRODUCTION AND WHO TO CONTACT

This appendix includes a list of contact and resource information for EPA Region 7. Contact information for locations outside of Region 7 may be found at www.envcap.org/statetools/ or by contacting the EPA Region in which your facility is located.

National Environmental Policy Act

For additional information about the National Environmental Policy Act, contact:

Joe Cothern
NEPA Team Leader
Environmental Services Division
Environmental Protection Agency Region 7
(913) 551-7148
cothern.joe@epa.gov

Pollution Prevention (P2)

To contact EPA Region 7 P2 staff, call **toll free: (800) 223-0425**

- P2 Internet Sites:
  - EPA Region 7 Pollution Prevention www.epa.gov/region07/p2
  - EPA Pollution Prevention www.epa.gov/p2
  - Pollution Prevention Resource Information Center www.p2ric.org/
- Recommended P2 EPA Publication:
  - *Facility Pollution Prevention Guide* (EPA/600/R-92/088)

Clean Water Act (CWA)

CWA Chemical or Oil Release Notification Requirements

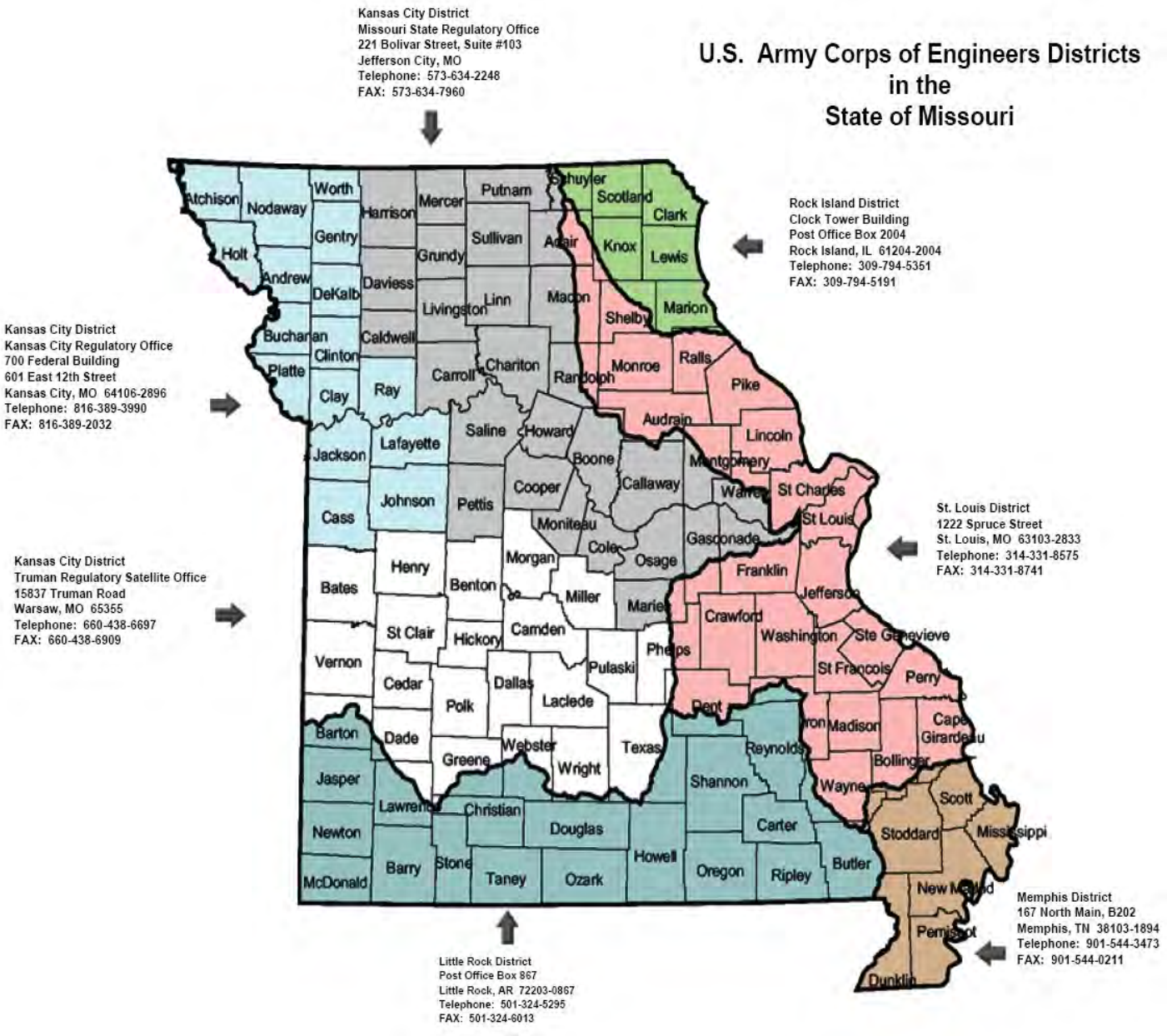
Subject	Law and Regulation	Who to Notify	When
CWA Release Notification	CWA 40 CFR Part 110 & 40 CFR Part 117	National Response Center (800) 424-8802	Immediately
Notification of Slug Loading to POTW	CWA 40 CFR Part 403	POTW, State Pretreatment Program	Immediately
Notification of Hazardous Waste Discharge to Septic System	CWA 40 CFR Part 144	EPA Regional Underground Injection Control Well Program Kurt Hildebrandt (913) 551- 7413 hildebrandt.kurt@epa.gov www.epa.gov/region07/water/contact.htm	Immediately
State Statutes	State Laws	State Environmental Agency	Varies

CWA National Pollutant Discharge Elimination System (NPDES) Permits

Agency	Contact	Web Address
Iowa Department of Natural Resources	Angela Chen (515) 281-4736 angela.chen@dnr.state.ia.us	www.iowadnr.gov/water/npdes/index.html
Kansas Department of Health and Environment	Don Carlson (785) 296-5547 dcarlson@kdhe.state.ks.us	www.kdheks.gov/indust/
Missouri Department of Natural Resources	Rob Morrison (573) 526-0991 rob.morrison@dnr.mo.gov	www.dnr.mo.gov/env/wpp/permits/index.html
Nebraska Department of Environmental Quality	Donna Garden (402) 471-1367 donna.garden@nebraska.gov	www.deq.state.ne.us
EPA	John Dunn (913) 551-7594 dunn.john@epa.gov	http://cfpub.epa.gov/npdes/home.cfm?program_id=45

CWA 404 Permits/ Wetlands Program

District\State Coverage	Contact	Web Address
Iowa Rock Island District Covers most of Iowa, except areas inside the levee along the Missouri River which are covered by the Omaha District	U.S. Army Rock Island Dist. Corps of Engineers Rock Island, Ill. (309) 794-5376	www2.mvr.usace.army.mil/Regulatory/default.cfm
Nebraska Omaha District Wehrspann Field Office	U.S. Army Omaha District Corps of Engineers (402) 896-0896	https://www.nwo.usace.army.mil/html/od-r/regwebpg.htm
Kansas Kansas City District Kansas City Regulatory Office Covers Northeastern Kansas	U.S. Army Corps of Engineers Northwestern Division Kansas City District Kansas City, MO (816) 389-3990	www.nwk.usace.army.mil/regulatory/regulatory.htm
Kansas Kansas City District Kanopolis Regulatory Satellite Office Covers Northern Kansas	U.S. Army Corps of Engineers Northwestern Division Kansas City District Marquette, Kan. (785) 546-2130	www.nwk.usace.army.mil/regulatory/regulatory.htm
Kansas Kansas City District Kansas State Regulatory Office Covers Southern Kansas	U.S. Army Corps of Engineers Northwestern Division Kansas City District El Dorado, Kan. (316) 322-8247	www.nwk.usace.army.mil/regulatory/regulatory.htm
Missouri Kansas City District Kansas City Regulatory Office St. Louis District Memphis District Little Rock District Rock Island District	**See map on next page.**	www.nwk.usace.army.mil/regulatory/regulatory.htm www.mvs.usace.army.mil/ConOps/permits/permits.html www.mvm.usace.army.mil/regulatory/memphis.htm www.swl.usace.army.mil/regulatory www2.mvr.usace.army.mil/regulatory/default.cfm



For more information on the Clean Water Act Section 404 Wetlands Program, call EPA's Wetlands Helpline at (800) 832-7828

Or Visit the Following Websites:

EPA's Wetlands Website www.epa.gov/owow/wetlands/regs/

Section 404 of the Clean Water Act www.epa.gov/owow/wetlands/laws/

Wetland Delineation Manual www.wes.army.mil/el/wetlands/wlpubs.html

U.S. Army Corps of Engineers Regulatory Program www.usace.army.mil/inet/functions/cw/cecwo/reg/

U.S. Army Corps of Engineers' Waterways Experiment Station Environmental Laboratory
www.wes.army.mil/el/wetlands/wetlands.html

Environmental Law Institute www.eli.org

Construction Industry Compliance Assistance Center http://cicacenter.org/wetlands.html

Additional information on on the Clean Water Act Section 404 Wetlands Program is available by contacting the following EPA Region 7 personnel:

State	Name	Phone	E-mail
Iowa	Jason M. Daniels	(913) 551-7443	daniels.jason@epa.gov
Kansas	Catherine Holston	(913) 551-7256	holston.catherine@epa.gov
Missouri	Vicky Johnson	(913) 551-7564	johnson.vicky@epa.gov
Nebraska	Eliodora Chamberlain	(913) 551-7945	chamberlain.eliodora@epa.gov

CWA National Pollutant Discharge Elimination System (NPDES) Permits

Agency	Contact	Web Address
Iowa Department of Natural Resources	Angela Chen (515) 281-4736 angela.chen@dnr.state.ia.us	www.iowadnr.gov/water/npdes/index.html
Kansas Department of Health and Environment	Don Carlson (785) 296-5547 dcarlson@kdhe.state.ks.us	www.kdheks.gov/indust/
Missouri Department of Natural Resources	Rob Morrison (573) 526-0991 rob.morrison@dnr.mo.gov	www.dnr.mo.gov/env/wpp/permits/index.html
Nebraska Department of Environmental Quality	Donna Garden (402) 471-1367 donna.garden@nebraska.gov	www.deq.state.ne.us
EPA	John Dunn (913) 551-7594 dunn.john@epa.gov	http://cfpub.epa.gov/npdes/home.cfm?program_id=45

CWA Pretreatment Program

Agency	Pretreatment Coordinator	Web Address
Iowa Department of Natural Resources	Tom Atkinson (515) 281-5054 tom.atkinson@dnr.state.ia.us	www.iowadnr.gov/water/pretreatment/index.html
Kansas Department of Health and Environment	Steve Caspers (785) 296-5551 scaspers@kdhe.state.ks.us	www.kdheks.gov/indust
Missouri Department of Natural Resources	Richard Laux (573) 751-6982 richard.laux@dnr.mo.gov	www.dnr.mo.gov/index.html
Nebraska Department of Environmental Quality	Chuck Duerschner (treatment facility construction permits) chuck.duerschner@nebraska.gov or Donna Garden (402) 471-1367 donna.garden@nebraska.gov	www.deq.state.ne.us
EPA	Paul Marshall (913) 551-7419 marshall.paul@epa.gov	http://cfpub.epa.gov/npdes/home.cfm?program_id=3

CWA Stormwater

Agency	Contact	Web Address
Iowa Department of Natural Resources	Joe Griffin (515) 281-7017 or Terry Kirchenman (constr. permits) (515) 281-8885 terry.kirschenman@dnr.state.ia.us	www.iowadnr.gov/water/stormwater/who.html
Kansas Department of Health and Environment	Joe Mester (785) 296-6804 jmester@kdhe.state.ks.us	www.kdheks.gov/stormwater
Missouri Department of Natural Resources	Kevin Mohammadi (573) 751-1740 kevin.mohammadi@dnr.mo.us	www.dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm
Nebraska Department of Environmental Quality	Mary Schorer (402) 471-2186 mary.schorer@nebraska.gov	www.deq.state.ne.us
EPA	Tanya L. Black (913) 551-7170 black.tanyal@epa.gov	http://cfpub.epa.gov/npdes/home.cfm?program_id=6

Spill Prevention, Control and Countermeasure (SPCC) and Facility Response Plans (FRP)

For more information about the SPCC/FRP rule:

- please visit **http://www.epa.gov/oilspill,**
- call the toll free **EPA Hotline at (800) 424-9346**, or
- obtain a copy of the "SPCC Guidance for Regional Inspectors" at **http://www.epa.gov/emergencies/content/spcc/spcc_guidance.htm**.

To speak with someone from EPA Region 7, please contact:

- Ward Burns, SPCC Coordinator, burns.ward@epa.gov, (913) 551-7960,
- Alan Hancock, Environmental Engineer, hancock.alan@epa.gov, (913) 551-7647, or
- Paul Doherty, FRP Coordinator, doherty.paul@epa.gov, (913) 551-7924

Safe Drinking Water Act (SDWA)

SDWA Public Water Supply Supervision Program

Agency	Contact	Web Address
Iowa Department of Natural Resources	Dennis Alt (515) 725-0275 dennis.alt@dnr.state.ia.us	www.iowadnr.gov/water/drinking/
Kansas Department of Health and Environment	Don Carlson (785) 296-5547 dcarlson@kdhe.state.ks.us	www.kdheks.gov/indust
Missouri Department of Natural Resources	Steve Sturgess (573) 751-1187 steve.sturgess@dnr.mo.gov	www.dnr.mo.gov/env/wpp/dw-index.htm
Nebraska Department of Health and Human Services	Jack Daniel (402) 471-0510 jack.daniel@hhs.state.ne.us	www.hhs.state.ne.us/enh/pwsindex.htm
EPA	Mary Mindrup (913) 551-7431 mindrup.maryp@epa.gov	www.epa.gov/safewater/pws/index.html

SDWA Source Water Protection Program

Agency	Contact	Web Address
Iowa Department of Natural Resources	Rebecca Ohrtman (515) 281-0932 rebecca.ohrtman@dnr.state.ia.us	www.iowadnr.gov/water/watershed/sourcewater.html
Kansas Department of Health and Environment	Sheryl Ervin (785) 296-8038 servin@kdhe.state.ks.us	www.kdheks.gov/nps/swap/
Missouri Department of Natural Resources	Ken Tomlin (573) 526-5449 ken.tomlin@dnr.mo.gov	www.dnr.mo.gov/env/wpp/wellhd/
Nebraska Department of Environmental Quality	Deana Barger (402) 471-6988 deana.barger@nebraska.gov	www.deq.state.ne.us/GroundW.nsf/Pages/WHPA
EPA	Stephane Lindberg (913) 551-7423 lindberg.stephanie@epa.gov	cfpub.epa.gov/safewater/sourcewater/

SDWA Underground Injection Control Program

Agency	Contact	Web Address
Iowa, Implemented by EPA-Region 7	Kurt Hildebrandt (913) 551-7413 hildebrandt.kurt@epa.gov	www.epa.gov/region07/water/dwgw.htm
Kansas Department of Health and Environment	Kirk Hoeffner (785) 296-5551 k.hoeffner@kdhe.state.ks.us	www.kdheks.gov/geo
Missouri Department of Natural Resources	Scott Kaden (573) 368-2100 scott.kaden@dnr.mo.gov	www.dnr.mo.gov/index.html
Nebraska Department of Environmental Quality	David Miesbach (402) 471-4982 david.miesbach@nebraska.gov	www.deq.state.ne.us/GroundW.nsf/Pages/UIC
EPA	Kurt Hildebrandt (913) 551- 7413 hildebrandt.kurt@epa.gov	www.epa.gov/safewater/uic

Clean Air Act

Law Citing	Regulation	Description	Contacts
CAA	40 CFR 52.21	Air Permits	**Iowa** Department of Natural Resources: Dave Phelps (515) 281-8189 Construction Permitting Supervisor www.iowacleanair.com **Kansas** Department of Health & Environment: Terry Tavener (785) 296-1581 Unit Supervisor - Natural Resources www.kdheks.gov/bar/ **Missouri** Department of Natural Resources: Kyra Moore (573) 751- 4817 Permits Section Chief www.dnr.mo.gov/env/apcp/ **Nebraska** Department of Environmental Quality: Clark Smith (402) 471-4204 Permitting Section Supervisor www.deq.state.ne.us Toll Free NDEQ Air Permits Hotline is 1- (877) 834-0474
CAA	40 CFR Part 60	New Source Performance Standards	
CAA	40 CFR Part 63	Maximum Achievable Control Technology	
CAA	40 CFR Part 61 Subpart M	Asbestos	Randall Whipple EPA Region 7 (913) 551-7093 whipple.randall@epa.gov
CAA 112(r)	40 CFR Part 68	Risk Management Program	**EPA** Hotline: (800) 424-9346 or (703) 412-9810 or (800) 553-7672 (TDD) www.epa.gov/emergencies/content/rmp/ EPA Region 7: George Hess, (913) 551-7540, hess.george@epa.gov

Emergency Planning and Community Right to Know Act (EPCRA)

EPCRA Chemical Release Notification Requirements

Subject	Law and Regulation	Who to Notify	When
EPCRA Release Notification	EPCRA 40 CFR Part 355	● **State Emergency Response Commissions (SERC)s:** **Iowa** Department of Natural Resources (515) 281-8694 **Kansas** Division of Emergency Management (785) 296-8013 or (800) -275-0297 **Missouri** Department of Natural Resources (573) 634-2436 **Nebraska** Department of Environmental Quality (402) 471-2186 or (402) 471-4230; Evenings and Weekends call Nebraska State Patrol – (402) 471-4545 ● **Local Emergency Planning Committee (LEPC)**	Immediately*
CERCLA Release Notification	CERCLA 40 CFR Parts 300 & 302	**National Response Center** (800) 424-8802	Immediately*
State Statutes	State Laws	State Environmental Agency	Varies

* For Emergency Planning/Superfund reporting purposes "immediately" is interpreted as "not to exceed 15 minutes after the person in charge has knowledge of the release." This interpretation is documented in A Legislative History of the Superfund Amendments and Reauthorization Act of 1986, Volume 2, October 1990.

Reporting Hazardous Chemical Storage – Tier II Reporting (EPCRA §312)

Tier II Administration	Tier II Reporting	Contact
Iowa Department of Natural Resources	**Submit to:** Adam Broughton Emergency Response Unit Iowa Department of Natural Resources 401 SW 7th Street, Suite I Des Moines, IA 50309	Adam Broughton (515) 281-8694 Fax: (515) 725-0218 emergencyresponse@dnr.state.ia.us
Kansas Department of Health and Environment	**Web site:** www.kdhe.state.ks.us/bar/index.html **Submit to:** Kansas State Emergency Response Commission 1000 SW Jackson; Suite 310 Topeka, KS 66612-1366 Information regarding the reporting process, instructions, or blank forms may be requested by writing to: Kansas State Emergency Response Commission 1000 SW Jackson; Suite 310 Topeka, KS 66612-1366 or calling (785) 296-1688, (785) 296-1689, or (785) 296-1691	Kimberly Steves ksteves@kdhe.state.ks.us (785) 296-4359 Fax: (785) 296-1545
Missouri Emergency Response Commission	**Web site:** http://hazmat.dps.mo.gov/ **Submit to:** Missouri Emergency Response Commission 2302 Militia Drive PO Box 3133 Jefferson City, MO 65102 **Special Instructions:** Submit all Tier II reports on the MISSOURI TIER TWO Electronic filing tool located at http://hazmat.dps.state.mo.us	For more information, including sample forms and instructions, visit http://hazmat.dps.mo.gov/ 1- (800) 780-1014 Or (573) 526-9239 Fax: (573) 526-9261
Nebraska Department of Environmental Quality	**Submit to:** Nebraska Department of Environmental Quality 1200 N Street, Suite 400 P.O. Box 98922 Lincoln, NE 68509 www.deq.state.ne.us/EAD.nsf/Pages/NEPCRA	Mark Lohnes (402) 471-4251 mark.lohnes@nebraska.gov

Toxic Release Inventory Reporting (EPCRA §313)

Agency	TRI Reporting	Contact
Iowa Department of Natural Resources	**Submit to:** Adam Broughton Emergency Response Unit Iowa Department of Natural Resources 401 SW 7th Street, Suite I Des Moines, IA 50309	For TRI reporting questions, contact Adam Broughton at: (515) 281-8694 Fax: (515) 725-0218 emergencyresponse@dnr.state.ia.us
Kansas Department of Health and Environment	**Submit to:** Kimberly Steves Kansas Department of Health and Environment Bureau of Air & Radiation Asbestos & Hazardous Chemical Information Unit 1000 SW Jackson, Suite 310 Topeka, KS 66612-1366 **Web Site:** www.kdhe.state.ks.us	For TRI reporting questions, contact Kimberly Steves at: ksteves@kdhe.state.ks.us (785) 296-4359 Fax: (785) 296-1545
Missouri Department of Natural Resources	**Submit by Certified Mail Only to:** TOXICS RELEASE INVENTORY c/o Earl Pabst Missouri Department of Natural Resources Division of Environmental Quality 1101 Riverside Drive Jefferson City, MO 65101 **Web Site:** www.dnr.mo.gov/env/tri/index.htm	For TRI reporting questions, contact Earl Pabst at: earl.pabst@dnr.mo.gov (800) 361-4827 (573) 571-6892 Fax: (573) 571-9227
Nebraska Department of Environmental Quality	**Submit by Certified Mail Only to**: Mark Lohnes SARA Title III and NEPCRA Coordinator Nebraska Department of Environmental Quality 1200 N. Street, Suite 400 Lincoln, NE 68509 **Web Site:** www.deq.state.ne.us	For TRI reporting questions, contact Mark Lohnes at: mark.lohnes@nebraska.gov (402) 471-4251 Fax: (402) 471-2909

Resource Conservation and Recovery Act (RCRA)

RCRA Hazardous Waste

Agency	Contact	Web Address
Iowa (EPA Region 7)	Edwin G. Buckner, PE RCRA Enforcement and State Programs Branch (913) 551-7621 buckner.edwin@epa.gov or For Solid Waste issues: Susan Johnson Environmental Specialist Iowa Department of Natural Resources (515) 281-7982 Susan.Johnson@dnr.iowa.gov	www.epa.gov
Kansas Department of Health and Environment	Jim Rudeen Chief, Compliance Assistance & Enforcement Section Bureau of Waste Management (785) 296-1600	www.kdheks.gov/waste/index.html
Missouri Department of Natural Resources	Tom Judge Environmental Specialist (573) 751-0752	www.dnr.mo.gov/env/hwp/index.html
Nebraska Department of Environmental Quality	Morgan Leibrandt Compliance Supervisor (402) 471-4217	www.deq.state.ne.us/
EPA	Edwin G. Buckner, PE RCRA Enforcement and State Programs Branch (913) 551-7621 buckner.edwin@epa.gov	www.epa.gov

RCRA Underground Storage Tanks

State Agency	Internet Address
Iowa Department of Natural Resources	www.iowadnr.gov/land/ust/index.html
Kansas Department of Health and Environment	www.kdheks.gov/tanks/index.html
Missouri Department of Natural Resources	www.dnr.mo.gov/env/hwp/tanks/tanks.htm
Nebraska State Fire Marshal	www.sfm.ne.gov
Nebraska Department of Environmental Quality	www.deq.state.ne.us/

Toxic Substances Control Act (TSCA)

For more information about TSCA

- Call the EPA TCSA Hotline: (202) 554-1404
- TSCA New Chemicals Prenotice Coordinator: (202) 564-9262
- Visit the TSCA New Chemicals Program Website: http://www.epa.gov/oppt/newchems/
- Visit the TSCA Biotechnology Website: http://www.epa.gov/oppt/biotech/

APPENDIX B – MANAGEMENT OF CRUDE GLYCERIN

Introduction

Crude glycerin, also known as glycerol, is an abundant byproduct of biodiesel production. About one pound of glycerin is created for every 10 pounds of biodiesel produced. Sustainable uses for it are currently being developed.

GLYCERIN SINKS DURING THE SEPARATION PROCESS

Many of the newer and larger facilities are building on-site refineries to create a purified glycerin product or ship crude glycerin to off-site refiners. One biodiesel facility is using a new process that creates a very pure glycerin as a direct co-product and does not have discharges of catalyst or "salty" wash water. It is likely that newer generations of biodiesel production facilities will move toward better recovery of methanol, fatty acids, and catalyst compounds.

More sophisticated facilities are segregating crude glycerin for refining into usable feedstock for other products. Refining can range from minimal processing up to creation of a food grade product.

Nationally, there is much research on the creation of new value-added products (ethanol, propylene glycol, etc.) using glycerin as a feedstock. Most of these projects are in university labs, but a few are up to pilot scale. These new technologies will be utilized at larger scales within the next few years, and are an important part of the profit stream for the industry.

GLYCERIN CAN BE USED TO MAKE SOAPS, SHAMPOOS, MAKE-UP, TOOTHPASTE AND OTHER USEFUL HOUSEHOLD PRODUCTS

Producers that choose to use or dispose of glycerin could be regulated under several EPA programs, depending on the practice. Poor handling of crude glycerin has resulted in fires, upset of sewage treatment plants and fish kills. This appendix is intended to show management options and how those options can fit into the regulatory framework.

Crude Glycerin as a Byproduct

Biodiesel is created by mixing 10 parts of oil or fat (vegetable or animal) with one part of methanol (with a catalyst and heat), to produce 10 parts of biodiesel and one part of crude glycerin. The quality of the crude glycerin is dependent upon the process that the producer uses to handle their glycerin. Companies that remove and reuse the excess methanol used during the production of biodiesel will generate glycerin with these characteristics:

- 85-88% glycerin
- ~10% water
- ~4% salt
- Methanol at up to 1,500 ppm (depending on methanol recovery)
- Fatty acids and soap (depending on purity of feedstock)
- Catalyst
- Trace metals
- Carryover feedstock
- Lost biodiesel product
- High ionic concentration due to catalyst and acid/base neutralization
- High BOD
- High Fuel Value (Pure Glycerin = 19,000 BTU/pound, crude glycerin = 7,000 BTU/pound net fuel value).

There are many possible technologies available for the use or disposal of crude glycerin[1]. Since glycerin is industrial in nature, it should not be disposed in subsurface (septic) systems or sanitary sewers, which are designed and permitted only for domestic waste. The high BOD would also upset those systems. Some of the disposal options are discussed, below.

Land Based Disposal

Landfilling

Disposal by landfill is covered by the state's solid waste regulations and is required to have Clean Water Act stormwater permits. Here is a regulatory description of crude glycerin, based on the solid waste regulations:

- Crude glycerin is a highly viscous liquid at room temperature and solidifies at cooler temperatures. Even though it is a liquid, crude glycerin meets the definition of a solid waste as cited in 40 CFR Part 257.
- The flashpoint of pure glycerin is 160ºF, but the methanol component of the crude glycerin has a much lower flashpoint. With methanol recovery, crude glycerin is likely not a hazardous waste based on a flashpoint of 140ºF. It doesn't take much methanol mixed with crude glycerin to cause its flashpoint to fall below 140ºF, thus making it an ignitable hazardous waste. Regardless of whether methanol is recovered, the producer must make a hazardous waste determination if glycerin is

1If the the crude glycerin is determined to be a hazardous waste, it may not be used as a fuel unless hazardous waste regulations are followed. See Chapter 2, Page 17 of this document.

disposed. See Chapter 2, Section 2.3 of this document for more information about making a hazardous waste determination. If the crude glycerin is a hazardous waste, land disposal, except for a permitted hazardous waste landfill, is expressly forbidden. Even in the hazardous waste landfill, the disposed glycerin must meet Land Disposal Restriction universal treatment standards of 40 CFR 268.48.

- Disposal of diatomaceous earth filter media in landfills has resulted in a number of fires caused by spontaneous combustion. The high surface area of the diatomaceous earth and the oil sets up a rapid decomposition that creates heat. This is similar to the hazard of spontaneous combustion in oily rags. Pyrophoric solid waste is an ignitable hazardous waste.
- Some landfills are refusing the waste due to the concern of spontaneous combustion.

CLOSEUP OF DIATOMACEOUS EARTH WASTE

While crude glycerin might not pass the paint filter test, it can be bulked with other materials and disposed in a landfill. EPA is aware of one small facility that mixes crude glycerin with dewatered municipal sewage sludge and disposes of the mixture in a landfill.

Composting

Hobbyist biodiesel producers have successfully added crude glycerin to a mixed compost (both traditional composting and vermiculture with worms). It is generally agreed that this process could be scaled up to work with industrial or municipal composting operations.

Crude glycerin cannot be composted alone since it is purely a carbon source. Composting requires a source of nitrogen and other nutrients. Also, the compost mixture must be bulked properly to allow adequate oxygenation. For this reason, crude glycerin is best suited to co-compost with other materials such as biosolids, brown and green waste, and bulked manures.

The high Biochemical Oxygen Demand (BOD)/energy content of crude glycerin would require more vigorous management of the compost to assure that the pile remains aerobic. In addition, there is more risk of a high BOD leachate from the pile which should be addressed in the stormwater permit for the co-composting operation.

Here is a list of specialized operational measures that should be considered.

- A concentrated BOD source could really heat up a pile. More active management (turning the pile, forced air in static windrow) might be required.
- Efficient mixing of glycerin with the pile might be difficult from a physical standpoint. This has already been seen when mixing crude glycerin into animal feed.

- Glycerin is a gel at room temperature, but a greasy liquid at compost temperature. More pile bulking might be needed to keep the compost from choking out air. Anaerobic conditions will cause odor problems.
- Winter handling could be tricky due to high viscosity of cold crude glycerin.
- Need some on site crude glycerin storage and the ability to meter addition to pile.
- Scarab or other efficient compost mixing would be far superior.
- Crude glycerin is basic, having very little buffering capacity, so overall alkalinity should be low enough to keep the compost pile's pH in composting range.

FINISHED COMPOST

There has been no large-scale demonstration of crude glycerin compost. An operation of this type would require a site-specific project to work out the operational details. Some states regulate the land application of compost products although federal rules do not. A co-compost with biosolids is regulated by the 40 CFR Part 503.

Land Application

There has not been any significant research on the land application of crude glycerin. Direct land application of crude glycerin can "burn" the plant cover. Scientists are not sure if this is due to the high salt content of the crude glycerin, or if the crude glycerin smothers the plant by physically hindering transpiration. Unrecovered methanol could also be a factor in burning the plant cover. If, because of its methanol content, the crude glycerin has a flash point less than 140ºF, it is an ignitable hazardous waste and land disposal is forbidden by the Resource Conservation and Recovery Act.

In some more arid parts of the country, application of glycerin as a dust suppressant on unpaved roads has shown positive results. But, this practice should be limited to areas where precipitation runoff to surface waters will not be a concern.

The high BOD of crude glycerin creates a high probability for adverse environmental impacts if there is any runoff into nearby streams. Land application over a field drain allows runoff, potentially causing a fish kill. Over-application of glycerin to land surface increases the probability of runoff, which may lead to a violation of the Clean Water Act, subjecting you to fines and enforcement.

Crude glycerin does not have any fertilizer value, and will tie up soil nitrogen as it decomposes. For this reason there has been little interest in studying land application.

GLYCERIN POLLUTING A CREEK

Guidance for the disposal of grease trap wastes suggests incorporation and loading rates of about four (4) tons per acre as appropriate to avoid choking of soils. Essentially, for land application to be benign, loading rates must be low, and runoff control is absolutely essential. Given the other management options, land application is the least desirable alternative: it has little beneficial aspect and is risky environmentally.

Subsurface Disposal

As more biodiesel facilities are developed, their options for the disposal of the glycerin or wastewater that is generated can be limited and injection wells are increasingly being evaluated as a possible disposal option. The current viable injection options for these fluids are either a Class I waste injection well or a Class V injection well. Class I wells inject industrial fluids or municipal wastewater beneath the lower-most underground source of drinking water and are designated as hazardous or non-hazardous, depending on the type of fluids injected. Class V injection wells are mostly shallow wells that inject into or above the underground source of drinking water, but some Class V wells are deep wells that inject below the lower-most underground source of drinking water. The use of deep Class V injection wells that inject below the lower-most underground source of drinking water is a potential option for disposal of glycerin or wastewater from biodiesel production facilities. However, depending on the characteristics of these fluids, meeting the non-endangerment standard may be difficult for Class V injection wells that inject into or above an underground source of drinking water.

Based on the current Underground Injection Control program requirements, the cost estimates for the construction of an injection well for the disposal of glycerin or wastewater generated at a typical biodiesel production facility would vary from $500,000 to $1.25 million depending on the specific drilling and construction requirements. This figure does not take into account the costs to maintain and operate the well after installation which can range from $10,000 to $20,000 annually depending on the testing requirements and their frequency. The majority of the costs associated with an injection well is attributed to the construction phase, while logging, operating, and reporting are a small portion of the total cost. It is important to note that the typical life expectancy of a properly operated and

maintained well is about 40 to 50 years. Additionally, states may impose more stringent requirements that could impact total costs or prohibit the use of an injection well for the disposal of these fluids.

Given the differences in geology and variances in state program requirements, it is important that facilities considering the use of an injection well to check with the state environmental, health or natural resources office listed in the underground injection control section of Appendix A before constructing a new injection well to make sure that the waste streams would be allowed to be disposed of via an injection well. It is equally important for owner/operators of existing injection wells to check before altering the composition of any fluid entering the injection well to make sure that all of the necessary permits or approvals are in place before proceeding.

WATER BASED DISPOSAL

Dumping

Direct discharge of crude glycerin to surface water is strictly forbidden. Crude glycerin is a highly concentrated waste, having a very high biochemical oxygen demand, meaning as it breaks down it consumes oxygen rapidly. Poor management of crude glycerin waste has been documented to cause fish kills in streams.

IN SOUTHEAST MISSOURI, AN ILLEGAL DUMP OF CRUDE GLYCERIN KILLED OVER 25,000 FISH.

Willful dumping/disposal of glycerin to surface water is a criminal violation of the Clean Water Act and may subject you to fines and criminal enforcement. As discussed in the previous section titled "Land Application", ignitable glycerin is a hazardous waste and may not be disposed in a stream.

Treatment at a Publicly Owned Treatment Works (POTW)

Crude glycerin has a very high Biochemical Oxygen Demand (BOD) and can easily disrupt the treatment process of a POTW. BOD is the measure of the oxygen used in breaking down an organic waste. The normal BOD at the headworks of a POTW is 200 mg/L. Washwater from the biodiesel process containing small amounts of crude glycerin can have a BOD of 10,000 – 15,000 mg/L, which drastically reduces the rate at which organic waste will decompose. Pure glycerin has a BOD of nearly 1,000,000 mg/L.

There have been several cases of plant upsets due to these unexpected glycerin loads into the water treatment system. One such event damaged the biological process in a treatment plant, creating untreated discharge water, which resulted in a fish kill.

In addition, biodiesel is often produced in a "batch" process. Batch process wastes tend to be discharged to the collection system all at once, rather than a slow continuous stream, so this increases the potential for organic shock or disruption of biological processes. Crude glycerin and washwater can be easily treated by a POTW when sent to a plant having adequate organic capacity.

The strength of process wastewater from biodiesel plants is highly variable. Plants with washwater recycle, or processes without washwater, can have moderate BOD levels. As stated earlier, washwater has very high BOD levels and crude glycerin is remarkably high in BOD. More sophisticated, well-designed plants use water more sparingly, while less sophisticated producers and hobbyists use more water. Sophisticated facilities are segregating glycerin as a side product and have efficient methanol recovery, while less sophisticated plants are more likely to dispose of crude glycerin, excess methanol, and washwater as a single waste stream. Essentially the strength of the wastewater is based on glycerin and methanol content.

Methanol is used in the biodiesel process to drive the reaction to completion. Most of the methanol leaves the process in the crude glycerin by-product and some is captured in the washwater. Larger processors heat the crude glycerin and recover the methanol through distillation. There are examples of home brew operations with methanol recovery, but these are rare. Crude glycerin without methanol recovery could have a flash point well below 140ºF, so the producer should be aware of this when making a hazardous waste determination. Recently there was an explosion at a biodiesel facility when methanol was inadvertently vented into a building and ignited by a garage door opener.

For large urban facilities, biodiesel wastewater could be beneficial in several ways. Crude glycerin is a concentrated source of Carbonaceous BOD (CBOD); and if organic capacity exists, could be a concentrated revenue source, based on user rates for pounds of BOD. While crude glycerin is such a concentrated form of CBOD, it is a nitrogen deficient waste. In this sense, crude glycerin could serve some POTWs by tying up nitrogen into wasted sludge/biosolids. While the land application or other disposal of the sludge imposes an additional cost to the POTW, the user fee for BOD could offset the additional cost.

POTWs will consider the following before accepting crude glycerin and washwater from a biodiesel plant:

- Composition of the waste
- Organic capacity of the POTW to accept additional BOD load
- The ability of the biodiesel plant or the POTW to avoid slugs of crude glycerin by using equalization or meters
- User fees paid by the biodiesel plant to the POTW. It is important for the POTW to be able to recover their costs. Note that biodiesel plants can avoid these fees if they find a beneficial use for the glycerin instead of disposing it as a waste.
- Limits on the biodiesel facility to ensure the biodiesel facility does not exceed BOD loading limits or slug load to the POTW
- Ignitability of the waste

With most high strength wastes, we would consider pretreatment through anaerobic digestion at the production facility prior to discharge to the POTW. This might not be altogether practical for the biodiesel industry, because the waste is nitrogen and nutrient deficient. To foster anaerobic digestion, you would need to add nitrogen and nutrients (more pollutants) to gain treatment at the facility site.

PUBLICALLY OWNED TREATMENT WORKS FACILITY

Because crude glycerin wastestreams from biodiesel manufacturing have a high organic load, a discharge to a POTW would most likely make the facility a Significant Industrial User (SIU) under the General Pretreatment Regulations, 40 CFR Part 403. Under these regulations, any industrial user that discharges 25,000 gallons per day of process wastewater, contributes 5% or more of the POTWs dry weather organic or hydraulic capacity, or is designated by the POTW to have a reasonable potential to adversely affect the POTWs operation, is considered an SIU. It would not be unusual for a biodiesel manufacturer to meet all three of these tests.

Consequently, all biodiesel manufacturers must contact the city to which they intend to discharge and determine if the city has an approved pretreatment program for regulating industrial discharges. If the city is a pretreatment city, the biodiesel facility must apply for a discharge permit, and provide information on the volume and strength of the intended discharge. If the city does not have adequate hydraulic or organic treatment capacity, the permit issued by the city will contain discharge limits that are not to be exceeded. In this instance, the biodiesel manufacturer would be required to install a treatment system to treat its wastewater before it could be discharged to the city. Disposal of concentrated crude glycerin waste to the sanitary sewer may be prohibited, not only because of its shock load effect on treatment, but also because glycerin can solidify and clog pipes.

Wastestreams from biodiesel manufacturing that are introduced into the solids-handling processes of a POTW without going through the plant headworks are also subject to the General Pretreatment Regulations. No discharge may contribute to or cause a POTW to violate an NPDES permit requirement, whether it is a discharge standard or a sludge disposal requirement. Because crude glycerin wastes when co-digested with domestic sewage generally result in increased methane production, some cities may be eager to take the wastes in order to capture the energy content. However, if the digesters were unable to keep up with treatment of the organic sludge coming from wastewater treatment, and the city experiences violations of its NPDES permit, the biodiesel discharge would be considered as contributing to the pass through and/or interference.

Many biodiesel facilities may discharge to smaller POTWs that have not been required to develop and implement a pretreatment program. For these smaller POTWs, the industry must not only contact the city but also the state to determine if a state-issued permit will be required.

Note: the discussion above is about process wastewater. Biodiesel facilities have water discharges based on stormwater, pre-treatment of process water (reverse osmosis and softening), cooling water, and boiler blowdown. These waste streams are regulated and require NPDES permits. NPDES permits are discussed in Chapter 2, Section 2.1 of this document.

Anaerobic Digestion

Direct anaerobic digestion with nitrogen rich wastes is probably the best means for water-based treatment. Why pump expensive air into an aerobic treatment process, when you can pump burnable methane bio-gas out of an anaerobic process? European biodiesel producers are selling crude glycerin to off site bio-gas facilities for 100 Euros per ton. Many facilities have digesters on site and use the methane fuel to heat the biodiesel process.

As with composting, crude glycerin is best broken down with a mixed waste in the anaerobic process. It should be seen as a fairly pure carbon feed for the anaerobic process. Due to this "purity," a complex source of nitrogen and micronutrients is necessary to assure a healthy, rich bacterial culture. Mixed cultures are much more dependable for process rigor and design. Alternate sources of co-digestion wastes could be various nitrogen rich organic wastes such as meat packing waste, egg cracking waste, manures or biosolids.

In terms of a fuel use of crude glycerin, anaerobic digestion is probably the best environmental alternative, producing clean burning methane gas and capturing nitrogen waste into a sludge that can be land applied as an organically based fertilizer. However, be aware that hydrogen sulfide can be produced if sulfur is available during anaerobic digestion. The hydrogen sulfide and the sulfur dioxide produced when hydrogen sulfide is combusted have air regulatory implications.

The anaerobic digestion process should be protected from organic shock. The biological process will need acclimation, and inputs should be equalized and metered. Two stage thermophylic/mesophylic digesters have shown better resistance to organic shock and may be better suited to the demands of crude glycerin digestion.

From a practical standpoint, anaerobic digesters can be designed to treat crude glycerin like a form of concentrated septage. The facility could store the crude glycerin in tankage and meter it into the digesters directly. The POTW could store the crude glycerin in tankage on the site of the POTW and meter it into the digesters directly. The POTW can charge the industrial user for costs associated with treatment based on the pounds of BOD treated.

Direct Discharges

While this appendix discusses the management of crude glycerin, biodiesel plants may also have discharges of wash water, reverse osmosis reject water, or cooling water. These discharges will also require NPDES permits or pretreatment permits. NPDES and pretreatment permits are discussed in Chapter 2, Section 2.1 of this document. The key concern with those waste streams is salt content and could be a water quality concern when discharges go to small streams with low dilution capacity.

APPENDIX C– NATIONAL ENVIRONMENTAL POLICY ACT PROCESS

The National Environmental Policy Act process consists of an evaluation of the environmental effects of a federal activity, including its alternatives. There are three levels of analysis, depending on whether or not an activity could significantly affect the environment. These three levels include:

1. A categorical exclusion determination
2. Preparation of an environmental assessment/finding of no significant impact; and
3. Preparation of an environmental impact statement

At the first level, an undertaking can be categorically excluded from a detailed environmental analysis if it meets certain criteria that a federal agency has previously determined as having no significant environmental impact. A number of agencies have developed lists of actions that are normally categorically excluded from environmental evaluation under their National Environmental Policy Act regulations.

A federal agency at the second level of analysis prepares a written environmental assessment to determine whether or not a federal activity would significantly affect the environment. If the answer is no, the agency issues a finding of no significant impact. The finding of no significant impact can address measures an agency will take to reduce potentially significant impacts.

If the environmental assessment finds that the environmental consequences of a proposed federal activity might be significant, an environmental impact statement is prepared. An environmental impact statement is a more detailed evaluation of the proposed action and alternatives. The public, other federal agencies, and outside parties can provide input into the preparation of an environmental impact statement and then comment on the draft statement when it is completed.

If a federal agency anticipates that an activity might significantly impact the environment, or if a project is environmentally controversial, a federal agency could choose to prepare an environmental impact statement without having to first prepare an environmental assessment.

A federal agency will prepare a public record of its decision after a final environmental impact statement is prepared. The public record will address how the findings, including consideration of alternatives, were incorporated into the agency's decision-making process.

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APPENDIX D - Emergency Response Program Development

An emergency response program should be proactive and ongoing. EPA interprets "response" to be consistent with the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard (29 CFR 1910.120). OSHA defines emergency response as "a response effort by employees from outside the immediate release area or by other designated responders...to an occurrence which results, or is likely to result, in an uncontrolled release of a hazardous substance."

Response Program Development should involve:

1. Systematic Planning
2. Role of Emergency Medical Service (EMS) in Planning; and
3. Counterterrorism Measures

Response actions during the first few minutes of a release are the most critical. They should not only be planned, but also well rehearsed to minimize the effects of a release. Facilities that take a comprehensive approach in developing a facility-specific emergency response program are better prepared to respond in a release event.

An emergency response plan outlines the action and equipment necessary for effective emergency response. However, a facility must conduct training, evaluate its program, maintain emergency equipment, and regularly coordinate with local agencies in order for an emergency response plan to be useful in an emergency.

SYSTEMATIC PLANNING

The following outline is an approach to an emergency response program. These proactive efforts should enable a facility to efficiently integrate facility-specific information, key technical and management resources, and relevant existing emergency response programs that might require coordination.

1. Identify Federal, State, and Local Regulations Relevant to Emergency Response

Applicable regulations and guidance documents need to be identified for the development of your facility emergency response program. Facilities are encouraged to contact the EPA Hotline at (800) 424-9346 for help in identifying appropriate federal and state regulations.

2. The Program Development Team

A facility should select a team of employees who bring expertise from each of their functional areas. Ideally, the team members should also have varying degrees of emergency response responsibilities and experience within and outside the facility. A three-member team for a small facility might involve a couple of process operators who are cross-trained as emergency responders. A large facility with its own response team might need representatives from the following areas:

- Maintenance
- Operations or Production Personnel
- Process or Upper Management
- Legal or Public Affairs
- Fire and Hazmat Response
- Environmental, Health, and Safety
- Security
- Emergency Coordinator; and
- Labor Relations or Personnel

3. Collect Existing Facility Specific Documents and Information

Members of the development team should collect, review, and maintain copies of the following types of facility-specific materials:

- Site plans
- Existing emergency plans or procedures
- Submissions to the local emergency planning committee
- Hazard evaluation and release modeling information
- Hazard communication and emergency response training
- Emergency drill and exercise programs
- After-action reports and response critiques; and

- Mutual aid agreements

The team might also identify related program materials from the following sources:

- Corporate and industry sponsored safety, training, and planning efforts; and
- Federal, state, and local government safety, training, and planning efforts.

Under CAA Section 112(r)(1), facilities have a general duty to:

- Use appropriate hazard assessment techniques to identify hazards that might result from release;
- Design and maintain a safe facility, taking such steps as necessary to prevent releases; and
- Minimize the consequences of accidental releases, which do occur.

Facilities are responsible under this general duty clause for ensuring that any process release can be effectively handled. Facilities that rely on local responders must determine if the local responders have suitable equipment and training. If they do not, the facility must take steps to meet any needs (e.g., develop facility response capabilities, develop mutual aid agreements, hire response contractors, partially fund local responders).

4. Identify Emergency Response Gaps

The team or a leadership subset should use the information collected to assess compliance with each emergency response program element of EPA's Risk Management Program (40 CFR Part 68). This assessment will expose existing gaps.

Facilities complying with OSHA's Hazardous Waste Operations and Emergency Response Standard will typically already satisfy most or all of EPA's requirements. An assessment of the gaps will help the team focus their efforts. (Note: Even if a facility is complying with OSHA's HAZWOPER Standard, it must submit a risk management plan to EPA as required by 40 CFR Part 68.)

5. Tailor Emergency Response Program to Facility-Specific Hazards

All processes and chemicals at a facility pose a variety of hazards, making it necessary to tailor elements of an emergency response program to facility-specific hazards.

Some common considerations of facility-specific hazards include the facility's susceptibility to the following:

- Fires, spills, and vapor releases
- Floods, temperature extremes, tornadoes, earthquakes, and hurricanes
- Loss of utilities (including power failures and brownouts)
- Train derailments, vehicle accidents, bomb threats, and other man-made disasters; and
- Chemical incompatibilities; e.g., ammonia and chlorine

6. Integrate Emergency Response Program Throughout Existing Plans

Many federal statutes and regulations require emergency response planning. Plans for specific responses can leave personnel and emergency responders confused. Many facilities have developed an integrated contingency plan (ICP) to consolidate emergency plans into a single response plan. Here is a suggested ICP format:

Introduction

- Background Information
- Facility Overview
- Scope and Objective of ICP

Core Emergency Response Plan

- Essential procedures to initiate, conduct, and terminate an emergency response
- Procedures for emergency recognition, notification, and initial response (e.g., assessment, mobilization, implementation)

Supporting Annexes

- Key supporting information and information required for regulatory compliance, such as:
  - ✓ Emergency Response Teams
  - ✓ External Notification
  - ✓ Evacuation Assembly Area
  - ✓ Emergency Response Equipment
  - ✓ Incident Command
  - ✓ Spill Prevention, Control and Countermeasures Plans

The National Response Team, a multi-agency group led by EPA, published integrated contingency plan guidance in the *Federal Register (61 FR 28642)* June 5, 1996. The guidance provides a mechanism for consolidating multiple plans into a single, functional emergency response plan.

7. Prepare Written Emergency Procedures

Facilities are required by risk management program regulations 40 CFR 68.52 (b)(4) and 40 CFR 68.69(a)(iv) to prepare written emergency shutdown procedures and instructions for operators, emergency responders, and others. At a minimum, these materials should be developed for each of the most likely emergency scenarios (e.g., power failure, fire event). These materials should include the following:

- A manual of standard operating instructions
- A system drawing showing the integral parts and their locations
- Emergency shutdown procedures and subsequent start-up procedures
- A table of the ranges of safe operating parameters measured at crucial locations

- Safety procedures to be exercised at various locations, and
- An emergency response flow chart

8. - Develop and Maintain Emergency Tools

A number of tools can be used to assist in a more orderly response during an emergency.

One such tool in the event of an accidental release of volatile chemicals is a wind sock. A wind sock can be an extremely helpful emergency tool as it can help determine wind direction and approximate wind speed at a glance. This information will help determine which direction the chemical is heading and help estimate approximate distance of the release. Facilities should mount wind socks in appropriate places and incorporate their use in their emergency response plans.

Some facilities have developed posters and signs with information for employees and emergency responders. These materials should be effective for the intended people (e.g., other languages, appropriate reading level, locations of signs relative to hazards and emergency exits). For example, the significance of the position of the windsock and its implications relative to evacuation routes should be discussed with all staff members so that an orderly emergency response will result.

Process flow diagrams (also referred to as P&IDs), ladder/logic diagrams, or single line diagrams should be kept up to date and incorporated into operator training programs. Some facilities laminate the P&IDs and/or ladder/logic diagrams and then post them adjacent to the equipment and store a copy with on-site emergency response equipment and plans.

ROLE OF EMERGENCY MEDICAL SERVICE (EMS) IN PLANNING

An integrated emergency medical response is critical in an emergency. People seriously injured by a hazardous material have a greater chance of recovery when:

- Appropriate emergency treatment is provided by prepared EMS personnel at the scene
- The patient is transported to a facility having the most appropriate personnel and technical resources; and
- Communication with the medical facility is open to relay information regarding the material affecting the patient

EMS agencies are crucial links in the community response system and are often the first to arrive at an emergency scene. They must be able to assess the nature of the hazard while attending to the immediate needs of victims.

The absence of EMS personnel in emergency response planning has resulted in the following types of problems:

- Incidents poorly managed by facility personnel and first responders
- Ineffective communication channels and/or redundant or no communication between private and public sectors
- Medical facilities inadequately prepared to treat or manage incoming patients involved in hazardous materials injuries; and
- Medical staff not informed as to the lethal effects of a chemical release

EMS personnel reinforce the importance of defining safe response scenarios, medical practices, and transportation guidelines in an emergency. They will also be critical links in collaborating with other response agencies, such as police and fire departments and hospitals.

EMS personnel should also participate in annual disaster drills and emergency plan reviews, keeping in mind lessons learned during other emergency events.

Your state emergency response commission and your local emergency planning committee play extremely important roles in emergency response planning. Their roles are:

State Commission:

- Establish local emergency planning districts
- Establish procedures for handling public requests for information
- Appoint and oversee local emergency planning committees
- Review local committees' emergency plans

Local Committee

- Prepare and maintain a comprehensive emergency response plan for the district
- Provide hazardous chemical data to the public, and
- Respond to or coordinate response

COUNTERTERRORISM (CT) MEASURES

Before specifically considering CT, a facility should ensure their emergency plan is up to date. Simply adding CT materials to an outdated plan will not produce an effective emergency plan. For example, review of an emergency plan sometimes identifies outdated emergency contact information or process modification and facility construction that had not yet been addressed. After updating an emergency plan, a facility should consider adding information and procedures related to potential terrorist threats.

Facility owners/operators should review their emergency response plan based on the following considerations:

1. - Emergency Contact Information

The National Response Center is the sole federal point of contact for reporting chemical spills/releases. NRC duty officers take reports of actual or potential terrorism, then link emergency calls to the following:

- Department of Defense (for technical advice on dealing with weapons of mass destruction), and
- Federal Bureau of Investigation (to initiate federal response actions and incident investigations).

2. Response Functions

An emergency response plan should clearly define responsibilities in an event. The plan should indicate how response functions change if an emergency occurs as the result of a known or suspected terrorist event. For example, an Incident Command System might transition to a Unified Command structure. The change in response leadership is typically necessary to accommodate emergency response efforts that involve mutual-aid partners and state and federal responders.

3. Hazards Analysis

Weapons of mass destruction (e.g., explosive, chemical, biological, and nuclear) should be considered when reviewing the hazards analysis portion of an emergency response plan. A facility should identify potential targets and their vulnerability to attack. Such a review would result in improvements to help ensure a facility is adequately protected. The emergency response plan is generally made publicly available and should not include details of the security system(s).

4. - Mitigation Procedures

Procedures included in an emergency response plan should involve consequence management efforts. The mitigation activities should be designed to protect workers and the public from further exposure to hazards. In general, public health officials, emergency medical service personnel, and criminal investigators should work together to identify and mitigate hazards following an event. The emergency plan could include a list of basic questions to ask victims, affected emergency responders, and other individuals in the affected population. Information and effective communication are critical in identifying and mitigating effects of a terrorist incident.

Active and passive mitigation systems should be considered. Passive mitigation means equipment, devices, or technology that function without human, mechanical, or other energy input. Examples of passive mitigation include dikes and enclosed systems. Active mitigation means equipment, devices, or technologies that need human, mechanical, or other energy input to function. Examples of active mitigation include interlocks,

shutdown systems, pressure-relieving devices, flares, emergency isolation systems and fire protection systems.

The system design, location, operating procedures, and emergency response procedures should be taken into consideration when determining the mitigation system to use. The design of the mitigation system should consider the different factors that would influence the system operation and potential release scenarios.

Practicing Your Plan

Effective responses to chemical releases require practice in addition to planning. Emergency responders must practice evaluation, isolation, containment and mitigation to prevent catastrophic releases. The following should be reviewed and practiced, as applicable, on a regular basis:

- **Typical Chemical Accidents**
- **Exposure Limits For Chemicals**
- **Requirements under Part 68 of the Clean Air Act -** Risk Management Program
- **Inspect Emergency Equipment**
  Emergency equipment should be inspected regularly to ensure respirators and other equipment are available, accessible, and usable. Air-purifying respirators must have appropriate and unexpired cartridges. Self-contained breathing apparatus (SCBA) air should be suitable for the temperature in which the SCBA will be worn. Facilities should also periodically verify that on-site response personnel are trained and fit-tested for the proper use of the emergency equipment.
- **Establish Emergency Shutdown and Start-up Procedures**
  Establish and practice emergency shutdown and start-up procedures on what to do during and after a power failure.
- **Conducting Emergency Response Drills**
  Numerous facilities are beginning to stage realistic response exercises with their local fire department or their hazmat emergency response teams. The response drills should all be announced and involve preplanning to ensure they are realistic but different from recent drills. All emergency responders (on-site and off-site) should "suit up" as part of each drill.

  Facilities have used regular emergency response drills to maintain and increase public awareness. Facilities might involve citizens in the immediate vicinity of their property. Emergency response and preparedness brochures might be distributed to nearby residences and businesses.

Emergency Planning and Response Guidance

The following materials are available for additional assistance in developing your emergency response program:

- ***Criteria for Review of Hazardous Materials Emergency Plans*** *(NRT-1A)*,
  National Response Team, May 1988.
  Provides evaluation criteria for emergency response plans.

- ***Emergency Response Guidebook***,
  U.S. Department of Transportation, 2008.
  Lists more than 1,000 hazardous materials and provides general hazard information and recommended isolation distances.

- ***Hazardous Materials Emergency Planning Guide*** *(NRT-1),*
  National Response Team, 1987.
  Designed to help communities plan for hazardous materials incidents and includes useful information on planning teams, plan review, and ongoing planning efforts.

- ***Hazardous Materials Guide for First Responders, Federal Emergency Management Association and U.S. Fire Administration***, 1998.

- ***LEPCs and Deliberate Releases: Addressing Terrorist Activities in the Local Emergency Plan***, EPA 550-F-01-005, August 2001.
  Discusses how counterterrorism measures can be incorporated into emergency planning.

- ***NIOSH Pocket Guide to Chemical Hazards,***
  NIOSH Publication No. 2000-130, July 2000.
  Provides 10 relevant databases, including recommendations for chemical protective clothing, toxicologic chemical reviews, and the 2000 Emergency Response Guidebook.

- ***Integrated Contingency Plan***,
  National Response Team, 61 FR 28642, June 5, 1996.
  Guidance on consolidating multiple plans into a single, functional emergency response plan that complies with various federal regulations.

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APPENDIX E - CLEAN AIR ACT SECTION 112(r) - PREVENTION PROGRAM REQUIREMENTS

Determine Your Facility's Program Level

If you have determined that your facility is subject to 40 CFR Part 68, you will first need to ascertain whether your facility is subject to **PROGRAM 1, PROGRAM 2** or **PROGRAM 3**. This appendix will guide you in making that determination as well as your corresponding responsibilities.

Your facility is subject to **PROGRAM 1** if:

- The process has not had an accidental release of a regulated substance that resulted in offsite death or injury, or required restoration of an environmental receptor, within five years of the date you submit your facility's risk management plan;
- Your process has worst-case release scenarios with no possible effect to public receptors; and
- Your process has emergency response procedures coordinated with local responders.

Your facility is subject to **PROGRAM 2** if:

- It has any process that does not meet criteria for Program 1 or Program 3.

Your facility is subject to **PROGRAM 3** if:

- It has any covered process that does not meet the eligibility requirements for Program 1 and either:
  - the process is in the North American Industry Classification System (NAICS) codes 32211, 32411, 32511, 325181, 325188, 325192, 325199, 325211, 325311, 32532; **or**
  - the process is subject to the OSHA process safety management standard (29 CFR 1910.119). **Most ethanol plants that handle risk management plan toxic chemicals are Program 3 facilities.**

If you aren't sure whether this rule applies to your facility or which program (1, 2, or 3) applies, call the EPA HOTLINE for assistance at: (800) 424-9346 or (800) 553-7672 (TDD).

Program Responsibilities

Once you have determined your facility's program level, the following table summarizes what the corresponding requirements are.

Program Level	**Program 1** ***40 CFR 68.12 (b)***	**Program 2** ***(40 CFR 68.12 (c))*** **&** **Program 3** ***(40 CFR 68.12 (d))***
Management System	None required	Required
HAZARD ASSESSMENT		
Worst-Case Scenario	One for each covered process.	One worst-case representative of all regulated toxics and one representative of all regulated flammables.
Alternative Release	None required	One for each regulated toxic and one representative of all flammables.
Five-Year Accident History	Provide information for accidental releases from covered processes that resulted in: 1.On-site deaths, injuries, or significant property damage; **or** 2.Off-site deaths, injuries, evacuations, sheltering in place, property damage, or environmental damage.	Provide information for accidental releases from covered processes that resulted in: 1.On-site deaths, injuries, or significant property damage; **or** 2.Off-site deaths, injuries, evacuations, sheltering in place, property damage, or environmental damage.
Prevention Program	None required	Required
Emergency Response Program	Must ensure that facility is included in the community emergency response plan. For facilities with only flammables, coordinate response actions with local fire department.	Required unless employees will not respond to accidental releases and facility is included in Community Emergency Response plan, response actions for regulated flammable substances are coordinated with local fire department, and public responder notification mechanisms are in place.
Submit a Risk Management Plan	Required	Required

Management System

The management system referred to in the table on the previous page is a requirement for Program 2 and Program 3 facilities to oversee their risk management programs. Facilities are required by 40 CFR 68.15 to do the following:

1. Develop a management system to oversee implementing the risk management program elements
2. Designate a qualified person or position with the overall responsibility for developing, implementing, and ensuring integration of the risk management program elements; and
3. Document names of people or positions and define lines of authority through an organizational chart or other similar document

Prevention Program

Please consider the following when building a prevention program on OSHA's process safety management standard or creating a new program:

- Assessing all hazards that could affect the public or the environment off site
- Integrating elements of the prevention program to ensure each change in any element in the program leads to review of other elements
- Involving staff early to secure their input in developing a concise and comprehensive program
- Visiting facilities that have successful accident prevention programs to learn of their implementation procedures; and
- Applying inspection checklists to determine areas in need of improvement

Hazard Assessment

The hazard assessment referred to in the table on the previous page must include a worst-case scenario for Program 1 facilities and an off-site consequence analysis for each covered Programs 2 or 3 process as follows:

- Worst-case and alternative release scenarios require that potential exposures to human populations be quantified and potential environmental damage identified
- Revised analyses and a revised risk management plan are required by 40 CFR 68.36 within six months of changes in processes or any changes that increase or decrease the distance to an endpoint by a factor of two or more; and
- Worst-case and alternative release scenarios must be reviewed and updated at least once every five years

Many facilities provide an accurate map showing these scenario distances (although not required) to the local emergency planning committee for their planning purposes.

Facilities subject to EPA's risk management program must also provide information on any accidental releases that resulted in deaths, injuries, significant property damage, evacuations, sheltering in place or environmental damage.

Hazard Assessment Resources

- *Risk Management Program Guidance for Offsite Consequence Analysis*, available at www.epa.gov/emergencies/guidance.htm#rmp.
- Appendix E of EPA's *General Risk Management Program Guidance*, available at www.epa.gov/emergencies/guidance.htm#rmp.
- EPA's *Technical Background Document for Offsite Consequence Analysis for Anhydrous Ammonia, Aqueous Ammonia, Chlorine, and Sulfur Dioxide* (April 1999), available at www.epa.gov/emergencies/guidance.htm#rmp.
- RMP*Comp™ software program developed by the National Oceanic and Atmospheric Administration and EPA, available at www.epa.gov/emergencies/tools.htm.

Facilities may choose to use publicly available or proprietary air dispersion models to do off-site consequence analysis. However, modelers should carefully review 40 CFR Part 68 requirements and EPA's *General Risk Management Program Guidance* to ensure compliance with the required conditions.

Your prevention program requirements might already be satisfied if your facility is in compliance with OSHA's process safety management standard, which is the basis for the Risk Management **Program 3,** with the addition of the off-site consequence analysis. Program 3 regulatory references are listed on the next page.

Program 2 prevention requirements address process safety management elements tailored to the less complex processes and chemical usage and involve less documentation than Program 3. Program 2 processes demonstrate compliance by following industry standards and codes, engineering practices, and federal and state regulations. Program 2 regulatory references are listed below.

Program 1 processes have no prevention program requirements.

Prevention Program Regulatory Reference

Section	Program 2
68.48	Safety Information
68.50	Hazard Review
68.52	Operating Procedures
68.54	Training
68.56	Maintenance
68.58	Compliance Audits
68.60	Incident Investigation

Section	Program 3
68.65	Process Safety Information
68.67	Processes Hazard Analysis
68.69	Operating Procedures
68.71	Training
68.73	Mechanical Integrity
68.75	Management of Change
68.77	Pre-Startup Review
68.79	Compliance Audits
68.81	Incident Investigation
68.83	Employee Participation
68.85	Hot Work Permit
68.87	Contractors

Five-Year Accident History

A five-year accident history must be completed and included within a facility's risk management plan by 40 CFR 68.42 and 68.168 if the release caused at least one of the following:

- **On-site** deaths, injuries, or significant property damage; or
- Known **off-site** deaths, injuries, property damage, environmental damage, evacuations, or sheltering in place

The facility's risk management plan must be modified to include a reportable accident within six months after its occurrence. A five-year accident history report must include:

- **Date and Time**. Date and approximate time when accidental release began
- **Chemical(s)**
- **Quantity Released**. Estimate of amount released (using at least two significant digits when possible)
- **Release Event**. Identify cause of release event, for example a gas release, liquid spill, evaporation, fire, explosion, etc.
- **Release Source**. Indicate release source(s), for example a storage or process vessel, piping, transfer hose, valve, pump, etc.

- **Weather Conditions**. On-site weather station, or the nearest weather station, information, for example the wind speed and direction, temperature, atmospheric stability class, precipitation. Also, many local airports will have and provide current weather conditions.

- **On-Site Impacts**. On-site effects including deaths, injuries, property damage.

- **Known Off-Site Impacts**. Deaths, injuries, evacuations, shelter-in-place, environmental damage.

- **Initiating Event**. Immediate cause of accident, for example an equipment failure, human error, weather conditions, theft.

- **Contributing Factors**. Factors contributing to the release, but not the initiating event. For example, equipment failure, human error, improper procedures, over pressurization, upset condition, bypass condition, maintenance activity/inactivity, process design, unsuitable equipment, unusual weather conditions, management error.

- **Off-site Emergency Responder Notifications**. If known, indicate the emergency response agencies that were contacted, such as the police, fire, EMS, LEPC, SERC, and/or NRC.

- **Changes Resulting from Accident**. Measures taken to prevent recurrence (e.g., improved/upgraded equipment, revised maintenance, revised training, revised operating procedures, new process controls, new mitigation systems, revised emergency response plan, changed process, reduced inventory).

Emergency Response Program

A facility has the option to coordinate its response with its LEPC, with the intent that the facility employees will NOT be responding to an accidental release (40 CFR 68.90(b)). If this is the case, then the emergency response program must have mechanisms in place to notify emergency responders and the facility is NOT required to comply with the requirements for 40 CFR 68.95**,** as described below.

If the facility employees will be responding to the emergency, **Program 2** and **Program 3** facilities and its employees must follow the steps outlined in the emergency response program (40 CFR 68.95). The facility must have:

- Procedures for informing the public and local emergency response agencies about accidental releases
- Documentation of proper first-aid and emergency medical treatment for accidental human exposure
- Procedures and measures for emergency response after an accidental release
- Procedures for using and maintaining emergency response equipment
- Training for employees in their emergency response responsibilities; and
- Procedures to review and update the emergency response plan

Emergency Response Plans

Emergency response plans developed to comply with other federal contingency planning requirements can meet the above requirements if they include the 40 CFR Part 68 required elements. The emergency response plan must be facility-specific. It must be maintained and kept at the facility.

Registration

Each registration must include, but is not limited to:

1.Facility Name and Address

2.Contact Person at Facility

3.Names and Quantities of Regulated Chemicals On-Site; and

4.North American Industry Classification System Code (information on NAICS codes can be found at: http://www.census.gov/epcd/www/naics.html. Click on NAICS under the "Business" heading).

Risk Management Plan Updates and Resubmittals

A facility must update and resubmit its risk management plan within six months of:

1. A change that requires a revised off-site consequence analysis (40 CFR 68.36)
2. A change that requires a revised hazard review or process safety analysis
3. A change that results in a change in program level of a covered process. The implementing agency for this regulation can ask the facility to revise the risk management plan under the audit provisions of 40 CFR 68.220. Risk management plans must be revised and resubmitted at least once every five years; or
4. The date of an accident that meets the criteria for the five-year accident history after April 9, 2004

A facility must update and resubmit its risk management plan within one month of a change of the emergency contact information.

Facilities no longer covered under the risk management plan rule are required by 40 CFR 68.190(c) to "de-register" with EPA within six months of the time it is no longer covered. (See Chapter 8 of RMP*Submit User 2004 Manual. The RMP Submit 2004 software can be downloaded at: http://www.epa.gov/emergencies/content/rmp/rmp_submit_2004.htm.

Plan to Work Safely – Best Practices

Accidents are preventable through increased operator training, improved procedures, and better communication of lessons learned. A major component of working safely is to develop and implement "best practices" at your facility. Best practices are intended to help facility engineers and operators:

- Learn from experiences of other facility engineers and operators
- Encourage proactive measures to minimize and prevent accidents relating to ethanol operations
- Recognize specific actions taken to improve process safety, prevent accidents, and enhance emergency planning and response efforts; and
- Be better prepared to help facility managers understand and approve the efforts required to incorporate these and other best practices

Best practices in the ethanol industry are still being established. According to the American Petroleum Institute, "the oil and natural gas industry is becoming an increasingly safer place to work, despite a job environment that often involves heavy equipment, hazardous materials, high temperatures and high pressure equipment. This is reflected by a declining rate of illnesses and injuries…" For more safety tips, please visit: www.api.org

Under the Clean Air Act Section 112(r)(1), facilities having extremely hazardous substances, including ethanol facilities of any size, have a GENERAL DUTY "to prevent releases, and to minimize the consequences of accidental releases which do occur." Implementing "BEST PRACTICES" helps facilities to comply with this law.

Additional Risk Management Plan Resources

Risk management plan guidance documents and training modules are available through the following sources:

- EPA's Office of Emergency Management at www.epa.gov/emergencies.
- EPA's Emergency Planning and Community Right-to-Know Act hotline at (800) 535-0202; or
- EPA's Technology Transfer Network at www.epa.gov/ttn

Confidential Business Information

Facilities can claim some risk management plan information as confidential business information. EPA then determines the validity of the facility's claim. The information can be released if EPA determines that the information is not confidential and has notified the facility. If EPA determines that the information is confidential, a local emergency planning committee might be able to obtain the information under 40 CFR 2.301(h)(3). That regulation provides for sharing confidential business information with state and local agencies having responsibilities under the Clean Air Act or its implementing regulations. Local committees can only gain access to confidential data under this rule if they can protect its confidentiality.

Local emergency planning committees, under Emergency Planning and Community Right-to-Know Act Section 303(d)(3), can compel Section 302 facilities to provide any information necessary to develop and implement a community emergency plan. A Section 302 facility must comply with requests from a local committee for information even if the facility has made a valid confidential business information claim.

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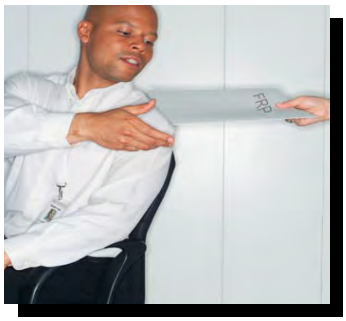
APPENDIX F – DO I NEED A FACILITY RESPONSE PLAN?

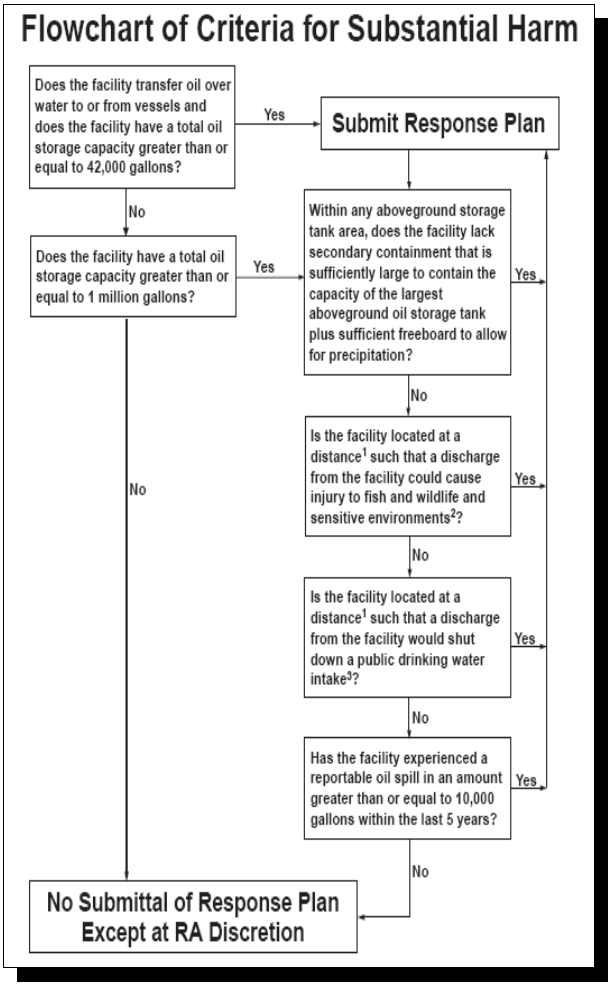


If your facility is regulated under the Spill Prevention, Control and Countermeasure regulation and an oil discharge from your facility could reasonably be expected to cause "substantial harm" to the environment from a discharge to navigable waters of the United States or the adjoining shorelines, you must prepare and implement a facility response plan and submit the plan to the appropriate EPA regional office.

The flowchart of criteria for substantial harm, below, shows the questions you must answer to determine if your facility can be classified as a substantial harm facility. The classification can be met in one of two ways:

- Your facility meets the substantial harm criteria outlined in 40 CFR 112.20(f)(1); or
- An EPA regional administrator determines that your facility poses a threat of substantial harm to the environment.

The following table is from 40 CFR Part 112 , Appendix C



[1] Calculated using appropriate formulas in Appendix C of 40 CFR 112, Attachment C-III or a comparable formula.

[2] For further description of fish and wildlife and sensitive environments, see appendices I, II, and III to DOC/NOAA's "Guidance for Facility and Vessel Response Plans: Fish and Wildlife and Sensitive Environments" (59 FR 14713, March 29, 1994) and the applicable Area Contingency Plan.

[3] Public drinking water intakes are analogous to public water systems as described at 40 CFR 143.2 (c).

Over Water Transfers

You can determine whether your facility meets the over water transfer criterion by answering the following question:

Does your facility transfer oil over water to or from vessels, and does your facility have an oil storage capacity of 42,000 gallons or more?

In order to answer the above question you must first know the following:

- Your facility's oil storage capacity can be determined by adding the capacities of all oil storage containers, such as drums, tanks, electrical equipment, including above ground containers with a capacity of 55 gallons or more.
- A vessel means any type of watercraft capable of being used as a means of transportation on water.

If you answered "yes" to the above question, your facility might pose a risk of substantial harm and you must prepare and submit a facility response plan to the regional administrator.

If you answered "no," you must consider whether your facility meets any of the criteria for facilities with 1 million gallons or more of oil storage capacity. (Please see the next section.)

Oil Storage Capacity

You can determine whether your facility meets the oil storage capacity criterion by answering the following question:

Does your facility have a total oil storage capacity of 1 million gallons or more?

If you answered "yes" to the above question, you need to further evaluate the following criteria:

- Secondary containment
- Proximity to fish and wildlife and sensitive environments
- Proximity to public drinking water intakes
- Reportable discharge of 10,000 gallons or more within the last five years

If you answered "no," you do not have to prepare and submit a facility response plan except at the discretion of the EPA regional administrator. Instead, you are required to prepare a certification that your facility is not a substantial harm facility (40 CFR 112, Appendix C, Attachment C-II) and maintain this at your facility along with your spill prevention, control and countermeasures plan.

Secondary Containment

You can determine whether your facility meets the secondary containment criterion by answering the following question:

Does your facility lack secondary containment large enough to hold the capacity of the largest aboveground storage tank within each storage area plus sufficient freeboard to allow for precipitation?

If you answered "yes" to the above question, your facility is a substantial harm facility, and you have to prepare, submit, and implement a facility response plan.

If you answered "no," you do not have to prepare and submit a facility response plan because of the secondary containment criterion. You must consider whether your facility meets other specified factors. (Please see the next section.)

Fish and Wildlife and Sensitive Environments

You can determine whether your facility meets the fish and wildlife and sensitive environments criterion by answering the following question:

Could a discharge from your facility cause injury to fish and wildlife and sensitive environments?

You must determine the following to answer the above question:

- Calculate the distance that discharged oil could travel from your facility before it is contained. You should use the planning distance calculations for fish and wildlife and sensitive environments to identify all fish and wildlife and sensitive environments within the planning distance. (See 40 CFR 112, Appendix C, Attachment C-III.)
- According to 40 CFR 112.2, injury means a measurable adverse change, either long- or short-term, in the chemical or physical quality or the viability of a natural resource. The change can result either directly or indirectly from exposure to a discharge of oil; from exposure to a product; or from reactions resulting from a discharge of oil.
- You must check other sources to determine what constitutes an area that is sensitive for fish and wildlife or the environment. These areas are identified by their legal designation, by evaluations conducted by area committee members or members of the federal on-scene coordinators' discharge response structure, or in an area contingency plan. These areas can be identified either because of sensitivity to the effects of a discharge event or danger to human health. Examples of these environments include:
    - Wetlands
    - National and state parks
    - Critical habitats for endangered species
    - Wilderness and natural resource areas
    - Marine sanctuaries and estuarine reserves
    - Conservation areas

  - Preserves
  - Wildlife areas
  - Wildlife refuges
  - Wild and scenic rivers
  - Recreation areas
  - National forests
  - Federal and state lands that are research natural areas
  - Heritage program areas
  - Land trust areas; and
  - Historical and archeological parks
- Additional information about fish and wildlife and sensitive environments is in Appendices I, II, and III to Department of Commerce/National Oceanic and Atmospheric Administration's Guidance for Facility and Vessel Response Plans: Fish and Wildlife and Sensitive Environments [59 FR 14713 (March 29, 1994)].

If you answered "yes" to the above question, your facility is a substantial harm facility, and you have to prepare, submit, and implement a facility response plan.

If you answered "no," you do not have to prepare and submit a facility response plan because of the fish and wildlife and sensitive environments criterion. You must consider whether your facility meets other specified factors. (Please see the next section.)

Public Drinking Water Intakes

You can determine whether your facility meets the public drinking water intake criterion by answering the following question:

Could a discharge from your facility affect public drinking water intakes?

To answer the above question, you must first determine the following:

- You must calculate the distance that discharged oil could travel from your facility before it is contained. To do so, you may use the formulas provided in the regulation. (See 40 CFR 112, Appendix C, Attachment C-III.)

- A system is a public water system if it provides piped water for human consumption and has at least 15 service connections or regularly serves at least 25 individuals.

- Public drinking water systems include collection, treatment, storage and distribution facilities.

- To locate a downstream public drinking water intake, consult the appropriate area contingency plan, and contact the municipal or county water authority for each area that might be affected by an oil discharge from your facility.

If you answered "yes" to the above question, your facility is a substantial harm facility, and you have to prepare, submit, and implement a facility response plan.

If you answered "no," you do not have to prepare and submit a facility response plan because of the public drinking water intake criterion. You must consider whether your facility meets other specified factors. (Please see the next section.)

Oil Spill History

You can determine whether your facility meets the reportable discharges criterion by answering the following question:

Has your facility had a reportable discharge of 10,000 gallons or more within the last five years?

If you answered "yes" to the above question, your facility is a substantial harm facility, and you have to prepare, submit, and implement a facility response plan.

If you answered "no," and have followed the sequence of questions to reach this final question, you do not have to prepare and submit a facility response plan except at the discretion of the EPA regional administrator. Instead, you are required to complete and maintain a certification (with your spill prevention, control and countermeasure plan) that your facility is not a substantial harm facility.

Certification of Non-Substantial Harm

If none of the substantial harm criteria applies to your facility, as described in 40 CFR 112.20(e) and in Appendix C, paragraph 3.0 of Part 112, you must complete and maintain at your facility, within your spill prevention, control and countermeasure plan, a certification form indicating that you have determined that your facility is not a "substantial harm" facility. If you decide to use an alternative formula (i.e., one that is not described above or in 40 CFR 112.20(f)(1)(ii)(B) or (C)) to determine that your facility does not meet the substantial harm criteria, you must attach documentation to the certification form that demonstrates the reliability and analytical soundness of the comparable formula and you must notify the EPA regional administrator in writing that you used an alternative formula.

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APPENDIX G - POLLUTION PREVENTION INSIGHTS AND BEST PRACTICES

EPA Region 7 tasked the expert researchers at the Pollution Prevention Resource Information Center (www.P2RIC.org) to provide updates on the science and best practices of biofuels production. These summaries are intended to assist businesses with pollution prevention strategies.

Pollution Prevention Insights

- *A Dry Wash Approach to Biodiesel Purification, BioDiesel Magazine, November 2007.* www.biodieselmagazine.com/article.jsp?article_id=1918&q=Dry%20Washing&category_id=21
  - Water management, both as an input and as wastewater, and the major expense for water removal equipment, has become the single largest production cost.
  - The wet washing process raises the fuel's water content in excess of 1,000 parts per million. Water removal is expensive, difficult and time-consuming.
  - Dry washing replaces water with a magnesium silicate powder to neutralize fluid contaminants.
  - The dry wash process creates high-quality fuel. Since water is not added in the dry wash process, production is more likely to achieve water content less than 500 parts per million in accordance with ASTM D 6751.
  - The magnesium silicate from the dry wash process can be reused. Magnesol used in the dry wash process has commercial use as compost and an animal feed additive.
  - Magnesol holds fuel source potential.

- Thar to produce BioDiesel without hexane, BioDiesel Magazine, March 2008. www.biodieselmagazine.com/article.jsp?article_id=2099&q=New%20Technology&category_id=21
  - In March 2008, Thar Technologies Inc. announced a new initiative to develop cost-effective technology for the mass production of biodiesel. The new process will use high-pressure carbon dioxide rather than hexane, a hazardous air pollutant, to extract oil from edible and inedible oilseed feedstocks.
  - Initial funding for the initiative was obtained through a $2 million grant from the Advanced Technology Program of the National Institute of Science and Technology.

- *Monitoring Biodiesel Production using in situ viscometer, Chemical Engineering Journal, 2008, Naoko Ellis*
  - The use of a viscometer can reveal when the reaction has reached its end point. A plateau in the viscometer curve readout reveals that the end of the reaction has been reached.
  - The viscometer data can also show when a reaction has been unsuccessful. The data will

not display a unique plateau pattern when a reaction is unsuccessful.

- A viscometer can be implemented in Biodiesel plants to help monitor the reaction process continually to help reduce product loss.

- *Towards Producing a Truly Green BioDiesel, Energy Sources, Part A, 2008, A.B. Chhetri*
  - Use methanotrophs to produce methanol from a wide variety of wastes. Methanotrophs are aerobic bacteria which utilize methane as their sole carbon and energy source. Methane gas can be used to produce methanol, using methanotrophs, instead of using methane.
  - Use ethyl alcohol fermented from grain-based biomass, such as corn or sweet sorghum and molasses from sugar, for alcoholysis of vegetable oils or fats.
  - Potassium hydroxide derived from wood ash or sodium hydroxide derived from sea salt can be used as a catalyst along with bio-based methanol in the production of Biodiesel.

- *Influence of Feedstock and Process Chemistry on Biodiesel Quality, Institution of Chemical Engineers: Process Safety and Environmental Protection, 2007, S. Saraf*
  - The transesterification reaction yield/conversion is affection by the following variables: molar ratio, temperature, impurities, and catalysts.
  - Recommend a starting material should have a free fatty acid content of less than 0.5 weight percent. The waste in cooking oil is generally high in free fatty acids (~2.0 weight percent).
  - Hydroxide catalysts resulted in increased saponification (formation of soap) side-reaction and higher solubility of fatty acid methyl esters in glycerol leading to reduced Biodiesel yields.
  - Temperature control is important not to produce any other side reactions.

- *Solazyme Produces World's First Algal-Based Jet Fuel, South San Francisco, California, September 9, 2008.* www.solazyme.com
  - Fuel passes all tested specifications including the most critical ASTM D1655 Specifications.
  - A unique algal conversion process allows algae to produce oil in large tanks quickly, efficiently and without sunlight. The process can employ a variety of non-food feedstocks, including cellulosic materials such as agricultural residues and high-productivity grasses including bagasse and switchgrass as well as industrial byproducts such as crude glycerol.

- *Biodiesel from Used Frying Oil. Variables Affecting the Yields and Chacteristics of the Biodiesel, American Chemical Society, 2005, Jose M. Encinar*
  - The methanol/oil molar ratio was one of the variables that had more influence on the process. The best results were obtained at a molar ratio of 6:1.
  - The transesterification progress was satisfactory at room temperature, which could be very interesting for industrial-scale production due to the energy savings that it would imply.

- *Room-Temperature Conversion of Soybean Oil and Poultry Fat to Biodiesel Catalyze by Nanocrystalline Calcium Oxides, Energy and Fuels, 2006, Chinta Reddy*
  - Nanocrystalline calcium oxide is an efficient catalyst for the production for environmentally compatible biodiesel fuel in high yields at room temperature using soybean oil and poultry fat as raw materials.
  - The reason nanocrystalline calcium oxides would be considered more favorable is the reduction in energy consumption.

- *Biodiesel Production Technology, National Renewable Energy Laboratories, 2004, J. Van Gerpen*, www.methanol.org/pdf/BiodieselProductionTechnology.pdf
  - The shear created by a centrifugal pump can create emulsion problems for the product stream from the biodiesel reactor.
  - Positive displacement pumps are more desirable. Example: internal or external gears or lobe pumps.
  - Mechanical crushing is preferred for smaller plants because it requires a smaller investment. Typically plants that process less than 100,000 kilograms/day use mechanical crushing and plants that process more than 300,000 kilograms/day use solvent extraction.
    - Before the oil can be extracted, the seeds must be prepared. This involves removing stems, leaves, stones, sand, dirt, iron, and weed seeds. After cleaning, the seeds are often dehulled. The hulls are abrasive and contain very little oil (less than 1%). Removing the hulls reduces the wear on the screw press. It can also increase the extraction of oil because the hulls absorb oil.
  - A key quality factor for the primary alcohol is the water content. Water interferes with transesterification reactions and can result in poor yields and high levels of soap, free fatty acids, and triglycerides in the final fuel.

- *North Carolina community college hires biofuels instructor, offers biofuels degree, Biodiesel Magazine, May 2008*
  - The program will train students to work in three areas: using vegetable oils to produce biodiesel; primarily corn-based ethanol production; and the production of biofuels from biomass including grasses, landfill and hog waste.
  - The courses will include biofuels analytics, biofuels waste management and renewable energy technology. As part of the interdisciplinary approach, students will also take courses in chemistry, electrical control systems, welding, bioprocessing practices and small business development.
  - Graduates of the program are expected to qualify for numerous positions within the industry including plant technician, plant manager, lab technician, sales manager, process coordinator or business owner.

- Professional Engineering*; December 12, 2007, Vol. 20 Issue 22, p47-47*
  - Scientists at the University of Leeds are turning low grade sludge into hydrogen-rich gas. Researchers are converting glycerol into hydrogen gas.
  - "The process developed by Dr Valerie Dupont and her co-investigators in the faculty of engineering at the university mixes glycerol with steam at a controlled temperature and pressure, separating the waste product into hydrogen, water and carbon dioxide, with no residues. An absorbent material filters out the carbon dioxide, which leaves a much purer product."
  - The CO_2 that is generated is not produced from fossil fuels.

- *Optimization of bio-hydrogen production from biodiesel wastes Klebsiella pneumoniae, Biotechnology Journal. Vol. 2, no. 3, pp. 374-380. March 2007. Fei Liu*
  - Details components that need to be in place to maximize bio-hydrogen production

- *When Pollution is a By-Product of "Clean Fuel." BioCycle, April 2008, Vol 49 Issue 4, P14-14*
  - The discharges from biodiesel plants can be hazardous to birds and fish.
  - The oil and glycerin deplete the oxygen content of the water very quickly and that will suffocate fish and other organisms.
  - In January 2008, a Missouri businessman was indicted in a glycerin discharge that killed at least 25,000 fish.

- *Catalysts in Production of Biodiesel, Journal of Biobased Materials and Bioenergy, Vol. 1, no 1, pp 19-30. Apr 2007*
  - This paper is a 10,000 foot view of biodiesel. It reviews the literature regarding both catalytic and non-catalytic production of biodiesel.
  - Provides information on the advantages and disadvantages of different methods and catalysts.

Best Practices

- When using a batch reactor to produce biodiesel, the reactor should be closed-looped to capture the methanol.
  - The methanol can be burned as a "biogas" to provide power to the plant or can sell the excess power to the grid, which is similar to what Waste Management, Inc., does at landfills.

- The bi-products of burning methanol are CO_2 and water.
  - A carbon dioxide scrubber or "carbon capture" system can be useful in not allowing as much carbon dioxide to be released.

- A consideration for excess methanol is to convert the methanol to hydrogen. www.biodiesel.org/resources/reportsdatabase/reports/gen/20021001_gen-354.pdf

- If applicable, recycle methanol to continue to use in the process of making Biodiesel. Methanol is an essential ingredient in producing a compound called "sodium methoxide," which is a key component in producing Biodiesel

- Insulate all pipes, reactors, and anything else that can be insulated.
  - With temperature extremes occurring in the Midwest it is important to maintain consistency of temperature

- Use straighter larger pipes where possible
  - Using larger pipes helps reduce friction.
  - Less power and energy will be required from the pumps when using larger straighter pipes.
  - Avoid elbows and curves; use only if need.

- Use energy optimization tools provided by the Department of Energy.
  - Energy Savings Profiler www1.eere.energy.gov/industry/bestpractices/quickpep_tool.html
  - Improving heating System Performance www1.eere.energy.gov/industry/bestpractices/pdfs/proc_heat_sourcebook.pdf

- Use non-virgin oil whenever possible to produce Biodiesel.
  - Using cooking oil from restaurants or other large scale operations is a plus.
  - The plant should try to obtain the same type of oil to improve consistency and quality of finished product.
    - Example: Obtain oil from all fried chicken restaurants (Similar to the system used in NYC.)

- Consistency of water, on-site purification should be strongly considered.
  - Maintain consistency of water by using second stage cleaning.
  - Solar powered purification units can be used to purify water.
  - The purification may only be viable in large scale production of biodiesel, should be considered on a plant by plant basis.

- A excellent source of background information, an excellent technical reference guide from "The federal network for sustainability" is:
  - www.federalsustainability.org/initiatives/biodiesel/biodieseltrg.htm
  - This document contains valuable information for producers on the laws and incentives mandated and offered by the federal government.
  - The one drawback to this article is that it is a little out of date. It was published in November 2005.

- Bio-methanators should be considered as a way to produce "biogas" for plant use.

- Geothermal and solar power should be considered as a way to reduce fossil fuel energy consumption.

- Important to make sure that everything that will touch the biodiesel or methanol is lined or coated to prevent corrosion.
  - Methanol eats uncoated plastic.
  - Try to avoid uncoated metal as it will rust and then contaminate the fuel making the fuel "rusty."
  - Avoid having natural rubber seals or hoses that are in direct contact with the Biodiesel

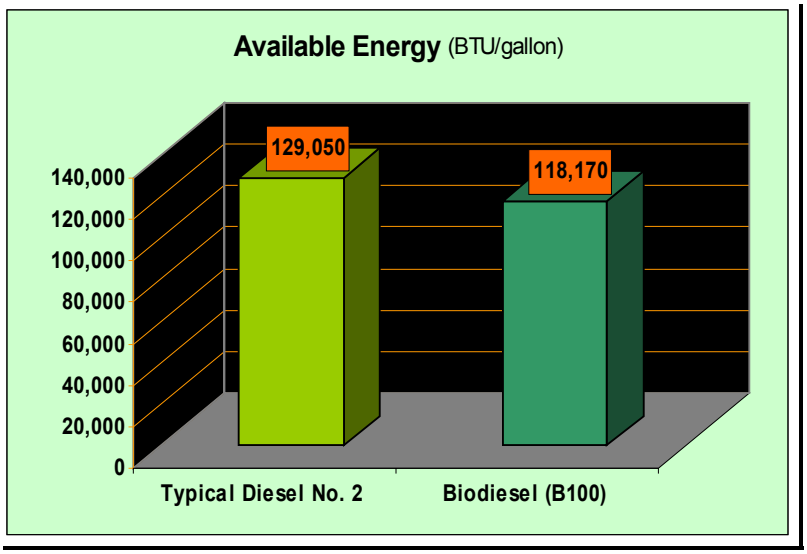
- Advantages of Proprietary Solid Catalyst Synthesis Process
  Texas Biodiesel holds the worldwide exclusive right to commercialize technology developed by the U.S. Department of Energy (DOE) Idaho National Laboratory. Visit www.texasbiodiesel.com/research.htm for more information.

- Optimization of the Continuous Process for Biodiesel Production
  A study grant started by the DOE in 2005, awarded to the state of Alabama. The funding was canceled at the last minute, so Alabama Biodiesel stepped up, raised the money and completed the study. www.eere.energy.gov/state_energy_program/project_detail.cfm/sp_id=788

- EPA Region 9 Innovative Research Project on Biodiesel Production
  Olof Hansen, EPA Region 9, (415) 972-3328
  Currently has a project going at the University of Nevada-Reno, on continuous computer controlled biodiesel production. The goal of this project is to reduce NOx emissions in the preproduction stage.

Fuel Efficiency Statistics

Biodiesel contains 8% less energy per gallon than typical No. 2 diesel in the United States; 12.5% less energy per pound. The difference between these two measurements is caused by the fact that biodiesel is slightly more dense than diesel fuel, so there are slightly more pounds in a gallon of fuel. All biodiesel, regardless of its feedstock, provides about the same amount of energy.



The difference in energy content can be noticeable if one is using B100. When using B20, the difference in power, torque, and fuel economy should be between 1% and 2%. Most users report little difference between B20 and No. 2 diesel fuel. As the biodiesel blend level is lowered, any differences in energy content become diminished and blends of B5 or less do not cause noticeable differences in performance compared to diesel No.2 . Visit www.nrel.gov/vehiclesandfuels/npbf/pdfs/40555.pdf for more information.

Continuous Process Biodiesel

The continuous process eliminates several neutralization and washing steps (and the associated waste streams) needed for conventional processes using homogeneous catalysts, such as sodium hydroxide or sodium methylate. In addition, the glycerin byproduct from Esterfip-H has a purity of better than 98%, compared to about 80% from homogeneous-catalyzed routes. (Chemical Engineering Corp, 01-DEC-07, Marshall, Rebekkah)

On average, using current refining equipment setup in a continuous flow process can have a conversion efficiency of 0.98. www.sage.wisc.edu/energy/Biodiesel_Manuscript.pdf

Continuous process production can produce more consistent batches of biodiesel than batch reaction. (reference biodieselmagazine.com/article-print.jsp?article_id=460

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APPENDIX H - DEFINITIONS OF ACRONYMS

Below is a list of common acronyms and their meanings. A more comprehensive list of environmental terms and acronyms can be found at: www.epa.gov/OCEPAterms/

ANSI	American National Standards Institute
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing Materials
ATSDR	Agency for Toxic Substances and Disease Registry
BACT	Best Available Control Technology
BOD	Biochemical Oxygen Demand
BTU	British Thermal Unit
CAA	Clean Air Act
CAS	Chemical Abstracts Service
CBI	Confidential Business Information
CBOD	Carbonaceous Biochemical Oxygen Demand
CDE	Central Data Exchange
CEPPO	Chemical Emergency Preparedness and Prevention Office
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (or "Superfund")
CESQG	Conditionally Exempt Small Quantity Generator
CFCs	Chlorofluorocarbons
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CT	Counter-Terrorism
CWA	Clean Water Act
DDGS	Dried Distillers Grain with Solubles
DOT	U.S. Department of Transportation
EMS	Emergency Medical Service
EPA	U.S. Environmental Protection Agency
EPA HQ	U.S. Environmental Protection Agency Headquarters
EPCRA	Emergency Planning and Community Right-To-Know Act
ERPGs	Emergency Response Planning Guidelines
FAME	Fatty Acid Methyl Ester
FFARS	Fuel and Fuel Additive Registration System
FR	Federal Register
FRP	Facility Response Plan
GPO	Government Printing Office
HAPs	Hazardous Air Pollutants
HAZMAT	Hazardous Materials
HAZWOPER	Hazardous Waste Operations and Emergency Response
HCFC	Hydrochloroflurocarbon
HP	Horsepower
ICP	Integrated Contingency Plan
ID	Identification
IDLH	Immediately Dangerous to Life and Health
ISO	International Standards Organization
kg	Kilogram

LAER	Lowest Achievable Emission Rate
LDR	Land Disposal Restriction
LEPC	Local Emergency Planning Committee
LQG	Large Quantity Generator
MACT	Maximum Achievable Control Technology
mg/L	Milligrams per liter
MMBtu/hr	Million British Thermal Units per hour
MSDS	Material Safety Data Sheet
NAAQS	National Ambient Air Quality Standards
NAICS	North American Industry Classification System
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NOAA	National Oceanic and Atmospheric Administration
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRC	National Response Center
NRT	National Response Team
NSC	National Safety Council
NSCEP	National Service Center for Environmental Publications
NSPS	New Source Performance Standards
NSR	New Source Review
NTIS	National Technical Information Service
OCA	Offsite Consequences Analysis
ODS	Ozone-Depleting Substance
OPA	Oil Pollution Act
OSHA	Occupational Safety and Health Administration
OSHRC	Occupational Safety and Health Review Commission
OSWER	Office of Solid Waste and Emergency Response
P2	Pollution Prevention
P&IDs	Piping and Instrumentation Diagrams
Pb	Lead
PEL	Permissible Exposure Limit
PHA	Process Hazard Analysis
PM	Particulate Matter
POTW	Publicly Owned Treatment Works
PPM	Parts per Million
PSD	Prevention of Significant Deterioration
PSM	Process Safety Management
PTD	Product Transfer Document
PTE	Potential to Emit
PWSS	Public Water Supply Supervision
RA	Regional Administrator
RCRA	Resource Conservation and Recovery Act
RFS	Renewable Fuel Standard
RICE	Reciprocating Internal Combustion Engine
RIN	Renewable Identification Number

RMP	Risk Management Plan
RQ	Reportable Quantity
RVO	Renewable Volume Obligation
SCBA	Self-Contained Breathing Apparatus
SDWA	Safe Drinking Water Act
SERC	State Emergency Response Commission
SIC	Standard Industrial Classification
SIU	Significant Industrial User
SO_2	Sulfur Dioxide
SOCMI	Synthetic Organic Chemical Manufacturing Industry
SOPs	Standard Operating Procedures
SPCC	Spill Prevention , Control and Countermeasure
SQG	Small Quantity Generator
STEL	Short Term Exposure Limit
SWP	Source Water Protection
TC	Toxicity Characteristic
TCLP	Toxicity Characteristic Leaching Procedure
TDD	Telephone Device for the Deaf
TPQ	Total Planning Quantity
TRI	Toxic Release Inventory
TSCA	Toxic Substances Control Act
TSDF	Treatment, Storage and Disposal Facility
UIC	Underground Injection Control
USDW	Underground Source(s) of Drinking Water
UST	Underground Storage Tank
UTS	Universal Treatment Standard
VOC	Volatile Organic Compounds
WHP	Wellhead Protection Program