MISSOURI DEPARTMENT OF NATURAL RESOURCES
Operator Certification Section
P.O. Box 176
Jefferson City, MO 65102-0176

Water & Wastewater Digest

Summer 2008

BIODIESEL CONCERNS FOR WASTEWATER OPERATORS

Biodiesel is a diesel fuel substitute produced from agricultural products, such as vegetable oils and animal fats, through a chemical process. Biodiesel production in Missouri is a relatively new and rapidly expanding industry. As with many industries in this scenario, there have been some unexpected environmental issues as the industry develops. Among those issues is the disposal of waste products, including glycerin, which the industry never planned on dealing with as a waste.

Glycerin is a byproduct of biodiesel manufacturing that has value as a commodity used in many other products. Unfortunately, the rapid growth of the biodiesel industry has resulted in a glut in the market for this commodity, causing the price for glycerin to crash. Further complicating the glycerin problem is that methanol, a volatile contaminant, is present in the glycerin as a result of the biodiesel process. The methanol can be removed through a refining process, but because of the added cost to do so, many smaller facilities are not equipped to refine their glycerin. Glycerin has an extremely high chemical oxygen demand, and the methanol in the glycerin has toxic characteristics.

Methanol is an extremely flammable simple alcohol. It is a light, volatile, colorless, poisonous liquid with a distinctive odor similar to, but milder and sweeter, than ethanol. A methanol flame is almost colorless and produces no smoke, causing an additional safety hazard.

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The flashpoint of a flammable liquid is defined as the lowest temperature at which it can form an ignitable mixture in air. The flashpoint of methanol is 11° C (52° F). On it's own, glycerin normally has a flash point of 160° C (320° F), but methanol contamination lowers that.

If the contaminated glycerin has a flashpoint below 60° C (140° F), it is an ignitable hazardous waste. If the contaminated glycerin has a pH less than or equal to 2.0, or greater than or equal to 12.5, it is a corrosive hazardous waste. Hazardous wastes have very specific requirements for tracking, storage, treatment and disposal. Any facility considering accepting or storing a hazardous waste must first obtain a permit from the Missouri Department of Natural Resources' Hazardous Waste Management Program.

In addition to glycerin and methanol, biodiesel facilities also have to deal with more routine wastes, typical of many industries, which have the potential to find their way into the sewer system. There are also some special wastes that must be considered. These include:

- Used engine oil, anti-freeze, batteries and similar waste generated from fork lifts, cars and trucks.
- Wastes associated with heating and air conditioning systems and building maintenance.
- Used chemicals, sludge from process tank clean-outs and other wastes generated from production.
- Soy bean oil, other vegetable or animal oils & fats.
- Strong acids and bases.
- process wastewater potentially containing salts, oils & fats, methanol & biodiesel.

All publicly owned treatment works are already required to know about and approve any industry discharging into their collection system. In addition, facilities are required to get approval from the department when new industrial wastewater is proposed. Because of this regulatory process, operators are usually prepared for commercial biodiesel facilities locating in a town and proposing to discharge process wastewater to the sewer system. Of greater concern are those operators approached by someone with glycerin for disposal, and those nefarious characters who simply dump their glycerin into a drain or manhole. When the high chemical oxygen demand load of the glycerin hits a treatment facility it can cause the entire process train to become anoxic, which is devastating to most conventional treatment processes. This scenario has played out across the country and in Missouri, resulting in violation of effluent limits, and fish kills.

Biodiesel isn't limited to large industrial facilities. It can also be manufactured in someone's garage. You may have heard about someone taking waste vegetable oils from restaurants to make their own diesel fuel. A garage-scale producer has the same byproducts as a commercial-scale facility, but often without the financing and sophistication to deal with the waste.

Summary tips:

- Investigate any rumors of small scale biodiesel production in your town. Ask what they are doing with the glycerin. It can be landfilled.
- Do not accept glycerin at your wastewater treatment facility unless it is designed to treat this industrial waste. Some facilities have had success using limited amounts of glycerin in anaerobic digesters.
- If you do decide to accept hauled glycerin, you must seek approval from the department. A permit modification may be required. You will be required to demonstrate what contaminants are present in the glycerin, and that your facility can treat this waste.
- If you are approved to accept and treat glycerin, you must be able to demonstrate that it is not a hazardous waste.
- Know what you are accepting, avoid damaging the environment and avoid fines.

To learn more, please visit the department's Web site to review several relevant fact sheets at www.dnr.mo.gov/pubs/index.html, or visit www.biodieselcommunity.org for information on the production processes for biodiesel fuel. For additional information, please contact Curtis Gately at 573-526-1155 with the department's Water Protection Program.

LT2 DEADLINE FAST APPROACHING FOR SMALL SURFACE WATER SYSTEMS (<10,000 POPULATION)

Sampling schedules are due July 1 and source water monitoring for *E. coli* is to begin in October.

Small (serving a population of fewer than 10,000) surface water systems and ground water under the direct influence of surface water systems must being sampling their source water for *E. coli* beginning October 1. This source water monitoring requirement is part of the Long Term 2 Enhanced Surface Water Treatment Rule or LT2. The initial source water monitoring requirement will be to collect two *E. coli* samples monthly (every two weeks) for 12 months. If the average number of *E. coli* detected in the source waters exceed 10 *E. coli*/100ml for lakes and reservoirs or 50 *E. coli*/100ml for rivers and streams, the systems will be required to test their source water for *Cryptosporidium*. Initial testing of the source waters of the large surface water systems for *E. coli* indicate a large percentage of Missouri's small surface water systems will exceed the *E. coli* triggers.

For those systems that exceed the *E. coli* triggers, source water monitoring for *cryptosporidium* will begin in April of 2010. The Missouri Department of Natural Resources' Public Drinking Water Branch has entered into a contract with Lab/Cor Inc., located in Seattle, WA to provide the *E. coli* and *cryptosporidium* testing. The *cryptosporidium* test is expensive and there are few laboratories certified for this method.

While actual *E. coli* sampling will begin in October 2008, affected systems are required to have completed a monitoring schedule that specifies the calendar dates and a description of their sampling location. The sampling point must provide raw untreated water and must address the sampling location in relation to the system's water sources and treatment processes, including pretreatment, points of chemical treatment and filter backwash recycle. This monitoring schedule must be completed by July 1. Unless an extreme condition arises, samples must be collected within two days before or two days after the dates indicated in their sampling schedule. Contact information for each system will be provided to Lab/Cor Inc. who will work with the water systems to set up the monitoring schedules.

If required to sample for *cryptosporidium* as a result of *E. coli* results, the number of oocysts that are found in the 24 source water samples determines what "bin" a water system will be placed in. Bin 1 requires no additional treatment and most water systems are expected to fall into this category. Bin 4 is the most stringent and it will require a total of 5.5-log of removal for *cryptosporidium*.

The reason behind the source water monitoring requirements of the LT2 rule is that all source waters are not created equal. Under current surface water treatment rule requirements, all surface water systems have to meet the same treatment/log removal requirements. This source water monitoring will hopefully detect any source waters that are especially vulnerable to *cryptosporidium* and eventually provide enhanced protection for the customers of that water system.

There are other requirements in the rule, including reporting and disinfection and profiling provisions.

The U.S. Environmental Protection Agency has enforcement authority over this rule until Missouri adopts the rule. Therefore, the EPA, along with Lab/Cor Inc, will be working together with the affected water systems to provide the testing services, set up the monitoring schedule and meet the requirements of the LT2 rule.

For further information on the LT2 rule, you can visit the U.S. Environmental Protection Agency's Web site at www.epa.gov/safewater/disinfection/lt2/index.html or contact Todd Eichholz with the department's Public Drinking Water Branch at 573-751-4090.

CONSUMER CONFIDENCE REPORTS

The Missouri Department of Natural Resources mailed 2007 annual Water Quality Reports/ Consumer Confidence Reports to all 1,500 community water supplies in mid-May. This is a reminder that the reports must be distributed to all customers by July 1. A copy of final consumer confidence reports and certification forms are due back to the Public Drinking Water Branch by Oct. 1.

There are some slight changes in the format due to a new report writing tool that the department is using this year, but they are basically the same. If you have any questions, please contact Lisa Vaughn with the department's Public Drinking Water Branch at 573-526-3832.

WASTEWATER DMR– QUALITY ASSURANCE STUDY (MAY 1—AUG. 29)

The annual Discharge Monitoring Report – Quality Assurance Study 28 is mandatory for major and selected minor permit holders under the Clean Water Act's National Pollutant Discharge Elimination System. The study is designed to evaluate the entire process used at each facility to routinely report results in discharge monitoring reports or DMRs. The study addresses the analytic ability of the laboratories that perform the chemical, microbiological and whole effluent toxicity analyses required in NPDES permits. It also reviews the facility's ability to properly report these results in DMRs.

Who must participate?
Wastewater facilities that have been classified as major facilities and a selection of minor facilities must participate. The Study 28 participant list is available online at www.dnr.mo.gov/env/wpp/docs/2008-study 28list.pdf.

What to look for…
Participants should have received the Study 28 Announcement Booklet from the U.S. Environmental Protection Agency in April. If you haven't, and you're on the participation list, you should check with others at your facility. It may have been mailed to the city administrator, for example.

How it works (briefly)…
After you order your sample, an EPA approved Proficiency Testing Provider or PT supplies a known sample(s) to the facility or the facility's contract lab for analysis. The same in-house or contract lab that ordinarily conducts DMR sample analysis must analyze the sample. The analytical results are considered ungraded because they have not been compared to the values of the known samples. Participants are responsible for obtaining ungraded results of the tests and submitting them by Aug. 29, to the PT provider so they can be graded. The ungraded results must also be submitted to the department's Water Protection Program.

If a report of "Not Acceptable" is sent to the facility from the PT provider after grading, the facility is responsible for submitting a Corrective Action Report to the department.

Please Remember:
- Participants should have received the Study 28 announcement from EPA in April.
- Do not assume you need to participate if you get a solicitation from one of the PT providers. Check the participation list online.
- Please remember Aug. 29 is the deadline to submit your ungraded results to the PT Provider

Questions?
If you have questions, contact Lance Dorsey at the department's Water Protection Program, by mail at P.O. Box 176, Jefferson City, MO 65102, by phone at 573-522-4506, or by e-mail at lance.dorsey@dnr.mo.gov. Additional information is also available on EPA's Web site at www.epa.gov/compliance/monitoring/programs/cwa/dmr/.

WASTEWATER PERMITS TO INCLUDE ANTIDEGRADATION REVIEW

New requirements for wastewater permitting are coming. Starting in August, all permit applications for new or expanded discharges will be required to follow the new Missouri Antidegradation Rule and Implementation Procedure.

All waters of the state are categorized into three tiers. Tier III waters are the Outstanding National and State Resource Waters; Tier II waters have water quality significantly better than water quality standards; and Tier I streams are near or at the minimum standards for water quality. An antidegradation review is required when a new or newly expanded facility discharges to a Tier II water and significant degradation of the water quality is proposed for a pollutant of concern. The department will require an alternatives analysis of less-degrading and non-degrading alternatives to the selected treatment process. These alternatives must be evaluated for practicability and economic efficiency, and may also be evaluated for affordability. Some lowering of water quality may be deemed necessary to accommodate important economic or social development. However, the water quality can not go below the water quality standard.

To assist understanding of the antidegradation review process, the department is hosting workshops across the state. This half-day workshop is geared towards staff involved in the development of engineering plans and construction permit application. The workshop is department-approved for renewal credit hours for operator certification.

The workshops will cover the background of the implementation procedure, the importance of water quality review assistance and antidegradation applicability and alternative analysis, as it relates to the permitting process. Following is a list of dates and locations:

June 2	Saint Louis
June 3	Springfield
June 4	Lee's Summit
June 5	Columbia
June 18	Poplar Bluff

For more workshop information, visit www.dnr.mo.gov/env/wpp/cwforum/antidegradation-workshops.htm. For more information on Antidegradation, visit www.dnr.mo.gov/env/wpp/wqstandards/wq_antideg_pol.htm or call the Water Protection Program at 573-751-1300.

WHEN DRINKING WATER CAUSES A FISH KILL

This article may be of particular interest to drinking water operators. It discusses what to do if a discharge from a main break causes a fish kill. It's important to note that the utility should notify the department any time there is a water quality standard violation, not just fish kills.
For more information about the water quality standards and when to notify the department, please visit the department's Web site at www.dnr.mo.gov/env/wpp/wqstandards/wq_criteria.htm

Drinking water that contains free chlorine or chloramine in concentrations allowed by the Safe Drinking Water Act can be lethal to fish and other aquatic life. A water main break or leak that causes drinking water to enter water that supports aquatic life can cause a fish kill. This is a violation of the Missouri Clean Water Law.

Chlorinated drinking water becomes a water contaminant when it is discharged to rivers, streams, lakes or other waters defined as "waters of the state" in concentrations that alter the physical, chemical or biological properties of the waters. Discharging a water contaminant that reduces the water quality below the state's Water Quality Standards is a violation of the Missouri Clean Water Law.

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When a water main break occurs, the utility should eliminate the source of the discharge as quickly as possible. Once the utility has regained control of the source, it should take steps to minimize the effects of the discharge on waters of the state. When the discharge of drinking water causes a fish kill, the responsible utility must notify the Missouri Department of Natural Resources' Environmental Emergency Response at 573-634-2436. It is the responsibility of the Missouri Department of Natural Resources and the Missouri Department of Conservation to conduct on-site evaluations to assess damages and monitor the utility's response to the incident.

Chlorine is volatile when exposed to air. On a hot day drinking water containing chlorine can be sprayed into the air or directed to run off a hot parking lot or across a field to minimize the risk of killing fish once it reaches the stream. Chloramines persist longer, which makes them ideal for disinfecting drinking water, but present a higher risk of a fish kill unless chemically treated before released to the environment.

Research indicates that water containing free chlorine and chloramine affects the fish's ability to transport oxygen in their bloodstream. Fish stressed by chlorine or chloramine can be observed gulping air at the water's surface similar to fish placed in an oxygen depleted environment.

In the event of a fish kill, the state may require the utility to reimburse the state for the value of the loss to the state's resources and the state's costs in the investigation. Assessment of civil penalty will be made on a case-by-case basis with leniency given to water systems that regularly maintain and replace aging water mains, especially if this is part of an effective Technical, Managerial and Financial program. Fish costs are based on procedures outlined in the American Fisheries Society, Special Publication 30, *Investigation and Monetary Values of Fish and Freshwater Mussel Kills,* while the state's costs are based on expenses directly attributed to the investigation such as staff time and analytical costs, which are not negotiable.

For additional information, contact Mary Ann Redden with the department's Water Protection Program at 573-522-4018.

MISSOURI WATER QUALITY CRITERIA

Criteria are elements of water quality standards, expressed as concentrations, levels, loads or narrative statements that represent the quality of water required to meet a designated or beneficial use.

Numeric criteria in the form of concentrations, loads, values etc. are applied to classified waters only. The majority of Missouri's numeric criteria can be found in tables A and B in 10 CSR 20-7.031.

Listed below is the set of eight narrative or general criteria for Missouri that must be met in all waters of the state.

General Criteria

No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:

1.	Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.
2.	Waters shall be free from oil, scum, and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses.
3.	Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.
4.	Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal, or aquatic life.
5.	There shall be no significant human health hazard from incidental contact with the water.
6.	There shall be no acute toxicity to livestock or wildlife watering.
7.	Waters shall be free from physical, chemical , or hydrologic changes that would impair the natural biological community.
8.	Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200-260.247.

INNOVATIVE ENERGY MANAGEMENT FOR WATER & WASTEWATER UTILITIES

EPA Region 7 Workshop

Date: July 22 from 8:30 a.m. to 4 p.m.

Location: EPA Cave, 8600 NE Underground Drive, Pillar 253, Door 32, Kansas City, MO

Co-sponsored by: Missouri Department of Natural Resources, Iowa Department of Natural Resources, Kansas State University Peer Center & University of Missouri at Rolla Peer Center

This energy management workshop will demonstrate how to reduce energy use and increase savings for water and wastewater treatment plants. It will provide: interactive instruction on reducing energy use by using energy management approaches; opportunities to learn from experienced utility representatives on energy performance improvements and associated cost savings; and help to identify follow-up opportunities for EPA to further assist utilities.

This workshop will help utilities:

- Develop an individual energy management plan.
- Prioritize energy management activities.
- Set measurable energy goals to reduce consumption.
- Manage energy to reduce operating costs.
- Establish a plan to follow through on priority energy management goals.

Each workshop participant will receive a copy of the Energy Management Workbook (2007) developed by EPA and Utility Managers

Registration Information Available Soon!
Registration is required, but there is no registration fee.

For more information please contact::

Kerry Herndon, USEPA Region 7
Tel: 913-551-7286
E-mail: herndon.kerry@epa.gov

Mary Mindrup – USEPA Region 7
Tel: 913-551-7431
E-mail: mindrup.mary@epa.gov

MISSOURI SOURCE WATER PROTECTION PROGRAM

The 1996 amendments to the federal Safe Drinking Water Act established a renewed emphasis on preventing contamination of groundwater and surface water drinking water sources. The Missouri Department of Natural Resources' Public Drinking Water Branch, endorses this initiative and has adopted a multiple-barrier approach to source water protection that includes risk prevention, risk management, risk monitoring and public awareness.

The Missouri Wellhead Protection program, established in 1994, was the state's first formal source water protection program, and was designed to protect groundwater resources. The source water protection program, administered by the department's Public Drinking Water Branch, was established several years later to include surface water sources, such as reservoirs or streams, into the state's source water protection efforts.

Both of these programs are designed to facilitate and support community-based source water protection efforts. The department's Public Drinking Water Branch strongly encourages every community served by a public water system to develop and implement a voluntary Source Water Protection Plan to protect their local drinking water sources and their critical water system infrastructure.

In Missouri, there are more than 3,800 active or proposed public water supply wells and 150 surface water intakes that supply water to drinking water suppliers. All public water systems, whether utilizing wells or surface water intakes, are susceptible to contamination from point and non-point source pollution. There are many

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possible pathways to contamination of a raw drinking water source, including:

- Proximity to known contaminant locations.
- Variable subsurface conditions and features such as karst topography or fractured bedrock.
- Improperly constructed, maintained, or abandoned wells.

The department's Public Drinking Water Branch performed preliminary contaminant inventory assessments for every public water system in Missouri in 1994 – the results of these assessments are available to the public through the Center for Agricultural, Resource and Environmental Systems (www.cares.missouri.edu). These preliminary assessments provide a foundation upon which communities and public water systems can build more detailed and accurate source water assessments to serve and protect their communities.

Can your community afford not to utilize source water protection? Contamination of raw water sources can increase the overall cost of the treatment process and make compliance with federal and state drinking water quality standards difficult. Common problems associated with contaminated source waters include increased turbidity, elevated microbial concentrations, and increases in organic, volatile organic, inorganic, or synthetic compound levels above the maximum contaminant level or health advisory limits. A public water system that experiences increased contamination to their raw water source must provide additional treatment to their raw water or outright replace their source. The financial burden that accompanies this increased cost can overwhelm a community and the public water system that serves them. A community that develops and implements a source water protection plan can dramatically reduce the impacts of contamination to their raw water quality and assist their public water system to operate in a more efficient and sustainable manner.

A critical component of source water protection is community involvement. Public water systems often lack the ability to moderate land use activities that actively or potentially contribute to raw water quality or quantity. Through partnership and coordination with local citizens and businesses that live and operate in the source water area, awareness of source water protection initiatives and community involvement will increase. Source water protection is a proactive approach to preventing contamination rather than responding to contamination through costly remediation and increased treatment processes.

The source water protection program has helped many public water systems improve raw water quality, treatment and finished water quality. The program has also helped remove source waters from the state's 303(d) impaired waters list or meet their total maximum daily loads. The most successful source water protection efforts are those that involve the entire community in the protection process. It is only through community awareness and vigilance that a source water protection plan can be truly effective – as communities develop and grow, additional sources of contamination will invariably be introduced into the watershed. An effective source water protection plan will assist communities and PWSs to plan for increased usage requirements and any potential contamination that accompanies that growth.

The department, in cooperation with other state, federal and non-governmental water quality interest groups, have dedicated individuals that can assist in the development and implementation of local source water protection plans.

For questions regarding the level of source water protection in your community, please contact any of the following departing staff:

Ken Tomlin, the department's Source Water Protection Coordinator, at 573-526-0269 or ken.tomlin@dnr.mo.gov.

Richard Morrow, an Environmental Specialist with the department's Northeast Regional Office, at 660-385-8052 or richard.morrow@dnr.mo.gov.

Katherine L. Frederick, an Environmental Specialist with the department's Kansas City Regional Office, at 816-622-7048 or katherine.frederick@dnr.mo.gov.

VISIT US ON THE WEB!

The list of approved training changes frequently as new courses are reviewed and approved by department staff or trainers adjust schedules. By the time this newsletter reaches you, there may be new courses available in your area.

Visit us at www.dnr.mo.gov/env/wpp/opcert to view an up-to-date list of approved courses.

Training

The mailed version of this publication included a three page list of approved training courses and exam schedule that was available at the time of printing. For a current listing of training, please visit:
www.dnr.mo.gov/env/wpp/opcert/oprtrain.htm

Water & Wastewater Digest

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