



State of Ohio
Environmental Protection Agency

Office of Compliance Assistance and Pollution Prevention

Want to Start a Biodiesel Production Operation?

Environmental Compliance Basics

April 2007

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Biodiesel Production Process

Biodiesel is a clean burning fuel produced from animal or vegetable oils through a chemical process called transesterification. Biodiesel is typically produced from seed, nut, soybean and olive oils. Animal oils (tallow, lard, grease) can also be used, although successful processing may need special conditions and procedures. Highly refined, food-based feedstock, such as soybean oil, is usually more suitable because its properties facilitate simple and quick transesterification. Less refined raw materials, such as animal fats, contain fatty acids, which can be an obstacle to generating high yields of biodiesel. Fatty acids can create problems because they tend to form soaps in the transesterification process. These soaps increase the formation of gels, which can make it more difficult to produce a high yield of biodiesel fuel.

Most commercial biodiesel produced today is from soybean oil. A typical biodiesel production operation using soybean oil feedstock has the following inputs and outputs¹:

<u>Input</u>	<u>Output</u>
12% Methanol	4% Methanol
1% Catalyst	9% Glycerin
87% Soybean Oil	86% Biodiesel
	1% other (fertilizer)

¹ Source: National Biodiesel Board™, www.biodiesel.org/.

The basic process reacts methanol, oil and a catalyst (such as sodium or potassium hydroxide) under heat and pressure. Feedstock materials are pumped from tanks or containers, in an enclosed process, to a reactor. Once the reaction is complete, biodiesel and glycerin are separated and pumped to storage tanks for distribution. Excess methanol can be separated and distilled for reuse.

Some biodiesel manufacturers can find buyers for their glycerin because it can be used to produce soap products. As biodiesel production has increased significantly nationwide, however, markets for glycerin have become much smaller.

Biodiesel can be used as a pure fuel or blended with regular petroleum-based fuels. A common blend is B20, containing 20% biodiesel and 80% petroleum diesel. Fuel-grade biodiesel produced for sale and distribution must meet strict industry specifications (ASTM D6751) and be registered with the U.S. Environmental Protection Agency (U.S. EPA).

Environmental Regulations and Biodiesel Production

There are several areas related to the construction, design and operation of a biodiesel manufacturing process that could be regulated by Ohio EPA, including:

- Air emissions from tanks, pumps and valves, fuel burning equipment and material handling;
- Process wastewater discharges from boiler blow down, cleaning and other production activities;
- Management and disposal of wastes;
- Storm water contamination from material handling, on-site storage and facility construction activities; and
- Spill prevention, planning and notification.

This guide highlights the environmental requirements that may apply to your biodiesel operation and resources available to help get your business started with the proper Ohio EPA permits. This guide is only a starting point, and should not be your only source of information on the regulations.



AIR POLLUTION SOURCES

Potential sources of air pollution that may require permits include:

Equipment	Air Permitting Requirements
Boiler or process heater (Air pollution from fuel combustion)	Air permit required unless rating is less than 10 million BTU/hr and burning natural gas, distillate oil (sulfur content less than 0.5%, by weight) or liquid petroleum gas.
Electrical generators (burning diesel fuel, natural gas, gasoline, LPG)	Air permit required unless unit is used only for emergency use and for less than 500 hours per year.
Material storage tanks (Air pollution from working and breathing losses)	<p>Air permit required unless tank has submerged fill* and its capacity is:</p> <ul style="list-style-type: none"> • less than 19,815 gallons; • between 19,815 and 39,894 gallons and material stored has a true vapor pressure less than 2.176 psia; (Note: the vapor pressure of methanol exceeds 2.176 psia.) • greater than 39,894 gallons and material stored has a true vapor pressure less than 0.508 psia <p>* Submerged fill means fill pipe at the discharge opening is entirely submerged when the liquid level is six inches above the bottom of the tank. Or when a tank is loaded from the side, this means fill pipe at the discharge opening is entirely submerged when the liquid level is 18 inches above the bottom of the tank.</p>
Reactors, separators, evaporator units (evaporative emissions from material transfers, process vents, pump and valve leaks)	Air permit required IF emissions exceed de minimis levels. (See discussion below). If the facility is capable of producing more than 1,102 tons of glycerin per year, based upon design capacity, then the equipment is subject to federal EPA rules and permits are required. A system that can produce three million gallons or more of biodiesel per year also can typically produce glycerin in an amount exceeding 1,102 tons per year.
Truck loading racks and/or drum filling operations (evaporative losses)	Air permit required IF emissions exceed de minimis levels. (See discussion below).

Equipment and process units that have low emissions may not need air permits. If you can document that an air emission source does not emit more than 10 pounds per day of air pollutants, it can be classified as a de minimis source and it does not need an air permit. For a small biodiesel operation with closed-loop process equipment, you may qualify for the de minimis exemption for one or all of your air emission sources.

If you do qualify for the exemption, there are record keeping requirements for you to comply with. See resource list at the end of this guide for links to more information on the de minimis exemption. You can contact Ohio EPA's Office of Compliance Assistance and Pollution Prevention (OCAPP) for help in determining if you qualify for the de minimis exemption. See the end of this guide for OCAPP contact information.

For units that require air permits, you need a permit-to-install (PTI) and permit-to-operate (PTO). The PTI is required before installing equipment and the PTO is needed to operate the equipment.

The terms and conditions of an air permit usually include emission limits, monitoring/operating conditions and record keeping requirements. Once you get the permit, it is very important that you read and understand the terms and conditions of your permit.

Note: If you are already operating your business and discover that you need an air permit, you must still complete and submit PTI and PTO applications.

WASTEWATER DISCHARGES

Process wastewater discharges from biodiesel manufacturing (for example, from boiler blow down, cleaning or other process operations) are regulated by Ohio EPA's Division of Surface Water (DSW).

Discharges to a municipal wastewater treatment plant

If you want to discharge to your local wastewater treatment plant (called a publicly owned treatment works, or POTW), contact them directly on local requirements and to see if you need a discharge permit from them. Because POTWs are not generally designed to treat wastewater containing chemicals, oils and other contaminants from manufacturing processes, you may be required to treat the wastewater before you can discharge it.

Many POTWs are authorized by Ohio EPA and run their own programs to control what goes into the local sewers. Ohio EPA has a list of POTWs with approved pretreatment programs. See the resource section at the end of this guide for a link to information on POTWs. If your POTW does not have an approved program, Ohio EPA's Division of Surface Water is responsible for issuing the discharge permit (called an indirect discharge permit).

In addition to local POTW requirements, if you will be constructing a wastewater holding tank or wastewater treatment system, this requires a permit-to-install (PTI) from Ohio EPA's Division of Surface Water before beginning construction.

IMPORTANT

Wastewater from biodiesel production may be high in free fatty acids and glycerin, and can have a high biochemical oxygen demand (BOD). These can disrupt wastewater treatment plant operations, so it's important that you contact your POTW about their requirements BEFORE discharging anything to them.

Direct discharges to waters of the state

A facility that wants to discharge wastewater directly to any waters of the state must first get a National Pollutant Discharge Elimination System (NPDES) discharge permit from Ohio EPA's Division of Surface Water. Examples of waters of the state include streams, rivers and lakes. Discharges that enter a conveyance system (like a ditch or storm sewer) that leads to a waterway may also require an NPDES permit.

The NPDES permit helps maintain the quality of surface waters by controlling the quantity and type of pollutants that can be discharged. The permit typically contains discharge limitations, monitoring and reporting requirements.

You may be required to treat wastewater to remove contaminants and meet effluent limitations before the wastewater is discharged. If you need to construct a wastewater treatment system, you need a separate PTI from Ohio EPA's Division of Surface Water before beginning construction.

ON-SITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS

If you are locating in an area that does not have sewers and need to construct an individual sewage treatment system (e.g., septic system, mound system, drip irrigation system, package plant), you need a permit-to-install (PTI) from Ohio EPA's Division of Surface Water. If you expand or modify an existing on-site sewage or wastewater treatment system, you need a PTI. If the system will have a discharge, you also need an NPDES discharge permit.

It's important to know that there are many factors related to whether an on-site sewage treatment/disposal system can be approved. Some of these factors include flow volume and character, property size, soil type, depth to bedrock, location of wells, access to receiving streams and access to existing sanitary sewers. If you want to locate your business in an area that does not have sewers, contact DSW staff at your local Ohio EPA district office before you purchase property to discuss your options for sewage and wastewater management.

IMPORTANT

Only sanitary waste and wastewater (from bathrooms and sinks) can go to an on-site sewage treatment or disposal system.

Process wastewater containing chemicals, oils or other contaminants **CANNOT** go into an on-site system. You must find another way to manage your process wastewater, such as installing a separate holding tank. A holding tank requires a PTI from Ohio EPA's Division of Surface Water. If you have chemicals in your wastewater, your tank may also be regulated as a hazardous waste tank by Ohio EPA's Division of Hazardous Waste Management. You'll need to contact a hauler to empty your holding tank. The wastewater must be evaluated and delivered to a commercial wastewater treatment facility or, if hazardous waste, to a hazardous waste disposal facility.

Bottom Line: Consider locating in an area with access to city water and sewer. This makes wastewater management much easier and probably not as costly.

See resource section at the end of this guide for links to wastewater permit resources.

Permits for Construction and Industrial Activities

Ohio EPA's storm water program addresses contamination that could be carried by storm water runoff into nearby waterways. Those regulated must get a National Pollution Discharge Elimination System (NPDES) storm water permit and develop a pollution prevention plan that outlines the steps taken to reduce or prevent storm water contamination. There are two different storm water permits that apply to biodiesel operations.

Storm Water Permit for Construction Activities

To help prevent erosion and loss of sediment on construction sites, Ohio EPA requires a storm water permit and pollution prevention plan for any construction activity that will disturb one or more acres. This includes any construction activity that might itself be less than one acre but is part of a larger project that disturbs one or more acres in its entirety.

Storm Water Permit Associated with Industrial Activities

If your facility falls into any of 11 specific categories included in the storm water regulations, you need a storm water permit. Some categories are defined by specific Standard Industrial Classification (SIC) codes. Others include operations where there is a potential for storm water contamination from outdoor material handling or storage. A list of the regulated categories is at <http://cfpub1.epa.gov/npdes/stormwater/swcats.cfm>.

There are two types of storm water permits, individual and general. A general permit covers facilities that have similar operations and discharges. There are several storm water discharge activities that can be covered under a general permit. There is a general permit for construction storm water activities and a general permit for industrial activities. There are certain circumstances where a general permit is either not available or not applicable to a specific activity. In these situations, an individual storm water permit is required. Storm water permits are issued by Ohio EPA's Division of Surface Water.

Storm Water "No Exposure" Exemption

Under this exemption, facilities in any of the 11 categories mentioned above (except construction activities) can certify that they have a condition of no exposure, if materials and operations at the site are not exposed to storm water. As long as no exposure exists, the facility is excluded from industrial storm water permit requirements. More information on the no exposure certification is at www.epa.state.oh.us/dsw/storm/ind_noexp_cert.html.

For more information on storm water permits, visit the following Web sites, or contact your local Ohio EPA district office, Division of Surface Water for help.

Storm Water Program Web Site -

www.epa.state.oh.us/dsw/storm/index.html

Construction Storm Water Permit -

www.epa.state.oh.us/dsw/storm/construction_index.html

Industrial Activity Storm Water Permit -

www.epa.state.oh.us/dsw/storm/industrial_index.html

Biodiesel production plants fall under the major SIC industrial group 28 (2869) and are required to get a storm water permit for their industrial activities.

SPILL PREVENTION CONTROL AND COUNTERMEASURE (SPCC) PLANS

If you have an aboveground aggregate storage capacity for oil or oil products (including vegetable oils) of greater than 1,320 gallons, you must meet the Spill Prevention Control and Countermeasures (SPCC) requirements. In determining your storage capacity, you must consider the total capacity of your tanks and containers, not the actual amount of oil stored. If you are storing oil in containers less than 55 gallons in size, you do not need to include these in calculating your SPCC storage capacity.

Under these rules, you must develop an SPCC plan, outlining the measures you will take to control and respond to an oil-related release at the site. The SPCC requirements also include secondary containment for oil/oil product storage units.

The SPCC program is administered under federal regulations by U.S. EPA. Ohio EPA's Division of Emergency and Remedial Response (DERR) assists U.S. EPA in conducting investigations for the SPCC program and can help respond to questions you may have about the regulations.

Visit Ohio EPA's Web site at www.epa.state.oh.us/derr/ersis/er/SPCC/spcc.html for more information and a list of SPCC contacts in your area. U.S. EPA's SPCC Web site is at www.epa.gov/oilspill/. Also see Ohio EPA's fact sheet Understanding the Spill Prevention, Control and Countermeasure (SPCC) Requirements, available at www.epa.state.oh.us/ocapp/sb/publications/spcc.pdf.

PUBLIC WATER SYSTEMS

If you have or want to install a water well, it could be classified as a public water system and regulated by Ohio EPA. A public water system is any system that provides water to at least 25 people any 60 days out of the year. This includes water used for drinking, bathing, showering, tooth brushing, food preparation or dishwashing.

Public water systems are regulated by Ohio EPA's Division of Drinking and Ground Waters (DDAGW). You are required to submit detailed plans to DDAGW for approval before installing a new public water system, or before making changes to an existing well or water treatment process. You also need a license from Ohio EPA to operate a public water system (there are some exceptions to this). Larger public water systems are required to have a certified operator in charge of the system.

For more information on public water systems, see Ohio EPA's *Guidelines for Design of Small Public Water Systems* at www.epa.state.oh.us/ddagw/Documents/greenbook.pdf. You can also contact DDAGW staff at your local Ohio EPA district office for help.

A private water system has less than 15 service connections and serves fewer than 25 people for at least 60 days per year. Local health departments regulate private water systems. Contact your local health department for additional information.

Non potable production wells are regulated by the Ohio Department of Natural Resources (ODNR). See resource section at the end of this guide for ODNR contact information.

EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT (EPCRA)

EPCRA is also known as SARA Title III. Major reporting requirements under EPCRA include:

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

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

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

The definition for hazardous chemicals and the list of extremely hazardous substances, along with the reporting thresholds for each are in the *Emergency Planning and Community Right-to-Know Facility Reporting Compliance Manual*, available at www.epa.state.oh.us/dapc/serc/Facility_book.pdf.

Methanol, sodium hydroxide, potassium hydroxide and glycerin are considered hazardous chemicals. The threshold quantity (TQ) for hazardous chemicals under Sections 311- 312 is 10,000 pounds. This TQ is for each chemical, not all chemicals combined.

Emergency Release Notification (Section 304)

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

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

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

For more information on release reporting requirements, see www.epa.state.oh.us/dapc/serc/Release_Reporting.pdf.

Toxic Chemical Release Inventory Reporting (Section 313)

Ohio EPA is required to establish an inventory of toxic chemical emissions from certain types of facilities. This inventory is called the Toxic Release Inventory, or TRI. A facility must file a report under this section if all of the following conditions are met:



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

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

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

Ohio EPA's Division of Air Pollution Control is responsible for the TRI program. For more information, visit the TRI Web site at www.epa.state.oh.us/dapc/tri/tri.html.

HAZARDOUS WASTE REGULATIONS

Under these regulations, all wastes generated from a business must be evaluated to determine if they are hazardous wastes. Ohio EPA has specific regulations on how hazardous waste must be handled and disposed. There are also record keeping requirements to comply with.

If you have a material that can no longer be used, or cannot be sold/recycled, this is considered a waste. You must evaluate the waste BEFORE you dispose of it and, if hazardous, ensure that it is sent to a permitted

hazardous waste facility. Hazardous waste CANNOT be thrown in your solid waste dumpster along with your normal trash.

As a starting point, see Ohio EPA's fact sheet *Identifying Your Hazardous Waste*, available at www.epa.state.oh.us/ocapp/sb/publications/identifyingwaste.pdf. Your biodiesel operation may not generate any hazardous waste, but it is important to have records on-site to show how you evaluated all your waste streams to prove they are nonhazardous.

If you can't find a recycling market for glycerin, this waste and any other wastes you generate must be properly evaluated prior to disposal.

Depending on the efficiency of the process, waste glycerin may meet the definition of ignitable hazardous waste because it contains methanol, which can give the waste a low flash point.

Manufacturer Registration for Biodiesel Fuel

Prior to introducing fuels (including biodiesel) for commerce, the manufacturer needs to register the fuel with the United States Environmental Protection Agency (U.S. EPA). You are required to complete a registration form and supply additional information about the biodiesel to U.S. EPA.

The registration form (form 3520-12) is available through U.S. EPA's Web site at www.epa.gov/otaq/regs/fuels/ffarsfrms.htm. Mail the registration form and attachments to the address shown on the form. You must supply the following information to U.S. EPA:

1. A description of the raw materials used to make the biodiesel;
2. A description of the process used to manufacture the biodiesel;
3. A laboratory test report for the biodiesel (demonstrating compliance with ASTM D-6751); and
4. Your National Biodiesel Board (NBB) membership ID or permission from the NBB to use their data concerning health effects. You can find more information at www.biodiesel.org.

In addition, U.S. EPA has established fuel quality standards for low sulfur diesel. For this reason, your biodiesel needs to be registered as compliant with the low sulfur diesel standards. To register your biodiesel, complete forms 3520-20A and 3520-20B1. You can find these forms at www.epa.gov/otaq/regs/fuels/rfgforms.htm. Mail the registration forms to the address shown on the instructions.

If you have questions regarding either of these registration processes, please contact U.S. EPA, Region 5 at (202) 343-9303.

NEED ADDITIONAL ASSISTANCE?

Permit applications are reviewed by the local Ohio EPA district office covering the area where your business is located. Air permit applications are reviewed by either the Ohio EPA district office or local air agency covering your area.

With proper planning, getting environmental permits does not have to be a difficult process, and Ohio EPA can work with you to help ensure that your permitting process goes as smoothly as possible. For more help, start by contacting your local Ohio EPA district office. Contact information is at www.epa.state.oh.us/new/dist.html. You may find Ohio EPA's *Guide to Environmental Permitting* a helpful starting point, available at www.epa.state.oh.us/ocapp/sb/publications/permitguide.pdf.

You can also contact Ohio EPA's Office of Compliance and Pollution Prevention (OCAPP) for help. OCAPP is an independent, non regulatory office providing free services to help small businesses with the environmental requirements. For more information, visit OCAPP's Web site at www.epa.state.oh.us/ocapp/ocapp.html.

RESOURCES

Division of Air Pollution Control
Permit Exemptions (de minimis sources)
Ohio Administrative Code (OAC) Rule 3745-15-05
www.epa.state.oh.us/dapc/regs/3745-15/3745-15-05.pdf

Ohio EPA
List of Approved POTW Wastewater Treatment Programs
www.epa.state.oh.us/dsw/pretreatment/approve_program_listing11.html

Ohio EPA, Division of Surface Water
Wastewater Permit-to-Install Program Web Site
www.epa.state.oh.us/dsw/pti/index.html

Ohio EPA, Division of Surface Water
NPDES Permit Web Page
www.epa.state.oh.us/dsw/permits/permits.html

Ohio Department of Natural Resources
Ground Water, Mapping and Technical Services
www.dnr.state.oh.us/water/maptechs/

Ohio Department of Agriculture
Biofuels Program
www.ohioagriculture.gov/ethanol/

Ohio Department of Development
Business Energy Resource Center
www.odod.state.oh.us/businessenergy/advanced-renewable.htm

U.S. EPA, Fuels and Fuel Additives Web Site
www.epa.gov/oms/fuels.htm

National Biodiesel Board
www.biodiesel.org/

OHIO EPA DISTRICT OFFICES



Contacts

Central District Office **(CDO)**
 50 West Town Street, Suite 700
 Columbus, Ohio 43215
 Phone: 614-728-3778
 FAX: 614-728-3898

Southeast District Office **(SEDO)**
 2195 Front St.
 Logan, OH 43138
 Phone: 740-385-8501
 FAX: 740-385-6490

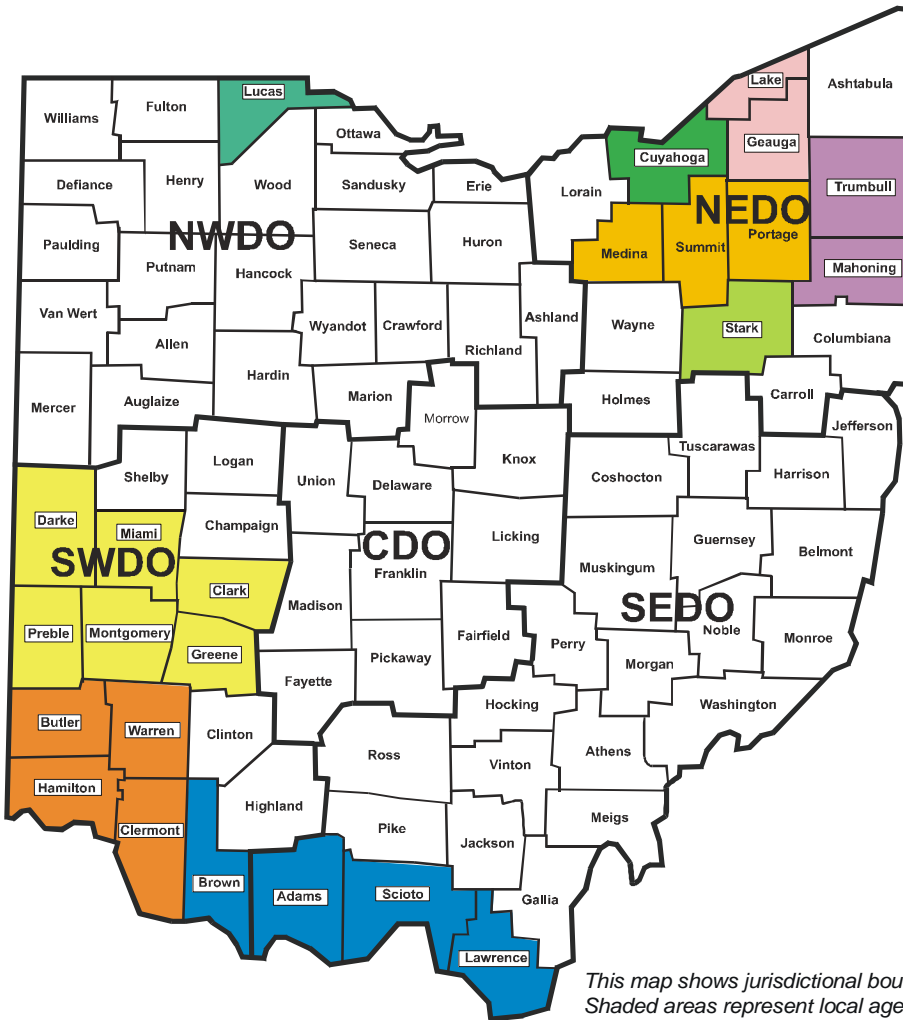
Northeast District Office **(NEDO)**
 2110 E. Aurora Rd.
 Twinsburg, OH 44087
 Phone: 330-963-1200
 FAX: 330-487-0769

Southwest District Office **(SWDO)**
 401 E. Fifth St.
 Dayton, OH 45402
 Phone: 937-285-6357
 FAX: 937-285-6249

Northwest District Office **(NWDO)**
 347 North Dunbridge Rd.
 Bowling Green, OH 43402
 Phone: 419-352-8461
 FAX: 419-352-8468

LOCAL AIR POLLUTION CONTROL AGENCIES

Division of Air Pollution Control
Ohio EPA, Central Office
(614) 644-2270



*This map shows jurisdictional boundaries.
Shaded areas represent local agencies within Ohio EPA districts.*



District Offices

CDO Isaac Robinson, APC Manager
01 Central District Office
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*Facilities located within these jurisdictions should file air permit applications with Ohio EPA's Northeast District Office (NEDO).

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