

Understanding the Basics of Gas Flaring

May 2012

As Ohio sees an increase in the exploration, production and processing of natural gas, liquids and oil from shale, natural gas flaring will occur as part of these processes. This fact sheet provides basic information about when and why flaring may occur. It also outlines the regulatory authority over flaring between the Ohio Department of Natural Resources (ODNR), Ohio Environmental Protection Agency (Ohio EPA) and U.S. Environmental Protection Agency (U.S. EPA).

What is natural gas flaring and why is it done?

Flaring is the controlled burning of natural gas and a common practice in oil/gas exploration, production and processing operations. A flare system consists of a flare stack and pipes that feed gas to the stack. Flare size and brightness are related to the type and amount of gas or liquids in the flare stack. Flares generate heat and noise. Large flares can be quite noisy because of the volume and velocity of the gas going through the flare stack.

Because natural gas is valuable, companies would rather capture rather than flare it. However, there are several reasons why it may be necessary to flare gas during drilling, production or processing.

During well production testing after drilling is completed

After a shale oil/gas well is drilled and hydraulically fractured, a temporary flare is used during well production testing. Testing is important in order to determine the pressure, flow and composition of the gas or oil from the well. Flaring at the well site can last for several days or weeks, until the flow of liquids and gas from the well and pressures are stabilized.

For safety and during emergencies and maintenance

A flare is an important safety device, particularly at gas processing plants. In an emergency situation where equipment or piping becomes over-pressured, special valves on the equipment automatically release gas through piping to flare stacks. In the absence of safety flares, plants would be at higher risk for fires and explosions.

Flares are also used as an outlet for gas during maintenance and equipment repairs. In these scenarios, the flare is operated temporarily until the emergency situation is resolved, or until maintenance activities have been completed.

For managing gas during compression and processing

Flare gas systems are used to manage small volumes of waste gas that cannot be efficiently captured and returned to the system for processing. For example, some natural gas compressor stations have small dehydrator units that remove water from the gas stream before it enters the pipeline system. There may be a small flare at the compressor station to burn off gas vapors captured by the dehydrator unit. These flares are typically small and not visible off site.



Example of a temporary flare system during well production testing after drilling is completed. *Ohio EPA file photo*

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Flaring at well sites to recover oil

Large-scale flaring is occurring in the Bakken shale region of North Dakota because the shale contains a significant amount of oil. Because of its higher market value, companies drilling in the Bakken region are more interested in extracting oil rather than the natural gas also contained in the shale. In addition, North Dakota lacks sufficient gathering pipelines and processing plants to transport and process gas from the wells, so companies flare a large volume of gas at their well sites.

Ohio and surrounding states are much farther along in the development of pipeline infrastructure and processing plants to handle natural gas and natural gas liquids (NGLs). This infrastructure, including existing natural gas pipelines across the East and Midwest, helps decrease the need for long-term flaring from drill sites.

What are the environmental concerns related to flaring?

Pure natural gas is mostly methane, a clean-burning fuel. However, methane is also a greenhouse gas (GHG) that, when released directly into the air, traps heat in the atmosphere. Because of this, there are concerns about methane and other volatile organic compounds (VOCs) from oil and gas operations.

The best option is to capture gas from wells, compressors and processing operations for use. However, in situations where capturing the gas is not possible, it is better from an air quality perspective to burn the gas through a flare system rather than vent it directly into the atmosphere.

Who regulates flaring?

Ohio EPA's rules address emissions of volatile organics from production operations at well sites and processing units, including parameters for the installation, operation and maintenance of any flares used to help control emissions. ODNR's rules for oil and gas well sites also cover flaring, including a prohibition on open venting of gases to the atmosphere. In addition, ODNR's rules require companies maintain a safe distance between flares and the wells, production tanks and inhabited structures.

How do the New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) recently passed by U.S. EPA affect flaring?

In April 2012, U.S. EPA passed rules to address air emissions from oil and gas exploration, production, processing and transportation. Under the rules, oil and gas well operators are required to reduce air emissions from drilling and hydraulic fracturing.

Beginning in January 2015, U.S. EPA will require that well operators use green completions¹ to control air emissions. Until then, well operators are allowed to direct emissions to a combustion device (e.g., flare) as an alternative to green completions. Many larger drilling companies, however, already employ green completions as part of their current practices. There are some exceptions to implementing green completions, including exploratory wells and certain low-pressure wells. Ohio EPA will evaluate the NSPS and NESHAP rules to determine how these requirements will be addressed.

References and Additional Resources

- *Flaring and venting in the oil and gas exploration and production industry*, International Association of Oil and Gas Producers, January 2000 — www.ogp.org.uk/pubs/288.pdf
- U.S. Department of Energy, Energy Information Administration — www.eia.gov/todayinenergy/
- *Oil and Natural Gas Sector — New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants*, U.S. EPA — <http://yosemite.epa.gov/oepi/rulegate.nsf/byRIN/2060-AP76>
- ODNR, Division of Oil and Gas Resources Management — www.ohiodnr.com/tabid/23415/default.aspx
- Ohio EPA, Shale Website — www.epa.ohio.gov/shale.aspx

¹ Green completions are also called reduced emission completions (or RECs). Green completions take place after a well has been hydraulically fractured, when the gas begins to come to the surface through the well. At this stage, gas is combined with residual water from the hydraulic fracturing. What makes the well completion more environmentally friendly, or "green," is that the gas, as it is separated from the water, is captured for use or sale instead of being released to the atmosphere.