



Bureau of Air Quality

# **Methane Reduction Strategies for Natural Gas Operations**

**Air Quality Technical Advisory Committee  
December 8, 2016**

Tom Wolf, Governor

Patrick McDonnell, Acting Secretary

## Background

- Air pollution sources, except for stationary compressor engines, at natural gas production sites were exempted by the Pennsylvania Department of Environmental Protection (DEP) from air permitting requirements prior to February 2, 2013.
- On February 2, 2013, DEP issued a comprehensive General Plan Approval and/or General Operating Permit (GP-5) for natural gas compression and processing facilities.
- On August 10, 2013, the DEP finalized comprehensive permit exemption criteria (Category Number 38) for sources located at natural gas well sites.

## Methane Emission Reduction from Oil and Gas Operations

On January 19, 2016, Governor Tom Wolf announced the following methane emission reduction strategy for oil and gas operations:

- DEP will develop a general permit for sources at new or modified unconventional well sites and remote pigging stations (GP-5A).
- DEP will revise its current general permit (GP-5) to update the permitting requirements for sources at natural gas compression, processing, and transmission facilities.
- DEP will develop a regulation for existing sources for consideration by the Environmental Quality Board.

## Amendment of Exemption Criteria

- DEP will propose an amendment to the Air Quality Permit Exemption List to revise Category Number 38.
- When revised, Category Number 38 will be applicable only to unconventional natural gas well sites that were constructed between August 10, 2013 and the effective date of the amendment to the Air Quality Permit Exemption List.
- The owner or operator of new well sites or modified sources at existing well sites may seek authorization to use the GP-5A or submit an application for a site-specific Plan Approval/Operating Permit.

## General Plan Approval/General Operating Permit 5A

- The proposed GP-5A will be applicable to unconventional natural gas well sites and remote pigging stations.
- Remote pigging stations are facilities where pigging operations are conducted that are not located at an unconventional natural gas well site, natural gas compressor station, processing plant, or transmission station with emissions greater than or equal to 200 tpy of methane, 2.7 tpy total VOC, 0.5 tpy of a single HAP, or 1.0 tpy of total HAP.
- Pigging operations are maintenance operations to clear liquids from pipelines in order to improve gas flow and collect natural gas liquids.

## General Plan Approval/General Operating Permit 5

- The proposed GP-5 will be applicable to natural gas compressor stations, gas processing plants, and gas transmission stations.
- Mid-stream gas compressor stations compress and/or process natural gas prior to the point of custody transfer, which is typically after a processing plant.
- Processing plants engage in the extraction of natural gas liquids from field gas and/or the fractionation of mixed natural gas liquids to natural gas products.
- Transmission stations compress and/or process natural gas after the point of custody transfer and typically only handle pipeline-quality gas.

## Proposed Changes to the General Requirements

- The general requirements in the proposed GP will be reorganized for clarity, and the entire permit will be streamlined to address all applicable requirements for ease of compliance.
- An administrative amendment may be authorized to address a change in the name, address, or contact information in the proposed GP.
- Owners and operators will be required to minimize noise in the surrounding environment and to meet the most stringent of applicable federal and local requirements at natural gas facilities.

## Proposed Changes to the General Conditions

- Email submission of notifications will be an option. Reports will be required to be submitted via hand delivery, courier, or sent by certified mail to the Air Program Manager of the appropriate regional office.
- An annual report will be required to be submitted to EPA in a format that meets the EPA's requirements.
- Notifications will be required at least 24 hours before any scheduled blowdown. Notifications will also be required no later than 24 hours after an unscheduled blowdown.

## Proposed Changes to the General Conditions

- The source testing requirements will be updated, requiring test protocols to be submitted 60 days prior to the test.
- Two copies of all submittals related to source testing will be required to be submitted by hand delivery, courier, or certified mail to the Air Program Manager of the appropriate regional office. An electronic copy will be required to be submitted via email.
- Source test protocols will not be required if the owner or operator of the facility follows the standard performance test procedure outlined in the General Permit for the source.

## Sources Common to Both GP-5 and GP-5A

- The proposed General Permits will contain conditions for:
  - Fugitive particulate matter;
  - Natural gas-fired combustion units;
  - Glycol dehydration units;
  - Stationary natural gas-fired spark ignition internal combustion engines;
  - Reciprocating compressors;
  - Storage vessels;
  - Tanker truck load-out operations;
  - Fugitive emissions components;
  - Controllers;
  - Pumps;
  - Control devices; and
  - Pigging operations.

## Sources Common to Both GP-5 and GP-5A

- Existing sources will continue to comply with the emissions standards from earlier versions of the General Permit or the Exemption Criteria.
- New sources will be required to comply with the new emissions standards established in GPs.
- Fugitive particulate matter emissions will be addressed through requirements to mitigate road dust and carryout emissions.
- Requirements for natural gas-fired combustion units from 10 MMBtu/h to 50 MMBtu/h will include emission standards.

## Sources Common to Both GP-5 and GP-5A

- New glycol dehydration units and storage vessels will be required to reduce methane and VOC emissions if uncontrolled potential emissions are greater than or equal to 200 tpy methane, 2.7 tpy total VOC, 0.5 tpy single HAP, or 1.0 tpy total HAP.
- Requirements for natural gas-fired rich-burn and lean-burn engines will include updated emissions standards.
- Reciprocating compressors will be required to comply with the requirements of 40 CFR Part 60 Subpart OOOOa.
- Tanker truck load-outs will be required to use a vapor recovery load-out system that meets the closed-vent requirements of the General Permit.

## Sources Common to Both GP-5 and GP-5A

- Electric controllers will be required when access to grid electricity is available at the site. If electricity is not available, pneumatic controllers will be required to be no-bleed for processing plants or to have a bleed rate of 6 scfh or less for other facilities.
- Electric pumps will be required when access to grid electricity is available. If electricity is not available, pneumatic diaphragm pumps must be no-bleed for processing plants or require control if technically feasible at other facilities.
- Non-diaphragm pumps will be required to comply with the notification, recordkeeping, and reporting requirements.

## Sources Common to Both GP-5 and GP-5A

- Pigging stations will be required to install a liquids drain in pig receiver chambers and to vent high-pressure pig chambers to a low-pressure pipeline or vessel if one is available.
- Pigging operations will be required to control methane and VOC emissions if uncontrolled potential emissions are greater than or equal to 200 tpy methane, 2.7 tpy VOC, 0.5 tpy single HAP, or 1.0 tpy total HAP.
- Controls will have maintenance, testing, notification, recordkeeping, and reporting requirements. Control efficiency for new sources is 98% or greater reduction of methane and VOC emissions.

# LDAR Requirements

- Fugitive emissions from the components will require a monthly auditory, visual, and olfactory (AVO) inspection and a quarterly leak detection and repair program (LDAR) inspection.
- Owners and operators will have the option to use optical gas imaging (OGI) or Method 21 inspections in their LDAR program.
- A leak is defined as:
  - Any positive indication, whether audible, visual, or odorous, determined during an AVO inspection;
  - Any visible emissions detected by an OGI camera; or
  - A concentration of 500 ppm or greater detected by an instrument reading.

## LDAR Requirements

- The owner or operator of a well site or remote pigging station can track the percentage of leaking components and reduce the frequency of inspection to semi-annually if the percentage is less than or equal to 2% in two consecutive inspections. The quarterly interval must resume if the percentage of leaking components exceeds 2% in any inspection.

## LDAR Requirements

- When a leak is detected, a first attempt of repair must occur within 5 calendar days. The leak must be repaired within 15 calendar days unless:
  - A part must be ordered to complete the repair, in which case the repair must be completed within 10 calendar days of receipt of the part; or
  - If the repair is infeasible to perform without a shutdown, blowdown, or well shut-in, in which case the repair must be completed at the next scheduled or unscheduled shutdown, blowdown, or shut-in or no later than 2 years from when it is detected.

## Sources Specific to GP-5A

- The proposed GP-5A will also include specific conditions for well drilling and hydraulic fracturing operations, well completion operations, and wellbore liquids unloading operations.
- The requirements for well completion operations will be identical to the requirements for 40 CFR Part 60 Subpart OOOOa.
- Manual wellbore liquids unloading operations will require an operator to be on site for the entire operation. Best management practices will be used to reduce methane and VOC emissions to the atmosphere to the extent practicable.

## Sources Specific to GP-5

- Stationary natural gas-fired combustion turbines will have updated emission standards.
- New wet seal centrifugal compressor degassing systems will be required to reduce methane and VOC.
- Dry-seal centrifugal compressors will be required to comply with the notification, recordkeeping, and reporting requirements.

## Existing Oil and Gas Operations

- On October 27, 2016, EPA published the Control Techniques Guidelines to address VOC emissions from existing sources. There will be collateral reduction of methane emissions.
- Within 2 years, DEP is required to submit State Implementation Plan regulations for existing sources to minimize emissions.
- The state plan must require that the emission controls be implemented as soon as practicable but no later than January 1, 2021.



**pennsylvania**  
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