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Air Quality

Sources of Air Pollution at The Ohio State University (OSU)

- the use of volatile and radioactive materials in laboratory research
- the combustion of fuel (e.g., natural gas or oil) in boilers, heating equipment, emergency generators, etc.
- the combustion of fuel in dynamometer test cells
- the use of parts degreasing and cleaning solvents in maintenance activities
- the demolition, repair, or construction of University buildings or property
- the use of solvents and inks employed in printing operations
- the application of architectural coatings
- the operation of bulk storage tanks and vehicle fueling
- the operation of University vehicles
- the operation and maintenance of refrigeration and air conditioning equipment
- the accidental releases of chemicals

What are the main types of air emissions resulting from different activities that are considered pollutants?

- particulate matter (PM, PM10, PM2.5)
- volatile organic compounds (VOC)
- carbon monoxide (CO)
- nitrogen oxides (NOx)
- sulfur dioxide (SO2)
- ozone (O3)
- lead (Pb)

Hazardous Air Pollutants (HAP) –A list of over 180 chemicals are classified as HAPs by the U.S. Environmental Protection Agency (EPA). A list of these HAPs can be found at the EPA's website or can be provided on request. Many of the HAPs are volatile while some are particulate.

At OSU, what are some of the sources of the air pollutants listed above?

PM, VOC, CO, NOx, and SO2 emissions typically result from the combustion of fuel from the operation of equipment such as boilers, furnaces, space heaters, hot water heaters, and emergency generators (emergency stand-by engines).

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PM emissions, including silica dust, generated during construction activities such as cutting and grinding and demolition activities.

VOC emissions result from the use of volatile organic chemicals in the laboratory and in maintenance operations. Some of these emissions may also include HAPs. VOCs can also be components of inks and paints.

HAP emissions result from the use of certain types of volatile organic chemicals in the laboratory and in general University operations. O3is formed in the atmosphere from chemical reactions which involve VOC and NOx.

What happens to air pollutants after they are emitted to the atmosphere?

The pollutants are transported, diluted, and modified chemically or physically in the atmosphere. Some major pollutants, called secondary pollutants, are actually formed in the atmosphere from precursors (primary pollutants). Eventually, the contaminants reach a receptor, where they may impact health, property, visibility, climate, or some other part of the environment. However, some of the pollutants are removed from the atmosphere by natural processes and never reach a receptor. During episodes of adverse atmospheric conditions, though, pollutant concentrations can increase and produce magnified effects on health.

What are the effects of these emissions on human health and the environment?

Particulate matter can:

- absorb chemically active substances and may cause direct chemical damage to human health, the environment, and to property;
- cause human health problems due to the toxicity of the particle itself, the toxicity of a substance absorbed on the particle, or interfere with mechanisms, which normally clear the respiratory tract;
- cause a deterioration in animal health if the animal feeds on plants covered by toxic particulate; and
- cause reduced visibility.

Some types of VOC and HAPs may be carcinogenic and others contribute to the formation of ozone, which can cause human health effects and reduce visibility.

Carbon monoxide is a poisonous inhalant that deprives the body tissues of necessary oxygen.

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Nitrogen oxides contribute to the formation of acid rain and can affect natural water sources, fish, and vegetation. In addition, nitrogen dioxide, a brown gas, contributes to the formation of ozone and reduces visibility.

Sulfur dioxide contributes to:

- acidification of natural water sources which in turn affects fish and vegetation;
- leaching of nutrients in soil, which can lead to a loss in productivity of crops and forests, or a change in the natural vegetation;
- reduced visibility and property damage.

What are the standards that govern refrigeration and air conditioning appliances?

Ozone depleting substances used in refrigeration and air conditioning appliances include chlorofluorocarbons and hydrochlorofluorocarbons, collectively referred to here as CFCs. This group of chemicals has been demonstrated to be harmful to the stratospheric ozone layer and is subject to a production phase out. This phase out will require the use and/or substitution of alternative refrigerants. As a result of the Clean Air Act requirements, the EPA has established a national recycling program for these substances when recovered during the servicing and disposal of refrigeration and air conditioning equipment.

Are emergency generators, which are used at OSU to provide electrical generation in the event of an electrical power outage, subject to air pollution regulations

Emergency generators (emergency standby engines) can be a source of air pollutants such as nitrogen oxides (NOx), carbon monoxide (CO), and particulate, as well as minor amounts of other pollutants. The Clean Air Act Amendments passed by Congress in 1990 required Ohio to take steps necessary to reduce the generation of these pollutants. As a result, the Ohio EPA issued regulations that govern the installation, use and operation of emergency generators. These regulations include the requirement to obtain a PBR (Permit by Rule) for each generator.

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RESPONSIBILITIES

Who regulates air pollution at OSU?

The Ohio Environmental Protection Agency, Division of Air Pollution Control and the U.S. Environmental Protection Agency regulate air emissions at OSU.

Who should I contact if I have questions regarding air quality issues associated with my activities?

- Contact the office of Environmental Health and Safety (EHS). The Environmental Affairs staff will help clarify air quality compliance issues associated with your activities. EHS staff will be able to file for any necessary air permits. The air quality issues referenced in this FAQ do not include indoor air quality. Indoor air quality services are provided by EHS -Occupational Health & Safety and Training.

When is an air quality permit required and what are the types of permits that may apply to activities at OSU?

Permits are required by the Ohio EPA for many activities, which could result in discharges of air pollution to the atmosphere. Activities requiring a permit generally involve the construction, reconstruction, or modification of a piece of equipment or facility, or a change in its use or operation. There are typically thresholds above which a permit may be required (i.e., the type and magnitude of air pollutant emissions expected). In general, two types of permits can be required:

- a Permit-to-Install, which is issued prior to construction, reconstruction, or modification of equipment, activities, or a facility based on the review and approval of the permit application submitted by the project proponent; and
- a Permit-to-Operate, which identifies the specific requirements that a facility operator must adhere to as a condition of continued operation of the facility. For more information on air quality permits, please refer to the Air Quality Permitting Fact Sheet.

OSU is not a big industrial source of air pollution. Why are there so many requirements that affect the University's activities and operations?

Historically, the regulatory agencies have, in fact, focused on large industrial sources of pollution. As a result, many industrial facilities have implemented air pollution control measures and reduced their emissions. The regulatory agencies are now addressing the cumulative effects of air pollutant emissions from many small emitters.

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What do I need to know if a regulatory agency comes to inspect my facility?

All discussions with environmental regulatory agencies should be handled though EHS. Contact the EHS office immediately.

PROCEDURES

What can be done to limit the amount of air pollution that enters the atmosphere from activities at OSU?

- Ensure that covers and lids are kept closed on all containers holding volatile chemicals and wastes when not removing from, or adding to, containers in use in the laboratory and for maintenance activities.
- Precautionary measures can be taken during demolition, construction, or repair of property or equipment to minimize the amount of airborne particulate matter or other air pollutants from being generated. Any project involving asbestos must be performed by a licensed asbestos abatement contractor.
- Effective non-toxic or low-VOC substitutes may be available to replace toxic or high VOC-content materials (e.g. paints, solvents, and inks).
- Combustion equipment can be converted from the use of fuel oil to the use of less polluting natural gas.
- Use of public transportation such as the COTA buses and OSU Campus Area Bus Services.
- Limit vehicle idling times.

If an air quality permit is not required, are there still actions that must be taken in order to maintain and demonstrate compliance with environmental regulations?

Depending upon the type of activity or piece of equipment in question, there may be applicable standards. For example, records may be required to demonstrate that a permit is not required. Also, training and certification may be required to operate or maintain a particular piece of equipment although no permit is needed. Regulations may require:

- air pollution control measures to be taken;
- air emissions control plans to be developed;
- permits and certifications to be obtained;
- testing, sampling, and monitoring to be performed;
- training to be conducted;
- records to be kept; or
- reports to be submitted.

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If activities or operations change, including modifications, additions, or removals of equipment, will the applicable requirements and/or need for a permit change?

Depending upon the type of change in activity, additional requirements may apply, existing requirements may no longer apply, and a permit may or may not be needed. Note that some permits apply to the campus as a whole and a change in operations or activities within one area of the campus may affect the entire campus in terms of environmental regulation and permitting.

NEED MORE INFORMATION?

US EPA | Ohio EPA Air Permits

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