



Bureau of Air Quality

COMMENT AND RESPONSE DOCUMENT

Control of VOC Emissions from Unconventional Oil and Natural Gas Sources

25 Pa. Code Chapters 121 and 129

50 Pa.B. 2633 (May 23, 2020)

Environmental Quality Board Regulation #7-544
(Independent Regulatory Review Commission #3256)

Control of VOC Emissions from Unconventional Oil and Natural Gas Sources

On May 23, 2020, the Environmental Quality Board (Board or EQB) published a *Pennsylvania Bulletin* notice of public hearing and comment period on a proposed rulemaking to amend Chapters 121 and 129 (relating to general provisions; and standards for sources). The Board held three virtual public hearings for the purpose of accepting comments on the proposed rulemaking. The hearings were held as follows: June 23, 2020, at 6 p.m.; June 24, 2020, at 2 p.m.; and June 25, 2020, at 6 p.m. The 66-day public comment period closed on July 27, 2020.

Based upon comments received and reanalysis by the Department, the Board revised the proposed rulemaking. The final-form rulemaking adds §§ 129.121—129.130 to adopt reasonably available control technology (RACT) requirements and RACT emission limitations for unconventional oil and natural gas sources of volatile organic compound (VOC) emissions which are in existence on or before the effective date of this proposed rulemaking, when published as a final-form rulemaking. These sources include storage vessels in all segments except natural gas distribution, natural gas-driven pneumatic controllers, natural gas-driven diaphragm pumps, reciprocating and centrifugal compressors, fugitive emissions components and storage vessels installed at unconventional well sites, gathering and boosting stations and natural gas processing plants, as well as storage vessels in the natural gas transmission and storage segment. The Board also adds definitions and acronyms and lists certain United States Environmental Protection Agency (EPA) methods in § 129.122 (relating to definitions, acronyms and EPA methods) to support the interpretation of the proposed control measures. The Board also amends certain terms in and adds an abbreviation to § 121.1 (relating to definitions) to support the amendments to Chapter 129.

This document summarizes the testimony received at the public hearings and the written comments received during the public comment period. In addition, the comments received from the House of Representatives, the Senate, the House and Senate Environmental Resources and Energy (ERE) Committees and the Independent Regulatory Review Commission (IRRC) are generally copied verbatim with minor clarifying edits and responses are provided. The Board received 4,510 written comments. When the multiple signatories to individual letters and petitions are included, the total number of individuals and organizations expressing an opinion on the proposed rulemaking is over 36,000. A list of the Commentators including name, affiliation (if any), and location can be found in Appendix A.

Copies of Comments

Copies of all comments received by the Board are posted on the Department's e-Comment website at <https://www.ahs.dep.pa.gov/eComment/>. Additionally, copies of all comments are available on IRRC's website at <http://www.irrc.state.pa.us> by searching for Regulation # 7-544 or IRRC # 3256.

Abbreviations and Acronyms

2016 O&G CTG	2016 Control Techniques Guidelines for the Oil and Natural Gas Industry
2020 reanalysis	Cost/Benefit Reanalysis Using 2020 Production and Emission Data and information received from the public comment process
AAP	American Association of Pediatrics
Act 13	Oil and natural gas (58 Pa.C.S.) Omnibus Amendments, Act 13 of 2012
Act 52	Pennsylvania Grade Crude Development Act, Act 52 of 2016
Act 126	Act 126 of 2014
APCA	Pennsylvania's Air Pollution Control Act
API	American Petroleum Institute
AQCC	Colorado Air Quality Control Commission
AQI	Air Quality Index
ATSDR	The Agency for Toxic Substances and Disease Registry
AVO	Auditory, Visual, and Olfactory Inspections
BAT	Best Available Technology
BMP	Best Management Practices
BOE	Barrels of Oil Equivalent
BSER	Best System of Emission Reduction
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
CAA	Clean Air Act
CARB	California Air Resources Board
CDAC	Pennsylvania Grade Crude Development Advisory Council
CDC	Center for Disease Control
CMES	Center for Methane Emissions Solutions
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CO _{2e}	Carbon Dioxide Equivalent
COPD	Chronic Obstructive Pulmonary Disease
COVID-19	Novel Coronavirus
CPMS	Continuous Parameter Monitoring System
CRA	Congressional Review Act
CTG	Control Techniques Guidelines
DEP	Pennsylvania Department of Environmental Protection
EEIC	Environmental Education and Information Center
EDF	Environmental Defense Fund
EMAP	Environmental Management Assistance Program
EPA	U.S. Environmental Protection Agency
ERE	Environmental Resources and Energy
EQB	Environmental Quality Board
FERC	Federal Energy Regulatory Commission
FIP	Federal Implementation Plan
GHG	Greenhouse Gas(es)
GHGI	Greenhouse Gas Inventory
GOR	Gas-to-Oil Ratio

GP-5	General Plan Approval/General Operating Permit for Natural Gas Compressor Stations, Processing Plants, and Transmission Stations
GP-5A	General Plan Approval/General Operating Permit for Unconventional Natural Gas Well Site Operations and Remote Pigging Stations
H ₂ S	Hydrogen Sulfide
HAP	Hazardous Air Pollutant
hp	Horsepower
IPAA	Independent Petroleum Association of America
IPCC	Intergovernmental Panel on Climate Change
IR	Infrared
IRRC	Independent Regulatory Review Commission
LDAR	Leak Detection and Repair
LNG	Liquified Natural Gas
MACT	Maximum Available Control Technology
Mcf	Thousand Cubic Feet
Mcfd	Thousand Cubic Feet per day
Method 21	EPA Method 21, 40 CFR Part 60 Appendix A-7
MMT	Million Metric Tons
MSC	Marcellus Shale Coalition
NAAQS	National Ambient Air Quality Standard
NCRO	North Central Regional Office
NESHAP	National Emission Standards for Hazardous Air Pollutants
NGStar	The Natural Gas Star Program
NMED	New Mexico Environmental Department
NO ₂	Nitrogen Dioxide
NO _x	Oxides of Nitrogen
NSPS	New Source Performance Standards
OGI	Optical Gas Imaging Camera
OHEPA	Ohio Environmental Protection Agency
OMB	Office of Management and Budget
OTC	Ozone Transport Commission
OTR	Ozone Transport Region
PAPUC	Pennsylvania Public Utility Commission
PGCC	Pennsylvania Grade Crude Oil Coalition
PHMSA	Pipeline and Hazardous Materials Safety Administration
PIOGA	Pennsylvania Independent Oil and Gas Association
PM	Particulate Matter
PM _{2.5}	Fine Particulate Matter or Particulate Matter with an Aerodynamic Diameter Less Than 2.5 Microns
PM ₁₀	Particulate Matter with an Aerodynamic Diameter Less Than 10 Microns
ppm	Parts Per Million
psi	Pounds per Square Inch
PTE	Potential to Emit
RAF	Regulatory Analysis Form
RRA	Regulatory Review Act
RACT	Reasonably Available Control Technology
RGGI	Regional Greenhouse Gas Initiative

SB 279	Senate Bill 279 of 2015
scf	Standard Cubic Feet
SIP	State Implementation Plan
SO ₂	Sulfur Dioxide
SO _x	Oxides of Sulfur
TPY	Tons Per Year
Subpart HH	40 CFR Part 63, Subpart HH
Subpart OOOO	40 CFR Part 60, Subpart OOOO
Subpart OOOOa	40 CFR Part 60, Subpart OOOOa
Subpart VVa	40 CFR Part 60, Subpart VVa
TSD	Technical Support Document
UIC	Underground Injection Control
USCG	U.S. Coast Guard
VOC	Volatile Organic Compound
WHO	World Health Organization

Comments of the Independent Regulatory Review Commission

1. Comment: IRRC states that Section 2 of the Regulatory Review Act (RRA) explains why the General Assembly felt it was necessary to establish a regulatory review process. Given the interest this proposal has generated, IRRC believes it is appropriate to highlight the following provision of Section 2(a) of the RRA. The provision states, “To the greatest extent possible, this act is intended to encourage the resolution of objections to a regulation and the reaching of a consensus among the commission, the standing committees, interested parties and the agency.”

IRRC notes that the vast majority of public comments are from individuals and environmental advocacy organizations in support of the proposal, but still urging the Department of Environmental Protection (Department or DEP) to adopt more restrictive requirements in the final-form rulemaking. IRRC also notes that numerous comments were from parties representing the oil and natural gas industries. These groups believe that the regulatory mandates for existing sources should not be more stringent than requirements for new or modified sources or the EPA’s 2016 Control Techniques Guidelines for the Oil and Natural Gas Industry (2016 O&G CTG).

Since the issues raised by the commentators are often in direct conflict with each other, IRRC recommends that the Board continue to actively seek input from all interested parties, including lawmakers, as it develops the final version of the rulemaking.

Response: The Department will continue to actively seek input from all interested parties, including lawmakers. In addition to the review outlined under the RRA, members of the General Assembly, particularly the House and Senate ERE Committees, have extensive involvement in the development of the Department’s rulemakings through members appointed to the Department’s advisory committees and four seats on the Board. The Department consistently seeks opportunities to engage productively with interested parties, including the Legislature. The Department’s Legislative Office works to address issues and ensure that the Legislature is informed of actions by the Department and the Board. Additionally, members of the public have several opportunities to provide input on the Department’s rulemakings. This includes the formal proposed rulemaking public comment and hearing process, as well as opportunities to provide

informal public comment at the Department's advisory committee meetings during both the proposed and final stages of development of a rulemaking.

2. Comment: IRRC states that Section 28 of the regulatory analysis form (RAF) relates to the regulatory review criterion of whether the regulation is supported by acceptable data. If data is the basis for a regulation, this section of the RAF asks for a description of the data, how the data was obtained, and how it meets the acceptability standard for empirical, replicable and testable data that is supported by documentation, statistics, reports, studies or research.

The Board states that the basis for this proposed rulemaking is the Federally mandated RACT requirements found in the 2016 O&G CTG. Commentators representing the oil and natural gas industry assert that the 2016 O&G CTG requirements are similar to performance standards developed for new or modified sources and question the appropriateness of applying these standards to existing sources such as conventional oil and natural gas wells. IRRC asks the Board to explain how it determined that the proposed standards are appropriate for both the conventional and unconventional oil and natural gas industries in Pennsylvania.

Response: This final-form rulemaking was amended to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. This final-form rulemaking implements control measures to reduce VOC emissions from five specific categories of air contamination sources, including storage vessels; natural gas-driven continuous bleed pneumatic controllers; natural gas-driven diaphragm pumps; reciprocating and centrifugal compressors; and fugitive emissions components.

The EPA selected these categories of sources for RACT recommendations because the information gathered and reviewed by the EPA indicated that they are significant sources of VOC emissions. In developing the 2016 O&G CTG, the EPA reviewed the oil and natural gas NSPS, including several technical support documents prepared in support of the NSPS actions for the oil and natural gas industry, as well as existing state and local VOC emission reduction approaches, and information on emissions, available VOC emission control technologies, and costs. In producing and reviewing this information, the EPA's Scientific Integrity Policy establishes that the EPA adheres to the 2002 Office of Management and Budget (OMB) Information Quality Guidelines, the 2005 OMB Information Quality Bulletin for Peer Review, the EPA's Quality Policy for assuring the collection and use of sound, scientific data and information, the EPA's Peer Review Handbook for internal and external review of scientific products, and the EPA's Information Quality Guidelines for maximizing the transparency, integrity and utility of information published on the EPA's websites.

During the development of the proposed rulemaking, the Department made the initial RACT determinations based on the entirety of information available to the Department, including the data and analysis provided in the 2016 O&G CTG as well as 2017 oil and gas production data reported to the Department's Oil and Gas Production Report and 2017 emissions data reported to the Department's air emissions inventory. In the time since the 2016 O&G CTG was issued by the EPA, the Department acquired additional information, from the public comment process and 2020 oil and gas production data and air emissions data, that was used in a cost/benefit reanalysis (2020 reanalysis) to establish the RACT determinations in the final-form rulemaking.

3. Comment: IRRC comments that section 1207(b) of the Pennsylvania Grade Crude Development Act, the act of June 23, 2016 (P.L. 375, No. 52) (58 P.S. §§ 1201-1207), known as Act 52, requires any rulemaking concerning conventional oil and gas wells that is considered by the Board must “be undertaken separately and independently of unconventional wells or other subjects and shall include a regulatory analysis form submitted to the Independent Regulatory Review Commission that is restricted to the subject of conventional oil and gas wells.” IRRC notes that lawmakers and commentators state that the Board has violated clear legislative directives by proposing a VOC emissions rule that includes requirements for conventional oil and gas well owners and operators along with, not “separately and independently” from, requirements for unconventional well operations. IRRC further notes that the Board has not prepared or submitted an RAF restricted to the need and impact of the rulemaking on the conventional oil and gas industry. IRRC highlights that lawmakers request that the provisions that apply to the conventional oil and gas industry be withdrawn from the rulemaking. IRRC asks the Board to explain how it has and will comply with the legislative directives of Act 52 of 2016.

Response: Act 52 does not apply to this final-form rulemaking. However, the Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by the commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

Section 1207(b) of Act 52 (58 P.S. § 1207(b)) states that “any rulemaking concerning conventional oil and gas wells that the Environmental Quality Board undertakes after the effective date of this act shall be undertaken separately and independently of unconventional wells or other subjects and shall include a regulatory analysis form submitted to the Independent Regulatory Review Commission that is restricted to the subject of conventional oil and gas wells.” Looking at section 1207(b) outside of the context of Act 52, it is not clear what the term “concerning conventional oil and gas wells” means or how to determine whether a rulemaking undertaken by the Board must comply with this requirement. It is not clear if this term is limited to regulation of (1) the well bore itself; (2) the well bore and the activities on the well site related to drilling, operation, plugging and restoration; or (3) the well bore, activities on the well site and all of the activities related to the development of conventional operations, including but not limited to residual waste processing, waste/water storage, well development pipelines, gathering pipelines, transmission pipelines, distribution pipelines, compressor stations, processing plants/facilities and all the equipment associated with these activities. Based on the plain language of this section, it is also not clear what “any rulemaking” means, especially relative to “concerning conventional oil and gas wells.” The plain language of section 1207(b) provides no bounds on what activities are controlled by this requirement and how the Board determines whether “any rulemaking” must comply with this section.

However, Act 52 outlines the duties for both the Pennsylvania Grade Crude Development Advisory Council (CDAC) and the Department. Under section 1204(a)(5) (58 P.S. § 1204(a)(5)), CDAC has a duty to “[r]eview and comment on the formulation and drafting of all technical regulations proposed under 58 Pa.C.S.” Under section 1205(1) (58 P.S. § 1205(1)), the Department is required to “consult with [CDAC] on all policies and technical regulations promulgated under Title 58 Pa.C.S. (relating to oil and gas).”

Given the vagueness in the plain language of section 1207(b), it is consistent with the Rules of Statutory Construction to look at the entirety of the statute and the consequences of a particular interpretation among other factors. See 1 Pa.C.S. §§ 1921—1922. Applying those factors here, sections 1204(a)(5) and 1205(1) provide the General Assembly’s intent that the scope of Act 52 is regulations promulgated under Title 58. Again, applying those factors, this scope provides a reasonable and appropriate limit on the applicability of section 1207(b) as Title 58 contains the statutory framework for regulating the activities associated with conventional development and contains applicable cross references and exemptions to other applicable statutes.

For this reason, Act 52 does not apply to this final-form rulemaking because it is being promulgated under the APCA in Title 35 — not Title 58. Where Title 58 contains the statutory framework for the oil and gas industry, Title 35 provides the statutory framework for air quality across all industry sectors.

In addition to IRRC’s comment related to Act 52, commentators claimed that the Department failed to comply with sections 1204 and 1205 of Act 52 because the Department did not consult with CDAC in the development of this final-form rulemaking. As discussed above, CDAC’s duty to review and comment and the Department’s duty to consult with CDAC applies to policies and regulations promulgated under the authority of Title 58. See 58 P.S. §§ 1204(a)(5), 1205(1). Unlike section 1207(b), it is clear from the plain language of Act 52 that CDAC’s and the Department’s duties apply to policies and regulations promulgated under Title 58. This final-form rulemaking is not being promulgated under Title 58. It is being promulgated under the authority of the APCA in Title 35. Therefore, the language in Act 52 does not provide CDAC with the authority to review the Department’s air quality regulations promulgated under Title 35 or obligate the Department to consult with CDAC in the development of air quality regulations promulgated under Title 35.

4. Comment: IRRC notes that this proposal has generated a substantial number of public comments from varied interests and organizations. IRRC’s comments reflect its review of the numerous issues raised by the commentators and how those issues pertain to the review criteria in the RRA. While IRRC asks the Board to further clarify or justify certain provisions that concern representatives of the oil and natural gas industry, IRRC also remains concerned that the final-form regulation fulfills the Board’s obligation to protect the quality and sustainability of the Commonwealth’s natural resources. To that end, IRRC asks the Board to explain how the standards set forth in the regulation meet the criterion under Section 5.2(b)(2) of the RRA pertaining to the protection of the public health, safety and welfare and the effect on the Commonwealth’s natural resources while imposing reasonable requirements upon the oil and natural gas industry.

Response: This final-form rulemaking is protective of the public health, safety and welfare, as well as the environment. The implementation of the VOC emission control measures in this final-form rulemaking are reasonably necessary to protect the public health and welfare and the environment from harmful ground-level ozone pollution. Reduced levels of VOC and methane emissions will also promote healthful air quality and ensure the continued protection of the environment and public health and welfare. The control measures in this final-form rulemaking, when implemented, are expected to provide VOC emission reductions of approximately 2,864 TPY. The EPA estimated that the monetized health benefits of attaining the 2008 8-hour ozone NAAQS of 0.075 ppm range from \$8.3 billion to \$18 billion on a national basis by 2020.

Prorating that benefit to this Commonwealth, based on population, results in a public health benefit of \$337 million to \$732 million. Similarly, the EPA estimated that the monetized health benefits of attaining the 2015 8-hour ozone NAAQS of 0.070 ppm range from \$1.5 billion to \$4.5 billion on a national basis by 2025. Prorating that benefit to this Commonwealth, based on population, results in a public health benefit of \$63 million to \$189 million. The Board is not stating that these estimated monetized health benefits would all be the result of implementing the RACT measures contained in this final-form rulemaking, but the EPA estimates are indicative of the benefits to Commonwealth residents of attaining and maintaining the 2008 and 2015 8-hour ozone NAAQS. Furthermore, the measures in this final-form rulemaking that control VOC emissions will also control methane emissions. When fully implemented, the control measures are anticipated to reduce 45,278 TPY of methane as a co-benefit.

5. Comment: The fiscal analysis provided by the EQB estimates that the proposed regulation will cost operators approximately \$35.3 million (2012 dollars) without consideration of the economic benefit of the saved natural gas. The value of the saved natural gas will yield a savings of approximately \$9.9 million (2012 dollars), resulting in a total net cost of \$25.4 million. These figures were based on 2012 EPA cost estimates contained in the 2016 O&G CTG.

Commentators question the accuracy of the fiscal analysis because the supporting data is outdated and is not specific to Pennsylvania's oil and natural gas industry. The IRRC agrees with the concerns raised by interested parties. In order for IRRC to determine whether this rulemaking is in the public interest, the EQB must submit a revised estimate of the costs and/or savings to the regulated community using data that is current and Pennsylvania industry specific.

Response: The Department provides a revised estimate of the cost and savings to the regulated community using current and Pennsylvania-specific data in the RAF for this final-form rulemaking. The updated fiscal analysis from the Department's 2020 reanalysis estimates that implementation of the control measures in this final-form rulemaking will cost affected owners and operators as a whole approximately \$21.9 million (2021 dollars) without consideration of the economic benefit of the saved natural gas. The value of the saved natural gas using \$1.70/Mcf as suggested by several commentators yields a savings of \$4.6 million (2021 dollars). This results in a total net cost of \$17.3 million (2021 dollars), which is based on some of the worst conditions of the past decade. As the price of natural gas increases, the impact on industry is mitigated; at approximately \$5.00/Mcf during the 2020/2021 timeframe for the development of this final-form rulemaking, the impact on industry drops to a net cost of \$8.5 million (2021 dollars). When the Department made the individual RACT determinations for the sources recommended in the 2016 O&G CTG, the value of the natural gas saved was not counted.

For storage vessels in the proposed rulemaking, a tiered emissions threshold was established to prevent backsliding for storage vessels subject to Exemptions 38(b) or 38(c). The Department's 2020 reanalysis shows that the 2.7 TPY VOC emission threshold is cost effective for both potential and actual emissions; therefore, a single 2.7 TPY VOC emission threshold is established in this final-form rulemaking for storage vessels at unconventional well sites, gathering and boosting stations and natural gas processing plants, and in the natural gas transmission and storage segment.

For reciprocating compressor rod packing replacements in this final-form rulemaking, the Department's 2020 reanalysis shows that it is cost effective to implement the rod packing replacements at unconventional well sites every 26,000 hours of operation or every 3 years.

For fugitive emission components, the proposed rulemaking established monthly AVO inspections and quarterly instrument based LDAR inspections for well sites with a well that produces, on average, 15 BOE per well per day. The proposed rulemaking also established a stepdown provision which enabled owners or operators to track the percentage of leaking components at each inspection and, if in two consecutive inspections there were less than 2% of components leaking, the owner or operator could reduce the quarterly schedule of instrument based LDAR to semiannual. This final-form rulemaking alters the production thresholds and removes the stepdown provision. The 2020 reanalysis shows that it is cost effective to implement instrument based LDAR at unconventional well sites with an average production of 15 BOE per day, with the frequency based on individual well production on the well site. For applicable unconventional well sites with at least one well that produces equal to or greater than 15 BOE per day the owner or operator must perform quarterly instrument based LDAR inspections. For applicable unconventional well sites with at least one well that is less than 15 BOE per day and equal to or greater than 5 BOE per day the owner or operator must perform annual instrument based LDAR inspections. The owner or operator is required to track well site production and the individual production of each well on the unconventional well site on an annual basis. The owner or operator may reduce the inspection frequency based on the production calculations which shows two consecutive years of production in the lower category. The owner or operator shall increase in inspection frequency immediately if the production calculations show an increase that is subject to more frequent inspections.

6. Comment: IRRC notes that the Department states that it “concurred with the EPA's proposal to allow in-house engineers to certify the determination of technical infeasibility to route pump emissions to a control and the design and capacity of a closed vent system, regardless of professional licensure.”

The proposed rulemaking defines “*In-house engineer*” as an individual who is qualified by education, technical knowledge, and experience to make an engineering judgment and the required specific technical certification. Since there is no requirement that the individual be employed by the facility, the IRRC asks the EQB to clarify the intent of this provision. What problem or situation is being addressed? Why is it needed?

Should the term “in-house engineer” be retained or, as some Commentators have suggested, replaced with “qualified engineer,” the IRRC asks the EQB to explain how the term is consistent with the “Engineer, Land Surveyor, and Geologist Registration Law” and the regulations governing professional qualified engineers and engineers-in-training. A fiscal analysis should be included that compares the costs of using an “in-house engineer” versus a “qualified professional engineer” under these sections. Finally, the EQB should explain how permitting an unlicensed individual to certify the system they may have designed is in the public interest.

Response: The EPA added the term “*In-house engineer*” to the Reconsideration of Subpart OOOOa of the NSPS to address a specific concern about the availability and costs associated with limiting the certification of closed vent system design and capacity or technical infeasibility of routing natural gas-driven diaphragm pump emissions to a control to a “*Qualified professional*

engineer” as defined in § 129.122. Because of the interrelatedness of the NSPS and the 2016 O&G CTG requirements, the Department pro-actively added this flexibility to the proposed rulemaking. The EPA stated in the Reconsideration that they “believe that an in-house engineer with knowledge of the design and operation of the [closed vent system] is capable of performing these certifications, regardless of licensure...” According to the EPA, a qualified professional engineer certification would cost \$547 while allowing an in-house engineer to make the certification would cost \$358. Unfortunately, the term “*In-house engineer*” was not defined in the NSPS or the 2016 O&G CTG, so the Department proposed the definition given. Based on comments received, the Department revised the definition of “*In-house engineer*” from proposed to final-form rulemaking to require that the “*In-house engineer*” be employed by the same owner or operator as the responsible official that signs the certification required under § 129.130(k).

The term “in-house engineer” is consistent with the “Engineer, Land Surveyor and Geologist Registration Law” (Registration Law) and the regulations governing professional qualified engineers and engineers-in-training in that it narrowly defines who is permitted to perform the certification of a natural gas-driven diaphragm pump or closed vent system in accordance with section 152 of the Registration Law, 63 P.S. § 152 (relating to exemption from licensure and registration). Clause (i) of the definition in this final-form rulemaking recognizes that in accordance with sections 152(f) and (g) of the Registration Law, the individual must be an employee of the owner or operator. Clause (ii) of the definition tightens the criteria of sections 152(f), (g), and (j) by requiring the individual be qualified by education, technical knowledge, and expertise in the design and operation of a natural gas-driven diaphragm pump or closed vent system as those subsections of the Registration Law do not specify the level of technical knowledge required.

There are two provisions in this final-form rulemaking that authorize use of an in-house engineer: § 129.125(c)(3)(ii)(A) and § 129.128(c)(1). The provision in § 129.125(c)(3)(ii)(A) allows an in-house engineer to perform an assessment to determine whether it is technically infeasible for a natural gas-driven diaphragm pump to connect to a control device or process. The provision in § 129.128(c)(1) allows an in-house engineer to perform a design and capacity assessment to ensure an installed closed vent system is sufficient to convey emissions to a control device that can accommodate those emissions. Authorizing the use of an in-house engineer in these two limited situations is in the public interest because it will not affect “the public safety or health or the property of some other person or entity” in accordance with sections 152(f) and (g) of the Registration Law. In fact, in the 2016 O&G CTG, the EPA allowed for this certification by either a licensed professional engineer (PE) or an in-house engineer because in-house engineers may be more knowledgeable about site design and control than a third-party PE.

7. Comment: IRRC also commented that commentators representing the conventional oil and gas industry are uncertain whether the proposed regulation applies to conventional oil and gas operations in this Commonwealth. IRRC commented that these industry representatives claim that the regulation would apply to some equipment utilized in conventional oil and gas operations but were informed that this regulation would not apply to their sector of the industry. IRRC asks the Board to clarify which provisions, if any, apply to the conventional oil and gas industry.

Response: This final-form rulemaking controls harmful VOC emissions from five specific categories of air emission sources as required by the EPA. These source categories include natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps, reciprocating and centrifugal compressors, fugitive emissions components and storage vessels at unconventional well sites, gathering and boosting stations and natural gas processing plants, as well as storage vessels in the natural gas transmission and storage segment. While these sources are the same pieces of equipment irrespective of whether they are used by owners or operators in the unconventional or conventional oil and natural gas industry, the Department will develop a separate rulemaking for sources of VOC emissions installed at conventional well sites. Therefore, no conventional owners or operators will be required to implement control measures as a result of this final-form rulemaking. However, the Department will need to promulgate a separate rulemaking for conventional sources because the EPA did not distinguish between unconventional and conventional sources of emissions in the 2016 O&G CTG, and the Department does not have the authority to exempt sources from Federal requirements.

To clarify regarding the conventional industry's understanding of the applicability of this final-form rulemaking, while not required to consult with CDAC, at the January 24, 2019 CDAC meeting, the Department reported to CDAC that this rulemaking was in the proposed stage. The Department also noted that most of the potentially regulated sources used by owners or operators in the conventional oil and gas industry would likely be exempted from implementing the proposed rulemaking control measures, because these sources tend to emit VOC emissions at levels well below the proposed thresholds requiring VOC emission controls. However, the Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources installed at unconventional well sites, gathering and boosting stations and natural gas processing plants.

8. Comment: IRRRC notes that the EQB states in Section 9 of the RAF that “Even though a finalized withdrawal of the 2016 O&G CTG would relieve the state of the requirement to address RACT for existing oil and natural gas sources, the Department is still obligated to reduce ozone and VOC emissions to ensure that the NAAQS is attained and maintained under section 110 of the Clean Air Act (CAA). 42 U.S.C.A. § 7410.” Commentators have asked the EQB to consider another public comment period should the federal regulations or guidelines be significantly changed before promulgation of the final-form rulemaking. IRRRC asks the EQB to explain how it will proceed if there are significant changes made to 2016 O&G CTG or Subparts OOOO and OOOOa prior to the promulgation of the final-form rulemaking.

Response: The relevant Federal regulations and the 2016 O&G CTG have not significantly changed and will not change prior to promulgation of this final-form rulemaking. In March of 2020, the Department received notice that the EPA had decided not to proceed with the withdrawal of the 2016 O&G CTG. The EPA announced in the OMB's Spring 2020 Unified Agenda and Regulatory Plan that the 2016 O&G CTG will remain in place as published on October 27, 2016. On November 16, 2020, the EPA issued a Final Rule entitled “Findings of Failure To Submit State Implementation Plan Revisions in Response to the 2016 Oil and Natural Gas Industry Control Techniques Guidelines for the 2008 Ozone NAAQS and for States in the Ozone Transport Region (OTR).” 85 FR 72963 (November 16, 2020). This Commonwealth was one of the five states issued a finding of failure to submit a SIP revision incorporating the 2016 O&G CTG RACT requirements by October 27, 2018. The EPA's finding triggers the sanction clock under the CAA. The Commonwealth must submit this final-form rulemaking as a SIP

revision and the EPA must determine that the submittal is complete within 18 months of the effective date (December 16, 2020) of the EPA's finding, that is, by June 16, 2022, or sanctions may be imposed.

9. Comment: IRRC notes that the Preamble and the RAF do not adequately describe the rationale or need for certain requirements or exclusions. Commentators representing environmental concerns identify two key provisions that they say are contrary to the goals of this rulemaking. The first is the exemption of low-producing wells from the requirements of LDAR inspections. The second one is the "step down" provision that allows owners or operators to decrease the frequency of LDAR inspections if the percentage of leaking components is less than 2% for two consecutive quarterly inspections. Owners or operators would have the option to reduce the inspection frequency to semi-annually. Opponents of these two measures say it is "faulty and risky" for the Department to assume that conventional operations do not emit at levels high enough to have a significant impact on air quality and climate. IRRC asks the Board to explain the need for each provision and how determinations were made, as well as what data was used to justify the exemptions.

Response: The control measures in this final-form rulemaking are reasonably necessary to attain and maintain both the 2008 and 2015 ozone NAAQS. The Department removed the stepdown provision and altered the production thresholds for LDAR requirements in this final-form rulemaking. For fugitive emission components, the proposed rulemaking established monthly AVO inspections and quarterly instrument based LDAR inspections for well sites with a well that produces, on average, 15 BOE per well per day. The proposed rulemaking also established a stepdown provision which enabled owners or operators to track the percentage of leaking components at each inspection and, if in two consecutive inspections there were less than 2% of components leaking, the owner or operator could reduce the quarterly schedule of instrument based LDAR to semiannual. However, the 2020 reanalysis shows that it is cost effective to implement instrument based LDAR at unconventional well sites with an average production of 15 BOE per day, with the frequency based on individual well production on the well site. For applicable unconventional well sites with at least one well that produces equal to or greater than 15 BOE per day the owner or operator must perform quarterly instrument based LDAR inspections. For applicable unconventional well sites with at least one well that is less than 15 BOE per day and equal to or greater than 5 BOE per day, the owner or operator must perform annual instrument based LDAR inspections. The owner or operator is required to track well site production and the individual production of each well on the unconventional well site on an annual basis. The owner or operator may reduce the inspection frequency based on the production calculations which shows two consecutive years of production in the lower category. The owner or operator shall increase the inspection frequency immediately if the production calculations show an increase that is subject to more frequent inspections.

10. Comment: IRRC notes that representatives from the oil and natural gas industry observe that no analysis has been shared by the EQB to support the Department's conclusion that the proposed requirements that are more stringent than EPA's 2016 O&G CTG "are reasonably necessary" to achieve or maintain the NAAQS. Commentators question the need to exceed the 2016 O&G CTG when Pennsylvania is near universal compliance with the 1997, 2008 and 2015 ozone standards.

IRRC further notes that the commentators explain that the state is not required to rely on the recommendations of the 2016 O&G CTG to establish the proposed rulemaking. Instead it could make RACT determinations for a particular source on a case-by-case basis considering the technological and economic feasibility of the individual source. Section 11 of the RAF also states that the Department determined that owners and operators must conduct quarterly LDAR inspections at their facilities, as opposed to the recommended semiannual frequency in the 2016 O&G CTG.

IRRC asks the EQB to explain the need for the quarterly LDAR inspection requirement, the low production threshold LDAR exemption, and the LDAR stepdown provision and how the determinations were made, as well as what data was used to justify the exemptions or more stringent regulations.

Response: The Department agrees that the ambient air ozone monitoring data demonstrates that this Commonwealth is in near universal compliance with the 1997, 2008, and 2015 ozone NAAQS. The Department's analysis of the 2020 ambient air ozone season monitoring data shows that all ozone samplers in this Commonwealth are monitoring attainment of the 2015 8-hour ozone NAAQS except three: the Bristol sampler in Bucks County, and the Philadelphia Air Management Services Northeast Airport and Northeast Waste samplers in Philadelphia County. All ambient air ozone samplers in this Commonwealth are projected to monitor attainment of the 1997 and 2008 8-hour ozone NAAQS. However, the Department must ensure that the 1997, 2008 and 2015 8-hour ozone NAAQS continue to be attained and *maintained* by implementing permanent and federally enforceable control measures.

Additionally, section 182(b)(2) of the CAA requires states with moderate ozone nonattainment areas to revise their SIPs to include RACT for sources of VOC emissions covered by CTG documents issued by the EPA prior to the area's date of attainment of the applicable ozone NAAQS. More importantly, section 184(b)(1)(B) of the CAA requires that states in the OTR, including this Commonwealth, submit a SIP revision requiring implementation of RACT for all sources of VOC emissions in the state covered by a specific CTG and not just for those sources located in designated nonattainment areas of the state. Consequently, since this Commonwealth is not designated by the EPA as in attainment with the 2015 ozone NAAQS and is not monitoring compliance Statewide with the 2015 ozone NAAQS, the Commonwealth's SIP must include regulations applicable Statewide to control VOC emissions from oil and natural gas sources that are not regulated elsewhere in Chapter 129. These sources were selected by the EPA because data and information has indicated that they are significant sources of VOC emissions.

The Department is obligated under the CAA to analyze the source sector, as defined in the 2016 O&G CTG, and regulate sources that have control techniques or equipment that is "reasonably available." The EPA issues guidance, in the form of a CTG, in place of regulations where the guidelines will be "substantially as effective as regulations" in reducing VOC emissions from a product or source category in ozone nonattainment areas. In other words, the 2016 O&G CTG has no legally binding effects. While the EPA provided information and RACT recommendations through the 2016 O&G CTG for VOC emissions, it is up to the Department to determine what is RACT for each source category of VOC emissions. As explicitly stated by the EPA in the 2016 O&G CTG, state air pollution control agencies are free to implement other technically-sound approaches that are consistent with the CAA and the EPA's regulations. See 81 FR 74798, 74799. The EPA also further clarified that "the information contained in the CTG

document is provided only as guidance” and “this guidance does not change, or substitute for, requirements specified in applicable sections of the CAA or the EPA’s regulations; nor is it a regulation itself.” *Id.* While the EPA will ultimately need to approve the Department’s RACT determinations by reviewing and approving the revision to the Commonwealth’s SIP, the Department has made the initial RACT determinations in this final-form rulemaking based on the entirety of information available to the Department, including the 2016 O&G CTG.

The Department’s obligation is to affirmatively determine what constitutes RACT for the source group identified in the 2016 O&G CTG and the EPA’s provision of guidance and data in the 2016 O&G CTG does not obliterate that legal requirement. In the time since the 2016 O&G CTG was issued by the EPA, the Department acquired additional information and current emissions data specific to this Commonwealth that it analyzed to determine the RACT emission limitations and requirements established in this final-form rulemaking.

The Department determined that the recommendations provided in the 2016 O&G CTG for natural gas-driven continuous bleed pneumatic controllers, natural gas driven-diaphragm pumps, and centrifugal compressors are RACT for sources in this Commonwealth. The EPA recommendations in the 2016 O&G CTG for storage vessels, reciprocating compressors, and fugitive emissions components were determined not to be RACT in this Commonwealth. The Department conducted a reanalysis based on Pennsylvania-specific data to determine RACT for these three categories of sources: storage vessels, reciprocating compressor rod packing, and fugitive emissions components. The information used in the 2020 reanalysis was obtained from the Department’s Air Emission Inventory, Oil and Gas Production Database, and information provided by industry trade associations during the public comment period.

As described in greater detail in the response to Comment 5, the quarterly LDAR inspection requirement for unconventional well sites with a well that produces, on average, 15 BOE per well per day is reasonably necessary to achieve and maintain the NAAQS for ozone and is technically and economically feasible. For applicable unconventional well sites with at least one well that is less than 15 BOE per day and equal to or greater than 5 BOE per day, the owner or operator must perform annual instrument based LDAR inspections. The Department determined that this is also reasonably necessary to achieve and maintain the NAAQS for ozone and is technically and economically feasible. Additionally, the Department notes that the leak rate-based LDAR stepdown provision has been removed in this final-form rulemaking.

To address the comment about case-by-case RACT determinations, the Department was incorrect in suggesting in the Preamble for the proposed rulemaking that a case-by-case RACT determination is available for this CTG-based rule. The Department decided not to exercise its discretion to conduct case-by-case RACT analysis for this final-form rulemaking. The process for submitting RACT determinations on a case-by-case basis to the EPA is administratively burdensome particularly given the larger number of regulated facilities. Instead, for this final-form rulemaking, the Department modified the EPA’s “presumptive norm” RACT recommendations. As stated by the EPA in a Federal Register Notice on September 17, 1979, titled, “State Implementation Plans; General Preamble for Proposed Rulemaking on Approval of Plan Revisions for Nonattainment Areas— Supplement (on Control Techniques Guidelines)”: “Along with information, each CTG contains recommendations to the States of what EPA calls the “presumptive norm” for RACT, based on EPA’s current evaluation of the capabilities and problems general to the industry. Where the States finds the presumptive

norm applicable to an individual source or group of sources, EPA recommends that the State adopt requirements consistent with the presumptive norm level in order to include RACT limitations in the SIP.” 44 FR 53761 (September 17, 1979).

11. Comment: Section 5(a)(12.1) of the RRA requires promulgating agencies to provide a regulatory flexibility analysis and to consider various methods of reducing the impact of the proposed regulation on small business. IRRC does not believe that the EQB has met its statutory requirement of providing a regulatory flexibility analysis or considering various methods of reducing the impact the proposed regulation will have on small business in its responses to various sections and questions on the RAF.

It is unclear from the RAF whether the 303 conventional wells subject to LDAR inspections are owned by small businesses. However, IRRC believes most, if not all, are small businesses and strongly disagrees that they will incur minimal costs as a result of the proposed rulemaking.

In Section 15 of the RAF, the EQB states that "further analysis is required to determine if any of the affected sources are owned or operated by small businesses." If it is unknown whether any of the affected sources are owned by small businesses, how was it determined that costs would be minimal? IRRC agrees with the Commentators that further analysis is needed to determine the financial impact on small businesses and asks the EQB to provide the required regulatory flexibility analysis when it submits the final-form rulemaking.

Response: As stated in the RAF for the proposed rulemaking, of the 71,229 conventional wells reporting production, only 303 were found to be above the 15 BOE/day production threshold as reported in the Department’s 2017 oil and gas production database and would have fugitive emissions component requirements. Upon further analysis by the Department, it seems that only 199 of the previously identified 303 conventional wells were potentially subject to the proposed LDAR requirements for fugitive emissions. In the analysis for the proposed rulemaking, the Department examined individual wells, not well sites. It is difficult to determine at the individual well level how many are owned or operated by small businesses as there may be several wells per well site. However, the costs to the owners or operators of those 199 conventional wells would have been minimal, because the Department’s cost analysis for quarterly LDAR was based on hiring a contractor, not purchasing equipment, hiring and training personnel, and conducting quarterly surveys. Even so, the Board amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources installed at unconventional well sites, gathering and boosting stations and natural gas processing plants.

The Department identified 577 client ID numbers for potentially affected owners or operators of facilities in Pennsylvania using the Department’s eFACTS and AIMS databases and the NAICS codes covered by the 2016 O&G CTG. These facilities include approximately 3,388 unconventional well sites, 486 gathering and boosting stations, and 15 natural gas processing facilities in this Commonwealth. Of these potential 577 owners or operators, approximately 306 may meet the definition of small business as defined in Section 3 of the Regulatory Review Act. However, it is possible that far fewer than the 577 owners or operators will be subject to the control measures of this final-form rulemaking, depending on the amount of VOC emissions that are emitted by the affected sources they own or operate or if they are subject to other regulations in Chapter 129 or if the same or more stringent permit conditions are already incorporated in

their operating permit. While many of the anticipated costs are due to new regulatory requirements, many of the costs associated with this final-form rulemaking are from what the Department believes are best management practices and controls that affected owners or operators may already be implementing.

Additional details on small businesses and the effects of this final-form rulemaking on small businesses can be found in Sections 15, 24 and 27 of the RAF.

12. Comment: The effective date of the proposed regulation is immediately upon publication as a final-form rulemaking in the *Pennsylvania Bulletin*. Commentators suggest that a minimum of a 60-day effective date would give owners and operators additional time to reasonably transition into the new requirements so that existing facilities are not required to immediately implement and comply with the new rules. Others suggest that owners and operators will need considerably more time to determine if their sources are required to comply with the rulemaking, as well as mobilize the necessary resources to perform the required inspections.

In addition, interested parties representing the oil and natural gas industry request that time periods between inspections be extended or made consistent with current 2016 O&G CTG timeframes to avoid duplicate compliance activities. IRRC encourages the EQB to work with the regulated community to resolve issues pertaining to inspection timeframes and recommend revising the effective date of the rulemaking to give sufficient time to the regulated community to implement and comply with requirements or explain why it is unnecessary to do so.

Response: This final-form rulemaking will be effective upon publication in the *Pennsylvania Bulletin*; however, the Board notes that compliance dates are established throughout this final-form rulemaking that provide affected owners or operators sufficient time to identify and comply with the applicable requirements.

13. Comment: The *Benefits, Costs and Compliance* section of the Preamble describes how the VOC RACT requirements established by this proposed rulemaking will be incorporated into “an existing permit.” How will this process to incorporate an existing permit be implemented based on the compliance schedule in Section 29F of the RAF (pertaining to expected date by which permits, licenses or other approvals must be obtained)? IRRC asks the EQB to provide a more detailed explanation of the process contained in this section and how it will be implemented.

Response: The incorporation of the requirements of this final-form rulemaking into an existing permit will follow the requirements of § 127.463 (relating to operating permit revisions to incorporate applicable standards). Owners or operators will not be required to submit an application for amendments to an existing operating permit. Instead, the requirements will be incorporated when the permit is renewed, if less than 3 years remain in the permit term, as specified under § 127.463(c). If 3 years or more remain in the permit term, the requirements would be incorporated as applicable requirements in the permit within 18 months of the promulgation of the final-form rulemaking, as required under § 127.463(b).

14. Comment: IRRC notes that § 129.121(a) provides that the proposed rulemaking would apply to the owners or operators of storage vessels in all segments except natural gas distribution; natural gas-driven continuous bleed pneumatic controllers; natural gas driven diaphragm pumps; reciprocating compressors; centrifugal compressors; or fugitive emissions component which

were in existence on or before the effective date of the final-form rulemaking. Commentators ask how “existing” will be interpreted under this rulemaking since there may be facilities that have initiated construction but are not yet operational on the effective date of the rulemaking. IRRC asks the Board to explain, in the Preamble to the final-form regulation, how “existing” will be interpreted under this chapter.

Response: The Department revised the applicability section, § 129.121(a), of this final-form rulemaking by removing the words “in existence” and replacing them with “constructed” to clarify that the requirements apply to sources constructed on or before the effective date of this final-form rulemaking. Sources constructed after the effective date will not be subject to this final-form rulemaking. However, new sources are subject to best available technology (BAT) requirements, so it is likely that the requirements for new sources will be equivalent to or more stringent than the RACT requirements of this final-form rulemaking.

15. Comment: Subparagraph (iii) of the definition of “*Deviation*” includes a failure to meet an emission limit, operating limit, or work practice standard during start-up, shutdown or malfunction as a “*Deviation*” regardless of whether a failure is permitted by these rules. Commentators ask the EQB to make clear that failure to meet a limit or standard should not be considered a “*Deviation*” if permit conditions are met. IRRC asks the EQB to clarify this definition.

Response: A deviation under subparagraph (iii) is not considered to be a violation of this final-form rulemaking or a permit and deviations must be recorded and reported as required under § 129.130. A facility that has a permit must evaluate the terms and conditions of the permit and the requirements of this final-form rulemaking and comply with the most stringent requirement. The deviation must be evaluated against the most stringent requirement. The Department will evaluate these instances for compliance with the applicable requirements and standards. Additionally, the definition of “deviation” is consistent with the EPA’s guidance in the 2016 O&G CTG.

16. Comment: For consistency, the definition of “*First attempt at repair*” should be revised to replace “organic material” with “VOC.”

Response: The Department explains that in the proposed rulemaking it used the definition of “*First attempt at repair*” from the EPA’s regulations at 40 CFR Part 60, Subpart VVa (relating to Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006). While the term “*First attempt at repair*” is used in Sections A, D, and G in the 2016 O&G CTG, it was not defined. After the EPA’s Reconsideration of the NSPS, a definition that differed slightly from that in Subpart VVa was added to Subpart OOOOa. As the definition of “*First attempt at repair*” from Subpart OOOOa is closer in line with the usage in the 2016 O&G CTG, the Department revised the definition from proposed to final-form rulemaking. The Department removed the proposed definition which stated, “action taken for the purpose of stopping or reducing leakage of organic material to the atmosphere using best practices” and replaced it with “for purposes of § 129.127 (relating to fugitive emissions components): an action using best practices taken to stop or reduce fugitive emissions to the atmosphere.” The Department also clarified that the term includes tightening bonnet bolts,

replacing bonnet bolts, tightening packing gland nuts and injecting lubricant into lubricated packing. This change accommodates the revision suggested by the commentators.

17. Comment: What is meant by the phrase “an engineering judgment” in the definition of “*In-house engineer*?” The EQB should define this term or explain why it is unnecessary to do so.

Response: The Department removed the phrase “an engineering judgment” and made further revisions to the definition of “*In-house engineer*” in this final-form rulemaking. Instead of the phrase “an engineering judgment,” the Department revised the definition of “*In-house engineer*” in this final-form rulemaking to require the engineer to be qualified by having expertise in the design and operation of a natural gas-driven diaphragm pump or closed vent system.

18. Comment: IRRC notes that subparagraph (i) in the definition of “*Leak*” reads “A positive indication, whether audible, visual or odorous, determined during an AVO inspection.” IRRC also agrees with commentators who have suggested that this subparagraph be amended for clarity to state “A positive indication **of a leak**...”

Response: The Department revised subparagraph (i) of the definition of “*Leak*” from proposed to final-form rulemaking by removing “A positive indication, whether audible, visual or odorous, determined” and replacing it with “Through audible, visual or odorous evidence.” The Department further clarified the definition of “*Leak*” by adding that it is “an emission detected” and providing for methods for detecting the emission. Additionally, the Department did not add “A positive indication **of a leak**...” to the definition as suggested by the commentators in accordance with section 2.11(h) (relating to definitions) of the Pennsylvania Code and Bulletin Style Manual. Section 2.11(h) states that “the term being defined may not be included as part of the definition.”

19. Comment: IRRC questions the need for the provision in subparagraph (ii) of the definition of “*Qualified professional engineer*” providing that “The individual making this certification must be currently licensed in this Commonwealth or another **state in which the responsible official, as defined in § 121.1 (relating to definitions), is located** and with which the Commonwealth offers reciprocity.”

Response: The EPA defined “*Qualified professional engineer*” in the 2016 O&G CTG as “an individual who is licensed by a state as a Professional Engineer to practice one or more disciplines of engineering and who is qualified by education, technical knowledge and experience to make the specific technical certifications required under this subpart. Professional engineers making these certifications must be currently licensed in at least one state in which the certifying official is located.” Therefore, the requirement that the “*Qualified professional engineer*” be licensed in one of the states where the responsible official does business is part of the EPA’s RACT recommendation. The Board added the requirement for reciprocity due to requirements that an engineer be legally qualified to engage in the practice of engineering and that the standards of the other state or territory be at least equal to the standards of this Commonwealth.

20. Comment: IRRC suggests that the phrase “For purposes of this section, §§ 129.121 and 129.123—129.130” in the definition of “*TOC—Total organic compounds*” is unnecessary and should be deleted from the definition.

Response: The Department agrees that the phrase “For purposes of this section, §§ 129.121 and 129.123—129.130” is redundant and removed that phrase from the definition in this final-form rulemaking.

21. Comment: The definitions of “conventional well” and “unconventional well” as defined in 25 Pa. Code §§ 78.1 and 78a.1 should be included by reference in § 129.122(a).

Response: The Department removed the references to “conventional well” and “unconventional well” from § 129.123(a) from proposed to final-form rulemaking. Section 129.123(a) was the only section that included the terms “conventional well” and “unconventional well” in the proposed rulemaking. However, the Department added definitions for “unconventional formation,” “unconventional well” and “unconventional well site” in this final-form rulemaking, since the applicability section was amended to clarify that this final-form rulemaking only applies to unconventional sources installed at an “unconventional well site.” The definitions of “unconventional formation” and “unconventional well” in this final-form rulemaking are identical to the definitions in § 78a.1.

22. Comment: Section 129.123(a)(2)(i) requires that potential VOC emissions for conventional, unconventional, gathering and boosting station and at a facility in the natural gas transmission and storage segment use a generally accepted model or calculation methodology, based on the maximum average daily throughput prior to the effective date of the rulemaking. Commentators ask the Department to revise this section to allow all generally accepted models or calculation methodologies and request the language referencing historical data be deleted. Use of past maximum averages that are no longer representative of the facilities throughputs, they say, will not provide an accurate emissions profile to justify the proposed compliance requirements. IRRC requests that the EQB explain its rationale for and the reasonableness of the provision relating to historical data.

Response: The Department revised § 129.123(a)(2)(i) at final-form rulemaking to add that the maximum average daily throughput is as defined in § 129.122 and to extend the calculation requirement from the date of publication to 60 days after. This revision was made to provide clarity, to be more representative of the facility operations and to provide a more accurate emissions profile.

23. Comment: Section 129.123(a)(2)(ii) provides that the determination of potential VOC emission must consider requirements under a legally and practically enforceable limit established in an operating permit or plan approval approved by the Department. IRRC requests that the EQB explain in the Preamble to the final-form regulation whether state permitting programs such as the General Plan Approval and/or General Operating Permit for Natural Gas Compressor Stations, Processing Plants, and Transmission Stations (GP-5), the General Plan Approval and/or General Operating Permit for Unconventional Natural Gas Well Site Operations and Remote Pigging Stations (GP-5A), and Exemption 38 of the Air Quality Permit Exemptions list will be considered satisfactory for this requirement.

Response: When calculating the potential VOC emissions for this final-form rulemaking, an owner or operator must ensure that they are complying with existing VOC limits in an operating permit or plan approval, including but not limited to GP-5 and GP-5A. Section 129.123(a)(2)(ii)

has been revised to replace “must” with “may” to read “The determination of potential VOC emissions *may* consider requirements under a legally and practically enforceable limit established in an operating permit or plan approval approved by the Department.” It was not EPA’s recommendation, nor the Department’s intent, to require that legally and practically enforceable limits be considered when calculating potential VOC emissions to determine applicability to the rule. The limits in GP-5 and GP-5A are both legally and practically enforceable, so they could be used when calculating potential VOC emissions to determine applicability to this final-form rulemaking. However, the only legally and practically enforceable limit that reduces VOC emissions is installation of a control device capable of meeting 95% reduction or greater by weight. Therefore, doing so is more of a demonstration that the storage vessel is already in compliance with the requirements of this final-form rulemaking. On the other hand, the conditions of Exemption 38 do not rise to the Federal definition of legally and practically enforceable, so therefore cannot be used when calculating potential VOC emissions to determine applicability to this final-form rulemaking.

24. Comment: Section 129.123(b)(1)(iii) requires routing emissions to a control device or process that meets the applicable requirements of § 129.129. Commentators note that § 129.129 contains requirements specific only to “control devices” and not to “processes.” IRRC requests that the EQB explain the intent of the proposed language and revise it if necessary. Similar language appears in §§ 129.125(b)(1)(ii), 129.126(c)(2), 129.128(a)(2)(ii) and 129.128(b)(1).

Response: The requirements for “processes” can be found in § 129.129(d) of this final-form rulemaking. In particular, section 129.129(d)(1)(iv) of the proposed rulemaking, regarding compliance requirements for an enclosed combustion device, established the requirements for the use of a boiler or process heater – a ‘process’ – to control the VOC emissions. VOC emissions routed to a boiler or process heater are considered controlled if the vent stream containing the VOC emissions is injected into the flame zone of the boiler or process heater. The Department retained this requirement in this final-form rulemaking.

25. Comment: Section 129.124(d) requires the owner or operator to tag each affected natural gas-driven pneumatic controller with the date the controller is required to comply with the requirements of this section and an identification number that ensures traceability to the records for that controller. IRRC asks the Board to explain the rationale for this requirement, including why it believes it is reasonable.

Response: The requirement is based on the EPA’s recommendation from the 2016 O&G CTG, and the Department has determined that the tagging would facilitate the determination that the owners or operators are in compliance with this final-form rulemaking.

26. Comment: IRRC states that interested parties representing environmental concerns commend the EQB for including alternative leak detection methods in the rulemaking. What is the approval process for alternative leak detection methods? Will alternative leak detection methods be required to achieve equivalent emission reductions as currently allowed devices or methods? IRRC asks the EQB to describe the requirements and approval process for alternative leak detection methods in the Preamble to the final-form rulemaking.

Response: The Department has adopted a performance-based approach for evaluating leak detection equipment and the equipment’s documented ability to measure the compounds of

interest at the detection level necessary to demonstrate compliance with the applicable requirement. In many cases, the technology has been evaluated by the EPA and appropriate quality assurance requirements have been specified. In addition to Method 21 and 40 CFR 60.18, 40 CFR 98.234 includes a list of other appropriate technologies and requirements. Since the Department's criteria are performance based, an owner or operator seeking to use an alternative method should provide documented evidence that the alternative technology is capable of detecting the leak at the specified leak threshold. For example, an alternative leak detection method with the appropriate performance criterion may be specified in a related, though not specifically applicable, regulation such as an NSPS or National Emission Standard for Hazardous Air Pollutants (NESHAP).

27. Comment: In § 129.127(a), IRRC asks the Board to specify a timeframe that will be used to determine per-day average production figures for the 15 BOE per day applicability threshold or explain why it is unnecessary to do so.

Response: The Department added a calculation procedure to estimate the average production of an unconventional well site in a new subsection, § 129.127(b), of this final-form rulemaking. The owner or operator of an unconventional well site shall calculate the average production in BOE per day of the well site using the previous 12 calendar months of operation as reported to the Department.

28. Comment: IRRC asks the Board to clarify whether the adjustments to the LDAR inspection are required under proposed subsection § 129.127(e), regarding requirements for extension of the LDAR inspection interval.

Response: The LDAR inspection frequency reductions under § 129.127(c)(4)(i) of this final-form rulemaking, which replaces subparagraph (b)(2)(i) of the proposed rulemaking, do not require an owner or operator to request an extension of the LDAR inspection frequency under § 129.127(f) of this final-form rulemaking. Section 129.127(f) was section 129.127(e) on proposed.

29. Comment: Section 129.127(e) permits the owner or operator of an affected facility to request, in writing, an extension of the LDAR inspection interval. IRRC asks the Board to explain the need for an extension, including under what conditions or circumstances an owner or operator may request an extension. IRRC also asks whether certain conditions or requirements are needed to request an extension, how owners or operators will be informed about those conditions or requirements and what the maximum amount of time is that an extension may be granted.

Response: The Department notes that proposed § 129.127(e) is now § 129.127(f) in this final-form rulemaking. The Department explains that the flexibility granted to an owner or operator by allowing them to request an extension of the LDAR inspection interval may be for any reason. Examples for requesting an extension of the inspection frequency could include that the owner or operator's inspection equipment requires repair and will be unavailable when the inspection is due, the owner or operator has numerous facilities and it will take longer than the time allowed under this final-form rulemaking to determine applicability, plan, and perform the initial inspections, or it is not possible to have a contractor perform the required inspection when it is due because there are no contractors available by that date. However, the conditions required for

and the duration of the extension will be determined on a case-by-case basis by the Air Program Manager of the appropriate Department Regional Office when approving the extension request.

30. Comment: IRRC notes that § 129.129(b)(5)(ii) refers to an “inspection and maintenance plan” in § 129.129(b)(1) that does not exist. IRRC asks the EQB to clarify the intent of this subparagraph and revise, if necessary.

Response: The Department has revised the language of § 129.129(b)(5)(ii) from proposed to final-form rulemaking to remove the reference to an “inspection and maintenance plan” and to instead require the use of the best combustion engineering practice applicable to the control device if the manufacturer’s repair instructions are not available.

31. Comment: IRRC notes that §§ 129.129(j)(1)(v)(D) and 129.129 (j)(1)(vi)(B) provide for requests for extension of initial performance test reports and asks the Board to refer to IRRC’s comments regarding the LDAR inspection interval extension requests in § 129.127(e) as the questions apply also to this subsection.

Response: Proposed § 129.129(j)(1)(v)(D) is now § 129.129(j)(1)(iii)(E)(IV) and proposed § 129.129(j)(1)(vi)(B) is now § 129.129(j)(1)(iii)(F)(II). The allowance for an owner or operator to request an extension of the initial performance test requirements provides flexibility to the owner or operator. The owner or operator may request an extension for any reason. For example, it is possible that an operator could request an extension due to scheduling issues with source testing contractors. However, the conditions required for and the duration of the extension will be determined on a case-by-case basis by the Air Program Manager of the appropriate Department Regional Office when reviewing and approving/denying the extension request.

32. Comment: IRRC asks the Board to delete the reference to subsection (c)(1)(ii) in § 129.129(k)(5) since subsection (c)(1)(ii) does not require or refer to a weight-percent VOC emission reduction requirement.

Response: The Department did not remove the reference to subsection (c)(1)(ii) in § 129.129(k)(5) and instead revised the language of § 129.129(c)(1)(ii) from proposed to final-form rulemaking to add a weight-percent VOC emission reduction requirement.

33. Comment: IRRC notes that § 129.130(d)(1) requires the records for each natural gas-driven diaphragm pump to include the date, location and manufacturer specifications for each pump. What “date” is required under this subsection? IRRC requests that the EQB revise this section to make it clear the date to which it is referring.

Response: The Department revised the language of § 129.130(d)(1) from proposed to final-form rulemaking to clarify that the date is the “required compliance” date.

34. Comment: IRRC notes that § 129.130(g)(2)(ii)(G)(II) requires the “instrument reading of each fugitive emission component” that meets the definition of a leak under the rulemaking. IRRC asks if this subsection be revised for consistency to account for leaks that are detected with optical gas imaging (OGI) equipment.?

Response: The Department did not revise this subsection, as the instrument reading for OGI equipment is a visible leak.

35. Comment: IRRC notes that Section 15 of the RAF indicates that the table in Section 23 provides a breakdown of the cost data for the industry. The figures provided in the table in Section 23 of the RAF represent industry-wide cost and savings estimates. The RAF in the final-form regulation should include the chart as described or remove this statement if one does not exist.

Response: The Department revised the response to Section 15 of the RAF to detail the breakdown of cost data for the industry on a per owner or operator and a per facility basis. The response to Section 19 of the RAF details the individual source costs, including the total industry cost based on the estimated number of affected sources in each category. The response to Section 23 still provides a breakdown of the total costs to the industry. Additionally, the Department removed the reference in the response to Question 15 to the table in the response to Question 23 as suggested.

36. Comment: IRRC recommends that in § 121.1, the term “Responsible official” subparagraph (iv) clause (B) after “or Chapter 129” should include parentheses containing a description of what the chapter is relating to.

Response: The Department respectfully disagrees with the suggestion as the parenthetical description is provided once per section the first time the referenced Chapter is cited, in accordance with § 5.12(a)(4) (relating to cross-references) of the Pennsylvania Code and Bulletin Style Manual. The definition of “*Compliant Coating*” in § 121.1 references Chapter 129 and includes the parenthetical “(relating to standards of sources)” with the description of Chapter 129.

37. Comment: IRRC notes that § 129.122(a) states that “the following words and terms, when used in this section, §§ 129.121 and 129.123-120.130, have the following meaning...” IRRC suggests inserting “shall” before “have” and revising “section” to “chapter.” Additionally, “section” should be deleted and replaced with “chapter” in “*Deviation*” and “*TOC –Total organic compounds*” definitions.

Response: The Department respectfully disagrees with these recommendations and did not add the word “shall” as suggested as the phrasing used in § 129.122(a) is consistent with other sections in Chapter 129 as well as the phrasing used in § 121.1. This is also consistent with section 6.7(a) (relating to use of “shall,” “will,” “must” and “may”) of the Pennsylvania Code and Bulletin Style Manual. Section 6.7(a) states that the term “shall” “expresses a duty or obligation. The subject of the sentence must be a person, committee or other nongovernmental entity that is required to or has the power to make a decision or take an action.” Additionally, the definitions in § 129.122(a) apply only to §§ 129.121—129.130, not the entirety of Chapter 129; therefore, the Board did not revise “section” to read “chapter” as recommended.

38. Comment: IRRC notes that the following terms and definitions appear in § 129.122(a) but are not used in the text of the Annex: “*completion combustion device*,” “*fuel gas*,” “*fuel gas system*,” “*natural gas and oil production segment*,” “*natural gas processing segment*,”

“*transmission compression station*,” and “*underground storage vessel*.” These terms and definitions should be deleted.

Response: The Department agrees with this suggestion and deleted these terms from this final-form rulemaking.

39. Comment: IRRC recommends that for consistency, a reference to the recordkeeping and reporting requirements found in § 129.130(i)(2) should be included in § 129.128(d).

Response: The Department notes that the recordkeeping and reporting requirements for closed vent systems in § 129.130(i)(2) are found in § 129.128(b)(6). The provisions of § 129.128(d) specify the procedures for the no detectable emissions inspection required in § 129.128(b)(2)(ii).

40. Comment: IRRC recommends amending § 129.130(k) to replace “can” with “may” so that the statement reads “The due date of the initial report *may* be extended with the written approval of the Air Program Manager of the appropriate Department Regional Office.”

Response: The Department agrees with this recommendation and revised § 129.130(k)(1)(ii) to replace “can” with “may.”

Comments of the General Assembly

Statutory Authority

41. Comment: Members of the Pennsylvania Senate ERE Committee write regarding the proposed rulemaking to express their concerns about the Board's disregard of legally mandated procedural safeguards for the conventional oil and natural gas industry.

The Senators state that the conventional oil and natural gas industry has safely operated in Pennsylvania for at least 150 years, since "Colonel" Edwin Drake drilled the first oil well in Titusville. Conventional oil and natural gas operations are distinctly different and separate from the much larger and complex unconventional oil and natural gas operations.

Response: The Department is not disregarding any legally mandated procedural safeguards for the conventional oil and natural gas industry. The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

Article I, Section 27 of the Pennsylvania Constitution

42. Comment: Representative Comitta notes that Pennsylvania's Environmental Amendment states “The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment.” We need an expansive vision of our future, not one that is focused on short term gain.

Response: The Department has fulfilled its duties as a trustee of the environment, set forth in Article I, Section 27 of the Pennsylvania Constitution and the Pennsylvania Supreme Court Ruling on the Environmental Rights Amendment in *Pennsylvania Environmental Defense Foundation v. Commonwealth of Pennsylvania*, 161 A.3d 911 (Pa. 2017) during the development of this final-form rulemaking. This final-form rulemaking was developed under the authority of sections 5(a)(1) and 5(a)(8) of the APCA. The APCA is built on a precautionary principle to protect the air resources of this Commonwealth for the protection of public health and welfare and the environment, including plant and animal life and recreational resources, as well as development, attraction and expansion of industry, commerce and agriculture. Implementation of the VOC emission control measures in this final-form rulemaking will help the Department protect the air resources of this Commonwealth as well as public health and welfare by reducing harmful VOC and methane emissions from the oil and gas industry. The Department recognizes Pennsylvanians' rights and the Commonwealth's obligations under the Pennsylvania Constitution and must meet those obligations in every action the agency takes. Because this final-form rulemaking simultaneously reduces VOC and methane emissions, resulting in considerable health benefits among others, the Department is satisfied that its Article I, Section 27 obligations have been met with development of this final-form rulemaking.

Act 52 of 2016

43. Comment: Senator Hutchinson states that he is stunned and perplexed, but also truly disappointed by the actions of the Department and the Board in putting forward the proposed rulemaking for the control of VOC emissions as they pertain to the conventional oil and natural gas industry here in Pennsylvania.

He further notes that as the author of Act 52 and several other pieces of legislation signed into law by the Governor that make it emphatically clear that the Pennsylvania conventional oil and natural gas industry is unique and must be treated as a completely separate, independent industry from the unconventional oil and natural gas industry, Senator Hutchinson was distressed to find out that these proposed rules not only break that law but also contradict public verbal assurances by Department representatives that any regulatory changes would most certainly follow the correct and separate legal procedure irrespective of unconventional oil and natural gas emissions proposals which were being discussed internally at DEP.

Senator Hutchinson also comments that Act 52 is clear, and the failure of the Board to comply with that directive (which would have further necessitated CDAC involvement along a unique separate track and detailed economic analysis among other considerations), suggests only one just and prudent course of action: every portion of this proposed rule must be withdrawn in every respect where it may be applicable to conventional oil and natural gas wells.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites. However, as discussed in response to Comment 3, the Pennsylvania Grade Crude Development Act (58 P.S. §§ 1201—1208), known as Act 52 is not applicable to this final-form rulemaking. This final-form rulemaking controls harmful VOC

emissions from five specific categories of air emission sources as required by the EPA. These source categories include storage vessels, natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps, reciprocating and centrifugal compressors, and fugitive emissions components.

44. Comment: Senator Hutchinson states that as an appointed voting member of the CDAC, a body formed as an important functional component of Act 52, he was present at the January 2019 meeting referenced in the rulemaking where the DEP representatives informed CDAC that the upcoming emissions rule would not affect conventional operations. Those comments by DEP are recorded in the minutes of the meeting. Rather than satisfying a required “solicitation of input”, this misinformation is either shoddy communication (which could have been corrected at subsequent CDAC meetings) or purposeful misdirection, neither of which is acceptable. The Department never altered or updated this communication, and never revisited the VOC rule with CDAC. The formal legal forum of stakeholders in the conventional oil and natural gas industry has been shunted to the sidelines and used in the opposite intent envisioned in Act 52.

Response: At the January 24, 2019, meeting of CDAC, the Department mentioned to the members of CDAC that this rulemaking was in the proposed stage. The Department also noted that most of the potentially regulated sources used by owners or operators in the conventional oil and gas industry would likely be exempted from implementing the proposed rulemaking control measures, because these sources tend to emit VOC emissions at levels well below the proposed thresholds requiring VOC emission controls. However, the Department did not state that the rulemaking, as proposed, would not apply to sources used in the conventional oil and gas industry.

As discussed in response to Comment 3, the Pennsylvania Grade Crude Development Act (58 P.S. §§ 1201—1208), known as Act 52 is not applicable to this final-form rulemaking. Section 1205 of Act 52 is clear that the Department is only required to consult with the CDAC on “policies and technical regulations promulgated under 58 Pa.C.S. (relating to oil and natural gas).” This final-form rulemaking is being promulgated under the authority provided to the Department and the EQB under sections 5(a)(1) and 5(a)(8) of the APCA, which is under Title 35. However, the Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

45. Comment: Members of the Pennsylvania Senate ERE Committee note that in order to promote Pennsylvania's historic conventional oil and natural gas industry and advocate for its future development, they enacted Act 52 of 2016. Among other protections, Act 52 provides specific procedural safeguards for small conventional operators in rulemakings by the Board. Specifically, section 7(b) of Act 52 mandates that “[a]ny rulemaking concerning conventional oil and natural gas wells that the Environmental Quality Board undertakes after [June 23, 2016] shall be undertaken separately and independently of unconventional wells or other subjects and shall include a regulatory analysis form submitted to the Independent Regulatory Review Commission that is restricted to the subject of conventional oil and natural gas wells.”

The Senate ERE Committee members also comment that notwithstanding this clear legislative mandate, the Board proposed a VOC emissions rule that concerns Pennsylvania's existing conventional oil and natural gas wells along with, not separately and independently from, unconventional wells. The Board also failed to prepare and submit a regulatory analysis form to the Independent Regulatory Review Commission restricted to the need for and impact of the proposed rule on conventional oil and natural gas wells. The Board's disregard of these clear legal requirements has left the conventional oil and natural gas operators in the dark, which is contrary to Pennsylvania law.

The Senate ERE Committee members conclude that in light of the fundamental legal flaws, the Board must withdraw the proposed rule as it applies to conventional oil and natural gas wells. Any future regulation of VOC emissions from conventional oil and natural gas operators must consider alternative regulatory options, the significant economic impacts to these small businesses, and must be developed separately and independently of a rulemaking regulating VOC emissions from unconventional wells.

Response: Please see the responses to Comments 3 and 7.

46. Comment: Representative Metcalfe states there are two main areas of concern with regards to the regulation. First, as written, it is unclear to what extent the regulation applies to the conventional oil and natural gas industry. Act 52 requires that the EQB regulate the conventional industry separately and independently from the unconventional industry. DEP informed the CDAC that the rule would not impact conventional operations, yet the manner in which numerous provisions and definitions of the regulation are drafted could be read to apply to the conventional industry.

Representative Metcalfe further comments that as this is both contrary to law, and rather disingenuous, the regulation must be withdrawn and all portions which may apply in any way to the conventional industry must be removed before the regulation can proceed. If DEP wishes to have portions of this regulation apply to the conventional industry, it must by law do so under a separate rulemaking package and more completely address the potentially serious impacts of the regulation in a separate regulatory analysis form.

Response: Please see the responses to Comments 3 and 7.

Support for the Proposed Rulemaking

47. Comment: Senator Santarsiero and 46 other members of the General Assembly, as well as 21 local government officials, offered support of strong and consistent control requirements to cut methane and ozone forming pollutants from oil and natural gas operations and to urge the Department of Environmental Protection to strengthen the proposed existing source rule prior to promulgation as a final-form regulation.

Response: The Department acknowledges this comment.

Strengthen the Proposed Rulemaking

48. Comment: Representative Comitta requested that the Board strengthen the proposed regulation to shape a healthy future for our children and grandchildren. Likewise, Senator Santarsiero and 46 other members of the General Assembly, as well as 21 local government officials, support the DEP's efforts to require stronger controls for reducing methane and air emissions from oil and natural gas operations. Air and climate pollution does not stop at the city, county, or legislative district line. Leaking equipment and infrastructure presents serious concern for public health and climate statewide. A strong final rule is sensible, cost effective, and essential for meeting Gov. Tom Wolf's climate goals and protecting the health of the Commonwealth.

Response: The final-form rulemaking is designed to implement the VOC emission limitations and other requirements of the EPA's recommendations in the 2016 O&G CTG as RACT for these sources in this Commonwealth. The EPA defines 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 Department reviewed the RACT recommendations included in the 2016 O&G CTG for their applicability to the ground-level ozone reduction measures necessary for this Commonwealth and determined that the VOC emission reduction measures and other requirements are appropriate for this source category; however, the Department determined in three cases that more stringent requirements are necessary to satisfy RACT for affected sources in this Commonwealth.

For storage vessels in the proposed rulemaking, a tiered emissions threshold was established to prevent backsliding for storage vessels subject to Exemptions 38(b) or 38(c). The Department's 2020 reanalysis shows that the 2.7 TPY VOC emission threshold is cost effective for both potential and actual emissions; therefore, a single 2.7 TPY VOC emission threshold is established in this final-form rulemaking for all applicable storage vessels.

For reciprocating compressor rod packing replacements in this final-form rulemaking, the Department's 2020 reanalysis shows that it is cost effective to implement the rod packing replacements at unconventional well sites every 26,000 hours of operation or every 3 years.

For fugitive emission components, the proposed rulemaking established monthly AVO inspections and quarterly instrument based LDAR inspections for well sites with a well that produces, on average, 15 BOE per well per day. The proposed rulemaking also established a stepdown provision which enabled owners or operators to track the percentage of leaking components at each inspection and, if in two consecutive inspections there were less than 2% of components leaking, the owner or operator could reduce the quarterly schedule of instrument based LDAR to semiannual. This final-form rulemaking alters the production thresholds and removes the stepdown provision. The 2020 reanalysis shows that it is cost effective to implement instrument based LDAR at unconventional well sites with an average production of 15 BOE per day, with the frequency based on individual well production on the well site. For applicable unconventional well sites with at least one well that produces equal to or greater than 15 BOE per day the owner or operator must perform quarterly instrument based LDAR inspections. For applicable well sites with at least one well that is less than 15 BOE per day and equal to or greater than 5 BOE per day the owner or operator must perform annual instrument based LDAR inspections. The owner or operator is required to track well site production and the individual

production of each well on the well site on an annual basis. The owner or operator may reduce the inspection frequency based on the production calculations which shows two consecutive years of production in the lower category. The owner or operator shall increase in inspection frequency immediately if the production calculations show an increase that is subject to more frequent inspections.

This final-form rulemaking is a primary component of the Commonwealth's strategy of ensuring that the 2008 and 2015 NAAQS for ozone are attained and maintained across this Commonwealth. To the extent that any of the requirements in this final-form rulemaking are more stringent than any provisions of the 2016 O&G CTG, the requirements are reasonably necessary to attain and maintain the health-based and welfare based 8-hour ozone NAAQS in this Commonwealth and to satisfy related CAA requirements. The Department determined that the reductions in VOC emissions that are achieved following the adoption and implementation of RACT emission control measures for source categories covered by this final-form rulemaking will assist the Commonwealth in making substantial progress in achieving and maintaining the ozone NAAQS. The final-form rulemaking will provide consistency among unconventional oil and natural gas sources in this Commonwealth for VOC emissions reduction.

In addition, this final-form rulemaking is consistent with Governor Wolf's strategy to reduce emissions of methane from the oil and natural gas industry in this Commonwealth. As part of the Governor's Methane Reduction Strategy, the updated emissions controls for VOCs will also reduce methane emissions, as the same control practices that prevent VOCs from escaping from natural gas infrastructure also prevent methane from escaping as well. It is estimated to reduce 2,864 TPY of VOC emissions, with approximately 411 TPY attributed to the Department's more stringent requirements. This proposed rulemaking is estimated to reduce 45,278 TPY of methane as a co-benefit, with approximately 6,124 TPY due to the Department's more stringent requirements. The Wolf administration has taken several steps to combat climate change and protect Pennsylvania from climate disasters, including joining the US Climate Alliance and directing the Department to draft regulations to take part in the Regional Greenhouse Gas Initiative to reduce carbon pollution from power plants.

Oil and Natural Gas Industry Impacts on Air Quality

49. Comment: Senator Santarsiero and several state and local government officials underscored the critical importance of protecting public health for our communities. As local government officials, their task is to safeguard the future for our families, neighbors, and constituents alike is more important than ever. As natural gas production has rapidly grown across our state, one of the biggest challenges we faced – and one that still challenges us today – is how to best protect quality of life for all Pennsylvanians. Strong and consistent state controls are important to help those who experience the effects of oil and natural gas pollution in their backyard and to protect air quality and the climate for everyone.

Response: The Department agrees with the Senator and the other commentators. Although this final-form rulemaking is designed primarily to address ground-level ozone air quality, there would also likely be reductions in methane emissions and other air contaminants which would result in other health and environmental benefits. The improvements in ground-level ozone, air quality, and groundwater quality through reduced emissions of VOC would provide economic and social benefits through reduced need for medical treatment for asthma and other lung-related

illnesses and reduced costs for repairing damage to infrastructure, as well as through improved crop yields, healthier forests and wildlife, and increased tourism to natural areas of this Commonwealth. For additional information on economic and social benefits from reduced emissions of VOC, please refer to Section 10 of the RAF for this final-form rulemaking.

For further information regarding the Department's determination that standards more stringent than the Federal requirements are necessary for some categories, please see the Responses to Comments 5 and 48.

Methane Mitigation Industry

50. Comment: Senator Santarsiero and several state and local government officials expects any responsible company to make regular efforts to prevent methane and air emissions from oil and natural gas operations. And since methane is the primary constituent of natural gas, reducing emissions can generate additional revenue by preventing loss and bringing more product to market. If the industry is serious about being good neighbors, we can all agree that starts with making sure companies are serious about controlling all the pollution from their activities. It is the right thing to do.

Response: The Department acknowledges this comment. While this final-form rulemaking is designed to implement the VOC emission reduction recommendations of the 2016 O&G CTG, the implementation of the VOC emission control measures is also expected to result in methane emission reductions of approximately 45,278 TPY. These anticipated methane emission reductions are a significant and meaningful co-benefit.

Small Business Impacts

51. Comment: Senator Hutchinson states that his legislative focus has always been championing the causes of small businesses and entrepreneurs. Senator Hutchinson lived his entire life in Oil City, which is about 15 miles from the birthplace of the world's petroleum industry 161 years ago at Drake's Oil Well. Senator Hutchinson witnessed the safe operation of the conventional industry over decades. He personally appreciates, and much of his life revolves around the beautiful, clean natural surroundings in the outdoor-lovers paradise where he has raised his family. Senator Hutchinson developed a close working relationship with many conventional oil and natural gas producers in his community. The producers have detailed the dubiously effective, unnecessary burdens and unknown financial impacts that the proposed rulemaking will mandate upon their "Mom and Pop" family-owned businesses operating in Western Pennsylvania. The legislature enacted strict legal protections and processes to eliminate this type of non-sensical burden. Many say that Pennsylvania's conventional oil and natural gas industry is in an economic death throe without further government fiats. Senator Hutchinson states that it is imperative that legislated procedures be followed to eliminate additional oppressive regulations which have no practical, beneficial effect.

Response: The owners and operators in the conventional industry are mistaken in their belief that they are exempt from applicable rules and regulations. Even though the Department recognizes that the conventional industry is composed primarily of small business-sized entities and has given the entire industry an exemption from obtaining plan approvals or operating permits, these owners and operators are still required to meet all federal, state, and local

requirements, including air pollution control regulations. However, the Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

52. Comment: Members of the Pennsylvania Senate ERE Committee state that Pennsylvania's conventional oil and natural gas producers are small businesses, typically single employee entities or individuals. Any increased costs associated with additional regulatory requirements can be devastating to conventional oil and natural gas producers, especially now after the industry has been ravaged by the COVID-19 pandemic.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

53. Comment: Representative Metcalfe stated that as the majority Chairman of the House ERE Committee, he writes to express his disapproval of proposed EQB Regulation 7-544. He sends this letter on behalf of citizens and businesses throughout the Commonwealth that will be negatively impacted if this regulation goes into effect as written. As the standing House Committee with legislative oversight over the Department, it is the committee's role to ensure that regulations proposed by DEP through the EQB are reasonable and consistent with the intent of the Acts on which they are based. He concludes that the proposed rulemaking fits neither criteria.

Response: The Department strongly disagrees. This final-form rulemaking is both reasonable and consistent with the Department and the EQB's authority under Sections 5(a)(1) and 5(a)(8) of the APCA. Section 184(b)(1)(B) of the CAA also requires states in the OTR, including this Commonwealth, to implement RACT requirements for all sources of VOC emissions in the state covered by an EPA CTG.

54. Comment: Representative Metcalfe states that the Department does not provide an adequate economic analysis as to why it has chosen to exceed the requirements from the EPA as part of the regulation and the existing economic analysis is clearly inaccurate. He notes that DEP has chosen to use the price of natural gas from 2012 to declare that the industry will see \$9.9 million in benefits from gas saved throughout the process. The 2012 price of natural gas is significantly higher than the current value of natural gas [July 2020], meaning that the number of benefits is vastly overstated.

Representative Metcalfe comments that reductions will vary in different parts of the state, and in many cases, DEP will require operators to expend significant resources implementing new technology which will result in little to no environmental benefit. He further states that DEP is proposing a regulation that will greatly harm the business community and investment in the Commonwealth without appropriately considering the economic impact of its actions. It is a part

of IRRC's role to analyze the economic and fiscal impacts of a regulation and he respectfully requests that IRRC do so as this regulation moves through the process.

Representative Metcalfe concludes that this proposed regulation is unacceptable, and if implemented would have a serious economic impact on the Commonwealth without addressing why parts of the regulation are necessary to achieve specific environmental benefits. He therefore asks IRRC to disapprove this regulation in its proposed form and urges the EQB and DEP to withdraw this proposed regulation in its current form. Representative Metcalfe writes this letter to draw IRRC's attention to the House ERE Committee's concerns with this proposed regulation and respectfully ask for your consideration.

Response: The Department's 2020 reanalysis shows that the cost/benefit of natural gas using \$1.70/Mcf is \$4.6 million (2021 dollars). The total industry cost to implement the requirements of the final-form rulemaking are \$21.9 million (2021 dollars), for a net cost to the industry of \$17.3 million (2021 dollars). This results in a total estimated VOC emissions reduction of 2,864 TPY, for an average net cost of \$6,370 per ton of VOC reduced. In addition, the economics of this final-form rulemaking improves to a net cost of \$15.2 million (2021 dollars) at \$2.50 per Mcf and a net cost of \$8.5 million (2021 dollars) at \$5.00 per Mcf, which is closer to the current value of natural gas. The RACT determination was based on the dollars per ton of VOC reduced or the annualized cost in dollars without the consideration of the value of natural gas saved.

55. Comment: Representative Metcalfe states that while the regulation is based on the 2016 O&G CTG released by the EPA, DEP has gone well past what was required by the EPA in the regulation. Specifically, the regulation adopts many requirements which are more in line with BAT rather than RACT which the federal guidelines require. This would compel an already struggling industry to make cost-prohibitive modifications to existing technology.

Response: The Department has determined that the final-form rulemaking is technically and economically feasible for VOC RACT and is consistent with the RACT recommendations of the 2016 O&G CTG. The justification for the more stringent RACT requirements for storage vessels, reciprocating compressors, and fugitive emissions components comes from the Department's 2020 reanalysis which shows the requirements are cost-effective.

56. Comment: Representative Metcalfe states that DEP has not released technical support documents for the regulation to demonstrate how the compliance requirements the regulation calls for will result in VOC emission reductions at greater rates than what the EPA requires.

Response: The technical justifications for the natural gas-driven continuous bleed pneumatic controllers, natural gas driven-diaphragm pumps, and centrifugal compressors are provided in EPA's 2016 O&G CTG. The justification for the more stringent RACT requirements for storage vessels, reciprocating compressors, and fugitive emissions components comes from the Department's 2020 reanalysis which shows the requirements are cost-effective, as described in the Responses to Comments 5 and 48.

§ 129.127 Fugitive emissions components.

57. Comment: Representative Metcalfe states that DEP is requiring a frequency of inspections which will be burdensome to operators and provide no significant emission reductions. This

requirement, along with many others in the regulation, goes well beyond what the EPA required without any demonstration of additional environmental benefits.

Response: The quarterly instrument based LDAR requirement for unconventional well sites that produce, on average, greater than or equal to 15 BOE per day and have at least one well that produces, on average, greater than or equal to 15 BOE per day provides an additional 333 TPY of VOC emission reductions and 4,932 TPY methane co-benefit emission reductions. The addition of the annual requirement for well sites that produce, on average, greater than or equal to 15 BOE per day and have at least one well that produces, on average, greater than or equal to 5 BOE per day but less than 15 BOE per day provides an additional 1 TPY of VOC emission reductions and 4 TPY methane co-benefit emission reductions.

The amount of the emission reductions is directly related to the frequency of the LDAR inspection—the longer a leak occurs, the more natural gas will escape. The Department’s analysis shows that the frequency requirements will not be burdensome to operators and that significant emission reductions will occur. At its heart, the RACT analysis and the applicable Federal Clean Air Act requirements involve a cost-benefit analysis where the annualized cost of the regulated entity is divided by the annual emission reductions. This final-form rulemaking is based on the Department’s thorough review of state-specific data and accurately and thoroughly documents the cost-benefit analysis. The reductions will aid the Commonwealth in attaining and maintaining the health-based and welfare-based 8-hour 2008 and 2015 ozone NAAQS as required by the CAA. Please also see the response to Comment 4 regarding the estimated monetized health benefits of attaining and maintaining the 8-hour ozone NAAQS.

58. Comment: Representative Comitta encourages the Board to strengthen the proposed regulation to control emissions of existing oil and natural gas operators by removing exemptions for low producing natural gas wells. These wells can actually emit just as much, or even more, methane than higher producing wells.

Response: The Department acknowledges this comment. The Department altered the production thresholds in this final-form rulemaking. The Department’s 2020 reanalysis has determined that an annual instrument-based LDAR program is cost-effective for RACT purposes for unconventional well sites that produce, on average, equal to or greater than 15 BOE per day and have at least one individual well that produces less than 15 BOE per day and equal to or greater than 5 BOE per day. The Department’s 2020 costs/benefits reanalysis has determined that an LDAR program is not cost-effective for RACT purposes for unconventional well sites that produce, on average, less than 15 BOE per day or that produce equal to or greater than 15 BOE per day with all wells at the well site producing less than 5 BOE per day.

59. Comment: Representative Comitta hopes that the Board will eliminate the provision that allows operators to shirk their responsibility to inspect their equipment frequently just because previous inspections did not reveal significant leaks. This would be like saying that someone need not get an annual car inspection if the vehicle passed the previous year’s inspection. Or, an elevator inspection. Pipelines can emit deadly chemicals and produce lethal explosions. Many of these pipelines go through densely populated communities. The occurrence of these disasters is not predictable. Inspections should be made on a frequent, established schedule. Senator Santarsiero and several state and local government officials encourage the DEP to strengthen the existing source oil and natural gas rule and ensure that controls are consistently applied to all

operations and equipment in our state. Regular leak detection and repair requirements should be extended to low-producing wells, which are responsible for more than half of the 1.1 million tons of methane released annually during oil and natural gas development. We must protect our climate and ensure that our air and communities are safe. Even though drilling rigs come and go, the wells and pipelines will remain and be in our communities for decades to come. We deserve to know that they are being properly inspected and maintained.

Response: The Department acknowledges this comment. The step-down provision based on the percentage of leaking components has been removed from this final-form rulemaking. This final-form rulemaking requires monthly AVO inspections and instrument-based LDAR with an inspection frequency determined by the well site's total production and the production of individual wells located at the well site. This final-form rulemaking also requires the owners or operators to calculate the production of their wells and well sites annually and to adjust the frequency of the instrument-based LDAR inspections based on the results of the calculations required under § 129.127(c)(4). Calculations for two consecutive inspection periods-showing that the well site qualifies for less frequent inspection periods are required before reducing the LDAR inspection frequency. The owner or operator is required to increase the LDAR inspection frequency immediately for a well site where a calculated result shows the well site should be monitored more frequently. Additionally, while this final-form rulemaking is designed to implement the VOC emission reduction recommendations of the 2016 O&G CTG, the implementation of the VOC emission control measures is also expected to result in methane emission reductions of approximately 45,278 TPY.

Methane is a Potent Greenhouse Gas

60. Comment: Representative Comitta states that reducing emissions is critical to our response to the climate crisis. We are at a climate crossroads. The earth is warming at a rate much faster than anticipated producing catastrophic results. Methane is a far more potent greenhouse gas (GHG), though shorter lived, than carbon dioxide and could cancel near term progress from efforts to reduce carbon emissions.

Response: The Department acknowledges the impacts of climate change on this Commonwealth and the world. Methane is a potent GHG with a global warming potential more than 28 times that of carbon dioxide over a 100-year time period, according to the EPA. The EPA has also identified methane, the primary component of natural gas, as the second most prevalent GHG emitted in the United States from human activities. While this final-form rulemaking is designed to implement the VOC emission reduction recommendations of the 2016 O&G CTG, the implementation of the VOC emission control measures is also expected to result in methane emission reductions of approximately 45,278 TPY. These anticipated methane emission reductions are a significant and meaningful co-benefit.

Public Comments

Regulatory Review Criteria and Process

61. Comment: The Commentator states that many members of the public are not able to participate during virtual comment periods like those for the proposed rulemaking. The

Commentator says that the virtual public hearings are inaccessible for many in rural communities who have limited access to the internet and inadequate cellular service.

Response: The Department understands the concerns expressed by the Commentator about participation in the virtual public hearings. In accordance with Governor Tom Wolf's emergency disaster declaration and based on advice from the Department of Health regarding the mitigation of the spread of the novel coronavirus (COVID-19), the Board held the public hearings for this rulemaking virtually. To ensure that all interested parties had access to the three virtual public hearings for this rulemaking, the Department and the Board made the hearings accessible via any telephone connection, including landline and cellular service, or internet connection. Two of the hearings were held at 6 p.m. so that members of the public could provide testimony outside of typical work hours, while one was held at 2 p.m. to provide an additional opportunity in the afternoon. The Board and the Department have seen record participation during the virtual public hearings and over 100 members of the public provided testimony on this proposed rulemaking.

Additionally, as with all Department and Board proposed rulemakings, members of the public had the opportunity to provide written comments by regular mail, the Department's eComment system, or email during the Board's formal public comment period. All public input, whether provided in the form of testimony at public hearings, or written comments submitted any of the forementioned methods, is given equal consideration in the Department's public participation process.

62. Comment: One Commentator states that it is critical to the future of the planet, and to the state of the world and our democracy, that the right of citizens to participate in decisions like the proposed rulemaking be affirmed. Another Commentator believes that under the Trump Administration this right is in danger of infringement.

Response: Under Commonwealth laws and regulations, members of the public have several opportunities to provide input on the Board's proposed rulemakings. This includes the formal public comment and hearing process, as well as opportunities to provide informal public comment at the Department's advisory committee meetings during both the proposed and final stages of a rulemaking. Comments provided at the advisory committee meetings are not included in the Comment Response Document prepared as part of this final-form rulemaking package.

63. Comment: Several Commentators state that many students and young people are frustrated when it comes to effective policies on climate action. The students and young people feel they are not being heard despite their participation in climate marches and voting on election day. Even while the youth continue to fight for action, there is a constant temptation to become resigned to the conclusion that money, corporate power, and an out of sight, out of mind mentality will win instead of policy that protects the future and the planet.

Response: The Department acknowledges the impacts of climate change on this Commonwealth and the world. Methane is a potent GHG with a global warming potential more than 28 times that of carbon dioxide over a 100-year time period, according to the EPA. The EPA has also identified methane, the primary component of natural gas, as the second most prevalent GHG emitted in the United States from human activities. While this final-form rulemaking is designed to implement the VOC emission reduction recommendations of the 2016

O&G CTG, the implementation of the VOC emission control measures is also expected to result in methane emission reductions of approximately 45,278 TPY. These anticipated methane emission reductions are a significant and meaningful co-benefit. The emission control measures and other provisions of this final-form rulemaking rely exclusively on the costs and benefits analyses of the anticipated VOC emissions reductions from the regulated sources—anticipated methane emission reductions are not used to calculate the costs or benefits of this final-form rulemaking.

64. Comment: The Commentator states that in the proposed rulemaking package published in the *Pennsylvania Bulletin*, the Board notes throughout the Background and Purpose section that the state is in near universal compliance with the 1997, 2008 and 2015 ozone standards. To the extent a county or region is in nonattainment, it is apparent these are counties and regions closest to densely populated metropolitan areas and the I-95 corridor. While the Department must, per the CAA, impose RACT standards on existing sources, as a matter of policy the Commentator does not believe the monitoring data supports a rulemaking that goes beyond the requirements established in the EPA’s Subpart OOOOa regulations and the 2016 O&G CTG. Much of the proposed rulemaking describes both the reasons why the state may move forward should the EPA withdraw the existing CTG as well as why the proposed rulemaking exceeds the 2016 O&G CTG in terms of stringency.

This proposed rulemaking does not establish applicability thresholds, the level under which control requirements would not apply, except for storage vessels. This is a significant departure from other RACT regulations, which provide a de minimis level of 2.7 TPY of VOC. RACT regulations must be cost-effective; therefore, there must be some threshold of emissions below which the implementation of controls is not cost-effective. While there may be co-benefit methane emission reductions as a result of this proposed rulemaking, the guiding regulatory construct is the implementation of Federal ozone control requirements, not methane control requirements.

Response: The Department agrees that the ambient air ozone monitoring data demonstrates that this Commonwealth is in near universal compliance with the 1997, 2008, and 2015 ozone NAAQS. The Department’s analysis of the 2020 ambient air ozone season monitoring data shows that all ozone samplers in this Commonwealth are monitoring attainment of the 2015 8-hour ozone NAAQS except three: the Bristol sampler in Bucks County, and the Philadelphia Air Management Services Northeast Airport and Northeast Waste samplers in Philadelphia County. All ambient air ozone samplers in this Commonwealth are projected to monitor attainment of the 1997 and 2008 8-hour ozone NAAQS. However, the Department must ensure that the 1997, 2008 and 2015 8-hour ozone NAAQS continue to be attained and *maintained* by implementing permanent and Federally enforceable control measures.

Furthermore, section 182(b)(2) of the CAA provides that for moderate ozone nonattainment areas, states must revise their SIPs to include RACT for sources of VOC emissions covered by CTG documents issued by the EPA prior to the area’s date of attainment of the applicable ozone NAAQS. More importantly, section 184(b)(1)(B) of the CAA requires states in the OTR, including this Commonwealth, to submit a SIP revision requiring implementation of RACT for all sources of VOC emissions in the state covered by a specific CTG and not just for those sources located in designated nonattainment areas of the state. Consequently, since the Commonwealth is not designated by the EPA as in attainment with the 2015 ozone NAAQS and

is not monitoring compliance Statewide with the 2015 ozone NAAQS, the Commonwealth's SIP must include regulations applicable Statewide to control VOC emissions from oil and natural gas sources that are not regulated elsewhere in Chapter 129.

The Department agrees with the Commentator that the rulemaking is designed to implement VOC emission control requirements consistent with the RACT recommendations of the EPA's 2016 O&G CTG. EPA's approach in using a production threshold instead of an emission threshold significantly minimizes the cost to the regulated industry to determine applicability of this final-form rulemaking. In addition, the production threshold is explicitly based on an analysis of VOC emissions and their cost-effectiveness. EPA consciously and deliberately choose, when issuing the 2016 O&G CTG, to use a production-based threshold instead of an emission-based threshold based on the high level of similarity in equipment and operating practices across the industry and to minimize compliance costs. The Department agrees with EPA that for this particular rulemaking, a production threshold is the superior means of determining applicability. In many previous RACT rulemakings and issuances of CTGs, emission calculations were selected because they were the superior method for determining applicability to those CTG-based regulations for those industries.

EPA did not establish VOC emission thresholds for any source under the 2016 O&G CTG, except for storage vessels. The Department is consistent with the 2016 O&G CTG in this regard, even in instances where the requirements are more stringent. The Department determined that the recommendations provided in the 2016 O&G CTG for natural gas-driven continuous bleed pneumatic controllers, natural gas driven-diaphragm pumps, and centrifugal compressors are provided in the 2016 O&G CTG are RACT for sources in this Commonwealth. The EPA recommendations in the 2016 O&G CTG for storage vessels, reciprocating compressors, and fugitive emissions components were determined to not be RACT in this Commonwealth. The Department's 2020 reanalysis to determine what RACT would be for these three classes of sources is described in the response to Comment 48.

The Department also notes that all calculations involving cost effectiveness strictly use the reduction of VOC emissions and do not include any environmental benefits from the co-benefit of methane reductions.

Whether the Regulation is Supported by Acceptable Data

65. Comment: The Commentator states that the EPA based its analysis in the 2016 O&G CTG on a "model plant" – intended to be representative of oil and natural gas facilities across the country. A drive across the Commonwealth to observe the variety of oil and natural gas facilities will quickly illustrate the foolishness associated with trying to represent the diversity of oil and natural gas facilities by a single model plant. The Department is well aware of this diversity. Its failure to account for these differences is unacceptable and renders its analysis inapt. In addition, the Department did not consider additional data that have been developed reflecting the VOC emissions profiles of marginal wells, including conventional wells in Pennsylvania.

Response: The Department cannot establish presumptive VOC RACT for individual facilities because presumptive RACT applies to specific source categories rather than to individual sources within a source category. The EPA has provided technical justification in the 2016 O&G CTG for use of a "model plant" for the presumptive RACT recommendations for fugitive

emissions components. In the Department's 2020 reanalysis, the fugitive emissions for each individual unconventional well site was based on either the reported emissions or the production of the well site and the assumption that 0.13% of production is emitted as fugitive emissions in the unconventional natural gas industry based on Omara et al., 2016. This information was used to estimate the cost of a single survey, which was used to determine the cost-effectiveness of LDAR for quarterly, semiannual, and annual inspection frequencies.

66. Comment: Several Commentators requested that the final regulation be based upon current facts and updated information; recognize and encourage significant technological advances of the industry; be cost effective; and provide a reasonable compliance schedule for implementation of requirements at affected facilities.

Response: During the development of this final-form rulemaking, the Department consulted with control technology vendors, the regulated industry, and environmental groups; evaluated current facts and information; accounted for advances in the industry; and evaluated the cost-effectiveness of requirements, as reflected in the Department's 2020 cost/benefit reanalysis utilizing 2020 oil and gas production data and air emissions data, as well as additional information received during the public comment period. The Department also established a reasonable compliance schedule in the final-form rulemaking for the implementation of applicable requirements at affected facilities.

67. Comment: The Commentator states that when the Board published the notice related to the 2016 O&G CTG in the *Pennsylvania Bulletin* on May 23, 2020, the underlying data "supporting" the proposal, such as varying natural gas and oil prices, VOC emissions data, and limited analyses, was outdated and insufficient. A majority of the data is from 2012 as the primary supporting document for the proposed controls in the 2016 O&G CTG which was finalized October 27, 2016. The 2016 O&G CTG relies on the Regulatory Impact Analysis finalized in April 2012 to support the imposition of VOC emissions control for various segments of the oil and natural gas industry at Subpart OOOO. A cursory review of the citations to the 2016 O&G CTG demonstrates that most of the data is from 2012 or earlier.

In light of a fundamental split between Pennsylvania and EPA in terms of characterizing groups of sources that will be affected by the rule as proposed, it is imperative that DEP review available VOC emissions data associated with marginal wells and conduct its own independent analysis of RACT for oil and natural gas sources in Pennsylvania. The NSPS and the 2016 O&G CTG focus on "affected facilities" and start with a requirement of a "hydraulically fractured" oil or natural gas well. EPA makes no distinction on whether the hydraulically fractured well has horizontal legs or into which geographic formation the well is drilled. EPA does not recognize the Pennsylvania-specific terms "conventional" or "unconventional." For DEP to conduct little-to-no additional research to account for the extreme differences between conventional and unconventional oil and natural gas sources in Pennsylvania only exacerbates the shortcomings of this proposed rulemaking.

Response: This rulemaking does not concern or regulate conventional oil and natural gas wells; instead it controls harmful VOC emissions from air contamination sources at unconventional well sites, gathering and boosting stations and natural gas processing plants including storage vessels, natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps, reciprocating compressors, centrifugal compressors, and fugitive emissions components.

In addition, storage vessels in the natural gas transmission and storage segment are also affected sources. These sources are the same pieces of equipment irrespective of whether they are used by the unconventional or conventional oil and natural gas industry. However, the Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

The Department's 2020 reanalysis shows that the 2.7 TPY VOC emission threshold is cost effective for both potential and actual emissions; therefore, a single 2.7 TPY VOC emission threshold is presented in the final-form rulemaking for all storage vessels. The Department's costs range from \$9,501 to \$22,871 (2021 dollars) for control of storage vessels and EPA's costs are \$30,909 (2021 dollars). Using EPA's cost data as a conservative value, the Department estimates there are 12 facilities with 44 storage vessels that emit 2.7 TPY or more of VOC with a total industry cost of \$370,908 (2021 dollars) per year. The Department estimates that implementation of the final-form control measures could reduce VOC emissions by as much as 211 TPY from the installation of controls for storage vessels. This results in an average cost of approximately \$758 (2021 dollars) per ton of VOC emissions reduced per year. Approximately 16 TPY of the VOC emissions reduction from this requirement is due to the technically and economically feasible RACT determination by the Department that is over and above the reductions from EPA's RACT recommendations.

The Department used the cost information from the 2016 O&G CTG, which is \$347 (2021 dollars) per year for natural gas-driven continuous bleed pneumatic controllers. The Department identified a total of 3,874 facilities with an estimated 8,572 affected pneumatic controllers. The total industry cost is \$2,974,484 (2021 dollars) per year. Using EPA's estimate of natural gas emissions per controller and Pennsylvania's average natural gas composition, the Department estimates that implementation of the final-form control measures could reduce VOC emissions by as much as 766 TPY from pneumatic controllers located at these facilities. The requirements for natural gas-driven continuous bleed pneumatic controllers are identical to EPA's CTG recommendation which EPA has determined to be cost effective.

The Department used the cost information from the 2016 O&G CTG, which is \$907 (2021 dollars) per year for natural gas-driven diaphragm pumps. The Department identified 17 well sites with an estimated 40 affected diaphragm pumps. The total industry cost is \$36,265 (2021 dollars) per year. Using EPA's estimate of natural gas emissions per pump, Pennsylvania's average natural gas composition, and a 95% emissions reduction, the Department estimates that implementation of the final-form control measures could reduce VOC emissions by as much as 7 TPY from natural gas-driven diaphragm pumps. The requirements for natural gas-driven diaphragm pumps are identical to EPA's CTG recommendation which EPA has determined to be cost-effective.

The Department's 2020 reanalysis shows that reciprocating compressor rod packing replacements every 26,000 operating hours or every 3 years is cost effective to implement at unconventional well sites. The Department's cost is \$782 (2021 dollars) per rod packing replacement. The Department estimates that there are approximately 535 affected sources with an industry cost of \$418,456 (2021 dollars). The Department estimates that implementation of

the final-form control measures could reduce VOC emissions by as much as 61 TPY from reciprocating compressors located at unconventional well sites. The Department has determined this requirement to be cost-effective since the annualized cost, the sum of the annualized capital cost and the annual operating expenses, is only \$782 per year. Annualized cost is one of many factors that the Department can consider when determining the cost-effectiveness of a control device or control technique. This technically and economically feasible RACT determination by the Department results in 61 TPY VOC emissions reduction over and above the EPA's RACT recommendations.

The Department used the cost information from the 2016 O&G CTG, which is \$2,990 (2021 dollars) for control of wet seal centrifugal compressor degassing systems. The Department estimates that there are no affected facilities of this category; however, the requirements are included in the final-form rulemaking in case there are sources in this Commonwealth that are unknown to the Department.

The Department identified 3,889 facilities including unconventional well sites, gathering and boosting stations, and natural gas processing plants. The calculation of fugitive emissions before control were based on estimates of the amount of natural gas leaked. The total industry cost is approximately \$18,094,239 (2021 dollars) and total VOC emissions will be reduced by as much as 1,819 TPY.

The frequency of instrument based LDAR inspections determines the emission reductions – 40% for annual LDAR inspections and 80% for quarterly LDAR inspections. The Department estimates there are 6 unconventional well sites that will be required to implement annual LDAR inspections at a cost of \$1,681 (2021 dollars) for a total annualized cost of \$10,086 (2021 dollars). The Department estimates VOC emissions will be reduced by as much as 1 TPY. This results in an average cost of approximately \$10,086 (2021 dollars) per ton of VOC emissions reduced per year. The Department estimates there are 2,610 well sites that will be required to implement quarterly LDAR inspections with annualized costs ranging between \$3,362 and \$6,723 (2021 dollars) per year for a total annualized cost of \$ 14,524,060 (2021 dollars). The Department estimates VOC emissions will be reduced by as much as 1,332 TPY. The Department estimates there are 264 gathering and boosting stations that will be required to implement quarterly LDAR inspections at a cost of between \$10,085 and \$13,447 (2021 dollars) for a total annualized cost of \$3,546,646 (2021 dollars). The Department estimates VOC emissions will be reduced by as much as 474 TPY. The Department estimates there is one gathering and boosting station with an annual LDAR program currently in place that will be required to implement a quarterly program. The total annualized cost is \$10,085. The Department estimates there is one natural gas processing plant without an LDAR program in place that will be required to implement quarterly LDAR inspections at a cost of \$13,447 (2021 dollars) for a total annualized cost of \$13,447 (2021 dollars). The Department estimates VOC emissions will be reduced by as much as 12 TPY which results in an average cost of approximately \$1,121 (2021 dollars) per ton of VOC emissions reduced per year.

Article I, Section 27 of the Pennsylvania Constitution

68. Comment: Several Commentators reference the Pennsylvania Constitution, Article 1, Section 27 pertaining to natural resources and the public estate which states “The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic

values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.” The Commentators state that the oil and natural gas industry infringes on this right and accuse the Department of failing in its Constitutional responsibilities.

Response: The Department has fulfilled its duties as a trustee of the environment, set forth in Article I, Section 27 of the Pennsylvania Constitution and the Pennsylvania Supreme Court Ruling on the Environmental Rights Amendment in *Pennsylvania Environmental Defense Foundation v. Commonwealth of Pennsylvania*, 161 A.3d 911 (Pa. 2017) during the development of this final-form rulemaking. This final-form rulemaking was developed under the authority of sections 5(a)(1) and 5(a)(8) of the APCA. The APCA is built on a precautionary principle to protect the air resources of this Commonwealth for the protection of public health and welfare and the environment, including plant and animal life and recreational resources, as well as development, attraction and expansion of industry, commerce and agriculture. Implementation of the VOC emission control measures established in this final-form rulemaking will help the Department protect the air resources of this Commonwealth as well as public health and welfare by reducing harmful VOC emissions from the oil and natural gas industry which contribute to the formation of ground-level ozone. Implementation of these VOC emission control measures will also provide reductions of methane emissions as a significant and meaningful co-benefit.

The Department recognizes Pennsylvanians’ rights and the Commonwealth’s obligations under the Pennsylvania Constitution and must meet those obligations in every action the agency takes. The Department disagrees that it is failing to perform its Constitutional responsibilities. It is a demonstrable fact that air quality in the state has made dramatic improvements over the past four decades. The Air Quality Index (AQI) is a current measurement of the air quality based on actual measurements collected by state, local and tribal agencies nationally. For each pollutant, an AQI value of 100 generally corresponds to an ambient air concentration that equals the level of the short-term national ambient air quality standard for protection of public health. AQI values at or below 100 are generally thought of as good or satisfactory. When AQI values are above 100, air quality is generally thought of as unhealthy; first for certain sensitive groups of people, then for everyone as AQI values get higher. In 1980, statewide AQI values met the good or satisfactory metric for 70% of days; in 2020, 99.5% of days met the good or satisfactory standard. In Allegheny County, only 4.9% of days in 1980 met the good or satisfactory standard; by 2020, 96.2% of days met the good or satisfactory standard. Philadelphia shows a similar trend where 33.8% of days in 1980 met the good or satisfactory standard; by 2020, 98.2% met the good or satisfactory standard.

Another way to demonstrate the Department is meeting its Constitutional responsibilities is to analyze trends in pollutant design values. A design value is a statistic that describes the air quality status of a given location relative to the level of the NAAQS. Looking at trends in ozone, sulfur dioxide (SO₂), and fine particulate matter (PM_{2.5}), there are encouraging downward trends in the data. Looking at the statewide ozone monitoring network design values since 1980 shows that all sites, with the exception of two sites downwind of Philadelphia and one site in Bucks County, are meeting the 2015 ozone NAAQS. SO₂ monitoring network design values show similar downward trends in the data, except for a single site in Allegheny County. PM_{2.5} has both an annual and 24-hour standard and by both metrics there is marked improvement across the state, again with one exception in Allegheny County. Based on preliminary data, the one

sensor in Allegheny County should meet both the annual and 24-hour PM_{2.5} design values for the 2018-2020 timeframe.

Finally, by examining emissions data, significant reductions in major categories of pollutants support the trends in both the AQI and the monitored data. Between 1990 and 2017, SO₂ emissions are down 93%, nitrogen dioxide (NO₂) emissions are down 83%, particulate matter (PM) emissions are down 31% and VOC emissions are down 60%. Overall, for the period between 1990 and 2017, emissions are down 88%. Because this final-form rulemaking is designed to reduce VOC emissions, resulting in considerable health benefits among others, the Department is satisfied that its Article I, Section 27 obligations have been met with development of this final-form rulemaking.

Act 13 of 2012

69. Comment: The Commentator states that many in their community were stunned that under the Oil and Natural Gas (58 Pa.C.S.) Omnibus Amendments, Act 13 of 2012 (Act 13), a suburban/rural residential community could be vulnerable to vertical fracking in their own backyards.

Response: The Department acknowledges this comment; however, it is outside the scope of this final-form rulemaking.

Act 52 of 2016

70. Comment: The Commentator states that Act 52 was adopted after Pennsylvania's conventional oil and natural gas industry was overlooked during the development of regulations at 25 Pa. Code Chapter 78 following the passage of Act 13 which amended Title 58 of the Pennsylvania Consolidated Statutes. The Commentator goes on to explain the history of the Department's Chapter 78 and 78a rulemakings. From that history, but especially from the plain language of Act 52, the Commentator states that it is clear that the legislature recognizes Pennsylvania's conventional and unconventional oil and natural gas operations as two separate industries and that the legislature has mandated a separate regulatory framework for each of the two industries.

Yet, despite that history, the DEP has, in the proposed rulemaking, failed to create a separate regulatory framework for conventional oil and natural gas operations. The DEP failure results in the same problem recounted in the Chapter 78 saga: concerns unique to the conventional industry were not considered or even discovered because necessary interface with and consideration of the conventional oil and natural gas industry, and its unique concerns, did not occur.

Response: Please see the responses to Comments 3 and 7. The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

71. Comment: The Commentator asks whether the Act 52 directives apply to the rulemaking. The Commentator believes that Act 52 does apply and that EQB's undertaking of this rulemaking has not complied with the directives of section 7(b) of Act 52.

Response: Please see the responses to Comments 3 and 7.

72. Comment: Several Commentators, assuming the proposed rule applies to conventional oil and natural gas operations even though the Board failed to adhere to requirements in section 7(b) of Act 52, note that there are additional legal flaws with the proposed rule based on the Board's failure to distinguish conventional from unconventional oil and natural gas operations in the proposed rule's requirements and the rulemaking record.

The procedural failure to treat the conventional industry via a separate regulatory framework and the consequential failure to properly interface with the industry, has corrupted the rulemaking process, at least to the extent the process purports to relate to the conventional oil and natural gas well industry. Indeed, the substantive comments submitted by the Commentators are necessarily handicapped because a lack of interface with the Department to understand the applicability of the proposed rule, its scope, what conditions the Department assumed to arrive at cost estimates, what data, if any, the Department has assembled relative to conventional oil and natural gas industry emissions, and the like, and the Department lacks the interface with the industry to have appropriately discussed need, costs, prevailing conditions, data, alternatives and the like.

Taking into account Act 52, and examining the plain language of the proposed rule, the Commentators conclude that the proposed rule must not apply to conventional oil and natural gas operations. Specifically, in reviewing the language of the proposed rule, it is clear the proposed rule would have applicability to unconventional wells. It is also clear that there has not been a VOC Emission rulemaking, concerning conventional oil and natural gas wells, that is separate and independent from the rulemaking that concerns unconventional wells. In other words, the proposed rulemaking is applicable to unconventional wells and by virtue of the statutory mandate contained in section 7(b) of Act 52, the proposed rule should not also apply to conventional wells. From this syllogism the Commentators conclude that the proposed rulemaking does not, or at least should not, apply to conventional oil and natural gas wells, according to law.

If the proposed rule is not intended to apply to conventional oil and natural gas operations, then the confusion created by references to "conventional" in the proposed rule and RAF, is moot, and the Commentators have no reason to comment on the proposed rule.

If, however, the proposed rule is intended to apply to conventional oil and natural gas operations, a number of procedural and substantive problems are presented. If the proposed rule is intended to apply to conventional oil and natural gas operations the overarching procedural problem is that the Department did not follow the steps, required under law, that would inform both the Department and the conventional oil and natural gas industry, about the need for, scope of, impact of, and alternatives to the proposed regulation. The Department's failure to follow these steps and provide the necessary facts and data corrupts the process, with one of the results of that corruption being the Commentators' inability to make informed comments, which, in turn, prevents the Board and Department from making informed decisions.

Response: Please see the responses to Comments 3 and 7. The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

73. Comment: The Commentator states that in Act 126 of 2014 (Act 126) the General Assembly specifically rejected, by an amendment to the Fiscal Code, the “one-size-fits-all” regulatory approach for conventional and unconventional oil and natural gas operations in the Chapter 78 regulations of Title 25 of the Pennsylvania Code. While the lawsuit alleging non-compliance with those Fiscal Code directives was dismissed as premature because of the meaning of the statutorily defined term “promulgate,” the Act 52 directives are substantively different than the Act 126 directives. The Act 52 directives are broader in scope, more prescriptive in the General Assembly’s rejection of the “one-size-fits-all” regulatory approach and based upon plain language rather than a statutorily defined term. No doubt the Act 52 language was informed by the result of the legal challenge concerning the Act 126 language. Unlike in the Fiscal Code litigation, the time for the Board’s compliance with the Act 52 directives for this “rulemaking concerning conventional oil and natural gas wells” has already passed. The Department has already undertaken the actions and activities reported on the RAF, particularly in Sections 14-19 and 23-27, to support this rulemaking, but the Department did not do so “separately and independently of unconventional wells or other subjects” with a RAF submitted to IRRC “that is restricted to the subject of conventional oil and natural gas wells.” as directed by Act 52.

Response: Please see the responses to Comments 3 and 7.

74. Comment: The Commentator states that the public comment opportunity for this rulemaking cannot be viewed as complying with either the letter or spirit of the plain language directives of Act 52, and the other comments submitted should not be interpreted as counter to the Commentator’s legal argument that this rulemaking cannot be applied lawfully to owners and operators of conventional wells. Because the public comment opportunity comes *after* the Department undertook the actions and activities that were reported on the RAF, particularly in Sections 14-19 and 23-27, it comes too late in the process.

Response: Please see the responses to Comments 3 and 7.

75. Comment: The Commentator states that the RAF contains many references to unconventional oil and natural gas operations. Because the RAF deals with the subject of unconventional oil and natural gas wells, and because Act 52 requires that any rulemaking concerning conventional oil and natural gas wells that the Board undertakes after the adoption of the Act shall include a regulatory analysis form submitted to the IRRC that is restricted to the subject of conventional oil and natural gas wells, the Commentator concludes that the proposed rulemaking does not apply to conventional oil and natural gas wells.

However, that logic is contradicted by express statements contained in the RAF. The Commentator claims that the Department specifically states that “conventional wells” will be required to comply with the regulation and the response does not restrict the analysis to unconventional natural gas operations. The Commentator states that much of the language

contained throughout the RAF states that the proposed rulemaking would apply to “owners and operators of one or more of the following oil and natural gas sources of VOC emissions...” which is sufficiently broad so as to include both conventional and unconventional oil and natural gas sources and therefore does not clarify the question of whether the proposed regulation is intended to apply to conventional oil and natural gas operations.

The Commentator also says that the update to CDAC gave the Council members no warning that the proposed rulemaking would impact the conventional oil and natural gas industry. The minutes from the January 24, 2019 meeting of the CDAC state: “Chairman Stewart inquired as to whether the methane rule from the Air Quality Board would impact the conventional industry. Mr. Klapkowski stated that his understanding was that it would not since the conventional wells typically do not cross the thresholds in place for methane emissions, and he agreed to procure additional information for the Council to evaluate.”

The Commentators state that the Department did not provide additional information at later CDAC meetings nor did the Department state in Section 14 of the RAF that the update to CDAC contained incorrect or incomplete information. If the Department now intends for the proposed regulation to govern conventional oil and natural gas operations, the Commentator concludes that Section 14 of the RAF would have been answered differently. If the Department intends that the proposed regulation apply to conventional oil and natural gas well operations the Department would not have set forth at Section 14 of the RAF that it had communicated such applicability to CDAC and that the Department had solicited input on such applicability from CDAC. The Commentator concludes, therefore, that the proposed rulemaking does not apply to conventional oil and natural gas well operations.

Response: Please see the responses to Comments 3 and 7. The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

76. Comment: The Commentator notes that if the proposed rulemaking is intended to apply to conventional oil and natural gas well operations, that fact was not timely communicated, and therefore the solicitation of necessary input was thwarted. Section 14 of the RAF raises more questions on the scope of the proposed rulemaking when the Department further describes its “communications with and solicitation of input from the public, any advisory council/group, small businesses and groups,” when the Department states they met with “industry and environmental stakeholders.” The Department specified that “On July 8, 2019, the Department met with industry stakeholders, including representatives from the Marcellus Shale Coalition (MSC), Penn Energy, Southwestern Energy, Range Resources, and Chesapeake Energy.” That list of industry stakeholders does not include representatives from the conventional oil and natural gas industry. If the conventional oil and natural gas industry is to be regulated by the proposed rulemaking and if the Department has communicated with and solicited input from the conventional oil and natural gas industry, then the list of industry members with which the Department communicated would include members of the conventional oil and natural gas industry such as the Commentator. Because the list does not, the Commentator concludes that the proposed rulemaking does not apply to conventional oil and natural gas well operations.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites. Please also see the responses to Comments 3 and 7.

77. Comment: The Commentator states that the proposed rulemaking contains reference to and appears to regulate other items of equipment which can be used in conventional oil and natural gas operations. According to the RAF these would include “natural gas-driven pneumatic controllers, natural gas-driven diaphragm pumps, centrifugal compressors and reciprocating compressors, and fugitive emission components.” Again, because the Department previously advised CDAC that the proposed rulemaking was not applicable to conventional oil and natural gas operations, and because Act 52 requires that a conventional oil and natural gas operations rulemaking be undertaken “separately and independently” from an unconventional oil and natural gas operations rulemaking, it remains unclear to the Commentator, based upon the conflicts between the proposed rulemaking and applicable law, whether the proposed rulemaking is intended to apply to conventional oil and natural gas operations in general and to such pieces of conventional oil and natural gas equipment in particular.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites. Please also see the responses to Comments 3 and 7.

Pennsylvania’s Air Pollution Control Act

78. Comment: The Commentator is pleased that the DEP grounded the rule in the APCA, which affirms the Department’s mandate to protect the health and welfare of Pennsylvania residents. This effectively connects the current proposed rulemaking to the emissions of methane and ethane from oil and natural gas operations which contribute to the formation of ground-level ozone.

Response: The Department agrees that it is obligated to protect the health and welfare of Pennsylvanians and has the authority to develop rulemakings to fulfill that obligation under the APCA.

79. Comment: The Commentator states that methane emissions meet the definition of “air pollution” under Section 3 of the APCA and nothing in that act restricts the Department from moving forward and establishing control measures. In fact, the Department has a trust responsibility under the Pennsylvania Constitution to “conserve and maintain” our public natural resources, including air quality. Under that article, Pennsylvania’s public natural resources are the corpus of the trust and the Commonwealth has a fiduciary duty to manage those assets for the

benefit of the people. Our State Supreme Court has held that before state “agencies approve use of trust resources, they must consider effect of use upon public trust interests and attempt, so far as feasible, to avoid or minimize any harm to those interests.”

Response: See response to Comment 68.

80. Comment: The Commentators state that the proposed rulemaking marks another critical step toward fulfilling Governor Wolf’s commitments to reduce methane emissions from the oil and natural gas sector and to reduce Pennsylvania’s GHG emissions consistent with Executive Order 2019-01. The Commentators concur with the EQB that this proposed rulemaking is authorized under Section 5(a)(1) of the APCA, which grants the EQB the authority to adopt rules and regulations for the prevention, control, reduction and abatement of air pollution in Pennsylvania.

Response: The Department agrees that this final-form rulemaking will help to advance the priorities of Governor Wolf’s Methane Reduction Strategy and is consistent with the climate change goals in Executive Order 2019-01. While this final-form rulemaking requires VOC emission reductions, methane emissions are also reduced as a co-benefit, because both VOCs and methane are emitted from oil and natural gas operations.

81. Comment: The Commentator states that the proposed rule is an improper exercise of the Board’s authority under Section 5(a)(1) of the APCA. While Section 5(a)(1) of the APCA grants the EQB authority to “adopt rules and regulations, for the prevention, control, reduction and abatement of air pollution.” this same section gives the EQB authority to “regulate any process or source or class of processes or sources” in such rules and regulations.

Contrary to what the EQB proposes now, the APCA expressly grants EQB the authority to treat classes of sources differently. This includes the different classes or categories of operations within the broader oil and natural gas industry, namely the conventional oil and natural gas industry on the one hand, and the unconventional oil and natural gas industry on the other. The EQB’s failure to differentiate between conventional and unconventional oil and natural gas operations in the proposed rule itself, and throughout the process for developing the proposed rule, is an improper exercise of the EQB’s authority under Section 5(a)(1) of the APCA. It is also inconsistent with recent actions the DEP has taken to regulate air emissions from both conventional and unconventional operations.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites. Please also see the responses to Comments 3 and 7.

82. Comment: The Commentators state that the EQB cites Section 5(a)(8) of the APCA as authority for the proposed rule. Section 5(a)(8) of the APCA grants the EQB authority “to adopt rules to implement the provisions of the Clean Air Act,” and requires such rules to be “consistent with the requirements of the Clean Air Act.”

Response: Both Section 5(a)(1) and 5(a)(8) of the APCA provide the Board with the authority to develop and promulgate this final-form rulemaking.

83. Comment: The Commentator states that Section 4.2(a) of the APCA precludes the EQB from adopting regulations that are not necessary to attain or maintain the NAAQS or satisfy other requirements that are imposed by the CAA or specifically authorized or required by the APCA. Section 4.2(b) of the APCA provides that control measures or other requirements in regulations adopted by the EQB “be no more stringent than those required by” the CAA or APCA.

The Commentator states that for the EQB to impose emission limitations by regulation, it must establish that those limitations are either necessary to attain or maintain the NAAQS, required by the CAA, or specifically authorized or required by the APCA and are not more restrictive than necessary to comply with the CAA or APCA.

Response: This final-form rulemaking is a primary component of the Commonwealth’s strategy of ensuring that the NAAQS for ozone is attained and maintained across this Commonwealth. To the extent that any of the requirements in this final-form rulemaking are more stringent than any provisions of the 2016 O&G CTG, the requirements are reasonably necessary to attain and maintain the health-based and welfare based 8-hour ozone NAAQS in this Commonwealth and to satisfy related CAA requirements. The Department determined that the reductions in VOC emissions that are achieved following the adoption and implementation of RACT emission control measures for source categories covered by this final-form rulemaking will assist the Commonwealth in making substantial progress in achieving and maintaining the ozone NAAQS. The final-form rulemaking will provide consistency among unconventional oil and natural gas sources in this Commonwealth for VOC emissions reduction. The Department estimates that these more stringent requirements will result in an additional VOC emission reduction of 411 tons per year and in an additional methane emission reduction of 6,124 tons per year.

84. Comment: The Commentator states that EPA determined that the recommended RACT emission limits in the 2016 O&G CTG were both technically feasible and cost effective. To the extent that emission limits in the proposed rulemaking are more stringent than those in the 2016 O&G CTG, they have not been determined to be RACT as they have not been demonstrated to be technically feasible, cost effective, or both. If emission limits imposed by the proposed rulemaking are more stringent than their counterpart recommendations in the 2016 O&G CTG and are not RACT, the Pennsylvania limits would be prohibited by subsections 4.2(a) and (b) of the APCA.

To avoid the prohibition imposed by Section 4.2 of the APCA and secure the environmental and public health benefits that the proposed rulemaking would provide, the EQB must establish that each individual emission limit that is more stringent than its counterpart recommendation in the 2016 O&G CTG is RACT.

Accordingly, the EQB should identify all of the emission limits in the proposed rulemaking that are more stringent than their counterpart recommendations in the 2016 O&G CTG, and demonstrate that each of the more stringent limits are both technically feasible and cost effective and, therefore, RACT.

Response: This final-form rulemaking is a primary component of the Commonwealth’s strategy of ensuring that the NAAQS for ozone are attained and maintained across this Commonwealth. To the extent that any of the requirements in this final-form rulemaking are more stringent than any provisions of the 2016 O&G CTG, the requirements are reasonably necessary to attain and maintain the health-based and welfare based 8-hour ozone NAAQS in this Commonwealth and to satisfy related CAA requirements. The Department determined that the reductions in VOC emissions that are achieved following the adoption and implementation of RACT emission control measures for source categories covered by this final-form rulemaking will assist the Commonwealth in making substantial progress in achieving and maintaining the ozone NAAQS. The final-form rulemaking will provide consistency among unconventional oil and natural gas sources in this Commonwealth for VOC emissions reduction. The justification for the more stringent RACT requirements for storage vessels, reciprocating compressors, and fugitive emissions components comes from the Department’s 2020 reanalysis which shows the requirements are cost-effective, as described in the response to Comment 5.

85. Comment: The Commentator states that even if the emission limits in the proposed rulemaking do not qualify as RACT, they may still be permissible under Section 4.2 of the APCA if the EQB demonstrates that the limits are required to attain or maintain the NAAQS.

Although the proposed rulemaking states that the ozone sampler in Bristol, Bucks County, Pennsylvania does not currently monitor attainment of the 2008 ozone NAAQS, EPA has determined that Bucks County and the rest of the Philadelphia area have attained that standard. Only five counties in the southeastern corner of Pennsylvania have been classified as “nonattainment” for the 2015 ozone NAAQS, with all other areas of the Commonwealth classified as “attainment/unclassifiable.”

The proposed rulemaking repeatedly asserts that the emission limits that it would impose are required or necessary to attain or maintain the 2008 and 2015 ozone NAAQS. Such evidence or analysis would help counter any assertion that the proposed rulemaking’s emission limits are not required to attain or maintain the NAAQS and are thus impermissible under Section 4.2(a) of the APCA.

Response: Please see the response to Comment 84.

86. Comment: The Commentator states that as the DEP did in 2018 when it revised the Air Quality Permit Exemptions list, revised the GP-5, and issued the GP-5A, the EQB must regulate VOC emissions from conventional and unconventional operations differently. In 2018, the DEP unconditionally exempted conventional well sites from air permitting requirements. Notably, the DEP did so after receiving comments pointing to the differences in scale and duration of the post-stimulation flowback periods, arrangement of compressors and storage tanks on or near well sites, pressures of the gas in the wellheads, and between emissions and sources at conventional and unconventional well sites.

Departing from the DEP’s recent air permitting actions and commingling the regulatory requirements for conventional operations with those of unconventional operators, is a misuse and abuse of the EQB’s authority under the APCA.

With these flaws and limitations in mind, and always with the question as to whether the DEP intends the proposed rulemaking to apply to conventional oil and natural gas operations, the Commentator offers additional comments, but in so doing, does not infer that they have the necessary understanding of the proposed rulemaking to provide fully informed comment.

Response: Air permits and regulations are hard to compare as they have different standards and requirements. In other words, the Department cannot use the way a permit is drafted as a justification for requirements in a regulation. However, the Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

Federal Clean Air Act

87. Comment: The Commentator states that with respect to VOC, the Department may determine based on the record that the reasonably available controls required by the CAA meet Pennsylvania’s constitutional requirement of minimizing harms “so far as feasible.” Given that reductions in methane emissions are addressed only as a co-benefit to VOC emissions, this action does not establish a record indicating the harms from methane emissions have been minimized so far as feasible.

Response: Please see the response to Comment 68.

88. Comment: The Commentators state that VOC are a precursor to the formation of ground-level ozone, which is defined as a criteria pollutant in accordance with Section 108 of the CAA. The EPA first promulgated NAAQS for ground-level ozone in 1997 and revised those standards in 2008 and again in 2015. All areas of Pennsylvania have attained the 2008 ozone NAAQS; all areas of Pennsylvania except for Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties have been designated as “attainment” or “unclassifiable” for the 2015 ozone NAAQS.

Response: The Department’s analysis of the 2020 ambient air ozone season monitoring data shows that all ozone samplers in this Commonwealth are monitoring attainment of the 2015 8-hour ozone NAAQS except three: the Bristol sampler in Bucks County, and the Philadelphia Air Management Services Northeast Airport and Northeast Waste samplers in Philadelphia County. All ambient air ozone samplers in this Commonwealth are projected to monitor attainment of the 1997 and 2008 8-hour ozone NAAQS. However, the Department must ensure that the 1997, 2008 and 2015 8-hour ozone NAAQS continue to be attained and maintained by implementing permanent and Federally enforceable control measures.

89. Comment: The Commentator states that in this Commonwealth, Allegheny, Armstrong, Beaver, Berks, Bucks, Butler, Carbon, Chester, Delaware, Fayette, Lancaster, Lehigh, Montgomery, Northampton, Philadelphia, Washington and Westmoreland Counties have elevated levels of Ozone, well beyond 2008 EPA standards for ozone NAAQS. For Pennsylvania to continue making progress in attaining and maintaining the 2008 8-hour ozone NAAQS, we need stringent uniform regulations free of all loopholes.

Response: The Department disagrees with the Commentator that the Commonwealth is monitoring nonattainment with the 2008 ozone NAAQS. The Department's analysis of the 2020 ambient air ozone season monitoring data shows that all ozone samplers in this Commonwealth are monitoring attainment of the 2015 8-hour ozone NAAQS except three: the Bristol sampler in Bucks County, and the Philadelphia Air Management Services Northeast Airport and Northeast Waste samplers in Philadelphia County. All ambient air ozone samplers in this Commonwealth are projected to monitor attainment of the 1997 and 2008 8-hour ozone NAAQS. However, the Department must ensure that the 1997, 2008 and 2015 8-hour ozone NAAQS continue to be attained and maintained by implementing permanent and Federally enforceable control measures. To this end, as required under section 182(b)(2) of the CAA, the Department developed this final-form rulemaking to implement RACT VOC emission control measures applicable to the owners and operators of certain sources in the oil and natural gas industry. The RACT VOC emission control measures in this final-form rulemaking are consistent with the RACT recommendations of the EPA issued in the 2016 O&G CTG. When implemented, the Department estimates that compliance with the VOC RACT requirements will provide additional reductions of 411 TPY.

90. Comment: Citizens in the Commonwealth of Pennsylvania are protected from ground-level ozone under Section 109 of the CAA that established both primary and secondary NAAQS. The primary standard protects public health and the secondary standard protects the public welfare and the environment. The Commentators believe that the proposed rulemaking is crucial to adopt RACT. It is vital to reduce VOC emissions from all five sources: storage vessels, natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps, reciprocating and centrifugal compressors, and fugitive emissions components.

Response: The Department agrees with the Commentators. Please also see the response to Comment 84.

91. Comment: The Commentator states that the primary policy used to control the hydrocarbon emissions of the oil and natural gas industry under Section 112 of the CAA has been to require what is known as maximum available control technology (MACT). The appropriate regulatory approach to VOC and methane emissions from unconventional gas drilling sites would be to require MACT rather than the less stringent RACT. MACT requires the entire industry to conform to the best actors, which is a way of rewarding those who chose to use the best pollutant control technology, rather than giving a competitive advantage to the bad actors who spend as little as possible on pollution control. This should be the State and Federal approach – and no site should be exempted.

Response: The EPA uses MACT standards for sources in the NESHAP. There is only one applicable MACT standard for this industry in 40 CFR Part 63, Subpart HH (Subpart HH) for glycol dehydration units, storage vessels with a potential for flash emissions, and fugitive emissions components (referred to as ancillary equipment in the NESHAP). Subpart HH regulates benzene, toluene, ethylbenzene, and xylene (BTEX) emissions from the above sources and several other hazardous air pollutants (HAP) found in Table 1 of Subpart HH of Part 63. The final-form rulemaking addresses VOC emissions, which may include volatile HAP emissions such as BTEX, n-hexane, or 2,2,4-trimethylpentane, to reduce ozone pollution. Actions to reduce VOC emissions will reduce the volatile HAP emissions as well. It should be noted, however, that

the average Pennsylvania natural gas composition indicates very low concentrations of HAP in the natural gas.

92. Comment: The Commentators state that Section 182(b)(2) of the CAA requires each State with a moderate ozone nonattainment area and Section 184(b) of the CAA requires each state within the northeast OTR to submit revisions to its SIP to implement RACT for sources of VOC that are covered by a CTG. Because EPA issued the 2016 O&G CTG that covers existing oil and natural gas sources, the CAA requires Pennsylvania's SIP to be revised to impose RACT on sources covered by the CTG.

Response: Because Pennsylvania is in the OTR, the Commonwealth is statutorily required to promulgate a regulation applicable to the entire state and subsequently revise the Commonwealth's SIP. For this reason, it is important that the sources covered in the 2016 O&G CTG be present in the final-form rulemaking, and at least as stringent as the RACT recommendations set forth by EPA.

93. Comment: Despite fundamental differences in the production processes, sizes and scales, emission points and rates, and the pressures and VOC content of gases managed by the conventional oil and natural gas industry on the one hand, and the unconventional oil and natural gas industry on the other, the EQB proposes to adopt EPA's CTG-recommended RACT, making it more stringent in two cases, and apply it to both conventional and unconventional operators. The EQB's failure to distinguish conventional from unconventional operations in the proposed rulemaking may be the product of a fundamental misunderstanding of the CAA requirements that apply to States when EPA issues CTG. The CAA does not require an affected State to adopt EPA's CTG-recommended RACT wholesale, much less make EPA's CTG-recommended RACT more stringent, as the EQB proposes to do here.

The proposed rule and record are devoid of any analysis of the technological and economic feasibility of implementing EPA's CTG-recommended RACT at conventional operations. While the "anticipated costs" per ton of implementing the proposed rulemaking's requirements are listed in the RAF, the EQB appears to have adopted, without analysis, EPA's cost estimates from the CTG. The EQB ignores or overlooks its responsibility to evaluate the technological and economic feasibility of applying the proposed VOC RACT rule to conventional operators. Simply put, a technical feasibility and cost-effectiveness analysis must be performed before any VOC RACT rule can be proposed for conventional oil and natural gas operators. The Board fails to demonstrate that proposed rule's requirements are RACT for conventional operators under the Clean Air Act.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

94. Comment: The Commentator states to the extent that emission limits in the proposed rulemaking are not as stringent as their counterparts in the 2016 O&G CTG, the Pennsylvania limits would seem to violate the CAA requirement that the states impose "all reasonably

available control measures” on sources covered by a CTG. The EQB must also identify any emission limits in the proposed rulemaking that are not as stringent as their counterparts in the 2016 O&G CTG, demonstrate that the more stringent CTG limits are not technically feasible or cost effective for sources in Pennsylvania, and establish that the less stringent Pennsylvania limits are technically feasible and cost effective.

Response: There are no provisions of the final-form rulemaking that are less stringent than the RACT recommendations in the 2016 O&G CTG. There are three cases where RACT was determined to be more stringent than EPA’s RACT recommendations, as described in the response to Comment 5.

CTG Withdrawal

95. Comment: The Commentator agrees with the Department that “even though a finalized withdrawal of the 2016 O&G CTG would relieve this Commonwealth of the requirement to address RACT for existing oil and natural gas sources, the Department is still obligated to reduce ozone and VOC emissions as a precursor under section 110 of the CAA.”

Response: In March of 2020, the Department received notice that the EPA had decided not to proceed with the withdrawal of the 2016 O&G CTG. Please see the response to Comment 8.

96. Comment: The Commentator states that the EPA proposed to withdraw the 2016 O&G CTG on March 9, 2018, but has not done so. Accordingly, sources of VOCs in the oil and natural gas industry in Pennsylvania must implement RACT.

Response: Through this final-form rulemaking, the Department is implementing the RACT requirements for five categories of sources of VOC emissions in the oil and natural gas industry. Please also see the response to Comment 8.

97. Comment: The Commentator states that while the withdrawal of the 2016 O&G CTG is predicated on a cost-benefit analysis that fails to monetize the costs and benefits related to the social cost of methane emissions, the Department cannot ignore those costs. A 2016 report of the Interagency Working Group on the Social Cost of Greenhouse Gases found a social cost of carbon dioxide (CO₂) of \$42 per ton in 2007 dollars. Given that methane has a global warming potential of between 28 and 86 times that of CO₂, a single ton of methane can create significantly more than \$1,000 in negative impacts in 2007 dollars.

Response: Methane is a potent GHG with a global warming potential more than 28 times that of carbon dioxide over a 100-year time period, according to the EPA. The EPA has also identified methane, the primary component of natural gas, as the second-most prevalent GHG emitted in the United States from human activities. While this final-form rulemaking requires VOC emission reductions, methane emissions are also reduced as a co-benefit, because both VOCs and methane are emitted from oil and natural gas operations. This final-form rulemaking will result in methane emission reductions of approximately 45,278 TPY. Please also see the response to Comment 8.

98. Comment: The Commentators state that while establishing a CTG presumptively defines RACT, the proposed withdrawal of the CTG does not change EPA’s underlying RACT analysis.

The 2016 O&G CTG notes that the “RACT recommendations for storage vessels, compressors, pneumatic controllers, and equipment leaks from natural gas processing plants are based on the 2012” NSPS Technical Support Documents (TSD) and the “RACT recommendations for pneumatic pumps and fugitive emissions from well sites and compressor stations were based on the 2016 NSPS TSDs.” The EPA further notes that it is reconsidering the 2016 NSPS and “because the 2016 NSPS and CTG share certain key pieces of data and information, the EPA believes it is prudent to withdraw the CTG in its entirety.”

Since EPA is not reconsidering the 2012 TSD it used as a basis for the RACT recommendations for storage vessels, compressors, pneumatic controllers, and equipment leaks from natural gas processing plants, the withdrawal of the 2016 O&G CTG should have no effect on the analysis for those sources. Furthermore, while EPA may revise the underlying 2016 TSD related to pneumatic pumps and fugitive emissions from well sites and compressor stations at some point in the future, until new data is presented it is appropriate for the Department to consider the existing TSD in making its own determination regarding RACT. Nothing in the EPA actions presents a cause of delay by the Department.

Response: Please see the response to Comment 8.

99. Comment: The Commentator states that the Department should modify the language of the Background and Purpose section of the Preamble to the proposed rulemaking to account for the amendment to EPA’s Regulatory Agenda to announce it no longer intends to withdraw the 2016 O&G CTG.

Response: The Department has modified the final-form regulatory documents to indicate the changes at the federal level.

100. Comment: The Commentator states that the Independent Petroleum Association of America (IPAA) Comments provide a discussion of why the 2016 O&G CTG is not necessary and will be ineffective at assisting states in achieving the applicable NAAQS for Ozone. DEP adopts much of EPA’s rationale for the 2016 O&G CTG, but then acknowledges that EPA has proposed to withdraw the 2016 O&G CTG. The current structure in place in Pennsylvania to regulate unconventional oil and natural gas operations as stationary sources of air pollution is functioning effectively. Given that the EPA has taken a position that questions the efficacy of Subpart OOOOa and is looking to revise its requirements regarding methane emissions, the Commentator questions the need to impose requirements on existing oil and natural gas operations that are generally equivalent to Subpart OOOOa.

Response: In March of 2020, the Department received notice that the EPA had decided not to proceed with the withdrawal of the 2016 O&G CTG. Please also see the response to Comment 8.

101. Comment: Several Commentators express concern that the Trump Administration’s reconsideration of the NSPS threatens to roll back clean air protections at the federal level and appreciate Governor Wolf and DEP continuing with the proposed oil and natural gas rulemaking that will help to protect families exposed to emissions from oil and natural gas operations in their communities and the citizens of this Commonwealth.

Response: On June 30, 2021, President Joseph R. Biden, Jr. signed into law a joint resolution of Congress, adopted under the Congressional Review Act (CRA), disapproving the final rule of the EPA titled, “Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Review,” 85 FR 57018 (September 14, 2020). This disapproval addresses the rescission of the methane requirements of Subpart OOOOa and the applicability of sources in the natural gas transmission and storage segment in Subparts OOOO and OOOOa. The technical amendments made to Subparts OOOO and OOOOa in the rule titled “Oil and Natural Gas Sector: Emissions Standards for New, Reconstructed, and Modified Sources Reconsideration,” 85 FR 57398 (September 15, 2020) remain in effect.

The Department did not modify the applicability of storage vessels in the natural gas transmission and storage segment in the final-form rulemaking, which is consistent with the CRA disapproval. The CRA disapproval restoring the methane requirements to Subpart OOOOa does not affect this final-form VOC RACT rulemaking.

102. Comment: The Commentators state that new requirements for oil and natural gas operators in Pennsylvania should not be finalized until the proposed amendments to EPA’s Subparts OOOO and OOOOa have been made final. If the NSPS is amended, the Board should take a second round of comment from the public and stakeholders.

Response: In accordance with President Biden’s Executive Order 13990, Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis, issued on January 20, 2021, the EPA is reviewing all existing regulations, orders, guidance documents, policies, and any other similar agency actions promulgated, issued, or adopted between January 20, 2017, and January 20, 2021, that are or may be inconsistent with the policy of the Executive Order, particularly the need to address climate change. The CRA disapproval of the “Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Reconsideration,” did not affect this final-form rulemaking, which is still consistent with the 2016 O&G CTG RACT recommendations and the Department’s 2020 reanalysis. There are no major modifications to the final-form rulemaking and therefore no need for a second round of public comment.

103. Comment: The Commentator supports two of EPA’s proposed changes to the NSPS that the EQB incorporated into the proposed rulemaking. Specifically, treating brownfield sites the same as green-field sites and the proposal to allow in-house engineers to certify a determination of technical infeasibility rather than require an engineer with a professional license to do so. The Commentator trusts experience over that piece of paper any day.

Response: The Department acknowledges this comment.

Department’s Mission Statement

104. Comment: The Commentators suggest that everyone who works at DEP take a moment to reflect on the Department’s mission statement which states: “The Department of Environmental Protection’s mission is to protect Pennsylvania’s air, land, and water from pollution and to provide for the health and safety of its citizens through a cleaner environment. We will work as partners with individuals, organizations, governments, and businesses to prevent pollution and restore our natural resources.” and then ask how that compares to what DEP actually does daily.

Response: The Department does much on a daily basis to protect this Commonwealth's air, and, and water from pollution. Please see the responses to Comments 68 and 89.

105. Comment: Several Commentators suggest that reviewing what the Department has done would reveal a systemic failure regarding protection of the environment and that the DEP works to facilitate the pursuit of profits for corporations which leads to the poisoning of the environment, the community, and the human body. This complacency must end.

Response: The Department disagrees with this comment and notes that Department staff work ceaselessly to protect the public health and welfare of Pennsylvanians and the environment. Please see the responses to Comments 68 and 89.

106. Comment: The Commentator asks the Department how they intend to lessen the harmful emissions inherent to the oil and natural gas industries, from inception to consumption? The Department has been underfunded by the State Legislature for decades, leaving DEP unable to carry out its mission.

Response: The Department acknowledges that it has seen budget and staff cuts over the years. This final-form rulemaking will reduce VOC emissions by approximately 2,864 TPY and methane emissions by approximately 45,278 TPY.

107. Comment: The Commentator states that they oppose House Bill 1106, which gives 30 days for the permit application review process for air quality, drilling, waste, erosion and sediment, and dam safety and, if after 30 days the review is not complete, the permit applications would be considered approved. This would allow the oil and natural gas industry to push through their permits and expand their industry. The Commentator also opposes House Bill 1107 which sought to eliminate DEP from the permitting process. DEP employees eliminated by the establishment of the five-member commission would have priority to interview with the commission.

Response: The Department acknowledges this comment; however, it is outside the scope of this final-form rulemaking.

Protection of the Public Health, Safety and Welfare

108. Comment: The Commentator refers to *Gorsline vs. Board of Supervisors of Fairfield Township*, a Lycoming County zoning case about fracking in a residential community which was eventually heard by the Pennsylvania Supreme Court. During oral arguments, an attorney for the operator stated, that a producing well "is a land use that is passive, low-impact in nature." The Commentator states that these lies, or at best ignorance, is pervasive and has led to the current situation – the beginning of the decline of the "play" in most of the overall area of the Commonwealth where it occurred. Production data is well established; the top 7 counties out of 28 consistently produce approximately 88% of all Pennsylvania gas. Lycoming County data shows only a handful of the 23 gas producing townships produce most of the gas with 3 townships accounting for 60% of the gas produced and 6 townships for 80%. In neighboring Wyoming County, 4 of the gas producing municipalities are responsible for more than twice the quantity of gas as the remaining 8 municipalities. It is apparent that there are hundreds, if not

thousands, of wells across the Commonwealth that were not profitable for investors, yet still highly lucrative for their developers. The result is now other entities are moving in to potentially repeat the cycle while proliferating well pad compressors.

Response: The Department acknowledges this comment; however, it is outside the scope of this final-form rulemaking.

109. Comment: Several Commentators state that strong, common-sense standards that cut harmful air and methane pollution are supported by a majority of Pennsylvanians, including faith groups, youth, veterans, public health experts, and business organizations. Cutting methane emissions is also the quickest, most cost-effective way to reduce emissions which is why some of the world's largest industry players, – such as Shell and XTO/ExxonMobil, which both operate in Pennsylvania, – support methane regulation.

Response: This final-form rulemaking is consistent with Governor Wolf's strategy to reduce emissions of methane from the oil and natural gas industry in this Commonwealth. While this final-form rulemaking requires VOC emission reductions, methane emissions are also reduced as a co-benefit, because both VOCs and methane are emitted from oil and natural gas operations. This final-form rulemaking is estimated to reduce 2,864 TPY of VOC emissions and estimated to reduce 45,278 TPY of methane as a co-benefit.

Asthma and Other Respiratory Afflictions

110. Comment: Several Commentators state that asthma is a major concern, especially among children. Adult onset asthma is also an issue and can be attributed to PM and other pollutants in the air in Pennsylvania, to which the oil and natural gas industry contributes. The Asthma and Allergy Foundation of America ranks Philadelphia as the fourth most challenging US metropolitan area to live with asthma. In 2018, the average rate of hospitalizations for children with asthma was 59.1 per 10,000. Among Black and Hispanic children, rates are significantly higher: 76.7 hospitalizations per 10,000 Black children and 62.5 hospitalizations per 10,000 Hispanic children. The Commentators also cite other respiratory ailments such as reactive airway disease, chronic obstructive pulmonary disease, lung injuries, and other breathing difficulties are exacerbated by air pollution from the oil and natural gas industry.

Response: Although this final-form rulemaking is designed primarily to address ground-level ozone air quality, there would also likely be reductions in methane emissions and other air contaminants which would result in other health and environmental benefits. The improvements in ground-level ozone air quality and groundwater quality through reduced emissions of VOC and methane would provide economic and social benefits through reduced need for medical treatment for asthma and other lung-related illnesses and reduced costs for repairing damage to infrastructure, as well as through improved crop yields, healthier forests and wildlife, and increased tourism to natural areas of this Commonwealth. The estimated monetized health benefit to the Commonwealth for attaining the 2015 8-hour ozone NAAQS \$63 million to \$189 million.

111. Comment: The Commentator states that nowhere in the human body is the environment more intimately wed to our being than in the lungs, where 300 million air filled alveoli have a surface area equal to a tennis court. The diameter of a human hair is about 70 microns and the

width of the alveoli membrane is 1 micron. On one side, air; on the other side, blood. Breathing is our most ecological act, and toxic VOC access the human body through respiration.

The children of this Commonwealth, including the increasing numbers of special needs children, are in crisis and the Commentator wonders who will bear the increasing costs of healthcare and education should the Commonwealth continue to allow millions of tons of toxic substances into the air these children breathe. Due to the global pandemic the virus continues to claim the lives of Americans by literally suffocating them to death.

Response: Since its establishment in 1971, the Department has implemented air pollution control programs to protect the air resources of the Commonwealth that, with a great deal of success, have addressed major public health and welfare air quality concerns. Significant changes have occurred over the years with the program, notably with the passage of the Clean Air Act Amendments in 1990 as well as the adoption and implementation of PM_{2.5} NAAQS requirements in 1997. Currently, the Department has an extensive air quality monitoring program. The Department has an ambient air quality monitoring program which is primarily responsible for air monitoring in the Commonwealth of Pennsylvania. The Bureau of Air Quality collects the raw data on an hourly basis, enabling near real-time monitoring. The Department utilizes continuous methods for ozone, SO₂, NO₂, oxides of nitrogen (NO_x), carbon monoxide (CO), PM_{2.5}, and particulate matter with an aerodynamic diameter less than 10 microns (PM₁₀). The Department continues to work to maintain attainment areas and bring all non-attainment areas into attainment.

Pregnancy and the Unborn

112. Comment: Several Commentators state that a recent study found that gas flaring poses a significant risk of pre-term births to expectant mothers, especially Hispanic women. The lead author of the study noted, “It’s on par with the increased risk you see for women who smoke.”

Response: The Department acknowledges this comment. The Department has reviewed the referenced study and the flaring operations discussed in the study are outside the scope of the affected sources covered by this final-form rulemaking.

COVID-19

113. Comment: The Commentators state that Pennsylvania has seen significantly higher rates of COVID-19 infection and mortality among people of color which can likely be attributed to systemic conditions that cause racial health disparities, such as pollution and toxin exposure.

Response: The Department acknowledges this comment.

114. Comment: The Commentator states that it was discovered during the COVID-19 pandemic that the virus is a particulate and can be carried by methane and smog molecules.

Response: The Department acknowledges this comment. While the purpose of this final-form rulemaking is to reduce VOC emissions, this final-form rulemaking is also estimated to reduce methane emissions and the formation of ground level ozone, colloquially known as smog.

Environmental Stewardship

115. Comment: Several Commentators state that it is important for the Commonwealth to protect future generations and leave a legacy of environmental stewardship that reduces pollutants that contribute to climate change and decreases the likelihood of suffering the effects of global warming. The Commentators state that the Commonwealth must take the long view on the environment, as many who came before did, to give us an environment that was better than in the past. Through the proposed rule, the Commonwealth can pass on an environment that will be improved and will be safe for our children and grandchildren.

Response: This final-form rulemaking is consistent with Governor Wolf's strategy to reduce emissions of methane from the oil and natural gas industry in this Commonwealth. Methane is a potent greenhouse gas with a global warming potential more than 28 times that of carbon dioxide over a 100-year time period, according to the EPA. The EPA has identified methane, the primary component of natural gas, as the second-most prevalent GHG emitted in the United States from human activities. While this final-form rulemaking requires VOC emission reductions, methane emissions are also reduced as a co-benefit, because both VOC and methane are emitted from oil and natural gas operations.

Adoption of the VOC emission control measures and other requirements in this final-form rulemaking is in the public interest as it would allow the Commonwealth to make substantial progress in achieving and maintaining the 1997, 2008, and 2015 8-hour ozone NAAQS statewide. Implementation of and compliance with the VOC emission reduction measures would also assist the Commonwealth in reducing the levels of ozone precursor emissions that contribute to public health and welfare and environmental impacts.

116. Comment: The Commentator states that rather than sell their mineral rights, they installed solar panels on two properties they own in Mount Lebanon, providing clean power for their needs and sending surplus energy to the grid many months of the year. The Commentator also drives an electric car and heats their water with sunshine. Even in Pittsburgh there is plenty of solar energy to share with no concerns about hazardous leaks. The Commentator does not worry that the solar energy generated by their panels will harm their children, their neighbors, or the children at nearby schools.

Response: The Department is committed to renewable technologies like solar. The US Department of Energy provided funding for "Finding Pennsylvania's Solar Future," a statewide planning effort to increase Pennsylvania's solar energy production to at least 10 percent of in-state electricity sales by 2030. In September 2018 Governor Tom Wolf issued a proclamation to highlight the advances in the Commonwealth on clean energy, which stated that Pennsylvania had over 354 megawatts of solar power generation installed at nearly 19,000 homes, farms, and businesses, and nearly 5,000 people employed in the solar energy field.

117. Comment: The Commentator states that as a lifelong Pennsylvania resident and also an asthma sufferer, they appreciate the fact that the oil and natural gas industry has embraced environmental stewardship.

Response: The Department acknowledges this comment.

118. Comment: As part of a sustainable economic and environmental policy, the Commentator supports natural resources management laws and programs that encourage the scientifically-sound conservation, stewardship and development of Pennsylvania's natural resources, including water, timber, minerals, oil, and natural gas, for the benefit of all Pennsylvanians.

Response: The Department acknowledges this comment.

Support for the Rule

119. Comment: Several Commentators offered support for the proposed rulemaking and Governor Wolf's contribution to protecting the environment and the health of Commonwealth citizens and of future generations.

Response: The Department acknowledges this comment.

Finalization of the Rule

120. Comment: Several Commentators state that emissions from existing sources in the oil and natural gas industry have been neglected and effective policies must be enacted before the public suffers the consequences of Pennsylvania placating the extraction industry.

Response: Governor Tom Wolf has identified climate change as the most critical environmental threat facing the world and in 2019 set a statewide goal to lower greenhouse gas emissions 80% by 2050. The Wolf administration has taken several steps to combat climate change and protect Pennsylvania from climate disasters, including joining the US Climate Alliance and directing the Department to draft regulations to take part in the Regional Greenhouse Gas Initiative (RGGI) to reduce carbon pollution from power plants. This final-form rulemaking is also consistent with Governor Wolf's strategy to reduce emissions of methane from the oil and natural gas industry in this Commonwealth. While this final-form rulemaking is designed to reduce emissions of VOC from the regulated sources, methane emissions are also reduced as a co-benefit, because both VOCs and methane are emitted from oil and natural gas operations. The requirements of this final-form rulemaking, once implemented, are estimated to provide 2,864 TPY of VOC emission reductions and 45,278 TPY of methane emission reductions as a co-benefit.

Protection of the Public

121. Comment: Several Commentators urge the Department to think of the oil and natural gas industry workers and the communities near these oil and natural gas wells. The Commentators state that the protection of the public health must be important to the Commonwealth and should take precedence over oil and natural gas industry profits.

Response: The Department of Environmental Protection's mission is to protect Pennsylvania's air, land and water from pollution and to provide for the health and safety of its citizens through a cleaner environment. The Department works as partners with individuals, organizations, governments and businesses to prevent pollution and restore Pennsylvania's natural resources.

Strengthen the Proposed Rulemaking

122. Comment: Several Commentators state that a proposed rulemaking that excludes sources that are responsible for half the emissions from the oil and natural gas industry or allows for a reduction in inspections is not an effective measure. These loopholes must be addressed to protect the health of the citizens of the Commonwealth and the environment.

Response: The final-form rulemaking is designed to implement the VOC emission limitations and other requirements of the EPA's recommendations in the 2016 O&G CTG as RACT for these sources in this Commonwealth. The EPA defines 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 Department reviewed the RACT recommendations included in the 2016 O&G CTG for their applicability to the ground-level ozone reduction measures necessary for this Commonwealth and determined that the VOC emission reduction measures and other requirements are appropriate for this source category; however, the Department determined in three cases that more stringent requirements are necessary to satisfy RACT for affected sources in this Commonwealth, as described in the response to Comment 5.

This final-form rulemaking also alters the production thresholds and removes the stepdown provision for LDAR inspection included in the proposed rulemaking. The owner or operator may only reduce the inspection frequency based on the production calculations which shows two consecutive years of production in a lower category. The owner or operator shall increase in inspection frequency immediately if the production calculations show an increase that is subject to more frequent inspections.

This final-form rulemaking is also a primary component of the Commonwealth's strategy of ensuring that the NAAQS for ozone are attained and maintained across this Commonwealth, and rulemaking is consistent with Governor Wolf's strategy to reduce emissions of methane from the oil and natural gas industry in this Commonwealth, as described in the response to Comment 48.

Clean Air and Water

123. Comment: Several Commentators state that clean air and water is necessary for the lives and health of humans, plants and animals and ask the Commonwealth to prioritize improving air quality.

Response: The Department of Environmental Protection's mission is to protect Pennsylvania's air, land and water from pollution and to provide for the health and safety of its citizens through a cleaner environment. The Department works as partners with individuals, organizations, governments and businesses to prevent pollution and restore Pennsylvania's natural resources. This final-form rulemaking is estimated to reduce 2,864 TPY of VOC emissions and estimated to reduce 45,278 TPY of methane as a co-benefit and will produce commensurate air quality and health benefits.

Stop Using Fossil Fuels

124. Comment: Several Commentators stated that the Commonwealth and the rest of the nation should transition from fossil fuels to renewable energy as quickly as possible. Fossil fuels are destroying our health and future, and methane is particularly bad as it is a potent GHG and if wasted doesn't produce useful energy.

Response: Please see the response to Comment 120.

Health Impacts of Air Pollution

125. Comment: The Commentator states that research shows exposure to air pollution over a long period leads to increased rates of asthma, lung disease, and heart disease. The Center for Disease Control (CDC) states that people with these underlying medical conditions can experience COVID-19 more severely. As the nation spends the next year dealing with the unprecedented fallout of the pandemic, it is no longer acceptable to continue allowing rampant air pollution. The cost of inaction is too steep for Pennsylvania's youngest citizens.

The Commentator states that when moving back to the Pittsburgh area after their spouse's military service to raise their children, they expected to do so in a healthy and safe environment. They did not expect to have sacrificed so much to ensure the safety of the country only to return home and not have the community working to protect them and their children in return.

Response: Please see the response to Comment 111.

Air Quality in Pennsylvania

126. Comment: The Commentators state that as members of varied faith communities, they have a moral responsibility to care for the most vulnerable and to act as good stewards of our Common Home. Unfortunately, the Commonwealth of Pennsylvania falls short on both due to some of the worst air quality in the nation, which is only getting worse.

Response: The Department of Environmental Protection's mission is to protect Pennsylvania's air, land and water from pollution and to provide for the health and safety of its citizens through a cleaner environment. The Department works as partners with individuals, organizations, governments and businesses to prevent pollution and restore Pennsylvania's natural resources. Please also see the response to Comment 68.

127. Comment: Several Commentators state that air pollution exacerbates heart and lung ailments, including asthma, emphysema and chronic obstructive pulmonary disease (COPD), and people with these conditions are most at risk for serious complications and adverse outcomes from COVID-19. Unfortunately, Pennsylvania has some of the worst air quality in the nation; according to the American Lung Association's most recent State of the Air report both the Pittsburgh and Philadelphia metro areas received failing grades for their air quality. One Commentator states that although air quality in the region has never been better, it still continues to receive failing grades in the State of the Air reports.

Response: Please see the response to Comment 68.

128. Comment: The Commentator states that the Commonwealth of Pennsylvania has some of the worst air quality in the nation US, second only to California. Also, Pennsylvania ranks 2nd or 3rd highest in the nation in cancer rates. This is a long-standing health threat to everyone, living, working, and playing in the Commonwealth, especially children. In fact, the American Association of Pediatrics (AAP) has recognized ambient air pollution as a health threat to children since 2004, due to children's immature lungs and brains and rapid respiratory rate. As climate change continues to make summers hotter and longer, the AAP also issued a policy statement about climate change as a threat to children's health. These issues need to be addressed with extreme urgency, to protect children's health; these issues are inextricably connected with COVID-19 which is further exacerbating the health threats to everyone in Pennsylvania and the nation.

The Commentator states that while many are familiar with the Child Care Weather Watch chart, which provides guidance for determining appropriate weather conditions for outdoor learning activities and playtime, many do not realize that the rules governing child care facilities, also restrict outdoor physical activity on days with an air quality code of orange or worse. This policy makes medical sense given the findings of the AAP.

The Commentator suggests that education, of the childcare providers and the children and their parents, could offer some solutions and references Clean Air Carolina's Clear the Air For Kids program as an example.

Response: Please see the response to Comment 68, regarding air quality in Pennsylvania.

While outside of the scope of this final-form rulemaking, the Department's Environmental Education and Information Center (EEIC) assists teachers and non-formal educators by conducting workshops, providing online lesson plans and sources of environmental curricula. The EEIC also does outreach to the general public through hands-on exhibits, the Teaching Green newsletter, and addressing questions at major events such as the Pennsylvania Farm Show, Home Shows, Ag Progress Days and others.

The Department also coordinates and funds the Environmental Education Grants Program, established by the Pennsylvania Environmental Education Act of 1993. Funding is provided from 5% of fines and penalties collected annually by the department. School districts, private schools, colleges and universities, intermediate units, environmental education centers, nonprofit conservation and education organizations and businesses and county conservation districts may apply for funding to develop new or expand current environmental education programming. Please go to DEP's Environmental Education website at <https://www.dep.pa.gov/Citizens/EnvironmentalEducation/Pages/default.aspx> for more information.

Oil and Natural Gas Industry Impacts on Air Quality

129. Comment: The Commentator states that the continued expansion of the oil and natural gas industry in Pennsylvania challenges the state's ability to maintain overall air quality standards, particularly in light of its inclusion in the OTR, a 13-state area across which the EPA requires

measures to control pollutants that create ozone. A recent study confirms that the shale gas boom of the last decade has worsened the state's air quality.

Response: The Department acknowledges this comment. This final-form rulemaking is estimated to reduce 2,864 TPY of VOC emissions and estimated to reduce 45,278 TPY of methane as a co-benefit. The Department continues to work to maintain attainment areas and bring all non-attainment areas into attainment.

130. Comment: The Commentators state that a major source of the Commonwealth's compromised air quality is the pollution from the oil and natural gas industry.

Peer-reviewed medical research identifies emissions from oil and natural gas extraction and production as threats to life and health, raising the incidence of numerous health issues among Pennsylvania's children, pregnant women, seniors, and other vulnerable populations.

While the most vulnerable are most impacted, all Pennsylvanians suffer from this pollution. Further, the CDC reports that people suffering from medical conditions including heart disease, diabetes and lung disease, which are worsened by air pollution, are "at higher risk for severe illness from COVID-19."

Response: Please see the response to Comment 129.

131. Comment: Several Commentators state that unhealthy levels of toxic compounds – including VOC, PM_{2.5}, HAP, radon, and silica dust are emitted with methane. Methane and VOC can leak at every stage of the natural gas supply chain, from production and processing to transportation and storage.

More than two dozen studies have shown a correlation between oil and natural gas development and a host of health issues, including respiratory problems, cardiopulmonary issues, fatigue and nausea, neurological issues such as memory impairment, and depression. Some studies have shown an increased incidence of birth defects, premature births, and low birth weight babies born to mothers living close to oil and natural gas development. People have up to 86 times greater exposure to known cancer-causing chemicals, such as benzene and toluene, if they live approximately one mile or less from unconventional drilling sites.

Response: Please see the response to Comment 110.

132. Comment: The Commentator is concerned that after several rounds of public input DEP repeatedly responded in the "Comment and Response Document Part 1 of 2, June 2018" that their proposal was to also "allow for the development of the natural gas industry in a safe and effective manner." It reads as if the DEP is encouraging the natural gas industry, which if a correct interpretation, is offensive.

Response: The Department disagrees with the Commentator's interpretation. As stated in the Comment and Response Documents for GP-5, GP-5A, and Exemption 38, the GP-5, GP-5A, and conditional Exemption 38 are protective of public health and allow for the development of the natural gas industry in a safe and effective manner. The sources covered under GP-5, GP-5A,

and conditional Exemption 38 are required to meet BAT to minimize emissions to the maximum extent possible (see 25 Pa. Code § 127.1).

133. Comment: The Commentators state that Pennsylvania is the fourth most polluting state in the nation and must do everything possible to fight pollution at the local, national, and global levels and avert climate disaster. Air quality is a major factor in quality of life, health outcomes and expenditures, and attracting businesses to Pennsylvania. The Commonwealth must put public health before industry profits and lead in reducing methane emissions

Response: The Department of Environmental Protection's mission is to protect Pennsylvania's air, land and water from pollution and to provide for the health and safety of its citizens through a cleaner environment. The Department works as partners with individuals, organizations, governments and businesses to prevent pollution and restore Pennsylvania's natural resources. In addition, this final-form rulemaking is consistent with Governor Wolf's strategy to reduce emissions of methane from the oil and natural gas industry in this Commonwealth. Please see the response to Comment 89, regarding the success of the Department's mission to reduce pollutants emitted to the atmosphere.

134. Comment: Several Commentators shared their personal health challenges and the environmental impacts on their homes and communities. The Commentators state that the emissions from the oil and natural gas industry exacerbates their personal conditions and increases the risk of health-based issues.

Response: Please see the response to Comment 110.

135. Comment: Several Commentators state that these companies must be required to mitigate pollution caused by fracking and accept the financial liabilities involved, instead of being permitted to take their assets and leave. The public should not pay to fix the mess the companies leave behind.

Response: The Department acknowledges this comment; however, it is outside the scope of this rulemaking, which is to regulate VOC emissions from unconventional oil and natural gas sources.

136. Comment: The Commentator states that humanity can't continue to compromise everything on this planet and not expect consequences. Destruction of eco-systems, polluting the air, land and oceans, killing wildlife, exhausting resources and a general attitude of profit and so-called progress above all else will be an end for us all. Humanity's demise can't come soon enough for the rest of life on this planet.

Response: The Department acknowledges this comment.

137. Comment: The Commentators state that DEP estimates that the proposed rulemaking, if enacted as written, would reduce VOC by approximately 4,400 TPY and methane by approximately 75,600 TPY.

The Commentators support the Board's proposal of more stringent requirements for toxic, ozone-producing VOC and GHG emissions, but is not reassured that the proposed rulemaking, at

best case, will reduce the methane emissions in Pennsylvania by only seven percent. One Commentator is not reassured by the fact that, according to EPA's definition, a major source of air pollutants is a source that has the potential to emit (PTE) 10 TPY of VOC. A source emitting less than 10 tons of VOCs are not considered major by the EPA and, therefore, the Commentator does not consider an estimated 4,400-ton reduction in VOCs to be major.

Response: This final-form rulemaking applies to both major and minor sources of VOC emissions. The anticipated VOC and methane reductions are a result of the control measures within the final-form rulemaking and are estimated to reduce VOC emissions by 2,864 TPY and methane emissions by 45,278 TPY.

138. Comment: The Commentators state that according to the available data, there are approximately 106,224 oil and natural gas wells in Pennsylvania. Of the 12,574 drilled unconventional wells, there have been 15,164 cited violations. Undoubtedly, the number of violations would be higher with stricter monitoring. These violations include the blatant disregard of permit limitations, illegal venting of gases, unreported leaks and spills, and the illegal dumping of hazardous materials. This egregious contempt of the law, its enforcers, and the citizenry of Pennsylvania should be considered when creating this proposed rulemaking and deciding whether the Department should grant a permit to these corporations.

Response: This final-form rulemaking establishes requirements and extensive testing, monitoring, recordkeeping, and reporting requirements to demonstrate compliance. Owners and operators of sources subject to this final-form rulemaking are required to comply with all applicable requirements regardless of permitting status.

139. Comment: The Commentator states it is fortunate that the EQB proposed rulemaking addresses both ozone and methane. Ozone is highly toxic, particularly to children who are outside exercising during periods when highest levels of ozone are present. But as a public health physician the Commentator is more concerned about the health impact of the climate change forcing effects of methane, one of which will be to further increase ozone levels.

Response: Please see the response to Comment 120.

140. Comment: The Commentator states that natural gas can be cleaner than coal but leaks of methane throughout the production segment are offsetting the advantage of natural gas and are driving emissions back up to dangerous levels.

A recent blowout that occurred in Ohio took 20 days to get under control and dumped a huge amount of methane into the atmosphere. Technology can help, such as remote sensing from satellites. But by that time the damage has been done.

Response: The Department acknowledges this comment. While this final-form rulemaking requires VOC emission reductions, methane emissions are also reduced as a co-benefit, because both VOC and methane are emitted from oil and natural gas operations. This final-form rulemaking is estimated to reduce VOC emissions by 2,864 TPY and methane emissions by 45,278 TPY, and inspection requirements required by this final-form rulemaking should assist in the detection and prevention of leaks and blowouts.

141. Comment: The Commentator is concerned about the secrecy surrounding the composition of the fluids that are being pumped at high pressure into the wells surrounding their home. When the landsmen started knocking on the Commentator's door, they knew that they would not sell their mineral rights to the Marcellus Shale under their property. The Commentator states that was a good thing, since the landsmen failed to tell them what was going to happen to their neighbors or the roads and surrounding communities.

Response: This comment is outside the scope of this final-form rulemaking. The Department's Office of Oil and Natural Gas Management regulates the safe exploration, development and recovery of Marcellus Shale natural gas reservoirs in a manner that will protect the Commonwealth's natural resources and the environment. Information related to hydraulic fracking fluid is available at the Department's website at <https://www.dep.pa.gov/Business/Energy/OilandGasPrograms/OilandGasMgmt/Marcellus-Shale/Pages/default.aspx>.

142. Comment: The Commentator is a resident in the Marcellus Shale Region, where indigenous people once lived in harmony with nature. The Commentator is heartbroken over how far the citizens of the Commonwealth have fallen from living within the laws of nature and that we waste our time instead of correcting the perversion of a legal system that declares nature as property to be managed by rules like this proposed rulemaking.

For the past ten years the Commentator documented the impacts of the oil and natural gas industry on people in Pennsylvania during the so-called shale gas revolution. Over the last four years the Commentator has also watched their family and friends suffer from health problems exacerbated by the oil and natural gas industry, which was given the legal authority to do so by Governor Wolf, his administration, and the Department.

The Commentator does not believe that the Department nor Governor Wolf will do what needs to be done. The Commentator will not thank DEP for anything because the staff have ignored their health, their family's health, and the health of millions of people across the Commonwealth for over a decade. The proposed rulemaking is an expensive, ineffective, stopgap that perpetuates a purposefully impotent system, distracts the public, and wastes the valuable time of the environmental community.

The DEP's mission is to protect the environment; however, those living in the shale fields know that's just poetry. It is time for environmentalists to recognize the fact that the rule making process is a dead end. This loophole ridden rule does exactly what it is intended to do, perpetuate harm and exploitation while offering superficial protections.

Response: This final-form rulemaking is designed to implement the VOC emission limitations and other requirements of the EPA's recommendations in the 2016 O&G CTG as RACT for these sources in this Commonwealth. The EPA defines 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 Department reviewed the RACT recommendations included in the 2016 O&G CTG for their applicability to the ground-level ozone reduction measures necessary for this Commonwealth and determined that the VOC emission reduction measures and other requirements are appropriate for this source category.

143. Comment: The Commentator states that all emissions from these two industries fall into three categories: fugitive, which is further subcategorized into intentional and unintentional; combustive; and associated. The Commentator cannot name a single process that is devoid of even one of these chemicals, vapors, or particulate matter. According to the Congressional Research Science Report of January 2020, the oil and natural gas industries are responsible for 20% of man-made VOC emissions and 40% of VOC's released by stationary sources. Pollution has risen exponentially with the advent of unconventional methods such as fracking, shale oil production and coalbed methane production.

Response: The Department reviewed the RACT recommendations included in the 2016 O&G CTG for their applicability to the ground-level ozone reduction measures necessary for this Commonwealth and determined that the VOC emission reduction measures and other requirements are appropriate for this source category. This final-form rulemaking is estimated to reduce 2,864 TPY of VOC emissions and estimated to reduce 45,278 TPY of methane as a co-benefit. See also the response to Comment 10.

144. Comment: The Commentators state that methane is toxic to the liver, causes dizziness and other harms to health. Methane also combines with other hazardous elements such as chlorine and mercury. During the COVID-19 pandemic and the climate crisis when people are vulnerable, methane emissions become even more serious.

Response: This final-form rulemaking is consistent with Governor Wolf's strategy to reduce emissions of methane from the oil and natural gas industry in this Commonwealth. As part of the Governor's Methane Reduction Strategy, the updated emissions controls for VOCs will also reduce methane emissions, as the same control practices that prevent VOCs from escaping from natural gas infrastructure also prevent methane from escaping as well. It is estimated to reduce 2,864 TPY of VOC emissions, with approximately 411 TPY attributed to the Department's more stringent requirements. This proposed rulemaking is estimated to reduce 45,278 TPY of methane as a co-benefit, with approximately 6,124 TPY due to the Department's more stringent requirements.

145. Comment: The Commentator states that the fossil fuels industry is spending millions to influence lawmakers with misrepresentations to justify poorly designed laws. Two years ago, the Commentator made an appointment with their Republican state senator to share their concerns. He then assured the Commentator that the cause of pollution in Pennsylvania is cloud seeding and insisted pollution would not be a problem if the Commonwealth banned the seeding of clouds.

Response: The Department acknowledges this comment.

Particulate Matter

146. Comment: The Commentator cites the November 27, 2019, edition of Inside Climate News which reported on a new Harvard University study that identified links between hospital admissions for kidney, blood, and skin disease and fine soot and PM_{2.5}, which are found in natural gas. The World Health Organization (WHO) estimates these particles are drawn deeply into the lungs, causing inflammation and exacerbating respiratory disease such as asthma.

Regular exposure to outdoor PM_{2.5} contributes to 3.7 million annual pre-mature deaths worldwide and tens of thousands in the US.

Response: For the PM_{2.5} NAAQS, Allegheny County is the only county in the Commonwealth currently designated as nonattainment. On June 12, 2020, EPA proposed approval of the attainment demonstration for the Allegheny County moderate PM_{2.5} nonattainment area. The data shows the Commonwealth's air quality is continuing to improve. The Department continues to work to maintain attainment areas and bring all non-attainment areas into attainment. Please also see the response to Comment 110.

147. Comment: The Commentator cites a recent Binghamton University study that attributes the death of four Pennsylvanians to PM_{2.5} pollution during well preparation, drilling, and fracking.

Response: For the 2012 PM_{2.5} NAAQS, Allegheny County is the only county in the Commonwealth currently designated as nonattainment. On May 14, 2021, the EPA issued a conditional final approval of the attainment demonstration for the Allegheny County moderate PM_{2.5} nonattainment area. See 86 FR 26388 (May 14, 2021). The conditions that ACHD agreed to implement are listed in the proposed approval notice the EPA issued on June 12, 2020. See 85 FR 35852, 35871 (June 12, 2020). The 2020 and 2021 ambient air monitoring data shows the Commonwealth's air quality is continuing to improve. The Department continues to work to maintain attainment areas and bring all nonattainment areas into attainment. Please also see the response to Comment 110.

Volatile Organic Compounds

148. Comment: The Commentators state harmful VOC leak alongside methane, threatening families with potentially severe health impacts such as cancer, birth defects, threats to pregnancy, and damage to the central nervous system. In addition, VOC contributes to ground level ozone when reacting with oxides of nitrogen (NO_x) in the presence of sunlight. It is unconscionable that operators have been allowed to harm families with this unchecked air pollution for so long without government holding them accountable.

Response: This final-form rulemaking is estimated to reduce 2,864 TPY of VOC emissions and estimated to reduce 45,278 TPY of methane as a co-benefit. Please also see the response to Comment 110.

149. Comment: The Commentator recommends implementing an ever-declining cap on VOC emissions.

Response: The CAA requires the EPA to review NSPS every 8 years. Any revision to the NSPS is incorporated into the Department's regulations by reference. These reviews evaluate whether there are new technologies available and whether lower emissions limits are justified. While this review is not a declining VOC emission cap, it is likely more effective in the control of VOC emissions.

150. Comment: The Commentators are concerned about the gases and chemicals which are emitted as VOC from oil and natural gas sources. Whether the VOC is emitted from household

products, drinking water, cleaning agents, fuel, or other sources, people can be exposed to elevated concentrations of pollutants over long periods of time.

Response: This final-form rulemaking is estimated to reduce 2,864 TPY of VOC emissions and estimated to reduce 45,278 TPY of methane as a co-benefit. See Comment 10, above.

151. Comment: The Commentator states that pollution is not avoidable, and it is much easier to reduce it at the source than it is to remediate. Once air pollution leaves its source, it becomes difficult to track and prohibitively expensive to remediate.

Response: This final-form rulemaking is estimated to reduce 2,864 TPY of VOC emissions and estimated to reduce 45,278 TPY of methane as a co-benefit.

Ozone

152. Comment: The Commentators state that ozone is responsible for many health conditions, such as respiratory issues, including chest pains, coughing, trouble breathing, emphysema, and bronchitis; heart disease; and nausea. Asthma, another respiratory ailment, has become a threat to the citizens of the Commonwealth. Additionally, ozone threatens the Commonwealth's agricultural economy by damaging important food crops, wildlife, and resources.

Response: Please see the response to Comment 154.

153. Comment: The Commentators state that modeled health impacts from ozone precursor emissions from oil and natural gas sources on populations in Pennsylvania include more than 30,000 asthma attacks per year, over 22,000 lost school days, and over 67,000 person-days when adults need to rest or reduce their activity because of high ozone levels. Pennsylvanians will clearly see health benefits from the reductions of VOC emissions that will result from this proposal.

States downwind of Pennsylvania will also see significant benefits from reductions in VOC pollution from the oil and natural gas sector. The modeling finds that residents of Maryland, Delaware, New Jersey, New York, and the New England states experience more than 40,000 asthma attacks per year from oil and natural gas industry pollution, demonstrating that it is also appropriate for Pennsylvania to reduce VOC pollution from this industry as part of its obligations under the CAA.

Response: The Department acknowledges this comment.

154. Comment: The Commentator states that ozone contributes significantly to poor air quality in Southwestern Pennsylvania. An analysis of qualified EPA monitoring data showed that ozone is the driving factor of the air quality index for this region 347 out of 1,096 days, or about 1/3 of the time, over 2016 – 2018. Furthermore, of the ozone monitors in the Pittsburgh area, one of the sites was in the worst 10%, one was in the worst 20%, and four were in the 30% – 50% range over 2016 - 2018.

Response: Since its establishment in 1971, the Department has implemented air pollution control programs to protect the air resources of the Commonwealth that, with a great deal of

success, have addressed major public health and welfare air quality concerns. Significant changes have occurred over the years with the program, notably with the passage of the Clean Air Act Amendments in 1990 as well as the adoption and implementation of PM_{2.5} NAAQS requirements in 1997. Currently, the Department has an extensive ambient air quality monitoring program which is primarily responsible for air monitoring in the Commonwealth of Pennsylvania. The Bureau of Air Quality collects the raw data on an hourly basis, enabling near real-time monitoring. The Department utilizes continuous methods for ozone, SO₂, NO₂, NO_x, CO, PM_{2.5}, and PM₁₀.

In May 2012, the EPA designated five areas in this Commonwealth as nonattainment for the 2008 ozone NAAQS. These areas include all or a portion of Allegheny, Armstrong, Beaver, Berks, Bucks, Butler, Carbon, Chester, Delaware, Fayette, Lancaster, Lehigh, Montgomery, Northampton, Philadelphia, Washington and Westmoreland Counties. Based on the Department's certified ambient air monitoring data for the Commonwealth's 2020 ozone season, all monitored areas of this Commonwealth are attaining and maintaining the 2008 8-hour ozone NAAQS.

On October 26, 2015, the EPA again lowered the primary and secondary ozone NAAQS, this time to 0.070 ppm (70 ppb) averaged over 8 hours. See 80 FR 65291 (October 26, 2015). On June 4, 2018, the EPA designated Bucks, Chester, Delaware, Montgomery and Philadelphia counties as marginal nonattainment for the 2015 ozone NAAQS, with the rest of this Commonwealth designated attainment/unclassifiable.

The certified ambient air ozone season monitoring data for the 2020 ozone season shows that all ozone samplers in this Commonwealth, except the Bristol sampler in Bucks county and the Northeast Airport and Northeast Waste samplers in Philadelphia county, are monitoring attainment of the 2015 ozone NAAQS. The Department must ensure that the 1997, 2008 and 2015 ozone NAAQS are attained and maintained by implementing permanent and Federally enforceable control measures. Reductions in VOC emissions that are achieved following the adoption and implementation of RACT emission control measures for source categories covered by this final-form rulemaking will assist the Commonwealth in making substantial progress in achieving and maintaining the ozone NAAQS. To the extent that any of the requirements in this proposed rulemaking are more stringent than any provisions of the 2016 O&G CTG, the proposed requirements are reasonably necessary to attain and maintain the health-based and welfare based 8-hour ozone NAAQS in this Commonwealth and to satisfy related CAA requirements.

Between 1990 and 2017, total criteria pollutant emissions in the Commonwealth have been reduced by 88%. For the PM_{2.5} NAAQS, Allegheny County is the only county in the Commonwealth currently designated as nonattainment. On June 14, 2021 (86 FR 26388), EPA approved the attainment demonstration for the Allegheny County moderate PM_{2.5} nonattainment area. The data shows the Commonwealth's air quality is continuing to improve. The Department continues to work to maintain attainment areas and bring all non-attainment areas into attainment.

Radioactive Substances

155. Comment: The Commentator is concerned that fracking waste contains radioactive substances and is not being adequately tested, monitored, or tracked throughout the disposal process. The DEP must regulate fracking waste at every phase of operation and not allow companies desperate to dispose of this waste to inject it underground, spread it on our roads, or dump it in our landfills where it leaks into the water system.

Response: This comment is outside the scope of this VOC rulemaking. For more information on radioactive substances associated with oil and natural gas extraction, please see the Department's TENORM study at <https://www.dep.pa.gov/Business/RadiationProtection/Pages/TENORM.aspx>.

156. Comment: The Commentator states that radioactive substances such as radon, the major cause of lung cancer in nonsmokers, may accompany the extracted natural gas.

Response: Please see the response to Comment 155.

Environmental Benefits of Natural Gas

157. Comment: The Commentators state that it is critically important to understand the contribution natural gas has made to enhancing air quality. Domestic natural gas production is up 50% since 1990 while the methane emission rate has declined by 43%.

In Pennsylvania, the percentage of electricity generated from natural gas has increased from approximately 0.001% in 2005, the advent of shale gas development in Pennsylvania to at least 40% today. Over the same time period, VOC emissions have declined by 33%, SO₂ emissions have declined by 93%, and NO_x emissions have declined by 80% from the power generation sector. From 2010 through 2017, CO₂ emissions from the power generation sector have declined by 36%, far surpassing the goals laid out in both Governor Wolf's Executive Order as well as the Paris Climate Agreement.

These emissions reductions are largely attributed to the increased use of natural gas. As a result, Pennsylvania's air is cleaner than since the dawn of the industrial revolution. Thousands of lives have been saved, and the health of thousands are better due to increased air quality.

Response: The Department acknowledges this comment.

158. Comment: The Commentator states that the Commonwealth has had success in meeting and surpassing federal air quality obligations. According to DEP and EPA air quality data, the state has achieved the following significant reductions in air emissions statewide since 1996: NO_x - 65%; VOC - 36%; PM_{2.5} - 27%; PM₁₀ - 45%; SO₂ - 90%; CO - 69%; and CO₂ - 21%

Pennsylvania has also reduced its GHG emissions in total tons more than that of all but one other state, according to the most recent Energy Information Administration data. According to EPA data, Pennsylvania has reduced GHG emissions across all sectors by 22% since 2005, with an 11.5% reduction from the transportation sector and a 38% reduction from the power generation sector.

Response: The Department acknowledges this comment.

159. Comment: The Commentators state that in Pennsylvania's regulatory environment, voluntary efforts by the natural gas industry and increased utilization of natural gas have contributed to improved air quality. Total VOC emissions decreased by 56% between 1990 and 2017. Total NO_x and oxides of sulfur (SO_x) reductions during this timeframe were 84% and 92%, respectively. Of interest, production-based methane emissions intensity, expressed as metric ton CO₂ equivalent per barrel of oil equivalent, declined in the Appalachian region between 2011 and 2017 by 82%. Furthermore, CO₂ emissions from Pennsylvania's power sector decreased by 35% between 2010 and 2017.

Response: The Department acknowledges this comment.

160. Comment: The Commentators are aware of the enormous economic contributions that the oil and natural gas industry has made to thousands of families and many communities in the Commonwealth. The Commentators are also aware of the voluntary efforts the industry has made to reduce emissions and maintain the environments in which it operates. Despite the repeated publications to the contrary, the Commentators know firsthand that the oil and natural gas industry contributed significantly to air quality improvement.

Response: The Department acknowledges this comment.

161. Comment: The Commentator states that Pennsylvania's shale gas industry takes its responsibility to operate safely and efficiently seriously and prides itself in going above and beyond federal and state environmental standards. The employees of the natural gas industry live in the local communities and have a vested interest in assuring that the Commonwealth's water, land, and air resources are protected and enhanced. Natural gas operators are proud of their contribution to reducing emissions and the impacts of climate change leading the way through participation in initiatives such as ONE Future, American Petroleum Institute's (API) Environmental Partnership, the EPA's Methane Challenge, and the Global Methane Initiative to name a few.

Nearly two thirds of MSC Board members participate in one or more of these initiatives. These programs come at a time when national production of natural gas has increased to historic levels, reducing our dependence on foreign sources of energy and providing critical feed stock necessary for consumer and medical goods, such as those needed to respond to the current global pandemic.

Response: The Department acknowledges this comment.

162. Comment: The Commentators state that research suggests CO₂ emissions could be reduced by 50% to 60% by switching from coal to natural gas. While burning natural gas does produce less CO₂ than burning coal, there are significant emissions of the methane that leaks from upstream infrastructure. In terms of global warming potential, these methane leaks make natural gas no cleaner than coal. This won't change until these fugitive methane emissions from the fossil fuel industry are adequately addressed.

Response: The Department acknowledges this comment. This final-form rulemaking is estimated to reduce VOC emissions by 2,864 TPY and methane emissions by 45,278 TPY, and inspection requirements required by the rulemaking should assist in the detection and prevention of leaks.

163. Comment: The Commentator points out that the natural gas industry has been leading efforts to reduce methane and other GHG emissions. Industry initiatives like API's Environmental Partnership are demonstrating action-oriented, cost-effective approaches to reducing emissions of methane and VOC across the industry. This collaboration, now in its third year, includes 83 members – with 36 of the top 40 US producers of natural gas, where partners share expertise and technologies in a voluntary effort to reduce emissions from their operations.

Efforts like these are working; according to the EPA's latest Greenhouse Gas Inventory (GHGI), overall, methane emissions from petroleum and natural gas systems declined 23% between 1990 to 2018, even as US natural gas production increased more than 70% over the same period.

Accordingly, the industry has been delivering climate solutions while also providing energy that powers economies and raises standards of living while continuing to support well-designed policies to address the risks of climate change and further innovation to reduce GHG. Through new technologies, innovation, and well-designed policies to address the risks of climate change, the Commonwealth can continue to safely and smartly harness US energy reserves, which will help power the country's economic comeback and make Americans' lives better, while lowering emissions.

Response: The Department acknowledges this comment.

164. Comment: The Commentator supports the voluntary pollution prevention and sustainability measures, and environmental management systems utilized by companies to efficiently and effectively meet environmental regulatory requirements and utilize resources to meet their financial and business objectives.

Response: The Department acknowledges this comment.

Odors, Noise, and Light Pollution

165. Comment: The Commentators state that oil and natural gas facilities often light up the sky, whether through flaring, drilling, or construction.

Response: This comment is outside the scope of this final-form rulemaking. The Bureau of Air Quality does not have the statutory authority to regulate light pollution.

166. Comment: The Commentators state that, beyond the scope of the proposed rulemaking and the Air Program, there is an urgent need to regulate noise in the unconventional natural gas fields. The problems caused by noise include poor and interrupted sleep, the inability to entertain family friends, and the inability to enjoy one's property. The Commentators explain the unpredictability of living next to an industrial site where methane releases and malfunctions can occur at any time, day or night, often interrupting sleep. With readings as high as 80 dB, the constant noise of an operating compressor engine makes it difficult to entertain friends and

family or enjoy one's property and can affect one's health and the environment with emissions and noise. Operators are supposed to enclose their compressor engines in a sound mitigating structure, but some do not; for those that do, the structure does not seem to have much effect. Noise regulations are desperately needed to preserve the rural and agricultural character of much of the Commonwealth or to have any peace living adjacent to an industrialized site.

The Commentators state that sound experts across the nation that have dealt with the oil and natural gas industry agree that these problems need to be corrected through noise regulations. The industry is willing and are installing buildings, but the buildings need to be acoustically soundproof. The Commentators ask the EQB to include requirements for noise suppression in the proposed rulemaking.

Response: This comment is outside the scope of this final-form rulemaking. The Department also notes that noise requirements are enforced locally, based on local regulations.

167. Comment: Several Commentators state that many natural gas facilities emit terrible odors which often makes people feel ill. Some state that the odors can be like exhaust or burning glycol, others that they leave a metal taste in one's mouth, and still others that the noxious odors required their family to be kept inside on an otherwise nice day. Complaints filed by nearby residents often reveal leaks that were previously undetected. These companies claim they were not required to repair the leaks but did so to be a good neighbor.

Response: This comment is outside the scope of this final-form rulemaking. However, the Department notes that in accordance with 25 Pa. Code § 123.31(b), a person may not permit the emission into the outdoor atmosphere of any malodorous air contaminants from any source, in such a manner that the malodors are detectable outside the property of the person on whose land the source is being operated.

168. Comment: The Commentator worries about the quality of the Commonwealth's air and water and monitors DEP's reports of spills and other violations. There have been reported spills on three of the four pads near the Commentator's home.

Response: The Department acknowledges this comment; however, it is outside the scope of this final-form rulemaking.

Economic or Fiscal Impacts

169. Comment: The Commentator states that the Department estimates that the proposed rulemaking will cost operators approximately \$35.3 million (2012 dollars). The value of the saved natural gas yields a savings of approximately \$9.9 million (2012 dollars), resulting in a total net cost of approximately \$25.4 million (2012 dollars) for this proposed rulemaking. Compared to the size of the oil and natural gas industry, with revenues of \$180 billion (2018 dollars), or the health, environmental, tourism, co-benefits from reduction of VOC that would also be in billions of dollars, this investment is miniscule.

Response: The Department acknowledges this comment.

170. Comment: The Commentators state that while addressing the public health and economic impacts of COVID-19 is paramount at this time, they welcome DEP's continued efforts to cut waste and mitigate climate change by reducing methane emissions from oil and natural gas operations. The current public health crisis makes smart, cost-effective policies to cut air pollution and protect the climate even more important. In support of these goals, the Commentators would like to hear the companies in their portfolios publicly support the DEP's regulation of methane.

The Commentators collectively direct trillions of dollars of investments to ensure sound financial returns for their beneficiaries. They recognize the significant financial risks posed by climate change and the enormous economic opportunities provided by low-carbon and climate-resilient technologies, markets, and business models.

Investors have prioritized engagement with oil and natural gas companies on methane emissions in recent years, working with them to set targets and align their operational practices accordingly. Yet, while some companies are demonstrating leadership on managing methane emissions, industry performance is not uniform. Without a level playing field, the poorest performers will shape the public narrative on natural gas, overshadowing proactive measures of industry leaders and risking the industry's social license to operate.

Response: The Department acknowledges this comment.

171. Comment: The Commentator is concerned about DEP's failure to communicate with the conventional industry regarding the costs of implementation which handicaps the industry's ability to comment upon the subject of costs. The uncertainty of the proposed rulemaking is supremely frightening to the conventional oil and natural gas industry which has been ravaged by the destruction of energy demand wrought by COVID-19. Oil and natural gas storage inventories are obscenely high. Layoffs and business closures in the conventional oil and natural gas industry have been rampant. Even when the world economy begins to regain its footing, the conventional oil and natural gas industry will not enjoy recovery until world inventories of stored oil and natural gas are whittled down.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites. The Department disagrees that there was a lack of communication on the Department's part. The Department presented the draft proposed rulemaking including the scope and applicability to several advisory committees. The Department also communicated, at the oil and natural gas industry's request, with industry members and trade organizations through meetings, conference calls and exchanges of technical data. The Department sent emails requesting information from industry members and trade organizations, from both the conventional and unconventional industries, with varying degrees of success. Generally, the unconventional industry was responsive and an active participant during all phases of the development of this final-form rulemaking. On the other hand, the Commentator and other representatives of the conventional oil and natural gas industry did not respond to multiple information requests. The Department also published the proposed rulemaking for

public comment, held public hearings, provided information as to the regulatory schedule, and provided training on what requirements this final-form rulemaking may have for industry.

The Department uses a cost-benefit analysis to determine the economic feasibility of a rulemaking. The cost-benefit analysis involves comparing the annualized cost of compliance by the regulated community versus the annual tons of VOC reduced. The requirements of this final-form rulemaking have been determined to be technically and economically feasible for all the sources included within the scope of this final-form rulemaking.

The RAF for this final-form rulemaking includes a detailed explanation of how costs were calculated. Essentially, compliance with the LDAR portion of this final-form rulemaking requires a handheld device and a limited number of manhours. In fact, the annualized cost for the average wellsite with annual LDAR requirements is \$1,681, which is equivalent to approximately 25 barrels of oil (or two days of production at 15 BOE per day). The annualized cost for the average wellsite with quarterly LDAR requirements is \$6,723, which is equivalent to approximately 102 barrels of oil (or seven days of production at 15 BOE per day). Every wellsite subject to this final-form rulemaking produces, at a minimum, 15 barrels a day of oil or its equivalent in natural gas.

172. Comment: The Commentator urges the DEP to adopt a strengthened rule for the future security and sustainability of the US economy.

Response: The Department acknowledges this comment and provides that this final-form rulemaking is more stringent than proposed.

173. Comment: The Commentators state that the EQB should not lose sight of the fact that what the regulatory agencies and some stakeholders view as a pollutant is the oil and natural gas industry's product. The industry has a purely economic motivation to capture every molecule of natural gas possible and avoid waste. Pennsylvania operators do not flare natural gas to the same levels as occurring elsewhere around the country, which undermines the basis for this proposed rulemaking.

Response: While the natural gas industry is younger in Pennsylvania, and Pennsylvania operators do not flare as often as operations occurring across the nation, this final-form rulemaking covers more source categories than simply flaring. This final-form rulemaking is needed to comply with the requirement that this Commonwealth revise its SIP with the EPA to cover these sources due to the issuance of the 2016 O&G CTG. This final-form rulemaking is also needed to help this Commonwealth achieve and maintain the NAAQS.

174. Comment: Several Commentators state that there are multiple owners and operators in Pennsylvania that operate over 1,000 conventional wells. Each well site is likely to have at least one storage vessel and one natural gas driven pneumatic controller. Considering only the equipment costs associated with retrofitting half of the existing natural gas driven pneumatic controllers with low-bleed pneumatic controllers, the costs alone for the new controllers would be over \$1.3 million, using the average cost of a low-bleed controller of \$2,698 in 2012 dollars from the 2016 O&G CTG. That cost does not include cataloging and tagging all pneumatic controllers and the associated labor to replace half of the existing pneumatic controllers.

The Commentators state that the EPA and the industry often refer to the term “marginal wells” in the context of certain EPA regulations and the Internal Revenue Code which is defined as wells that produce an average of 15 BOE per day. While this usage of marginal well is in reference to their level of production, the term may also refer to their economic viability. Fifteen BOE per day is approximately equivalent to 90 thousand cubic feet (Mcf) per day (Mcf/d) of natural gas; most marginal wells and conventional wells in Pennsylvania average less gas than that per day. At the current price of \$1.70 per Mcf, a well producing 90 Mcf/d will gross \$153 per day and net about \$25 per day, which means that an extremely efficient marginal well will net approximately \$0.28 per Mcf.

EPA and DEP suggest that controls costing in the range of \$6,600 per ton of VOC removed are somehow economically justified, which the Commentator believes is ludicrous. EPA’s Subpart OOOOa were not designed or cost-justified to control sources from conventional wells in Pennsylvania. The regulations were in response to and targeted at the large volume hydraulically fractured unconventional wells with horizontal legs. The production from these wells in their initial years of production were beyond anything the industry had ever seen. To factor those levels of production into the cost-effectiveness analysis over the life of the well seriously front loads the benefits. EPA and DEP argue, based on the 2016 O&G CTG and the proposed rulemaking, that the cost of one new pneumatic device costing \$3,000 is cost-effective. Assuming the conservative assumptions set forth above concerning conventional wells, it would take an operator 119 days to break even just on that single device.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

EPA’s cost estimation in the 2016 O&G CTG to replace a natural gas-driven continuous high-bleed pneumatic controller with a natural gas-driven continuous low-bleed pneumatic controller is \$296 (2012 dollars) on an annual basis, which when adjusted to 2021 dollars is \$347. The Department did not consider the value of saved natural gas when determining RACT for natural gas-driven continuous bleed pneumatic controllers.

However, using the Commentator’s price of \$1.70/Mcf, and the difference in emissions from the high-bleed to low-bleed controller of 37.3 scfh and 1.39 scfh, respectively, from 40 CFR Part 98, Subpart W Table W-1A, the marginal well operator will earn an additional \$535 per year (2021 dollars). With annual costs of approximately one hour of labor for recordkeeping and reporting at \$84/hour and an estimated one-time cost of approximately one hour of labor to tag the affected controller, marginal well owners or operators will earn an additional \$367 in revenue in the first year, increasing in following years to \$451 per year. This additional revenue increases to \$618 in revenue in the first year and \$702 per year in following years at \$2.50 per Mcf and \$1,405 in revenue in the first year and \$1,489 per year in following years at the current price of approximately \$5.00/Mcf.

175. Comment: The Commentator states that there is no discussion, or even recognition, of the effect the sudden unavailability of conventional production would have on western Pennsylvania

natural gas utilities to meet their least cost service and reliability obligations under the Public Utility Code and their customers. The Commentator notes that DEP works with the Pennsylvania Public Utility Commission (PAPUC) concerning Act 13 impact fee matters and that the chairperson of the PAPUC is a member of the EQB.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

176. Comment: The Commentator advocates for environmental laws, regulations and policies that measure success based on environmental health and quality metrics rather than fines and penalties; develop a private-public relationship which promotes working together to meet proper compliance; and that ensure timely regulatory approvals and authorizations.

Response: The Department acknowledges this comment.

177. Comment: The Commentator believes that environmental excellence and economic growth are compatible objectives, and that environmental and natural resources laws and programs should be framed and implemented to concurrently meet these twin objectives. The Commentator advocates for environmental laws, regulations, and policies that set environmental protection goals, while allowing and encouraging flexibility and creativity in their achievement; allow market-based approaches to seek attainment of environmental goals in the most cost-effective manner; and do not impose costs which are unjustified compared to actual benefits achieved.

With respect to air quality, the Commentator advocates for cost effective air laws, regulations and policies based on sound principles that are reasonable and technologically and economically feasible to protect and enhance public health and the environment without placing in-state businesses at a competitive disadvantage. With regard to GHG emissions, the Commentator supports efforts in Pennsylvania which balance societal environmental, energy, and economic objectives; fit rationally within any finally adopted and applicable national or international strategy; and capitalize on the availability of Pennsylvania's diverse natural resources to facilitate economic development in the Commonwealth.

Response: The Department acknowledges this comment.

178. Comment: The Commentator states that, as part of its consideration, the proposed rulemaking attempts to balance the costs to industry, calling on facilities to utilize the RACT standard. Industry claims they share in the environmental goals to reduce these toxic pollutants. In response to the December 17, 2019 action by the Board approving the proposed rulemaking, David Spigelmyer, President of the MSC, stated, "Our industry is focused on ensuring methane, the product we produce and sell, as well as related emissions are effectively and safely managed. To continue to build upon our air quality-related successes, we're enhancing best practices, utilizing new technologies and collaborating as an industry around these shared environmental and business goals, all while pushing record production levels." If industry is committed to

meeting these shared goals and utilizing the newest technology to ensure public health and safety, then there should be no objection from industry in the state to comply with this regulation.

Response: The Department acknowledges this comment.

179. Comment: A 2014 study conducted by ICF International, updated in 2016 following a decrease in natural gas prices, found that when natural gas is \$2/Mcf, the cost of reducing methane emissions by forty percent is about \$0.01/Mcf of natural gas produced. The cost-effective nature of the available technology to monitor and capture VOC and methane then, means that today, even with significantly lower commodity prices, oil and natural gas wells of any size should be able to comply with these regulations without a significant burden to their bottom line.

Response: The Department's analysis of the cost-effectiveness of quarterly LDAR inspections in the proposed rulemaking did not include the savings from natural gas. The Department's 2020 reanalysis of the cost-effectiveness of LDAR inspections in this final-form rulemaking also does not include the savings from natural gas. In both cases, the cost-effectiveness of LDAR inspections improve if the value of the natural gas is accounted for.

180. Comment: The Commentator states that oil and natural gas producers should not be able to externalize the costs of methane and other pollutants from leaks that are predictable outcomes of their business, or to avoid the cost of preventing them.

Response: The Department acknowledges this comment.

181. Comment: The Commentator states that damage to public health and the environment does not come without an economic cost.

Response: The Department's mission is to protect Pennsylvania's air, land and water from pollution and to provide for the health and safety of its citizens through a cleaner environment. The Department works as partners with individuals, organizations, governments and businesses to prevent pollution and restore Pennsylvania's natural resources.

182. Comment: The Commentator states that it is easy to say that one wishes to cut emissions to zero yet doubts that anyone will turn off the furnace that uses methane as a fuel source to warm themselves and their family in the middle of winter. All human activity has an environmental cost, and the goal should be impact minimization or mitigation.

Response: The Department acknowledges this comment.

183. Comment: The Commentator states that it is in the interest of public health and the economy to utilize the best technology for the lowest emission limitation. In this proposal, the EPA defines 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 Commentator suggests that if it is not economically feasible, then perhaps this is not the correct energy source or the right product to benefit

Pennsylvania, and the operator should not be attempting this work. Instead cleaner industries with sustainable jobs can replace them.

Response: The reduction of pollution in Pennsylvania is determined primarily through our BAT and RACT programs. BAT requires a control measure be technically and economically feasible for a new source whereas RACT requires a control measure be technically and economically feasible for an existing source. In both cases, the control measure is only required if the emission reduction is cost-effective. This final-form rulemaking is based on the technical and economic feasibility for a control measure that is determined based on the abatement cost per ton of pollutant.

184. Comment: The Commentator's area is rich in natural gas deposits. About a decade ago, innovations in drilling and fracking led to a massive ramp up in development for their area. The Commentator cautiously supported of the boom as their area had struggled economically, and it wasn't feasible for many families to still make it as farmers.

The Commentator's friends, neighbors, and family members all benefited from the boom. They were making good money doing good work at a time when good jobs were hard to come by. As mineral owners, the Commentator was hopeful that they could see some of those benefits. But like every oil and natural gas boom, there was a bust; and while production has continued to soar in Pennsylvania, the Commentator never saw the infrastructure materialize to participate in that boom due to sustained low gas prices from over-production. The industry had gotten too good at its job for its own good.

Response: The Department acknowledges this comment.

185. Comment: The Commentator states that the Department claims in the preamble that the proposed rulemaking will provide consistency among all oil and natural gas sources but mentions nothing about how the proposed rulemaking compares with requirements for other industries in the Commonwealth with similar emission profiles. Accordingly, the Board should consider other emissions sources before proceeding with this proposed rule to avoid establishing overly burdensome requirements relative to other sources.

Response: The Department has a legal obligation to address the applicable sources in the 2016 O&G CTG. Other industries that have been regulated include surface-coating operations, degreasing operations, and graphic arts systems. These industries are also often run as small businesses with wide variety in the numbers and types of sources at their facility.

186. Comment: The Commentator states that the section on compliance costs describes how these requirements will be incorporated into "existing operating permits." The Board has not provided clarity for operators on how this is to occur and whether these requirements will apply to GP-5 and GP-5A permits.

Response: The incorporation into an existing permit will follow the requirements of 25 Pa. Code § 127.463. Please see the response to Comment 13 for more information. GP-5 and GP-5A will be amended as appropriate to incorporate the applicable VOC RACT requirements. In the meantime, the owners or operators with a GP-5 or GP-5A must demonstrate that they are complying with the requirements of this final-form rulemaking by submitting the proper reports

and maintaining the required records. Where duplication is found in the recordkeeping and reporting requirement, the Department would accept the more detailed (stringent) report or record with a statement that the information therein satisfies both this final-form rulemaking and the general permit requirements.

187. Comment: The Commentator points out that fracking never produced the economic boom it was supposed to for Pennsylvania residents. Vast numbers of new jobs created went to people from Texas who were brought in to work the operations, while Pennsylvania heating costs have not noticeably changed because so much gas is being exported. While a few lucky landowners get a small windfall, all their neighbors are exposed to health risks, ruined drinking wells, and long-term environmental degradation that affects all of Pennsylvania. The Commonwealth needs to invest in renewable and clean energy, and not continue to protect the profits of an industry that would not be profitable if they paid the true cost of their operations instead of leaving taxpayers with cleanup and reclamation costs, healthcare costs, and increased government regulation and infrastructure costs. These costs will all go away when the Commonwealth ceases fracking entirely and cleans up the aftermath.

Response: The Department acknowledges this comment.

188. Comment: The Commentator states that natural gas prices are extremely low as a result of the rapid deployment of fracking in the Marcellus and Utica formations underlying Pennsylvania. If natural gas prices increase a little bit in order to cover the cost of monitoring, it is a cost the industry is well positioned to pay, indeed that they are responsible for paying. In contrast, the health and climate change induced costs associated with VOC and methane emissions will be extraordinarily high.

Response: The Department acknowledges this comment.

189. Comment: As with most proposed changes, the Commentator expects resistance from people used to the current level of regulation who don't want to pay more or risk losing value in their assets due to changes in how they do business. Yes, jobs and profits may be threatened. Pennsylvania producers claim they are doing a perfectly adequate job policing themselves, and they argue, why ever would they allow much leakage of this valuable product?

The answer is that it can be more expensive to fix and repair pipelines or refit wells and compressors than it is to lose the gas under current operating conditions. It is more profitable to ignore these losses, even when they poison the drinking water supplies in adjacent communities, even when children at nearby schools get sick, even when these gas emissions threaten world food supplies due to global warming and the coastlines due to rising seas. Create dangerous levels of heat, and extreme weather events causing destruction of homes, property and lives in every county, every state, every nation.

Yes, some jobs may be lost, and shareholders may earn less money. But when a builder lets their supplies spill into the nearby streets, they are required to clean it up. Why? Because it is wrong to let businesses create a public hazard. If a drug company produces a medication with life-threatening complications, they must remove it from the market even if jobs are lost, until they can figure out a way to make their product without killing people. The oil and natural gas industry should be no different.

Response: The Department acknowledges this comment.

190. Comment: The Commentator states that agriculture is a critical large industry in Pennsylvania that is important for the US. This industry is under a severe threat, caused by GHG induced climate change, including the loss of essential insects. It has been reported that the insect population has dropped dramatically due to climate change, with some studies showing that the number of flying insects has dropped by 75% in just 25 years. This is huge, it is shocking, and will have a devastating effect on agriculture as it worsens.

Pollinators are among the most sensitive according to scientific studies, and these species are critical to Pennsylvania's agriculture industry. The Commentator states that quoting studies are not necessary to demonstrate this; that by simply observing, one already knows that there are far fewer bugs peppering the windshield of one's car. This is not a good thing; twenty years ago, there were far more. The Commentator urges everyone to notice how many fewer insects cover the car's windshield the next time they go for a drive and remember how critical insects are to the basic functioning of our ecology. Pennsylvanians are depending on the DEP to protect the environment.

Response: The Department of Environmental Protection's mission is to protect Pennsylvania's air, land and water from pollution and to provide for the health and safety of its citizens through a cleaner environment. The Department works as partners with individuals, organizations, governments and businesses to prevent pollution and restore Pennsylvania's natural resources. This final-form rulemaking was developed under the authority of sections 5(a)(1) and 5(a)(8) of the APCA. The APCA is built on a precautionary principle to protect the air resources of this Commonwealth for the protection of public health and welfare and the environment, including plant and animal life and recreational resources, as well as development, attraction and expansion of industry, commerce and agriculture. Implementation of the VOC emission control measures established in this final-form rulemaking will help the Department protect the air resources of this Commonwealth as well as public health and welfare by reducing harmful VOC emissions from the oil and natural gas industry which contribute to the formation of ground-level ozone. Implementation of these VOC emission control measures will also provide reductions of methane (a GHG) emissions as a significant and meaningful co-benefit.

191. Comment: The Commentators state that the economic benefits of these proposed changes are well thought out and documented both quantitatively and qualitatively in the proposal. The Commentators state that the benefits on the industrial side are very real, in terms of both reductions in lost product and the income that will be generated for small businesses like emission abatement and environmental monitoring companies. However, these pale in comparison to the benefits that will be achieved in terms of health care costs, agriculture, forestry, water quality and marine life and other such benefits.

Response: The Department acknowledges this comment.

192. Comment: The Commentator states that in addition to the cost of human and animal disease, the Commonwealth pays in taxpayer dollars to companies getting tax breaks, and to remediate the environmental damage done over the years. Plugging an old well can cost tens of thousands of dollars, and along with capturing fugitive emissions are true costs of producing and

processing oil and natural gas. The industry does not treat them as such rather passing the costs off to the public and the Commonwealth allows them to do so.

While the industry complains that the new rule will cost them too much, the DEP estimates the average cost per operator to be \$5,000. That is not too much to ask of these companies; indeed, much more needs to be done to capture fugitive methane and VOC.

Response: The Department acknowledges this comment. Leak detection and repair requirements for sources of fugitive emissions are included in this final-form rulemaking.

193. Comment: The Commentator's request to remove the low-production threshold means perhaps thousands more operators would be subject to the rulemaking. The cost to operators of meeting the requirement may cause many of the low producing well sites to no longer be financially viable. That's just a business concept called economies of scale. The thing is, modifying the rule that way introduces a potentially negative effect. The low production well could no longer be financially valuable, and then the well's production may be halted; however, the well could be left in limbo and not fully decommissioned.

The Commentator's proposed modifications are also intended to better align the known and anticipated downstream costs to the upstream source. Right now, the public is paying the healthcare costs of those emissions. The public is also paying the increasing costs of climate change, which are known to be amplified in the short term by methane. Setting comprehensive emissions reduction requirements shifts those costs from the public to the sources triggering those costs, the operation of these wells and stations.

In order to do more for the health and safety of the citizens of the Commonwealth, which is the core of the DEP's mission, please pass the proposed rules and strengthen them with the more expansive requirements outlined.

Response: Removing the low-production well threshold could have some of the effects discussed by the Commentator. The Department has revised the low-production thresholds; this final-form rulemaking alters the production thresholds and removes the stepdown provision. The 2020 reanalysis shows that it is cost effective to implement instrument based LDAR at unconventional well sites with an average production of 15 BOE per day, with the frequency based on individual well production on the well site. For unconventional well sites with production equal to or greater than 15 BOE per day, a well site with at least one well that produces equal to or greater than 15 BOE per day must perform quarterly instrument based LDAR inspections; a well site with at least one well that is less than 15 BOE per day and equal to or greater than 5 BOE per day must perform annual instrument based LDAR inspections. The owner or operator is required to track the well site and individual well production on an annual basis and can adjust the inspection frequency based on the varying production. Two consecutive years of production in the lower category are required before reducing the frequency of inspections; however, any time production moves to the higher category, the increase in inspection frequency is immediate.

194. Comment: The Commentator recalls spending a lot of time outside as a child with their cousins in public parks and on the lands their family owned between Delaware County and Reading in Berks County. When the Commentator goes to Reading now to visit, they can smell

the difference in air quality compared to Philadelphia. The air pollution in Philadelphia and Pittsburgh should not define the state, and yet it does in many ways.

The Commonwealth continues to give tax breaks to these massive fossil fuel companies at the expense of its citizens. The Commonwealth will continue to pay for it as these super storms and hurricanes and mass flooding wrack our state requiring investment in new infrastructure.

Response: Tax policy is the purview of the State Legislature. The Department of Environmental Protection's mission is to protect Pennsylvania's air, land and water from pollution and to provide for the health and safety of its citizens through a cleaner environment. The Department works as partners with individuals, organizations, governments and businesses to prevent pollution and restore Pennsylvania's natural resources.

195. Comment: The Commentator states that regulating VOC leaks from existing fossil fuel infrastructure is a necessary step, but the proposed rulemaking doesn't go far enough in preventing needless emissions of the strong GHG, methane.

Response: The control of methane is beyond the scope of this VOC RACT rulemaking; however, the Department estimates that this final-form rulemaking will reduce methane emissions by 45,278 TPY as a co-benefit to the VOC emission reductions required under the CAA.

196. Comment: The Commentator states that industry has justified the continued production of fossil fuel despite grave risks to climate and public health by insisting they are needed for energy. However, methane leaks are waste that don't fuel our society, create jobs, or generate profit. They only accelerate the rate of global warming without providing any benefit to society.

The Commentator states that to continue fossil fuel production despite catastrophic climate change, the minimum requirement is to ensure that every measure to reduce wasteful and preventable methane emissions from this industry is taken.

Response: The control of methane is beyond the scope of this VOC RACT rulemaking; however, the Department estimates that this final-form rulemaking will reduce methane emissions by 45,278 TPY as a co-benefit to the VOC emission reductions required under the CAA. The Department requires measures to reduce emissions from the oil and natural gas industry that are both technically and economically feasible.

197. Comment: The Commentator knows that the oil and natural gas industry provides jobs to the Commonwealth, but oil and natural gas production must be done and maintained in a way that protects the health of the citizens and the environment.

Response: The Department acknowledges this comment.

198. Comment: The Commentator asks whether a baker would tolerate holes in their flour bin? The Commentator then asks why a company would allow the product it sells to leak away rather than take measures to capture it. This behavior reveals the abundance of natural gas and the wasteful nature of the industry.

Response: The Department acknowledges this comment.

199. Comment: The Commentator states that poor air quality contributes to the economic drain of Pennsylvania's communities due to increased healthcare costs, lower property values, a declining tax base, and difficulty in attracting and retaining businesses.

Response: Please see the response to Comment 68.

200. Comment: The Commentator states that some companies are not following best practices and they put the entire industry's social license to operate at risk. Natural gas is a viable bridge fuel only if methane emissions are controlled. With stronger rules Pennsylvania could move into a leadership position on this issue, thereby strengthening Pennsylvania's economy. That's because industries and states that can demonstrate their competitive advantage in a low-carbon economy will be better positioned for success as investors and consumers reward those demonstrating leadership on climate change.

Response: The Department acknowledges this comment.

Environmental Justice

201. Comment: The Commentators state that common-sense standards that cut harmful air and methane pollution and climate action in general are supported by a majority of Pennsylvanians. The Wolf administration should continue its work to advance draft rules to cut methane and air pollution from oil and natural gas infrastructure at a time when protecting public health and safeguarding the climate is more important than ever. The Commonwealth cannot afford to neglect the looming climate crisis and its impacts on public health and the environment, including many members of vulnerable communities such as those experiencing homelessness or are living with mental health and substance abuse challenges in addition to their physical health concerns. This is also especially critical at this juncture in US history because data shows that environmental injustices tend to affect Black and Brown communities more adversely than White communities.

Response: The Department agrees that addressing climate change and environmental justice concerns should be a priority. The Department is continuing its effort to reduce air pollution, including VOC and methane, from unconventional oil and natural gas sources by finalizing this final-form rulemaking. While this final-form rulemaking requires VOC emission reductions, methane emissions are also reduced as a co-benefit, because both VOC and methane are emitted from oil and natural gas operations. This final-form rulemaking would help ensure that the citizens of this Commonwealth would benefit from reduced emissions of harmful VOC and methane from regulated sources. These reductions would also benefit health and welfare and the numerous animals, crops, vegetation and natural areas of this Commonwealth by reducing the amount of ground-level ozone air pollution resulting from these sources. The reduction of ground-level ozone air pollution concentrations directly benefits the human and animal populations of this Commonwealth with improved ambient air quality and healthier environments. The Department also has an Office of Environmental Justice which works to ensure the fair treatment and meaningful involvement of all people with the development, implementation, and enforcement of environmental policies, regulation, and laws; as well as with respect to the identification of environmental issues that affect the most vulnerable communities.

Additionally, the Office of Environmental Justice is working collaboratively with environmental justice partners and other State agencies to develop data tools and resources to document environmental and environmental health conditions of vulnerable communities and consider opportunities to enhance resources to overburdened communities. The Department is also in the process of revising the Environmental Justice Public Participation Policy to improve the Department's support to vulnerable communities. The Department plans to strengthen public participation and include additional integration of equity and environmental justice concerns within existing DEP policies.

202. Comment: The Commentators appreciate the Department's efforts during this difficult time but wants to acknowledge the most vulnerable Pennsylvanians in our communities. The Commentators urge the Department to move forward swiftly with strict standards to protect all Pennsylvanians. Under the conditions of COVID-19 the most vulnerable community members - pregnant women, children, the elderly, the economically disadvantaged, people of color, and those with chronic medical conditions - will be especially impacted by the decisions the Department makes regarding oil and natural gas regulations.

Response: The Department acknowledges this comment and is continuing its effort to reduce air pollution, including VOC and methane, from unconventional oil and natural gas sources by finalizing this rulemaking. Please also see the response to Comment 201 for more information.

203. Comment: The Commentators state that poor air quality hits communities of color particularly hard as they are more likely to live near polluting industries. They are also more likely to suffer from urban heat island impacts. A study in the Proceedings of the National Academy of Sciences found that pollution exposure among Black and Hispanic people far outweighs the amount of pollution they cause. These environmental impacts have led to significant health disparities for Black and Hispanic Americans, including higher rates of asthma, cancer, and premature, underweight, and stillborn births to name only a few.

Response: The Department acknowledges this comment and the concerns expressed. The Department is continuing its effort to reduce air pollution, including VOC and methane, from unconventional oil and natural gas sources by finalizing this rulemaking. Please also see the response to Comment 201 for more information.

204. Comment: The Commentators are concerned about the disproportionate burdens from pollution experienced by Pennsylvania residents and residents of the country, depending on their circumstances. The pandemic has put a spotlight on the aggravated public health threats to the poor communities and communities of color associated with poor air quality. One of the many sobering realities placed in high relief is how badly the regulatory system has failed to ensure that breathing isn't hazardous for people's health, no matter where they live.

Response: The Department acknowledges this comment and the concerns expressed. Please also see the response to Comment 201 for more information.

205. Comment: The Commentator states that the Western Pennsylvania region's 2.6 million people are at risk if the loopholes in the proposed rulemaking are not closed. This includes vulnerable populations who bear disproportionate risks from current levels of air pollution: 48,000 children with pediatric asthma; 214,000 people with adult asthma; 160,000 people with

COPD; 220,000 people with cardiovascular disease; 291,000 people living with low incomes; and 363,000 people who are non-white. The environmental justice concerns are clear, substantial, and should not be ignored.

Response: The Department acknowledges this comment and is continuing its effort to reduce air pollution, including VOC and methane, from unconventional oil and natural gas sources by finalizing this rulemaking. Please also see the response to Comment 201 for more information.

206. Comment: The Commentator presents their comments prayerfully on behalf of these Pennsylvanians who suffer disproportionately and asks Secretary McDonnell and the Department to implement the proposed rulemaking incorporating their suggested amendments.

The Environmental Justice section of DEP's website says, "It is our duty to ensure that all Pennsylvanians, especially those that have typically been disenfranchised, are meaningfully involved in the decisions that affect their environment and that all communities are not unjustly and/or disproportionately burdened with adverse environmental impacts." The Commentator agrees.

The Commentator states that this can be a powerful moment for justice, when DEP uses its authority to cut methane and air pollution from existing gas infrastructure. By doing so, the Commonwealth will ensure a more stable climate future and better health for Pennsylvanians, especially for those who suffer environmental injustice through no fault of their own.

Response: The Department acknowledges this comment and is continuing its effort to reduce air pollution, including VOC and methane, from unconventional oil and natural gas sources by finalizing this rulemaking. Please also see the response to Comment 201 for more information.

207. Comment: The Commentator states that two important principles of their Unitarian Universalist faith are to affirm and promote "the inherent worth and dignity of every person" and "respect for the interdependent web of all existence." The proposed rulemaking for the 2016 O&G CTG is a significant step for environmental justice in several ways; however, the proposed rulemaking leaves open two loopholes that prevents it from being as protective as it should be, evoking a saying by Michelangelo "The greatest danger is not that our aim is too high and we miss the goal, but that is it too low and we achieve it." In this case, aiming too low imperils the future of the climate and all Earth's creatures.

According to the US EPA, environmental justice "will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work." The Commentator states that these proposed regulations work to advance environmental justice in at least three ways. First, on a local level, by limiting emissions of harmful VOC, people and animals living or working near oil and natural gas infrastructure will be less likely to suffer serious health effects, ranging from headaches and nausea, to central nervous system and liver damage, to birth defects, to cancer.

Second, on a regional level, preventing emission of VOC, which are a precursor of ground level ozone, will reduce harmful ground level ozone concentrations. As stated in the *Pennsylvania Bulletin*, "these reductions would benefit the health and welfare of the approximately 12.8

million residents and the numerous animals, crops, vegetation and natural areas of this Commonwealth.” These reductions are especially important to the many people who suffer from asthma, COPD, and now COVID-19, who are disproportionately black and brown people.

Finally, the proposed regulations have the co-benefit of controlling leaks of the potent GHG, methane which is the main component of natural gas and is responsible for 25% of the climate change being experienced worldwide.

Response: The Department acknowledges this comment and is continuing its effort to reduce air pollution, including VOC and methane, from unconventional oil and natural gas sources by finalizing this rulemaking. Please also see the response to Comment 201 for more information.

208. Comment: The Commentator supports the proposed rulemaking to reduce methane and VOC pollution of existing oil and natural gas sources but is concerned about the loopholes that would effectively miss 50% of the methane emissions at the targeted facilities. For the proposed rulemaking to meaningfully address the climate crisis and meet Pennsylvania's commitment to cut methane these shortcomings need to be addressed.

As a resident of Philadelphia and a member of that city's black and brown community, the Commentator is struck by the similarities and the proximity of the shale equipment to the Caucasian residents in rural Pennsylvania and those black and brown residents whose neighbor would now shutter refineries in urban south Philadelphia. Environmental justice is not served by equally sacrificing the health of black, brown, and white children. Nor is it served by granting the petroleum industry exceptions based on cost in exchange for the wellbeing of our families. The future of Pennsylvania lies with our children and not in any industry whose fortunes require shortening their lives. There is much more that can be done, but the Commentator suggests starting with closing the loopholes and adopting the proposed rulemaking.

Response: The Department acknowledges this comment and is continuing its effort to reduce air pollution, including VOC and methane, from unconventional oil and natural gas sources by finalizing this rulemaking. This final-form rulemaking alters the production thresholds and removes the stepdown provision for LDAR inspection included in the proposed rulemaking. The owner or operator may only reduce the inspection frequency based on the production calculations which shows two consecutive years of production in a lower category. The owner or operator shall increase in inspection frequency immediately if the production calculations show an increase that is subject to more frequent inspections. This final-form rulemaking is also a primary component of the Commonwealth's strategy of ensuring that the NAAQS for ozone is attained and maintained across this Commonwealth, and rulemaking is consistent with Governor Wolf's strategy to reduce emissions of methane from the oil and natural gas industry in this Commonwealth, as described in the response to Comment 48.

Please also see the response to Comment 201 for more information.

209. Comment: The Commentator states that Environmental Injustice is not just a phrase from left leaning organizations, but rather is a profound fact that environmental damage more frequently affects the already-burdened poor and communities of color. With the oil and natural gas industry comes air pollution, including VOC, ozone, and methane. The proposed rulemaking advanced here does not take into consideration recent research that indicates the level of “safe”

exposure must be significantly reduced when exposure is in dense and congested urban areas. Recent research also indicates that previously established benchmarks of safety must be recalculated in areas where accumulations will occur due to congestion, overdevelopment of heavily polluting projects in a contiguous area, and where there are existing high levels of illness and respiratory distress syndromes such as asthma. These conditions are the reality in poor, urban communities and communities of color. The EPA prior to 2018 theorized in a report that millions of urban dwellers have a 10% higher chance of developing cancer due to constant exposure to the very same chemicals, gases, and particulate matter that the Department claims to be able to control.

Response: The Department acknowledges this comment and is continuing its effort to reduce air pollution, including VOC and methane, from unconventional oil and natural gas sources by finalizing this rulemaking. Please also see the response to Comment 201 for more information.

Methane Mitigation Industry

210. Comment: The Commentator states that the methane mitigation industry is a robust and growing American industry, with more than 130 companies headquartered in the U.S. and more than 570 methane mitigation facilities located across the country, including Pennsylvania.

The Commentators appreciate the important role the oil and natural gas industry have in the state's economy, providing thousands of quality jobs for entry-level and highly skilled employees and value to communities.

However, there are real environmental and economic costs associated with fugitive emissions. Pennsylvania oil and natural gas operations lose upwards of \$86 million dollars-worth of natural gas a year due to inefficiencies at oil and natural gas well sites including faulty equipment and venting practices. If those leaks and venting were addressed, it would mean more product could be brought to market and more revenue for companies. Moreover, cutting methane waste can also help ensure a fair return for royalty owners and help protect the environment.

Response: The control of methane is beyond the scope of this VOC RACT rulemaking; however, the Department estimates that this final-form rulemaking will reduce methane emissions by 45,278 TPY as a co-benefit to the VOC emission reductions required under the CAA. The Department estimates that meeting the requirements of this final-form rulemaking will allow owners and operators to recover approximately \$4.6 million of natural gas (2021 dollars).

211. Comment: The Commentators state that responding to the economic and environmental challenge, methane mitigation companies have developed a range of effective, innovative, and low-cost services and technologies that reduce wasteful methane emissions. In their March 2020 report entitled "Global methane emissions from oil and natural gas", the International Energy Agency found that "[w]hile natural gas prices today are relatively low, we estimate that around one-third of our latest estimate of methane emissions from oil and natural gas operations could still be avoided at no net cost." These results reflect the Commentators' experience in other states, like Colorado, that have imposed proposals similar to the one under consideration in Pennsylvania.

As a result, DEP does not need to make a difficult choice between protecting public health and supporting the economy. It is the Commentators' view that, for the most part, the rule under consideration today strikes this important balance.

Response: The control of methane is beyond the scope of this VOC RACT rulemaking; however, the Department estimates that this final-form rulemaking will reduce methane emissions by 45,278 TPY as a co-benefit to the VOC emission reductions required under the CAA.

Small Business Impacts

212. Comment: The Commentator states that part of the process of promulgating the proposed regulations the DEP is required to provide a regulatory flexibility analysis and to consider various methods of reducing the impact of the proposed regulation on small business.

Response: The costs to the operators of the estimated 306 small businesses required to comply with this final-form rulemaking would be minimal, especially at marginal well sites. Most small business that include marginal well sites would not be required to install controls on storage vessels because their estimated actual VOC emissions are well below the control threshold of 2.7 TPY VOC. As discussed in Comment 174, the requirement to replace a natural gas-driven continuous high-bleed pneumatic controller with a natural gas-driven continuous low-bleed pneumatic controller would result in a net profit to owners and operators of small businesses, especially at marginal well sites. The Department estimates that very few owners or operators will be required to implement natural gas-driven diaphragm pump requirements because few that report the use of pumps have available controls at the unconventional well sites. There are very few reciprocating compressors at marginal well sites, which can be owned or operated by small businesses, but the costs of doing the replacements are somewhat offset by the natural gas recovered. The Department's cost analysis for LDAR was based on hiring a contractor, not purchasing equipment, hiring and training personnel, and conducting the appropriate number of surveys. Therefore, the costs associated with the EPA's analysis in the 2016 O&G CTG, which were amortized over several well sites, do not apply in this instance. In addition, the Department has added flexibility for owners and operators that are required to perform annual LDAR inspections based on their unconventional well site production and the production of the individual wells at the well site. The owner or operator may submit a determination to the Department showing that annual LDAR is not RACT for their unconventional well site and, with Department approval, be exempted from the instrument based LDAR requirements.

213. Comment: The Commentator states that the proposed rulemaking will have a disproportionate and devastating impact on conventional oil and natural gas operations within the state due primarily to the sheer numbers of existing conventional oil and natural gas wells, storage vessels, gathering and boosting stations, and natural gas driven pneumatic controllers. The Department estimates the proposed rulemaking has the potential to impact over 71,000 conventional oil and natural gas wells in Pennsylvania. Considering the tens of thousands of individual pieces of equipment for which applicability will need to be determined, there is considerable cost associated with the initial compliance determination for, and ongoing compliance with, the proposed rulemaking. For many small conventional operators who are currently operating at very low margins, the added costs associated with determining regulatory applicability and ongoing recordkeeping and compliance could be catastrophic. Costs that should

be considered include the cataloging of equipment, applicability determinations, and associated recordkeeping; compliance monitoring, recordkeeping and reporting; administrative costs; increasing support staff; and hiring consultants and testing firms.

Many wells would be deemed uneconomic to operate given the administrative costs of this proposed rulemaking. The economic impact to small operators and to the rural communities that rely on small operators as employers, ceasing operation of existing conventional wells causes many issues, including depriving royalty owners of income; the loss of a natural resource with sunk costs and reduced environmental impact; the loss of direct and indirect jobs; the loss of impact fees and severance taxes; the loss of Commonwealth income tax from lost jobs; and dependence on out-of-state gas and energy resulting in increased energy costs for consumers.

The Department also indicates that its data suggests only 303 of those conventional wells exceed the regulatory threshold of 15 BOE per day production that would subject them to the fugitive emission provisions of the proposed rulemaking. Because the Department did not identify and inform the operators of the 303 wells the Department believes exceed the threshold, the Department is forcing the operators of the remaining conventional wells to spend thousands of dollars to determine the applicability of the rulemaking. This is especially true of many marginal and conventional well operators in Pennsylvania that must absorb these costs while recovering \$25 a day or less from a well; this will most likely result in the operator shutting-in the well. The Department could minimize the costs to industry by using 12 BOE or more a day as a screening threshold and contacting those owners that they must conduct an applicability determination. This approach which would give the Department a degree of confidence that it is identifying all sources that may need to comply.

The Commentator states that because of the nature of oil and natural gas production, the application of controls on new sources through Subpart OOOOa will achieve the air quality objectives of the Department without the need to create extensive regulations that apply to the owners and operators of existing sources. As the production of the well declines, its ability to emit VOC also declines. VOC emissions from these older conventional wells are not comparable to VOC emissions associated with unconventional wells due to drastic differences in operating pressure and production. Yet the proposed rulemaking would subject the owners and operators of tens of thousands of existing Pennsylvania conventional wells to new regulations that were developed for new or modified affected sources, which are predominantly unconventional wells. The Commentator disputes the cost effectiveness of the proposed requirements to existing Pennsylvania sources, especially conventional operations. The additional administrative burdens that will affect the Department by exposing tens of thousands of existing conventional oil and natural gas sources is overlooked in the proposed rulemaking, even though that is a specific concern under the RRA. Although the Department has initiated systems and tools to streamline the air quality permit process associated with oil and natural gas development, delays are still common in the processing of oil and natural gas well permitting events. If Department staffing and funding levels are inadequate for the current air quality regulatory structure in Pennsylvania, the addition of tens of thousands of newly affected oil and natural gas sources would undoubtedly make the work of Department staff even more difficult. The Commentator suggests that the current air quality regulatory structure for existing unconventional oil and natural gas operations be retained and that the proposed rulemaking be withdrawn.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

214. Comment: The Commentator states that the RRA, specifically at Sections 5(a)(12.1) and 5.2(b)(8), requires consideration of less stringent compliance or reporting requirements, less stringent schedules or deadlines for compliance or reporting requirements, consolidation or simplification of compliance or reporting requirements, establishment of performance standards to replace design or operational standards, and the exemption of small businesses from all or any part of the requirements contained in the rulemaking.

Most of the conventional oil and natural gas operators, including all of the Commentator's industry association members, are small businesses. The proposed rulemaking does not contain any accommodation for small business. Such omission, therefore, fails to comply with the obligations imposed under the RRA and greatly impacts industry association's members.

The omission also reveals the fatal procedural oversights which have poisoned the process. The Department failed to separately examine the needs presented by the conventional oil and natural gas industry which renders it impossible to consider whether less stringent alternatives can meet a legitimate regulatory need. Similarly, it is impossible to analyze or comment upon whether alternative performance or operational standards will meet a legitimate regulatory need when the regulatory agency fails to state the data, unique to the conventional oil and natural gas industry, that underlies the regulatory need.

It is impossible to assess the viability of such alternatives because the RAF does not contain the data and analysis necessary to meaningfully implement Sections 5(a)(12.1) and 5.2(b)(8) of the RRA, nor does the RAF contain the data and analysis necessary to allow the Commentator to provide meaningful comment on small business alternative requirements including a potential requirement to plug an orphan well instead of implementing the testing and accommodations called for in the proposed rulemaking. The orphan well plugging alternative may or may not be meaningful, and there may or may not be more alternatives that meet the dictates of the RRA; however, that cannot be known, because the process and outcome under Act 52 and the RRA is not achieved until the Department meets its obligation to treat the conventional oil and natural gas industry separately; its duty to consult with the industry; its duty to provide data meaningful to that industry; its duty to assess the need relative to that industry; and its duty to provide for meaningful comment and exchange that results in the consensus contemplated in the RRA.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

Any small business owner or operator that needs assistance in determining their applicability to the regulation can seek assistance through third-party consultants or the Department. The Department plans to educate and assist the public and the regulated community in understanding the proposed requirements and how to comply with them. The Department will continue to work with the Department's provider of Small Business Stationary Source Technical and Environmental Compliance Assistance. These services are currently provided by the Environmental Management Assistance Program (EMAP) of the Pennsylvania Small Business Development Centers. The Department has partnered with EMAP to fulfill the Department's obligation to provide confidential technical and compliance assistance to small businesses as required by the APCA, section 507 of the CAA (42 U.S.C.A. § 7661f) and authorized by the Small Business and Household Pollution Prevention Program Act (35 P.S. §§ 6029.201—6029.209). In addition to providing confidential one-on-one consulting assistance and onsite assessments, EMAP also operates a toll-free phone line to field questions from small businesses in this Commonwealth, as well as businesses wishing to start up in, or relocate to, this Commonwealth. EMAP operates and maintains a resource-rich environmental assistance web site and distributes an electronic newsletter to educate and inform small businesses about a variety of environmental compliance issues.

Additionally, this final-form rulemaking is designed to implement the air emission control recommendations of the 2016 O&G CTG issued by the EPA under sections 171(c)(1), 184(a), and 184(b) of the CAA, by establishing RACT for five categories of air emission sources used by the oil and natural gas industry. Therefore, the plugging of orphan wells is outside the scope of this final-form rulemaking. See also the responses to Comments 3, 7, 11 and 171.

215. Comment: The Commentator states that the members of the industry association they represent are subject to provisions of the CAA, the APCA, Act 13, the Pennsylvania Clean Streams Law, and other environmental statutes and implementing regulations relevant to oil and natural gas operations in Pennsylvania. The Commentator and the association's members have a direct interest in the proposed rulemaking.

While many of the industry association's members are companies that engage in large volume hydraulic fracturing with horizontal legs in organic shale formations, or unconventional drilling, the predominant portion is comprised of smaller, family run operations that engage in hydraulic fracturing involving vertical wells without horizontal legs in non-shale formations, or conventional oil or gas drilling.

The Commentator states that industry association's members are small businesses under the Small Business Regulatory Enforcement Fairness Act of 1996. The Commentator emphasizes that the imposition of the "one-size-fits-all" regulatory approach of the proposed rulemaking on both existing conventional and unconventional oil and natural gas operations in Pennsylvania, which blindly reflects the recommendations of the EPA's 2016 O&G CTG, is inappropriate, disproportionately impacts conventional operations and small businesses in Pennsylvania, and fails to comply with the plain directives of Act 52.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate

rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites. The determination of applicability should be able to be accomplished by all owners or operators regardless of their classification of a small business. Adding less stringent requirements for small businesses would likely increase the applicability to small businesses, which is contrary to the intent of the Commentator. Any small business owner or operator that needs assistance in determining their applicability to the regulation can seek assistance through third-party consultants or the Department. See Comment 214 for information about EMAP.

Also, this final-form rulemaking is designed to implement the air emission control recommendations of the 2016 O&G CTG issued by the EPA under Sections 171(c)(1), 184(a), and 184(b) of the CAA. These air emission control recommendations apply to five categories of air emission sources used by the oil and natural gas industry. Regarding Act 52, please see the response to Comments 3 and 7.

216. Comment: The Commentators state that the industry association’s members consist entirely of small businesses, many of which are single-employee entities or individual operators. The industry association’s mission is to advance local economies and engage in regulatory processes that affect conventional oil and natural gas development and their members reside and operate throughout western Pennsylvania and are appointed to sit upon the CDAC. Any increased costs associated with additional regulatory requirements can be devastating to conventional oil and natural gas producers, especially now after the ravages of the COVID-19 pandemic.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites. This final-form rulemaking is required to, at a minimum, comply with EPA’s RACT recommendations in the 2016 O&G CTG. The VOC RACT requirements in this final-form rulemaking have been determined by the Department to be technically and economically feasible.

Scope of the Rulemaking

217. Comment: The Commentator recommends three points for consideration to the Board regarding VOC: requiring fracking companies to publicly disclose all chemicals used in drilling and hydraulic fracturing before they are used on-site; aggregating all sources of air pollution in a given area to accurately assess air quality; and conducting a comprehensive health survey to the determine the effects of living near unconventional drilling sites.

Many additional benefits would arise from these changes beyond the reduced risk from VOC. The Board states that the proposed rulemaking could potentially save the oil and natural gas industry about \$9.9 million per year due to a lower natural gas loss rate during production. The Commentator is pleased that this proposed rulemaking will not result in significant adverse impacts on small oil and natural gas operators and will instead save them money and help them comply with the laws of the Commonwealth. This money that would have been lost can now be used to improve old equipment, conduct maintenance inspections, and purchase LDAR

technologies that can help detect and repair leaks sooner. The required LDAR inspections will minimize the effects of oil and natural gas industry emissions on public health and safety. The reduction of VOC, and therefore ground-level ozone, will benefit the welfare of approximately 12.8 million residents, vegetation, and animals; while public health is a primary concern, so is the environment. The environment can be susceptible to disease, experience changes to water and nutrient cycles, lose species, endure environmental stresses, and fail crop yields as a result of oil and natural gas industry emissions.

Response: This final-form rulemaking establishes VOC RACT requirements for five applicable sources in the oil and natural gas industry. Hydraulic fracturing is not an applicable source; therefore, the comment concerning disclosure of chemicals used in hydraulic fracturing is outside the scope of this final-form rulemaking.

The Department's Office of Oil and Gas Management regulates the safe exploration, development and recovery of Marcellus Shale natural gas reservoirs in a manner that will protect the Commonwealth's natural resources and the environment. Information related to hydraulic fracturing fluid is available at the Department's website, <https://www.dep.pa.gov/Business/Energy/OilandGasPrograms/OilandGasMgmt/Marcellus-Shale/Pages/default.aspx>.

The VOC RACT requirements are applicable to all existing facilities. Also, the Department is relying on the regulatory criteria to determine whether emissions from two or more facilities should be aggregated and treated as a single source for air quality permitting purposes.

There are two studies conducted by the Agency for Toxic Substances and Disease Registry (ATSDR), in collaboration with EPA to conduct an exposure investigation to evaluate if residents living near a natural gas compressor station were being exposed to concentrations of carbonyls/aldehydes, reduced sulfur compounds (including hydrogen sulfide (H₂S)), PM_{2.5}, or VOC in air that might cause health effects. For one, air samples were collected from residential properties in the community surrounding the Brigich Compressor Station in Chartiers Township, Washington County, Pennsylvania.

ATSDR reached two important conclusions for this site:

Exposure to the detected levels of chemicals in the ambient air from residences surrounding Brigich compressor is not expected to harm the health of the general population.

However, some sensitive subpopulations (e.g., asthmatics, elderly) may experience harmful effects from exposures to H₂S and PM_{2.5}. Some individuals may also be sensitive to aldehyde exposures, including glutaraldehyde.

Additional health related data can be found at the Pennsylvania Department of Health's website at <https://www.health.pa.gov/topics/envirohealth/Pages/OilGas.aspx>

218. Comment: The Commentator is uncertain whether the proposed rulemaking applies to conventional oil and natural gas operations in Pennsylvania. The Commentator's other comments examine the factual and legal bases for uncertainty, describe legal flaws in the proposed

rulemaking under the authorizing statutes, offer comments in the context of such uncertainty and failings, and note the absence of considerations for small businesses, which is required under Pennsylvania administrative law and federal environmental law. The Commentator requests that the proposed rulemaking be withdrawn with respect to conventional oil and natural gas operations.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites. This final-form rulemaking is designed to implement the air emission control recommendations of the 2016 O&G CTG issued by the EPA under Sections 171(c)(1), 184(a), and 184(b) of the CAA. These air emission control recommendations apply to sources at unconventional well sites, gathering and boosting stations and natural gas processing including storage vessels, natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps, reciprocating compressors, centrifugal compressors, and fugitive emissions components. In addition, storage vessels in the transmission and storage segment are also affected sources. See also the responses to Comments 3 and 7.

219. Comment: The Commentators understand that the proposed rulemaking is a response to the CTG issued by the EPA on October 27, 2016. However, DEP is exceeding the scope of the CTG by drafting regulations that more closely align with permit requirements using BAT determinations rather than RACT determinations required by this type of rulemaking. In addition, it is the Commentators' opinion that existing source regulations should not be more stringent than those for new and modified sources due to the difficulty and cost-prohibitive nature of implementing control requirements designed for newer sources on existing equipment.

Response: The Department is obligated under the Federal CAA to analyze the source sector, as defined in the 2016 O&G CTG, and regulate sources that have control techniques or equipment that is "reasonably available." The 2016 O&G CTC has no legally binding effects, although it does set forth, as guidance only, what EPA has determined as reasonably available using data collected nationally. The Department reviewed the RACT recommendations included in the 2016 O&G CTG to determine the ground-level ozone reduction measures necessary for the Commonwealth.

The definition of RACT in 25 Pa. Code § 121.1 is the lowest emission limit for VOCs or NOx that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility. The Department has determined that this final-form rulemaking is technically and economically feasible for VOC RACT and is consistent with the 2016 O&G CTG RACT recommendations. BAT is the requirement in 25 Pa. Code § 127.1 that new sources shall control the emission of air pollutants to the maximum extent, consistent with the best available technology as determined by the Department as of the date of issuance of the plan approval for the new source. The standards for new and modified sources in the oil and natural gas industry were established in 2011 and 2015 by EPA; EPA has recently proposed to revise the oil and natural gas industry NSPS.

The Department estimates that the total industry-wide cost of complying with this final-form rulemaking will be about \$21.9 million per year (2021 dollars). However, implementation of the control measures will also potentially save owners or operators in the oil and natural gas industry about \$4.6 million per year (2021 dollars) due to a lower natural gas loss rate during production. This cost estimate consists of two major categories of data; the annual cost to implement the RACT requirements for each affected source or affected facility and the number of potentially affected facilities. The Department estimates net costs, on average, of approximately \$4,459 per facility or, on average, \$30,053 per owner or operator.

For storage vessels in the proposed rulemaking, a tiered emissions threshold was established to prevent backsliding for storage vessels subject to Exemptions 38(b) or 38(c). The Department's 2020 reanalysis which shows that the 2.7 TPY VOC emission threshold is cost effective for both potential and actual emissions; therefore, a single 2.7 TPY VOC emission threshold is presented in this final-form rulemaking for all storage vessels. The Department used EPA's annualized cost estimate of \$30,909 (2021 dollars) as the cost for control. The Department identified a total of 31,270 facilities with storage vessels from the Department's databases. There are 12 facilities with 44 storage vessels that emit 2.7 TPY or more of VOC with a total industry cost of \$370,908 per year (2021 dollars). The Department estimates that implementation of the final-form control measures could reduce VOC emissions by as much as 11 TPY from the installation of controls for storage vessels. This results in an average cost of approximately \$1,758 per ton of VOC emissions reduced per year.

According to the 2016 O&G CTG, the annualized cost to replace a continuous high-bleed pneumatic controller with a low-bleed pneumatic controller is \$347 per year (2021 dollars). The Department identified a total of 3,874 facilities with an estimated 8,572 affected pneumatic controllers. The total industry cost is \$2,974,484 per year (2021 dollars). Using EPA's estimate of natural gas emissions per controller and Pennsylvania's average natural gas composition, the Department estimates that implementation of the final-form control measures could reduce VOC emissions by as much as 766 TPY from pneumatic controllers located at these facilities. The requirements for natural gas-driven continuous bleed pneumatic controllers are identical to EPA's CTG recommendation which EPA has determined to be cost-effective.

According to the 2016 O&G CTG, the annualized cost to control one natural gas-driven diaphragm pump is \$907 per year (2021 dollars). The Department identified 17 well sites with an estimated 40 affected diaphragm pumps. The total industry cost is \$36,265 per year (2021 dollars). Using EPA's estimate of natural gas emissions per pump, Pennsylvania's average natural gas composition, and a 95% emissions reduction, the Department estimates that implementation of the final-form control measures could reduce VOC emissions by as much as 5 TPY from natural gas-driven diaphragm pumps. The requirements for natural gas-driven diaphragm pumps are identical to EPA's CTG recommendation which EPA has determined to be cost-effective.

For reciprocating compressor rod packing replacements in this final-form rulemaking, the Department's 2020 reanalysis shows that it is cost effective to implement the rod packing replacements every 26,000 operating hours or every 3 years at unconventional well sites. The annualized cost to replace the rod packings for one reciprocating compressor at an unconventional well site is based on the data in the Department's TSD for the general permits GP-5 and GP-5A. The Department identified 448 well sites reporting a total of 535 engines. The

Department assumes that all of the engines drive reciprocating compressors. The total industry cost is \$418,456 per year (2021 dollars). The Department estimates that implementation of the final-form control measures could reduce VOC emissions by as much as 61 TPY due to the replacement of reciprocating compressor rod packings located at well sites. The Department has determined this requirement to be cost-effective since the annualized cost, the sum of the annualized capital cost and the annual operating expenses, is only \$782 per year. Annualized cost is one of many factors that the Department can consider when determining the cost-effectiveness of a control device or control technique. The 61 TPY of the VOC emissions reduction from this requirement is due to the technically and economically feasible RACT determination by the Department that is over and above the reductions from EPA's RACT recommendations.

According to the 2016 O&G CTG, the annualized cost to control a wet seal centrifugal compressor degassing system is \$2,990 per year (2021 dollars). The Department identified 3 gathering and boosting stations reporting at least 7 turbines and 2 processing plants reporting at least 2 turbines. The Department assumes that all of the turbines drive centrifugal compressors. These centrifugal compressors are all likely to be dry seal centrifugal compressors and the owners or operators of these sources would not have applicable VOC emission control requirements under this final-form rulemaking. The requirements for wet seal centrifugal compressor degassing systems are identical to EPA's CTG recommendation which EPA has determined to be cost effective.

For fugitive emission components, the proposed rulemaking established monthly AVO inspections and quarterly instrument based LDAR inspections for well sites with a well that produces, on average, 15 BOE per day. The proposed rulemaking also established a stepdown provision which enabled owners or operators to track the percentage of leaking components at each inspection and, if in two consecutive inspections there were less than 2% of components leaking, the owner or operator could reduce the quarterly schedule of instrument based LDAR to semiannual. This final-form rulemaking alters the production thresholds and removes the stepdown provision. The 2020 reanalysis shows that it is cost effective to implement instrument based LDAR at unconventional well sites with an average production of 15 BOE per day, with the frequency based on individual well production on the well site. For unconventional well sites with production equal to or greater than 15 BOE per day, a well site with at least one well that produces equal to or greater than 15 BOE per day must perform quarterly instrument based LDAR inspections; a well site with at least one well that is less than 15 BOE per day and equal to or greater than 5 BOE per day must perform annual instrument based LDAR inspections. The owner or operator is required to track the well site and individual well production on an annual basis and can adjust the inspection frequency based on the varying production. Two consecutive years of production in the lower category are required before reducing the frequency of inspections; however, any time production moves to the higher category, the increase in inspection frequency is immediate.

The Department identified a total of 3,889 facilities including well sites, gathering and boosting stations, and natural gas processing plants. The calculation of fugitive emissions before control were based on estimates of the amount of natural gas leaked. The breakdown between the amounts of VOC and methane emissions is calculated using this Commonwealth's natural gas composition ratio of 4.47% VOC and 86.03% methane. The value of natural gas saved is calculated using the assumed value of \$1.70 per Mcf as well as \$2.50 per Mcf and \$5.00 per Mcf which reflects current prices.

The total industry cost is approximately \$18,094,239 (2021 dollars). The Department estimates that the final-form control measures could reduce VOC emissions by 1,819 TPY or more from the subject fugitive emissions components due to implementation of the required LDAR inspection program at these facilities. The total industry savings for natural gas is \$3.1 million (2021 dollars) at \$1.70 per Mcf, \$4.6 million (2021 dollars) at \$2.50 per Mcf, or \$9.2 million (2021 dollars) at \$5.00 per Mcf.

There are approximately 6 well sites with no LDAR program currently in place that the Department assumes will be required to implement an annual LDAR program. The total annualized cost is \$10,086 (2021 dollars) reducing VOC emissions by approximately 1 TPY for a total cost per ton of VOC reduced of \$10,086. The 1 TPY of the VOC emissions reduction from this requirement is due to the technically and economically feasible RACT determination by the Department that is over and above the reductions from EPA's RACT recommendations.

There are approximately 1,461 well sites with no LDAR program currently in place that the Department assumes will be required to implement a quarterly LDAR program. The total annualized cost is \$9,822,303 (2021 dollars) reducing VOC emissions by approximately 501 TPY. The Department has determined this requirement to be cost-effective since the annualized cost is only \$6,723 per year. Approximately 125 TPY of the VOC emissions reduction from this requirement is due to the technically and economically feasible RACT determination by the Department that is over and above the reductions from EPA's RACT recommendations.

There are approximately 499 well sites currently required to perform annual LDAR that the Department assumes will be required to implement a quarterly LDAR program. The total annualized cost is \$2,516,255 (2021 dollars) reducing VOC emissions by approximately 314 TPY. The Department has determined this requirement to be cost-effective since the incremental annualized cost is only \$5,043 per year. Approximately 79 TPY of the VOC emissions reduction from this requirement is due to the technically and economically feasible RACT determination by the Department that is over and above the reductions from EPA's RACT recommendations.

There are approximately 650 well sites currently required to perform semiannual LDAR that the Department assumes will be required to implement a quarterly LDAR program. The total annualized cost is \$2,185,125 (2021 dollars) reducing VOC emissions by approximately 517 TPY. The Department has determined this requirement to be cost-effective since the incremental annualized cost is only \$3,362 per year. Approximately 129 TPY of the VOC emissions reduction from this requirement is due to the technically and economically feasible RACT determination by the Department that is over and above the reductions from EPA's RACT recommendations.

There are approximately 263 gathering and boosting stations with no LDAR program currently in place based on their construction date, the lack of LDAR requirements in their permits, or that have no reported fugitive emissions components. The Department assumes these facilities will be required to implement a quarterly LDAR program. The total annualized cost is \$3,536,561 (2021 dollars). Using EPA's estimate of fugitive natural gas emissions per gathering and boosting station and Pennsylvania's average natural gas composition, the Department estimates a VOC emissions reduction of 473 tpy. The requirements for quarterly LDAR at natural gas gathering

and boosting stations are identical to EPA's CTG recommendation which EPA has determined to be cost-effective.

There is one gathering and boosting station with an annual LDAR program currently in place that the Department assumes will be required to implement a quarterly program. The total annualized cost is \$10,085. The requirements for quarterly LDAR at natural gas gathering and boosting stations are identical to EPA's CTG recommendation which EPA has determined to be cost-effective.

There is one natural gas processing plant with no LDAR program currently in place that the Department assumes will be required to implement a quarterly LDAR program. The total annualized cost is \$13,447 (2021 dollars) reducing VOC emissions by approximately 12 TPY for a total cost per ton of VOC reduced of \$1,121.

This estimate consists of two major categories of data. The first is the cost per year to control each piece of equipment or site affected, which came from either the 2016 O&G CTG or the Department's TSD for the GP-5 and GP-5A, as detailed in the response to Question 17 of the RAF. The second is the number of potentially affected facilities, which were obtained from several data sources including the Department's Oil and Gas Production Report, eFACTS, and AIMS. The cost per year to control each piece of equipment or site affected was multiplied by the number of each in this Commonwealth. The costs for each category of sources were added together to come up with a final estimated cost and savings.

220. Comment: The Department creates uncertainty by suggesting that the 8,403 unconventional oil and natural gas wells that are in production, along with transmission compressor stations and natural gas processing facilities, MAY be subjected to the proposed rulemaking. The Commentator suggests ALL these wells and facilities be subject to the proposed rulemaking and that the requirements be extended to the complete oil and natural gas supply chain.

Response: Owners or operators of the five source categories are required to determine applicability under this final-form rulemaking. If the sources at the facility do not meet the applicability requirements, they are not required to comply with this final-form rulemaking. However, these facilities are still required to comply with any applicable Federal, state, or local requirements. The applicability requirements are consistent with the 2016 O&G CTG RACT recommendations and are determined based on technical and economic feasibility.

221. Comment: The Commentator, as a matter of principle, supports strict regulations, systems, equipment and policies that protect public health and safety, air, water, and other environmental resources, from adverse impacts of the oil and natural gas industry, including climate impacts of its GHG emissions, primarily methane. Specifically, the Commentator supports state-of-the-art pollution controls, including leak detection, emissions monitoring, and effective emissions restrictions, throughout the entire system of exploration, extraction, production, transmission, transport, refining, storage and use of oil and natural gas. Such an inspection and control regimen would be expected to have the salutary effect of improving the health and safety of neighboring communities and of workers in the oil and natural gas industry.

The Commentator finds deficient any proposed rulemaking that falls short of the strict regulations and the state-of-the-art pollution controls they support as ideal. The Commentator advocates that the proposed rulemaking should be improved to achieve greater reductions in emissions of methane and VOC.

Should the Department choose not to require state-of-the-art pollution controls in every situation, the Commentator recommends at a minimum that commonsense emission detection procedures and prompt repairs be required evenhandedly for all sources, large and small, conventional and unconventional, with more serious controls commensurate to the extent of the problems identified, and with the goal of reducing sector wide emissions by an order of magnitude.

Response: The requirements for RACT are that the emissions reductions are technically and economically feasible. The requirements of this final-form rulemaking meet that standard and are consistent with the recommendations in the 2016 O&G CTG. In addition, this final-form rulemaking requires monthly AVO inspections, instrument based LDAR inspections with frequency determined by the well site production and the production of individual wells at the well site, and stringent repair requirements.

222. Comment: The Commentator states that during the construction and development of a well pad, their community had to endure large convoys of diesel trucks carrying tanks and heavy equipment, crawling at about 15 miles per hour through the neighborhood. There were about 25,000 individual truck trips to and from this site. Imagine the amount of exhaust, noise, and vibrations that these trucks caused day and night, all days of the week. The impact of that traffic is that Cedar Road had to be completely re-paved and a bridge over a creek had to be rebuilt.

Response: The Department acknowledges this comment.

Grand Jury Investigation

223. Comment: The Commentator states that to support their request that stronger oversight be required by the proposed rulemaking they refer the EQB to the recommendations of the Grand Jury tasked by Attorney General Josh Shapiro to investigate the actions of Cabot Oil and Gas and the DEP in Dimock, PA. The Post-Gazette on June 15, 2020 reported that Cabot was charged with 15 criminal counts, 9 of them felonies. The June 25, 2020 press statement supports the findings from Report 1 of the Forty-Third Statewide Investigating Grand Jury:

“The Grand Jury’s two-year investigation uncovered systematic failure by government agencies in overseeing the fracking industry and fulfilling their responsibility to protect Pennsylvanians from the inherent risks of industry operations...

In response to the failures of government oversight and in order to ensure that the regulators have the tools necessary to hold this industry accountable, the Grand Jury’s report details eight recommendations. These recommendations would better protect Pennsylvanians from the risk posed by fracking operations and confront the culture of inadequate oversight in the unconventional gas industry and government agencies that oversee their activities:”

Response: As provided in the Department’s response to Report 1 of the Forty-Third Statewide Investigating Grand Jury, many of the recommendations in the report either mirror activities that the Department already has in place or supports as actions by the Pennsylvania General Assembly. A copy of the report may be found at <https://www.attorneygeneral.gov/wp-content/uploads/2020/06/FINAL-fracking-report-w.responses-with-page-number-V2.pdf>. This final-form rulemaking continues the Department’s goal to comprehensively regulate air emissions sources associated with the oil and natural gas industry. Please also see the response to Comment 201 for information related to the health benefits resulting from this final-form rulemaking.

Regulate Methane

224. Comment: Several Commentators are concerned that the proposed rulemaking does not directly regulate methane emissions, but instead only achieves methane reductions because of mandated VOC emissions reductions. While it is appropriate to consider the co-benefits from reductions in methane and other pollutants when evaluating the benefits of the proposed rulemaking, that does not relieve the Department of its responsibility to independently consider the effects of the remaining methane emissions and mitigate those harms. For that reason, the Department should develop additional measures to directly regulate methane.

Response: As required under Section 182(b)(2) of the CAA, the Department developed this final-form rulemaking to implement RACT VOC emission control measures applicable to the owners and operators of certain sources in the oil and natural gas industry. The RACT VOC emission control measures in this final-form rulemaking for unconventional sources at unconventional well sites, gathering and boosting stations and natural gas processing plants are consistent with the RACT recommendations of the EPA issued in the 2016 O&G CTG. Once implemented, these RACT VOC emission control measures will support Governor Tom Wolf’s Methane Reduction Strategy. The co-benefit methane reductions that will be achieved by implementation of these RACT VOC emission control measures are estimated to be as much as 45,278 TPY and will contribute to attaining Governor Wolf’s Greenhouse Gas Emissions Reduction goals.

225. Comment: The Commentator is concerned that the proposed rulemaking does not directly regulate methane. While the proposed rule would regulate the “wet” gas found in southwestern Pennsylvania, it would not apply to “dry” gas found in north central and northeast parts of the state.

Response: Other than an applicability threshold for potential or actual VOC emissions for storage vessels, there are no VOC thresholds for sources regulated under this final-form rulemaking. This final-form rulemaking applies to all applicable sources in the oil and natural gas industry regardless of the VOC content of the natural gas.

226. Comment: The Commentator states that because the proposed rulemaking does not consider the oil and natural gas industry’s aggregate emissions, Pennsylvania needs to set a cap on total methane emissions, require monitoring at all the possible sources, and limit the number of sources to the methane emissions cap divided by the emissions detected at the monitored sources.

If pervasive monitoring is not possible, then satellite technology needs to be deployed to detect total methane emissions, which would then be applied to the cap. The difference between total methane emissions detected and the sum of emissions detected at individual sources should guide the addition of more monitoring as well as reduction in number of sources.

The Intergovernmental Panel on Climate Change (IPCC) reports that 2030 is the target year to achieve zero GHG emissions and avoid permanent, irreversible harm from climate change. The Commentator suggests that the cap should therefore decrease on a schedule to achieve that goal. The decreasing cap can be achieved through a combination of plugging leaks and retiring infrastructure. Pennsylvania should invest in energy storage for capacity planning to promote clean air and jobs, since clean energy can supply more jobs than the declining fossil fuel industry.

Response: While this final-form rulemaking is designed to implement the VOC emission reduction recommendations of the 2016 O&G CTG, the implementation of the VOC emission control measures is also expected to result in methane emission reductions of approximately 45,278 TPY. These anticipated methane emission reductions are a significant and meaningful co-benefit.

227. Comment: The Commentators state that regulating emissions of VOC while regarding methane emissions reduction as a co-benefit discourages the development and deployment of new sensor technologies that promise to reduce the cost of compliance while improving environmental outcomes.

Response: This final-form rulemaking will not discourage the development and deployment of new sensor technologies. Alternative leak detection methods may be approved by the Department if they are demonstrated to be at least equivalent to either OGI or Method 21 inspection methods.

228. Comment: The Commentators recommend changing the title of the rulemaking to “Control of Hydrocarbon Emissions from Oil and Natural Gas Sources.” Doing so acknowledges the methane reductions that the proposed requirements will achieve, especially if strengthened, and the Governor’s promise to reducing methane from existing oil and natural gas facilities. Doing so also acknowledges the Department’s stated goal that the proposed rulemaking, while targeting VOC emissions, also reduces methane emissions.

The Commentators state that methane meets the definition of “air contaminant,” “air contamination,” and “air pollution,” in the APCA, and limiting the title of the proposed rulemaking to VOC detracts from the reduction in pollution the proposed rulemaking will achieve.

Response: While the Department does have the authority under the APCA to regulate methane emissions, this final-form rulemaking for unconventional sources at unconventional well sites, gathering and boosting stations, and natural gas processing plants establishes VOC RACT requirements for five specific source categories determined by the EPA to be significant sources of VOC emissions. This final-form rulemaking is being promulgated to satisfy specific legal requirements under section 182(b)(2) of the CAA. The VOC RACT emission control measures in this final-form rulemaking are consistent with the RACT recommendations of the EPA issued

in the 2016 O&G CTG. CTGs are designed to address the emissions of VOC and NO_x as precursors to the formation of ozone, a criteria pollutant. However, the controls for VOC emissions will also limit methane emissions. Once implemented, the Department estimates that these VOC RACT emission control measures will provide co-benefit methane reductions of as much as 45,278 TPY.

229. Comment: The Commentators state that there are two separate obligations that require the Department to undertake regulatory actions to control VOC and methane emissions from existing oil and natural gas sources. In 2016 Governor Wolf committed to regulating methane from existing sources in the oil and natural gas industry sources as part of a strategy “to protect the environment and public health, reduce climate change, and help businesses reduce the waste of a valuable product...” Per this commitment, the Governor directed the Department to develop “a regulation for existing sources” to reduce leaks at existing oil and natural gas facilities. The Department similarly stated its intent to develop a regulation that establishes robust requirements for existing sources in the oil and natural gas industry and to institute best management practices for methane monitoring and leak detection and repair provisions aimed at controlling or preventing fugitive emissions from pipelines.

Moreover, in 2019, the Governor signed an Executive Order requiring the state to achieve a 26% reduction of net greenhouse gas emissions statewide by 2025 from 2005 levels, and an 80% reduction of net greenhouse gas emissions by 2050 from 2005 levels. Reducing methane from existing oil and natural gas sources is critical to achieving these targets.

While the emission reductions in the rulemaking represent an important step towards fulfilling the Governor’s commitment to reducing methane from existing sources, DEP must do significantly more to fulfill the Governor’s methane strategy and meet the state’s GHG reduction goals. The Commentators make specific suggestions throughout their comments that would lead to thousands of tons of additional methane and VOC reductions and would fulfill Governor Wolf’s promise to reduce harmful methane emissions from Pennsylvania’s oil and natural gas sector.

Response: Please see the response to Comment 224.

230. Comment: The Commentator advises that Pennsylvania measure the amount of methane leaving a well site and compare it to the amount of methane in the pipeline at its destination and tax the company based on how much gas has leaked. That would incentivize the companies to reduce leaks.

Response: The Department acknowledges this comment; however, it is outside the scope of this final-form rulemaking.

Regulate Additional Sources

231. Comment: The Commentators recommend that the Department complement the methane reductions from the broad mix of existing sources that are covered in the EPA’s 2016 O&G CTG with reductions from other non-de minimis existing emissions not covered by the Federal CTG through VOC emissions reductions. The Commentators are confident that the Department and

Pennsylvania have substantial authority under the APCA and the CAA to control, reduce, and limit methane emissions directly.

Response: Please see the responses to Comments 224 and 228.

232. Comment: The Commentator states that DEP properly acknowledges the benefits of establishing consistent control requirements among all oil and natural gas sources in Pennsylvania. The Commentator commends the Department for addressing liquids unloading in GP-5A and urges DEP to include liquids unloading as a source category in this proposed rulemaking. DEP should also require the use of best management practices (BMP) to mitigate methane and VOC emissions during liquids unloading including the use of a plunger lift system, soaping, and swabbing, except where venting is necessary for safety. In all cases, DEP should require that an owner or operator capture the gas and direct it to a pipeline or process, unless there are safety reasons that require venting to the atmosphere.

Other sources with requirements in the GP-5 and GP-5A but do not have requirements in the proposed rulemaking include glycol dehydrators, stationary natural gas-fired internal combustion engines, and truck loadout equipment. The GP-5 also includes requirements for stationary natural gas-fired turbines. The GP-5A also includes requirements for reciprocating and centrifugal compressors. For these processes and all emission mitigation efforts in the oil and natural gas sector DEP should require that captured emissions be routed to a pipeline or process rather than directed to a flare or incineration device, whenever possible. The Commentator recommends that incineration or flaring should be used as an emission control method only when no other options apart from venting are available; and venting must be permitted for these operations only as a last resort to avoid safety hazards.

Response: The Department acknowledges this comment; however, the sources covered by this final-form rulemaking at unconventional well sites, gathering and boosting stations, and natural gas processing plants are consistent with the 2016 O&G CTG RACT recommendations.

233. Comment: The Commentator states that a major source of natural gas emissions is unlit and inefficient flares. A study in the Permian Basin found that 93% of gas sent to flares is uncombusted, thereby venting methane and VOC to the atmosphere. Another study found that 10% of flares in the Permian Basin are unlit or malfunctioning, meaning nearly all of the VOC and methane directed to those flares is vented to the atmosphere. The GHG impact of flares is affected by both feed gas composition and flare efficiency. Because this problem is intermittent the emissions are unlikely to be detected by occasional surveys undertaken with Method 21 or OGI.

Response: The control of sources requires that emissions be routed through a closed vent system to a control device or process operated in accordance with § 129.129. The use of a flare is permitted under the final-form rulemaking as long as it meets the conditions of § 129.129(e).

234. Comment: The Commentator states that short-term equipment leases can bring the worst-maintained equipment into the field, which can be rotated with similar short-term, dirty equipment, resulting in a terrible impact on the air and climate.

Response: All sources at a facility must meet the applicable requirements. New equipment added to an existing facility would be expected to meet the Exemption 38(c) requirements or the BAT requirements of GP-5 or GP-5A. For LDAR requirements, the most stringent inspection frequency would apply.

235. Comment: The Commentator states that the proposed rulemaking should require that all future permitted compressor stations be powered by electricity, not natural gas. Electric turbines are the best available technology according to the EPA Energy Star Program and the use of electric power eliminates virtually all VOC and methane emissions. With this one rule change, hundreds of tons of emissions would be eliminated yearly for each new compressor station and there will be many compressor stations. According to the EPA this change will save gas producers money over the long term.

Carbon County is part of the beautiful Poconos area and eco-tourism is the number one jobs producer. Unfortunately, the Department will soon permit a compressor station located near Hickory Run State Park. Ironically, if the air quality were not as good as it is now, the compressor station would not be permitted as it will emit over 100,000 TPY GHG and over 100 TPY VOC.

Response: A compressor station that emits over 100 TPY VOC is a major source, and subject to Title V permitting requirements. The recommendation by EPA's Energy Star Program only addresses the emissions of the driver for a compressor, not the leaks from the compressor itself; it is the compressor that is the applicable source under this final-form rulemaking. The driver of a compressor is beyond the scope of this VOC RACT rulemaking.

236. Comment: The Commentator states that a lesson should be learned from the history of coal mining in the Commonwealth. After investigating how a local remediation project is managed, the Commentator discovered that as small coal mine companies near the end of their productive work in the mines, they can declare bankruptcy. Debts are reallocated and they enter a lengthy legal process to create trusts to facilitate, manage, and pay for the cleanup for which the company should have been responsible. From this example, the Commentator cannot trust that a corporate interest, no matter how large or small, will act in the public good and remediate pollution that their business caused.

To support this cleanup work, it is necessary to have regulations that require regular inspection of small gas wells and help these small business owners keep more methane and other gas products in their pipelines. Keeping the product in the pipeline will also protect the health of local communities and reduce the GHG emissions that are destroying the planet. These resources are rapidly declining and a transition to other fuels will be necessary in the short term. To avoid disastrous climate change, 60% to 80% of fossil fuel reserves are not viable, meaning many of these wells will be stranded assets with the potential to leak precious fuel and dangerous emissions.

The Commentator states that it is important to have a plan to help well owners monitor the integrity of their infrastructure and ultimately provide for capping the wells safely. A solid monitoring plan for all wells is common sense for today's health, tomorrow's safety, and the future of the planet. The Commentator urges the Board to insist on regular inspections of low

producing oil and natural gas wells to ensure the health and safety of our communities and the planet.

Response: The Department acknowledges this comment. This final-form rulemaking for unconventional sources at unconventional well sites, gathering and boosting stations, and natural gas processing plants controls harmful VOC emissions from five specific categories of air emission sources, while simultaneously reducing methane emissions. The Department altered the production thresholds in this final-form rulemaking. The 2020 reanalysis shows that it is cost effective to implement instrument based LDAR at unconventional well sites with an average production of 15 BOE per day, with the frequency based on individual well production on the well site. For unconventional well sites with production equal to or greater than 15 BOE per day, a well site with at least one well that produces equal to or greater than 15 BOE per day must perform quarterly instrument based LDAR inspections; a well site with at least one well that is less than 15 BOE per day and equal to or greater than 5 BOE per day must perform annual instrument based LDAR inspections. The owner or operator is required to track the unconventional well site and individual well production on an annual basis and can adjust the inspection frequency based on the varying production. Two consecutive years of production in the lower category are required before reducing the frequency of inspections; however, any time production moves to the higher category, the increase in inspection frequency is immediate.

Act 13 requires owners or operators to plug wells upon abandonment; a well is abandoned if it “has not been used to produce, extract or inject any gas, petroleum or other liquid within the preceding 12 months.” Companies must also provide schedules to the Department that prioritize plugging activities for wells that pose the greatest environmental or public health and safety risk. In addition, Act 13 authorizes the Department to plug orphan and abandoned wells to address environmental, health and safety concerns.

237. Comment: According to the Commentators, Penn State University Extension estimates there are 3 million abandoned wells in the United States and 750,000 in Pennsylvania alone. The Commentators believe the number is higher than that as the wildcatters just put wells down wherever they wanted. According to the Commentators, a special report by Reuters estimates there are millions of abandoned oil wells leaking methane, a climate menace. The Commentators cite the Insurance Journal from June 23, 2020 which reports millions of abandoned oil and natural gas wells pose environmental and health risks although the Commentator believes the Insurance Journal’s interest is in the economic risks. The Commentators also cite U.S. News and World Report, which states that Pennsylvania faces new wave of abandoned oil and natural gas wells; between 2016 and 2019, two companies abandoned nearly 3,000 wells in and around Allegheny National Forest and their responsibility to remediate their sites which could cost the state tens of millions of dollars. The Commentators state that the public has commented, as have the apologists for the oil and natural gas industry. The Department must make a choice on behalf of the citizens of Pennsylvania who are Constitutionally guaranteed clean air and water.

Response: Please see the response to Comment 236.

238. Comment: The Commentator states that a potential alternative emission reduction requirement is the plugging of orphaned wells. The DEP currently holds an inventory of approximately 10,000 such wells, and a major problem associated with orphaned wells is their

potential methane emissions. The conventional oil and natural gas industry is uniquely poised with the equipment and skilled personnel to plug orphaned wells.

The implementation of the proposed rulemaking will impose costs upon small business owners in the form of testing and accommodations. It may be that, in the context of the potentially small emissions from conventional oil and natural gas wells, such costs will yield little environmental benefit. A more meaningful alternative, having potentially greater environmental benefit, may be to plug an orphaned well, in lieu of the implementation of the testing and accommodations called for under the proposed rulemaking.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites. This final-form rulemaking is designed to implement the air emission control recommendations of the 2016 O&G CTG issued by the EPA under sections 171(c)(1), 184(a), and 184(b) of the CAA, by establishing RACT for five categories of air emission sources used by the oil and natural gas industry. Therefore, the plugging of orphan wells is outside the scope of this final-form rulemaking.

239. Comment: The Commentator states that the cost of ceasing operations is considerable and includes restoration of currently active sites and the plugging of currently producing wells. Well plugging costs can range from \$30,000 to \$300,000 depending on the well type. Many conventional operators cannot bear this cost burden.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites. This final-form rulemaking is designed to implement the air emission control recommendations of the 2016 O&G CTG issued by the EPA under Sections 171(c)(1), 184(a), and 184(b) of the CAA, by establishing RACT for five categories of air emission sources used by the oil and natural gas industry. The final-form rulemaking does not require cessation of operations or plugging of currently producing wells.

240. Comment: The Commentator states that the proposed rulemaking fails to mention abandoned wells as an area of concern. While these sites are no longer used to extract oil and natural gas, they pose the same risk of leaks as those currently in operation and often are left in ruins and ignored by regulators. PIOGA estimates the number of these abandoned wells to be in the hundreds of thousands.

While the risk of leaks occurring is relatively low compared to active sites, they do still occur. A recent report from Reuters linked 281 kilotons of methane emissions in 2018 to abandoned wells across the country, equivalent to 16 million barrels of crude oil. Since the proposed rulemaking would apply to far fewer wells than PIOGA estimates are in existence, one can only assume the Commonwealth does not plan to find and monitor these abandoned sites. The proposed

rulemaking must add provisions for tracking down and regulating these abandoned wells to address leaks more comprehensively.

Response: Tracking and addressing abandoned wells is beyond the scope of this VOC RACT rulemaking. Act 13 authorizes the Department to plug orphan and abandoned wells to address environmental, health and safety concerns and the Department has a program in place to address this issue.

241. Comment: The Commentators state that a major source of natural gas leaks is gathering pipelines, which account for 30% of natural gas emissions in the Permian Basin of southeast New Mexico. One Commentator has observed gas bubbling through water as it escaped from rusting pipes where the pipeline that delivers gas to their cabin cross a small creek.

Response: This final-form rulemaking addresses emissions from facilities in the gathering and boosting segment. However, the pipelines themselves are under the jurisdiction of the PAPUC and the Federal Energy Regulatory Commission (FERC). The pipelines are routinely inspected for leaks.

242. Comment: The Commentator states that the Board must develop requirements that end venting, blowdowns, compressor and metering station leaks, pipeline equipment, and pig launcher releases, and industry must develop methods to comply with those requirements.

Response: Pipeline equipment, compressor station leaks, and metering station leaks in the gathering and boosting segment are affected sources in the final-form rulemaking with requirements to reduce emissions. Venting, blowdowns, and pig launcher releases were not affected sources in the 2016 O&G CTG RACT recommendation and are beyond the scope of this VOC RACT rulemaking.

243. Comment: The Commentators state that methane emission monitoring needs to be applied to animal agriculture, especially cattle and sheep because of their digestive process. While an individual animal may emit negligible amounts of methane in the aggregate the emissions are significant. The Commentators state that other methane emission sources, such as retired wells, conventional wells, and all points from natural gas extraction to distribution should also be monitored.

Response: The control of methane is beyond the scope of this VOC rulemaking; however, while this final-form rulemaking is designed to implement the VOC emission reduction recommendations of the 2016 O&G CTG, the implementation of the VOC emission control measures is also expected to result in methane emission reductions of approximately 45,278 TPY. These anticipated methane emission reductions are a significant and meaningful co-benefit. However, Act 13 authorizes the Department to plug abandoned and orphaned wells, and the DEP has a program in place to address this issue. Emissions from agriculture are not subject to regulation under the APCA unless required by the CAA.

244. Comment: The Commentator states that the data on methane release from drilling companies is noteworthy for the exceptional variation from site to site and over time that affects the amount of VOC released. The resulting hot spots have a major impact on total VOC and methane release and the best way to eliminate them is to compel this highly skilled industry to

discover the reasons for this variation by increasing oversight and imposing consequences for failure. Governor Wolf's proposed rulemaking begins to do that but needs to go further. Until there is at least 5 years of data from all sites, the variation in release means no site should be exempted from thorough and repetitive inspection. This initial data gathering would not be necessary had the industry been more cooperative in providing release data in the past.

Response: Many unconventional well sites affected by this final-form rulemaking have been conducting an LDAR inspection program since 2013. This final-form rulemaking alters the production thresholds and removes the stepdown provision. The 2020 reanalysis shows that it is cost effective to implement instrument based LDAR at unconventional well sites with an average production of 15 BOE per day, with the frequency based on individual well production on the well site. For applicable unconventional well sites with at least one well that produces equal to or greater than 15 BOE per day the owner or operator must perform quarterly instrument based LDAR inspections. For applicable unconventional well sites with at least one well that is less than 15 BOE per day and equal to or greater than 5 BOE per day the owner or operator must perform annual instrument based LDAR inspections. The owner or operator is required to track unconventional well site production and the individual production of each well on the well site on an annual basis. The owner or operator may reduce the inspection frequency based on the production calculations which shows two consecutive years of production in the lower category. The owner or operator shall increase in inspection frequency immediately if the production calculations show an increase that is subject to more frequent inspections.

245. Comment: The Commentator states the appropriate metric regarding climate change for the shale gas industry is not to merely be better than coal. Unlike most other sources, methane that is deep underground in shale formations only becomes part of the global methane cycle when the drilling industry brings it to the surface. Allowing an industry to bring up this climate forcing agent should require that as little as possible is released to the air. The industry needs to accept this as part of their social license to operate rather than stonewall oversight of their methane-releasing operations by claiming that they are better alternative to coal.

Response: The Department acknowledges this comment.

246. Comment: The Commentator states that conventional operators should be required to report their emissions annually as a recent analysis estimates that oil and natural gas industries leaks up to 60 times more methane than what the reports state. DEP should conduct its own measurements and increase the number of inspections to verify what operators report to the Commonwealth.

Response: The final-form rulemaking does not include a requirement for the owners or operators of conventional well sites to report their emissions to the air emissions inventory. Should the Department determine that it is necessary for the owners or operators of conventional well sites to report their emissions annually in the future, they will be notified through the *Pennsylvania Bulletin*.

Need for the Regulation

247. Comment: The Commentator notes that the natural gas industry is highly regulated both in Pennsylvania and on the national level. There is little disagreement that Pennsylvania has some

of the strictest emission requirements in the nation; in fact, the State Review of Oil and Natural Gas Regulations have rated Pennsylvania's oil and natural gas program highly and other state regulatory agencies use Pennsylvania's program as a reference. The implementation of DEP's GP-5 and conditional Exemption 38 in 2013, the increased requirements in 2015 and 2018 revisions, and the addition of GP-5A for unconventional well pads in 2018. The Pennsylvania requirements are in addition to the federal NSPS for Oil and natural gas in Subparts OOOO and OOOOa.

Response: The Department acknowledges this comment.

248. Comment: The Commentator states there is a need for more stringent environmental regulations and enforcement. Efforts to do so should only be applauded if it adequately responds to the scientific evidence regarding risks to public health. These measures are only successful if there's long-term predictability that will ultimately drive investment in clean energy technologies.

Response: The Department acknowledges this comment.

2nd Largest Natural Gas Producer, 3rd Largest GHG Polluter

249. Comment: Several Commentators state that because Pennsylvania is the second largest natural gas-producing state in the country, and is the third-largest GHG polluting state, Pennsylvania has a responsibility to step up and be a national leader in reducing harmful methane and air pollution from existing oil and natural gas infrastructure. Given Governor Wolf's commitment to reduce GHG emissions 26% by 2025 and 80% by 2050 from 2005 levels, Pennsylvania should take this opportunity to take a step in the right direction for a healthier populace and planet, especially at this time when the future seems very bleak.

Response: Please see response to Comment 224.

EDF Study

250. Comment: The Commentators cite the Environmental Defense Fund's (EDF) Pennsylvania Oil and Natural Gas Emissions Data. Because there are far more conventional wells than unconventional wells in the state, and because conventional wells are older, they leak at a much higher rate, conventional wells contribute approximately an equal amount of methane emissions to unconventional wells. The Commentators state that EDF estimates that 23% of methane produced at a conventional well is leaked into the atmosphere compared to 0.3% of production is leaked at an unconventional well.

Because unconventional wells produce considerably more natural gas than conventional wells the EDF calculated that in 2015 unconventional wells emitted approximately 253,500 tons of methane and conventional wells, approximately 268,900 tons.

Response: While this final-form rulemaking is designed to implement the VOC emission reduction recommendations of the 2016 O&G CTG, the implementation of the VOC emission control measures is also expected to result in methane emission reductions of approximately 45,278 TPY. These anticipated methane emission reductions are a significant and meaningful co-

benefit. To explain how the Department estimated the methane emissions reductions, the Department provides the following information:

According to Omara et al. 2016 in the report titled “Methane Emissions from Conventional and Unconventional Natural Gas Production Sites in the Marcellus Shale Basin,” the production-normalized methane emission rate for unconventional well sites ranged between 0.001-1.2% with a median of 0.13%. The report can be found at <https://pubmed.ncbi.nlm.nih.gov/26824407/>. Based on the Department’s estimates in the 2020 reanalysis, unconventional well sites emitted approximately 86,300 tons of methane. The requirements in this final-form rulemaking are estimated to reduce methane emissions from unconventional well sites by 34,278 tons, or approximately 40%.

251. Comment: The Commentators state that the natural gas industry emits approximately 63,500 tons of VOC, which is 21 times the emissions reported.

Response: According to the Department’s 2020 reanalysis, the unconventional well site, gathering and boosting station, and natural gas processing plant emissions are approximately 5,648 tons of VOC. The requirements in this final-form rulemaking are estimated to reduce VOC emissions by 2,864 tons, or approximately 51% industry wide.

252. Comment: Several Commentators state that a recent research report from the EDF found that more than 1.1 million tons of methane are emitted annually from Pennsylvania wells, which is 16 times higher than is reported by companies to the DEP.

In a May 14, 2020, State Impact article, Hillary Hull, senior manager for research and analytics for the EDF, said that companies report less emissions than are actually emitted because they are determined by EPA derived formulas which estimate natural gas emissions based on the type and quantity of equipment the company is using. These formulas do not account for leaks from malfunctions and abnormal processes which emit most of the industry’s methane.

One of the Commentators gives an example of emissions from malfunctions, citing a US News report on September 24, 2017, that details the Harmony Compressor Station in Susquehanna County which leaked more than 200 hundred tons of methane in 2 hours on September 2, 2017. An average compressor emits less than half that amount in a year. The compressor operator did not notify the County Emergency Management Agency since it was considered “a small leak” and there was no state investigation because their permit for the compressor station did not cover methane emissions.

Response: The Department acknowledges this comment.

Methane Migration

253. Comment: The Commentator states that growing up in rural Pennsylvania, they heard stories about how people could ignite the water of nearby creeks because of the methane in the water that could have come from nearby wells. The Commonwealth cannot afford to ignore the 72,000 conventional wells across the state that are responsible for about half of all methane pollution in the state.

Response: The Department acknowledges this comment. The scope of this final-form rulemaking is to reduce VOC emissions from unconventional sources in the oil and natural gas industry. Methane is reduced as a co-benefit to the VOC emissions reductions. The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

254. Comment: The Commentator has been communicating with the operators of Cappucci well site for a year now. Last summer they drilled and fracked three wells. The air pollution was very intense for the Commentator's sensitive immune system and they were very sick. The operator ruined any possibility of the Commentator enjoying their property and the Commentator went on three different trips to have some relief. Every time it was the same; after a couple days away, the Commentator would feel great and after two or three days of returning home the Commentator experienced breathing difficulties, extreme fatigue, and digestive distress. By mid-September, the Commentator knew something wasn't right over at the well site. They were done drilling and fracking but were still there daily and with a lot of noise. The Commentator wasn't feeling very well, once again couch bound. The operator walked the Commentator's property at least four times to check their well head and draw a water sample. There were signs that methane was migrating, and the operator did incur trouble with one or more wells and the DEP encouraged them to repair the problem.

Response: The drilling and fracturing operations are beyond the scope of this VOC RACT rulemaking; however, drilling and fracturing operations are required to comply with all federal, state, and local requirements. For drilling and fracturing, the requirements in 25 Pa. Code Chapter 78 or 78a are applicable; for completion, the requirements of Subpart OOOOa are applicable. Local ordinances for noise must be followed; failure to do so should be enforced by the locality.

Equal Standards

255. Comment: The Commentator states that the well on their property was eventually sold to Shell Oil, which was welcomed news given the company's reputation and commitment to reducing pollution, their support of methane regulation, and their commitment to reduce climate change emissions. However, the industry is going through another major transformation due to the current economic environment, and Shell Oil is selling the well again.

As landowners and royalty owners, the Commentators do not believe that their health and economic future should be at the whim of whichever company happens to own the well on their property when production finally starts. All companies must be held to the same high standard and air pollution must be reduced as much as possible. Royalty owners should be protected by reducing the amount of waste that occurs during development.

Response: Requirements in the final-form rulemaking apply to sources at a facility regardless of a change in ownership. The new owner or operator is subject to the same requirements as the previous owner.

Methane Detected

256. Comment: The Commentator states that about 5 years ago they went for a ride through their neighboring towns with Gas Safety USA. The Commentator was shocked and appalled at the spikes detected by the methane monitor when visiting the natural gas infrastructure in Susquehanna County that were many times larger than those he had seen before. Due to the profound implications of methane to climate change the Commentator emphasizes that allowing gas companies, or anyone, to leak methane into the atmosphere is reckless.

Response: Please see the response to Comment 224.

257. Comment: The Commentator is a resident of the heavily impacted shale gas region of Washington County and is speaking on behalf of a non-profit environmental protection organization and as a trained, certified OGI thermographer. The organization conducts OGI nationwide to document and expose oil and natural gas air pollution.

This proposed rulemaking has been years in the making and the Commentator applauds DEP's efforts to date, including the decision to exceed federal standards in some areas, especially the quarterly LDAR requirement with a strong repair schedule. The Commentator also commends the 500 parts per million (ppm) leak definition using a gas leak detector.

During the past two and a half years, the Commentator's organization has made 22 trips to 17 Pennsylvania counties to film oil and natural gas pollution, covering more than 100 well sites, compressor stations, and processing plants. Using industry standard OGI technology, the Commentator's organization has documented problems at conventional wells in Pennsylvania, including frequent leaks from well casings and emissions from tank batteries. The Commentator reported this pollution to the DEP and Department of Conservation and Natural Resources through over 40 formal complaints; however, the Commentator has also documented continued problems during repeat visits to some of these facilities.

However, the proposed rulemaking misses key opportunities to effectively and efficiently cut air pollution. It would leave out tens of thousands of wells and other emissions sources, and therefore not offer the pollution reductions that our climate and health demand. The Commentator asks DEP to apply rules equally by removing the low-production exemption, to standardize the LDAR requirements by removing the step-down provision, and to improve emissions detection, quantification, and reporting requirements. Until this proposed rulemaking is strengthened, it will leave far too many Pennsylvanians exposed to avoidable pollution and the climate in continued peril.

Response: For fugitive emission components, the proposed rulemaking established monthly AVO inspections and quarterly instrument based LDAR inspections for well sites with a well that produces, on average, 15 BOE per well per day. The proposed rulemaking also established a stepdown provision which enabled owners or operators to track the percentage of leaking components at each inspection and, if in two consecutive inspections there were less than 2% of components leaking, the owner or operator could reduce the quarterly schedule of instrument based LDAR to semiannual. This final-form rulemaking alters the production thresholds and removes the stepdown provision. The 2020 reanalysis shows that it is cost effective to implement instrument based LDAR at unconventional well sites with an average production of 15 BOE per

day, with the frequency based on individual well production on the well site. For applicable unconventional well sites with at least one well that produces equal to or greater than 15 BOE per day the owner or operator must perform quarterly instrument based LDAR inspections. For applicable unconventional well sites with at least one well that is less than 15 BOE per day and equal to or greater than 5 BOE per day the owner or operator must perform annual instrument based LDAR inspections. The owner or operator is required to track unconventional well site production and the individual production of each well on the well site on an annual basis. The owner or operator may reduce the inspection frequency based on the production calculations which shows two consecutive years of production in the lower category. The owner or operator shall increase in inspection frequency immediately if the production calculations show an increase that is subject to more frequent inspections.

258. Comment: The Commentator states a 2014 Penn State study detected a methane plume over Southwestern Pennsylvania using an aircraft air monitor. This plume is not the result of a single well or well site that is leaking but rather the cumulative effect of all the oil and natural gas operations in the region. DEP must consider the cumulative impact of this air pollution and not just what is leaking from a single well.

Response: This methane study is beyond the scope of this final-form rulemaking. This final-form rulemaking establishes VOC RACT requirements for individual sources identified by the EPA as significant sources of VOC emissions. However, the cumulative impact on air pollution related to this final-form rulemaking is determined as the total of the emission reductions from the individual sources.

Pennsylvania Natural Gas is Low VOC

259. Comment: The Commentators state that a large proportion of Pennsylvania's natural gas resources are almost completely devoid of VOC. A prominent example is the Marcellus shale of northeastern Pennsylvania, which in 2018, produced 3.4 trillion cubic feet of gas, or 54% of the Pennsylvania total of 6.3 trillion cubic feet. In fact, Susquehanna, Bradford, Tioga, Wyoming, Lycoming, and Sullivan counties accounted for 9% of total US dry gas production. The natural gas of northeastern Pennsylvania has very low VOC content; the field gas in Bradford County, in the heart of this region, has an average VOC content of less than 0.1%. In other words, there is 1,000 times more methane than VOC in Bradford County fugitive emissions. Pennsylvania also produces about 10 billion cubic feet of coal bed methane annually which has negligible VOC content. Because most natural gas in Pennsylvania contains little VOC, a Pennsylvania regulation limiting VOC emissions is unlikely to be effective for limiting natural gas emissions.

Response: Even though the purpose of this final-form rulemaking is to control VOC emissions, because natural gas is a mixture of methane, VOC, and other compounds, controlling VOC also reduces other air pollutants, including methane. The only VOC dependent threshold for control or abatement is for storage vessels, where storage vessels with an annual VOC PTE of 2.7 TPY requires at least 95% control of VOC emissions. Alternatively, if the actual VOC emissions without control are less than 2.7 TPY on a 12-month rolling basis, control is not required.

Natural gas-driven continuous bleed pneumatic controllers, natural gas driven-diaphragm pumps, reciprocating compressors, centrifugal compressors, and fugitive emissions components have VOC control requirements that are not tied to an emissions threshold; all requirements are

required to be met unless the source meets an exception or exemption within the final-form rulemaking. This ensures that VOC and other air pollutants, including methane, are reduced regardless of actual VOC content of the natural gas.

260. Comment: The Commentators are concerned that DEP has not considered in its RACT evaluation that many of the potential sources operate in areas where the VOC concentration of the gas is extremely low. In some regions this concentration may be less than 1% by weight which has a significant impact on the economic feasibility of the proposed VOC controls.

Response: Because Pennsylvania is part of the OTR, the proposed rulemaking is applicable to the entire state. For this reason, the Department used the same average natural gas composition determined in the TSD for Exemption 38, GP-5, and GP-5A when determining the cost-effectiveness of the control measures included in this final-form rulemaking. Please also see the responses to Comment 259.

Leak Rates are Not Correlated to Production Rates

261. Comment: The Commentator states that while it might be imagined that emission rates are proportional to production, evidence shows that the relationship between lost gas and beneficially produced gas is weak.

Data for Pennsylvania are available in table format:

Production (Mcf/d)	< 10	10 - 100	100 – 1,000	> 1,000
Contribution to PA’s methane emissions from this sector (%)	38	23	4	34

Omara et al. estimates that Pennsylvania wells producing less than 100 Mcfd are responsible for 61% of total methane emissions, while wells producing more than 100 Mcfd are responsible for 38% of total emissions. Natural gas in western Pennsylvania is predominantly methane and in eastern Pennsylvania it is essentially pure methane. Therefore, the distribution of methane emissions is expected to be similar to the distribution of natural gas emissions. Thus, one must conclude that the proposed regulation is likely to be inadequate to address the needs outlined in the commentary to the rulemaking.

Response: The control of methane is beyond the scope of this VOC rulemaking; however, while this final-form rulemaking is designed to implement the VOC emission reduction recommendations of the 2016 O&G CTG, the implementation of the VOC emission control measures is also expected to result in methane emission reductions. Even if wells that produce less than 100 Mcfd are responsible for 61% of total methane emissions, the air pollution emissions come from all sources at a well site and are not restricted to fugitive emissions components. The only source for which a facility is not subject to a requirement due to a production threshold is fugitive emissions components. All other sources must meet the applicable requirements, regardless of production.

Technical Support Document

262. Comment: Several Commentators state that the stakeholders never received a copy of the technical support document to review during the public comment period. The reduction and cost numbers referenced in the preamble are inconsistent with those determined in the 2016 O&G CTG, and in many cases, simply do not make sense. Without a thorough understanding of the calculations and where the numbers came from, it is impossible to effectively comment on this proposal. Both the AQTAC and MSC requested this document in May and June but received no response from the DEP.

This is not the first time the Department has proposed a comprehensive air quality rulemaking yet failed to provide the technical support document during the public comment period. This document provides the calculations, methodology and other detailed information that form the foundation for and justification of the proposed rulemaking. This information should be provided to all stakeholders, as well as the IRRC and legislative committees, during the public comment period so that stakeholders in the rulemaking process can provide informed feedback on the proposal. In addition, the public comment period should be extended by 30 days pending the release of the technical support document.

Response: The technical justifications for the requirements in this final-form rulemaking for natural gas-driven continuous bleed pneumatic controllers, natural gas driven-diaphragm pumps, reciprocating compressors at facilities other than well sites, and centrifugal compressors are provided in EPA's 2016 O&G CTG, a publicly available document. While the Air Quality Program has developed Technical Support Documents in some instances, for general permits for example, there is no requirement to develop and provide a Technical Support Document for air quality regulations. The justification for the more stringent RACT requirements for storage vessels, reciprocating compressors at unconventional well sites, and fugitive emissions components comes from the Department's 2020 reanalysis which shows the requirements are cost-effective. The 2020 reanalysis is detailed in the RAF for this final-form rulemaking. Please see the response to Comment 219.

Proposed Rule is Inconsistent with RACT

263. Comment: Several Commentators state that if the Department is considering compliance requirements which are more stringent than what EPA has proposed in the 2016 O&G CTG, the Department needs to show justification in terms of cost analysis for those requirements. The "Compliance Costs" section of the preamble includes some information on equipment costs but nothing on how those costs correspond to VOC emissions rate reductions. Otherwise, many operators will be forced into costly compliance requirements with minimal VOC related environmental benefit (i.e. negligible reduction of VOCs).

Response: Please see the response to Comment 219.

264. Comment: Several Commentators note that EPA's Memorandum of October 20, 2016 regarding Implementing Reasonably Available Control Technology Requirements for Sources Covered by the 2016 Control Techniques Guidelines for the Oil and Natural Gas Industry, the 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 General Preamble Supplement, 44 FR 53761 (September 17, 1979), goes on to indicate that RACT for a particular source is determined on a case-by-case basis, considering the technological and economic circumstances of the individual source. In evaluating economic feasibility for RACT determinations, the EPA gives significant weight to economic efficiency and relative cost effectiveness. The EPA has not established universal decision criteria for technological and economic feasibility that would apply in every case and did not establish decision rules that would have restricted the cost consideration in determining whether an emissions control is considered “cost effective.” Therefore, all RACT determinations are considered case-by-case determinations.

Response: The economic feasibility of the RACT as determined by EPA or the Department are covered in the response to Comment 219, along with the individual costs of control, estimated emissions reductions, and cost per ton of VOC emissions reduced.

265. Comment: Several Commentators state that on page 2636 of the preamble to the proposed rulemaking [as published in the *Pennsylvania Bulletin*], the Department states “Except for storage vessels, the requirements for control of emissions are not dependent on an applicability threshold for VOC, meaning that most requirements have no minimum level of VOC emissions under which sources are granted an exemption.” This contention is inconsistent with the way that RACT is intended to be applied to emissions sources; the purpose of which is to reduce VOC emissions as stated on page 2633 of the preamble. The Department clearly states that in many cases, specific VOC emissions rates are not considered prior to assigning control requirements to a source category and thus implies that no cost analyses in terms of \$/ton of VOC removed were performed. If compliance requirements which are more stringent than what EPA has proposed in the 2016 O&G CTG are being considered, the Department needs to show justification in terms of cost analysis for those requirements. The “Compliance Costs” section of the preamble includes some information on equipment costs but nothing on how they correspond to VOC emissions rate reductions. Otherwise, many operators will be forced into costly compliance requirements with negligible reduction of VOC and therefore minimal related environmental benefit. One of these Commentators further notes that the majority of sources in Pennsylvania would be conventional wells which are fundamentally different than unconventional wells in their associated emissions profiles, which further skew the cost-effectiveness of the proposed rulemaking.

Response: The economic feasibility of the RACT as determined by EPA or the Department are covered in the response to Comment 219, along with the individual costs of control, estimated emissions reductions, and cost per ton of VOC emissions reduced.

266. Comment: The 2016 O&G CTG contains recommended controls that States may readily adopt, subject to EPA approval, for groups of covered sources. However, a state may also consider the uniqueness of a specific source's operations in evaluating whether the recommended controls are RACT for that source. The air agency should provide EPA with the information supporting the source-specific determination of RACT for each source. This demonstration should consider cost effectiveness. Where the EPA determines that the air agency has shown that an alternative to the controls recommended in the CTG satisfies the requirements for RACT, the EPA will propose to approve the RACT demonstration.

Response: The Department agrees with the Commentator. This final-form rulemaking is designed to implement RACT requirements for the owners or operators of the regulated sources. The economic feasibility of the RACT as determined by EPA or the Department are covered in response to Comment 219, along with the individual costs of control, estimated emissions reductions, and cost per ton of VOC emissions reduced.

267. Comment: The Commentator states that EQB’s proposed rulemaking is single-spaced and takes up more than twenty pages in the *Pennsylvania Bulletin*; the 2016 O&G CTG is almost 340 pages long. The EQB does not compare the emission limits in the proposed rulemaking to those recommended by the 2016 O&G CTG. The sheer length and complexity of the proposed rulemaking and the 2016 O&G CTG make it difficult to determine which limits in the proposed rulemaking are more, or less, restrictive than the presumptive RACT established by the CTG. Notwithstanding the omission of a comparison between the requirements of the proposed rulemaking and the 2016 O&G CTG’s recommendations, it appears that several emission limits in the proposed rulemaking are more stringent than their counterpart recommendations in the 2016 O&G CTG.

Response: The Department is obligated under the Federal CAA to analyze the source sector, as defined in the 2016 O&G CTG, and regulate sources that have control techniques or equipment that is “reasonably available.” The 2016 O&G CTC has no legally binding effects, although it does set forth, as guidance only, what EPA has determined as reasonably available using data collected nationally. The Department reviewed the RACT recommendations included in the 2016 O&G CTG to determine the ground-level ozone reduction measures necessary for this Commonwealth. The requirements of this final-form rulemaking are comparable to the RACT recommendations in the Appendices of EPA’s 2016 O&G CTG. The requirements for three source categories are more stringent than EPA’s recommendations; see the response to Comment 219 for specific details. Additionally, a comparison between the requirements of the proposed rulemaking and the 2016 O&G CTG’s recommendations was provided in both the Preamble and the RAF for the proposed rulemaking.

268. Comment: The Commentators do not dispute that the controls suggested in the EPA’s 2016 O&G CTG and DEP’s proposed rulemaking are remarkably similar to the EPA’s 2016 NSPS for the oil and natural gas sector. As the title implies, new source performance standards are requirements that were promulgated for “new sources” or existing sources that were “modified” as defined by the EPA. Part of the process of establishing the standards for the new or modified sources is generally referred to as the “Best System of Emissions Reduction” or BSER. BSER is not a “defined” term but is discussed in Section 111(h)(1) of the CAA.

The remarkable similarities between Subpart OOOOa and the 2016 O&G CTG did not go unnoticed by the Commentators. In October 2016, the EPA acknowledged that its CTG requirements were similar to BSER determinations in Subpart OOOOa but simply stated “the CTG are based on a separate analysis.” But the EPA provided no further discussion of the separate supporting analysis. The EPA tries to undercut stakeholder comments on this point by stating “the commenter fails to specify any particular deficiency in EPA’s analysis that resulted in the RACT presumptive norm included in the CTG and instead relies on a general, unsupported assertion that RACT cannot be the same as BSER.” The EPA speaks in generalities and stated the analysis “included retrofit cost adjustment *where information was available*.” In the same paragraph the EPA stated “[b]ased on existing requirements and *available information and data*

we provided recommendations for RACT for select oil and natural gas industry emission sources...” No citations, no sources – merely references to “where information was available.” The obligation is on the regulatory agency to justify its controls, not on industry to point out the flaws. The reality is there was very little information on existing sources available when the EPA rushed to judgment in a presidential election year to finalize Subpart OOOOa and the 2016 O&G CTG. While the EPA has proposed to withdraw the CTG, the flaws remain and the EPA has not adequately addressed the comments made by PIOGA, IPAA, and the API. The Department relies almost exclusively on the 2016 O&G CTG. The Department must adequately address the comments of PIOGA, IPAA, and the API on the 2016 O&G CTG to correctly determine RACT.

Response: The EPA’s response to the Commentators regarding the alleged failure of the EPA in their RACT analysis was the following: “the commenter fails to specify any particular deficiency in EPA’s analysis that resulted in the RACT presumptive norm included in the CTG and instead relies on a general, unsupported assertion that RACT cannot be the same as BSER.” The Department agrees with the EPA on this point and notes that the Commentators have not provided any additional information on this point in their comments for this final-form rulemaking.

269. Comment: The preamble to the proposed rulemaking states: “If the owner or operator cannot meet the provisions of this proposed rulemaking, then they have the option to demonstrate to the Department’s satisfaction that it is economically or technically infeasible to meet the applicable VOC RACT emission limitation in a case-by-case RACT permit application.”

Notwithstanding this statement, neither the proposed rulemaking nor the existing provisions of Chapter 129 identify the criteria that would be used to evaluate a permit application for a case-by-case RACT determination. To prevent such determinations from being made arbitrarily or capriciously, the Commentator recommends that the proposed rulemaking be amended to include the criteria that will be used to make case-by-case RACT determinations for sources of VOC in the oil and natural gas industry.

Response: The Department was incorrect in suggesting that a case-by-case RACT determination is available for this CTG-based rule. The language referenced by the Commentator has been removed from the Preamble for this final-form rulemaking. Due to the number of facilities, the Department decided not to exercise its discretion to conduct case-by-case RACT. Instead, the Department modified the “presumptive norm” RACT recommendations by the EPA in this final-form rulemaking. As stated by the EPA in a Federal Register Notice on September 17, 1979, titled, “State Implementation Plans; General Preamble for Proposed Rulemaking on Approval of Plan Revisions for Nonattainment Areas— Supplement (on Control Techniques Guidelines)”:

“Along with information, each CTG contains recommendations to the States of what EPA calls the “presumptive norm” for RACT, based on EPA’s current evaluation of the capabilities and problems general to the industry. Where the States finds the presumptive norm applicable to an individual source or group of sources, EPA recommends that the State adopt requirements consistent with the presumptive norm level in order to include RACT limitations in the SIP.

However, recommended controls are based on capabilities and problems which are general to the industry they do not take into account the unique circumstances of each facility. In many cases appropriate controls would be more or less stringent. **States are urged to judge the feasibility of imposing the recommended controls on particular sources and adjust the controls accordingly.**

The presumptive norm is only a recommendation. For any source or group of sources, regardless of whether they fall within the industry norm, the State **may develop case-by-case RACT requirements** independently of EPA's recommendation. EPA will propose to approve any submitted RACT requirement that the State shows will satisfy the requirements of the Act for RACT, based on the economic and technical circumstances of the particular sources being regulated.” 44 FR 53761 (September 17, 1979).

270. Comment: The Commentator recommends that owners or operators that cannot meet the provisions of the proposed rulemaking and instead apply for a case-by-case RACT permit should be subject to a follow up inspection within 6 months to ensure it is following the RACT requirements.

Response: Please see the response to Comment 269.

271. Comment: The Commentator states that the Department recently published a draft technical guidance document to clarify the exemption status of a variety of potentially affected sources in this proposed rulemaking. The Commentator requests that any decisions related to the applicability of this proposed rulemaking be postponed until there has been adequate opportunity to review the guidance. Facilities that are determined to be exempt upon clarification in the guidance should similarly be exempted from requirements under this rule.

Response: The Air Quality Permit Exemptions list applies to new and modified sources, whereas the final-form rulemaking only applies to existing sources, defined as those constructed before the applicability date. The revisions of the Air Quality Permit Exemptions list have no effect on the final-form rulemaking. The owner or operator of a facility that is subject to the final-form rulemaking and the Air Quality Permit Exemptions list will have to determine which requirement is the most stringent and comply with the appropriate requirements.

272. Comment: The Commentator states that individual permits for compressor stations and well pads do not adequately account for the cumulative exposures to themselves, their family, and their neighbors. They and their family are surrounded by well pads with increasing numbers of wells, and a compressor station within a mile of their homes and farm, and directly in the path of the prevailing winds.

Response: The Department agrees with the Commentator that the requirements established in individual permits for specific compressor stations or well sites are applicable only to the specific facility and do not account for the cumulative exposures for other surrounding facilities. The VOC RACT requirements are applicable to all existing facilities. Also, the Department is relying on the regulatory criteria to determine whether emissions from two or more facilities should be aggregated and treated as a single source for air quality permitting purposes.

Regulatory Analysis Form

273. Comment: The Commentator states that the RAF is intended to answer the many questions of the conventional industry and allay the industry's concerns. Because of the DEP's failure to follow the process designed to provide information and foster dialogue with the industry, the Commentator is unable to provide informed comment, the IRRC is unable to evaluate the regulation, and the legislative oversight committees are unable to provide the intended input to the regulatory process.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites. The Department satisfied all the requirements under Sections 5 and 5.1 of the RRA that detail procedures for developing regulations. Therefore, all the information relevant to the proposed rulemaking was publicly available for members of the public to comment on during the comment period.

274. Comment: The RAF fails, remarkably, to articulate the positive benefit that would be yielded by imposing the new regulation upon the conventional oil and natural gas industry. There are 128,485 active wells in Pennsylvania, of which 11,867 are unconventional wells. There are, therefore, 116,618 active conventional wells, of which only 71,229 report production. How many TPY would be removed by regulation that impacts 300 of the 116,000 active conventional oil and natural gas wells? By the DEP's own data, not much. Per the DEP's data, the average production from an unconventional well is 1,636 Mcfd. The average production from a conventional well is 6 Mcfd. Thus, the average unconventional well produces 272 times more natural gas per day than the average conventional well. Clearly, reducing emissions from two or three hundred conventional wells is going to have infinitesimal impact. Indeed, if we employ the average data, the imposition of a new regulatory scheme upon the entire conventional industry would have the same impact as regulating ONE average unconventional oil and natural gas well.

The Commentators ask how an infinitesimal environmental impact justifies need? The Commentators state that it does not.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

State Implementation Plan

275. Comment: The Commentator supports the Department's decision to propose additional monitoring requirements and VOC emissions limits at oil and natural gas sites by adding § 129.121—129.130 to the Commonwealth's SIP. Protections like these are essential in light of new studies that point to increased health risks for people in areas with greater pollution levels

and due to COVID-19. The Commentator is concerned for their community as 50 new wells and 10 new well pads have been proposed.

Response: The Department acknowledges this comment.

276. Comment: The Commentator states that because Pennsylvania is a member of the Ozone Transport Commission (OTC), the Department must include regulations that implement RACT to control VOC from oil and natural gas sources covered by the CTG in its SIP. The EPA issued the 2016 O&G CTG for oil and natural gas sources in October 2016, triggering a statutory obligation for Pennsylvania to propose RACT for oil and natural gas sources.

Response: The Department agrees with the Commentator. The Department must include RACT regulations to control VOC emissions from oil and natural gas sources covered by the 2016 O&G CTG in the Pennsylvania SIP. Section 110(a) of the CAA requires each state to adopt and submit to the EPA a plan to implement measures (a SIP) to enforce the NAAQS or a revision to the NAAQS promulgated under section 109(b) of the CAA. A SIP includes the regulatory programs, actions and commitments a state will carry out to implement its responsibilities under the CAA. Once approved by the EPA, a SIP is legally enforceable under both Federal and State law. Section 172(c)(1) of the CAA provides that SIPs for nonattainment areas must include “reasonably available control measures,” including RACT, for sources of emissions of VOC and NO_x. Section 182(b)(2) of the CAA provides that for moderate ozone nonattainment areas, states must revise their SIPs to include RACT for sources of VOC emissions covered by CTG documents issued by the EPA prior to the area’s date of attainment of the applicable ozone NAAQS. More importantly, section 184(b)(1)(B) of the CAA requires states in the Ozone Transport Region, including this Commonwealth, submit a SIP revision requiring implementation of RACT for all sources of VOC emissions in the state covered by a specific CTG and not just for those sources located in designated nonattainment areas of the state. Consequently, the Commonwealth’s SIP must include regulations applicable Statewide to control VOC emissions from oil and natural gas sources that are not regulated elsewhere in Chapter 129. This rulemaking should achieve VOC emission reductions and lowered concentrations of ground-level ozone locally as well as in downwind states. Adoption of VOC emission reduction requirements is part of the Commonwealth’s strategy, in concert with other OTR jurisdictions, to further reduce the transport of VOC ozone precursors and ground-level ozone throughout the OTR to attain and maintain the 8-hour ozone NAAQS. If published as a final-form rulemaking in the *Pennsylvania Bulletin*, the Department will submit the final-form rulemaking to the EPA as a revision to Pennsylvania’s SIP.

Effective Dates and Timeframes

277. Comment: The Commentator points out that the preamble states the rule will be effective immediately upon publication of the final rule in the *Pennsylvania Bulletin*. It is suggested that a minimum 60-day effective date period be used to allow for a reasonable transition into the new requirements so that existing facilities are not required to immediately implement and comply with extensive new rules.

Response: The regulation will be effective upon publication of the final-form rulemaking in the *Pennsylvania Bulletin*. Compliance dates are established throughout the regulation that provide

affected owners and operators sufficient time to identify and comply with the applicable requirements of the final-form regulation.

§ 129.121. General Provisions and Applicability

278. Comment: The Commentator points out that there are twelve exceptions to the requirements in the proposed rulemaking in Sections 129.121 through 129.127. There was a dearth of reasoning given as to why these exceptions were being written into this flawed set of rules. For several exceptions, the description of the exceptions was missing. One exception required “compliance when financially feasible,” but since when is “financially feasible” a reason for or an excuse not to protect public health? The Commentator also points out that compliance to these flawed rules and exceptions is to be established and monitored by the owner’s records, with no independent analysis; the Department should not grant exceptions without clear definition or rationale, and compliance determined based solely on the owner’s or operator’s records.

Response: The VOC RACT is determined on the technical and economic feasibility of a specific source category. Where EPA determined that certain sources within a source category should be excluded from a requirement, EPA has provided the justification in the 2016 O&G CTG. For storage vessels at unconventional well sites, natural gas gathering and boosting stations, natural gas processing plants, and natural gas transmission stations, DEP reduced the exception threshold based on the Department’s analysis.

279. Comment: Several Commentators state that since this is an “existing” source rule, it should apply to sources not covered by other rules and regulations that cover “new” sources. The fact that the effective date is proposed to be the date the final rule is published in the *Pennsylvania Bulletin* means that any source listed in § 129.121 that is in existence on or before the publication date of this rulemaking will be subject to the rule.

In addition, the Commentators recommend clarification for how “existing” vs “new” will be determined for facilities that have initiated construction, but are not yet in operation on the effective date of the rule (i.e. what does “in existence on or before” the effective date of the rule mean).

Response: The Department has revised § 129.121(a) to read “*Applicability*. Beginning _____ (*Editor’s Note:* The blank refers to the effective date of this rulemaking, when published as a final-form rulemaking.), this section and §§ 129.122—129.130 apply to an owner or operator of one or more of the following unconventional oil and natural gas sources of VOC emissions installed at an unconventional well site, a gathering and boosting station or a natural gas processing plant in this Commonwealth which were constructed on or before _____ (*Editor’s Note:* The blank refers to the effective date of this rulemaking, when published as a final-form rulemaking.)”. The provision now states that all sources that were constructed before the publication of the final-form rulemaking would be required to meet the more stringent requirement between the RACT determinations of this final-form rulemaking or their current requirements from the Air Quality Permit Exemptions list, General Plan Approval/General Operating Permit, or site-specific Plan Approval. “Construction” is defined in 25 Pa. Code §121.1.

280. Comment: The Commentators state that an effective date based on the publication of the final rule in the *Pennsylvania Bulletin* would result in facilities being subject to the proposed rulemaking as well as other authorization mechanisms such as the GP-5, GP-5A, and Exemption 38, resulting in inconsistent and potentially conflicting requirements. The Commentators request that DEP remove applicability to the proposed rulemaking for facilities and sources constructed on or after August 23, 2011, the applicability date for the Subpart OOOO.

Response: The VOC RACT applies to all sources constructed before the publication of the final-form rulemaking, including those operating under GP-5, GP-5A, or Exemption 38. Compliance with the more stringent requirements for the applicable sources will satisfy all other requirements. For example, a facility authorized under Exemption 38(c) would be required to meet the most stringent applicable LDAR requirements based upon the well site and individual well production found in the final-form rulemaking in § 129.127(b). If the unconventional well site production is equal to or greater than 15 BOE per day and has a well producing equal to or greater than 15 BOE per day, the facility would be subject to the quarterly LDAR inspection requirements of § 129.127(c)(2). If the unconventional well site production is equal to greater than 15 BOE per day and no well producing equal to or greater than 15 BOE per day, or if the facility well site production is less than 15 BOE per day, the facility would be subject to the semiannual LDAR inspection requirements of Exemption 38(c).

281. Comment: The Commentators request that the effective date of the rule be at least 60 days from the date of publication of the final rule, to allow for an appropriate transition period, since there may be changes between the proposed rulemaking and the final rule. Facilities should not be required to immediately implement new requirements which may not have been seen in final form until the publication date.

Response: The effective date of the final-form rulemaking will be upon publication of the final-form rulemaking in the *Pennsylvania Bulletin*. The individual requirements have a compliance date based upon the effective date which gives operators time to implement the requirements.

282. Comment: The Commentators state that § 129.121(a)(2) should only apply to continuous high-bleed natural gas driven pneumatic controllers as recommended in the CTG and should specifically state that the requirements are not applicable to low-bleed and intermittent controllers. It should be noted that Subpart OOOOa requires natural gas continuous bleed pneumatic controllers to be “low-bleed” controllers with a bleed rate not to exceed 6 standard cubic feet per hour (scfh) or, for natural gas processing plants, 0 scfh. That is, for natural gas processing plants, pneumatic controllers are to operate by a means other than natural gas, such as, compressed instrument air.

Response: The Department did not intend to require natural gas-driven pneumatic controllers other than continuous bleed controllers to be subject to the proposed rulemaking and has revised § 129.121(a)(2) in this final-form rulemaking to read “Natural gas-driven continuous bleed pneumatic controllers.” to be consistent with EPA’s recommended RACT applicability.

283. Comment: The Commentators state that § 129.121(b) provides relief from proposed requirements where they are subject to “more stringent requirements”. As many facilities have recently completed case-by-case RACT evaluations, additional relief should be provided to determine the equivalency of the requirements and an opportunity to demonstrate technical or

economic feasibility based upon their current permit which is based upon the case-by-case RACT evaluation. Where the proposed controls are required, DEP should consider additional time for these facilities to meet the final requirements.

Response: The language of proposed § 129.121(b) is consistent with language in other Department regulations, for example 25 Pa. Code §§ 129.52a—129.52d. Additional time for installation of controls or for evaluation of other emissions reduction requirements is provided by the compliance dates for implementing the applicable requirements.

§ 129.122. Definitions, Acronyms and EPA Methods

284. Comment: The Commentators state that the term “completion combustion device” is not used anywhere in §§ 129.121 or 129.123—129.130 of the proposed rulemaking, so this definition should be deleted. The only other place where the term is used is in the definition of “Flare,” but that reference is also unnecessary in the context of this rule and should be deleted.

However, if retained, Subparagraph (ii) of this definition specifically includes “pit flares,” but the definition of “Flare” specifically excludes a “completion combustion device,” which appears to be a conflict between those two definitions. Also, subparagraph (i) of this definition would seem to include any type of flare, but again, the definition of “Flare” specifically excludes a “completion combustion device,” which appears to be a potential conflict between those two definitions.

In addition, subparagraph (i) of this definition uses the terms “exploration,” “production,” and “completions,” none of which are defined terms for purposes of this rule. Because “completions” are generally considered a separate phase in the life of a well from “exploration” or “production” if the defined term “completion combustion device” is retained in this rule, the Commentator suggests that subparagraph (i) be revised to read “An ignition device, installed horizontally or vertically, used to combust otherwise vented emissions from the completions phase of a well.”

Response: There is no conflict between the definitions of “*Completion combustion device*” and “*Flare*.” The pit flares listed under the “*Completion combustion device*” are not considered to be a “*Flare*” under this proposed rulemaking due to subparagraph (ii). However, the Department has removed this definition from the final-form rulemaking and incorporated it into the definition of “*Flare*.”

285. Comment: The Commentator states that the definition of “*Compressor station*” exempts compressor stations on well sites. This indicates that there’s a disconnect between DEP and industry. This provision is not reflective of the situation on-the-ground and if this provision remains in effect, industry will be able to place compressor stations on any well site and not be effectively regulated for air quality capable of protecting public health. This is intolerable.

The Commentator states that clarification is necessary to determine at what point compressors located on well sites are in fact an operating field natural gas compressor station. The Commentator suggests a parameter of horsepower (hp) be considered. The Commentator does not understand why well sites are not being considered as compressor stations.

The Commentator believes that the exemption needs further clarification. Rather than exempting compressors at well sites, a better approach would be a definitive threshold for total horsepower onsite that would in turn define the well site with compressors as a compressor station. The Commentator strongly recommends that the definition of compressor station includes well sites whenever total compression is equal to or greater than 500 hp originating from one or more compressor engines.

In subparagraph (ii), the definition states that the compression moves natural gas at increased pressure through a gathering or transmission pipeline. Gathering pipelines adjacent to well sites are gathering gas and begin directly at the edge of the well site. The Commentator recommends that subparagraph (iii) be revised to read “The term includes well sites whenever total compression is equal to or greater than 500 hp originating from one or more compressor engines.”

Response: The Department agrees that the exemption of compressors must be evaluated at unconventional well sites as in the 2016 O&G CTG the EPA did not recommend RACT requirements for compressors at well sites or at an adjacent well site and servicing more than one well site. The Department’s 2020 reanalysis of reciprocating compressors at unconventional well sites or at an adjacent unconventional well site and servicing more than one well site shows that the annualized cost of \$782 per year (2021 dollars). This is cost effective under the benchmarks used for the final-form rulemaking.

Therefore, in this final-form rulemaking, the applicability for reciprocating compressors in § 129.126(d) has been revised to read “Subsection (c) does not apply to the owner or operator of a centrifugal compressor that meets the following:” In addition, the Department has removed the definition of “*Compressor Station*,” instead relying on the definitions of “*Wellhead*,” “*Well Site*,” and “*Natural gas transmission and storage segment*” and the requirements of § 129.126 to establish the applicability for compressors.

286. Comment: The Commentators state that it is not clear whether there is an intentional distinction between the defined term “*Compressor station*” and the defined term “*Gathering and boosting station*.” The definitions of those two terms are similar, but not identical. The only place in these rules where the term “*Compressor station*” is used is in the definition of “*Natural gas transmission and storage segment*,” which is limited to transportation between natural gas processing plants and the distribution segment. As such, it is unclear why “gathering” is included in the “*Compressor station*” definition since that term is only used in these rules in the context of the “*Natural gas transmission and storage segment*” definition. The Commentators urge the Department to clarify these definitions and determine whether each definition is needed in the proposed rulemaking.

Response: The EPA has not defined the “*Natural gas transmission and storage segment*” in their 2016 O&G CTG even though they repeatedly used this term throughout their RACT recommendations. The Department attempted to define this term based on a description from the 2016 O&G CTG. In creating this definition, the Department used the defined term “*Compressor station*,” which the EPA defined in Section C.7 of the 2016 O&G CTG. Because the EPA’s definition of “*Compressor station*” included the term “*Transmission compressor station*” and did not define that term, the Department incorporated the definition of “*Natural gas transmission*” into the definition of “*Transmission compression station*.”

Because the Department has removed the definition of “*Compressor station*” from this final-form rulemaking, the Department incorporated the definition of “*Transmission compression station*” into the definition of “*Natural gas transmission and storage segment*.” Because this definition incorporates the definition of “*Transmission compression station*,” and the error in the original defined term, the definition of “*Transmission compression station*” has been removed from this final-form rulemaking.

287. Comment: The Commentators state that the reference to “pipeline(s)” in subparagraph (i) of the proposed definition of “*Connector*” would seem to be more appropriately referred to as “pipe(s)” and subparagraph (i) should be revised to read “A flanged fitting, screwed fitting or other joined fitting used to connect two pipes or a pipe and a piece of process equipment or that closes an opening in a pipe that could be connected to another pipe.”

Response: The Department agrees with the Commentators that the reference in subparagraph (i) in the definition of “*Connector*” to “pipeline” infers a long pipe for conveying oil or natural gas over a long distance and is inappropriate. Therefore, the Department has accepted the Commentators’ recommendation to revise the definition of “*Connector*.”

288. Comment: Several Commentators state that subparagraph (iii) of the definition of “*deviation*” includes the failure to meet an emission limit, operating limit, or work practice standard during start-up, shutdown or malfunction as a “*deviation*,” regardless of whether a failure is permitted by these rules. Failure to meet a limit or standard should not be considered a deviation if it is in compliance with the rules.

Response: A deviation under subparagraph (iii) is not construed as a violation of the terms and conditions of this rule or a permit; that deviation must be recorded and reported as required under § 129.130. A facility that has a permit must evaluate the terms and conditions of the permit and the requirements of the final-form rulemaking and comply with the most stringent requirement. The deviation must be evaluated against the most stringent requirement. These instances will be evaluated for compliance with the applicable requirements and standards. The definition of “*deviation*” is consistent with the guidance in the 2016 O&G CTG.

289. Comment: The Commentator states that the definition of “*Deviation*” applies to storage vessels; natural gas-driven continuous bleed pneumatic controllers; natural gas-driven diaphragm pumps; compressors; fugitive emissions components; covers and closed vent systems; control devices; and recordkeeping and reporting.

The Commentator is concerned that rather than using the existing Notice of Violation compliance protocol the Department is introducing a weakened, two-tiered standard. The Commentator recommends that there be no allowable deviations from the regulations. The Notice of Violation compliance protocol has worked well and there is no reason to weaken the compliance tools. Therefore, the Commentator recommends deleting the definition for “*Deviation*.”

Response: The definition for “*Deviation*” is identical to EPA’s definition used in nearly every section of the 2016 O&G CTG. The definition exists to make the recordkeeping and reporting requirements clear. This does not change the existing compliance protocol, including the

issuance of Notices of Violation. The frequency and severity of deviations from the requirements will be evaluated, as they are with all other regulations, and the Department will take the appropriate action.

290. Comment: Several Commentators state that it is not clear why the definition of “*First attempt at repair*” refers broadly to "organic material" when this rule is specifically applicable to "VOCs." They suggest replacing "organic material" in this definition with "VOCs" as shown below: "*First attempt at repair—Action taken for the purpose of stopping or reducing leakage of VOC 's organic material to the atmosphere using best practices.*"

Response: The Department used the definition of “*First attempt at repair*” from Subpart VVa because the term is used in Sections A, D, and G in the 2016 O&G CTG. After the Reconsideration, a slightly different definition from that in Subpart VVa was added to Subpart OOOOa. As the definition of “*First attempt at repair*” from Subpart OOOOa is closer to the in-line usage in the 2016 O&G CTG, the Department revised the definition, and the revision accommodates the Commentator’s suggestion.

291. Comment: The Commentators state that, consistent with Comment 284 regarding the definition of “*Completion combustion device*,” suggest deleting subparagraph (ii) of the “*Flare*” definition which refers to a “*Completion combustion device*.” The term “*Completion combustion device*” is not used anywhere in §§ 129.121 or 129.123—129.130 of these rules, so it is unnecessary to refer to that term in the “*Flare*” definition for purposes of this rule.

Response: The term “*Completion combustion device*” is necessary to define “*Flare*” by listing what types of controls are not considered to be a “*Flare*” under Chapter 129. The Department has removed the definition of “*Completion combustion device*” from this final-form rulemaking and incorporated it into the definition of “*Flare*.”

292. Comment: The Commentators state that the only place in these rules where the term “*Flow line*” is used is in the definition of “*Wellhead*,” to help define the limits of what constitutes the wellhead. Within this definition, the reference to a pipeline used to transport oil or gas to a “processing facility” is somewhat unclear, since what constitutes a “processing facility” is not defined, and flow lines could transport to other equipment such as storage or compression as well. The Commentators suggest that the terminology “processing facility” in this definition be revised to read “*Flow line—A pipeline used to transport oil or gas, or both, to processing equipment, compression equipment, storage, or other collection system for further handling or a mainline pipeline.*”

Response: The Department has revised the definition of “*Flow line*” in this final-form rulemaking.

293. Comment: The Commentators state that the term “*Fuel gas*” is not used anywhere in §§ 129.121 or 129.123—129.130 of these rules, so this definition is not necessary for purposes of this rulemaking and should be deleted.

Response: The term “*Fuel gas*” is used in Section F(d) of EPA’s 2016 O&G CTG which refers to the performance testing requirements for manufacturer tested combustion control devices. The

Department incorporated these requirements by reference in § 129.129(c) and therefore removed the definition of “*Fuel gas*” from this final-form rulemaking.

294. Comment: The Commentators state that the term “*Fuel gas system*” is not used anywhere in §§ 129.121 or 129.123—129.130 of these rules, so this definition is not necessary for purposes of this rulemaking and should be deleted.

Response: The Department removed the definition of “*Fuel gas system*” from the final-form rulemaking.

295. Comment: The Commentators urge DEP to expand the scope of the LDAR program to apply the definition of “fugitive emissions component” to all sources of unintentional venting, including continuous-bleed and intermittent-bleed pneumatic devices. A series of studies demonstrates that both types of controllers can have significant emissions when malfunctioning. In light of these findings, DEP must extend the proposal’s LDAR requirements to include both continuous- and intermittent-bleed controllers. These standards would be highly cost-effective.

On March 23, 2017, the California Air Resources Board (CARB) finalized standards regulating GHG emissions from oil and natural gas operations, which require quarterly LDAR inspections of oil and natural gas wellpads and compressor stations, and require checking all intermittent-bleed pneumatic controllers for improper continuous emissions during each inspection. Colorado also requires operators to perform an instrumental inspection of all pneumatic controllers with the same frequency as LDAR inspections. Using these two state programs as examples, the Commentators recommend that DEP require operators to inspect any controller venting natural gas to the atmosphere to decrease the harmful excess emissions that these devices so often produce. Every device should be inspected with OGI or similar instruments, and operators should confirm that any continuous bleed device is emitting less than 6 scfh with a direct measurement.

Response: The definition of “*Natural gas-driven continuous bleed pneumatic controller*” states it is “[a]n automated instrument used for maintaining a process condition such as liquid level, pressure, delta-pressure or temperature powered by a continuous flow of pressurized natural gas.” The definition of “*Fugitive emissions components*” in subparagraph (i) includes instruments. Subparagraph (ii) limits the leak definition from “a device, such as a natural gas-driven continuous bleed pneumatic controller or a natural gas-driven diaphragm pump, that vents as part of normal operations if the gas is discharged from the device’s vent.” The Department acknowledges the Commentators information regarding California’s and Colorado’s requirements to quantify pneumatic controller emissions.

296. Comment: The Commentator recommends changing subparagraph (i) of the definition of “*Fugitive emissions component*” to “A piece of equipment that has the potential to emit fugitive emissions of VOC at a well site, a gathering and boosting station, or a natural gas processing plant, **not limited to [including]** the following:”

The Commentator recommends this change due to the dynamic nature of the industry, processes, and technologies. It is necessary for the DEP field staff to have the authority to address any substandard equipment that the industry chooses to locate on well sites, gathering and boosting stations, and natural gas processing plants.

Response: The listing of included components in the definition of “*Fugitive emissions components*” does not disqualify other components if the component “has the potential to emit fugitive emissions of VOC.” The Pennsylvania Legislative Reference Bureau does not use the qualifier “not limited to.” The use of the word “including” is not restrictive and this interpretation is of long-standing in Commonwealth regulations.

297. Comment: The Commentators state that the term “*GOR – Gas-to-oil ratio*” should be clarified as its only substantive use is in § 129.127(b) for determining the fugitive monitoring requirements at well sites where monitoring applicability is determined based on the GOR relative to a threshold of 300 standard cubic feet (scf) of gas per barrel of oil produced. The term is defined as “the ratio of the volume of gas ... that is produced from a volume of oil when depressurized to standard temperature and pressure.” Consequently, for a well that produces only gas and no oil, there would be no gas produced from that oil and the GOR would be zero, meaning that no fugitive monitoring would be required per § 129.127(b)(1)(i). DEP should clarify whether that is the intent.

Response: In EPA’s analysis for fugitive emissions components in the 2016 O&G CTG, they only use the GOR for oil wells. In their recommendation in Section I of the CTG, they refer to wells generally in the applicability requirements. The Department has revised § 129.127 to reflect the 2020 reanalysis performed in light of several comments; see § 129.127 Fugitive Emissions Components that begins at Comment 352, below. This provision is now found at § 129.127(c)(1).

298. Comment: The Commentator strongly objects to the exclusion of well sites in the definition of “*Gathering and boosting station*.” The Commentator recommends changing subparagraph (ii) to read “The term includes well sites whenever total compression is equal to or greater than 500 hp originating from one or more compressor engines.” The proposed rulemaking clearly states that the term does not define one or more compressors on well sites as a gathering and boosting station. The gathering and boosting station which collects natural gas from one or more well sites, serves as a compressor station and should be included in the definition of “*Compressor station*.” This is an opportunity for a bad actor to circumvent the regulations at the expense of the environment and public health.

Response: The Department did not revise the definition of “*Gathering and boosting station*” as recommended by the Commentator because subparagraph (ii) clarifies that a “*Well site*” or a “*Natural gas processing plant*” does not become a “*Gathering and boosting station*” by virtue of having compressors onsite. The applicability requirements for compressors at unconventional well sites are in § 129.126(d); subsection (d) has been revised in the final-form rulemaking to reflect that reciprocating compressors at an unconventional well site have requirements under the final-form rulemaking. Centrifugal compressors at an unconventional well site do not have requirements under the final-form rulemaking.

299. Comment: The Commentators state that the proposed definition of “*In-house engineer*” as “an individual who is qualified by education, technical knowledge and experience...” does not specifically require that the engineer be an “in-house” individual. Any engineer, whether in-house or not, who is “qualified by education, technical knowledge and experience” should be eligible to perform the associated duties, so the defined term here, and in §§ 129.125(c)(3)(ii)(A)

and 129.128(c)(1) where that term is used, should be changed from “in-house engineer” to “qualified engineer,” as shown below: and the definition revised to read “*Qualified engineer*—An individual who is qualified by education, technical knowledge and experience to make an engineering judgment and the required specific technical certification.”

Response: The Department has revised the definition of “*In-house engineer*” to limit the individual to one employed by the responsible official. By doing this, the Department ensures that both the responsible official and in-house engineer would be held accountable for issues with the certification. An owner or operator that desires to hire a third-party individual must hire a “*Qualified professional engineer*.”

300. Comment: The Commentator states that in subparagraph (i) of the definition of “*Leak*”, the wording should be amended to state more clearly “A positive indication of a leak, whether audible, visual or odorous, determined during an AVO inspection.”

Response: The Department has amended subparagraph (i) of the definition of “*Leak*” to read “Through audible, visual, or odorous evidence during an AVO inspection.” Please also see the response to Comment 18.

301. Comment: The Commentator states that subparagraph (iii) in the definition of “Natural gas and oil production segment” should be modified to read “A low or high-pressure, both small and large diameter gathering pipeline and related components that collect and transport the natural gas, condensate, oil and other materials and wastes from the well to the natural gas processing plant or refinery.”

The reason for this modification is that it is convoluted and leads to a variety of interpretations. Regarding what is low pressure? and what is the size of a small diameter gathering pipeline? If this definition would be strictly applied conventional wells, the Commentator could agree on the definition. However, as applied to unconventional natural gas wells it is not realistic. Generally, a small diameter pipeline is 8 inches or less and would have a pressure below 200 pounds per square inch (psi). However, it is well known that Pennsylvania’s gathering fields have miles of gathering pipelines that are larger than 8 inches from where the pipe leaves the well site and the pressures are beyond 1,000 psi in many cases.

The Commentator suggests clarifying the types of wells to which it pertains; conventional, or unconventional, and natural gas only or multiple product lines. As it stands the definition has the potential to create misinterpretations.

Response: The term “*Natural gas and oil production segment*” was used in the 2016 O&G CTG in Section A.5(a)(4) to describe the recordkeeping and reporting requirements for storage vessels that are skid-mounted or permanently attached to something that is mobile; specifically, the “records indicating the number of consecutive days that the vessel is located at a site in the oil and natural gas production segment, natural gas processing segment, or natural gas transmission and storage segment.” This language was not in the definition of “*storage vessel*” in the proposed rulemaking nor is it included in the final-form rulemaking, so the definition of “*Natural gas and oil production segment*” has been removed.

302. Comment: The Commentators state that the definition of “*Natural gas and oil production segment*” is not used anywhere in the proposed regulations, so it should be deleted. If it is retained, the definition should be clarified with respect to subparagraph (iii), as the reference to a “low-pressure, small diameter” gathering pipeline does not explain what is considered “low-pressure” or “small diameter” for purposes of this rule.

Response: The Department removed the definition from the final-form rulemaking; see the response to Comment 301.

303. Comment: The Commentator states that the definition of “*Natural gas-driven pneumatic controller*” does not include any mention of intermittent controllers. This needs to be included and be consistent with the general permits and the Subpart OOOOa.

Response: The definition of “*Natural gas-driven pneumatic controller*” in § 129.122 was revised to read “*Natural gas-driven continuous-bleed pneumatic controller.*” The revised definition specifies the controller is continuous-bleed. The definition incorporates the definition of “*Natural gas-driven pneumatic controller*” and “*Pneumatic controller*” found in Subparts OOOO and OOOOa and the 2016 O&G CTG in Section B.6. The Department incorporated the definitions of “*Pneumatic controller*” and “*Continuous bleed*” into the definition of “*Natural-gas driven continuous bleed pneumatic controller*” for clarity. The applicability of §§ 129.121(a)(2) and 129.124(a) clarifies that the only affected sources are natural gas-driven continuous bleed pneumatic controllers.

304. Comment: The term “gas plant” is not used anywhere in the proposed regulations, so it should be deleted from the definition of “*Natural gas processing plant or gas plant.*”

Response: The term “*gas plant*” has been removed from the definition of “*Natural gas processing plant*” in the final-form rulemaking.

305. Comment: The Commentator states that the term “*Natural gas processing segment*” is not used in the proposed rulemaking, so it should be deleted.

Response: The term “*Natural gas processing segment*” was used in the 2016 O&G CTG in Section A.5(a)(4) to describe the recordkeeping and reporting requirements for storage vessels that are skid-mounted or permanently attached to something that is mobile; specifically, the “records indicating the number of consecutive days that the vessel is located at a site in the oil and natural gas production segment, natural gas processing segment, or natural gas transmission and storage segment.” This language was not in the definition of “*storage vessel*” in the proposed rulemaking nor is it included in the final-form rulemaking, so the definition of “*Natural gas processing segment*” has been removed.

306. Comment: The Commentators state that the wording in the definition of “*Produced water*” refers to “water that is extracted...from an oil or natural gas production well...” which is not clear as to whether the definition is intended to include flowback water or any other water recovered from the well prior to the well being put into production. As drafted, the definition would appear to exclude those preproduction waters. DEP should clarify this definition by making it consistent with the federal rulemaking, and the Commentators recommend that DEP utilize the same definition of “*Produced water*” as EPA utilizes in 40 CFR § 435.33(v) “Produced water means

the fluid brought from the hydrocarbon-bearing strata during the extraction of oil and gas. and includes. where present. formation water. injection water. and any chemicals added downhole or during the oil/water separation process.”

Response: This definition of “*Produced water*” is consistent with the definitions in Subparts OOOO and OOOOa and the 2016 O&G CTG; therefore, the Department has maintained this definition in the final-form rulemaking.

307. Comment: The Commentator recommends the addition of subparagraph (iii) to the definition of “*Returned to service*” that reads “Reconnected or installed after having been subjected to leak detection and repair protocol.” The Commentator reasons that at times a company in an industrial or commercial operation will remove a malfunctioning item from operation and install a replacement. The removed equipment is often set aside with other equipment awaiting repair. Then, a malfunction at another location occurs and the mechanics, who haven’t yet repaired the removed equipment, take a chance and send that unrepaired and untested equipment back out into the field hoping the chance that the regulator won’t notice. Since the DEP is not sufficiently staffed this is a factor contributing to the oil and natural gas industry’s significant environmental impact.

Response: The Department disagrees with the Commentator’s recommendation to add subparagraph (iii) to the definition of “*Returned to service*” as this scenario is covered under subparagraphs (i) and (ii).

308. Comment: The Commentators state that subparagraph (iii)(C) would exclude from the definition of “*Storage vessel*” containers or tanks with a capacity greater than 100,000 gallons used to recycle water that has been passed through two-stage separation, but there is no explanation or rationale provided as to why that proposed exclusion is limited only to containers or tanks greater than 100,000 gallons capacity. As long as the contained water meets the stated condition that it has been passed through two-stage separation, there should not be a size threshold limit to the exclusion, and subparagraph (iii)(C) should be revised to read “A container described in subparagraph (i) used to recycle water that has been passed through two-stage separation.”

Response: In Section A.1(b) of EPA’s 2016 O&G CTG states “A storage vessel with a capacity greater than 100,000 gallons used to recycle water that has been passed through two stage separation is not a storage vessel.” The Department incorporated this applicability provision into the definition of “*Storage vessel*” consistent with process vessels and pressure vessels.

309. Comment: The Commentator suggests that the language that reads “For purposes of this section, §§ 129.121 and 129.123—129.130,” in the definition for “*TOC—Total organic compounds*” is duplicative of the introductory wording at § 129.122(a) applicable to all of the definitions in this section. It is unnecessary to repeat the language in the “*TOC*” definition which should be edited to read: “*TOC—Total organic compounds—The results of EPA Method 25A.*”

Response: The Department has revised the definition to read “*TOC—Total organic compounds—The results of EPA Method 25A.*”

310. Comment: The Commentator states that the term “*Transmission compression station*” is used once in the proposed rulemaking, in the definition of “*Natural gas transmission and storage segment*.” Because the term is not used anywhere else, it is unclear this definition is even needed. If retained, the word “compression” in the defined term should be changed to “compressor,” and subparagraph (i) of the definition related to pipelines should be deleted since the pipelines are not part of the compressor station. The definition should be revised to read “*Transmission compressor station* – The term includes the land, mains, valves, meters, boosters, regulators, storage vessels, dehydrators, compressors, and their driving units and appurtenances, and equipment used for transporting gas from the production plant, delivery point of purchased gas, gathering system, storage area or other wholesale source of gas to one or more distribution areas.”

Response: The Department has incorporated this definition into the definition of “*Natural gas transmission and storage segment*” in the final form rulemaking; see Comment 286.

311. Comment: The Commentators state that the term “*Underground storage vessel*” is not used in the proposed rulemaking so the definition should be deleted.

Response: The term “*Underground storage vessel*” is used in Section G of the 2016 O&G CTG which was not incorporated into the proposed rulemaking. The definition of “*Underground storage vessel*” has been removed from the final-form rulemaking.

312. Comment: The Commentators state that VRU's do not route vapor back into a storage vessel, nor to a liquids line as stated in the definition of “*VRU – Vapor recovery unit*.” The Commentators recommend replacing the definition with “A device used to recover vapor and route it to a process, flow line, or similar equipment.”

Response: The reference to “a line carrying hydrocarbon fluids” does not limit the line to a liquids line, as fluids in physics refers to both liquids and gases. The 2016 O&G CTG uses the term “*VRU—Vapor recovery unit*” in Section A.1(a); however, EPA does not define the term. The definition is based on the description of a vapor recovery unit in Section 4.3.1.1 of the 2016 O&G CTG. The Department revised the definition in the final-form rulemaking to read “*VRU—Vapor recovery unit*—A device used to recover vapor and route it to a process, flow-line or other equipment.”

313. Comment: The Commentator states that the definition of “well” includes “a hole...into which fluid is injected,” which would potentially include all Underground Injection Control (UIC) wells; however, the applicability language at § 129.121(a) for purposes of this rule limits applicability to “oil and natural gas sources of VOC emissions.” It is not clear whether DEP intends these rules to apply to UIC wells, and if so, whether the applicability would be limited only to UIC wells directly associated with oil and natural gas operations, such as Class II UIC wells. The applicability or non-applicability to UIC wells should be made clearer.

Response: This definition is consistent with the definition found in Sections C.7, H.6, and I.6 of the 2016 O&G CTG and in Subparts OOOO and OOOOa. The concern over underground injection control wells is addressed in the definition of “*Well site*.” Please see the response to Comment 315.

314. Comment: The Commentator states that in order to properly clarify the definition and limit the scope to the actual wellhead equipment, subparagraph (iii) of the definition of “*Wellhead*,” should be revised to read “The term does not include other equipment at the well site except for a conveyance at the wellhead through which gas is vented to the atmosphere.”

Response: This definition is consistent with the definition found in Sections C.7, H.6, and I.6 of the 2016 O&G CTG and in Subparts OOOO and OOOOa. In the federal requirements the definition references “...any conveyance through which gas is vented to the atmosphere.” In the final-form rulemaking, subparagraph (iii) reads “...a conveyance through which gas is vented to the atmosphere.”

315. Comment: The Commentator states that the reference to an “injection well” in subparagraph (i) of the definition of “*Well site*,” requires clarification in the same manner as Comment 313 regarding which injection wells are considered within scope.

Response: This definition was modified in Subpart OOOOa during the Reconsideration of the NSPS; for this final-form rulemaking the language in subparagraph (iii) of the definition of “*Well site*” was added for consistency. In addition, definitions for “*UIC—Underground injection control*”; “*UIC Class I oilfield disposal well*” and “*UIC Class II oilfield disposal well*” were added to this final-form rulemaking.

§ 129.123. Storage Vessels

316. Comment: The Commentator states that storage vessels associated with conventional well operations should not be regulated under the proposed rulemaking. The burden of adding capture and control equipment – and certainly the burden of replacing storage vessels – cannot be readily borne by the owners and operators of marginal conventional well operations. In the 2016 O&G CTG, the EPA relates storage vessel VOC emissions to well production rates. The information provided in the 2016 O&G CTG indicates that marginal well operations fall well below even the EPA’s presumed RACT threshold of 6 TPY for both oil and natural gas wells. Rather than deliberate on storage vessel emissions estimates or require conventional operators in Pennsylvania to assess storage vessel emissions and regulatory applicability, the straightforward approach to defining the scope of the proposed storage vessel regulatory requirement, apart from the directives of Act 52, would be to exclude marginal well operations from the proposed storage vessel provisions. Similarly, when a facility’s production levels fall to the point where it inevitably becomes a marginal or stripper well operation, it should no longer be required to operate any vapor capture system. Beyond the proposed exclusion of storage vessels associated with conventional wells, there should also be the opportunity for operators to demonstrate that their uncontrolled storage vessel VOC emissions are below 4 TPY to obtain an exclusion from being subject to the storage vessel provisions of the proposed rulemaking. As well production decreases over time, there should also be a an “off-ramp” for controlled tanks that would allow for the reconfiguration of control equipment. At lower production levels, control technology will not only become impracticable, but it also will cause more environmental impact than direct emissions of VOC.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at

unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites. In EPA's 2016 O&G CTG and this final-form rulemaking, the assessment of applicability for storage vessels is based on the VOC emissions, not the production, of a source. The Department understands that production is not the only indicator of VOC emissions from a source, therefore the assessment of applicability must be made by the owner or operator. The method for determining potential VOC emissions can be found in § 129.123(a)(2) while the alternate method for determining applicability using actual VOC emissions can be found in § 129.123(c)(2). Under § 129.123(c), if the owner or operator demonstrates that their actual VOC emissions are below 2.7 TPY on a 12-month rolling basis, the owner or operator does not need to meet the requirements of § 129.123(b).

The proposed "off-ramp" already exists because any owner or operator that can demonstrate they are no longer subject to § 129.123(c)(2) can remove the control device if the control device is not required for another source.

317. Comment: The Commentator states there are significant differences associated with emissions from new storage vessels versus existing storage vessels. A new vessel can be designed to accommodate a vapor collection system whether it is for recovery or combustion. Once built, both the vessel and the system can be maintained to assure that they are operating effectively and safely. Because the proposed rulemaking and the 2016 O&G CTG addresses existing facilities, there is no certainty that the affected storage vessels will be capable of accepting the equipment retrofits, if needed, to capture vapors. Vessels deteriorate over time despite maintenance, and if the structural integrity is compromised by the additional equipment, a safety issue arises, rendering the retrofit impractical. Under DEP inspection rules, mechanical integrity must be certified, and the retrofits required under the proposed rulemaking could cause such tanks to be uncertifiable, which in turn would require their replacement.

In this context, and more generally, the cost basis of the proposed rule must be scrutinized. EPA suggests that in the 2016 O&G CTG, VRU or combustors can be considered RACT for vessels with potential VOC emissions of 6 TPY or more. However, if a storage vessel cannot safely operate with additional equipment, the entire vessel would have to be replaced, if storage vessel replacement is even economically feasible. Neither EPA nor DEP considered this situation in calculating cost effectiveness but should have because the consequences would considerably alter the determination of RACT. For example, at some facilities and under current economic conditions, the cost of a new storage vessel would not be economically feasible based on the facility's production rates and realized low natural gas commodity prices.

Response: The VOC RACT rule applies to all storage vessels constructed on or before the effective date of this final-form rulemaking regardless of condition. If the structural condition of the vessel cannot be operated safely to comply with the final-form rulemaking, then the storage vessel should be replaced. The replacement will be treated as a new source, and therefore subject to BAT.

318. Comment: The Commentator states that the conventional industry is concerned over the lack of information in the RAF about the impact of the proposed rulemaking for controlling VOC emissions from storage vessels that exceed 6.0 TPY. The annual cost estimate in the RAF

is \$25,194 per year per storage vessel, which in the conventional oil and natural gas industry, number in the tens of thousands.

How many of those thousands of storage vessels will be impacted by the new regulation; in how many instances will the conventional oil and natural gas industry be expected to bear the cost of \$25,194? The RAF does not have a single estimate of how many conventional oil and natural gas storage vessels will be affected, which is the purpose of the RAF. Once the proposed rulemaking is finalized it is too late. Before that happens, the DEP and EQB should know how many storage vessels will be subject to the rule and should inform the industry members expected to comply with the rule.

The Commentator states that if the DEP had properly communicated with conventional industry, there would have been a forum to ask other relevant questions such as whether the \$25,194 assumes the operator has access to electricity at the storage vessel to power the control device and if electricity is required and is not present, what alternative controls can be employed? If an electricity alternative involves a generator, how are the emissions from the generator factored into the benefits and costs analyses? If a group of wells is served by a single storage vessel will the 6.0 TPY be adjusted upward to account for the number of wells served? How does the operator ascertain whether the 6.0 TPY threshold is implicated? If testing is required, will every storage vessel need to be tested? Must an outside contractor be employed to test? Must the tester be certified? How much does a testing device cost? How many man hours are required to perform a test? What training is required? What record keeping is involved? The Commentator asks what factors are to be considered in realizing an average?

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

319. Comment: The Commentator requests the Department provide a list of operating permits or plan approvals currently determined to meet the requirements for consideration of a legally and practically enforceable limit. The Commentator believes that state level permitting programs such as the GP-5, GP-5A, and existing Exemption 38 programs should be considered satisfactory for this requirement.

Response: Where requirements of this final-form rulemaking and a permit both apply, the owner or operator must comply with the most stringent applicable requirement. If compliance with existing permit requirements demonstrates compliance with the applicable requirements of this final-form rulemaking, the owner or operator of the facility would be in compliance with the applicable requirements of this final-form rulemaking.

320. Comment: The Commentator observes that the proposed rulemaking applies to storage vessels installed at a conventional well site and that have the potential to emit 6.0 TPY or greater VOC emissions. The Commentator considered the possibility that, even though the foregoing section of the proposed rulemaking refers to a storage vessel at a conventional well site, the section would not apply to conventional oil and natural gas well operations if the storage vessel

emits less than 6.0 TPY VOC emissions. Whether conventional oil and natural gas storage vessels do or do not emit less than 6.0 TPY VOC per year is not clear to the Commentator. Neither the proposed rulemaking nor the RAF prepared by the Department shed light on what type of conventional oil and natural gas storage vessels, if any, would be subject to the foregoing provision of the proposed rulemaking.

In addition, the Commentator polled its members in attendance of the July 9, 2020, industry organization's general member meeting to determine whether any member had conducted testing to determine the volume or rate of VOC emissions from conventional oil and natural gas storage vessels. No member had performed such testing nor is aware of the Board or the Department conducting any testing to determine the volume or rate of VOC emissions from storage vessels used in conventional oil and natural gas operations. For these reasons, the proposed rulemaking leaves the Commentator uncertain as to whether the proposed rulemaking is intended to apply to conventional oil and natural gas wells in Pennsylvania.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

321. Comment: The Commentators state that the terms "conventional well" and "unconventional well" are not defined in § 129.122(a) or elsewhere for purposes of this rule. The Commentator suggests that definitions of those terms, as defined in 25 Pa. Code §§ 78.1 and 78a.1, be included by reference in § 129.122(a).

Response: The Department removed the references to "conventional well" and "unconventional well" from § 129.123(a) from proposed to final-form rulemaking. Section 129.123(a) was the only section that included the terms "conventional well" and "unconventional well" in the proposed rulemaking. However, the Department added definitions for "unconventional formation," "unconventional well" and "unconventional well site" in this final-form rulemaking since the applicability section was amended to clarify that this final-form rulemaking only applies to unconventional sources installed at an "unconventional well site." The definitions of "unconventional formation" and "unconventional well" in this final-form rulemaking are identical to the definitions in § 78a.1.

322. Comment: The Commentator states that for improved clarity, and consistency with § 129.121(a), the installation timeframe specified in § 129.123(a)(1)(iii) of the proposed rulemaking as "on or after August 10, 2013" should be modified by adding that installation also had to occur by the effective date of this rule. The provision should be revised to read "Is installed at an unconventional well site on or after August 10, 2013 **and before [insert the date after the effective date of this rule]** and has the potential to emit 2.7 TPY or greater VOC emissions."

Response: Revisions to the applicability in § 129.121(a) and § 129.123(a) have rendered this recommendation moot. In the final-form rulemaking, all storage vessels constructed on or before

the effective date of the final-form rulemaking with a potential to emit of 2.7 TPY VOC or greater are subject to the requirements.

323. Comment: The Commentators state that a more accurate emissions profile could be determined by using actual storage vessel monthly throughputs for VOC PTE calculations. If DEP ultimately decides to continue with this methodology, the condition must provide a time frame for maximum average daily throughput evaluations. Without a limitation on how far back an operator is required to go, the calculations would result in inaccurate emissions profiles for tanks that have been in place for a significant period of time. Many of these tanks may have begun production before 2012. Ideally the maximum daily average throughput should be based on recent data such as the prior twelve months, not outdated throughputs prior to well decline or other operational changes that would cause inaccurate results.

Response: The language of § 129.123(a)(2)(i) in the final-form rulemaking was revised to read:

“(i) The potential VOC emissions in paragraph (1) must be calculated using a generally accepted model or calculation methodology, based on the maximum average daily throughput **as defined in § 129.122 (relating to definitions, acronyms and EPA methods)** prior to _____ (*Editor’s Note: The blank refers to the date 60 days after the effective date of this rulemaking, when published as a final-form rulemaking.*) for an existing storage vessel.”

This change provides clarity and limits the maximum average daily throughput to the 30 days prior to the effective date and is more representative of the facility operations and provide a more accurate emissions profile.

324. Comment: The Commentator states that the PTE calculations should include the emissions reductions required under Exemption 38, not just those in plan approvals and operating permits.

Response: There are no emission reductions under Exemption 38 that would be applicable to § 129.123(a)(2)(ii) when calculating PTE. However, compliance with Exemption 38 would ensure compliance with the final-form rulemaking for storage vessels.

325. Comment: The Commentator states that determining the applicability of the proposed rule storage vessel requirements requires employing “generally accepted methods” to determine the VOC emissions rate from each and every storage vessel. Typically, this is done using the calculation methodologies from EPA for Organic Liquid Storage Tanks and using commercially available emissions modelling software. Setting up an emissions model and emissions calculation for a single tank is time-consuming and costly, through either lost man hours or the use of consultants or test firms, which could run on the order of \$1,000 per tank. Further, with the recent amendments to EPA AP-42 Chapter 7: Liquid Storage Tanks, many commercially available software programs do not meet the new calculation methodologies. Considering the tens of thousands of existing storage vessels in Pennsylvania that would require an applicability analysis and determination, the administrative and economic burdens of running tank emissions calculations is immense.

Response: The Department does not endorse any specific calculation method or software other than it be a “generally accepted method” to determine VOC emissions from each storage vessel. All of the methods the Commentator lists would be accepted as a “generally accepted method.”

326. Comment: The Commentators commend DEP for including an applicability threshold based on potential VOC emissions in this proposed rulemaking that is more stringent than EPA’s recommendation in the 2016 O&G CTG for control of certain storage vessel emissions. EPA recommended 95% reduction of VOC emissions for tanks with a PTE of 6 TPY or greater for all types of facilities. DEP has adopted the 6 TPY applicability threshold only for those tanks located at a conventional well site or at an unconventional well site constructed prior to August 10, 2013 and not subsequently modified.

For storage vessels located in the transmission and storage segment, at natural gas gathering and boosting stations, processing plants, or unconventional well sites constructed, modified, or reconstructed on or after August 10, 2013, DEP has established a PTE threshold of 2.7 TPY VOC. For storage vessels installed at those unconventional well sites, this stringency is consistent with the threshold used under Exemption 38, so this simply prevents backsliding for those sources.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites. For storage vessels in the proposed rulemaking, a tiered emissions threshold was established to prevent backsliding for storage vessels subject to Exemptions 38(b) or 38(c). The Department’s 2020 reanalysis shows that the 2.7 TPY VOC emission threshold is cost effective for both potential and actual emissions; therefore, a single 2.7 TPY VOC emission threshold is established in this final-form rulemaking for all storage vessels at unconventional well sites, gathering and boosting stations and natural gas processing plants, and in the natural gas transmission and storage segment.

327. Comment: The Commentators urge DEP to establish a PTE threshold of 2.7 TPY VOC for all storage vessels at all facilities in the oil and natural gas sector which would ensure consistency of control requirements for owners and operators of storage vessels across Pennsylvania. DEP has described “great success with the 2.7 TPY VOC threshold in Exemption 38,” which has been in place for seven years. A threshold of 2.7 TPY VOC is also appropriate given the very low cost of controlling VOC from these sources relative to others that cannot be controlled with devices that actually increase revenue for facility operators.

Response: The Department’s analysis shows that it is cost effective to install VOC control for all storage vessels with uncontrolled potential VOC emissions equal to or greater than 2.7 TPY. Therefore, a single 2.7 TPY VOC emission threshold is established in this final-form rulemaking for all storage vessels. Storage vessels may qualify for an exception if actual VOC emissions are less than 2.7 TPY as a 12-month rolling sum.

328. Comment: The Commentators urge DEP to define a “storage vessel” so that two or more physical tanks that are manifolded together are treated as a single unit for the purposes of

determining applicability using the 2.7 TPY VOC threshold. In recent years, it has become common for multiple storage vessel batteries, sometimes containing different liquids, to be manifolded at the emissions line and routed to a common control device. It is a more rational approach to use the sum total emissions from these tank batteries for applying control requirements and is consistent with the long-standing definition used in other jurisdictions like Colorado. Otherwise, operators will be incentivized to install multiple smaller tanks on a site to avoid having a single tank that exceeds the emissions threshold and is subject to the 95% emissions control standard. Of course, actual emissions in that case would be as high as from a single uncontrolled tank.

Response: EPA determined in the 2016 O&G CTG that the PTE of an individual storage vessel is preferable to use as an applicability threshold. Although the Reconsideration of Subpart OOOOa allows accounting for storage vessels in a tank battery, the emissions are averaged, not summed as the Commentators suggest and therefore, not materially different than determining individual PTE.

329. Comment: The Commentator states that the proposed rulemaking requires storage vessels installed before August 10, 2013 with a PTE of 6.0 TPY VOC and storage vessels installed on or after August 10, 2013 with a PTE of 2.7 TPY VOC to control VOC emissions with 95% efficiency. The 2016 O&G CTG does not recommend imposing the 95% control requirement on storage vessels with a PTE of less than 6.0 TPY VOC.

Response: The Department is obligated under the Federal CAA to analyze the source sector, as defined in the 2016 O&G CTG, and regulate sources that have control techniques or equipment that is “reasonably available.” The 2016 O&G CTC has no legally binding effects, although it does set forth, as guidance only, what EPA has determined as reasonably available using data collected nationally. The Department reviewed the RACT recommendations included in the 2016 O&G CTG to determine the ground-level ozone reduction measures necessary for this Commonwealth. The 2.7 TPY VOC control threshold applies to all storage vessels at unconventional well sites, gathering and boosting stations and natural gas processing plants, and in the natural gas transmission and storage segment, as supported by the Department’s 2020 reanalysis.

330. Comment: Several Commentators state that § 129.123(b)(1)(iii) requires routing emissions to a “control device or process that meets the applicable requirements of 129.129.” While § 129.129 contains requirements specific to “control devices” it is unclear what “processes” are addressed by § 129.129 or what requirements may apply to them. A clearer reference to the specific processes in § 129.129 should be provided. Note that this same comment would apply to the similar wording in §§ 129.125(b)(1)(ii), 129.126(c)(2), 129.128(a)(2)(ii), and 129.128(b)(1).

Response: The requirements for “processes” can be found in § 129.129(d) of this final-form rulemaking. Based on the requirements for control in § 129.129(d), emissions controlled by routing to a boiler or process heater is considered controlled if the emissions are injected into the flame zone of the process. The term “process” is defined in § 121.1.

331. Comment: The Commentator agrees with the approach of “the owner or operator of a storage vessel subject to this section shall reduce VOC emissions by 95.0% by weight or greater.” There is an extended time frame from proposed rulemaking to final rulemaking that

provides an adequate amount of time for the operator to prepare for the required changes; changes that a good operator instituting “Best Practices” would presently have in place. Therefore, the Commentator recommends revising the effective date so that Subsection (b) reads “...within _____” instead of “...beginning _____.”

Response: The Department has used the “beginning DATE” language for establishing the compliance date in several regulations in Chapter 129 for several years. Changing the language in this subsection would be inconsistent with the usual construct for establishing compliance dates. In addition, this construct is used throughout the final-form rulemaking, and these changes would cause inconsistencies that could lead to interpretation, implementation, and enforcement issues with other sections in Chapter 129. Further, revising the language as suggested by the Commentator does not change the practical application as the regulated entity must demonstrate compliance beginning on that date; whether the entity complies prior to that date is not subject to enforcement.

332. Comment: The Commentators state that the 1-year deadline for control device installation will be difficult to comply with due to the difficulties associated with retrofitting older sites with new controls and controller availability from manufacturers. Additional time may also be necessary to receive authorization to construct an air cleaning device and accommodate any additional erosion and sediment permits necessary for the expansion of the site to accommodate any new equipment. For example, in some regional offices it can take over 200 days to obtain an erosion and sediment control permit from the Department.

Response: The Department acknowledges this comment. The Department disagrees with the Commentators that it may be difficult to meet a 1-year deadline for control device installation.

333. Comment: The Commentators state that the exemption provisions will not apply to any storage vessels since a limit cannot be obtained without approval from the Department. The language needs to be revised to be applicable to existing sources with VOC emissions at, or above, thresholds for applicability.

Response: The Department has revised the language of § 129.123(c)(1) to read:

“(1) The emissions limitations and control requirements in subsection (b) do not apply to the owner or operator of a storage vessel that maintains actual VOC emissions less than 2.7 TPY determined as a 12-month rolling sum. An owner or operator claiming this exception shall perform the compliance demonstration requirements under paragraph (2) and maintain the records under subsection (g), as applicable.”

334. Comment: The Commentators state that to accurately estimate actual tank emissions, monthly VOC emissions estimates should be based on the actual monthly tank throughputs, not the highest average daily throughput. Using the highest average daily throughput will result in an overly conservative monthly throughput volume and inaccurate actual emission estimates.

Response: The Department has revised the language of § 129.123(c)(2)(i)(B) to read:

“(B) Be based on the **monthly** average throughput for the previous 30 calendar days.”

335. Comment: The Commentators state that the maximum timeframe between calculations should be extended from 30 days to 45 days. Setting an arbitrary 30-day standard will ultimately lead to unmanageable scheduling and duplicate compliance activities being performed in the same month.

Response: The Department has revised the language of § 129.123(c)(2)(i) to read:

“(i) **Beginning on or before _____** (*Editor’s note: The blank refers to the date 30 days after the effective date of this rulemaking, when published as a final-form rulemaking.*), calculate the actual VOC emissions **once per calendar month** using a generally accepted model or calculation methodology. The monthly calculations must meet the following:”

The Department also revised the language of § 129.123(c)(2)(i)(A) to read:

“(A) Be separated by at least 15 calendar days but not more than **45** calendar days.”

336. Comment: The Commentators state that fracturing, or refracturing, a well should not, by itself, result in control requirement applicability. Fracturing and refracturing does not automatically cause storage vessel throughputs or emissions to increase beyond those determined during the original facility design. Control requirements should only be applicable if a facility undergoes a significant modification that results in emissions increases above the original potential to emit determination.

Response: The Department revised § 129.123(c)(2)(ii) to read: “(ii) Comply with subsection (b) within **1 year** of the date of the monthly calculation showing that **actual** VOC emissions from the storage vessel have increased to **2.7 TPY VOC** or greater.”

The Department removed § 129.123(c)(2)(iii) from the final-form rulemaking. This allows the owners or operators to continue making their monthly VOC emissions determination; if the emissions exceed the applicable actual VOC emission threshold regardless of reason, then the operator shall comply with subsection (b) within 1 year of determining the exceedance.

337. Comment: The Commentator recommends that the timeliness of information about when the storage vessel is returned to service should not be “notification in the next annual report” but rather via informal email notification alerting the DEP that the storage vessel is on site. Field personnel need to be aware of what equipment is on site, especially during inspections.

Response: The requirement to keep the records under § 129.130(b) and the annual reports under § 129.130(k)(1) are sufficient to verify compliance with the storage vessel VOC RACT requirements. Because records must be made available to the Department upon request, the field inspector will have access whenever they visit the site.

§ 129.124. Natural Gas-Driven Continuous Bleed Pneumatic Controllers.

338. Comment: The Commentator states that the proposed rulemaking incorrectly characterizes all pneumatic controllers as affected facilities. The proposed rule should be revised to clearly reflect that intermittent or snap-action pneumatic controllers are not affected facilities under

Subpart OOOOa or the 2016 O&G CTG and should not be affected facilities under the proposed rule.

Response: The Department has revised § 129.121(a)(2) to read: “Natural gas-driven **continuous bleed** pneumatic controllers.”

The Department has also revised § 129.124(a) to read:

“This section applies to the owner or operator of a natural gas-driven **continuous bleed** pneumatic controller subject to § 129.121(a)(2) (relating to general provisions and applicability) located prior to the point of custody transfer of oil to an oil pipeline or of natural gas to the natural gas transmission and storage segment.”

339. Comment: The Commentators urge DEP to issue standards for these sources that broadly require the use of zero-emitting technology. The Commentators argue that emissions from continuous-bleed pneumatic controllers, even those designed to be “low-bleed,” can be substantial. Although low-bleed controllers are superior to high-bleed controllers, they often do not function as designed or otherwise emit more than designed; a significant number of controllers designated as low-bleed by operators or manufacturers have been observed to emit above the 6 scfh threshold. Improperly functioning devices may result in substantial emissions.

Intermittent-bleed controllers frequently have high emissions for two reasons. First, they are designed to vent natural gas while actuating, and some controllers actuate frequently. Second, intermittent-bleed pneumatic controllers frequently do not operate as designed and emit natural gas continuously, not just when actuating. Emissions from intermittent-bleed pneumatic controllers, specifically in Pennsylvania, are substantial and much higher than emissions from high-bleed controllers. Intermittent-bleed devices are a major source of harmful air pollution that are not subject to any federal or Pennsylvania emissions standards. While there is currently no precise data for the exact number of these devices in Pennsylvania, based on EPA’s Greenhouse Gas Reporting Program, the Commentators estimate that, in 2018, there were nearly 33,000 intermittent-bleed controllers with emissions of over 52,000 metric tons of methane in the state. In contrast, the Commentators estimate that there were only about 73 high-bleed controllers in Pennsylvania in 2018, emitting about 340 metric tons of methane. By omitting intermittent controllers, DEP’s proposed rulemaking will fail to address the vast majority of harmful VOC emissions from pneumatic controllers in the Commonwealth.

The Commentators state that solar- and grid-powered electronic controllers and instrument air technology are in wide use and available in the market. The Commentators also states that zero-emission solutions are available today and are cost-effective to implement in nearly every situation.

Costs are lower for existing sites because older controllers are higher-emitting, especially continuous-bleed controllers, which may be high-bleed if they predate EPA’s Subpart OOOO and cost per ton of VOC reduced is cost-effective based on the median wells drilled in Pennsylvania in 2016. It is more cost-effective for large sites with many controllers, sites that have pneumatic pumps, and at sites that have electrical power available.

Response: In the 2016 O&G CTG analysis, EPA states that “[a]t sites with a continuous and reliable source of electricity, controllers can be actuated by an instrument air system that uses compressed air instead of natural gas. These sites may also use mechanical or electrically powered pneumatic controllers.” They also state “[t]o our knowledge, natural gas processing plants are the only facilities in the oil and natural gas industry that are likely to have electrical service sufficient to power an instrument air system, and most existing natural gas processing plants use instrument air instead of natural gas-driven devices.” The requirements for natural gas processing plants in § 129.124(c)(1)(ii) account for this fact by requiring they have a bleed rate of zero scfh. Because the use of instrument air systems at a facility is potentially more expensive than replacing a natural gas-driven continuous high-bleed pneumatic controller with a low-bleed pneumatic controller unless there are a large number of pneumatic controllers at the facility, this option is likely not cost-effective for smaller facilities or technically infeasible due to lack of access to a reliable electrical source.

When determining BAT for the recent GP-5 and GP-5A, the Department received a comment from several owners or operators that “[w]hile transmission compression stations and most storage facilities are likely to have access to grid power, the controllers are often associated with equipment or components that are critical to facility operation and safety such as closing a valve during an emergency shutdown. This critical infrastructure must always be available and using electric controllers could affect reliability or compromise safety. Events where power is lost are also events where facility safety procedures are likely to be triggered.” The Department agreed with this analysis and removed the electric controller requirements from the BAT determination based on safety and reliability issues. The Department carries this reasoning regarding safety and reliability issues over to the VOC RACT making electrical controllers technically infeasible.

The Department agrees with the analysis in the 2016 O&G CTG where EPA states “It is our understanding that self-contained devices that release natural gas to a downstream pipeline instead of to the atmosphere have no emissions. “Closed loop” systems are applicable only in instances with very low pressure and may not be suitable to replace many applications of continuous or intermittent bleed pneumatic devices.” Many of the same issues with “closed loop” systems also apply to the capture of VOC emissions and routing them to a VRU or a fuel line.

In addition, the purpose of this final form rulemaking is to implement VOC emission reduction requirements, so using the methane abatement cost would not be appropriate here.

340. Comment: The Commentators state that DEP should consider the varying regional VOC content of the gas across the Commonwealth to determine appropriate and accurate cost and efficiency associated with emissions reductions.

Response: Because Pennsylvania is part of the OTR, the proposed rulemaking is applicable to the entire state. For this reason, it is appropriate to use an average natural gas composition when determining cost effectiveness in the final-form rulemaking.

341. Comment: The Commentators state that the burden of cataloging and labeling all existing pneumatic devices, evaluating their applicability to the proposed rulemaking, and replacing affected pneumatic controllers with new, compliant pneumatic controllers represents a capital cost that most conventional well operators in Pennsylvania would not be able to bear. The capital equipment costs associated with retrofitting existing continuous bleed natural gas driven

pneumatic controllers with low-bleed pneumatic controllers, would be approximately \$2,698 (2012 dollars) per unit, based on the pneumatic controller costs from the 2016 O&G CTG. That cost does not include the administrative cost of evaluating rule applicability to each controller and cataloging and tagging each controller. Considering that several controllers could be present at each well site, operators with 500 active wells could be facing compliance costs of \$1,000,000 or more.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. The EPA's 2016 O&G CTG for pneumatic controllers shows that the \$2,698 (2012 dollars) is the total capital cost. The annualized cost and the cost per ton of VOC removed are found on the same table where the Commentators drew the total capital cost, and are \$296 and \$209 per ton of VOC removed in 2012 dollars, respectively. The economic feasibility is typically determined based on the dollars per ton of VOC removed or the annualized cost, not the total capital cost of the control measure, although all are under the VOC RACT threshold used by the Department.

342. Comment: The Commentators recommend that reporting should be limited to continuous bleed natural gas-driven pneumatic controllers that do not comply with the applicable standard of 6 scfh.

Response: The recordkeeping and reporting requirement for all continuous bleed pneumatic controllers is needed to check whether a compliant controller had a deviation that caused emissions to exceed the emission limits of § 129.124(c).

§ 129.125. Natural Gas-Driven Diaphragm Pumps

343. Comment: The Commentator states that there is an extended time frame from proposed rulemaking to finalization that provides adequate time for the operator to prepare for reasonable changes; changes that a good operator would likely have in place as "best practices." Rather than "Beginning ... 1 year after the effective date of this rulemaking" the Commentator recommends revising subsection (b) to read "Within _____ (*Editor's Note:* The blank refers to the date 1 year after the effective date of this rulemaking, when published as a final-form rulemaking.)"

Response: Please see the response to Comment 331.

344. Comment: The Commentator appreciates the inclusion of the well site provisions for natural gas-driven diaphragm pumps. The Commentator especially appreciates the "or greater" portion and applauds every effort to ensure the most restrictive controls are used at every well pad within 1,000 feet of occupied structures as measured from the edge of the well site. The Commentator recommends adding subparagraph (iv) to § 129.125(b) which reads "Well Site locations within 1,000 feet of occupied structures, as measured from the edge of the well site, must install a natural gas-driven diaphragm pump capable of reducing VOC emissions by the greatest amount beyond 95.0% by weight." This provision is reasonable and necessary as no entity in the Pennsylvania government has researched what is considered a safe distance from a well site to an occupied structure. There are numerous studies that indicate the closer people are to an unconventional well site the more likely they are to experience health issues.

Those living within 1,000 feet of well sites, like the Commentator and their pets, are dealing with health problems. Pennsylvania doesn't need to increase our national cancer rating; it is necessary to create a more stringent provision for well sites that should never have been sited so close to homes in the proposed rulemaking. The Commentator suggests that DEP take a bold step forward and care about the health of Pennsylvanians who are living within 1,000 feet of unconventional well sites.

Response: The Department disagrees with adding subparagraph (iv) to § 129.125(b) as proposed by the Commentator. According to the EPA's 2016 O&G CTG, it is not cost effective to require a well site to install a control device to reduce emissions from a natural gas-driven diaphragm pump. The requirements of § 129.125(b) require 95% control only if a device already exists at the site. Requirements for well siting are outside the scope of this final-form rulemaking. Well site setback requirements are mandated under Act 13 which is enforced by the Department's Office of Oil and Gas Management.

345. Comment: The Commentator states that § 129.125(b)(1)(ii) requires routing emissions to a "control device or process that meets the applicable requirements of § 129.129." However, § 129.129 only appears to contain requirements specific to "control devices" and nothing specific to "processes," so it is unclear whether processes must somehow meet certain § 129.129 control device requirements, or if the proper reading of this subsection is simply that there are no applicable requirements for "processes." Please refer to the recommendation on "processes" included in Comment 330.

Response: The requirements for "processes" can be found in § 129.129(d) of the final-form rulemaking. Based on the requirements for control in § 129.129(d), emissions controlled by routing to a boiler or process heater is considered controlled if the emissions are injected into the flame zone of the process. The term "process" is defined in § 121.1.

346. Comment: The Commentator states that the proposed rulemaking requires that emission controls be installed and operated at all natural gas-driven diaphragm pumps located at well sites and requires 95% control efficiency of VOC emissions from such pumps, unless a particular pump shares more than one well. The 2016 O&G CTG recommends similar requirements as a general rule but recommends exemptions for existing control devices that are unable to meet the 95% efficiency requirement and for sites without existing control devices.

Response: The requirements for exceptions and exemptions to § 129.125(b) can be found in § 129.125(c) and (d).

347. Comment: The Commentator states that the exceptions do not promote the anticipated benefits of the proposed rulemaking and will allow diaphragm pumps located at well sites to continue contributing to the harmful effects of VOC emissions. The Commentator recommends that the Department omit subsection (c) which grants exceptions to certain natural gas-driven diaphragm pumps at well sites and that the Department require the installation of control devices that are capable of reducing VOC emissions to the fullest extent possible. This is especially necessary when the edge of the well site is within 1,000 feet from the nearest occupied structure.

Response: The establishment of VOC RACT requirements require that the control be technically and economically feasible. The exceptions listed in § 129.125(c) were determined by

EPA in the 2016 O&G CTG VOC RACT recommendation to disqualify control for either technical or economic reasons. An example of technical limitations includes if a device cannot achieve 95% emissions reduction; it should be noted that even if the control device cannot achieve a 95% reduction, it will still achieve some reduction as emissions from the natural gas-driven diaphragm pump would still be required to be routed to the control. An example of economic reasons includes if there is no available control or process, as it is not cost-effective to install controls only for a natural gas-drive diaphragm pump.

348. Comment: The Commentator recommends modifying subsection (d) to read “The emissions limitations and control requirements in subsection (b) do not apply to the owner or operator of a natural gas-driven diaphragm pump located at a well site which operates less than 90 non-consecutive days per calendar year. An owner or operator claiming this exemption shall maintain the records under § 129.130(d)(3).”

The operator can't be allowed to use exempt equipment on well sites during the summer months when ozone levels are usually higher and ozone action days occur more frequently. This is not promoting good health outcomes for Pennsylvanians when this exemption may occur as “regulated” during all the summer months. Airnow.gov is an excellent site for learning about the harmful effects of summer air quality.

Response: The 90-day operational exemption in § 129.125(d) from the requirements of subsection (b) were not limited to non-consecutive days in EPA's VOC RACT recommendation. The ozone season is from May to September, which is a total of 153 days; the Commentator's recommendation to limit the 90 day operational exemption to non-consecutive days would not resolve the Commentator's concern that this would allow operators to emit during the ozone season, as the majority of the 90 non-consecutive day operation could be accommodated during the ozone season.

349. Comment: The Commentator states that the proposed rulemaking provides a categorical exemption for natural gas-driven diaphragm pumps located at a well site, which operate less than 90 days per calendar year, so long as the owner or operator maintains records of the operating days. However, there is no cost-effective, commercially available technology available capable of tracking the pneumatic pump operating days. As such, this exemption will likely not be utilized, and operators will be forced to comply with the rule for pumps which should otherwise be exempt. The requirement to track actual operating data should, therefore, be removed and be replaced with a one-time applicability determination of worst-case actual operation to document the exemption status of a pneumatic pump.

Response: This requirement is consistent with EPA's 2016 O&G CTG. If the operator cannot track the operating days for their natural gas-driven diaphragm pump to keep the records of § 129.130(d)(3), then the operator cannot claim this exemption. The operator may still be eligible for an exception under § 129.125(c).

§ 129.126. Compressors.

350. Comment: The Commentators state that compressor blowdowns occur periodically for maintenance, operational stand-by, or emergency shutdown testing. During this process, methane may be released to the atmosphere from a number of sources including the high-pressure gas

remaining within the compressors and associated piping between isolation valves. There are no effective emission control requirements established in the proposed rulemaking for blowdown episodes. There are no notice requirements for scheduled blowdowns and no reporting or recordkeeping requirements for emissions from such events. Nor are there direct standards that require operators to reduce or control emissions during blowdowns. DEP's Emissions Inventory, which collects data only from unconventional wells and compressor stations, shows that VOC emissions from blowdown vents alone exceeded 1,815 tons from 2012-2018. Methane emissions from these sources exceeded 169,000 tons during this same period, and recent analysis clearly demonstrates the extent to which emissions are undercounted by inventory estimates. Therefore, the Commentators urge DEP to include control requirements in this proposed rulemaking to reduce blowdown emissions.

There are multiple cost-effective, technologically feasible means by which operators can responsibly control emissions from blowdowns, and the Commentators urge DEP to strengthen the proposed rulemaking by including standards to require such control. EPA's Natural Gas STAR program and participating program partners have found that simple changes in operating practices and in the design of blowdown systems can save money and significantly reduce VOC and methane emissions. The Commentators encourage DEP to consider the example from a neighboring state, Ohio.

The Ohio Environmental Protection Agency (OHEPA) recently finalized a series of new general permits that will reduce air pollution from natural gas compressor stations. Among these new permits, General Permit 17.1 establishes that reciprocating compressors located at compressor stations shall be designed with a technology that captures and controls emissions from compressor isolation valves and compressor blowdown vents. OHEPA allows operators to meet this requirement by using a design that either captures 100% of gases from these sources and routes them to a flare designed for 95% destruction or that first routes the high pressure gases to a low pressure line in order to reduce the gas pressure prior to venting to the atmosphere the remaining low pressure gas such that at least 90% of the gases are recovered. GP 17.1 further requires that operators minimize the frequency and size of blowdown events by "conducting routine operation and maintenance activities in a manner consistent with safety and good air pollution control practices." The Commentators urge DEP to follow Ohio's lead and adopt similar emission mitigation measures for blowdown events, with a decided preference for the control method that will result in the greatest emission reductions.

Response: The source categories for the VOC RACT applicability are consistent with the 2016 O&G CTG; blowdowns are not an applicable source. Therefore, the Department did not include blowdown vents in the final-form rulemaking.

351. Comment: The Commentator asks whether all compressors used in conventional oil and natural gas well operations are subject to the proposed rulemaking?

In the RAF, DEP estimates that only 435 midstream compressor stations will be affected by the proposed rulemaking. The Commentator asks whether compressors used in conventional oil and natural gas operations that are not midstream units are affected by the proposed rulemaking or does the estimate not include compressors used in the conventional oil and natural gas operations because the DEP was unable to provide an estimate as to the number of such compressors?

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

352. Comment: The Commentators suggest that § 129.126(a)(1) should state that any reciprocating compressor located at a well site and servicing more than one well site is not a source subject to VOC requirements under this rule to ensure consistency with the CTG.

Response: Please see the response to Comment 351.

353. Comment: The Commentator states that there is an extended time frame from proposed rulemaking to final rulemaking that provides an adequate amount of time for the operator to prepare for required changes; changes that a good operator instituting “Best Practices” would presently have in place. Therefore, the Commentator recommends revising the effective date so that Subsection (b) reads “...within _____” instead of “...beginning _____.”

Response: Please see the response to Comment 331.

354. Comment: The Commentators understand that § 129.126(b)(1)(i)(B) implies that rod packing must be replaced prior to the effective date of the rule. However, for practical implementation, the rule should incorporate typical requirements that allow for sufficient time following the effective date of a regulation for its implementation, that is, for replacement of rod packing.

Response: A rod packing replacement is not required prior to the effective date. The requirements based on this effective date in subsection (b) are only tracking time, whether through hours of operation in paragraph (1)(i) or through calendar months in paragraph (1)(ii), both of which have durations of approximately 3 years. The Department has determined that 3 years is plenty of time to prepare for a rod packing replacement. If the source was subject to a similar requirement prior to the effective date of this final-form rulemaking, then the tracking from the previous date of replacement in subparagraph (i)(A) or (ii)(A) allows the operator to continue that schedule.

355. Comment: The Commentators state that § 129.126(b)(2) would only allow routing emissions from a reciprocating compressor to a “process” and not to a “control device.” Routing to a “control device” should be an allowable option here, the same as is allowed for centrifugal compressors, storage vessels, and natural gas-driven diaphragm pumps, and for consistency with § 129.129(a) which includes § 129.126(b)(2) in the applicability for control devices and in the language of § 129.129(a)(2). The Commentators suggested revising § 129.126(b)(2) to read “Route the VOC emissions to a control device or process by using a reciprocating compressor rod packing emissions collection system that operates under negative pressure and meets the cover requirements of § 129.128(a) (relating to covers and closed vent systems) and the closed vent system requirements of § 129.128(b).”

Response: The Department has revised § 129.126(b)(2) to read:

“Route the VOC emissions to a **control device or a process that meets § 129.129 (relating to control devices)** by using a reciprocating compressor rod packing emissions collection system that operates under negative pressure and meets the cover requirements of § 129.128(a) (relating to covers and closed vent systems) and the closed vent system requirements of § 129.128(b).”

356. Comment: The Commentators state that § 129.126(c)(2) requires routing emissions to a “control device or process that meets the applicable requirements of § 129.129.” However, § 129.129 only appears to contain requirements specific to “control devices” and nothing specific to “processes,” so it is unclear whether processes must somehow meet certain § 129.129 control device requirements, or if the proper reading of this subsection is simply that there are no applicable requirements for “processes.” Please refer to the recommendation on “processes” included in Comment 330.

Response: The requirements for “processes” can be found in § 129.129(d) of the final-form rulemaking. Based on the requirements for control in § 129.129(d), emissions controlled by routing to a boiler or process heater is considered controlled if the emissions are injected into the flame zone of the process. The term “process” is defined in § 121.1.

357. Comment: Several Commentators recommend not granting exemption to compressors located at a well site or located at an adjacent well site that services more than one well site under subsection (d). Exempting compressors at well pads is short-sighted as operators have found it is less expensive to install compressors on well sites than drill and hydraulically fracture or re-fracture wells. This has been occurring frequently since the 2018 emissions inventory, so it is possible that central office is not aware of this information. Rural areas are no longer quiet, and people living near well sites can hear these loud, noisy engines in areas that were quieter than a library. One of the Commentators expressed frustration that a compressor engine was installed at a well site very close to occupied residences and as a result the Commentator often experiences malodors inside their homes from this nasty, smelly engine. The Commentators totally object to this exemption, and don’t think they should have more of these engines located here!

The Commentators may have had a different point of view if health outcomes been a factor in well site locations -- but they were not considered. The opportunity of the proposed rulemaking is to affect change for the better and the Department should take advantage of it!

Response: Please see the response to Comment 351. Additionally, requirements for well siting are outside the scope of this final-form rulemaking. Well site setback requirements are mandated under Act 13 which are enforced by the Department’s Office of Oil and Gas Management.

358. Comment: The Commentator states that DEP has not established an exemption for compressors based on size or operating conditions. Reciprocating compressors can be rated as low as 2 hp and may be equipped with blow-by gas recycle with no leakage to the atmosphere. In addition, many small compressors associated with gathering and boosting operations are electric. Small reciprocating compressors do not have rod packings and have not been identified as having appreciable emissions beyond very low fugitives. Given the administrative costs of compliance documentation, and reduced emissions associated with smaller compressors, such

sources should be exempted. Without an exemption, the industry would be faced with a huge administrative burden for compressors exhibiting extremely low or no VOC emissions.

The costs associated with required maintenance of small gathering and boosting operations is also cost prohibitive. As a real-world example, a common configuration consists of four 6 Mcfd wells feeding a small 10 hp electric powered reciprocating compressor realizes a profit of \$0.28 per Mcfd, based on the current gas price of \$1.70/Mcf and a \$1.42 breakeven level. For the total 24 Mcfd produced by the four wells, there is a daily profit of \$6.72. Because there are no exemptions for this small compressor, the proposed compressor rules would apply. The cost of documenting and tracking compliance in this system is estimated to be a minimum of \$1,000 per compressor and would take 148 days of operation to pay for the compliance documentation alone.

Response: The 2016 O&G CTG and both Subparts OOOO and OOOOa are silent on the size of an applicable reciprocating compressor. Whether a reciprocating compressor is driven by an electric motor is irrelevant to potential emissions from a rod packing. A reciprocating compressor that does not have rod packings has no requirements under the final-form rulemaking. A reciprocating compressor that is equipped with a blow-by gas recycle with no leakage to the atmosphere may be able to comply under § 129.126(b)(2); the operator should determine whether the system meets the criteria of §129.126(b)(2).

§ 129.127. Fugitive Emission Components.

359. Comment: The Commentator applauds the DEP's decision to exceed the federal CTG in some areas and to incorporate many aspects of federal NSPS, including quarterly LDAR. The Commentator supports the strong repair schedule of five and fifteen days for the first and final repair attempts, respectively, and the threshold of 500 ppm of methane or equivalent for defining a "leak" using a gas detector instrument.

Response: The Department acknowledges this comment.

360. Comment: The Commentator encourages DEP to clarify its criteria for acceptable leak detection methods. The proposed rule allows for use of OGI, gas detectors compliant with EPA Method 21, or "[a]nother leak detection method approved by the Department." The rule does not specify what process the DEP would use to consider and approve alternative methods; such ambiguity in criteria and standards could create a risk to the DEP regarding the effectiveness of the LDAR requirement.

Response: The Department has adopted a performance-based approach for evaluating leak detection equipment and the equipment's documented ability to measure the compounds of interest at the detection level necessary to demonstrate compliance with the applicable requirement. In many cases, the technology has been evaluated by the EPA and appropriate quality assurance requirements have been specified. In addition to Method 21 and 40 CFR § 60.18, 40 CFR § 98.234 includes a list of other appropriate technologies and requirements. Since the Department's criteria are performance based, an operator seeking to use an alternative method should provide documented evidence that the alternative technology is capable of detecting the leak at the specified leak threshold. For example, an alternative leak detection

method with the appropriate performance criterion may be specified in a related, though not specifically applicable, regulation such as an NSPS or NESHAP.

361. Comment: The Commentator states that the proposed rulemaking relies heavily on AVO inspections to detect leaks from fugitive emissions components and covers and closed vent systems. It prescribes monthly AVO inspections to detect “defects that could result in air emissions.” While AVO methods may help alert inspectors to the presence of some leaks, AVO is not a substitute for a robust LDAR program.

Using OGI cameras, the Commentator has documented leaks at many facilities in several states that do not exhibit audible, visual, or olfactory signals of a leak. In these cases, an AVO inspection would have resulted in a "false negative," and the leaks would have gone undetected and unrepaired.

Further, AVO relies on the subjective experiences of workers and inspectors and variable environmental conditions such as wind direction and noise levels. Some emissions sources, such as tall condensate tanks, may not be accessible to an AVO inspection. In the Commentator’s fieldwork experience, using an olfactory test is especially challenging because chemical and gas odors constantly permeate some sites.

AVO inspections are at best a necessary screening tool but should be employed in conjunction with, rather than as a substitute for, a reliable leak detection method. DEP should maximize the potential effectiveness of this method by strengthening the AVO inspection requirement to require weekly, rather than monthly, AVO inspections. The New Mexico Environment Department (NMED) recently released draft regulations to propose weekly AVO inspections.

Response: The Department disagrees with the Commentator. Monthly AVO has proven to be adequate to detect large leaks between quarterly instrument based LDAR inspections at midstream compressor stations and natural gas processing plants since 2013. In addition, the LDAR inspection program in the final-form rulemaking is a robust program, more stringent than that recommended by EPA in the 2016 O&G CTG.

362. Comment: The Commentator states that California's greenhouse gas reduction rules for the oil and natural gas sector stipulates that operators should conduct quarterly inspections of their sites using OGI as a screening tool to find visible leaks, followed by measurement using a gas analyzer. In Colorado, operators with oil and natural gas pollution sources within 1,000 feet of residences, schools, businesses, and recreational venues are required to conduct inspections using OGI more often than in other settings.

Response: Pennsylvania’s LDAR program in the final-form rulemaking is more stringent than the EPA’s recommendation in the 2016 O&G CTG. Also, the emissions from fugitive emissions components are required to be reported annually to the Air Emissions Inventory.

363. Comment: The Commentator suggests strengthening the effectiveness of LDAR and reducing the burden upon regulators and the regulated community, by considering an alternative compliance pathway using third-party verification as a complement to the required LDAR compliance schedules.

DEP and operators could partner with third parties such as private consultants, academic institutions, and non-governmental organizations to detect and report leaks. DEP could require third party verifiers to use the same or similar approved leak detection methods as operators. These parties could provide valuable assistance to regulators and operators by revealing leaks most in need of repair, in turn allowing DEP to focus inspection and enforcement resources more efficiently.

The Commentator recommends that the DEP incorporate provisions to allow credible, third-party information indicating operator noncompliance submitted to or obtained by the Department as evidence of a presumed violation, as proposed in the draft NMED regulations.

Response: The Department requires instrument based LDAR inspections based upon the unconventional well site's overall production and the production of individual wells located at the well site; it does not specify that the inspection be completed by the owner or operator. The owner or operator may hire or contract with a third-party organization to perform the inspections.

364. Comment: The Commentator suggests that a third party verification must show the same pattern of results as the original company when they calculate their VOC emissions as required in §§ 129.123(i), 129.124(c), 129.125(f), and 129.126(e) to ensure there is no bias or forging of data. This will assist in achieving VOC emission reductions to maintain levels of the 8-hour ozone NAAQS, meeting sections 172(c)(1), 182(b)(2), and 184(b)(1)(B) of the CAA. In addition to ensuring VOC emissions reductions, it will also provide consistency among all oil and natural gas sources and Governor Tom Wolf's strategy to reduce the harmful effects from the oil and natural gas industry.

Response: There is no need for a third-party verification because the operator must submit to the Department an annual report as required in § 129.130(k) that is certified by the responsible official. Consequences exist if it is determined that a certified report contains false information.

365. Comment: The Commentators support a LDAR program with frequent inspections, including AVO inspections. It should be the responsibility of the operators to regularly inspect for leaks similar to the regular inspections and maintenance necessary to keep a motor vehicle in good running condition.

Response: The Department finalized an inspection program that requires monthly AVO and instrument based LDAR with frequency determined by the unconventional well site's production and the production of individual wells located at the unconventional well site. The final-form rulemaking requires the owners and operators to determine the production of their unconventional wells and well sites annually and requires the owners and operators to adjust the frequency of the instrument based LDAR dependent on the results of the calculations. Two consecutive calculations that show that the unconventional well site would be subject to a lower frequency are required before reducing the LDAR frequency. A calculation that shows that the unconventional well site would be subject to a higher frequency are required to increase the LDAR frequency immediately. The step-down provision based on the percentage of leaking components has been removed.

366. Comment: The Commentator states that any substance that pollutes the air must be dealt with swiftly to reduce harm to the people. The Commentator suggests that a company that

doesn't fix leaks must be heavily fined to bring them into compliance. Companies that offend a second time should be required to submit a corrective action plan. Companies that keep having leaks without repairing them, should be forced to close.

Response: The Department requires that any leak detected, whether during an AVO inspection or an instrument based LDAR inspection, must have a first attempt at repair within 5 calendar days, be repaired within 15 calendar days unless there are extenuating circumstances, and a resurvey to determine the efficacy of the repair within 30 days of the completion of the repair. Failure to comply with these requirements will be evaluated, as they are with all other regulations, and the Department will take the appropriate action.

367. Comment: The RAF predicts an annual cost of \$4,220 to implement a quarterly LDAR program. The conventional oil and natural gas industry is unfamiliar with the required steps to establish an LDAR program. Based upon polling of an industry organization's members at a recent member meeting, none owns or has utilized LDAR equipment. Therefore, the costs to obtain the equipment and to be trained in its use would be new to the conventional industry which is opposite to the DEP assumption that most industry members already perform quarterly LDAR inspections. That assumption from the RAF is likely true of the unconventional oil and natural gas industry but not of the conventional industry.

The Commentator is also concerned about which wells and equipment will be subject to the quarterly LDAR inspection requirements, and the remediation required if leaks are found. The proposed rulemaking appears to impose the inspection obligation upon numerous facilities, some of which can exist in conventional oil and natural gas operations.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites. The Department requires instrument based LDAR inspections depending upon the unconventional well site's production and the production of individual wells located at the well site; the Department does not specify that the inspection be completed by the owner or operator. The owner or operator may hire or contract with a third-party organization to perform the inspections.

368. Comment: The Commentator states that the proposed rulemaking appears to exclude wells which produce less than an average of 15 BOE per day from the LDAR inspection requirements. The Commentator asks how DEP will regard conventional well production that is commingled in common collection lines and storage vessels? Specifically, will any aspect of the collective production be the metric for the applicability of the proposed regulation, or will the metric be constrained to single wells, even though the production from individual wells is estimated because of the commingling?

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate

rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites. A procedure to estimate an unconventional well site's production has been written into the final-form rulemaking at § 129.127(b). The owner or operator of a producing unconventional well site is required to track the average production of the well site and individual well production on an annual basis by calculating the average production for the previous year not later than February 15. The owner or operator shall determine the average production by calculating the total production for each active individual well for the previous year, summing the results for all active wells at the unconventional well site, and then dividing the total by the number of days in the year. The operator is allowed to use the data that they report in accordance with 25 Pa. Code §§ 78.121 and 78a.121. The result is used to determine the required LDAR frequency in § 129.127(c).

369. Comment: The Commentator asks what accounts for the seeming conflict in numbers of affected sources set forth by the DEP in the RAF and in a PowerPoint presentation available on the EQB website. In them DEP estimates that “approximately 71,229 conventional wells, 8,403 unconventional wells, 435 midstream compressor stations, 120 transmission stations, and 10 natural gas processing plants may have sources that will be affected by this proposed rulemaking;” yet at other places in those documents, the DEP estimates that only 200 or 300 conventional wells will be affected by the proposed rulemaking.

The Commentator asks which conventional oil and natural gas operators will have to conduct LDAR and how many components will they have to inspect? Perhaps in some circles these conventional industry questions are viewed as unreasonable pushback. From the perspective of the Commentator however, it is not unreasonable, after being left in the dark, to then be fearful of the unknown.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

370. Comment: Finding \$4,220 to implement a new LDAR program will be impossible as prior to the economic contraction that sum represented 40 barrels of oil and now it's 100 barrels. The Commentator asks if the \$4,220 includes the cost of the LDAR equipment or is it the cost of the equipment amortized across a large number of wells or compressors? If it is the amortized cost, how does a mom and pop oil producer, who owns five wells and one compressor, afford the equipment? Does that \$4,220 include the costs of training and record keeping; what are those costs? Does the machine have to be calibrated, and are those costs included in the \$4,220 figure?

The Commentator asks what remediation is required when a leak is found? What emission standard must be achieved by the remediation and who is responsible for testing that achievement? What recordkeeping is required? What are the estimated costs of remediation and record keeping?

Response: In the 2016 O&G CTG, the \$4,220 cost to implement a quarterly LDAR program was for the EPA's model plant and a company-defined area including 22 facilities and includes

the costs to read the rule, develop the monitoring plan, perform initial activities planning, submit the notification of initial compliance, perform subsequent activities planning, perform the monitoring, perform the repairs and resurveys, and prepare and submit the annual reports. An owner or operator has the option to hire a third-party contractor to perform the inspections instead of purchasing the equipment and performing the inspections themselves. The Department has determined that the cost-effectiveness of purchasing the equipment and training inspectors is comparable to the cost-effectiveness of hiring a third-party contractor.

To comply with the final-form rulemaking, the owner or operator is required to make a first attempt at repair within 5 calendar days, complete the repair within 15 calendar days unless there are extenuating circumstances, and resurvey the component to determine the efficacy of the repair within 30 days of the completion of the repair for any leak detected during an AVO inspection of an instrument based LDAR inspection.

The operator is required to maintain the records of § 129.130(g) and report the results annually in accordance with § 129.130(k)(3)(vi). EPA estimated the cost of remediation in the 2016 O&G CTG; the costs of recordkeeping and reporting are also included in the \$4,220 control cost.

371. Comment: The Commentator urges DEP to include both intermittent-bleed and continuous-bleed pneumatic controllers among the equipment that operators must cover in their LDAR inspections. This will ensure that improperly functioning devices are located and repaired on a regular basis.

Response: While intermittent-bleed pneumatic controllers are not addressed under a specific regulatory section in this final-form rulemaking, they do have to meet requirements for fugitive emission components. The Department revised the definitions of the proposed terms “natural gas-driven pneumatic controller” and “fugitive emissions component” in this final-form rulemaking. The final-form definition of “*Natural gas-driven continuous bleed pneumatic controller*” states it is “[a]n automated instrument used for maintaining a process condition such as liquid level, pressure, delta-pressure or temperature powered by a continuous flow of pressurized natural gas.” The final-form definition of “*Fugitive emissions components*” in subparagraph (i) includes instruments. By including the term “instruments” in the definition of fugitive emissions components, an intermittent-bleed pneumatic controller is required to be inspected through AVO and LDAR. However, emissions that vent as part of the controller’s normal operations are not considered to be leaks. Subparagraph (ii) limits the leak definition from “a device, such as a natural gas-driven continuous bleed pneumatic controller or a natural gas-driven diaphragm pump, that vents as part of normal operations if the gas is discharged from the device’s vent.”

372. Comment: The Commentator states that the requirements outlined in § 129.127 (relating to fugitive emissions components), and the subsequent proposed LDAR and AVO inspection obligations are duplicative and conflict with existing federal or state programs. The industry has widely stated that it has a mutual interest to identify and promptly repair leaking infrastructure to minimize production losses. The Commentator is subject to extensive LDAR and AVO inspections through Subparts OOOO and OOOOa requirements and Pennsylvania’s GP-5 and GP-5A. These existing rules provide adequate coverage and inspection frequencies to reasonably identify and eliminate leaks.

Response: The Department is aware that the oil and natural gas industry is subject to many federal, state, and local requirements. The owner or operator is required to determine which LDAR program is most stringent and implement that program; the more stringent requirement will ensure compliance with all other requirements. See Comment 280, above, for a more specific example.

373. Comment: Recently Colorado strengthened for the second time its requirements for low producing wells, noting “more site visits results in the identification and repair of more leaks.” Specifically, the AQCC increased the inspection frequency for the well sites emitting between 2 and 12 TPY of VOCs from tanks to semi-annual. The AQCC retained the more frequent inspections, either quarterly or monthly, for well sites with tank emissions greater than 12 TPY, and the annual inspection requirement for well sites with tank emissions between 1 and 2 TPY VOCs located in the nonattainment area. The state also adopted a wholly new requirement that requires more frequent inspections at well sites located near homes.

Colorado’s experience underscores that frequent LDAR surveys at lower production well sites is necessary and important for securing additional pollution reductions and that frequent surveys are both feasible and cost-effective. Indeed, Colorado has moved forward with strengthening monitoring requirements at both new and existing facilities, in sharp contrast to EPA’s proposal to weaken requirements currently in place. Colorado’s recent estimates of the cost of methane and VOC abatement suggest that EPA has significantly overestimated the cost of monitoring.

Response: The Colorado tiered inspection frequency method based on tank emissions is less stringent than Pennsylvania’s LDAR requirements which do not rely on an emission threshold; it applies to all fugitive emissions components, including those on storage vessels. Colorado does not require a quarterly frequency until the tank emissions reach 12 TPY VOC; changes increasing the frequency of inspection at sites with annual frequency to semiannual were to comply with Federal regulations. Additionally, Colorado’s cost justifications are based on both methane and VOC.

374. Comment: The Commentator states that climate change threatens the well-being of humans and ecosystems, and in order to prevent its most severe impacts, a wide array of measures will need to be employed. One such measure is reducing fugitive methane emissions associated with the production of oil and natural gas. The Department’s proposed rulemaking is designed to reduce air pollution from existing natural gas wells and infrastructure in order to protect public health, limit GHG emissions and implement the Commonwealth’s Methane Reduction Strategy. The proposal relies on LDAR and more frequent use of leak-sensing technologies, which create opportunities to reduce natural gas losses and promote greater efficiency. Using these tools to control VOC and methane emissions is a smart approach to improving air quality and fighting climate change.

Response: The Department acknowledges this comment.

Alternative Leak Detection Methods

375. Comment: The Commentators state that a process should be created that encourages the development and use of new technologies that reduce the cost of compliance of regulated entities while reducing the quantities of methane and VOC emitted within the Commonwealth. These

technologies might include remote sensing and permanent sensor technologies. An example of how to encourage technical innovation is to replace the requirement that LDAR surveys be performed using prescribed technology with a requirement that LDAR surveys can be performed using any technology that has been demonstrated to achieve equivalent reductions in aggregate emissions. A specific procedure for conducting that demonstration has been developed by a group of operators, regulators, academics, solution providers, consultants, and non-profit groups from Canada and the U.S. This regulation has been implemented successfully in the Canadian Province of Alberta, and a similar regulation in Pennsylvania would likely be successful as well.

Response: Please see the response to Comment 360.

376. Comment: The Commentator states there are only two oilfield leak detection technologies currently approved by the EPA, Method 21 and OGI. Both, as commonly implemented, are sensitive to both methane and VOC. However, there is broad agreement, ranging from the EDF to the IPAA, that the presently employed technologies are inefficient and sometimes ineffective. New sensor technologies are currently being developed and tested to detect natural gas emissions. Many of the most promising of these techniques are sensitive to methane but insensitive to VOC. Regulation of both methane and VOC will not change the present situation and will allow Pennsylvania companies to use the best reasonably available control technology for emission detection and control that may arise in the future.

Method 21 uses a probe to sample the air at the surfaces of pipe fittings, valves, and other components. OGI images gas plumes, enabling more efficient and effective leak detection than Method 21 probes. Optical gas imagers use broadband infrared (IR) spectroscopy, which is suitable for inspections within 4 meters (approximately 13 feet). The most common OGI instruments used in the oil and natural gas industry are sensitive to wavelengths in the mid-IR band, between 3.2 μm and 3.4 μm , which is sensitive to both methane and VOC.

Given the presently approved methods as commonly implemented, relying solely on a VOC emission rule is equivalent to relying on a methane emission rule, so long as Method 21 and OGI are used to inspect all infrastructure, regardless of the VOC content of natural gas produced in the region.

However novel technologies to detect fugitive emissions are being developed by innovators and field tested by a broad coalition of operators, industry trade groups, and environmental advocates. Advanced technologies can be usefully deployed to reduce, perhaps dramatically, the cost of compliance with natural gas LDAR requirements. These technologies potentially include surveillance of oil and natural gas infrastructure by sensors deployed on drones, helicopters, fixed-wing aircraft, or earth-orbiting satellites. For many emerging technologies, speciation of fugitive emissions is inherent to the physical principles that underly the detection technique.

As much of the natural gas produced in Pennsylvania has low VOC content and, because of the poor sensitivity of advanced leak detection methods to VOC, the Commentator states that aerial or satellite detection of VOC is likely impractical. By signaling that the reduction of methane emissions is not a priority of Pennsylvania, the development, improvement, and deployment of the best reasonably available control technologies for methane is discouraged; the Commonwealth may well condemn regulated entities to the continued use of costly, tedious, and sub-optimal techniques for natural gas leak detection.

Response: This final-form rulemaking requires the owner or operator of an affected source to perform LDAR using OGI or Method 21, which detect total gaseous hydrocarbons including VOC. For OGI, the leak definition is any visible leak. It appears in the technologies described, like OGI, a leak definition would be any leak visible to IR spectroscopy. Therefore, if IR spectroscopy was approved for use by the Department in accordance with §§ 129.127(c)(2)(ii)(C), (c)(3)(ii)(C), or (e)(2)(iii), any leak found would require repair in accordance with § 129.127(k). The Department appreciates the edification of the IR spectral characteristics of methane and VOC also provided by the Commentators.

377. Comment: Several Commentators state that the ability to monitor leaks in real time exists and detecting and correcting those leaks makes sense from an asset management perspective. This saves resources for future needs and reduces current impacts to the climate and our health. The Commonwealth already has thousands of abandoned shallow wells across the state that leak and are extremely difficult to find and remediate. It makes sense to institute monitoring where possible now, rather than hoping for the best and struggling to find the leaks at some point in the future. It is difficult to reclaim our streams damaged by acid mine runoff; it will be even more difficult to find leaking wells in the future without regular and effective monitoring.

Response: The Department does require real-time monitoring through monthly AVO inspections supplemented by quarterly or annual instrument based LDAR inspections. The Department requires leaks to be monitored, recorded, and reported.

378. Comment: The Commentator suggests that the data collected through leak detection and monitoring should be available to the public and to the Department so that legal action can be taken if leaks are not promptly addressed.

Response: The public may request information from the Department on leaks that are detected and repaired.

379. Comment: The Commentator states that the economics of methane reduction must be considered. The average marginal well emits approximately 0.5 Mcfd of methane. Even if LDAR applied to marginal wells were to capture all of that emitted methane and add it to the sales line, the financial benefit to the producer of LDAR would be approximately \$400 per well per year at today's prices. Given that EQB estimates LDAR will cost approximately \$4,000 per well per year, it appears unlikely that mandating traditional LDAR on marginal wells will be economically justifiable.

However, there exists a middle ground between the extremes of allowing most of the industry's emissions to continue by exempting marginal wells from regulation and placing a financial burden on producers by mandating uneconomic LDAR for marginal wells. Numerous new LDAR technologies are being developed by a diverse set of innovators. Academic studies have indicated that the new technologies can improve performance and reduce cost relative to traditional LDAR technologies such as optical gas imaging. These new technologies take advantage of the observation that most of the industry's emissions, in Pennsylvania and elsewhere, come from a small number of "super-emitting" facilities, including marginal wells. The new technologies focus on identifying the super-emitters in ways unachievable using traditional technology, allowing the new technologies to achieve large emissions reduction at

low cost. In one example, Rashid et al. found an optimal routing solution for the aerial surveillance of 119,000 Pennsylvania oil and natural gas wells utilizing an airborne platform with a sensitivity of 1 kg/hr. They estimate the cost of inspection to be only \$100/well, while the effectiveness of inspection is approximately the same as from optical gas imaging.

LDAR performed on marginal wells in Pennsylvania using these emerging technologies is likely to reduce a substantial fraction of emissions from this important source category at no net cost to the average producer, because the cost of the LDAR measurement is comparable to the additional revenue arising from selling the saved gas. The Commentator suggests that allowing emerging technologies to be used to monitor emissions from marginal wells achieves a middle ground and represents a win-win for the producers and for the environment.

Response: The Commentator promotes the use of aerial surveillance, which has its shortcomings, especially in light of the quoted sensitivity of 1 kg/h and its cost of approximately \$100 per well. The required sensitivity for OGI equipment is that it is capable of detecting a gas that is half methane, half propane at a concentration of 10,000 ppm at a flow rate of 60 g/h or less from a ¼ inch diameter orifice. This is at least an order of magnitude more sensitive than the aerial surveillance method described by the Commentator.

The Commentator states that the Board estimated that it would cost \$4,000 per well per year to conduct LDAR. While the \$4,220 annual cost estimate for quarterly LDAR is from EPA's 2016 O&G CTG, the cost included 22 well sites in the analysis. With an average of approximately 2 wells per well site, this is 44 wells; therefore, the cost is approximately \$96 per well which is slightly lower than the cost of aerial surveillance.

§ 129.127. Fugitive Emission Components.

380. Comment: Several Commentators state that § 129.127(a)(1) contains an applicability threshold of 15 barrels of oil equivalent per day, “on average,” but it is not clear over what period of time the “average” must be determined. Is that per day average production figure to be determined over a month, a year, or what timeframe?

Response: The Department added a procedure to estimate an unconventional well site's production in § 129.127(b) of the final-form rulemaking. The owner or operator of a producing unconventional well site is required to track the average production of the well site and individual well production on an annual basis by calculating the average production for the previous year not later than February 15. The owner or operator shall determine the average production by calculating the total production for each active individual well for the previous year, summing the results for all active wells at the well site, and then dividing the total by the number of days in the year.

381. Comment: The Commentators recommend changing the proposed rulemaking that exempts thousands of low-producing wells from common sense LDAR requirements. Research has demonstrated that low-producing wells are responsible for a disproportionate and significant amount of methane pollution from oil and natural gas sources in Pennsylvania. In practice, fewer than 1% of Pennsylvania's tens of thousands of conventional wells meet this production threshold, meaning that over 99% of these wells will be exempted from any LDAR inspection requirements despite a recent EDF analysis that shows conventional wells are responsible for

more than half the methane pollution from Pennsylvania's oil and natural gas sector. The Commentators urge DEP to remove this exemption from the proposed rulemaking and require routine inspections for all wells regardless of production levels to ensure emission leaks are quickly identified and repaired.

Response: The Department's 2020 reanalysis has determined that an LDAR program including an annual instrument-based frequency is cost-effective for RACT purposes for unconventional well sites that produce, on average, equal to or greater than 15 BOE per day and has at least one individual well that produces less than 15 BOE per day and equal to or greater than 5 BOE per day. The Department's 2020 reanalysis has determined that an LDAR program is not cost-effective for RACT purposes for unconventional well sites that produce, on average, less than 15 BOE per day or that produce equal to or greater than 15 BOE per day with all wells producing less than 5 BOE per day.

382. Comment: The Commentator has documented problems at conventional wells in Pennsylvania, including frequent leaks from well casings and emissions from tank batteries using industry-standard OGI technology. As an example, in August 2018, the Commentator conducted an OGI inspection to document emissions from a tank hatch and a leak near the well shaft, which were reported to DEP in a formal complaint. A DEP inspector responded and visited the site, later reporting to the Commentator that the operator had tightened the well shaft part that was leaking.

The inspector acknowledged that the amount of leaking gas shown in the OGI video appeared significant, but that he could not issue a violation to the owner or operator for either the tank emissions or the leak because current Pennsylvania regulations allow such well sites to release large quantities of emissions. When asked how long these components had been leaking, the inspector indicated there was no way of knowing. According to DEP well production records, the last site inspection was conducted 5 years prior--meaning the leak and tank emissions could have persisted for years without detection or repair.

Response: Please see the response to Comment 381.

383. Comment: The Commentator suggests that the Department revise the proposed rulemaking to close the exemption of low-producing wells from LDAR. The Pennsylvania Constitutional requirement is that the Department seek to minimize pollution "so far as feasible." Considering an LDAR program consisting of a monthly AVO inspections and a quarterly instrument-based inspection requires little more than a brief monthly visit to the site to see if any leakage is readily apparent, it is unclear under what grounds this would not be considered feasible. This is especially true given the testimony the Department has heard that these wells are responsible for more than half of the methane emissions.

While the Department presented an analysis of the emissions benefits from fugitive emissions controls, it should be noted that significant parts of this data likely rely on a calculation methodology published by the EPA in 1995 that not only pre-dates the unconventional natural gas industry, it does not consider well production as a factor in leak estimation. The EPA as well, when developing the 2016 O&G CTG for these sources, did not review data for sources producing less than 15 BOE per day and consequently made no recommendation regarding RACT. To the extent that the Department relies on either of these sources, it can have no basis

to determine the control of leakage from low producing wells is not feasible. Barring an actual analysis to the contrary, the Department should immediately close the loophole for low-producing wells.

Response: Please see the response to Comment 381.

384. Comment: The Commentators state that the proposed rulemaking currently applies LDAR requirements only to well sites with a well that produces, on average, greater than 15 BOE per day. This production threshold was adopted by the Department from EPA's recommendations in the 2016 O&G CTG as constituting RACT for these sources in Pennsylvania. However, it is critical to note that the 2016 O&G CTG did not determine that sites with low-producing wells do not emit significant emissions through equipment leaks; rather, it simply declined "at this time ... to include a RACT recommendation" for those well sites. As such, EPA "encourage[d] air agencies to consider site-specific data from these sources in their RACT analyses."

DEP estimates that "[o]f the 71,229 conventional wells reporting production, only 303 are above the 15 barrel of oil equivalent per day production threshold as reported in the Department's 2017 oil and natural gas production database and will have fugitive emissions component requirements." That equates to only 0.425% of these sources being subject to baseline quarterly LDAR requirements. The remaining 99.575% will have no inspection requirements whatsoever.

There is no site-specific data or analysis presented by DEP in the proposed rulemaking or supporting materials on either the costs or emission reduction benefits associated with implementing LDAR programs for low-producing wells, despite EPA's encouragement. Given the sheer volume of Pennsylvania wells that would be exempted from applicable LDAR requirements using this production threshold, as well as comprehensive analysis demonstrating these low-producing well sites emit nearly 600,000 short tons of methane per year, the Commentators urge DEP to remove this low-producing well exemption from the proposed rulemaking. DEP does not require that conventional well operators report their emissions, but it is estimated that these wells are responsible for over half the annual methane emissions from upstream oil and natural gas sites despite contributing less than 10% of total natural gas production in Pennsylvania.

If DEP insists on providing some form of exemption for low-producing wells, the Commentators propose two narrower exemptions. The Commentators' first recommendation is to limit any marginal well exemption to those operators that only have low producing wells in their portfolio (Category 2). Category 1 includes all operators that have at least one non-exempt well in their company inventory. Using the information on the types of wells in each operator's portfolio, the Commentators compared the cost of conducting quarterly inspections for Category 1 and Category 2 wells to the total revenue from all wells each operator's portfolio. The Commentators also calculated total VOC and methane reductions associated a quarterly inspection requirement at all Category 1 wells.

Using this approach, the Commentators recommend that all Category 1 operators conduct quarterly inspections of the wells in their portfolio. This would reduce emissions by 421,510 tons of methane and 43,455 tons of VOC at a cost of approximately 1.6% of annual revenue for those operators. The second alternative recommendation is to establish a tiered LDAR approach based on the facilities production, consistent with Colorado's LDAR program. This approach is also

highly cost effective, falling under traditional thresholds for cost effectiveness used by other states and EPA. The emissions reduced in the tiered LDAR structure are summarized in the following table:

	Well Count	Tiered LDAR Reductions (tons CH4)	Tiered LDAR Reductions (tons VOC)
More than 15 BOE per day	2,435	304,609	31,403
5-15 BOE per day	626	11,574	1,193
Less than 5 BOE per day	64,483	132,229	13,632
Total	67,544	448,412	46,228

Response: The Department has a comprehensive LDAR program in the final-form rulemaking which is more stringent than the EPA’s VOC RACT recommendation. This RACT determination was based on the Department’s 2020 reanalysis and is estimated to reduce VOC emissions by 1,807 TPY and co-benefit methane emissions by 28,973 TPY from all unconventional well sites producing greater than 15 BOE per day. The Department has carefully considered the information provided by the Commentators and disagrees with the initial estimations of emissions. The Department’s 2020 reanalysis estimates production emissions of VOC to be 4,643 TPY and methane to be 86,300 TPY. The Commentators’ estimated emissions reductions are approximately ten times the total VOC emissions and approximately five times the total methane emissions estimated by the Department. This is in part due to the Commentators’ emission reductions calculated to come from abnormal operation emissions, which would not be effectively reduced by an LDAR program.

Any emissions from abnormal operations must be reported in the annual Air Emissions Inventory under 25 Pa. Code § 135.3. Air Emissions Inventory personnel review the annual submissions and communicate with operators if the numbers seem off. Many times, the reason for the differences in reported emissions are due to venting to affect repairs. When an applicable requirement of the final-form rulemaking is exceeded due to abnormal operation, a “*Deviation*” must be recorded. This does not change the existing compliance protocol, including the issuance of Notices of Violation. The frequency and severity of deviations from the requirements will be evaluated as they are with all other regulations and the Department will take the appropriate action.

385. Comment: The Commentator states that the Board’s proposed rulemaking only extends to existing wells that produce more than 15 BOE per day with a GOR of greater than 300 scf of gas per barrel of oil. For a gas well, 15 BOE per day is equivalent to 90 Mcfd, where 1 BOE is 6,003 Mcf. Methane emissions are not explicitly regulated but are assumed to be reduced as a co-benefit of VOC regulation. The Commentator states that the exclusion of existing wells that produces less than 15 BOE per day will allow at least 61% of natural gas emitted to the atmosphere to escape undetected.

Response: Please see the response to Comment 381.

386. Comment: The Commentator states that a significant shortcoming of the proposed rulemaking is the reliance of DEP on the data provided in the 2016 O&G CTG, which is largely reliant on data developed in support of Subparts OOOO and OOOOa. The data developed by EPA are not representative of the vast majority of the sources that would be impacted by the

proposed rulemaking; the conventional wells of Pennsylvania, which are almost universally characterized as low production or stripper wells.

DEP estimates that the proposed rulemaking would affect 71,229 conventional wells currently in production in Pennsylvania, of which 303 would be subject to LDAR requirements. By DEP's own estimates, this equates to only 0.42% of conventional wells in production. For those owners and operators that do not own the 303 affected wells, the administrative costs, lost man hours, and costs for environmental consultants associated with an applicability determination to conclude that they are exempt is overly burdensome, especially considering that DEP has already in effect made the determination. DEP should provide the basis for its estimate of the number of conventional wells subject to LDAR requirements under the proposed rulemaking.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

387. Comment: The Commentator asks about the proposed rulemaking's potential applicability to conventional oil and natural gas operations. The proposed rulemaking provides that "fugitive emissions components" are subject to requirements that apply at well sites with a well that "produces, on average, greater than 15 barrels of oil equivalent per day." The rulemaking does not state an exception for conventional oil and natural gas wells and, in theory, it is possible that a conventional oil and natural gas well can produce more than 15 BOE per day, depending upon numerous factors including the ratio of oil to gas used to determine equivalency and including the time period during which the average is measured.

At the industry organization's general member meeting conducted on July 9, 2020, the Commentator polled its members in attendance to determine whether any member operated or owned a conventional well which produces, on average, greater than 15 BOE per day. In response, most members answered "no." However, the members in attendance were unable to provide answers with certainty due to questions regarding the ratio used to determine "equivalent" and the time period during which the average is measured. Some members advised that they did not operate or own any wells which produced or were capable of producing 15 BOE per day at any time. Some members reported that, under certain conditions, newly completed wells might produce greater than 15 BOE per day for a short period of time. In addition, the Commentator's members reporting the possibility of production in excess of 15 BOE per day cautioned that, in many cases, new wells are connected to common fluid and natural gas collection lines which commingle natural gas and produced fluids from the new well with existing wells, and that such commingled production is not measured at the individual well site but is, instead, measured at a common storage vessel and natural gas meter. Those members went on to report that it would be difficult to ascertain with certainty what portion of the fluid and natural gas production was attributable to the new well and what portion of the fluid produced by the new well was water or oil.

For these reasons the Commentator is uncertain as to whether any of Pennsylvania's conventional oil and natural gas wells would fall within what the proposed rulemaking intends as

the average of 15 BOE per day and, therefore, as to whether the proposed rulemaking applies to conventional oil and natural gas wells, especially as that latter term is used in the context of Act 52.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

388. Comment: The Commentator states that the provisions that exempt low production wells from the LDAR requirements in the proposed rulemaking are supported by the 2016 O&G CTG which states:

“It is our understanding that fugitive emissions at a well site with low production wells are inherently low and that many well sites are owned and operated by small businesses. We are concerned about the burden of the fugitive emissions recommendation on small businesses, in particular where there is little emission reduction to be achieved.”

The EPA is correct in its assertion that the costs associated with LDAR inspections at low production wells would create an unnecessary financial burden on small business while simultaneously creating a huge administrative burden on both operators and DEP. The same justification for exempting low production wells from LDAR requirements should also be applied to gathering and boosting operations that are associated with conventional operations in Pennsylvania.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants.

389. Comment: The Commentator states that aging conventional oil and natural gas assets are unlikely to rise to the 15 BOE per day threshold, meaning that well sites subject to this rule would likely be unconventional well sites. Producing unconventional wells sites are already subject to fugitive monitoring requirements under federal and state programs, rendering additional AVO and LDAR requirements as overly burdensome without providing environmental benefit.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites. The owner or operator of an unconventional well site shall comply with the more stringent AVO and LDAR requirement. For example, an unconventional well site subject to Exemption 38(b) would be required to conduct the monthly AVO and instrument based LDAR inspections of the frequency as determined based on the well site’s production and the production of the individual wells located at the unconventional well

site unless the annual instrument based LDAR requirement of Exemption 38(b) is more stringent. The owner or operator of a facility that is subject to GP-5 or GP-5A would be required to meet the conditions of the general permits, as the general permits are more stringent than the requirements of the final-form rulemaking.

390. Comment: The Commentator states that the LDAR requirements in the proposed rulemaking apply to all producing well sites with a GOR of at least 300 scf of gas per barrel of oil. The 2016 O&G CTG does not recommend RACT for such sites if they produce less than 15 BOE per day on average.

Response: The steps for determining applicability should be conducted in the following order. Start with § 129.127(b) and determine if the well site's production is equal to or greater than 15 BOE per day and the production of the individual wells located at the well site. If it is an oil well site, determine the GOR in accordance with § 129.127(c)(1). Next, check applicability under § 129.127(c)(1)(i) and (ii) if the well is an oil well using the result from § 129.127(c)(1). Then check applicability under § 129.127(c)(2) and (3) to determine the LDAR program requirements that apply to the well site. If neither § 129.127(c)(2) nor (3) are applicable to the well site, the owner or operator is still required to comply with § 129.127(c)(4) and modify their applicability as appropriate.

391. Comment: The Commentators state that subsection (b)(1)(ii)(A) of the proposed rulemaking requires monthly AVO inspections for existing sources which is beyond the scope of the Subpart OOOOa and the 2016 O&G CTG. DEP has not demonstrated the economic feasibility of such controls in reducing VOC emissions from existing sources. The Commentators state this provision should be eliminated.

The Commentators state that placing a 30-day maximum separation deadline for any compliance activity is inconsistent with the Subpart OOOOa and will lead to unmanageable scheduling and a greater likelihood of non-compliance. The Commentators' goal is compliance with all regulatory requirements and seek the Department's assistance in achieving this goal by not setting an arbitrary, unobtainable deadline.

The 30-day standard will lead to duplicate compliance activities being performed in the same month to demonstrate compliance. The Commentators recommend a minimum deadline approximately 50% longer than the defined period, or for a monthly requirement a 45-day standard.

Response: The Department is aware that most owners or operators conduct walk-around inspections monthly or on a more frequent basis. The monthly AVO is no different than these walk-around inspections except that a record of any leak detected must be noted in the records and repaired as required in § 129.127(k). Therefore, the monthly AVO requirement is not beyond the scope of economic feasibility. The monthly AVO inspection provision was, however, moved to § 129.127(e)(1) of the final-form rulemaking and has been revised to read:

“An **initial** AVO inspection **on or before** _____ (*Editor's Note: The blank refers to the date 60 days after the effective date of this rulemaking, when published as a final-form rulemaking.*), with monthly inspections **thereafter** separated by at least 15 calendar days but not more than **45** calendar days.”

392. Comment: The Commentator states that subsection (b)(1)(ii)(A) of the proposed rulemaking requires operators to conduct an AVO inspection at all affected facilities within 30 days of the effective date of the rulemaking. This is not an adequate amount of time for operators to properly evaluate whether their assets are applicable to this rulemaking, as well as mobilize the necessary resources to perform these inspections. The Commentator requests that this timeframe be extended to a minimum of 120 days.

Response: This provision was moved to § 129.127(c)(2)(i) in this final-form rulemaking. The initial AVO inspection for this section and § 129.127(c)(3)(i) was set for a date 60 days after the effective date; the effective date is the date of publication in the *Pennsylvania Bulletin*. The Department has determined that 60 days is an adequate amount of time to determine applicability and schedule the first AVO inspection. See Comment 391 for the language in this final-form rulemaking.

393. Comment: The Commentator expects and supports strong meaningful oversight of oil and natural gas development and operations in the Commonwealth by the Department. However, various aspects of the proposed rulemaking will impose costly and burdensome requirements upon oil and natural gas operators that will provide little or no benefit to air quality in the Commonwealth.

Section 129.127(b)(1)(ii)(B) requires quarterly LDAR. The Commentator sees the benefit of LDAR and believes following current schedules and timeframes is sufficient to minimize fugitive emission leaks and provide the environmental benefit that the Department is looking for. The Commentator's current LDAR program inspects approximately 98,000 components throughout the Commonwealth with a leak rate identified and repaired of 0.26%. The program data demonstrates that the risk of leakage is not an issue and that increased frequency will only add costly compliance and recordkeeping requirements. The Commentator notes that the Department included a mechanism to decrease the frequency of inspections, however, the recordkeeping to demonstrate compliance for the change in frequency will create complicated tracking to ensure compliance. In order to adequately reflect the benefits of implementation of current LDAR standards, the Commentator suggests updating the annual reporting requirements to allow reporting of fugitive emissions based on documented LDAR data versus standard population counts and emission factors. The Commentator also suggests keeping LDAR requirements consistent with current standards.

Response: The Department finalized an inspection program that requires monthly AVO and instrument based LDAR with frequency determined by the unconventional well site's production and the production of individual wells located at the well site. The final-form rulemaking requires the owners and operators to determine the production of their wells and unconventional well sites annually and requires the owners and operators to adjust the frequency of the instrument based LDAR dependent on the results of the calculations. Two consecutive calculations that show that the unconventional well site would be subject to a lower frequency are required before reducing the LDAR frequency. If a calculation shows that the unconventional well site should be subject to a higher frequency, the owner or operator is required to increase the LDAR frequency immediately. The step-down provision based on the percentage of leaking components has been removed.

394. Comment: The Commentators state that the quarterly LDAR inspection requirement for existing producing well sites is beyond the scope of the 2016 O&G CTG. DEP has not shown quarterly LDAR inspections to be technically feasible, and therefore this requirement should be eliminated from this rulemaking. The Commentators have twice submitted data to the Department which demonstrates that annual LDAR surveys are effective in reducing leaks well below the proposed off-ramp thresholds, and there will not be significant emissions reductions resulting from the implementation of quarterly, or even semi-annual, frequency. Quarterly inspections are significantly more restrictive than what was recommended in the 2016 O&G CTG and the off-ramps provide little if any relief for most operators as they create scheduling conflicts and recordkeeping burdens.

The Commentators believe that the LDAR requirements from Exemption 38(b) should be the template for the existing source rule as they offer an environmentally beneficial and practical option for leak detection. The benefits of LDAR survey frequencies more stringent than annual have not been proven and are not economically feasible for sources constructed prior to August 10, 2013. The Commentators state that the initial compliance period should be longer than 60 days and recommends the compliance period be extended to 120 days. Numerous sites are already required to perform LDAR inspections on a periodic basis and these initial existing source surveys will interfere with those facilities already on the schedule.

Quarterly LDAR surveys should be separated by at least 60 days, but no more than 120 days. Semi-annual LDAR surveys should be separated by at least 120 days, but no more than 240 days.

Response: The frequency of instrument based LDAR inspection is based on the unconventional well site production and the production of individual wells located at the well site, as noted in §§ 129.127(c)(2) and (3). The language regarding quarterly LDAR surveys in § 129.127(c)(2)(ii) has been revised to read:

“Conduct an **initial** LDAR inspection program **on or before** _____ (*Editor’s Note:* The blank refers to **the date 60 days after** the effective date of this rulemaking, when published as a final-form rulemaking.), with quarterly inspections **thereafter** separated by at least 60 calendar days but not more than **120** calendar days using one or more of the following:”

The language regarding annual LDAR surveys in § 129.127(c)(3)(ii) of the final-form rulemaking reads:

“Conduct an initial LDAR inspection program on or before _____ (*Editor’s Note:* The blank refers to the date 150 days after the effective date of this rulemaking, when published as a final-form rulemaking.), with annual inspections separated by at least 335 calendar days but not more than 395 calendar days using one or more of the following:”

395. Comment: The Commentator states that LDAR inspection frequency for well sites should be changed from quarterly to semi-annually, consistent with Subpart OOOOa and the 2016 O&G CTG. The Commentator recommends revising subsection (b)(1)(ii)(B) to read “Conduct an LDAR inspection program within 60 days after _____ (*Editor’s Note:* The blank refers to the effective date of this rulemaking, when published as a final-form rulemaking.), with semi-annual

inspections separated by at least 4 months but not more than 9 months using one or more of the following:”

Response: The proposed § 129.127(b)(1)(ii)(B) is now §129.127(c)(2)(ii) in this final-form rulemaking which reads:

“Conduct an initial LDAR inspection program on or before _____ (Editor's Note: The blank refers to the date 60 days after the effective date of this rulemaking, when published as a final-form rulemaking.), with quarterly inspections thereafter separated by at least 60 calendar days but not more than 120 calendar days using one or more of the following:”

The Department’s 2020 reanalysis has determined that an LDAR program including an annual instrument-based frequency is cost-effective for unconventional well sites that produce, on average equal to or greater than 15 BOE per day and at least one individual well with production less than 15 BOE per day and equal to or greater than 5 BOE per day. This requirement is at § 129.127(c)(3)(ii) of this final-form rulemaking which reads:

“Conduct an initial LDAR inspection program on or before _____ (*Editor's Note:* The blank refers to the date 150 days after the effective date of this rulemaking, when published as a final-form rulemaking.), with annual inspections thereafter separated by at least 335 calendar days but not more than 395 calendar days using one or more of the following:”

The Department’s 2020 reanalysis has determined that an LDAR program is not cost-effective for unconventional well sites that produce, on average less than 15 BOE per day and for unconventional well sites that produce equal to or greater than 15 BOE per day with all wells at the well site producing less than 5 BOE per day.

396. Comment: The Commentators recommend the Department require quarterly, instrument-based, comprehensive LDAR for all existing wells. In addition, operators should be required to check wells monthly for leaks using AVO inspections. Emissions from leaks and abnormal operating conditions are the largest source of methane emissions, per EDF’s inventory. These sources contributed a total of 1,107,800 tons of methane in Pennsylvania in 2018. Numerous studies have demonstrated that leaks are a very large source of harmful methane emissions at upstream oil and natural gas facilities. The scientific consensus, based on numerous studies involving direct measurement of oil and natural gas leaks, demonstrates the heterogeneous, unpredictable, and ever-shifting nature of equipment leaks. These characteristics strongly point toward the need for frequent inspections to identify and repair leaking components and equipment.

Response: The Department’s 2020 reanalysis has determined that an LDAR program including an annual instrument-based inspection frequency is cost-effective for unconventional well sites that produce, on average equal to or greater than 15 BOE per day and at least one individual well with production less than 15 BOE per day and equal to or greater than 5 BOE per day. The Department’s 2020 reanalysis has determined that an LDAR program is not cost-effective for unconventional well sites that produce, on average less than 15 BOE per day and for

unconventional well sites that produce, on average equal to or greater than 15 BOE per day with all wells at the well site producing less than 5 BOE per day.

397. Comment: The Commentators state that a comprehensive, instrument-based robust leak detection and repair program that requires operators to inspect for leaks on a quarterly basis and requires monthly AVO inspections can significantly reduce emissions from abnormal operating conditions and leaks. The Department should require quarterly inspections to reduce leaks; other jurisdictions have successfully established regulations that require quarterly LDAR for existing sources including Colorado, Wyoming, California, and Mexico. A quarterly inspection schedule would put Pennsylvania operators on par with states such as California as well as Wyoming and Colorado. Comprehensive quarterly instrument-based leak inspections can reduce emissions from improperly operating equipment, such as gas-powered pneumatic controllers, dump valves on separators, access points on storage tanks, as well as traditional components.

Response: Please see the response to Comment 396.

398. Comment: The Commentator states that quarterly LDAR inspections are cost effective as demonstrated by information from other states, leading operators, and independent consulting groups. Quarterly inspections have been proven cost-effective in California, Colorado and Wyoming.

Response: Please see the response to Comment 396.

399. Comment: The Commentator states that any instrument-based inspections program should be coupled with monthly AVO inspections. Prudent operators inspect their assets routinely in order to ensure that production is occurring normally. Requiring an operator to look for leaks during routine monthly trips to their well sites does not impose any costs on operators yet has the potential to identify abnormally operating equipment that can cause excess emissions to the atmosphere. Other states, such as Colorado and California, require monthly AVO in addition to quarterly instrument-based inspections. DEP must add a provision to the rule requiring operators conduct monthly AVO inspections at all well sites, regardless of production or emission levels.

Response: The Department is aware that most owners or operators conduct walk-around inspections monthly or on a more frequent basis. The monthly AVO is no different than these walk-around inspections except that a record of any leak detected must be noted in the records and repaired as required in § 129.127(k). Therefore, the monthly AVO requirement is not beyond the scope of economic feasibility. The monthly AVO inspection provision was, however, moved to § 129.127(e)(1) of the final-form rulemaking and has been revised to read:

“An **initial** AVO inspection **on or before** _____ (*Editor’s Note: The blank refers to the date 60 days after the effective date of this rulemaking, when published as a final-form rulemaking.*), with monthly inspections **thereafter** separated by at least 15 calendar days but not more than **45** calendar days.”

400. Comment: The Commentator states that the Department should specify in the proposed rulemaking that an alternative leak detection device or method must achieve equivalent emission reductions as OGI or Method 21 inspections.

Response: The Department requires owners or operators to demonstrate the equivalency of an alternative leak detection method to the Bureau of Air Quality Division of Source Testing and Monitoring. Since the Department's criteria is performance based, an owner or operator seeking to use an alternative method should provide documented evidence that the alternative technology is capable of detecting the leak at the specified leak definition. An appropriate performance criterion may already be specified in a related, even though possibly not specifically applicable, regulation.

401. Comment: The Commentators state that the proposed rulemaking would allow operators to reduce the frequency of inspections if less than 2% of equipment is found to be leaking on-site over two consecutive inspections. Research shows that large, uncontrolled leaks are random, difficult to predict, and can only be detected with frequent and regular inspections. The majority of methane emissions are from a small number of sites with very large leaks, so finding and fixing these leaks must be a top priority. The Commentators urge the DEP to eliminate this step-down provision.

Response: The Department finalized an inspection program that requires monthly AVO and instrument based LDAR with frequency determined by the unconventional well site's production and the production of individual wells located at the well site. The final-form rulemaking requires the owners and operators to determine the production of their wells and unconventional well sites annually and requires the owners and operators to adjust the frequency of the instrument based LDAR dependent on the results of the calculations. Two consecutive calculations that show that the unconventional well site would be subject to a lower frequency are required before reducing the LDAR frequency. A calculation that shows that the unconventional well site would be subject to a higher frequency are required to increase the LDAR frequency immediately. The step-down provision based on the percentage of leaking components has been removed.

402. Comment: The Commentator states that the step-down provision is counterproductive because leaks can occur any time and are more likely to occur if equipment is not inspected and maintained at regular, frequent intervals. Through the Commentator's extensive field experience, they have found examples of leaks that recur after an initial fix or that were missed in recent inspections.

For example, at the low-producing well described in Comment 382, the Commentator documented subsequent leaks in August 2019, just one year after the initial investigation and subsequent repair. The second investigation again detected tank hatch emissions and new or previously undetected leaks from valves on a small compressor at the site.

Even small leaks can release large volumes of emissions if left unaddressed. Basing the provision on the percentage of leaking components is illogical and problematic, as it does not address the volume of emissions being released. This approach is designed to reduce the workload and costs for operators, but compromises emissions control. If leaks are not detected in a timely manner and allowed to persist, they can have a considerable cumulative impact on air quality, health, and the climate.

Response: The step-down provision based on the percentage of leaking components has been removed from this final-form rulemaking. The Department points out that several of the facilities

subject to the final-form rulemaking may not currently have any LDAR requirement and therefore will be increasing the frequency of their current inspections even at the annual instrument based LDAR frequency. Even for those facilities that are originally subject to a quarterly LDAR of § 129.127(c)(2)(ii), the ability to reduce the instrument-based LDAR inspections to annually under § 129.127(c)(4)(i), the monthly AVO inspection requirement remains unchanged.

403. Comment: The Commentator feels the proposed rulemaking can be strengthened by eliminating the provision that allows operators to reduce the frequency of LDAR inspections. In the Commentator’s experience, leaks occur regularly due to minor errors or wear-and-tear of equipment, and therefore a successful inspection does not mean the next will yield the same result. A survey of producers in Colorado after implementation of Regulation 7, which requires regular monitoring, indicated that approximately 9 out of 10 leaks found were the result of something simple to repair, like an open valve or loose seal. The Commentator’s experiences in Colorado and other states have confirmed that the most effective strategy for reducing emissions in a cost-effective manner is one that establishes regular monitoring schedules that allows producers to plan for and incorporate such practices into their operating budget.

Response: Please see the response to Comment 401.

404. Comment: The Commentators state that the proposed rulemaking creates a perverse incentive by rewarding operators for failing to identify harmful leaks. The 2007 EPA report *“Leak Detection and Repair—A Best Practices Guide”* found “significant widespread non-compliance with [LDAR] regulations” at petroleum refineries and other facilities subject to variable-frequency inspection requirements. EPA observed: “Experience has shown that poor monitoring rather than good performance has allowed facilities to take advantage of the less frequent monitoring provisions.” The report recommends that “[t]o ensure that leaks are still being identified in a timely manner and that previously unidentified leaks are not worsening over time,” companies should monitor more frequently. DEP should establish a rigorous and fixed baseline that incentivizes operators to find leaks more quickly and accurately — maximizing environmental benefits while minimizing costs.

DEP’s proposed metric for determining adjusted frequency – the percentage of leaking components – is not an accurate predictor of a facility’s emissions performance. At a conceptual level, if emissions from leaking components were homogeneously distributed, the percentage of components leaking at a facility would be a good indicator of facility-level emissions. However, there is overwhelming evidence that leak emissions follow a skewed, highly heterogeneous distribution, with a relatively small number of sources accounting for a large portion of emissions. In such circumstances, the percentage of leaking components will not accurately reflect emissions and should not be used to determine the frequency of LDAR survey requirements.

Additionally, several recent studies, including some conducted in Pennsylvania, have shown that a majority of emissions come from a very small number of leaking components or “super-emitters.” For example, only about 1% of total components were found to be emitting using EPA’s Method 21 approach, and only about 0.2% were found to be emitting using OGI cameras. Therefore, even sites with high total emissions will likely have fewer than 2% of components leaking at any point. Independent operator data show that while the largest reductions in VOC

emissions occur in the first year of an LDAR program, significant emission reductions are still achieved in subsequent years – because leaks re-occur at facilities.

The Commentators urge DEP to remove the provisions allowing operators to reduce inspection frequency based on the percentage of leaking components identified in prior surveys. Using any metric, past emissions are not a good predictor of future emissions, given the prominent role that improperly functioning equipment, poorly maintained equipment, and other random events play in overall emissions.

Response: The requirement that responsible officials certify the annual report, which includes LDAR records, is a disincentive to falsify said records. Consequences exist if it is determined that a certified report contains false information. Also, even though the instrument based LDAR requirement may reduce in frequency, monthly AVO inspections are still required and capable of detecting leaks in between the instrument-based inspections. Also, the step-down provision based on the percentage of leaking components has been removed from this final-form rulemaking.

405. Comment: The Commentators appreciate the Department’s efforts in drafting the proposed rulemaking and look forward to working with DEP to improve upon this measure where there are questions and concerns. The Commentators are encouraged by the Department’s “step down” provision regarding LDAR frequency for well sites that show low leak rates and state that this provision should be preserved.

Response: Please see the response to Comment 401.

406. Comment: The Commentator questions the LDAR inspection frequency in the proposed rulemaking and although the Commentator understands the importance of inspections, some appear to have no environmental benefit, or could even increase VOC emissions. The Commentator believes that it would be appropriate for existing well sites subject to the proposed rulemaking to have less frequent LDAR inspections with further step downs for low leak rates allowed.

Response: Please see the response to Comment 401.

407. Comment: The Commentator states that in the Department’s comments to EPA on the Reconsideration of the NSPS dated December 17, 2018, they “recommend not reducing the LDAR inspection frequency for well sites and compressor stations, not allowing a step-down provision for LDAR inspection frequency at well sites as it is not appropriate to reduce semi-annual inspection frequency, and requiring that the LDAR inspection frequency be based on the economic feasibility and not on the production of a well...” Since 2013 the DEP has had quarterly LDAR inspection requirements and monthly AVO inspections.

Response: The Department was commenting on the EPA’s proposal to reduce the semiannual instrument based LDAR requirement for well sites and quarterly instrument based LDAR requirement at compressor stations to a lower frequency. Ultimately, in the Reconsideration the EPA maintained the semiannual requirement for well sites and reduced the frequency for compressor stations to semiannual as well. The Department’s statement in “not allowing a step-down provision for LDAR inspection frequency at well sites” is consistent with the

Department's comment that well sites should not have less than a semiannual LDAR frequency. The requirements cited from 2013 for quarterly LDAR inspections and monthly AVO inspections only applied to compressor stations and natural gas processing plants authorized under the 2013 GP-5; those requirements are consistent with the 2018 GP-5 and the final-form rulemaking.

408. Comment: The Commentator recommends adding a provision that imposes more stringent requirements on well sites within 1,000 feet of occupied structures in order to adequately and sufficiently protect public health. The Commentator suggests adding clause (b)(1)(ii)(C) which should read "Conduct an LDAR inspection program within 60 days after _____, with monthly inspections separated by at least 15 days but not more than 30 calendar days for all well sites located within 1,000 feet of an occupied structure." The Commentator also recommends that there not be a reduction in LDAR inspection frequency for any reason.

Those living nearby are exposed to VOC, including toxic carcinogens, daily even when the facility is properly working. They should not be exposed to toxins for nearly 180 days before anyone shows up to inspect. There's no reason to further burden those dealing with a variety of health challenges due to a well site being sited too close. The Commentator's suggestions will ensure the site is operating optimally, will better protect public health, and benefit the operator due to less product loss.

Response: The Department determined that monthly instrument based LDAR inspections are not economically feasible for VOC RACT purposes. Pennsylvania's LDAR requirements in the final-form rulemaking are more stringent than the EPA's recommendation in the 2016 O&G CTG. The Department's 2020 reanalysis shows that, for unconventional well sites producing on average equal to or greater than 15 BOE per day, quarterly instrument-based LDAR inspections with monthly AVO inspections with at least one individual well at the well site producing greater than 15 BOE per day and annual instrument-based LDAR inspections with monthly AVO inspections with at least one individual well at the well site producing less than 15 BOE per day and equal to or greater than 5 BOE per day are RACT. By definition, RACT is sufficient to protect the public health and welfare.

409. Comment: The Commentators state that, consistent with Comment 394 to change the quarterly LDAR monitoring to annual, the reduced frequency allowed by § 129.127(b)(2)(i) of the proposed rulemaking should be changed to read "If the percentage of leaking components is less than 2% for two consecutive annual inspections, the owner or operator may reduce the LDAR inspection frequency to biennially with inspections separated by at least 15 months but not more than 27 months."

Response: Please see the response to Comment 401.

410. Comment: The Commentator states that, consistent with Comment 395 to change the quarterly LDAR monitoring to semi-annual, the reduced frequency allowed by § 129.127(b)(2)(i) of the proposed rulemaking should be changed to read "If the percentage of leaking components is less than 2% for two consecutive semi-annual inspections, the owner or operator may reduce the LDAR inspection frequency to annually with inspections separated by at least 9 months but not more than 18 months."

Response: Please see the response to Comment 401.

411. Comment: Several Commentators ask the EQB to clarify that the allowance under this subparagraph to reduce the inspection frequency when the leak rate is less than 2% for two consecutive inspections does not require the owner or operator to request that extended inspection interval under paragraph § 129.127(e).

Response: The step-down provision based on the percentage of leaking components has been removed. However, the LDAR inspection frequency reductions under the final-form rulemaking § 129.127(c)(4)(i), which replaces § 129.127(b)(2)(i) of the proposed rulemaking, do not require an operator to request an extension of the LDAR inspection frequency under § 129.127(f) of the final-form rulemaking.

412. Comment: The Commentators state that many operators have been performing LDAR inspections on an annual, semi-annual, or quarterly basis for years when the proposed rulemaking becomes effective. The proposed rulemaking reasonably includes a step-down provision for well site facilities which have a low percentage of leaking components, yet there is no provision to use historical LDAR data likely gathered in accordance with the Department's requirements under Exemption 38. The Commentators request that the Department include a provision allowing the use of historical LDAR data to immediately utilize the step-down provision. Otherwise, operators will be burdened with completing thousands of LDAR surveys on facilities with a history of minimal leaks at great cost and effort and no environmental benefit.

Response: The step-down provision based on the percentage of leaking components has been removed. Please also see the response to Comment 401.

413. Comment: For the reasons cited in Comment 396, above, the Commentators urge DEP to eliminate the provision that allows well site operators to reduce the frequency of LDAR inspections if the percentage of leaking components identified on-site is less than 2% for two consecutive quarterly inspections. Research shows that large, uncontrolled leaks are random and can only be detected with frequent and regular inspections, because leaks recur at facilities.

DEP's proposed control requirements for fugitive emissions components establish a baseline quarterly inspection frequency with one of three types of leak detection methods, OGI, Method 21, or another device approved by DEP. Operators must adhere to detailed requirements to ensure their leak detection devices are operating properly, retain detailed records of each inspection, tag or retain digital photographs of each component on the delayed repair list, and submit records in annual reports. The proposed rulemaking further allows well site operators to reduce the inspection frequency to semi-annual if the percentage of leaking components is less than 2% for two consecutive inspections. The inspection frequency reverts to quarterly if at any time the percentage of leaking components is higher than 2%.

The Commentators suggest improving the strength and protectiveness of the LDAR provisions in the proposed rulemaking by removing the provision that allows well operators to decrease the inspection frequency to semi-annual based on the percentage of leaking components.

Response: The step-down provision based on the percentage of leaking components has been removed from this final-form rulemaking. Please also see the response to Comment 401.

414. Comment: The Commentators state that the requirement to perform an LDAR inspection on a shut in well by the date of the next required LDAR inspection in subsection (c)(2) seems to require LDAR inspections even though the shut in well would be producing less than the § 129.127(a)(1) applicability threshold of 15 BOE per day on average over the shut in period. Is that the intent, or should subsection (c)(2) be amended to read “The date of the next required LDAR inspection after the well is put into production,” similar to the wording in subsection (c)(1)?

Response: For an unconventional well site that has produced prior to the well site being temporarily shut in, the well site must continue the established LDAR inspection schedule unless the next inspection falls during the shut-in period. Upon returning the shut-in unconventional well site to production, the LDAR inspections must resume at the earliest of 60 days of returning to production or the next scheduled LDAR inspection. This provision was moved in this final-form rulemaking to § 129.127(d)(2) and revised to read:

“(2) The date of the next required LDAR inspection **after the well site is put into production.**”

415. Comment: The Commentator states that at natural gas gathering and boosting stations and natural gas processing plants, the proposed rulemaking requires monthly AVO inspections and quarterly LDAR inspections using OGI, Method 21, or another Department approved method. The 2016 O&G CTG recommends an LDAR program equivalent to one described by 40 CFR Part 60 Subpart VVa for equipment in VOC service.

Response: The Department has determined that the quarterly instrument based LDAR requirement and monthly AVO inspections in the final-form rulemaking are sufficient to reduce emissions from fugitive emissions components, including those at processing plants. The Subpart VVa requirements that EPA recommends for processing plants are no more protective, as the inspection frequencies for various types of components and the allowable emission thresholds are generally less stringent than those required in the final-form rulemaking.

416. Comment: The Commentators state that monthly AVO inspections should not be required and suggest removing this paragraph entirely. If it is retained, the maximum timeframe between inspections should be extended from 30 days to 45 days. Setting a 30-day standard will ultimately lead to unmanageable scheduling and duplicate compliance activities being performed in the same month.

Response: Please see the response to Comment 399. The Department is aware that most owners or operators conduct walk-around inspections monthly or on a more frequent basis. The monthly AVO is no different than these walk-around inspections except that a record of any leak detected must be noted in the records and repaired as required in § 129.127(k). Therefore, the monthly AVO requirement is not beyond the scope of economic feasibility. The monthly AVO inspection provision was, however, moved to § 129.127(e)(1) of the final-form rulemaking and has been revised to read:

“(1) An **initial AVO inspection on or before** _____ (*Editor’s Note: The blank refers to the date 60 days after the effective date of this rulemaking, when published as a final-*

form rulemaking.), with monthly inspections **thereafter** separated by at least 15 calendar days but not more than **45** calendar days.”

417. Comment: The Commentators state that the maximum timeframe between LDAR inspections should be extended from 90 days to 135 days. Setting a 90-day standard will ultimately lead to unmanageable scheduling and duplicate compliance activities being performed in the same quarter.

Response: This provision was moved to § 129.127(e)(2) of the final-form rulemaking and revised to read:

“(2) An **initial** LDAR inspection program **on or before** _____ (*Editor’s Note:* The blank refers to **the date 60 days after** the effective date of this rulemaking, when published as a final-form rulemaking.), with quarterly inspections **thereafter** separated by at least 60 calendar days but not more than **120** calendar days using one or more of the following:”

418. Comment: The Commentators suggest allowing a step-down provision for reducing the frequency of LDAR inspections at gathering and boosting stations from quarterly to semi-annually for leak rates less than 2%, similar to the provisions in § 129.127(b)(2) for well sites. This should be accomplished by inserting a new paragraph (d)(3) with wording like paragraph (b)(2).

Response: The step-down provision based on the percentage of leaking components has been removed and replaced with a production-based requirement. The Department is not considering a similar stepdown based on facility throughput for gathering and boosting stations or processing plants.

419. Comment: The Commentators support DEP’s proposal to require a quarterly LDAR program at oil and natural gas facilities, especially for applicable well sites. Several leading states require quarterly inspections, and analyses prepared by these states, independent consulting groups, and leading operators, demonstrate that quarterly inspections are cost-effective. Numerous scientific studies demonstrate that equipment and components can fail or operate abnormally on unpredictable schedules and across facility and equipment types. Such events can contribute significant emissions, far in excess of estimates that rely on emission factors. Indeed, a study in the Barnett Shale found leaks to be over 50% greater than estimated in EPA’s national GHGI. This and many other studies relying on direct measurement underscore the critical need for operators to frequently inspect facilities for abnormal operating conditions, repair any such conditions expeditiously, and document and report the results of inspections.

Response: The Department acknowledges this comment.

420. Comment: The Commentators commend DEP for including a provision in the proposed rulemaking that allows for operators to use approved leak detection technologies other than OGI or Method 21. They urge the agency to adopt a robust alternative compliance pathway that creates an entry point for appropriately qualified and demonstrated methane selective or multiple hydrocarbon detecting approaches and that allows for public participation in the approval of such alternative approaches. DEP should create space for innovative technologies, which may be able to deliver improved environmental performance at reduced cost. New technologies such as

drones can also measure leak rates, allowing DEP to develop improved emissions estimates. These alternatives to OGI are often mounted on mobile platforms such as trucks, drones, and planes and have the potential to cover large areas in a short time, thus significantly reducing the cost of an LDAR program. Colorado has adopted a rule and detailed guidance documents setting forth the specific elements an alternative leak detection technology must demonstrate, and the process by which such an alternative technology is reviewed and approved. The Commentators urge DEP to adopt similar criteria, accompanied by clear and transparent instructions, governing the necessary elements of an application for an alternative technology and the approval process. However, the DEP must ensure that any process for approving alternative methods of LDAR allows only technologies that are shown to be at least as effective as OGI or Method 21.

Response: Please see the response to Comment 363.

421. Comment: The Commentator states that DEP needs to provide parameters for fixing fugitive emissions components as it is not reasonable to have an open-ended regulation. The Commentator's experience with both operator's or contractor's field staff has been dismal. They promise to provide information and do not, they do not return phone calls, they mislead. At times, the Commentator feels the need to travel nearly two hours to the North Central Regional Office (NCRO) to get information on what is happening a mere 500 feet from their home; things that affects their health, the health of their pets, and the value of their home. The Commentator understands that DEP cannot affect the quality of staff the operators have, or the substandard operations. The Commentator stresses how dependent they are on the DEP field staff to have the proper equipment to observe and measure leaks.

Response: The Department's eFACTS allows individuals to search for authorizations, clients, sites and facilities as well as inspection and pollution prevention visits and inspection results, including enforcement information when violations are noted. The Department's Air Emissions Inventory allows individuals to see the types and amounts of pollutants emitted by sources required to report to the inventory. The Commentator can contact the Department's Regional Office by phone or email and request additional information if desired.

The requirements for repairing fugitive emissions components are provided in § 129.127(l) of this final-form rulemaking.

422. Comment: The Commentators believe the fugitive monitoring plan required in subsection (f) should be streamlined. The Commentators are aware that the requirements of the fugitive monitoring plan were part of the Reconsideration of Subpart OOOOa at the federal level and many of these requirements are overly burdensome and provide no environmental benefit.

Response: The fugitive monitoring plan requirements include those recommended by EPA in the 2016 O&G CTG and Subpart OOOOa, with the exception of the frequency of surveys and the recordkeeping sections omitted. The frequency of surveys is determined by the type of facility; for unconventional well sites, the production of the well site and of the individual wells on the site determines the frequency and can change as production varies over time. Therefore, the Department determined it was unnecessary to include the frequency in the fugitive emissions monitoring plan. The records to be kept and length of time they will be maintained has been set by the Department in §129.130(g) and therefore are unnecessary to include in the fugitive emissions monitoring plan.

423. Comment: The Commentator states that, consistent with Comment 395, the maximum timeframe between inspections should be 50% longer than the defined period, the maximum of 12 months apart in subsection (f)(10)(iii) should be changed to read “The monitoring schedule for each component identified as difficult-to-monitor or unsafe-to-monitor. The monitoring schedule for difficult-to-monitor components must include at least one survey per year no more than 18 months apart.”

Response: This provision was moved to § 129.127(g)(10)(iii) of the final-form rulemaking and the language revised to read:

“The monitoring schedule for each component identified as difficult-to-monitor or unsafe-to-monitor. The monitoring schedule for difficult-to-monitor components must include at least one survey per year no more than **13** months apart.”

424. Comment: The Commentators state that the daily verification checks on OGI and Method 21 analyzers are only practical if the equipment is being used daily. Per manufacturer recommendation, verification checks should be performed prior to use, not necessarily daily. The Commentators request that subsection (g)(2) be changed to read “Performing a verification check prior to use.”

Response: This provision was moved to § 129.127(h)(2) of this final-form rulemaking and revised to read: “(2) Performing a verification check **each day prior to use.**”

425. Comment: The Commentators state that the maximum viewing distance is variable and will change based on ambient conditions, location, and operator. The Commentators request that subsection (g)(3) be removed.

Response: This requirement is consistent with the verification procedures for OGI equipment in Section I.2(c)(7)(iii) of 2016 O&G CTG and § 60.5397a(c)(7)(iii) of Subpart OOOOa. Therefore, it has been retained in this final-form rulemaking.

426. Comment: The Commentators state that OGI camera operators are trained to operate the camera when leaks can be detected. Furthermore, increased wind speed may or may not affect the accuracy of the readings depending on the operator, distance from the component, other ambient conditions and the spatial relationship of the component being observed to other nearby equipment. The camera operators are trained to understand these variables and to take appropriate action. The Commentators request that subsection (g)(4) be removed.

Response: This requirement is consistent with the verification procedures for OGI equipment in Section I.2(c)(7)(iv) of 2016 O&G CTG and § 60.5397a(c)(7)(iv) of Subpart OOOOa. Therefore, it has been retained in this final-form rulemaking.

427. Comment: The Commentators state that subsection (g)(5) should be changed to read “Determining how the equipment operator will perform the following:”

Response: This provision was moved to § 129.127(h)(5) of this final-form rulemaking.

428. Comment: The Commentator recommends removing the provision in subparagraph (ii) regarding “technically infeasible.” Clause (A) should not be technically infeasible; as vent blowdowns occur from time to time. Clause (B) should not be technically infeasible as facilities are shutdown from time to time. Clause (C) should not be technically infeasible as wells are shut-in from time to time. Clause (D) should not be technically infeasible; as if it is unsafe to repair during operation of the unit, the operator should simply shut it down and repair and resurvey it. The Commentator also recommends modifying paragraph (1)(iii)(C) to read “Within 6 months.” It is unreasonable to delay a repair for 2 years when the goal of the proposed rulemaking is to reduce VOC emissions from existing oil and natural gas sources.

Response: This provision was moved to § 129.127(l) of the final-form rulemaking. The Department has determined that there are times that a repair may be technically infeasible to accomplish and forcing a repair at this time may result in increased emissions, cause safety hazards, or cause reliability issues with natural gas distribution. The repair requirements for a component that is technically infeasible to repair under paragraph (1)(ii) must occur at the earliest of a planned vent blowdown, facility shutdown, or 2 years which is consistent with Section I.2(f)(2) of the 2016 O&G CTG and § 60.5297a(h)(3) of Subpart OOOOa.

429. Comment: The Commentator states that robust, detailed recordkeeping and reporting requirements are critical to compliance monitoring and enforcement and provide important information on the efficacy of LDAR programs.

Response: This provision was moved to § 129.127(m) of the final-form rulemaking which incorporates detailed recordkeeping and reporting requirements for fugitive emissions components.

§ 129.128. Covers and Closed Vent Systems.

430. Comment: The Commentators state that subsection (a)(2)(ii) refers to routing emissions to a “control device or process that meets the applicable requirements of § 129.129.” However, § 129.129 appears to only contain requirements specific to “control devices” and nothing specific to “processes,” so it is unclear whether processes must meet certain § 129.129 control device requirements, or if the subsection should be interpreted that there are no applicable requirements for “processes.” Please refer to the recommendation on “processes” included in Comment 330.

Response: The requirements for “processes” can be found in § 129.129(d) of the final-form rulemaking. Based on the requirements for control in § 129.129(d), emissions controlled by routing to a boiler or process heater is considered controlled if the emissions are injected into the flame zone of the process. The term “process” is defined in § 121.1.

431. Comment: The Commentators state that the maximum timeframe between inspections required in paragraph (a)(4) should be extended from 30 days to 45 days. Setting an arbitrary 30-day standard will ultimately lead to unmanageable scheduling and duplicate compliance activities being performed in the same month.

Response: The Department has revised the language of § 129.128(a)(4) of the final-form rulemaking to read:

“Conduct an **initial AVO inspection on or before** _____ (*Editor’s Note: The blank refers to the date 60 days after the effective date of this rulemaking, when published as a final-form rulemaking.*), with monthly inspections **thereafter** separated by at least 15 calendar days but not more than **45** calendar days for defects that could result in air emissions. Defects include the following:”

432. Comment: The Commentators state that subsection (b)(1) refers to routing emissions to a “control device or process that meets the applicable requirements of § 129.129.” However, § 129.129 appears to only contain requirements specific to “control devices” and nothing specific to “processes,” so it is unclear whether processes must somehow meet certain § 129.129 control device requirements, or if the subsection should be interpreted that there are no applicable requirements for “processes.” Please refer to the recommendation on “processes” included in Comment 330.

Response: The requirements for “processes” can be found in § 129.129(d) of the final-form rulemaking. Based on the requirements for control in § 129.129(d), emissions controlled by routing to a boiler or process heater is considered controlled if the emissions are injected into the flame zone of the process.

433. Comment: The Commentator states that the maximum timeframe between inspections should be extended from 30 days to 45 days. Setting an arbitrary 30-day standard will ultimately lead to unmanageable scheduling and duplicate compliance activities being performed in the same month.

Response: The Department has revised the language of § 129.128(b)(2)(i) of this final-form rulemaking to read:

“Conduct an **initial AVO inspection on or before** _____ (*Editor’s Note: The blank refers to the date 60 days after the effective date of this rulemaking, when published as a final-form rulemaking.*), with monthly inspections **thereafter** separated by at least 15 calendar days but not more than **45** calendar days for defects that could result in air emissions. Defects include the following:”

434. Comment: The Commentator states that the “no detectable emissions” requirements required in subsection (b)(2)(ii) should allow operators to use OGI technology consistent with the monitoring schedule for the facility's normal LDAR program. Different survey schedules for these activities can create scheduling difficulties, which lead to significant economic impacts and no environmental benefit. These components are often included in the normal Subpart OOOOa LDAR program, which allows the use of OGI technology. Method 21 may not be practical, safe, or even possible, in some locations where these requirements are applicable due to height and inaccessibility such as, across the tops of large storage tanks.

The Commentator recommends changing the inspection interval for closed vent systems from quarterly to annually, consistent with Comment 394 regarding LDAR inspection intervals for well sites. The language of subparagraph (b)(2)(ii) should be changed to read “Conducting a no detectable emissions or no visible leak inspection as specified in subsection (d) within 30 days after _____ (Editor's Note: The blank refers to the effective date of this rulemaking, when

published as a final-form rulemaking.), with annual inspections separated by at least 9 months but not more than 18 months.”

Response: To allow a facility to use its quarterly or annually scheduled LDAR inspection, the Department has revised the language of § 129.128(b)(2)(ii) of the final-form rulemaking to read:

“(ii) Conducting a no detectable emissions inspection as specified in subsection (d) **during the facility’s scheduled LDAR inspection in accordance with § 129.127(c)(2)(ii), (c)(3)(ii) or (e)(2).**”

See § 129.128(d) for language regarding the addition of the OGI method.

435. Comment: The Commentator states that the inspections for closed vent systems should be changed from quarterly to semi-annual, consistent with Comment 395 regarding LDAR inspection intervals for well sites. As proposed in subsection (b)(2)(ii) due to the reference to subsection (d), the closed vent system inspections could only be performed using Method 21. This should be revised to allow those inspections to be performed using OGI equipment by revising the language in subsection (b)(2)(ii) to read “Conducting a no detectable emissions or no visible leak inspection as specified in subsection (d) within 30 days after _____ (Editor’s Note: The blank refers to the effective date of this rulemaking, when published as a final-form rulemaking.), with semi-annual inspections separated by at least 4 months but not more than 9 months.”

Response: Please see the response to Comment 434.

436. Comment: The Commentator states that the maximum timeframe between inspections should be extended from 30 days to 45 days. Setting an arbitrary 30-day standard will ultimately lead to unmanageable scheduling and duplicate compliance activities being performed in the same month.

Response: The Department has revised the language of § 129.128(b)(4)(ii)(B) of final-form rulemaking to read:

“Visually inspecting the mechanism in clause (A) to verify that the valve is maintained in the non-diverting position **on or before** _____ (Editor’s Note: The blank refers to **the date 60 days after** the effective date of this rulemaking, when published as a final-form rulemaking.), with monthly inspections separated by at least 15 calendar days but not more than **45** calendar days.”

437. Comment: The Commentator states that the closed vent system design and capacity assessments are unnecessary as issues with design and capacity will be revealed during the leak surveys or control equipment manufacturer design specifications and that this requirement can be met via these alternative methods.

Response: The requirements for a closed vent system design and capacity assessment are consistent with the requirements of Section D.1(b)(4) of the 2016 O&G CTG.

438. Comment: The Commentators state that DEP should amend subsection (d) to allow for and address OGI procedures for the no detectable emissions requirement of subsection (b)(2)(ii). Subsection (d) should be changed to read “*No detectable emissions and no visible leak procedures*. The owner or operator shall conduct the no detectable emissions test procedure under Section 8.3.2 of EPA Method 21 or a no visible leak test procedure using OGI equipment.”

Subsection (d)(1)(i) should be changed to read “Use a gas leak detection instrument that meets § 129.127(h) or OGI equipment that meets 129.127(g).” Subsection (d)(2)(ii) should be changed to read “Determine if a potential leak interface operates with no detectable emissions or no visible leak if the gas leak detection or OGI instrument reading is not a leak as defined in § 129.122(a) (relating to definitions, acronyms and EPA methods).”

Response: To allow for the use of OGI equipment, the Department revised the language of § 129.128(d) of this final-form rulemaking.

§ 129.129. Control Devices.

439. Comment: The Commentator suggests that DEP increase the destruction removal efficiency of all flares used to control emissions from storage vessels, natural gas diaphragm pumps at well sites, and centrifugal compressors to 98%. Colorado and Wyoming require a 98% destruction efficiency for select sources.

In GP-5 and GP-5A, DEP initially called for 98% control efficiency, stating: “[t]he proposed General Permits required 98% control efficiency which was based on the economic feasibility of combustion control devices, as shown in Appendix D – Cost Analysis for Combustion Control Devices. In addition, the Department demonstrated that at a combustion zone temperature of 1,600 °F a methane destruction of 98% is achievable.” However, in 40 CFR Part 60 Subparts OOOO and OOOOa, the operators have the option to purchase manufacturer-tested models, which require 95% VOC control efficiency. Therefore, DEP revised the methane, VOC, and HAP destruction efficiency required from 98% to 95% to enable the owners or operators to comply with the federal requirements and terms and conditions of the general permits using manufacturer-tested models.

A 98% or greater destruction and removal efficiency is common in state requirements. Colorado requires that combustion devices used to control hydrocarbons at storage vessels, glycol dehydrators, and gas “coming off a separator, [or] produced during normal operation” must have a design destruction efficiency of at least 98% for hydrocarbons. Wyoming similarly requires that combustion devices used to control emissions from storage vessels, separation vessels, glycol dehydrators, and pneumatic pumps meet a 98% control requirement. North Dakota similarly requires operators use control devices that achieve at least a 98% destruction removal efficiency for VOCs to control emissions from glycol dehydrators and storage vessels with the potential to emit greater than 20 tons of VOC annually at production facilities in the Bakken Pool.

The Commentator urges DEP to require flares for storage vessels, natural gas-driven diaphragm pumps at well sites, and centrifugal compressors to operate with a destruction efficiency of at least 98%, which can typically achieve a destruction and removal efficiency in excess of 99.5%.

Doing so will ensure that the level of methane reductions expected are actually achieved while providing significant benefits to air quality.

Response: The 95% VOC reduction requirement was recommended in the 2016 O&G CTG and was incorporated into the final-form rulemaking to allow operators to benefit from the manufacturer-tested models in accordance with the Federal regulations. Maintaining the 95% control requirement avoids additional source testing to demonstrate 98% control efficiency, instead relying on the manufacturer's certification list,

https://www.epa.gov/sites/default/files/2020-11/documents/mfr-tested_combustor_list_november_2020.pdf, maintained by EPA to demonstrate and maintain compliance under the Federal regulations.

440. Comment: The Commentators state that § 129.129 should not contain requirements more stringent than those found in Subpart OOOOa.

Response: The Department has reviewed EPA's RACT recommendations found in the 2016 O&G CTG and the requirements of Subparts OOOO and OOOOa. The requirements of § 129.129 are not more stringent than those found in the federal regulations.

441. Comment: The Commentator states that the potential vapors available from a tank emitting 6 TPY are marginal in comparison to the natural gas required to maintain the gas pilot and assist gas for a combustion control device. Approximately 11 times more gas would be combusted than the vapors controlled. The environmental impacts of combusting excess gas to maintain a control device should be considered as it will increase emissions of other regulated pollutants, swapping one emission for several others.

Response: The Department does not agree with the Commentator's assessment. There are control devices that use an auto-igniter rather than a continuous flame pilot and the use of such controls is allowed and accounted for under § 129.129(b)(3).

442. Comment: The Commentator suggests that DEP add a requirement that operators certify that their control devices, regardless of type, are adequately sized and operated in accordance with their design to capture, convey, and control emissions. Equipment must be designed to handle the pressure of liquids when transferred from separators to tanks. If the tank vapor system is not adequately sized to handle the peak surge of flash emissions that occur when pressurized liquids dump to the atmospheric storage tanks, then flash emissions do not make it to the control devices. Rather, access points on tanks designed to only open during emergencies or maintenance open, releasing uncontrolled flash emissions to the atmosphere. The Commentator urges DEP to adopt a provision patterned on Colorado's and EPA's, that requires operators certify their facilities are designed and operated to meet reduction requirements.

Response: The annual report required in § 129.130(k) requires the responsible official to "...sign, date and certify compliance and include the certification in the initial report and each subsequent annual report."

443. Comment: The Commentators state that the maximum timeframe between inspections required in §§ 129.129(b)(2) and (4)(i) should be extended from 30 days to 45 days. Setting an

arbitrary 30-day standard will ultimately lead to unmanageable scheduling and duplicate compliance activities being performed in the same month.

Response: The Department has revised § 129.129(b)(2) of the final-form rulemaking to read:

“Ensure that the control device is maintained in a leak-free condition by conducting a physical integrity check according to the manufacturer’s instructions, with monthly inspections separated by at least 15 calendar days but not more than **45** calendar days.”

The Department has also revised § 129.129(b)(4)(i) to read:

“Each monthly visible emissions test shall be separated by at least 15 calendar days but not more than **45** calendar days.”

444. Comment: The Commentators state that not all control devices operate with a pilot flame, so subsection (b)(3) should be modified to read “Where applicable, maintain a pilot flame while operating the control device and monitor the pilot flame by installing a heat sensing continuous parameter monitoring system (CPMS) as specified under subsection (m)(3).”

Response: The requirements for the type of control in subsections (c) through (i) refer to the applicable requirements under § 129.129(b). For example, in subsections (c) and (d), the general requirements of (b)(1) through (7) must be met. In subsection (i), only the general requirements of (b)(1) and (b)(2) must be met.

445. Comment: The Commentators state that DEP should incorporate an exemption for facilities that utilize combustors that only operate intermittently based on pressure switches that are activated by pressure buildups in subsection (b)(4). Once the set point is reached the combustor ignites only long enough to burn off enough pressure to lower the storage vessel pressure to below the set point. These combustor design systems are unlikely to operate continuously for a 15-minute period.

Response: Subsection (b)(4) directs the person conducting a visible emissions test to follow Section 11 of EPA Method 22. Section 11.4.1 of Method 22 accounts for intermittent operation and states “Record the clock time when observations begin. Use one stopwatch to monitor the duration of the observation period. Start this stopwatch when the observation period begins. If the observation period is divided into two or more segments by process shutdowns or observer rest breaks (see section 11.4.3), stop the stopwatch when a break begins and restart the stopwatch without resetting it when the break ends.”

446. Comment: The Commentators state that the reference to an “inspection and maintenance plan of paragraph (b)(1)” in subparagraph (b)(5)(ii) should be deleted because paragraph (b)(1) does not require or refer to an “inspection and maintenance plan.” The subparagraph should be amended to read: “(ii) *The best combustion engineering practice applicable to outlined in the control device ~~inspection and maintenance plan of paragraph (1).~~*”

Response: The Department has revised the language of § 129.129(b)(5)(ii) of the final-form rulemaking to read:

“The best combustion engineering practice **applicable to the control device if the manufacturer’s repair instructions are not available.**”

447. Comment: The Commentators state that a CPMS requirement is too restrictive for existing sources. Engineering calculations performed during the equipment or facility design phase should satisfy concerns relating to inlet flow. The requirement of subsection (c)(1)(i) could result in extensive design and retrofitting for existing equipment and the installation of complex data acquisition systems and other technically complex and cost-prohibitive equipment, which is more difficult to implement than the design and construction of a new facility.

Response: The Department disagrees that the requirement for a flow CPMS is too restrictive to monitor the inlet flow of a manufacturer tested combustion device as this is a requirement of 40 CFR Part 60 Subparts OOOO and OOOOa and a recommendation in the 2016 O&G CTG when using a manufacturer tested control device to be eligible for the exemption from performance testing under § 129.129(c)(1)(i).

448. Comment: The Commentators state that submitting a copy of the performance test to EPA is something that is completed by the device manufacturer, for devices that are manufacturer-tested. Having the owner or operator re-submit the report is duplicative and serves no purpose. If a device has been approved by EPA, the test report will have already been submitted and if approved, EPA will publish the make and model on their continually updated list of devices.

Response: The language of 40 CFR § 60.5413a(e)(6) reads:

“If the owner or operator operates a combustion control device model tested under this section, an electronic copy of the performance test results required by this section shall be submitted via email to Oil__and__Gas__PT@EPA.GOV unless the test results for that model of combustion control device are posted at the following Web site: epa.gov/airquality/oilandgas/.”

Therefore, the operator is only required to submit the manufacturer-test report to the EPA if the control device does not appear on the list of certified models. The operator is able to use a manufacturer tested control device that is not on the list as long as it was tested in accordance with 40 CFR § 60.5413a(d) and they submit an electronic copy of the performance test results to the email address in § 60.5413a(e)(6).

449. Comment: The Commentators state that requiring an arbitrary temperature for a combustion device is not appropriate; if subsection d(1)(iii) is not removed, it should be revised to read “at a minimum temperature to ensure proper combustion as demonstrated in the performance test”.

Response: Section E.1(a)(1)(iii) of the 2016 O&G CTG and 40 CFR 60.5412(a)(1)(iii) and 60.5412a(a)(1)(iii) all require a minimum temperature of 760 °C, which is equivalent to 1,400 °F.

450. Comment: The Commentators state that the requirement in subsection (f)(4)(i)(A) that a thermal unit have a permit or authorization by the "Department's Bureau of Waste Management" should only apply if the thermal treatment unit is located in Pennsylvania. For thermal treatment

units located outside of Pennsylvania, any permit or authorization should be by the state in which the unit is located. The Commentators recommend revising the language of subsection (f)(4)(i)(A) to read “A thermal treatment unit for which the owner or operator has been issued a permit or authorization by the Department's Bureau of Waste Management if located in Pennsylvania, or if located outside of Pennsylvania, by the state in which the unit is located, in accordance with any applicable requirements of that state.”

Response: The language of § 129.129(f)(4)(i)(A) of this final-form rulemaking has been revised to read:

“(A) A thermal treatment unit for which the owner or operator has been issued a permit **under 40 CFR Part 270 (relating to EPA administered permit programs: the hazardous waste permit program) that implements the requirements of 40 CFR Part 264, Subpart X (relating to miscellaneous units).**”

451. Comment: The Commentators state that the requirement of subsection (f)(4)(ii)(B) that an industrial furnace have a permit or authorization by the “Department's Bureau of Waste Management” should only apply if the industrial furnace is located in Pennsylvania. For industrial furnaces located outside of Pennsylvania, any permit or authorization should be by the state in which the unit is located. The Commentators recommend revising the language of subsection (f)(4)(ii)(B) to read “An industrial furnace for which the owner or operator has been issued a permit or authorization by the Department's Bureau of Waste Management if located in Pennsylvania, or if located outside of Pennsylvania. the state in which the unit is located in accordance with any applicable requirements of that state.”

Response: The language of § 129.129(f)(4)(ii)(B) of this final-form rulemaking has been revised to read:

“(B) An industrial furnace for which the owner or operator has been issued a permit **under 40 CFR Part 270 that implements the requirements of 40 CFR Part 266, Subpart H (relating to hazardous waste burned in boilers and industrial furnaces).**”

452. Comment: The Commentators state that the maximum timeframe between inspections required in subsection (g)(1)(i)(A) should be extended from 30 days to 45 days. Setting an arbitrary 30-day standard will ultimately lead to unmanageable scheduling and duplicate compliance activities being performed in the same month.

Response: The Department has revised the language of § 129.129(g)(1)(i)(A) of this final-form rulemaking to read:

“The mechanical connections for leakage with monthly inspections separated by at least 15 calendar days but not more than **45** calendar days.”

453. Comment: The Commentators state that the maximum timeframe between inspections in subsections (g)(1)(i)(B) and (C) should be extended from 90 days to 120 days. Setting a 90-day standard will ultimately lead to unmanageable scheduling and duplicate compliance activities being performed in the same quarter.

Response: The Department has revised the language of § 129.129(g)(1)(i)(B) and (C) of the final-form rulemaking to read:

“...quarterly inspections separated by at least 60 calendar days but not more than **120** calendar days.”

454. Comment: The Commentators state that in addition to the testing issues for combustors that operate intermittently discussed in Comment 445, conducting stack tests on all nonmanufacturer tested control devices within 180 days of rule promulgation will be difficult, expensive, and impractical. Many field combustors are not designed or equipped for stack testing. Protocol approval and scheduling will require more time to avoid unnecessary and unintended compliance issues. Currently, Department stack testing protocol approval can be excessive, often taking over six months. Because of design differences, a standard protocol is not practical. The Commentators request that this requirement be removed.

Response: The Department has revised the language of § 129.129(j)(1) of this final-form rulemaking.

455. Comment: The Commentators state that in the introductory paragraph of (k), the reference to subsection (c)(1)(ii) should be deleted since subsection (c)(1)(ii) does not refer to a weight-percent VOC emission reduction requirement. The paragraph should be modified to read “(k) *Performance test method for demonstrating compliance with a control device weight percent VOC emission reduction requirement. Demonstrate compliance with the control device weight-percent VOC emission reduction requirements of subsections (d)(1)(i), (f)(1)(i), and (i)(1)(i) by meeting subsection (j) and the following:*”

Response: The Department has revised the language of § 129.129(c)(1)(ii) of the final-form rulemaking to read:

“Conducting a periodic performance test under subsection (k) instead of installing a flow CPMS **to demonstrate that the mass content of VOC in the gases vented to the device are reduced by 95.0% by weight or greater.**”

§ 129.130. Recordkeeping and Reporting.

456. Comment: The Commentators recommend DEP adopt a self-certification requirement that tracks reporting requirements, similar to requirements in Colorado and EPA regulations. This mechanism will provide a basis for enforcement actions due to false or inaccurate compliance reporting.

Response: The annual report required in § 129.130(k) requires the responsible official to “...sign, date and certify compliance and include the certification in the initial report and each subsequent annual report.”

457. Comment: The Commentator states that methane emissions reporting should be mandatory and performed according to strict state guidelines.

Response: The purpose of this final-form rulemaking is the reduction of VOC emissions in accordance with the 2016 O&G CTG. However, the Department does require unconventional natural gas wells, gathering and boosting stations, natural gas processing plants, and transmission stations to report emissions, including methane, to the Air Emissions Inventory under 25 Pa. Code Chapter 135.

458. Comment: The Commentator states that the term “deviation” is mentioned several times in § 129.130. The Commentator asks if the proposed rulemaking includes the definition of deviation from § 129.122, how many deviations are tolerated during a specified period of time? At what point does the operator alert the DEP of these deviations?

Response: Any emissions from abnormal operations must be reported in the annual Air Emissions Inventory under 25 Pa. Code § 135.3. Any time an applicable requirement of the final-form rulemaking is exceeded due to abnormal operation, a “*Deviation*” must be recorded. This does not change the existing compliance protocol, including the issuance of Notices of Violation. The frequency and severity of deviations from the requirements will be evaluated as they are with all other regulations and the Department will take the appropriate action. Unless otherwise required, the records of deviations will be submitted to the Department in the annual report required under § 129.130(k).

459. Comment: The Commentators state that several years ago, DEP required operators of unconventional wells and facilities to begin reporting their emissions of GHG, VOC, and HAP. The Commentator recommends that DEP require all operators to report their annual hydrocarbon emissions as allowing the conventional industry to avoid this requirement deprives Pennsylvanians of an accurate understanding of the oil and natural gas industry’s contribution to air pollution and climate change, and as discussed in Comment 381, makes indefensible any assumption that the conventional industry is not a significant source of emissions. The Commentator also recommends that DEP ensure public access to emissions reporting for the conventional industry, as it does with emissions data for the unconventional shale industry.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites. The Department acknowledges the Commentators’ concern about conventional well emissions and the lack of a requirement to report to the Air Emissions Inventory. If the Department determines that owners or operators of conventional wells should report to the Air Emissions Inventory, a separate notice in the *Pennsylvania Bulletin* will be published requiring them to do so.

460. Comment: The Commentator states that operators should continue to be required to report data to DEP emission inventories, even though this reporting does not provide an accurate accounting of emissions volumes. Several studies have demonstrated that measured emissions can be significantly higher than what operators report to inventories; therefore, DEP should require field measurements occur at compressor stations, processing plants, and large well pads, at a minimum. DEP should then integrate the results of the field measurements into its review of the emission inventories submitted by the operators to verify the accuracy of those reports.

Response: This final-form rulemaking does not impact the requirement for owners or operators to report data to DEP's emission inventory. While emission inventory procedures are outside the scope of this final-form rulemaking, the Department will take the Commentator's suggestion for field measurements into consideration.

461. Comment: The Commentator states that it is important to track and assess events, such as malfunctions and blowdowns, that cause pollution above permitted levels. Given Pennsylvania's climate goals and commitment to reducing GHG, VOCs, and HAP from the oil and natural gas industry, emissions from these events should be included in the emissions inventory. The data would provide the basis for determining whether state policies and regulations to reduce oil and natural gas pollution are effective.

The emissions inventory which includes the emissions from events would also help determine the impacts of oil and natural gas industry emissions on health. Environmental health research confirms that large, episodic emission events can have an immediate impact on health or within hours, as toxicity is determined by the concentration of the chemical and intensity of exposure.

Response: Blowdown emissions are required to be reported to the Air Emissions Inventory. Malfunction emissions are accounted for in the emissions from a source that reports to the Air Emissions Inventory. In addition, GP-5 and GP-5A permitted sources are required to report emissions in accordance with the GP-5 and GP-5A Malfunction Reporting Instructions.

462. Comment: The Commentators state that Pennsylvanians are being exposed to harmful pollution and accurate data is the only way to know the extent of that exposure. Given the role of methane and ethane in forming ground-level ozone pollution, reducing emissions from the oil and natural gas industry will be key to Pennsylvania's ability to meet federal air quality standards.

More monitors are needed in areas where the numbers of oil and natural gas wells and facilities are growing, particularly those near more developed and populated areas. The public should be able to access regularly updated information on the monitors and the surrounding facilities. While DEP's ambient air monitoring network has expanded in recent years, the pollutants being tracked are limited and inconsistent and oil and natural gas areas continue to lack coverage.

The adjustments described will ensure that the proposed rulemaking results in meaningful reductions in the oil and natural gas industry's pollution and their impacts on health and climate in Pennsylvania.

Response: Ambient air quality monitoring in Pennsylvania is performed by the Department and local air pollution control agencies in Philadelphia and Allegheny Counties. DEP's Air Monitoring Network consists of 65 air monitoring stations, located in 38 of the 67 counties in Pennsylvania, and includes ambient air monitoring sites for criteria pollutants and air toxics, including VOC. With the exception of the Philadelphia Metropolitan Statistical Area, all areas of the state are meeting the ozone NAAQS of 0.070 ppm set by EPA in 2015. Data collected by DEP over the past decade does not show an increase in ambient ozone levels in oil and natural gas production areas. Since ozone is a secondary pollutant, it is not formed immediately from emissions; rather it is formed downwind under specific atmospheric conditions. In response to

the expansion of the oil and natural gas industry in Pennsylvania, DEP the Department has installed multiple new sites specifically located to monitor ambient air quality related to oil and natural gas activities; none of these new sites have indicated an issue with NAAQS pollutants. However, adding additional monitors is beyond the scope of this final-form rulemaking.

463. Comment: The Commentators strongly recommend that § 129.130 (relating to recordkeeping and reporting) not contain requirements more stringent than or inconsistent with those found in Subpart OOOOa.

Response: The Department does not require any additional recordkeeping or reporting requirements from those recommended by EPA in the 2016 O&G CTG or required under Subparts OOOO or OOOOa except as determined by the Department as necessary to assure compliance with a more stringent requirement.

464. Comment: The Commentators are suspect of how the operator reports emissions data with all the emissions reported under one well. The Commentators state that DEP needs to standardize this data, as some operators report emissions for each individual well while others report all their emissions under one well. The Commentators recommend requiring data to be reported for individual wells as that would increase transparency and increase the public's trust in the data. One Commentator intended to review the most recent emissions inventory, do some calculations, and determine what effect the proposed rulemaking will have. Unfortunately, the most recent inventory does not include the three wells recently placed in production, the 1,300 hp compressor engine, or the numerous malodors and releases that occur over a year.

Response: The Department is currently in the process of updating the data handling and storage for these sources. The intention is to migrate the information reported regarding air emissions from the Oil and Gas Electronic Reporting (OGRE) database to eFACTS and AIMS. This will form a link between an individual air contamination source and a site ID so that a better understanding of the equipment associated with an unconventional well site and the emissions for each source and for the entire facility. However, the data reported by operators that report emissions for each individual well divide the total emissions from the wellpad by the number of wells.

465. Comment: The Commentator recognizes the data the Department receives is as reported by industry with no audits to determine whether operators are accounting for releases and malfunctions. How can operators account for emissions from releases and malfunctions, when they are not onsite for the entire event? The Commentator does not view the reported data as accurate. The data cannot be relied upon, and the Commentator believes anyone reviewing the data would come to the same conclusion.

Response: The Department does verify the emissions reported to the Air Emissions Inventory; however, it is not possible to audit every unconventional well site, gathering and boosting station, or natural gas processing plant. This review of emissions data has greatly improved over the past few years and will continue to improve as data handling and storage for these sources migrates from the OGRE database to eFACTS and AIMS. The operators are required to keep records of blowdowns and vents, and while they may not know with precision to the second of when these releases occur, the operators can estimate the time within minutes based on the

sensors and meters that are installed to track the amount of natural gas at the inlet and outlet of the facility.

466. Comment: The Commentator recommends directing operators to provide current well site compression, the date of installation, the horsepower, the pollution prevention technology installed, and noise mitigation technology methods used for well site compression within 60 days of the effective date of the rulemaking. The BAQ should share this information with the [Office of Oil and Gas Management]. The Commentator recommends adding a provision providing that DEP shall be notified when compression is added to a well site the DEP must be notified in advance of installation placement and within three days of completed installation.

Response: The final-form of rulemaking is not applicable to natural gas-fired engines or turbines used for unconventional well site compression. Any time a new natural gas-fired engine or turbine compression system is added to an existing unconventional well site, it is subject to requirements under Exemption 38 or GP-5A. Those installed under GP-5A require notifications be submitted to the appropriate Department Regional Office.

467. Comment: The Commentator recommends that the Department require air monitoring technologies that have the capacity to detect peaks rather than simply averages as adequate data is needed to properly enforce regulations and meet Pennsylvania's goals of decreasing GHG emissions by 80% by 2050.

Response: This comment is beyond the scope of this final-form rulemaking.

468. Comment: The Commentators state that requiring a unique set of coordinates for individual tanks within a multi-tank battery is overly burdensome and does not provide any environmental benefit. The Commentator proposes that a single latitude and longitude for a tank battery be supplied to the Department to meet this requirement.

Response: For adequate verification of compliance with the final-form rulemaking, the latitude and longitude are required for each source.

469. Comment: The Commentators believe that the date the calculation was performed provides no environmental benefit and has no bearing on compliance and requests that this requirement be removed.

Response: The determination for potential to emit is only required to be performed once. The date requirement for the actual VOC emissions calculation is because the calculation must be performed monthly and determined on a 12-month rolling basis. Noting the date of the monthly calculation is not overly burdensome.

470. Comment: The Commentators state that the reference in subsection (b)(7) to § 129.123(d)(3) should be changed to § 129.123(d)(1) since that is the paragraph that addresses skid-mounted or mobile storage vessels.

Response: The Department has corrected the reference in this final-form rulemaking.

471. Comment: The Commentators request that the recordkeeping and reporting requirements for natural gas-driven driven pneumatic controllers should be limited to high-bleed pneumatic controllers and not include low-bleed or intermittent natural gas-driven pneumatic devices.

Response: The applicability of § 129.121(a)(2) and of § 129.124(a) has been corrected to reflect the requirements only apply to natural gas-driven continuous bleed pneumatic controllers.

472. Comment: The Commentators state that it is unclear what date in subsection (c)(1) is required to be recorded. For consistency with § 129.124(d)(1), the date should refer to the required compliance date for the controller, and subsection (c)(1) should be edited to read “The required compliance date, identification, location, and manufacturer specifications for each natural gas-driven pneumatic controller subject to § 129.124 (relating to natural gas-driven pneumatic controllers).”

Response: The Department has revised the language of § 129.130(c)(1) of the final-form rulemaking to read:

“(1) The **required compliance** date, identification, location and manufacturer specifications for each natural gas-driven **continuous bleed** pneumatic controller subject to § 129.124 (relating to natural gas-driven **continuous bleed** pneumatic controllers).”

473. Comment: The Commentators state that, as drafted, it is unclear what "date" is required to be recorded for paragraph (1). The required "date" for purposes of this paragraph should be specified, or the reference to "date" should be deleted from paragraph (1).

Response: The Department has revised the language of § 129.130(d)(1) of this final-form rulemaking to read:

“(1) The **required compliance** date, location and manufacturer specifications for each natural gas-driven diaphragm pump subject to § 129.125 (relating to natural gas-driven diaphragm pumps).”

474. Comment: The Commentators state that the reference in subsection (d)(7) to § 129.125(c)(1)(iii) does not exist. Subsection (d)(7) should be amended to read “For a natural gas-driven diaphragm pump required to reduce VOC emissions under § 129.125(c)(1), the demonstration under § 129.125(c)(1)(i)(C).”

Response: The Department has revised the language of § 129.130(d)(7) of this final-form rulemaking to read:

“(7) For a natural gas-driven diaphragm pump required to reduce VOC emissions under § **129.125(b)(1)**, the demonstration under § **129.125(b)(1)(iii)**.”

475. Comment: The Commentators state that for consistency with the recommendation that reciprocating compressors should be allowed to route emissions to a control device in addition to a process, this subsection should be revised to read “A statement that emissions from the rod packing are being routed to a control device or process through a closed vent system under negative pressure.”

Response: The Department has revised the language of § 129.130(e)(3)(i) of this final-form rulemaking to read:

“(i) A statement that emissions from the rod packing are being routed to a **control device or a process** through a closed vent system under negative pressure.”

476. Comment: The Commentators believe that an annual review and update of the GOR is unnecessary since the GOR will not change significantly over time; therefore, the calculation will not materially differ from a one-time analysis. The Commentators also request that the certification requirement by a responsible official be removed as it should not be needed for this type of analysis. The Commentators are not sure of the intent of this condition but believes requiring samples to be collected and analyzed from every site is overly burdensome and ultimately unnecessary.

Response: The Department has revised the language of § 129.130(g)(1)(ii) to remove the annual review requirement from this final-form rulemaking.

477. Comment: The Commentators recommend that for consistency with the language referenced in § 129.127(b)(1)(i), the wording of subsection (g)(1)(ii) should be changed to read “The annual analysis documenting a GOR of less than 300 standard cubic feet of gas per barrel of oil produced, conducted using generally accepted methods.”

Response: The Department has revised the language of § 129.130(g)(1)(ii) to remove the word “stock” from this final-form rulemaking.

478. Comment: The Commentators believe that the reference in subsection (g)(2) to § 129.127(b)(2) should be changed to read “For a well site subject to § 129.127(b)(1)(ii), a natural gas gathering and boosting station, and a natural gas processing plant:”

Response: Due to the changes in this final-form rulemaking, this condition was moved to subsection (g)(3).

479. Comment: The Commentators believe that the reference in subsection (g)(2)(ii) to § 129.127(b)(1)(ii) should be modified to read “The records of each monitoring survey conducted under § 129.127(b)(1)(ii)(B) or § 129.127(d)(2).”

Response: Due to the changes in this final-form rulemaking, this condition was moved to § 129.130(g)(3)(ii).

480. Comment: The Commentators state that, as drafted, subclause (g)(2)(ii)(G)(II) requires “the instrument reading” to be recorded for each leak, but does not describe what that means for leaks detected with OGI equipment. This should be clarified accordingly.

Response: The instrument reading for OGI equipment is a visible leak.

481. Comment: The Commentators state that for consistency with the recommendations that OGI inspections be allowed for no detectable emissions inspections in §§ 129.128(b)(2)(ii) and

129.128(d), subsection (i)(2) should be amended to read “For the no detectable emissions or no visible leaks inspections of § 129.128(d), a record of the monitoring survey as specified under subsection (g)(2)(ii).”

Response: Because of the change to § 129.128(d) which accommodates the use of OGI for a no detectable emissions inspection, this provision did not need to be revised as suggested. It was revised to correct the reference to § 129.130(g)(3)(ii) based on revisions to subsection (g).

482. Comment: The Commentators state that the records of the date of purchase in subsection (j)(2) and a copy of the purchase order in subsection (j)(3) for a control device are wholly irrelevant for compliance with this rule. The Commentators state that the pertinent concern is ensuring that the installation date of a control device is prior to the applicable compliance date and requests that the requirements of subsections (j)(2) and (3) be removed.

Response: This requirement is consistent with Sections A.5(a)(6)(ii) and (iii) and C.6(a)(1)(ii)(B) and (C) the 2016 O&G CTG.

483. Comment: The Commentators state that it is not clear if the “name of the company” refers to the company that performed the test or the company that owns or operates the control device. This subsection should be clarified accordingly prior to finalization.

Response: For § 129.130(j)(5)(iv)(A), the name of the company refers to the owner or operator of the control device as shown in Figure 22-1 of 40 CFR Part 60 Method 22, Appendix A-7. To further clarify, the language of § 129.130(j)(5)(iv)(A) of this final-form rulemaking has been revised.

484. Comment: The Commentators state that subsection (k) does not specify the duration of the initial compliance period, only the date by which the initial report is due. The Commentators request that the Department include clarification on the duration of the compliance period and the report due date. The Commentators recommend that the initial compliance period be one year following the effective date of the rule, the initial report be due within 90 days of the initial compliance period, and subsequent reports be due annually following the due date of the initial report.

Response: The Department has revised the language of § 129.130(k) of this final-form rulemaking.

New Fortress Energy, LLC

485. Comment: The Commentator states that New Fortress Energy LLC, dba Bradford County Real Estate Partners LLC, is a natural gas liquefaction plant that expects to process 3.5 to 4 million gallons of liquified natural gas (LNG) per day and ship it overland to a port along the Delaware River for export to foreign markets. The facility expects to release VOC, GHG, and other emissions, as stated in its permit. The sources at the facility included in this project have emissions limits of 95.90 TPY NO_x, 90.04 TPY CO, 35.57 TPY VOC, 83.25 TPY SO_x, 99.67 TPY PM, 99.67 TPY PM₁₀, 99.60 TPY PM_{2.5}, 8.77 TPY HAP, 4.55 TPY any single HAP, 49.02 TPY ammonia, 24.56 TPY sulfur acid, and 1,107,670 TPY CO_{2e}. These emissions are in addition to other emissions from oil and natural gas related activities in the region.

The facility is across the street from a retirement home, approximately 1 mile from a day care center, approximately 1.5 miles from an elementary school and a high school, and approximately 1.5 miles from a winery. The Commentator recommends that the proposed rulemaking is applied retroactively so that they apply to the Bradford County Real Estate Partners, LLC LNG Plant authorized under minor facility plan approval 08-00058A.

Response: This facility will have to determine applicability if construction is completed before the effective date of this final-form rulemaking. The requirements for all applicable sources will have to be compared to the requirements under the plan approval and compliance will be demonstrated through the most stringent requirement.

486. Comment: The Commentator states that the Bradford County Real Estate Partners, LLC LNG Plant processes natural gas and will require a pipeline. The pipeline portion of the project is not in eFACTS. The Commentator recommends that the public should be informed about permits applied for and received for pipelines that feed natural gas to gas-processing facilities. The current level of project segmentation is unacceptable, from a public-disclosure standpoint. Every gas processing plant has a pipeline leading to it. Pipelines and related compressor stations are a source of emissions. If the client applying for the gas-processing facility does not disclose its pipeline plans, DEP has a duty to ask. The Commentator recommends that the eFACTS Site search results need to disclose an entire project.

The Commentator also recommends publicly posting all DEP Air Quality permits and exemptions in an easily viewable format, such as a table with the name of the facility, location, authorization type, status, expiration date, and link to DEP correspondence. The public needs to be able to view all sources in an area.

Response: Utility distribution lines and transmission pipelines are under the jurisdiction of the PAPUC or the US Department of Transportation. Compressor stations are required to obtain authorization under an air quality plan approval or general permit.

The Department is working to have public permitting files online in the future. The Department follows the public notice requirements contained in 25 Pa. Code §§ 127.44, 127.424, and 127.521. Documents related to permitting decisions are available for public view from the Department's Regional Offices and are available upon request. The Department has placed emissions inventory, issued permits, and asbestos notifications at the Air Quality Reports portion of the Department's website. Furthermore, permitted facilities' status are found at the Department's eFACTS, which allows individuals to search for authorizations, clients, sites and facilities, inspection and pollution prevention visits, and inspection results, including enforcement information when violations are noted.

487. Comment: The Commentator states that DEP's approach to Air Quality permitting is problematic as it does not aggregate emissions from different companies, such as the well operator and the LNG operator, operating at the same site.

Response: The Department acknowledges this comment; however, it is outside the scope of this final-form rulemaking. Sources are subject to this final-form rulemaking regardless of whether the sources are aggregated into one facility or not for Title V, NSR, NSPS, or MACT purposes.

488. Comment: The Commentator states that Edge Gathering Virtual Pipeline is a business model using mobile liquefaction units. The company anticipates expanding this business model via the deployment of additional “cryobox” liquefaction units. According to communications with DEP, the Commentator learned that truck-based systems are exempt from air quality permitting under Category 31 “Sources of uncontrolled VOC emissions not addressed elsewhere in this exemption listing modified or newly added, such that emission increases are less than 2.7 TPY. Facilities claiming this exemption must provide a 15-day prior written notification to the Department and limit VOC emission increases to less than 2.7 TPY.”

The Commentator recommends applying the proposed rulemaking to the complete supply chain of the LNG business, to include overland shipping by rail and tanker truck, and ensuring that truck-based LNG systems and stationary well-mounted LNG processors are included.

Response: These sources are beyond those identified by EPA in the 2016 O&G CTG and therefore are beyond the scope of this VOC RACT rulemaking.

489. Comment: The Commentator states that DEP’s approach to exemption does not anticipate aggregate VOC emissions from widespread use of mobile liquefaction units. The exemption provides a loophole which allows LNG mobile units to become the new industry norm, dotting the landscape with “mobile” liquefaction units. The aggregated emissions from these facilities will lower the air quality of a region, endangering public health.

The Commentator recommends removing exemptions for any source of VOC. Because large numbers of small equipment in the aggregate can result in significant emissions, remove the minimum size and operating times criteria for regulatory inclusion.

Response: Please see the responses to Comments 487 and 488.

490. Comment: The Commentator recommends applying strict VOC limits to all petrochemical projects, such as fertilizer production, methanol production, ethane crackers and other facilities encouraged by House Bill 732.

Response: This comment is outside the scope of this final-form rulemaking.

Ban Fracking

491. Comment: The Commentators state that the Commonwealth of Pennsylvania should ban fracking now. Cutting methane pollution from the oil and natural gas industry is the quickest, most cost-effective way for Pennsylvania to reduce climate warming GHG, and the quickest, most cost-effective way to cut methane pollution is to ban fracking now.

Response: This final-form rulemaking is designed to implement the air emission control recommendations of the 2016 O&G CTG issued by the EPA under Sections 171(c)(1), 184(a), and 184(b) of the CAA. These air emission control recommendations apply to sources at unconventional well sites, gathering and boosting stations, and natural gas processing plants and include storage vessels, natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps, reciprocating compressors, centrifugal compressors, and fugitive

emissions components. In addition, storage vessels in the natural gas transmission and storage segment are also affected sources. This final-form rulemaking is estimated to reduce 2,864 TPY of VOC emissions and estimated to reduce 45,278 TPY of methane as a co-benefit.

492. Comment: The Commentators state that the secret chemical cocktails used in fracking are dangerous. It's better for many reasons to stop fracking and put resources into swiftly developing green energy.

Response: This final-form rulemaking establishes VOC RACT requirements for sources at unconventional well sites, gathering and boosting stations, and natural gas processing plants and include storage vessels, natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps, reciprocating compressors, centrifugal compressors, and fugitive emissions components. In addition, storage vessels in the natural gas transmission and storage segment are also affected sources. Hydraulic fracturing is not an applicable source; therefore, the comment concerning disclosure of chemicals used in hydraulic fracturing is outside the scope of this final-form rulemaking.

The Department's Office of Oil and Gas Management regulates the safe exploration, development and recovery of Marcellus Shale natural gas reservoirs in a manner that will protect the Commonwealth's natural resources and the environment. Information related to hydraulic fracturing fluid is available at the Department's website, <https://www.dep.pa.gov/Business/Energy/OilandGasPrograms/OilandGasMgmt/Marcellus-Shale/Pages/default.aspx>.

493. Comment: The Commentator suggests that to reduce the number of sources, new permits should be withheld, and existing ones withdrawn.

Response: For each new source or modification, the Department evaluates BAT on a case-by-case basis. BAT is an evolving standard and is defined as equipment, devices, methods or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be made available. The Department may not arbitrarily deny applications for plan approval or operating permit or withdraw a plan approval or operating permit issued in accordance with 25 Pa. Code Article III.

Shell Ethane Cracker

494. Comment: The Commentator cites the June 3, 2020 report from Inside Climate News that the Beaver County natural gas & ethane cracker under construction by Royal Shell Oil has become a risky proposition. The Institute for Energy Economy & Financial Analysis reports that the facility will make less plastic pellets than expected and provide less monetary return to investors. Increased competition will mean less union jobs and less money to pour into the local economy, certainly not the return expected from the 1.6 million metric tons of plastic pellets that had been promised. "It will be a distressed asset for years to come." The Commentator states that this failure is the future of the over-supply of natural gas and its byproducts, a failure that extends to those that promised an economic rebirth of a regional petrochemical buildup. The Commentator states that the Commonwealth should stop construction of this unneeded, air

polluting facility and concentrate on bringing in renewable energy resources to ensure Pennsylvania's future.

Response: This comment is outside the scope of this final-form rulemaking. Information on the Shell Chemical Appalachia LLC Petrochemicals Complex project can be found at DEP's website at

<https://www.dep.pa.gov/About/Regional/SouthwestRegion/Community%20Information/Pages/Shell-Petrochemical-Complex-.aspx>

495. Comment: The Commentators state that around seven years ago, Governor Corbett struck a deal to build a petrochemical plant in Beaver County with the promise of stimulating jobs in the area. It was a very big, bad business mistake; one that could have been reversed but was continued by Governor Wolf.

The Commentators state that it is a business mistake because the oil and natural gas industry is in financial turmoil and is subject to human error. Human error requires tighter regulations; however, the DEP doesn't have the people power to enforce the current regulations. This industry is driven by greed and a thirst for power, is a highly polluting industry, and creates a product that is not needed because plastic is no longer the magic word it was in 1957.

Response: Please see the response to Comment 494.

Greenhouse Gases

496. Comment: The Commentators welcome the proposed rulemaking by the Department to control and significantly reduce the emission of VOC from wells and other gas facilities. Not only are VOC emissions injurious to public health, but they also contribute to global warming. Of special concern is the emission of methane which, with a lifecycle in the atmosphere of twelve years, is by far the largest component of the VOC emissions from these sources.

In January 2019 Governor Wolf set a climate goal of reducing GHG emissions by 26% by 2025. According to the latest DEP GHG Inventory the emissions from natural gas production, transmission, and distribution amounted to 11.80 million metric tons (MMT) CO₂e in 2015. To achieve the Governor's goal for 2025 will require a reduction of 3.07 MMT CO₂e, far more than is expected to be gained by the draft VOC emissions rule.

Response: The Department acknowledges this comment and notes that the Department is working on other initiatives to achieve the Commonwealth's GHG reduction goals.

497. Comment: The Commentator states that while arguing over methane controls in Pennsylvania, research and analyses over the past years are informed by the successes of other states. With rapidly increasing fugitive emission events being documented, DEP must discard any presumption that it is reasonable to designate de minimis levels of methane production in this proposed rulemaking.

Response: This final-form rulemaking establishes VOC RACT requirements based on EPA's recommendations in the 2016 O&G CTG and the Department's 2020 reanalysis. The

Department estimates that 45,278 TPY of methane will be reduced as a co-benefit of the controls for VOC emissions.

498. Comment: The Commentator states that the 2016 Pennsylvania GHGI cites voluntary reports of 305.75 MMT CO₂e for Gross Production Emissions, including CO₂, methane, and nitrous oxide. The 2019 Inventory released December 2019 uses 2016 data to describe the GHG problem:

“In 2016, (the most recent data available for the 2019 Inventory) Pennsylvania applicable sources voluntarily reported that they were responsible for 264 million metric tons of carbon dioxide equivalent (MMTCO₂e) being emitted into the atmosphere. Production and consumption of energy accounted for nearly 90 percent of these emissions. Pennsylvania’s forestry and land use sector sequestered nearly 30 MMTCO₂e in 2016.”

A major portion of these emissions are from methane. These numbers from voluntary submissions by subject polluters are in sharp contrast to a 2018 study by EDF.

Response: The Department acknowledges this comment. The Department estimates that 45,278 TPY of methane will be reduced as a co-benefit of the controls for VOC emissions.

499. Comment: The Commentator states that research suggests actions to reduce methane emissions have the potential to lower its atmospheric concentrations even more quickly than those of CO₂, thus slowing the rate of warming over the next few decades while society works to reduce the emissions of longer-lasting gases such as CO₂. There is a wide array of existing cost-effective options to reduce methane throughout the natural gas supply chain, many with estimated payback periods of a year or less.

Response: Please see the response to Comment 497.

500. Comment: The Commentator states that the EDF analysis shows that emissions from the tens of thousands of conventional wells in Pennsylvania, which tend to be older and lower-producing than unconventional sources, collectively contribute more than half the total methane pollution from Pennsylvania well sites. Leaky, outdated, and malfunctioning equipment at oil and natural gas sites constitute a primary source of industrial methane emissions, and the requirements finalized in this rulemaking must help materially reduce harmful emissions from existing facilities. Most of these facilities are operating today without the protections afforded either by the EPA’s 2016 NSPS, which the EPA proposed to significantly revise and fundamentally weaken, or even by the limited and outdated VOC controls imposed by DEP’s Exemption 38. If Pennsylvania is going to reach its climate commitments, DEP must aggressively move forward with this proposed rulemaking and other GHG pollution controls.

Response: The Department amended this final-form rulemaking to clarify that the control measures are only applicable to unconventional sources of VOC emissions installed at unconventional well sites, gathering and boosting stations and natural gas processing plants. Given the concerns expressed by commentators, the Department will develop a separate rulemaking and regulatory analysis form for the RACT requirements for sources of VOC emissions installed at conventional well sites.

501. Comment: The Commentator states that in addition to contributing harmful pollution to the atmosphere, methane emissions also represent waste of a valuable resource. EDF estimates that the 1.1 million tons of methane emitted to the atmosphere equates to 57 billion cubic feet of natural gas that could otherwise be sold. Reducing emissions from existing sources can result in significantly more gas being brought to market, to the benefit of Pennsylvania operators and citizens. Implementing common sense, economically sensible regulations is smart policy for the Keystone state.

Response: The Department acknowledges this comment. While this final-form rulemaking is designed to implement the VOC emission reduction recommendations of the 2016 O&G CTG, the implementation of the VOC emission control measures is also expected to result in methane emission reductions of approximately 45,278 TPY.

502. Comment: The Commentator states that as a scientist they have been following the issue of global warming in the scientific literature since the early '90s. The problem is not going to go away; it is getting worse. At one time the IPCC indicated that it is imperative to avoid a 2 °C warming by the end of the century. Current global emissions rates are on track to pass that threshold just past mid-Century even with drastic cuts to carbon emissions over the next decade. Mankind has let the problem get to the point that, in addition to emission cuts, removing and sequestering CO₂ directly from the atmosphere. Every additional carbon atom allowed to escape via these leaks is another carbon atom that must be removed within the next 20 to 30 years at high cost.

Response: Please see the response to Comment 120.

Effects of Climate Change

503. Comment: The Commentators state that Penn State University scientists warn that the devastating impacts of climate change on Pennsylvania will likely include warmer temperatures throughout the 21st century; more frequent and intense storms, including flooding; and longer dry periods, including droughts. The IPCC recommends that GHG emissions be eliminated by 2050 in order to avoid these impacts and possibly more disastrous ones. Additional negative impacts suggested by the Commentators include increasing tick populations and subsequent spread of Lyme disease; the spread of other vector-borne diseases; fires; polar ice melt; the polar vortex; sea level rise; climate refugees; urban heat island effects; increasing ground-level ozone; mass extinctions; declining human physical and mental health; and damage to infrastructure, water systems, and agriculture.

Response: Please see the response to Comment 120.

Uncategorized Comments

504. Comment: As one of the specific responsibilities of the Board is to formulate, adopt, and promulgate such rules and regulations as may be determined by the Board to be necessary for the proper performance of the Department's duties, the Commentator offers a frank discussion of the realities of the fiscal health of the shale gas industry and the necessity of promulgating this proposed rulemaking. The recent bankruptcy filing of Chesapeake Energy, that for years was the

Commonwealth's largest lease-holding operator, is a prime example of the Commentator's concern.

The Commentator was informed of the frequent, long pressure releases from the Cappucci well pad which consisted of methane, other hydrocarbons, and any trace contaminants attached to the gases from the pad's compressor. The Commentator believes these events should be of extreme interest to DEP and asks if the Department knows the frequency and duration of the releases, estimated the related methane and VOC emissions, and whether the releases created a noise nuisance. The Commentator understands that Pennsylvania will continue to produce a lot of natural gas, but Pennsylvania operators are not going to produce as much this year as they did in 2019. The Commentator believes this will be the beginning of a downward trend of natural gas production in Pennsylvania and that the proposed rulemaking could be, with prudent, non-partisan governance, the first in the decline era of the play. This is a rare opportunity for the Board to end the highly risky "exploration and production" phase of Pennsylvania's shale gas experiment; an experiment that, along with positive benefits, also distributed mayhem among rural Pennsylvanians, countered reasonable and prudent international climate policy, degraded rural air and water quality, and wreaked financial havoc on far more people than it benefitted. Fulfilling the Board members' obligation and examining this regulation in the context of the Environmental Rights amendment could lead to better outcomes for the present and future of the Commonwealth and the health and welfare of all who do and will live here.

Response: The Department acknowledges this comment. The Office of Oil and Gas Management regulates the safe exploration, development, and recovery of natural gas reservoirs in unconventional formations in a manner that protects public health, public safety, and the environment. The Department inspects unconventional well sites from construction to reclamation to ensure that the site has proper erosion controls in place, and that any waste generated in drilling and completing the well was properly handled and disposed. Also, unconventional well operators are required to submit a variety of reports regarding well drilling, completion, production, waste disposal, and well plugging. If necessary, the Department employs aggressive enforcement against well operators to ensure that facilities are brought into compliance.

The Department also inspects unconventional well sites to ensure that the operator sites and drills the well according to the permit and applicable laws. The Department staff investigate complaints where an unconventional well or drilling activity may be causing environmental or public safety concerns. The Department's air quality program received no complaints about the Cappucci well site. Additionally, the Cappucci well site must meet the requirements of conditional Exemption 38.

LNG is a new source category for which the Department is collecting information about air contamination sources, control devices, temporary or permanent operation, emissions, location, impact to surrounding areas, capacity, hours of operations, etc. LNG facilities may be regulated by several Federal agencies, primarily FERC, the USCG, and PHMSA, as well as by state utility regulatory agencies.

505. Comment: The Commentator understands the pressures on legislators caused by threats of consumer price increases, but this proposed rulemaking will increase product and increase income over time. The Commentator asks the solons on the Board, why Pennsylvania continues

to be so timid with the gas industry that hemorrhages other people's money, incurs criminal indictments, destroys Pennsylvanian's quality of life and their property value, and impacts people's health. The Commentator states that allowing the industry to abuse the people with a proposed rulemaking that is inconsistent with the Pennsylvania Constitution shows a complete lack of empathy.

The Commentator states that the legislators on the Board, especially their own Senator Yaw, may have seen support for free market oversight of the industry in early years of shale gas development as a benefit. Swapping out coal plants in urban areas for well field development in sparsely populated regions in need of economic development may have made sense to the legislators on the Board, but the facts are, though many of your constituents benefitted from the largess of the gas industry, there were many that were harshly impacted. The impact is more severe in southwestern Pennsylvania than in the dry gas regions, including Senator Yaw's district, though there are plenty of people harmed there, too.

The Commentator asks the legislative members of the Board to consider the property owners in those townships, not just the larger landowners that have leased multiple acres and can live far from well pads and other infrastructure. Having a well pad producing from one's 99 acres that is located on someone else's property nearly one mile away and uphill through a thick forest from one's dwelling may not be an issue for either property owner; however, having a large compressor engine on a well pad just over 500 feet away, or even 2,500 feet away from their home may certainly be a serious problem for some families.

Response: The Department acknowledges this comment. The Office of Oil and Gas Management regulates the safe exploration, development, and recovery of natural gas reservoirs in unconventional formations in a manner that protects public health, public safety, and the environment.

The Department inspects unconventional well sites from construction to reclamation to ensure that the site has proper erosion controls in place, and that any waste generated in drilling and completing the well was properly handled and disposed. Also, unconventional well operators are required to submit a variety of reports regarding well drilling, completion, production, waste disposal, and well plugging. If necessary, the Department employs aggressive enforcement against well operators to ensure that facilities are brought into compliance.

The Department also inspects unconventional well sites to ensure that the operator sites and drills the well according to the permit and applicable laws. The Department staff investigate complaints where an unconventional well or drilling activity may be causing environmental or public safety concerns.

506. Comment: The Commentator reminds those from the Governor's administration on the Board that shale gas development was a bi-partisan effort from the get-go. The Rendell administration did not give Pennsylvania citizens in either the Susquehanna River Valley or Ohio River Basin any say in the matter. The Commentator states natural gas is so inexpensive that the Commonwealth cannot afford to properly regulate does nothing for the common good. It is still competitive here, with short distances to transport gas to major northeastern markets and those markets that serve the Commonwealth while the energy transition unfolds. The additional cost for more frequent inspections, like California's monthly requirement, may curtail production to

some degree. But it may also ensure that uneconomic assets controlled by operators facing a bleak future can be retired properly when vertically integrated companies, take the Constitution seriously. The future of the Commonwealth would be in a less dire position when these companies decide to leave. This can only be accomplished with a legislature that understands funds for proper oversight of the gas industry can only come from fees assessed to the industry. That combined with an Administration that understands fees added beyond the impact fee should not go to anything but ensuring proper oversight until those agencies providing oversight are fully funded and the legislature then has the necessary information to fairly analyze the economic impacts.

Response: Please see the response to Comment 505.