

## Air Contaminants

Below you will find a general description of air pollutants associated with oil and gas production. To learn about the various sources of these the particular contaminants, visit the [Sources of Oil and Gas Air Pollution](#) page.

- [Benzene, Toluene, Ethylbenzene and Xylene \(BTEX\)](#)
- [Carbon Monoxide](#)
- [Dust](#)
- [Hydrogen Sulfide](#)
- [Methane](#)
- [Nitrogen Oxides](#)
- [Ozone](#)
- [Particulate Matter](#)
- [Sulfur Dioxide](#)
- [Volatile Organic Compounds](#)

**BTEX compounds.** BTEX stands for benzene, toluene, ethylbenzene, and xylene, a group of compounds all that also belong to the broader category of volatile organic compounds, VOCs. Benzene is a known carcinogen, and has also been shown to cause blood disorders and to impact the central nervous system the reproductive system. Toluene may affect the reproductive and central nervous systems. Ethylbenzene and xylene may have respiratory and neurological effects. BTEX compounds can be emitted during various oil and gas operations activities, including flaring, venting, engines, produced water storage tanks, and during the dehydration of natural gas.

**Carbon monoxide (CO).** Carbon monoxide is emitted during flaring and from the operation of various machinery at oil and gas development sites. It is a colorless, odorless, flammable gas produced by incomplete burning of carbon-based fuels such as oil, natural gas, coal, and even wood. Carbon monoxide is poisonous if inhaled. It inhibits the blood's ability to carry oxygen, and can cause dizziness, unconsciousness, and even death.

**Dust.** Dust is created whenever there is dirt-moving activity such as construction of well pads, as well as when there is vehicle traffic on unpaved roads. Dust can cause or aggravate nuisances such as hay fever and allergies; stunt the growth of vegetation; and lead to decreased visibility.

**Hydrogen sulfide (H<sub>2</sub>S).** Hydrogen sulfide occurs naturally in some oil and gas formations. When oil or gas is extracted from these formations, H<sub>2</sub>S may be released when gas is vented, when there is incomplete combustion of flared gas, or via fugitive emissions from equipment. Hydrogen sulfide is a toxic gas which has a characteristic rotten egg odor at low concentrations. It is lethal if inhaled at high concentrations.

**Methane.** Natural gas is released during venting operations, or when there are leaks in equipment used during oil and gas development. The primary component of natural gas is [methane](#), which is odorless when it comes directly out of the gas well. In addition to methane, natural gas typically contains other hydrocarbons such as ethane, propane, butane, and pentanes. Raw natural gas may also contain hazardous air pollutants such as benzene, toluene, ethylbenzene, xylenes and hexanes, hydrogen sulfide (H<sub>2</sub>S), and carbon dioxide. Other compounds in natural gas typically include water vapor, helium, and nitrogen. Almost all references to the odor of raw or wellhead natural gas state that it, like methane, is odorless. The Ohio Department of Natural Resources, however, advises landowners that one way to detect an abandoned oil or gas well on their property is if they smell "natural gas" odors coming from their tap water. So, in some cases, there may be a slight hydrocarbon odor associated with venting of natural gas.

**Nitrogen Oxides (NO<sub>x</sub>).** NO<sub>x</sub> are formed during the combustion of fossil fuels, which causes a chemical reaction between nitrogen (which occurs naturally in the atmosphere) and oxygen. During oil and gas production, NO<sub>x</sub> are formed during flaring operations, and when fuel is burned to provide power to machinery such as compressor engines and other heavy equipment. NO<sub>x</sub>, in turn, may react with VOCs to form ground-level ozone. Nitrogen dioxide, one of the NO<sub>x</sub> chemicals, is a criteria pollutant regulated by the EPA, and can be seen, along with other particles in polluted air, as a reddish-brown haze. The health impacts from NO<sub>x</sub> include respiratory problems, heart conditions, and lung damage,

**Ozone.** Ozone itself is not released during oil and gas development. But some of the main compounds that combine to form ozone (e.g., volatile organic compounds and nitrogen oxides) are released from oil and gas operations. Ozone, when found at ground-level, is also referred to as "smog," which, when inhaled can cause or aggravate respiratory ailments such as asthma.

**Particulate Matter.** Particulate matter is composed of small particles that are suspended in the air and settle to the ground slowly. The most common sources of particulate matter from oil and gas operations are dust or soil entering the air during pad construction, traffic on access roads, and diesel exhaust from vehicles and engines used to power machinery at oil and gas facilities. Particulate matter can also be emitted during venting and flaring operations. Depending on the size and chemical composition of the particulate matter, the inhalation of these particles may lead to adverse health effects such as respiratory or breathing ailments, cancer, or premature death. Particulate matter suspended in air may also contribute to decreased visibility (i.e., regional haze).

**Sulfur dioxide (SO<sub>2</sub>).** Sulfur dioxide is formed when fossil fuels containing sulfur are burned. Many oil, natural gas, and coal formations contain traces of sulfur. Thus, SO<sub>2</sub> may be emitted during flaring of natural gas, or when fossil fuels are burned to provide power to pumpjack or compressor engines or other equipment and vehicles at oil and gas sites. Sour gas processing plants also emit sulfur dioxide. SO<sub>2</sub> is regulated by the EPA as a criteria air pollutant, and along with NO<sub>x</sub>, is a principal contributor to acid rain. Sulfur dioxide reacts with other chemicals to form particulate pollution, which can damage lungs and cause respiratory illness, heart conditions, and premature death.

**Volatile organic compounds (VOCs).** VOCs are carbon-containing substances that readily evaporate into the air. They can combine with nitrogen oxides to form ground-level **ozone**, which can cause respiratory ailments such as asthma, and decreased lung function. Examples of VOCs are benzene and toluene.

---

**For more information:**

**Related OGAP Web Pages**

- [Sources of Oil and Gas Air Pollution](#)
  - [Oil and Gas Air Pollutants Summary Chart](#)
- Fact Sheets**
- *Think Again:* Air pollution from oil and gas facilities  
Tagged with: [oil and gas](#), [fracking](#), [drilling](#), [air pollution](#), [air emissions](#)