



**pennsylvania**  
DEPARTMENT OF ENVIRONMENTAL PROTECTION



Bureau of Air Quality

# **Draft RACT Regulation for the Oil and Natural Gas Industry**

Air Quality Technical Advisory Committee

December 13, 2018

Tom Wolf, Governor

Patrick McDonnell, Secretary

## CTG BACKGROUND

- The United States Environmental Protection Agency (EPA) issues guidance called Control Technique Guidelines (CTG), in place of regulations, where they will be “substantially as effective as regulations” in reducing volatile organic compounds (VOC) from a product or source category in ozone nonattainment areas. States use the guidance in determining reasonably available control technology (RACT) requirements.
- States in ozone nonattainment areas, including the ozone transport region (OTR), must revise their state implementation plans (SIP) to implement RACT for sources of VOC covered by a CTG.
- After a state promulgates a regulation implementing the requirements of the CTG, the State must submit the regulation to EPA for approval as part of the state’s SIP.

# BACKGROUND

- On October 27, 2016, EPA issued the CTG for the Oil and Natural Gas Industry for emissions of VOC from existing sources.
- Within 2 years, DEP is required to submit SIP regulations to address RACT requirements for VOC emissions from the Oil and Gas Industry.
- EPA has applied an implementation deadline of January 1, 2021, for all RACT requirements of the CTG as provided in 40 CFR 51.1112(a)(3).

## BACKGROUND

- Section 172(c)(1) of the Clean Air Act (CAA) provides that a SIP for nonattainment areas must include “reasonably available control measures,” including RACT, for existing sources of emissions.
- CAA Section 184(b) requires that states in an OTR must revise their SIP to implement RACT with respect to all sources of VOC covered by a CTG in the state.
- Pennsylvania (PA) is in the Northeast OTR, so RACT is required under Section 184 of the CAA for covered categories.

# WHAT IS RACT?

- EPA has defined RACT as: “the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility.”
- The term “reasonably available” rather than “best available” is intended to take into account the remaining economic life of the unit as well as factors that could increase the cost of installing a technology on an existing unit, when determining the appropriate control technology.

# EPA'S WITHDRAWAL REQUEST OF CTG

- On March 9, 2018, EPA requested public comment on a potential withdrawal of the CTG.
- The EPA's rationale for the potential withdrawal was that the CTG relied upon data and conclusions made in the 2016 New Source Performance Standards (NSPS) that is currently under reconsideration.
- DEP submitted comments to EPA on April 23, 2018 expressing opposition for the comprehensive withdrawal of the CTG.

## EPA'S WITHDRAWAL REQUEST OF CTG

- On October 15, 2018, EPA proposed amendments to 2016 NSPS requirements as a result of reconsideration.
- The proposed amendments include changes to the frequency for monitoring fugitive emissions (also known as “leaks”) at well sites and compressor stations, requirements for pneumatic pumps at well sites, and requirements for professional engineer certification.
- Despite EPA’s proposed withdrawal of CTG, DEP intends to develop the regulations for existing sources at natural gas and oil facilities with due consideration to the proposed changes.

## DEP's DRAFT RACT REGULATION

- DEP's Draft Regulation places controls on VOC emissions which in turn reduce methane emissions as a co-benefit since both VOC and methane are found in field gas in oil and gas operations.
- Each source that was selected for RACT recommendations in the CTG was evaluated to determine whether the regulation complies with the CTG.
- For each source, the regulation achieves equivalent or greater VOC reductions, than the comparable CTG requirement.

# SOURCES COVERED

- Storage vessels
- Natural gas-driven pneumatic controllers
- Natural gas-driven diaphragm pumps
- Compressors (Centrifugal and Reciprocating)
- Fugitive emissions components

# STORAGE VESSELS

- Storage vessels installed prior to August 10, 2013:
  - 95% reduction of VOC emissions is required.
  - If potential to emit (PTE) is less than 6 tons per year (TPY) as determined monthly, for 12 consecutive months, 95% control is not required.
  - If actual VOC emissions without controls are less than 4 TPY, as determined monthly, for 12 consecutive months, 95% control is not required, provided uncontrolled VOC emissions remain below 4 TPY.
- Storage vessels installed on or after August 10, 2013:
  - 95% reduction of VOC emissions is required if VOC emissions from the tank are over 2.7 TPY.

# PNEUMATIC CONTROLLERS

- Natural gas processing plant:
  - Natural gas bleed rate of zero standard cubic feet per hour (scfh). There are exceptions for functional needs including, but not limited to, response time, safety and positive actuation that require higher bleed rate.
- Wellhead and gathering & boosting stations to processing plants or point of custody transfer:
  - Natural gas bleed rate  $\leq 6$  scfh. There are exceptions for functional needs including, but not limited to, response time, safety and positive actuation that require higher bleed rate.

# PNEUMATIC PUMPS

- Well site:
  - Require routing of VOC emissions from the pump to an existing onsite control device/process with 95% control.
  - If the onsite existing control device/process cannot achieve 95%, maintain documentation demonstrating the percent reduction the control device is designed to achieve.
  - Maintain records if there is no existing control device at the location of the pump or routing the VOC emissions to an existing control device/process is technically infeasible.

# PNEUMATIC PUMPS

- Well site (cont.):
  - No requirements for an individual natural gas-driven diaphragm pump located at a well site that is in operation for any period of time each calendar day for less than a total of 90 days per calendar year.
- Natural gas processing plant:
  - Zero VOC emissions is required.

# RECIPROCATING COMPRESSORS

- Reciprocating compressor located at a well site, or an adjacent well site and servicing more than one well site:
  - RACT doesn't apply.
- Reciprocating compressor located between the wellhead and point of custody transfer to the natural gas transmission and storage segment:
  - Reduce VOC emissions by replacing reciprocating compressor rod packing on or before 26,000 hours of operation or 36 months since the most recent rod packing replacement.
  - Alternatively, route rod packing emissions to a process through a closed vent system under negative pressure.

# CENTRIFUGAL COMPRESSORS

- Centrifugal compressor using wet seals located at a well site, or an adjacent well site and serving more than one well site:
  - RACT doesn't apply
- Centrifugal compressor using dry seals:
  - RACT doesn't apply.
- Centrifugal compressor using wet seals that is located between the wellhead and point of custody transfer to the natural gas transmission and storage segment:
  - Reduce VOC emissions from each centrifugal compressor wet seal fluid gassing system by 95%.

# LEAKS (EQUIPMENT LEAKS & FUGITIVE EMISSIONS)

- Fugitive emissions (leaks) from individual well sites with wells with a gas-to-oil ratio (GOR)  $\geq 300$  that produce, on average,  $> 15$  barrel of oil equivalents (boe) per well per day:
  - Develop and implement quarterly Optical Gas Imaging (OGI) monitoring and repair plan covering fugitive emissions components within a company-defined area.
  - Decrease frequency to semiannual OGI monitoring and repair if less than 2% of total components are found leaking in two consecutive quarterly inspections.
  - If more than 2% leaking components are found in any semiannual inspection, return to quarterly OGI inspections.
  - Method 21 can be used as an alternative to OGI at a 500 ppm repair threshold level.

# LEAKS (EQUIPMENT LEAKS & FUGITIVE EMISSIONS)

- Fugitive emissions at individual gathering & boosting stations and natural gas processing plants located from the wellhead to the point of custody transfer to the natural gas transmission and storage segment, or an oil pipeline:
  - Develop and implement a quarterly OGI monitoring and repair plan that covers the collection of fugitive emissions components.
  - Method 21 can be used as an alternative to OGI at a 500 ppm repair threshold.
- The next four slides compare the CTG recommendations and DEP's draft requirements for each source category.

# SUMMARY OF RACT RECOMMENDATIONS

Sources Covered	CTG — Reasonably Available Control Technology (RACT) Recommendation	Pennsylvania Proposed Reasonably Available Control Technology (RACT)
<b>Storage vessels</b>		
<ul style="list-style-type: none"> <li>Individual storage vessels with a potential to emit (PTE) <math>\geq</math> 6 tons per year (tpy) of VOCs.</li> </ul>	<ul style="list-style-type: none"> <li>95% reduction of VOC emissions.</li> </ul>	<ul style="list-style-type: none"> <li>Storage vessels installed on or after August 10, 2013, 95% reduction for emissions over 2.7 TPY.</li> </ul>
	<ul style="list-style-type: none"> <li>If owner/operators demonstrate that actual VOC emissions without controls are less than 4 tpy, as determined monthly, for 12 consecutive months, 95% control no longer required, provided uncontrolled VOC emissions remain below 4 tpy.</li> </ul>	<ul style="list-style-type: none"> <li>Storage vessels install prior to August 10, 2013, PTE less than 6 TPY and that have actual VOC emissions without controls are less than 4 tpy, as determined monthly, for 12 consecutive months, 95% control no longer required, provided uncontrolled VOC emissions remain below 4 tpy.</li> </ul>
<b>Natural gas-driven pneumatic controllers</b>		
<ul style="list-style-type: none"> <li>Individual continuous bleed, natural gas-driven pneumatic controller at a natural gas processing plant.</li> </ul>	<ul style="list-style-type: none"> <li>Natural gas bleed rate of zero standard cubic feet per hour (scfh). Some exceptions for functional needs including, but not limited to, response time, safety and positive actuation that require higher bleed rate.</li> </ul>	<ul style="list-style-type: none"> <li>Same requirements as CTG.</li> </ul>
<ul style="list-style-type: none"> <li>Individual continuous bleed natural gas-driven pneumatic controller located from the wellhead to the natural gas processing plant or point of custody transfer to an oil pipeline.</li> </ul>	<ul style="list-style-type: none"> <li>Natural gas bleed rate <math>\leq</math> 6 scfh. Some exceptions for functional needs including, but not limited to, response time, safety and positive actuation that require higher bleed rate.</li> </ul>	

# SUMMARY OF RACT RECOMMENDATIONS

Sources Covered	CTG — Reasonably Available Control Technology (RACT) Recommendation	Pennsylvania Proposed Reasonably Available Control Technology (RACT)
<b>Natural gas driven diaphragm pumps</b>		
<ul style="list-style-type: none"> <li>Individual natural gas-driven diaphragm pump located at a natural gas processing plant.</li> </ul>	<ul style="list-style-type: none"> <li>Zero VOC emissions.</li> </ul>	<ul style="list-style-type: none"> <li>Same requirements as CTG.</li> </ul>
<ul style="list-style-type: none"> <li>Individual natural gas-driven diaphragm pump located at a well site.</li> </ul>	<ul style="list-style-type: none"> <li>Require routing of VOC emissions from the pump to an existing onsite control device/process.</li> </ul>	
	<ul style="list-style-type: none"> <li>Require 95% control, unless the onsite existing control device/process cannot achieve 95%. If onsite existing device/process cannot achieve 95%, maintain documentation demonstrating the percent reduction the control device is designed to achieve.</li> <li>Maintain records if there is no existing control device at the location of the pump.</li> </ul>	
<ul style="list-style-type: none"> <li>Individual natural gas-driven diaphragm pump located at a well site that is in operation for any period of time each calendar day for less than a total of 90 days per calendar year.</li> </ul>	<ul style="list-style-type: none"> <li>Not covered; RACT would not apply.</li> </ul>	

# SUMMARY OF RACT RECOMMENDATIONS

Sources Covered	CTG — Reasonably Available Control Technology (RACT) Recommendation	Pennsylvania Proposed Reasonably Available Control Technology (RACT)
<b>Compressors (Centrifugal &amp; Reciprocating)</b>		
<ul style="list-style-type: none"> <li>Individual reciprocating compressor located between the wellhead and point of custody transfer to the natural gas transmission and storage segment.</li> </ul>	<ul style="list-style-type: none"> <li>Reduce VOC emissions by replacing reciprocating compressor rod packing on or before 26,000 hours of operation or 36 months since the most recent rod packing replacement.</li> <li>Alternatively, route rod packing emissions to a process through a closed vent system under negative pressure.</li> </ul>	<ul style="list-style-type: none"> <li>Same requirements as CTG.</li> </ul>
<ul style="list-style-type: none"> <li>Individual reciprocating compressor located at a well site, or an adjacent well site and servicing more than one well site.</li> </ul>	<ul style="list-style-type: none"> <li>Not covered; RACT would not apply.</li> </ul>	
<ul style="list-style-type: none"> <li>Individual centrifugal compressor using wet seals that is located between the wellhead and point of custody transfer to the natural gas transmission and storage segment.</li> </ul>	<ul style="list-style-type: none"> <li>Reduce VOC emissions from each centrifugal compressor wet seal fluid gassing system by 95%.</li> </ul>	
<ul style="list-style-type: none"> <li>Individual centrifugal compressor using wet seals located at a well site, or an adjacent well site and servicing more than one well site.</li> </ul>	<ul style="list-style-type: none"> <li>Not covered; RACT would not apply.</li> </ul>	
<ul style="list-style-type: none"> <li>Individual centrifugal compressor using dry seals.</li> </ul>	<ul style="list-style-type: none"> <li>Not covered; RACT would not apply.</li> </ul>	

# SUMMARY OF RACT RECOMMENDATIONS

Sources Covered	CTG — Reasonably Available Control Technology (RACT) Recommendation	Pennsylvania Proposed Reasonably Available Control Technology (RACT)
<b>Fugitive emissions components</b>		
<ul style="list-style-type: none"> <li>Fugitive emissions (leaks) from individual well sites with wells with a gas to-oil ratio (GOR) <math>\geq 300</math> that produce, on average, &gt; 15 barrel of oil equivalents (boe) per well per day.</li> </ul>	<ul style="list-style-type: none"> <li>Develop and implement semiannual optical gas imaging (OGI) monitoring and repair plan covering fugitive emissions components within a company-defined area.</li> </ul>	<ul style="list-style-type: none"> <li>Conduct monthly Audio, Visual and Olfactory (AVO) inspection. Develop and implement quarterly OGI monitoring and repair plan. Step down to semiannual OGI monitoring and repair if less than 2% of total components are found leaking in two consecutive quarterly inspections. If more than 2% leaking components are found in any semiannual inspection, return to quarterly OGI inspections.</li> </ul>
	<ul style="list-style-type: none"> <li>Method 21 can be used as an alternative to OGI.</li> </ul>	<ul style="list-style-type: none"> <li>Method 21 or another leak detection method as approved by DEP can be used as an alternative to OGI.</li> </ul>
<ul style="list-style-type: none"> <li>Fugitive emissions (leaks) at individual gathering &amp; boosting stations located from the wellhead to the point of custody transfer to the natural gas transmission and storage segment, or an oil pipeline.</li> </ul>	<ul style="list-style-type: none"> <li>Develop and implement a quarterly OGI monitoring and repair plan that covers the collection of fugitive emissions components at gathering and boosting stations within a company-defined area.</li> </ul>	<ul style="list-style-type: none"> <li>Conduct monthly Audio, Visual and Olfactory (AVO) inspection. Develop and implement a quarterly OGI monitoring and repair plan.</li> </ul>
	<ul style="list-style-type: none"> <li>Method 21 can be used as an alternative to OGI.</li> </ul>	<ul style="list-style-type: none"> <li>Method 21 or another leak detection method as approved by DEP can be used as an alternative to OGI.</li> </ul>
<ul style="list-style-type: none"> <li>Equipment leaks from components in VOC service located at a natural gas processing plant.</li> </ul>	<ul style="list-style-type: none"> <li>Implement the 40 CFR part 60, subpart VVa leak detection and repair (LDAR) program for natural gas processing plants.</li> </ul>	

# CONCLUSION

- On October 27, 2016, EPA issued CTG for the Oil and Natural Gas Industry for emissions of VOC from existing sources.
- On March 9, 2018, EPA requested public comment on a potential withdrawal of the CTG because EPA believed the CTG relied upon data and conclusions made in the 2016 NSPS that is currently under reconsideration. DEP provided comments on April 23, 2018.
- Despite EPA's proposed withdrawal of the CTG, DEP intends to develop the RACT regulations for existing sources at natural gas and oil facilities, as it will demonstrate that additional VOC emission reductions from the source category are technically and economically feasible.



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## Questions and Contacts

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