



A PENNSYLVANIA FRAMEWORK OF ACTIONS FOR METHANE REDUCTIONS FROM THE OIL AND GAS SECTOR

INTRODUCTION

Methane (CH₄) has been identified by the U.S. Environmental Protection Agency (EPA) as the second most prevalent greenhouse gas (GHG) emitted in the United States from human activities, accounting for 10 percent of domestic GHG emissions in 2013.ⁱ According to EPA, CH₄ is estimated to have a Global Warming Potential (GWP) of 28-36 over 100 years, which is 28-36 times more potent than carbon dioxide (CO₂) as a GHG. This figure reflects the fact that CH₄ emitted today will persist in the atmosphere for about a decade on average, which is much less time than CO₂, the primary GHG emitted through human activities. However, CH₄ also absorbs much more energy than CO₂. The net effect of the shorter lifetime and higher energy absorption is reflected in the GWP.ⁱⁱ

Recent trends in the EPA's *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2013* (dated April 15, 2015) indicate that CH₄ emissions from anthropogenic sources in the country decreased from 29,820 kilotons in 1990 to 25,453 kilotons in 2013. The key anthropogenic source categories of total CH₄ emissions in the GHG emissions inventory include the following categories: enteric fermentation from domestic livestock (25.9%), natural gas systems (24.7%), landfills (18%), coal mining (10.2%), manure management (9.7%), petroleum systems (4.0%), wastewater treatment systems (2.4%), rice cultivation (1.3%), stationary source combustion (1.3%), abandoned underground coal mines (0.98%), and forest fires (0.92%). These source categories accounted for 99.4 percent of the nation's total CH₄ emissions in 2013.ⁱⁱⁱ

As a leading state in natural gas production in the country, Pennsylvania is uniquely positioned to be a national leader in addressing climate change while supporting Governor Wolf's commitment to ensuring responsible development, creating new jobs, and protecting public health and our environment.

Substantially reducing CH₄ emissions will have a significant impact on lessening the effects of climate change. Therefore, the Pennsylvania Department of Environmental Protection (DEP) has developed an enhanced strategy to reduce CH₄ emissions in the Commonwealth from the oil and natural gas industry. DEP considers this CH₄ emission reduction strategy to be an integral component of the next update of the *Pennsylvania Climate Change Action Plan* that will be presented to Governor Wolf in 2016.

The Commonwealth's CH₄ emission reduction strategy will implement a multi-pronged approach for reducing air contaminant emissions including volatile organic compounds (VOCs) and CH₄ from the natural gas sector. The "best-in-class" measures that Pennsylvania will require are already used by industry-leading companies, required by Federal regulations, or mandated by other states.

DEP's strategy to reduce CH₄ emissions supports Governor Wolf's vision for an economically and environmentally sustainable future for Pennsylvania.

REGULATION OF OIL AND GAS OPERATIONS

Pennsylvania is the birthplace of the oil drilling industry, and petroleum production has remained a fixture of the state's economy. In addition, the Commonwealth's burgeoning annual gross natural gas production in 2014 (exceeding 4 million trillion cubic feet) made Pennsylvania the second largest producer of this fuel nationwide, providing a critical resource for achieving carbon reductions within the electric and transportation sectors. In addition to its rulemaking authority, Pennsylvania will use permitting and monitoring strategies to implement this framework for CH₄ reductions. DEP will also work with partners on voluntary initiatives to implement best management practices (BMPs), including best available technology (BAT), to reduce CH₄ emissions from the oil and gas industry.

Federal Regulations

DEP regulates new sources of emissions of CH₄ from oil and gas extraction activities under the Air Pollution Control Act and regulations adopted under the act; its Air Quality Permitting Program; and by implementation of federal regulations codified at 40 CFR Part 60, Subpart OOOO (relating to Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution). These regulations are adopted and incorporated by reference in their entirety at 25 *Pa. Code*, Chapter 122.

New and Modified Sources

On August 18, 2015, EPA released the proposed *Oil and Natural Gas Sector: Emission Standards for New and Modified Sources*, amending Subpart OOOO to reduce VOC and CH₄ emissions from new and modified sources in the oil and natural gas source category. Notice of the proposed rule was published in the *Federal Register* on September 18, 2015 (80 FR 56593). Sources subject to regulation under the new source performance standards (NSPS) will include compressors, equipment leaks, pneumatic controllers and pumps, completions of hydraulically fractured wells at natural gas well and oil well sites, production gathering and boosting stations, natural gas processing plants, and natural gas compressor stations and transmission and storage facilities. EPA also proposed CH₄ reduction requirements for sources in this sector already subject to VOC regulations.

DEP Action

Upon issuance of the final rule for this sector in 2016, EPA's NSPS requirements will automatically take effect in Pennsylvania. DEP will implement and enforce the new Subpart OOOOa requirements under the delegation of authority granted by EPA in 1985 (50 FR 34140; August 23, 1985).

Existing Sources

On August 18, 2015, the EPA also released Draft Control Techniques Guidelines (CTG) for the Oil and Natural Gas Industry and a model rule to reduce VOC and CH₄ emissions from certain existing oil and natural gas industry emission sources in ozone nonattainment areas classified as “Moderate” or higher and the Ozone Transport Region. Notice of the “Release of Draft Control Techniques Guidelines for the Oil and Natural Gas Industry” was published in the *Federal Register* on September 18, 2015 (80 FR 56577). The proposed CTG recommendations apply to existing VOC emission sources (including pneumatic controllers, pneumatic pumps, compressors, storage vessels, equipment leaks and fugitive emissions) in the onshore production and processing segments of the oil and natural gas industry. The final CTG, expected in the summer of 2016, will establish Reasonably Available Control Technology (RACT) recommendations for existing VOC sources located in ozone nonattainment areas and the Ozone Transport Region, which include the entire Commonwealth.

DEP Action

DEP intends to expeditiously pursue the adoption of a regulation for existing sources that will enhance EPA’s final RACT recommendations for each VOC emission source category or process in the oil and natural gas sector that will be covered by EPA’s final guidelines. Pennsylvania’s final-form regulation will be due to EPA as a State Implementation Plan (SIP) revision within two years after EPA’s issuance of the final CTG.

State Regulations

General Permit 5 (GP-5)

In addition to implementing and enforcing stringent laws and regulations, the air quality permitting program is one of DEP’s key tools in preventing and reducing air pollution. Since February 2013, Pennsylvania’s regulation of CH₄ emissions from compressor stations has been achieved through the revised GP-5. This general permit for non-major sources establishes BAT requirements for reducing emissions including CH₄ and VOC emissions from new sources, and contains terms and conditions requiring periodic inspection, a Leak Detection and Repair (LDAR) program, performance testing, and recordkeeping and reporting obligations for affected owners and operators.

GP-5 was the first general permit in the nation to require LDAR programs for mid-stream gathering and compression facilities. Pennsylvania’s current LDAR program requires operators to conduct LDAR inspections monthly using audible, visual, and odor detection methods. Based on the re-evaluation of GP-5, including BAT requirements for new sources, the general permit requirements will be strengthened by DEP, as appropriate and necessary.

Appendix A provides a comparison of Pennsylvania’s existing permitting requirements to the Colorado regulations, the Center for Sustainable Shale Development’s (CSSD) performance standards, EPA’s proposed NSPS for the control of CH₄ emissions from the oil and natural gas

sector, and preliminary recommendations for the development of a new general permit for well pads and amendments to the existing GP-5.

DEP Action

Revise GP-5 to strengthen the operating requirements for Natural Gas Compression and/or Processing Facilities to minimize emissions.

New General Permit to Replace Exemption 38

Since August 10, 2013, Pennsylvania has regulated CH₄ emissions from unconventional natural gas wells through the implementation of conditional permit exemption criteria (Category No. 38) set forth in DEP's "Air Quality Permit Exemptions" technical guidance (Document No. 275-2101-003). These permit exemption criteria were issued by DEP for conventional wells, unconventional wells, wellheads and all other associated equipment including engines, storage vessels/tanks, flaring activities, and equipment leaks. Sources at these natural gas well sites are currently exempt from permitting requirements if the owner or operator meets all applicable requirements established in the Category No. 38 exemption criteria including LDAR inspection requirements for well pads. The owner or operator must also comply with all applicable federal and state requirements. On August 10, 2013, the DEP also issued conditional permit exemption criteria (Category No. 33) for Compressed Natural Gas Dispensing Facilities, including LDAR inspection requirements, similar to the Category No. 38 conditional permit exemption criteria.

DEP Action

DEP intends to include BAT and LDAR requirements in the agency's first-ever Air Quality General Permit for oil and gas exploration, development, and production facilities including well pads. The Category No. 38 Exemption Criteria for unconventional wells will be replaced by a new General Permit, to be issued by DEP in August 2016.

Leakage from Transmission and Distribution Lines

Pennsylvania does not generally require CH₄ monitoring, leak detection, or measures to control or prevent fugitive emissions from transmission or distribution pipelines.

DEP Action

Working through the Pennsylvania Pipeline Infrastructure Task Force (PITF), DEP intends to establish best practices for CH₄ monitoring and LDAR aimed at controlling or preventing fugitive emissions from transmission or distribution pipelines.

METHANE EMISSION REDUCTION STRATEGY SUMMARY

The Pennsylvania General Assembly has provided DEP with broad powers and duties under the Air Pollution Control Act to protect the air resources of the Commonwealth by abating, preventing or controlling air pollution. Through the use of existing statutes, regulations, and permitting requirements, Pennsylvania has already demonstrated that technology and best practices to deliver substantial reductions in CH₄ emissions exist and can be accomplished cost effectively. DEP will develop and implement the following CH₄ emission reduction measures:

- **Issue a General Permit to replace the August 2013 Category No. 38 conditional permit exemption criteria issued for oil and gas exploration, development, and production facilities including well pads.** The new general permit will make Pennsylvania the national leader in controlling emissions from unconventional natural gas wells. DEP intends to establish BAT requirements at unconventional gas well pads for sources including dehydrators, engines, turbines for compressor engines at well pads, pigging operations, liquid unloading venting, gas processing units, storage tanks, and truck load-outs.
- **Revise the current general permit for new and modified Natural Gas Compression and/or Processing Facilities (GP-5) such that it becomes the model for other states.** DEP will do the following:
 - Update Best Available Technology (BAT) requirements including the LDAR program for new sources.
 - Amend the requirements for affected sources.
 - Expand the applicability of GP-5 to cover sources located at natural gas transmission stations.
 - Establish more stringent requirements for affected sources.
- **Develop a regulation for consideration by the Environmental Quality Board that establishes stringent requirements for existing sources in the Oil and Natural Gas Industry.**
- **Establish BMPs, including LDAR programs, to reduce fugitive CH₄ emissions from production, gathering, processing, and transmission facilities.**

SOURCES

ⁱ U.S. Greenhouse Gas Inventory Report: 1990-2013, <http://www.epa.gov/climatechange/ghgemissions/gases.html>

ⁱⁱ Understanding Global Warming Potential, <http://epa.gov/climatechange/ghgemissions/gwps.html>

ⁱⁱⁱ Ibid. Table 2-2: Recent Trends in U.S. Greenhouse Gas Emissions and Sinks (kt).