

Air Emissions Inventory for the Natural Gas Industry

There are significant gas exploration and extraction activities occurring in the Commonwealth within the Marcellus Shale formation and other formations. The Pennsylvania Department of Environmental Protection (DEP) collects data from the owners and operators of natural gas production and processing operations in unconventional shale formations in the Commonwealth. The development of a comprehensive emissions inventory for natural gas operations in the shale formations will allow the DEP to quantify and assess air contaminant emissions. The reporting of source, production and emissions data is authorized under section 4(3) of the Pennsylvania Air Pollution Control Act (35 P.S. § 4004(3)) and 25 Pa. Code Chapter 135 (relating to reporting of sources).

What are the reporting and regulatory requirements?

In accordance with 40 CFR Part 51, Subpart A (relating air emissions reporting requirements), the DEP is required to report total statewide air pollutant emissions to EPA every three years. The emissions inventories for calendar year 2011, which was due to EPA by December 31, 2012, provided comprehensive emission inventories for point, area, mobile (including on-road and non-road sources), and biogenic sources. DEP collects data from point sources on an annual basis.

An “initial notification” of the source reporting requirements was issued to approximately 100 potentially affected owners and operators of the unconventional shale formation natural gas production and processing operations on December 6, 2011. As required under 25 Pa. Code § 135.3 (relating to reporting), the first ever reports for the natural gas industry were due to DEP by March 1, 2012. DEP granted extensions of time for the submittal of the reports for “reasonable cause,” and may continue to do so for future reports.

What types of sources and information are required to be reported?

Basic information about air contamination sources will be required including, but not limited to, the following: company contact, lease and facility location, and equipment and production data (hours of operation, type of control equipment used, amount of gas produced, amount of fuel used, and amount of frack water processed). Air emissions data for sources associated with natural gas development including production, processing, and related activities will also be reported to the department.

Owners and operators download spreadsheets from the DEP Oil and Gas Reporting-Electronic (OGRE) system specific to their facilities that provide for reporting of the different processes in the natural gas activities. Owners and operators then provide emissions data and source reports for sources including:

- stationary engines,
- heaters,
- tanks/impoundments,
- dehydration units,
- pneumatic pumps,
- fugitives,

venting and blowdown,
drill rigs, and
well completions.

What types of air contaminant emissions were reported to DEP?

Emissions data should be reported for air contaminants including the following:

carbon monoxide,
oxides of nitrogen,
particulate matter less than 10 micrometers in diameter (PM10),
particulate matter less than 2.5 micrometers in diameter (PM2.5),
sulfur dioxide, and
volatile organic compounds.

Additionally, emissions of hazardous air pollutants including benzene, ethylbenzene, formaldehyde, N-hexane, toluene and 2,2,4-trimethylpentane were also reported to the department. These same parameters, plus greenhouse gas emissions, are to be reported for future annual reports from the unconventional drilling industry. DEP did not require GHG emission as part of the 2011 inventory.

DEP also announced on December 29, 2012 that compressor stations associated with conventional oil and gas operations should report their emissions data for the 2012 point source reporting requirement, due to DEP by March 1, 2013.

How much emissions were reported to DEP for 2011?

The reported emissions from the unconventional natural gas sector are 6,852 tons of carbon monoxide; 16,542 tons of nitrogen oxides; 577 tons of particulate matter (PM10); 122 tons of sulfur oxides; and 2,820 tons of volatile organic compounds.

Name	Year	CO TPY	NOx TPY	PM10 TPY	PM2.5 TPY	SOx TPY	VOC TPY
Unconventional Natural Gas	2011	6,852	16,542	577	505	122	2,820

How have point source emissions changed since the last comprehensive emissions inventory was reported to EPA in 2008?

Emissions from point sources have decreased since the last complete emissions inventory was developed for 2008 as shown in the following table (tons per year or TPY). The SOx emissions have decreased as a result of the conversion to natural gas as well as the installation of control equipment on the electric generating units. NOx emissions have also been reduced.

Category	Year	CO TPY	NOx TPY	PM10 TPY	SOx TPY	VOC TPY
All Point Sources	2008	94,409	235,485	30,719	864,789	24,671
All Point Sources	2011	85,990	192,275	22,588	353,480	20,363
Difference		(8,419)	(43,210)	(8,131)	(511,309)	(4,308)
Unconventional Natural Gas	2011	6,852	16,542	577	122	2,820
Net Difference		(1,567)	(26,668)	(7,554)	(511,187)	(1,488)

This data shows that PM10 and SOx emissions from the unconventional natural gas industry are very small compared to the other point sources. Emissions of CO, NO, and VOC are small compared to the other point sources. The availability of the natural gas has supported the increased use of the natural gas-fired electric generating units.

What if I need more information?

For more information, visit www.depweb.state.pa.us, and click "Air" or enter search keyword: Emission Inventory.