

Overview of Revisions to the Proposed GP-5A and GP-5 and Emissions Discussion

Oil and Gas Technical Advisory Board

February 14, 2018

Background

- All air pollution sources at oil and natural gas production sites were unconditionally exempted from air permitting requirements from July 26, 2003 to August 10, 2013.
- On August 10, 2013, the Department finalized a conditional exemption for sources located at unconventional natural gas well sites.
- Modifications to Exemption 38 were proposed with the GP-5 and GP-5A, and they will be collectively finalized through publication in the Pennsylvania Bulletin.

Background

- Draft GP-5 and GP-5A (GPs) were published in the Pa. Bulletin for public comment on February 4, 2017. The comment period ended on June 5, 2017.
- DEP received over 10,500 comments from advisory boards and committees, regulated industries, environmental organizations and the public.
- Revisions were made, as appropriate, based on the comments and supplementary information received.
- Draft-final GPs were posted on DEP's AQTAC website on November 30, 2017.

Organizational Changes

- The draft-final GPs were reorganized so that sources common to both GP-5 and GP-5A are listed in common sections.
- Redundant requirements were removed.
- Federal requirements that do not differ from state Best Available Technology determinations are incorporated by reference.
- Various terms and conditions in the proposed permits have been clarified.

Key Revisions to GPs

- Applications may be received through e-permitting when available.
- Applications require representative fractional analysis of the proposed or existing natural gas stream.
- Replaced proposed notification requirements for construction of sources with a single notification for the commencement of operation, including construction completion date.

Key Revisions to GPs

- Removed the scheduled blowdown notification requirements and changed the malfunction reporting requirements to be consistent with the [GP-5 Malfunction Reporting Instructions](#).
- Changed annual report date from March 1st to the anniversary date of the authorization to use the GPs.
- Added a provision to allow the owner or operator to install or modify the source if the requirements of 25 Pa. Code §127.449 (a), (b), and (d) – (i) are met. Engines or turbines that require Selective Catalytic Reduction (SCR) are not eligible to use this provision.

Key Revisions to GPs

- Replaced the section pertaining to the fugitive particulate matter requirements with a citation of 25 Pa. Code §§ 123.1 and 123.2.
- Removed the requirements for natural gas-fired combustion units rated at less than 10 MMBtu/hr, as these units are exempt under 25 Pa. Code §127.14.
- For glycol dehydrators, removed daily recordkeeping requirements for throughput of natural gas and glycol circulation rate.

Key Revisions to GPs

- Re-determined BAT requirements based on additional information received from public comments.

Engine Type	Rated bhp	NOx	CO	NMNEHC (as propane excluding HCHO)	HCHO
Lean-Burn	500 < ER <1,875 2,370	0.50 g/bhp-h	0.25 g/bhp-h	0.25 g/bhp-h	0.05 g/bhp-h
Lean-Burn	1,875 ≤ ER <3,000 ≥2,370	0.35-0.30 g/bhp-h Uncontrolled or 0.05 g/bhp-h with Control	0.25 g/bhp-h	0.25 g/bhp-h	0.05 g/bhp-h
Lean-Burn	≥ 3,000	0.05 g/bhp-h	0.25 g/bhp-h	0.25 g/bhp-h	0.05 g/bhp-h

Key Revisions to GPs

- Removed the requirement for installation of fuel flow meter for engines.
- Removed redundant recordkeeping and reporting requirements for engine operating hours per month and fuel usage per month.
- Revised the condition for tanker-truck loadout operations so that control is required only if emissions exceed control thresholds (uncontrolled 2.7 tpy VOC emissions, uncontrolled 1 tpy total HAPs, uncontrolled 0.5 tpy any HAP and uncontrolled 200 tpy Methane).

Key Revisions to GPs

- Removed the recordkeeping requirement for entire tanker truck fleet used to collect liquid from a facility.
- Removed reporting requirements for tanker truck loadout operations, except for annual emissions inventory.
- Removed the leak quantification requirements using a high flow sampler from the fugitive emission components section.
- If pump emissions are greater than the control thresholds, 98% control for methane, VOC, and HAP is required.
- Provided flexibility to employ best management practices for pigging operations.

Key Revisions to GP-5A

- GP-5A will be effective 60 days after publication in the Pa. Bulletin.
- Removed the requirements for temporary sources such as site preparation, well drilling, hydraulic fracturing and work-over activities and placed them under the revised conditional permit exemption.
- Added requirements for venting of the annular space.
- Removed the requirements for an operator to be present during manual unloading operations.

Key Revisions to GP-5

- GP-5 will be effective 30 days after publication in the Pa. Bulletin.
- Removed the requirement for installation of fuel flow meter for turbines.
- Added a provision to allow turbines and the associated air pollution control equipment that are operated when the ambient temperature is at or below 0°F in a manner consistent with good air pollution control practices to be exempt from the applicable BAT emission standards.

Key Revisions to GP-5

- Re-determined BAT requirements based on additional information received from public comments.

Turbine Rating (bhp)	NO _x (ppmdv @ 15% O ₂)	CO (ppmdv @ 15% O ₂)	NMNEHC (as propane) (ppmdv @ 15% O ₂)	Total PM (lbs/MMBtu)
1,000 ≤ TR < 5,000	25.00	25.00	9.00	0.030
5,000 ≤ TR < 15,900	15.00 Uncontrolled or 1.75 with Control	10.00 Uncontrolled or 1.75 with Control	5.00 Uncontrolled or 4.50 with Control	0.030
≥ 15,900	9.00 Uncontrolled or 1.50 with Control	10.00 Uncontrolled or 1.75 with Control	5.00 Uncontrolled or 4.50 with Control	0.030

Estimated Emissions Reductions

Emission reductions from sources that may be located at an unconventional well site or a mid-stream compressor station are scientifically-based estimates.

Actual emissions at any particular site depend on a case-by-case analysis that accounts for - gas production or throughput; type of equipment; management practices; and composition of the gas or liquids.

Estimates of reductions are based on changes due to BAT requirements from the current general permit and conditional exemption to the proposed general permits.

Unconventional Natural Gas Wells

Source	Emissions Reduction Estimate				
	CH4 (tpy)	VOC (tpy)	HAP (lbpy)	NOX (tpy)	CO (tpy)
Glycol Dehydration Unit	2.48	0.08	0.03	NA	NA
Lean-Burn Engines (rating < 100 hp)	NA	0.38	NA	0	0
Lean-Burn Engines (100 hp ≤ rating ≤ 500 hp)	NA	1.93	NA	0	6.27
Lean-Burn Engines (500 hp < rating < 2,370 hp)	NA	10.28	NA	11.43	40.00
Lean-Burn Engines (rating ≥ 2,370 hp 0.3g NOx)	NA	10.29	NA	16.01	40.01
Lean-Burn Engines (rating ≥ 2,370 hp SCR)	NA	10.29	NA	21.72	40.01
Rich-Burn Engines (rating < 100 hp)	NA	0.57	NA	0.38	1.34
Rich-Burn Engines (100 hp ≤ rating ≤ 500 hp)	NA	2.41	NA	3.62	8.20
Rich-Burn Engines (rating > 500 hp)	NA	2.42	NA	3.87	8.22

Unconventional Natural Gas Wells

Source	Emissions Reduction Estimate				
	CH4 (tpy)	VOC (tpy)	HAP (lbpy)	NOX (tpy)	CO (tpy)
Reciprocating Compressors (EPA emission factors)	0.04	0*	0*	NA	NA
Reciprocating Compressors (UT avg emission factor)	3.03	0.17	0.07	NA	NA
Storage Vessels	2.48	0.08	0.03	NA	NA
Tanker Truck Load-Out Operations	0	0	0	NA	NA
Fugitive Emissions Components	6.36	0.35	0.14	NA	NA
Controllers	0	0	0	NA	NA
Pumps	0.11	0.01	0*	NA	NA
Pigging Operations (Daily - 90 cf CV @ 1,250 psi)	51.98	2.83	1.16	NA	NA
Wellbore Liquids Unloading Operations (BMP reduces BDV to 2,250 cf @ 800 psi)	27.90	1.52	0.62	NA	NA
Wellbore Liquids Unloading Operations (4,500 cf @ 800 psi routed to control)	54.68	2.98	1.22	NA	NA

Midstream Compressor Stations

Source	Emissions Reduction Estimate				
	CH4 (tpy)	VOC (tpy)	HAP (lbpy)	NOX (tpy)	CO (tpy)
Glycol Dehydration Unit	5.43	0.20	0.08	NA	NA
Lean-Burn Engines (rating < 100 hp)	NA	0.38	NA	0	0
Lean-Burn Engines (100 hp ≤ rating ≤ 500 hp)	NA	1.93	NA	0	6.27
Lean-Burn Engines (500 hp < rating < 2,370 hp)	NA	0	NA	0	0
Lean-Burn Engines (rating ≥ 2,370 hp 0.3g NOx)	NA	0	NA	4.57	0
Lean-Burn Engines (rating ≥ 2,370 hp SCR)	NA	0	NA	10.29	0
Rich-Burn Engines (rating < 100 hp)	NA	0.57	NA	0.38	1.34
Rich-Burn Engines (100 hp ≤ rating ≤ 500 hp)	NA	0	NA	0	0
Rich-Burn Engines (rating > 500 hp)	NA	0	NA	0	0

Midstream Compressor Stations

Source	Emissions Reduction Estimates				
	CH4 (tpy)	VOC (tpy)	HAP (lbpy)	NOX (tpy)	CO (tpy)
Reciprocating Compressors (EPA emission factors)	0	0	0	NA	NA
Storage Vessels	6.71	0.25	0.10	NA	NA
Tanker Truck Load-Out Operations	0.79	0.04	0.02	NA	NA
Fugitive Emissions Components	0	0	0	NA	NA
Controllers	0	0	0	NA	NA
Pumps	0	0	0	NA	NA
Pigging Operations (Daily – 90 cf @ 1,250 psi)	51.98	2.83	1.16	NA	NA
Natural Gas-Fired Combustion Units	NA	NA	NA	0.80	5.49

Midstream Compressor Stations

Source	Emissions Reduction Estimates				
	CH4 (tpy)	VOC (tpy)	HAP (lbpy)	NOX (tpy)	CO (tpy)
Turbines (1,000 hp ≤ rating < 5,000 hp)	NA	0	NA	0	0
Turbines (5,000 hp ≤ rating < 15,900 hp)	NA	4.96	NA	0	11.81
Turbines (rating ≥ 15,900 hp 9 ppm NOx)	NA	*	NA	11.40	*
Turbines (rating ≥ 15,900 hp SCR)	NA	*	NA	25.65	*
Turbines (rating ≥ 15,900 hp 10 ppm CO 5 ppm VOC)	NA	0	NA	*	0
Turbines (rating ≥ 15,900 hp Oxidation Catalyst)	NA	0	NA	*	0
Centrifugal Compressors	23.8	0.78	0.32	NA	NA

* Depends on whether turbine is controlled or uncontrolled



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