Regulatory Analysis Form

(Completed by Promulgating Agency)

(All Comments submitted on this regulation will appear on IRRC's website)

IRRC Number: 3256

(1) Agency:

Environmental Protection

(2) Agency Number: 7

Identification Number: 544

(3) PA Code Cite: 25 Pa. Code Chapters 121 and 129

(4) Short Title: Control of VOC Emissions from Oil and Natural Gas Sources

(5) Agency Contacts (List Telephone Number and Email Address):

Primary Contact: Laura Griffin, 717-783-8727, laurgriffi@pa.gov
Secondary Contact: Jessica Shirley, 717-783-8727, jesshirley@pa.gov

(6) Type of Rulemaking (check applicable box):

- ☐ Proposed Regulation
- ☒ Final Regulation
- ☐ Final Omitted Regulation
- ☐ Emergency Certification Regulation;
- ☐ Certification by the Governor
- ☐ Certification by the Attorney General

(7) Briefly explain the regulation in clear and nontechnical language. (100 words or less)

This final-form rulemaking adds reasonably available control technology (RACT) requirements and RACT emission limitations for oil and natural gas sources of volatile organic compound (VOC) emissions to Chapters 121 and 129 (relating to general provisions; and standards for sources). VOC emissions are precursors to the formation of ground-level ozone, a public health, welfare and environmental hazard. Sources affected by this final-form rulemaking include 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 and fugitive emissions components. 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 gas operations.

This final-form rulemaking will be submitted to the United States Environmental Protection Agency (EPA) for approval as a revision to the Commonwealth's State Implementation Plan (SIP) following promulgation of the final-form regulation.

(8) State the statutory authority for the regulation. Include specific statutory citation.

This final-form rulemaking is authorized under section 5(a)(1) of the Air Pollution Control Act (APCA) (35 P.S. § 4005(a)(1)), which grants the Board the authority to adopt rules and regulations for the prevention, control, reduction and abatement of air pollution in this Commonwealth. Section 5(a)(8) of the APCA (35 P.S. § 4005(a)(8)) also grants the Board the authority to adopt rules and regulations designed to implement the provisions of the Clean Air Act (CAA) (42 U.S.C.A. §§ 7401—7671q).

(9) Is the regulation mandated by any federal or state law or court order, or federal regulation? Are there any relevant state or federal court decisions? If yes, cite the specific law, case or regulation as well as any deadlines for action.

Yes, this final-form rulemaking to adopt RACT requirements and emission limitations for oil and natural gas sources of VOC emissions is required under the CAA. In accordance with sections 172(c)(1), 182(b)(2)(A) and 184(b)(1)(B) of the CAA (42 U.S.C.A. §§ 7502(c)(1), 7511a(b)(2)(A) and 7511c(b)(1)(B)), this final-form rulemaking establishes the VOC emission limitations and other RACT requirements consistent with the EPA's recommendations in the "Control Techniques Guidelines for the Oil and Natural Gas Industry," EPA 453/B-16-001, Office of Air Quality Planning and Standards, EPA, October 2016 (2016 O&G CTG) as RACT for these sources in this Commonwealth. See 81 FR 74798 (October 27, 2016).[1] This final-form rulemaking is also necessary to attain and maintain the National Ambient Air Quality Standards (NAAQS) for ozone and protect public health and welfare from harmful air pollution.

Background on the Ozone National Ambient Air Quality Standards (NAAQS)

Under section 108 of the CAA (42 U.S.C.A. § 7408), the EPA is responsible for establishing NAAQS, or maximum allowable concentrations in the ambient air, for six criteria pollutants considered harmful to public health and the environment: ground-level ozone; particulate matter; nitrogen oxides (NO_x); carbon monoxide; sulfur dioxide; and lead. Section 109 of the CAA (42 U.S.C.A. § 7409) established two types of NAAQS: primary standards, which are limits set to protect public health; and secondary standards, which are limits set to protect public welfare and the environment. In section 302(h) of the CAA (42 U.S.C.A. § 7602(h)), effects on welfare are defined to include protection against visibility impairment and from damage to animals, crops, vegetation and buildings. The EPA established primary and secondary ground-level ozone NAAQS to protect public health and public welfare, including the environment.

On April 30, 1971, the EPA promulgated primary and secondary NAAQS for photochemical oxidants, which include ground-level ozone, under section 109 of the CAA. See 36 FR 8186 (April 30, 1971). These standards were set at an hourly average of 0.08 parts per million (ppm) total photochemical oxidants not to be exceeded more than 1 hour per year. On February 8, 1979, the EPA revised the level of the primary 1-hour ozone standard from 0.08 ppm to 0.12 ppm and set the secondary standard identical to the primary standard. See 44 FR 8202 (February 8, 1979). This revised 1-hour standard was reaffirmed on March 9, 1993. See 58 FR 13008 (March 9, 1993).

On July 18, 1997, the EPA concluded that revisions to the then-current 1-hour ozone primary standard to provide increased public health protection were appropriate to protect public health with an adequate margin of safety. Further, the EPA determined that it was appropriate to establish a primary standard of 0.08 ppm averaged over 8 hours. At this time, the EPA also established a secondary standard equal to the primary standard. See 62 FR 38856 (July 18, 1997). In 2004, the EPA designated 37 counties in this Commonwealth as 8-hour ozone nonattainment areas for the 1997 8-hour ozone NAAQS. See 69 FR 23858, 23931 (April 30, 2004). 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 1997 8-hour ozone NAAQS.

In March 2008, the EPA lowered the primary and secondary ozone NAAQS to 0.075 ppm (75 parts per billion (ppb)) averaged over 8 hours to provide greater protection for children, other at-risk populations and

[1] See also EPA, Control Techniques Guidelines for the Oil and Natural Gas Industry, EPA 453/B-16-001, Office of Air Quality Planning and Standards, October 2016, https://www.epa.gov/sites/default/files/2016-10/documents/2016-ctg-oil-and-gas.pdf

the environment against the array of ozone-induced adverse health and welfare effects. See 73 FR 16436 (March 27, 2008). In May 2012, the EPA designated five areas in this Commonwealth as marginal nonattainment for the 2008 ozone NAAQS with the rest of this Commonwealth designated as attainment. See 77 FR 30088, 30143 (May 21, 2012). The five designated 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. As with the 1997 ozone NAAQS, the Department must ensure that the 2008 ozone NAAQS is attained and maintained by implementing permanent and enforceable control measures. 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. Adoption of the VOC emission control measures in this final-form rulemaking would allow the Commonwealth to continue its progress in 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 as attainment. See 83 FR 25776 (June 4, 2018). The Department must ensure that the 2015 8-hour ozone NAAQS is attained and maintained by implementing permanent and federally enforceable control measures. 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. 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 2015 ozone NAAQS.

Clean Air Act (CAA) requirements: Implementation of permanent and Federally enforceable control measures for attaining and maintaining the ozone NAAQS

Section 101(a)(3) of the CAA (42 U.S.C.A. § 7401(a)(3)) provides that air pollution prevention (that is, the reduction or elimination, through any measures, of the amount of pollutants produced or created at the source) and air pollution control at its source is the primary responsibility of States and local governments. Section 110(a) of the CAA (42 U.S.C.A. § 7410(a)) gives states the primary responsibility for achieving the NAAQS in nonattainment areas and for maintaining the NAAQS in areas of the state that are in attainment. Section 110(a) of the CAA provides that each state shall adopt and submit to the EPA a plan (a SIP) for implementation, maintenance and enforcement of the NAAQS or a revision to the NAAQS promulgated under section 109(b) of the CAA. Additionally, section 110(a) provides that the plan shall contain adequate provisions to prevent emissions activity within a state from contributing significantly to nonattainment in, or interference with maintenance by, any other state with respect to a NAAQS. The entirety of the 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 and incorporated into the state's SIP, the measures of a SIP are legally enforceable under both Federal and state law.

Section 172(c)(1) of the CAA (42 U.S.C.A. § 7502(c)(1)) provides that a SIP for states with nonattainment areas must include "reasonably available control measures," including RACT, for affected sources of VOC and NO_x emissions. 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." See 44 FR 53761 (September 17, 1979). Upon submittal to the EPA, state regulations to control VOC emissions from affected sources are reviewed by the EPA to determine if the

provisions meet the RACT requirements of the CAA and its implementing regulations designed to attain and maintain the ground-level ozone NAAQS. If the EPA determines that the provisions meet the applicable requirements of the CAA, the provisions are approved and incorporated as amendments to the state's SIP.

Section 182 of the CAA (42 U.S.C.A. § 7511a) requires that, for areas which exceed the ground-level ozone NAAQS, states must develop and implement a program that mandates certain major stationary sources develop and implement a RACT emission reduction program. Section 182(b)(2) of the CAA provides that for moderate ozone nonattainment areas, a state must revise its SIP to include RACT for sources of VOC emissions covered by a CTG document issued by the EPA prior to the area's date of attainment of the applicable ozone NAAQS. CTG documents provide states with information about a VOC emission source category and recommendations of what the EPA considers to be RACT for the source category to attain and maintain the applicable ozone NAAQS. State air pollution control agencies may use the Federal recommendations provided in the CTG to inform their own determination as to what constitutes RACT for VOC emissions from the covered source category for subject sources located within the state. State air pollution control agencies may implement other technically-sound approaches that are consistent with the CAA requirements and the EPA's implementing regulations or guidelines.

Although the designated nonattainment areas in this Commonwealth for the 2008 and 2015 ground-level ozone NAAQS are classified as "marginal" nonattainment, this entire Commonwealth is treated as a "moderate" ozone nonattainment area for RACT purposes because the Commonwealth is included in the Ozone Transport Region (OTR) established by operation of law under sections 176A and 184 of the CAA (42 U.S.C.A. §§ 7506a and 7511c). Section 176A grants the Administrator of the EPA the authority to establish an interstate transport region and the associated transport commission. Section 184(a) of the CAA established the OTR comprised of the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont and the Consolidated Metropolitan Statistical Area that includes the District of Columbia. 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 major stationary sources of VOC emissions in the state covered by a specific CTG and not just for those sources that are located in designated nonattainment areas of the state.

Consequently, the Commonwealth's SIP must include regulations implementing RACT requirements Statewide to control VOC emissions from the oil and natural gas sources covered by the 2016 O&G CTG. These sources, which are not regulated elsewhere in Chapter 129, were selected by the EPA because data and information has indicated that they are significant sources of VOC emissions. Significantly, this final-form rulemaking should achieve VOC emission reductions and lowered concentrations of ground-level ozone locally as well as in downwind states. Additionally, 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. This final-form rulemaking will be submitted to the EPA for approval as a revision to the Commonwealth's SIP following promulgation of the final-form rulemaking.

The EPA's Control Techniques Guidelines for the Oil and Natural Gas Industry

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. On October 27, 2016, the EPA issued the 2016 O&G CTG which provided information to assist states in determining what constitutes RACT for VOC emissions from select oil and natural gas industry emission sources. See 81 FR 74798. On March 9, 2018, the EPA had proposed to withdraw the 2016 O&G CTG in its entirety because the CTG had relied upon underlying data and

conclusions made in the 2016 new source performance standards which the EPA was reconsidering. See 83 FR 10478 (March 9, 2018). However, on March 5, 2020, the EPA announced in the U.S. Office of Management and Budget's Spring 2020 Unified Agenda and Regulatory Plan that the EPA was no longer pursuing the action to withdraw the CTG and "the CTG will remain in place as published on October 27, 2016."[2]

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 mentioned 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. In other words, 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 obviate 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.

Findings of Failure to Submit, sanctions and deadline for action

If the EPA finds that a state has failed to submit an approvable SIP revision or has failed to implement the requirements of an approved measure in the SIP, the EPA issues a "finding of failure to submit notice." 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 National Ambient Air Quality Standards (NAAQS) and for States in the Ozone Transport Region," with an effective date of December 16, 2020. 85 FR 72963 (November 16, 2020). This Commonwealth was one of the five states issued a finding of failure to submit a SIP revision addressing the RACT requirements associated with the 2016 O&G CTG by October 27, 2018. The EPA's finding triggers the sanction clock under section 179 of the CAA (42 U.S.C.A. § 7509). However, sanctions cannot be imposed until 18 months after the EPA makes the determination, and sanctions cannot be imposed if a deficiency has been corrected within the 18-month period. Thus, the Commonwealth must submit this final-form rulemaking as a SIP revision and the EPA must determine that the submittal is complete by June 16, 2022, or sanctions could take effect.

On December 16, 2021, the EPA issued a Finding of Failure to Submit SIP Revisions for the 2016 O&G CTG for the 2015 Ozone NAAQS and for states in the OTR, with an effective date of January 18, 2022. 86 FR 71385 (December 16, 2021). This finding also triggers the sanction clock under section 179 of the CAA and the Commonwealth must submit a SIP revision and the EPA must determine that the submittal is complete by July 18, 2023.

[2] See Supplemental Notice of Potential Withdrawal of the Control Techniques Guidelines for the Oil and Natural Gas Industry, https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=202004&RIN=2060-AT76

Section 179 of the CAA authorizes the EPA to use two types of sanctions: 1) imposing what are called "2:1 offsets" on new or modified sources of emissions; and 2) withholding of certain Federal highway funds. Under section 179 of the CAA and its implementing regulations, the Administrator first imposes "2:1 offsets" sanctions for new or modified major stationary sources in the nonattainment area, and then, if the deficiency has not been corrected within 6 months, also applies Federal highway funding sanctions. See 40 CFR 52.31 (relating to selection of sequence of mandatory sanctions for findings made pursuant to section 179 of the Clean Air Act). The Commonwealth receives Federal transportation funding annually, $1.8 billion in 2020 and 2021.

Additionally, the findings trigger an obligation under section 110(c) of the CAA for the EPA to promulgate a Federal Implementation Plan (FIP) no later than 2 years after the effective date of the finding of failure to submit if the Commonwealth has not submitted, and the EPA has not approved, the required SIP submittal. If the EPA promulgates a FIP, the EPA could, in its discretion, also withhold a portion of the Department's air pollution grant funds provided for in section 105 of the CAA. However, if the Commonwealth makes the required SIP submittal and the EPA takes final action to approve the submittal within 2 years of the effective date of these findings, the EPA is not required to promulgate a FIP.

This final-form rulemaking will address both the December 2021 and the November 2020 findings of failure to submit SIP revisions by addressing the RACT requirements associated with the 2016 O&G CTG. This final-form rulemaking is being promulgated to attain and maintain both the 2008 and the 2015 ozone NAAQS and will be submitted to the EPA for approval as a revision to the Commonwealth's SIP following promulgation. The Department is working toward completing the submittal by June 16, 2022, to avoid any sanctions.

(10) State why the regulation is needed. Explain the compelling public interest that justifies the regulation. Describe who will benefit from the regulation. Quantify the benefits as completely as possible and approximate the number of people who will benefit.

Need for the Regulation

Beyond the legal requirements detailed in the response to Question 9, the control measures in this final-form rulemaking are needed to reduce VOC emissions from oil and natural gas sources throughout this Commonwealth. Affected sources include natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps, reciprocating compressors, centrifugal compressors, fugitive emissions components, and storage vessels in all segments except natural gas distribution. Implementing VOC emission control measures consistent with the RACT recommendations of the 2016 O&G CTG for these sources will help the Commonwealth continue to maintain the 1997 and 2008 ozone NAAQS, as well as attain and maintain the 2015 ozone NAAQS. Achieving and maintaining the ground-level ozone NAAQS provides healthful air quality which attracts and retains residents and industry, supports healthy environmental conditions for agriculture and the ecosystems of this Commonwealth, and reduces transport of VOC emissions and ground-level ozone to downwind states.

VOC emissions are precursors to the formation of ground-level ozone, a public health, welfare and environmental hazard.[3, 4] Ground-level ozone is not emitted directly to the atmosphere from any sources, including oil and natural gas sources. However, ground-level ozone is formed by a photochemical reaction

[3] EPA, Ecosystem Effects of Ozone Pollution, https://www.epa.gov/ground-level ozone-pollution/ecosystem-effects-ozone-pollution

[4] EPA, Health Effects of Ozone Pollution, https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution

between emissions of VOC and NO_X in the presence of sunlight; oil and natural gas sources do emit these two pollutants. Ground-level ozone is a highly reactive gas, which at sufficiently high concentrations can produce a wide variety of effects harmful to public health and welfare and the environment. Section 302(h) of the CAA defines effects on welfare to include adverse impacts on animals, wildlife, weather, climate, visibility, crops and vegetation. Additionally, climate change may exacerbate the need to address ground-level ozone. According to the EPA, atmospheric warming, as a result of climate change, may increase ground-level ozone in regions across the United States. This impact could also be an issue for states trying to comply with future ozone standards.[5]

Ground-level ozone is a respiratory irritant and repeated exposure to high ambient concentrations of ground-level ozone pollution for both healthy people and those with existing conditions may cause a variety of adverse health effects, including difficulty in breathing, chest pains, coughing, nausea, throat irritation, and congestion. In addition, people with bronchitis, heart disease, emphysema, asthma and reduced lung capacity may have their symptoms exacerbated by high ambient concentrations of ground-level ozone pollution. Asthma, in particular, is a significant and growing threat to children and adults in this Commonwealth. Ozone can also cause both physical and economic damage to important food crops, forests, and wildlife, as well as materials such as rubber and plastics.

The implementation of additional measures to address ozone precursor emissions impacts on air quality in this Commonwealth is necessary to protect the public health and welfare and the environment. Because VOC emissions are precursors for ground-level ozone formation, adoption of the VOC emission control measures and other requirements in this final-form rulemaking is in the public interest as it will allow the Commonwealth to continue to make substantial progress in maintaining the 1997 and 2008 NAAQS as well as attaining and maintaining the 2015 8-hour ozone NAAQS Statewide. Implementation of and compliance with the final-form VOC emission reduction measures will also assist the Commonwealth in reducing the levels of ozone precursor emissions that contribute to potential nonattainment of the 2015 ozone NAAQS in downwind states. As a result, the VOC emission control measures 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.

VOC and Methane Emission Reduction Benefits

The Department estimates that in 2020, sources in the oil and natural gas industry emitted 24,405 tons per year (TPY) VOC and that implementation of the control measures in this final-form rulemaking could reduce VOC emissions by as much as 12,068 TPY. These VOC emission reductions will contribute to reductions in the formation of ground-level ozone and to achieving and maintaining the ozone NAAQS. These reductions also contribute to the monetized public health benefits described below.

Except for storage vessels, the requirements in this final-form rulemaking serve to limit natural gas emissions without a specific VOC emission threshold, consistent with the methodology used in the 2016 O&G CTG. Because natural gas is a mixture of hydrocarbons, including methane, and other compounds there will be a significant reduction in methane emissions as a co-benefit to the required VOC emissions. Therefore, the implementation of the VOC emissions control measures in this final-form rulemaking is consistent with Governor Tom Wolf's strategy to reduce emission of methane from the oil and natural gas industry. 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 greenhouse gas emitted in the United States from human activities.

[5] EPA, Air Quality and Climate Change Research, https://www.epa.gov/air-research/air-quality-and-climate-change-research

The Department estimates that the oil and natural gas industry emitted 464,388 TPY methane in 2020 and that the co-benefit methane emissions reduction from this final-form rulemaking may be as much as 221,066 TPY.

Monetized public health benefits of attaining the 2015 ozone NAAQS

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.[4] Prorating that benefit to this Commonwealth, based on population, results in a public health benefit of $63 million to $189 million. The Department is not stating that these estimated monetized health benefits would all be the result of implementing the RACT measures, but the EPA estimates are indicative of the benefits to Commonwealth residents of attaining the 2015 8-hour ozone NAAQS through the implementation of a suite of measures to control VOC emissions in the aggregate from different source categories.

Adverse health and welfare effects of ground-level ozone on humans, animals, and the environment

Exposure to high levels of ground-level ozone air pollution correlates to increased respiratory disease and higher mortality rates. Ozone can inflame and damage the lining of the lungs. Within a few days, the damaged cells are shed and replaced. Over a long time period, lung tissue may become permanently scarred, resulting in permanent loss of lung function and a lower quality of life. When ambient ozone levels are high, more people with asthma have attacks that require a doctor's attention or use of medication. Ozone also makes people more sensitive to allergens including pet dander, pollen and dust mites, all of which can trigger asthma attacks. The EPA has concluded that there is an association between high levels of ambient ozone and increased hospital admissions for respiratory ailments including asthma. While children, the elderly and those with respiratory problems are most at risk, even healthy individuals may experience increased respiratory ailments and other symptoms when they are exposed to high levels of ambient ozone while engaged in activities that involve physical exertion. High levels of ground-level ozone also affect animals including pets, livestock and wildlife, in ways similar to humans.

In addition to causing adverse human and animal health effects, the EPA has concluded that ground-level ozone affects vegetation and ecosystems, leading to reductions in agricultural crop and commercial forest yields. Ozone damage to the foliage of trees and other plants can decrease the aesthetic value of ornamental species used in residential landscaping, as well as the natural beauty of parks and recreation areas. Through deposition, ground-level ozone also contributes to pollution in the Chesapeake Bay. These effects can have adverse impacts including loss of species diversity and changes to habitat quality and water and nutrient cycles. The implementation of additional measures to address ground-level ozone air quality in this Commonwealth is necessary to protect the public health and welfare and the environment.

Adverse effects of ground-level ozone on this Commonwealth's economy

The economic value of the impacts of ground-level ozone on this Commonwealth's farm crops, fruit industries, forests, parks and timber due to high concentrations of ground-level ozone can be calculated, through things such as crop yield loss from both reduced growth and smaller, lower-quality seeds and tubers with less oil or protein. If ozone episodes last a few days, visible injury to some leaf crops, including lettuce, spinach and tobacco, as well as visible injury to the leaves of ornamental plants, including grass, flowers and shrubs, can appear. Other types of welfare loss may not be quantifiable, such as the reduced aesthetic value of trees growing in heavily visited parks.

Information about the economic benefit of the agricultural industry to this Commonwealth is provided by the Pennsylvania Department of Agriculture (PDA). In 2019, this Commonwealth had more than 53,157 farms occupying more than 7.3 million acres of farmland which account for 75,475 direct jobs and $9.0 billion in direct economic output from production agriculture. In addition to production agriculture, the industry also raises revenue and supplies jobs through support services such as food and beverage processing, marketing, transportation, farm equipment, forestry production and processing, and landscaping. In total, production agriculture and agribusiness support 232,463 direct jobs and contribute $59.7 billion to this Commonwealth's economy. The agriculture industry, including forestry, contributes 593,600 total direct, indirect, and induced jobs and $132.5 billion in total direct, indirect, and induced output.[6] Reducing ground-level ozone concentrations will serve to protect agricultural yield and reduce losses to production agriculture and agribusiness in this Commonwealth.

This Commonwealth is forested over a total of 16.6 million acres, which represents 58% of its land area. Federal, state, and local government hold 5.1 million acres in public ownership, with the remaining 11.7 million acres in private ownership.[7] The forest product industry only owns 0.4 million acres of forest, with the remainder held by an estimated 750,000 individuals, families, partnerships, or corporations.[8] This Commonwealth leads the Nation in volume of hardwood with over 120.5 billion board feet of standing sawtimber.[9] Recent data shows that the state's forest growth-to-harvest rate is better than 2 to 1.[10] As the leading producer of hardwood lumber in the United States, this Commonwealth also leads in the export of hardwood lumber, exporting nearly $463 million in 2019, and over $1.1 billion in lumber, logs, furniture and paper products to more than 70 countries around the world. Production is estimated at 1 billion board feet of lumber annually.[11] This vast renewable resource puts the hardwoods industry at the forefront of manufacturing in this Commonwealth. Forestry production and processing account for 69,437 direct jobs and $21.8 billion in direct economic output and direct value added to Pennsylvania's economy.[12] Reducing ground-level ozone concentrations will serve to protect the Commonwealth's position as the leader of growing volume of hardwood species and producer of hardwood lumber in Nation.

The Pennsylvania Department of Conservation and Natural Resources (DCNR) is the steward of the state-owned forests and parks. DCNR awards millions of dollars in construction contracts each year to build and maintain the facilities in its parks and forests. Hundreds of concessions throughout the park system help complete the park experience for both state and out-of-state visitors. State forests, parks and game lands make up 3.9 million acres of forest land. This Commonwealth's 2.2 million-acre state forest system, found in 48 of this Commonwealth's 67 counties, comprises 13% of the forested area in the Commonwealth.[13] The state forest represents one of the largest expanses of public forestland in the eastern United States, making it a priceless public asset. Ozone damage to the foliage of trees and other plants can decrease the aesthetic value of ornamental species used in residential landscaping, as well as the natural beauty of parks and recreation

[6] PDA, Pennsylvania Agriculture: A look at the Economic Impact and Future Trends Version 1, Jan. 2018, https://www.agriculture.pa.gov/Documents/PennsylvaniaAgriculture_EconomicImpactFutureTrends.pdf
[7] United States Department of Agriculture, Forests of Pennsylvania, 2019, https://public.tableau.com/views/FIA_OneClick_V1_2/Factsheet?%3AshowVizHome=no
[8] The Pennsylvania State University, Forest Management and Timber Harvesting in Pennsylvania, Sept. 9, 2019, https://extension.psu.edu/forest-management-and-timber-harvesting-in-pennsylvania
[9] *Id.*
[10] United States Department of Agriculture, Forests of Pennsylvania, 2019, https://public.tableau.com/views/FIA_OneClick_V1_2/Factsheet?%3AshowVizHome=no
[11] PDA, Response to Email Inquiry, Harrisburg, Pennsylvania, Mar. 2, 2020, available on request.
[12] PDA, Pennsylvania Agriculture: A look at the Economic Impact and Future Trends Version 1, Jan. 2018, https://www.agriculture.pa.gov/Documents/PennsylvaniaAgriculture_EconomicImpactFutureTrends.pdf
[13] Pennsylvania DCNR Bureau of Forestry, Our Mission and What We Do, https://www.dcnr.pa.gov/about/Pages/Forestry.aspx

areas. However, the effects of the reduced aesthetic value of trees in heavily visited parks may not be quantifiable. Reducing the concentration of ground-level ozone will help maintain the benefits to this Commonwealth's economy due to tourism.

In sum, adoption and implementation of the VOC emission control measures in this final-form rulemaking for the owners or operators of certain sources in the oil and natural gas industry is reasonably necessary to allow the Commonwealth to continue its progress in attaining and maintaining the public health-based and welfare-based 8-hour ozone NAAQS and to satisfy related CAA requirements. The VOC emission reductions achieved through implementation of the regulatory requirements established in this final-form rulemaking and the associated decrease in formation of ground-level ozone will benefit the health and welfare of the residents of this Commonwealth as well as the health of tourists and visitors, with improved ambient air quality and healthier environments. The decrease in ground-level ozone formation will also benefit farmers, loggers, hunters and outdoor enthusiasts and the numerous animals, crops, vegetation and natural areas of this Commonwealth. The agriculture and timber industries and related businesses will benefit directly from reduced economic losses that result from ozone damage to crops and timber. Likewise, the natural areas and infrastructure within this Commonwealth and downwind states will benefit directly from reduced environmental damage and economic losses due to ground-level ozone.

(11) Are there any provisions that are more stringent than federal standards? If yes, identify the specific provisions and the compelling Pennsylvania interest that demands stronger regulations.

Yes, some provisions of this final-form rulemaking are more stringent than Federal standards. Under Section 4.2(b)(1) of the APCA (35 P.S. § 4004.2(b)(1)), the Board has the authority to adopt control measures that are more stringent than those required by the CAA if the Board determines that it is reasonably necessary for the control measure to exceed minimum CAA requirements for the Commonwealth to achieve or maintain the NAAQS. To the extent that a requirement in this final-form rulemaking is more stringent than the recommendations of the 2016 O&G CTG, the more stringent requirement is 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 control requirements for storage vessels, reciprocating compressors and fugitive emissions components in this final-form rulemaking are more stringent than the recommendations of the 2016 O&G CTG. Based on comments received, the Department performed an updated cost/benefit analysis (2020 reanalysis) which shows that the more stringent standards in this final-form rulemaking are RACT, meaning they are technically and economically feasible. As discussed previously, the Department is obligated to determine what control standards are RACT for sources of VOC emissions in this Commonwealth. In the 2016 O&G CTG,[14] the EPA provided RACT recommendations based on the information reviewed by the EPA at the time. However, 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.*

[14] See EPA, Control Techniques Guidelines for the Oil and Natural Gas Industry, EPA 453/B-16-001, Office of Air Quality Planning and Standards, October 2016, https://www.epa.gov/sites/default/files/2016-10/documents/2016-ctg-oil-and-gas.pdf, for a detailed description of the sources, VOC emissions, RACT recommendations, available VOC emission control technologies, and costs.

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 RACT determinations in this final-form rulemaking based on the entirety of information available to the Department, including the 2016 O&G CTG. 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. Additionally, due to this Commonwealth's status as a member of the OTR and the 2015 ozone nonattainment areas, the VOC emission reductions achieved by this final-form rulemaking are necessary to attain and maintain compliance with the ozone NAAQS and to fulfill the Commonwealth's obligation under Section 184 of the CAA.

Furthermore, based on analysis of data available to the Department during the development of the proposed rulemaking as well as additional and updated data available during the final-form rulemaking development phase, the Department determined in three cases that RACT requirements more stringent than the recommendations in the 2016 O&G CTG are cost-effective and necessary to continue the Commonwealth's progress in attaining and maintaining the ground-level ozone NAAQS.

To determine whether a specific air pollution control technology is an economically feasible option to be considered as RACT, the Department has used a cost-effectiveness benchmark in terms of annualized costs per ton of VOC emissions removed. The Department adjusted cost benchmarks established in previous RACT rulemakings of $5,500 per ton of VOC emissions removed, by multiplying by the Consumer Price Index differential between 2014 and 2021 to arrive at a benchmark of $6,600 per ton of VOC emissions removed.

Storage vessels

In the first case, the Department established in proposed § 129.123(a)(1)(i)—(vi) (relating to storage vessels) a tiered emissions threshold based on the potential to emit for the affected owners or operators of subject storage vessels to prevent backsliding on the amount of controlled emissions for storage vessels subject to the Department's Air Quality Permit Exemptions 38(b) or 38(c). The tiered emission threshold established in proposed § 129.123(a)(1)(i) and (ii) was the potential to emit 6.0 TPY or greater VOC emissions for a storage vessel installed at a conventional well site or at an unconventional well site before August 10, 2013. The tiered emission threshold established in proposed § 129.123(a)(1)(iii)—(vi) was the potential to emit 2.7 TPY or greater VOC emissions for a storage vessel installed at an unconventional well site on or after August 10, 2013, a storage vessel installed at a gathering and boosting station, a storage vessel installed at a natural gas processing plant and a storage vessel installed at a facility in the natural gas transmission and storage segment.

However, during the development of this final-form rulemaking, the Department performed additional analysis which shows that the 2.7 TPY VOC emission threshold for storage vessels is RACT as it is technically and economically feasible for both potential to emit and actual emissions from all covered storage vessels at both conventional and unconventional well sites. The analysis examined the sensitivity to the initial capital cost of the control device and found that the total cost per ton of VOC reduced is below the RACT benchmark of $6,600/ton reduced. Therefore, a single 2.7 TPY VOC emission threshold is established in § 129.123(a)(1) in this final-form rulemaking that applies to affected owners or operators of storage vessels in all segments except natural gas distribution. The tiered emissions thresholds in proposed § 129.123(a)(1)(i)—(vi) are deleted in this final-form rulemaking.

Reciprocating compressor rod packing replacements

In the second case, the proposed rulemaking included an exemption in § 129.126(d) for the owner or operator of a reciprocating compressor or a centrifugal compressor located at a well site or located at an adjacent well site and servicing more than one well site. However, the Department's additional analysis for this final-form rulemaking shows that it is both technically and economically feasible to require reciprocating compressor rod packing replacements every 26,000 hours of operation or every three years, at the operator's discretion, for reciprocating compressors located at well sites. The analysis showed that the cost-effectiveness of the rod packing replacement is highly sensitive to the emissions factor used to represent emissions from reciprocating compressors. Using the average of several emission factors from the University of Texas at Austin's Emission Factor Improvement Study,[15] the cost per ton of VOC reduced is approximately $6,600 which is consistent with the RACT benchmark. Therefore, the exemption in proposed § 129.126(d) for reciprocating compressors is deleted in this final-form rulemaking, meaning this final-form rulemaking requires affected owners or operators to implement reciprocating compressor rod packing replacements on reciprocating compressors located at well sites. This is a new requirement that was not included in the proposed rulemaking and was not one of the recommendations in the 2016 O&G CTG.

Fugitive emissions components

In the third case, the Department established a requirement in proposed § 129.127(b)(1)(ii)(A) and (B) (relating to fugitive emissions components) that affected owners or operators shall conduct monthly audible, visual, and olfactory (AVO) inspections and quarterly instrument-based leak detection and repair (LDAR) inspections of fugitive emissions components for well sites with at least one well that produces, on average, 15 barrels of oil equivalent (BOE) per day. In proposed § 129.127(b)(2), the Department also established a stepdown provision which enabled affected owners or operators to track the percentage of leaking components at each inspection and if, in two consecutive quarterly inspections, less than 2% of components were leaking emissions, the owner or operator could reduce the quarterly schedule of instrument-based LDAR inspections to semiannual.

This final-form rulemaking deletes the stepdown provisions of proposed § 129.127(b)(2)(i) and (ii). The Department's additional analysis shows that it is both technically and economically feasible for an affected owner or operator to implement instrument-based LDAR inspections at a well site with an average production of 15 BOE or more per day, with the frequency of inspections based on the production from each individual well at the well site. The owner or operator of a well site with an average production of 15 BOE or more per day and with at least one individual well producing 15 BOE or more per day, on average, shall conduct quarterly instrument-based LDAR inspections. The owner or operator of a well site with an average of 15 BOE or more per day and at least one individual well producing 5 BOE or more but less than 15 BOE per day, on average, shall conduct annual instrument-based LDAR inspections. In this final-form rulemaking the Department also included an option for the owner or operator of a well site producing, on average, equal to or greater than 15 BOE per day, and at least one well producing, on average, equal to or greater than 5 BOE per day but less than 15 BOE per day to submit to the Department a request for an exemption from the annual instrument-based LDAR requirement. However, the request must include, among other information, a demonstration that the annual LDAR requirement is not RACT (technically or economically feasible) for the well site.

Reasonable and necessary to implement more stringent than EPA RACT recommendations

In addition to the technically and economically feasible RACT requirements detailed above, the Commonwealth is responsible for ensuring that the 2015 8-hour ozone NAAQS is attained and maintained by

implementing permanent and Federally enforceable control measures. This final-form rulemaking is a primary component of the Commonwealth's strategy of ensuring that the ozone NAAQS are attained and maintained across this Commonwealth. Reductions in VOC emissions that are achieved following the adoption and implementation of RACT VOC emission control measures for the select oil and natural gas 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 a requirement in this final-form rulemaking is more stringent than the recommendations of the 2016 O&G CTG, the more stringent requirement is 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.

(12) How does this regulation compare with those of the other states? How will this affect Pennsylvania's ability to compete with other states?

The 2016 O&G CTG applies to affected sources in designated areas of nonattainment and the states and jurisdictions included in the OTR established by operation of law under the CAA. The Department contacted representatives from Maryland, New York, Ohio, Texas and West Virginia; all stated that they do not have affected sources. The remaining states in the OTR (Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, Rhode Island and Vermont, as well as the District of Columbia) also do not have affected sources.

Several states regulate VOC emissions from storage vessels used in the oil and natural gas industry. There are also a few states (e.g., California, Colorado and Montana) that have established specific regulations that control VOC emissions from emission sources in the oil and natural gas industry (e.g., compressors, pneumatic controllers and fugitive emission components).

CALIFORNIA AIR RESOURCES BOARD

The California Air Resources Board (CARB) has a statewide methane rule for sources in the oil and gas industry, entitled *Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities*.[16]

For storage vessels, the CARB rule requires separators and tank systems not controlled by a vapor collection system to conduct a flash analysis. If the annual emission rate is greater than 10 metric tons of methane, emissions must be controlled by a vapor collection system. If the annual emission rate is less than 10 metric tons, the owner or operator must conduct an annual flash analysis for 3 years; if the annual emission rate is consistently less than 10 metric tons, reduce testing to once every 5 years. For circulation tanks used for well stimulation treatments, owners or operators must implement best practices to reduce emissions.

For natural gas-driven pneumatic controllers, the CARB rule requires that continuous bleed controllers shall not vent to the atmosphere and that each device must be inspected during each LDAR inspection. Continuous bleed controllers installed prior to January 1, 2016 may be used, provided they have a bleed rate of less than or equal to 6 standard cubic feet per hour (scfh); are tested annually using a direct measurement method; those with a bleed rate of greater than 6 scfh must be repaired within 14 calendar days. Each device that must be replaced or retrofitted to comply shall either be controlled by a vapor collection system or be

[15] Harrison, M., Galloway, K., Hendler, A., Shires, T., Allen, D., Foss, M., Thomas, J., Spinhirne, J., Natural Gas Industry Methane Emission Factor Improvement Study Final Report Cooperative Agreement No. XA-83376101, Dec. 2011, https://dept.ceer.utexas.edu/ceer/GHG/files/FReports/XA_83376101_Final_Report.pdf

[16] See 17 CCR §§ 95665—95677, https://ww2.arb.ca.gov/sites/default/files/2020-03/2017%20Final%20Reg%20Orders%20GHG%20Emission%20Standards.pdf

replaced with compressed air or an electricity driven controller. Intermittent bleed controllers must be inspected during each LDAR inspection while the device is idle and not controlling.

For natural gas-driven diaphragm pumps, the CARB rule requires that pumps shall not vent to the atmosphere and that each pump must be inspected during each LDAR inspection. Each device that must be replaced or retrofitted to comply shall either be controlled by a vapor collection system or be replaced with compressed air or an electricity driven pump.

For reciprocating compressors at production facilities, the CARB rule requires rod packings or seals be inspected during each LDAR inspection and repaired within 30 days of detection. For reciprocating compressors at natural gas gathering and boosting stations, processing plants, transmission stations, and underground storage facilities, the CARB rule requires rod packings or seals be inspected during each LDAR inspection; the rod packing or seal emission rate be tested annually using a direct measurement method; those with a rod packing or seal emission rate greater than 2 standard cubic feet per minute (scfm), or a combined emission rate greater than the number of compression cylinders multiplied by 2 scfm must be repaired within 30 calendar days. Alternatively, emissions shall be controlled by a vapor collection system.

For wet seal centrifugal compressors, the CARB rule requires components on driver engines and compressors be inspected during each LDAR inspection; the wet seal emission flow rate be tested annually using a direct measurement method; those with a wet seal emission flow rate greater than 3 scfm, or a combined wet seal emission rate greater than the number of wet seals multiplied by 3 scfm must be repaired within 30 days of detection. If no parts are available to make repairs, the wet seal must be replaced with a dry seal no later than January 1, 2020. Alternatively, emissions shall be controlled by a vapor collection system.

For dry seal centrifugal compressors, the CARB rule requires components on driver engines and compressors be inspected during each LDAR inspection.

For fugitive emissions components, the CARB rule requires quarterly inspections with at least one quarterly inspection performed using EPA Method 21, 40 CFR Part 60, Appendix A-7 (relating to test methods 19 through 25E), regarding determination of VOC leaks (Method 21). Optical Gas Imaging (OGI) may be used for the remaining inspections, however any leak detected must be measured within 2 calendar days using Method 21. For unsafe or inaccessible components, the CARB rule requires annual inspection using Method 21. If additional inspections are performed using OGI, any detected leak must be measured within 14 calendar days using Method 21. A facility with less than or equal to 200 components may have 5 leaks greater than or equal to 1,000 ppm and less than or equal to 9,999 ppm which must be repaired within 14 calendar days unless it is a critical component. A facility with less than or equal to 200 components may have 2 leaks greater than or equal to 10,000 ppm and less than or equal to 49,999 ppm which must be repaired within 5 calendar days unless it is a critical component. A facility with greater than 200 components may have 2% of inspected components with leaks greater than or equal to 1,000 ppm and less than or equal to 9,999 ppm which must be repaired within 14 calendar days unless it is a critical component. A facility with greater than 200 components may have 1% of inspected components with leaks greater than or equal to 10,000 ppm and less than or equal to 49,999 ppm which must be repaired within 5 calendar days unless it is a critical component. There are no allowable leaks with a detected leak greater than or equal to 50,000 ppm; the leak must be repaired within 2 calendar days unless it is a critical component.

For facilities visited daily, daily AVO inspections of hatches, pressure-relief valves, well casings, stuffing boxes and pump seals are required. For facilities not visited daily, weekly AVO inspections of hatches, pressure-relief valves, well casings, stuffing boxes and pump seals are required. Annual AVO inspections

must be completed of all pipes. Any leak detected during an AVO inspection and not repaired within 24 hours of detection must be measured using Method 21.

For fugitive emissions components, the CARB rule requires that components that incur 5 repair actions in a year must be replaced with a compliant component and reinspected using Method 21.

For fugitive emissions components, the CARB rule allows delay of repair for parts on order not to exceed 30 calendar days unless approved by the Executive Officer. If a gas service utility provides documentation that the system is temporarily classified as critical to reliable public gas system operation or if the owner or operator demonstrates the component is a critical component, the repair must be completed by the end of the next process shutdown or within 12 months, whichever is sooner.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

The South Coast Air Quality Management District (SCAQMD) has Rule 463[17] for organic liquid storage and Rule 1173[18] for control of VOC leaks and releases from components at petroleum facilities and chemical plants.

For storage vessels, the SCAQMD rule requires storage vessels with a capacity greater than or equal to 19,815 gallons and containing an organic liquid with a true vapor pressure (TVP) greater than or equal to 1.5 pounds per square inch absolute (psia) under actual storage conditions or with a capacity greater than or equal to 39,630 gallons and containing an organic liquid with a TVP greater than or equal to 0.5 psia under actual storage conditions to control using either an external floating roof; internal floating-type cover; vapor recovery system that routes emissions to a fuel gas system or reduces emissions by 95% by weight when compared to a fixed cone roof tank holding the same liquid without control or vapor recovery system; or other approved equivalent control.

For fugitive emissions components, the SCAQMD rule requires quarterly inspection of all accessible components in light liquid/gas/vapor service and pumps in heavy liquid service using Method 21. For inaccessible components in light liquid/gas/vapor service, annual inspection using Method 21 is required. For pressure-relief devices that vent to the atmosphere, inspection within 1 calendar day and reinspection within 14 calendar days after every release are required.

For pumps, compressors and atmospheric pressure-relief devices, the SCAQMD rule requires AVO inspection every 8 hours unless the source is located at an unmanned production field or pipeline transfer station.

For fugitive emissions components, the SCAQMD rule defines a major leak in light liquid/gas/vapor service as greater than 10,000 ppm for valves, pumps, compressors, threaded connections, or other components; as greater than 200 ppm for pressure-relief devices; as a light liquid leak greater than 3 drops per minute. A minor leak in light liquid/gas/vapor service is defined as greater than or equal to 500 ppm and less than or equal to 10,000 ppm for valves, pumps, compressors, threaded connections or other components. A major leak in heavy liquid service is defined as greater than 500 ppm for valves, compressors, threaded connectors or other components; as greater than 100 ppm for pumps; as greater than 200 ppm for pressure-relief devices; as a heavy liquid leak greater than 3 drops per minute. A minor leak in heavy liquid service is defined as

[17] SCAQMD, Organic Liquid Storage, Rule 463, November 4, 2011, https://ww3.arb.ca.gov/drdb/sc/curhtml/r463.pdf
[18] SCAQMD, Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum Facilities and Chemical Plants, Rule 1173, February 6, 2009, https://ww3.arb.ca.gov/drdb/sc/curhtml/r1173.pdf

greater than or equal to 100 ppm and less than 500 ppm for valves, compressors, threaded connections or other components. For facilities with less than or equal to 200 components, valves, compressors, pressure-relief devices, threaded connections and other components, the sources are allowed to have 1 leak; pumps are allowed to have 2 leaks. For facilities with greater than 200 components, valves and threaded connectors are allowed to have leaks equal to 0.5% of total components inspected; pumps are allowed to have leaks equal to 1% of total components inspected; compressors, pressure-relief devices, and other components are allowed to have 1 leak.

For fugitive emissions components, the SCAQMD rule requires that minor leaks for components in light liquid/gas/vapor service and heavy liquid service be repaired within 7 calendar days with an additional 7 calendar days extended repair period. A heavy liquid leak with greater than 3 drops per minute and a minor leak by concentration have a repair period of 7 calendar days with no extended repair period. A major leak greater than 25,000 ppm has a repair period of 2 calendar days with an additional 3 calendar days extended repair period. A major leak greater than or equal to 25,000 ppm has a repair period of 1 calendar day with no extended repair period. A major leak for a component in heavy liquid service has a repair period of 1 calendar day with no extended repair period. A light liquid leak greater than 3 drops per minute has a repair period of 1 calendar day with no extended repair period. The extended repair period can be used for a total number of leaking components not to exceed 0.05% of the number of components inspected, by type, rounded to the nearest integer.

For fugitive emissions components, the SCAQMD rule requires that components that incur five repair actions in a year must be replaced or retrofitted with an applicable technology, replaced with a best available control technology (BACT) equipment, or vented to an air pollution control device approved by the Executive Officer of the SCAQMD.

SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT

The San Joaquin Valley Air Pollution Control District (SJVAPCD) has Rule 4409[19] for components at light crude oil production facilities, natural gas production facilities, and natural gas processing facilities and Rule 4623[20] for storage of organic liquids.

For storage vessels, the SJVAPCD rule requires storage vessels with a capacity greater than or equal to 1,100 gallons and less than or equal to 19,800 gallons and a TVP greater than or equal to 0.5 psia and less than 11 psia to control using either a pressure-vacuum relief valve, internal floating roof, external floating roof or vapor recovery system and with a TVP greater than or equal to 11 psia to control using a pressure vessel or vapor recovery system. The rule requires storage vessels with a capacity greater than 19,800 gallons and less than or equal to 39,600 gallons and a TVP greater than or equal to 0.5 psia and less than 1.5 psia to control using either a pressure-vacuum relief valve, internal floating roof, external floating roof or vapor recovery system; with a TVP greater than or equal to 1.5 psia and less than 11 psia to control using either an internal floating roof, external floating roof or vapor recovery system; and with a TVP greater than or equal to 11 psia to control using a pressure vessel or vapor recovery system. The rule requires storage vessels with a capacity greater than 39,600 gallons and a TVP greater than or equal to 0.5 psia and less than 11 psia to control using either an internal floating roof, external floating roof or vapor recovery system and with a TVP greater than or equal to 11 psia to control using a pressure vessel or vapor recovery system. There are also different requirements for small producers based on their crude oil throughput.

[19] SJVAPCD, Components at Light Crude Oil Production Facilities, Natural Gas Production Facilities, and Natural Gas Processing Facilities, Rule 4409, April 20, 2005, https://ww3.arb.ca.gov/drdb/sju/curhtml/r4409.pdf

[20] SJVAPCD, Storage of Organic Liquids, Rule 4623, May 19, 2005, https://ww3.arb.ca.gov/drdb/sju/curhtml/r4623.pdf

For fugitive emissions components, the SJVAPCD rule requires quarterly inspection of all accessible components using Method 21. For unsafe or inaccessible components, inspection must occur annually using Method 21. Frequency may be reduced to annually for components, except for pumps, compressors, and pressure-relief devices, provided there is not a violation during five consecutive quarterly inspections, the operator did not receive a notice of violation during the previous 12 months, and the reduction in frequency is requested in writing with the documentation to demonstrate these requirements have been met.

For facilities visited daily, daily AVO inspections of operating pumps, compressors, and pressure-relief valves. For facilities not visited daily, weekly AVO inspections are required of operating pumps, compressors, and pressure-relief valves. Annual AVO inspections are required of all pipes. Any leak detected during an AVO inspection not repaired within 24 hours of detection must be measured using Method 21.

For fugitive emissions components, the SJVAPCD rule defines a major leak as greater than 10,000 ppm for all components. A minor leak in light liquid service is defined as greater than or equal to 1,000 ppm and less than or equal to 10,000 ppm for all components other than pressure-relief devices; for a pressure-relief device a leak in light liquid service is defined as greater than or equal to 200 ppm and less than or equal to 10,000 ppm. A minor leak in gas/vapor service is defined as greater than or equal to 2,000 ppm and less than or equal to 10,000 ppm for all components other than pressure-relief devices; for a pressure-relief device a leak in gas/vapor service is defined as greater than or equal to 400 ppm and less than or equal to 10,000 ppm. For facilities with less than or equal to 200 components, valves, threaded connections, flanges, compressors, pressure-relief devices and other components are allowed to have 1 leak; pumps, pipes at production facilities, and pipes at natural gas processing facilities are allowed to have 2 leaks; polished rod stuffing boxes are allowed to have 4 leaks. For facilities with greater than 200 components, valves, threaded connectors, and flanges are allowed to have leaks equal to 0.5% of total components inspected; pumps and pipes at production facilities are allowed to have leaks equal to 1% of total components inspected; compressors, pressure-relief devices, and other components are allowed to have 1 leak; pipes at natural gas processing facilities are allowed to have 2 leaks; polished rod stuffing boxes are allowed to have leaks equal to 2% of total components inspected.

For fugitive emissions components, the SJVAPCD rule allows minor leaks 7 calendar days for repair with an additional 7 calendar days extended repair period unless it is a critical component. A major leak less than or equal to 50,000 ppm has a repair period of 5 calendar days with an additional 2 calendar days extended repair period unless it is a critical component. A major leak greater than 50,000 ppm has a repair period of 2 calendar day with no extended repair period unless it is a critical component. The extended repair period can be used for a total number of leaking components not to exceed 0.05% of the number of components inspected, by type, rounded to the nearest integer.

For fugitive emissions components, the SJVAPCD rule requires that components that incur five repair actions in a year must be replaced or retrofitted with an applicable technology, replaced with a BACT equipment meeting Rule 2201,[21] vented to a closed vent system, or removed from operation. A critical component must be repaired by the end of the next process shutdown or within 12 months, whichever is sooner.

[21] SJVAPCD, New and Modified Stationary Source Review Rule, Rule 2201, April 21, 2011, https://ww3.arb.ca.gov/drdb/sju/curhtml/r2201.pdf

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

The Colorado Department of Public Health and Environment, Air Quality Control Commission developed a regulation applicable to oil and natural gas industry emission sources covered by the 2016 O&G CTG, entitled *Regulation Number 7 Control of Ozone via Ozone Precursors and Control of Hydrocarbons via Oil and Gas Emissions (emissions of volatile organic compounds and nitrogen oxides)*. See 5 CCR § 1001-9.

At production facilities in ozone nonattainment areas

Condensate storage tanks with actual uncontrolled VOC emissions greater than or equal to 2 TPY require 90% reduction on a calendar weekly basis from May 1 through September 30 and require 70% reduction on a calendar monthly basis from October 1 through April 30.

Natural gas-driven pneumatic controllers are required to be replaced or retrofitted such that emissions are reduced to less than or equal to 6 scfh unless a higher bleed rate is required for safety or process purposes.

Natural gas-driven diaphragm pump emissions are required to be routed to a control device or process unless technically infeasible. VOC emissions must be reduced by 95% or the highest destruction efficiency the control can achieve.

Fugitive emissions components require annual LDAR for facilities emitting greater than 1 TPY VOC and less than or equal to 6 TPY VOC and semiannual LDAR for facilities emitting greater than 6 TPY VOC. LDAR can be with Forward-Looking Infrared (FLIR) imaging, with a leak definition of any visible emission, or Method 21 with a leak definition of 500 ppm as methane. Leaking components must have a first attempt to repair within 5 calendar days, with repair completed no later than 30 calendar days unless delay of repair is necessary. Repairs must be remonitored within 15 calendar days. Delay of repair is allowed for ordering parts required for repair, which must be completed within 15 calendar days of receipt of parts or if a shutdown is required for repair, which must be completed at the next scheduled shutdown but no later than 2 years.

At compressor stations and processing plants in ozone nonattainment areas

Storage vessels with actual uncontrolled VOC emissions greater than or equal to 2 TPY require 95% reduction on a 12-month rolling basis.

Natural gas-driven pneumatic controllers at compressor stations are required to be replaced or retrofitted such that emissions are reduced to less than or equal to 6 scfh unless a higher bleed rate is required for safety or process purposes. Natural gas-driven pneumatic controllers at processing plants are required to have a bleed rate of zero unless required for safety or process purposes.

Natural gas-driven diaphragm pumps at processing plants are required to have zero emissions.

Reciprocating compressor rod end packings are required to be replaced every 26,000 hours of operation or every 36 months. Alternatively, emissions from the rod end packing can be routed to a process through a closed vent system.

Centrifugal compressor wet seal degassing system emissions are required to be routed to a control device achieving 95% destruction efficiency through a closed vent system.

Fugitive emissions components require quarterly LDAR at compressor stations. LDAR can be with FLIR imaging, with a leak definition of any visible emission, or Method 21 with a leak definition of 500 ppm as methane. Leaking components must have a first attempt to repair within 5 calendar days, with repair completed no later than 30 calendar days unless delay of repair is necessary. Repairs must be remonitored within 15 calendar days. Delay of repair is allowed for ordering parts required for repair, which must be completed within 15 calendar days of receipt of parts or if a shutdown is required for repair, which must be completed at the next scheduled shutdown but no later than 2 years.

Fugitive emission components at processing plants require LDAR in accordance with 40 CFR Part 60, Subpart OOOOa (relating to standards of performance for crude oil and natural gas facilities for which construction, modification or reconstruction commenced after September 18, 2015), if applicable; otherwise, in accordance with 40 CFR Part 60, Subpart OOOO (relating to standards of performance for crude oil and natural gas facilities for which construction, modification, or reconstruction commenced after August 23, 2011, and on or before September 18, 2015) regardless of construction date.

At oil and gas facilities across the state

Condensate storage vessels with actual uncontrolled VOC emissions greater than or equal to 20 TPY require 95% reduction on a 12-month rolling basis. Other storage vessels with actual uncontrolled VOC emissions greater than or equal to 6 TPY require 95% reduction on a 12-month rolling basis unless a combustion control device authorized on or after May 1, 2014 is used in which case it must have a design 98% destruction efficiency.

Natural gas-driven pneumatic controllers at production facilities and compressor stations are required to be replaced or retrofitted such that emissions are reduced to less than or equal to 6 scfh unless a higher bleed rate is required for safety or process purposes. Natural gas-driven pneumatic controllers at processing plants are required to have a bleed rate of zero unless required for safety or process purposes.

Fugitive emissions components require one time only LDAR and monthly AVO inspections for production facilities emitting greater than 0 TPY VOC and less than or equal to 6 TPY VOC; annual LDAR and monthly AVO inspections for production facilities emitting greater than 6 TPY VOC and less than or equal to 12 TPY VOC; quarterly LDAR and monthly AVO inspections for production facilities with storage vessels emitting greater than 12 TPY VOC and less than or equal to 50 TPY VOC and for production facilities without storage vessels emitting greater than 12 TPY VOC and less than or equal to 20 TPY VOC; and monthly LDAR for production facilities with storage vessels emitting greater than 50 TPY VOC and for production facilities without storage vessels emitting greater than 20 TPY VOC. LDAR can be with FLIR imaging, with a leak definition of any visible emission, or Method 21 with a leak definition of 500 ppm as methane. Leaking components must have a first attempt to repair within 5 calendar days, with repair completed no later than 30 calendar days unless delay of repair is necessary. Repairs must be remonitored within 15 calendar days. Delay of repair allowed for order of parts required for repair, which must be completed within 15 calendar days of receipt of parts or if a shutdown is required for repair, which must be completed at the next scheduled shutdown but no later than 2 years.

Fugitive emissions components require annual LDAR for compressor stations emitting greater than 0 TPY VOC and less than or equal to 12 TPY VOC; quarterly for compressor stations emitting greater than 12 TPY VOC and less than or equal to 50 TPY VOC; and monthly for compressor stations emitting greater than 50 TPY VOC. LDAR can be with FLIR imaging, with a leak definition of any visible emission, or Method 21 with a leak definition of 2,000 ppm as methane for compressor stations constructed prior to May 1, 2014 and a leak definition of 500 ppm as methane for compressor stations constructed on or after May 1, 2014.

Leaking components must have a first attempt to repair within 5 calendar days, with repair completed no later than 30 calendar days unless delay of repair is necessary. Repairs must be remonitored within 15 calendar days. Delay of repair is allowed for ordering of parts required for repair, which must be completed within 15 calendar days of receipt of parts or if a shutdown is required for repair, which must be completed at the next scheduled shutdown but no later than 2 years.

MARYLAND DEPARTMENT OF THE ENVIRONMENT

The Maryland Department of the Environment (MDE) submitted a negative declaration[22] for the 2016 O&G CTG to the EPA on June 11, 2020.

MDE is also proposing to create a methane rule[23] in two phases for the control of sources in the oil and natural gas industry. The first phase is for an LNG facility and 4 natural gas compression facilities which have the following proposed requirements:

For natural gas-driven pneumatic controllers, the bleed rate cannot exceed 6 scfh whether they are continuous or intermittent bleed. Beginning January 1, 2022, continuous bleed controllers must be powered by compressed air or electricity unless they were installed prior to January 1, 2021 and use a vapor collection system or receive approval from MDE.

For reciprocating compressors, the rod packing flow rate must be measured annually and repaired if the flow rate exceeds 1 scfm or the combined flow rate equal to the number of cylinders times 1 scfm. Alternatively, emissions can be routed to a vapor collection system.

For fugitive emissions components, quarterly LDAR inspections using OGI or Method 21 are proposed. Repairs must be made and certified within 30 calendar days. Delay of repair is authorized for ordering parts, with repair completed within 7 calendar days of receipt of parts; if repair is infeasible, requires a vent or compressor station blowdown or is unsafe to repair during operation, repair must be completed during the next planned shutdown or vent blowdown.

There is a forthcoming proposed methane rule for the natural gas distribution system as part of phase one.

The second phase is the production sector; however, Maryland only has 10 active wells and has had a hydraulic fracturing ban in place since 2017.

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

The Montana Department of Environmental Quality requires oil and gas well facilities to control emissions from the time the well is completed until the source is registered or permitted. Subchapter 16 implements emission control requirements for oil and gas well facilities operating prior to the issuance of a Montana Air Quality Permit. See ARM 17.8.1601—1606. Subchapter 17 implements the registration of air contaminant sources. See ARM 17.8.1701—1713.

[22] MDE, Maryland Negative Declaration for Control Techniques Guidelines (CTG) for the Oil and Natural Gas Industry (EPA-453/B-16-001 – October 2016), June 11, 2020, https://mde.maryland.gov/programs/Air/AirQualityPlanning/Documents/CTGs/20-07_CTG_Oil_Gas_Negative_Declaration.pdf

[23] MDE, Chapter 41 Control of Methane Emissions from the Natural Gas Industry, Oct. 11, 2019, https://mde.maryland.gov/programs/Regulations/air/Documents/SHMeetings/NaturalGasCompressors/26.11.41DiscussionDraft10112019.pdf

For storage vessels with a PTE greater than or equal to 15 TPY VOC and vapors of 500 Btu/scf in subchapter 16 or 200 Btu/scf in subchapter 17, emissions must be captured and routed to a gas pipeline, routed to a smokeless combustion system or air pollution control device capable of achieving 95% emissions reduction.

For all piping components, a monthly AVO inspection must be conducted. Leaking components must have a first attempt to repair within 5 calendar days, with repair completed as soon as practicable but no later than 15 calendar days unless delay of repair is necessary. Delay of repair is allowed if a shutdown is required for repair, which must be completed before the end of the first facility shutdown after the leak is detected.

NEW MEXICO

The New Mexico Environment Department (NMED) proposed a regulation on May 6, 2021, to establish emissions standards for VOC and NO_X for oil and gas production and processing sources located in areas where ozone concentrations are exceeding 95% of the NAAQS.

The proposed rule applies to crude oil and natural gas production and processing equipment and operations that extract, collect, separate, dehydrate, store, process, transport, transmit, or handle hydrocarbon liquid or produced water located at wellhead sites, tank batteries, gathering and boosting sites, natural gas processing plants, and transmission compressor stations, up to the point of the local distribution company custody transfer station.

The proposed rule contains NO_X and VOC reduction measures for engines and turbines, compressor seals, control devices, natural gas well liquids unloading, glycol dehydrators, heaters, hydrocarbon liquid transfers, pig launching and receiving, pneumatic controllers and pumps, storage tanks and workovers.

NMED proposed storage vessels requirements are 95% control efficiency for storage vessels with PTE between 2 TPY and 10 TPY and 98% control efficiency for storage vessels with PTE greater than or equal to 10 TPY.

NMED proposed requirements that pneumatic controllers be non-emitting at facilities with access to commercial electricity. For well sites without access to commercial electricity, the proposed requirement is that between 80% and 90% of pneumatic controller sites be non-emitting by 2030, based on the historic percentage of non-emitting controllers. For natural gas compressor stations and processing plants without access to commercial electricity the proposed requirement is that 98% of pneumatic controllers are non-emitting by 2030.

NMED proposed a requirement that pneumatic pumps be non-emitting at processing plants and at well sites and compressor stations with access to commercial electricity. For well sites and compressor stations without access to commercial electricity, the proposed requirements are that pneumatic pump emissions be routed to a control device if it is technically feasible and that VOC emissions be reduced by 95%.

NMED proposed requirements for reciprocating compressors and centrifugal compressors identical to the 2016 O&G CTG.

NMED proposed LDAR provisions require AVO on a 10 BOE per day production threshold; AVO requirements includes for sources at well sites, tank batteries, gathering and boosting stations, processing plants, and transmission compressor stations. New Mexico requires instrument-based LDAR on PTE basis, with well sites and tank batteries requiring annual at less than 2 TPY PTE, semiannual at equal to or greater than 2 TPY but less than 5 TPY PTE, and quarterly at equal to or greater than 5 TPY PTE and gathering and

boosting sites, processing plants, and transmission compressor stations requiring quarterly at less than 25 TPY PTE and monthly at equal to or greater than 25 TPY.

The public hearing held by New Mexico Environmental Improvement Board to consider NMED's proposed regulations targeting emissions of ozone precursor pollutants from the oil and natural gas sector began September 20, 2021, and concluded October 1, 2021. See EIB 21-27 (R).

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

On November 8, 2018, the New York State Department of Environmental Conservation (NYSDEC) announced that it was developing a stakeholder regulation outline[24] and seeking public comment on a potential rulemaking for new requirements in the oil and natural gas sector. The regulation was proposed on April 21, 2021, with a public comment period that closed on July 20, 2021. The proposed regulation covers sources at oil and gas production sites; oil, condensate, and produced water separation and storage; natural gas storage; natural gas gathering and boosting; natural gas transmission and compressor stations; and natural gas metering and regulating stations. Sources covered by the proposed regulation include storage vessels, natural gas actuated pneumatic devices and pumps, centrifugal compressors, reciprocating compressors, blowdown activities, and leak detection and repair.[25]

Storage vessels installed prior to January 1, 2023 with PTE greater than or equal to 6 TPY VOC must have a vapor control efficiency of 95%. Storage vessels installed on or after January 1, 2023 with PTE greater than or equal to 6 TPY VOC must not vent to the atmosphere.

Beginning January 1, 2023, continuous bleed natural gas pneumatic devices shall not vent natural gas to the atmosphere and comply with LDAR requirements. Continuous bleed natural gas-driven pneumatic controllers installed prior to January 1, 2023, may be used as long as it has a bleed rate less than or equal to 6 scfh and is clearly marked with a permanent tag identifying the natural gas flow rate as less than or equal to 6 scfh. All continuous bleed devices must be tested by a direct measurement method by January 1, 2024, and tested annually thereafter and any with a measured flow rate greater than 6 scfh must be repaired within 14 days. Continuous bleed natural gas actuated pneumatic devices and pumps that need to be replaced or retrofitted by collecting all vented natural gas using a vapor collection system or by using compressed air or electricity to operate.

Beginning January 1, 2023, intermittent bleed natural gas actuated pneumatic devices shall comply with LDAR requirements.

Beginning January 1, 2023, natural gas-actuated pneumatic pumps shall not vent natural gas to the atmosphere and comply with LDAR requirements.

Beginning January 1, 2023, components on driver engines and compressors at natural gas transmission compressor stations and natural gas underground storage facilities must comply with LDAR requirements. The compressor rod packing or seal emission flow rate shall be measured annually by direct measurement while the compressor is running at normal operating temperature; a rod packing or seal flow rate greater than 2 scfm or a combined flow rate greater than 2 scfm multiplied by the number of compression cylinders Reciprocating natural gas compressors that operate fewer than 200 hours over a 12 month period are exempt

[24] NYSDEC, Oil and Natural Gas Sector Emissions in New York Stakeholder Regulation Outline, November 2018, https://www.dec.ny.gov/docs/air_pdf/oilgasoutline.pdf

[25] See Proposed 6 NYCRR Part 203, https://www.dec.ny.gov/docs/air_pdf/prop203.pdf

as long as they are equipped with a non-resettable hour meter and records of the operating hours per month are maintained for five years and reported to the Department once per year.

Beginning January 1, 2023, centrifugal compressors at natural gas transmission compressor stations and natural gas underground storage facilities with wet seals shall control the wet seal vent gas using a vapor collection system or be replaced with a dry seal. Components on driver engines and compressors that use a wet seal or a dry seal shall comply with LDAR requirements. The wet seal emission flow rate shall be measured annually by direct measurement while running at normal operating temperature; a wet seal emission flow rate greater than 3 scfm or a combined flow rate greater than 3 scfm multiplied by the number of wet seals must be repaired within 30 days unless it is a critical component in which case the wet seals must be repaired no later than 12 months. Alternatively, the wet seal may be replaced with a dry seal no later than 18 months after the exceedance. Centrifugal natural gas compressors that operate fewer than 200 hours over a 12 month period are exempt as long as they are equipped with a non-resettable hour meter and records of the operating hours per month are maintained for five years and reported to the Department once per year.

For components subject to LDAR requirements at well sites shall be inspected semiannually using Method 21, OGI, or an approved alternative method. If using an approved alternative method using continuous monitoring, one Method 21, OGI, or approved alternative method inspection shall be conducted over 24 months. For components subject to LDAR requirements at gathering and boosting stations or the city gate shall be inspected quarterly using Method 21, OGI, or an approved alternative method. If using an approved alternative method using continuous monitoring, one Method 21, OGI, or approved alternative method inspection shall be conducted over 12 months. For components subject to LDAR requirements at natural gas transmission compressor stations or storage facilities shall be inspected bimonthly using Method 21, OGI, or an approved alternative method. If using an approved alternative method using continuous monitoring, one Method 21, OGI, or approved alternative method inspection shall be conducted over 12 months. The Method 21 leak definition is 500 ppm. The OGI leak definition is any visible emission. Leaking equipment must be repaired or replaced within 30 days of discovery unless it is a critical component. Repaired or replaced components must be resurveyed within 15 days. Critical components must be repaired by the end of the next process shutdown or within 12 months, whichever is sooner.

The rule also has recordkeeping and reporting requirements for pipeline or compressor station blowdowns greater than 10,000 scf and for pigging activities along natural gas pipelines.

It should be noted that New York has had a high-volume hydraulic fracturing ban in place since 2010.

OHIO ENVIRONMENTAL PROTECTION AGENCY

On November 20, 2018, the Ohio Environmental Protection Agency (Ohio EPA) issued a request for preliminary input from stakeholders on potential regulations aimed at air pollution emissions from unconventional oil and gas facilities not currently covered by existing permits and/or state regulations.[26] The regulations would have covered similar equipment and requirements currently covered in the 2016 NSPS, as well as Ohio EPA's oil and gas general permits. The regulations would have also covered both existing and new sources, such as oil and gas well sites and gas compressor stations.

However, Ohio EPA decided not to develop rules for existing sources as most of the wells in Ohio were developed after the promulgation of 40 CFR Part 60, Subpart OOOO. Ohio EPA's general permits currently

[26] Ohio EPA, Early Stakeholder Outreach- New Rules Regulating Emissions from the Oil and Gas Industry, Nov. 16, 2018, https://www.epa.ohio.gov/Portals/27/regs/3745-31/ESO_NewOilandGasRules_2018.pdf

contain the Subpart OOOO requirements and will be updated with new requirements after the EPA finalizes the changes to 40 CFR Part 60, Subpart OOOOa.

COMPARISON OF THIS FINAL-FORM RULEMAKING WITH REGULATIONS IN OTHER STATES

This final-form rulemaking is less stringent than CARB's methane requirements; however, it is more stringent than CARB's LDAR requirements as the quarterly instrument-based inspections required by this final-form rulemaking use a leak definition of 500 ppm as methane for all types of components, with no allowances for number or size of leaks as in the CARB program. The LDAR requirements of this final-form rulemaking are more stringent than both SCAQMD's and SJVAPCD's LDAR requirements as these two California programs have allowable numbers of leaks based on the detected concentration.

The storage vessel requirements in Colorado are slightly more stringent than this final-form rulemaking in that the VOC emission threshold is 2 TPY in ozone nonattainment areas, although the control efficiency required is lower than in this final-form rulemaking at well sites (90% from May to September and 70% from October to April). In the rest of the state, the Colorado requirement is for a 98% reduction for combustion control devices installed on or after May 1, 2014. This final-form rulemaking requires a 95% reduction to maintain consistency with the requirements in the Department's general permits and Federal regulations and allow owners or operators to use manufacturer-tested models. Generally, however, the manufacturer-tested models typically achieve significantly greater than 95% control in practice.

This final-form rulemaking is more stringent than Colorado's regulations for the owners or operators of reciprocating compressors at well sites. These owners or operators are required to perform rod packing changes or route rod packing emissions through a collection system to a control or process.

This final-form rulemaking is more stringent than Colorado's regulations regarding LDAR for well sites as Colorado has an inspection frequency ranging from annual to semiannual based upon the production facility's VOC emissions. The instrument-based LDAR inspection frequency requirement established in this final-form rulemaking is quarterly for well sites producing equal to or greater than 15 BOE per day with at least one well producing equal to or greater than 15 BOE per day and annually for well sites producing equal to or greater than 15 BOE per day with at least one well producing equal to or greater than 5 BOE per day. This final-form rulemaking is more stringent than Colorado's regulations regarding LDAR for compressor stations as Colorado has an inspection frequency ranging from annual to monthly based upon the compressor station's VOC emissions. Processing plants are required to meet the conditions of Subpart OOOO or OOOOa, as applicable. The instrument-based LDAR inspection frequency requirement established in this final-form rulemaking is quarterly for the owners or operators of gathering and boosting stations and natural gas processing facilities in this Commonwealth.

The requirements for the owners or operators of natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps and centrifugal compressor wet seal degassing systems in Colorado's regulations and this final-form rulemaking are identical.

This final-form rulemaking is more stringent than Maryland, as Maryland has filed a negative declaration with the EPA. However, the proposed requirements under Maryland's methane rule for LNG (liquified natural gas) facilities and compressor stations are more stringent than this final-form rulemaking for continuous bleed pneumatic controllers and reciprocating compressors. The proposed requirements for fugitive emissions components are slightly less stringent than this final-form rulemaking due to the 30-day repair requirement.

This final-form rulemaking is more stringent than Montana's regulations for storage vessels as the threshold in this final-form rulemaking is 2.7 TPY PTE, which is less than Montana's 15 TPY PTE VOC emission required control. This final-form rulemaking is also more stringent than Montana's regulations for fugitive emissions as Montana only requires monthly AVO inspections.

New Mexico's proposal is more stringent than this final-form rulemaking for storage vessels, as the initial VOC emission threshold is 2 TPY and the control efficiency required increases to 98% for those with VOC emissions above 10 TPY. New Mexico's proposal is also more stringent than this final-form rulemaking for pneumatic controllers and pneumatic pumps. New Mexico's proposal is more stringent than this final-form rulemaking as the LDAR requirement ranges from quarterly to monthly based on the facility's VOC PTE.

New Mexico's proposal is less stringent than this final-form rulemaking for reciprocating compressors at well sites. The requirements for centrifugal compressors are identical to this final-form rulemaking. New Mexico's proposal is also less stringent than this final-form rulemaking as the LDAR requirement ranges from annual to quarterly based on the facility's VOC PTE.

New York's proposal contains elements that are less stringent than this final-form rulemaking, as well as more stringent than this final-form rulemaking. Proposed requirements for storage vessels, reciprocating compressors, and fugitive emissions components at well sites, gathering and boosting stations, and processing plants are all less stringent. New York's proposal is more stringent than this final-form rulemaking for pneumatic controllers and pumps at well sites and gathering and boosting stations. The fugitive emissions component requirements for gathering and boosting stations are identical.

The requirements of this final-form rulemaking are more stringent than the proposal offered by Ohio considering their decision to not pursue an existing source rule. This final-form rulemaking is more stringent than Subparts OOOO and OOOOa as it establishes a 2.7 TPY threshold for storage vessels, requires the owners or operators of reciprocating compressors at well sites to perform rod packing changes or route rod packing emissions through a collection system to a control or process, and requires more frequent LDAR inspections.

With the exception of storage vessels, reciprocating compressors, and fugitive emissions components, the control measures established in this final-form rulemaking are consistent with and not more stringent than the recommendations of the 2016 O&G CTG. For storage vessels, reciprocating compressors, and fugitive emissions components, the requirements of this final-form rulemaking are cost-effective and necessary to attain and maintain the ozone NAAQS. This ensures that this Commonwealth will not be at a competitive disadvantage with other states.

(13) Will the regulation affect any other regulations of the promulgating agency or other state agencies? If yes, explain and provide specific citations.

No other Department regulations or regulations of other Commonwealth agencies are affected by this final-form rulemaking.

(14) Describe the communications with and solicitation of input from the public, any advisory council/group, small businesses and groups representing small businesses in the development and drafting of the regulation. List the specific persons and/or groups who were involved. ("Small business" is defined in Section 3 of the Regulatory Review Act, Act 76 of 2012.)

The Department consulted with the Air Quality Technical Advisory Committee (AQTAC) and the Small Business Compliance Advisory Committee (SBCAC) in the development of the proposed rulemaking. On December 14, 2017, the Department presented concepts to AQTAC on a potential rulemaking incorporating the 2016 O&G CTG recommendations. The Department returned to AQTAC on December 13, 2018, for an informational presentation on a preliminary draft Annex A. The proposed rulemaking was presented for a vote to AQTAC on April 11, 2019, and SBCAC on April 17, 2019. Both committees concurred with the Department's recommendation to move the proposed rulemaking forward to the Board for consideration.

The Department also conferred with the Citizens Advisory Council's (CAC) Policy and Regulatory Oversight Committee concerning the proposed rulemaking on May 7, 2019. On June 18, 2019, the full CAC concurred with the Department's recommendation to move the proposed rulemaking forward to the Board for consideration.

The Department also met with industry and environmental stakeholders to receive additional input on the proposed rulemaking. On January 24, 2019, the Department updated the Pennsylvania Grade Crude Development Advisory Council on the status of the proposed rulemaking. On March 21, 2019, the Department provided an informational presentation to the Oil and Gas Technical Advisory Board. On July 8, 2019, the Department met with industry stakeholders, including representatives from the Marcellus Shale Coalition, Penn Energy, Southwestern Energy, Range Resources, and Chesapeake Energy. On August 27, 2019, the Department met with environmental stakeholders, including representatives from PennFuture, Environmental Defense Fund, and the Clean Air Council.

The Board adopted the proposed rulemaking at its meeting of December 17, 2019 by an 18 to 1 vote. The proposed rulemaking was published at 50 Pa.B. 2633 (May 23, 2020). Due to requirements to mitigate the spread of the COVID-19 virus, the Board held three virtual public hearings on June 23, 24 and 25, 2020. A 66-day public comment period closed on July 27, 2020. The Board received 4,510 written comments and 121 individuals provided verbal testimony at the virtual public hearings. The written comments included individual letters and petitions with multiple signatories, so the total number of persons expressing interest in the proposed rulemaking was approximately 36,100. The Independent Regulatory Review Commission separately provided comments on the proposed rulemaking. The comments received on the proposed rulemaking are summarized in the Preamble to this final-form rulemaking and are also addressed in a separate Comment and Response Document that accompanies this final-form rulemaking. All comments on the proposed rulemaking were considered and addressed.

This final-form rulemaking was presented to AQTAC on December 9, 2021, the CAC Policy and Regulatory Oversight Committee on January 12, 2022 and the CAC on January 18, 2022, and SBCAC on January 27, 2022.

(15) Identify the types and number of persons, businesses, small businesses (as defined in Section 3 of the Regulatory Review Act, Act 76 of 2012) and organizations which will be affected by the regulation. How are they affected?

The 2016 O&G CTG listed the following five North American Industry Classification System (NAICS) codes to identify businesses potentially covered by the 2016 O&G CTG. The NAICS is an industry

classification system developed by Canada, Mexico and the United States that groups establishments into industry groups based on the economic activities, producing and nonproducing, in which the establishment is primarily engaged. More information about the United States portion of the NAICS is available at: http://www.census.gov/eos/www/naics/.

The types of persons, businesses, small businesses, and organizations in this Commonwealth that would be affected by this final-form rulemaking are the same as those identified in the 2016 O&G CTG:

1. 211111 Crude Petroleum and Natural Gas Extraction.
2. 211112 Natural Gas Liquid Extraction.
3. 221210 Natural Gas Distribution.
4. 486110 Pipeline Distribution of Crude Oil.
5. 486210 Pipeline Transportation of Natural Gas.

In 2017, these five NAICS codes were changed to the following codes with potentially affected sources, which should not affect the scope of sources affected in this Commonwealth:

1. 211120 Crude Petroleum Extraction.
2. 211130 Natural Gas Extraction.
3. 221210 Natural Gas Distribution.
4. 486110 Pipeline Distribution of Crude Oil.
5. 486210 Pipeline Transportation of Natural Gas.

In addition, there are two additional NAICS codes used by the oil and natural gas industry to report emissions to the Department's Air Information Management System (AIMS) database:

1. 213111 Drilling Oil and Gas Wells.
2. 486990 All Other Pipeline Transportation.

The United States Small Business Administration (SBA) has established definitions of what constitutes a small business concern and publishes a list of size standards for each NAICS code. See 13 CFR 121.201. The size standard, usually stated in number of employees or average annual receipts, represents the largest size that a business (including its subsidiaries and affiliates) may be to remain classified as a small business for SBA and Federal government programs. For crude petroleum extraction (211120) and natural gas extraction (211130), the SBA size definition is 1,250 employees. For natural gas distribution (221210) and drilling oil and gas wells (213111), the SBA size definition is 1,000 employees. For pipeline distribution of crude oil (486110), the SBA size definition is 1,500 employees. For pipeline transportation of natural gas (486210), the SBA size definition is $30 million in annual receipts. For all other pipeline transportation (486990), the SBA size definition is $40.5 million in annual receipts.

The Department gathered information about potentially affected facility owners or operators from the Environmental Facility Application Compliance Tracking System (eFACTS) database and the AIMS database. The eFACTS database contains facility-specific information, including NAICS code, for permitted facilities and some previously inspected facilities for which permits are not required. The AIMS database contains site-specific source and air pollutant emissions data, as well as NAICS codes, to maintain the air quality emission inventory. The eFACTS and AIMS databases include only those owners or operators of facilities with which the Department has had contact and for which the Department has a reason to input data. These owners or operators may or may not meet the definition of "small business" in accordance with Section 3 of the Regulatory Review Act (71 P.S. § 745.3).

The Department identified 5,039 client ID numbers for owners or operators of facilities in this Commonwealth using the Department's eFACTS and AIMS databases and the NAICS codes covered by the 2016 O&G CTG. These facilities include approximately 30,648 well sites, 486 gathering and boosting stations, and 15 natural gas processing facilities in this Commonwealth. A single client ID entity may own or operate more than one type of facility and may own or operate multiple facilities of the same facility type. The owners or operators of these facilities are all potentially subject to this final-form rulemaking as they are likely to have air contamination sources subject to this final-form rulemaking.

The Department categorized the 5,039 owners or operators based on their client type in eFACTS. Of the 5,039 owners or operators, the Department determined that 3,783 owners or operators have a "for profit" client type of estate/trust, individual, non-government, partnership-general, partnership-limited, or sole proprietorship. The Department assumed that these 3,783 "for profit" entities are likely a small business. The Department determined that 1,170 of the 5,039 owners or operators have a "for profit" client type of limited liability company, limited liability partnership, non-Pennsylvania corporation, or Pennsylvania corporation. The Department assumed that each of these 1,170 "for profit" entities is not a small business unless it meets the applicable SBA size definition based on the data available. The remaining 86 owners or operators with the client type of association/organization, authority, county, Federal agency, municipality, other (government), school district, or state agency are classified as "not for profit" client types. These types are not considered small businesses.

The Department requested the assistance of the Commonwealth's Small Business Development Center's (SBDC) Environmental Management Assistance Program (EMAP) in reviewing the list of "for profit" 1,170 owners or operators for their small business-size status. The SBDC EMAP searched the Hoover's database and found 117 entries for the 1,170 owners or operators and provided the Hoover's data for these 117 facilities to the Department. The Department reviewed the Hoover's data for these 117 facility owners or operators and determined that 51 facilities meet the definition for small business size for the applicable NAICS code. Based on the above assumptions and analyses, the Department estimates that as many as 3,834 of the 5,039 owners or operators identified may meet the definition of small business as defined in Section 3 of the Regulatory Review Act.

The Department estimates an annual compliance cost of $31.7 million per year for the 5,039 owners or operators and an annual $20.3 million per year in savings due to conserving the natural gas rather than losing it through uncontrolled VOC emissions. See the discussion in the response to Question 17 for how these financial estimates are derived.

The Department estimates that the potentially affected 5,039 Pennsylvania facility owners or operators, including small business-sized owners or operators, could incur an average annual cost of approximately $6,285 per owner or operator. The Department estimates that each owner or operator could accrue an average annual savings from conservation of natural gas, assuming a price of $1.70 per thousand cubic feet (Mcf) of natural gas, of approximately $4,023 per owner or operator. This amounts to a net cost per owner or operator of approximately $2,263.

As an alternative to the average costs per owner or operator cited above, an average cost can be generated using the average cost per facility and multiplying by the number of facilities the owner or operator controls. The Department estimates that, for the 31,149 potentially affected facilities, the average annual cost per facility is approximately $1,017 and the average annual savings from conservation of natural gas is approximately $651. This results in an average net cost per facility of approximately $366.

The VOC emissions reductions from the potentially affected 31,149 facilities are estimated to be 12,068 TPY. See the discussion in the response to Question 17 for the details on estimated VOC emissions reductions. The estimated average amount of potential VOC emission reductions per affected facility is approximately 0.4 TPY. The estimated average VOC emission reductions per affected facility owner or operator will vary depending on the types of affected sources being monitored and controlled at the facility. The average cost per ton of reducing VOC emissions is approximately $2,625 and the average net cost per ton of reducing VOC emissions is approximately $945.

Except for the requirements for storage vessels, reciprocating compressors at well sites, and fugitive emissions components, some of the potentially affected facility owners or operators, including small businesses, are likely in compliance with this final-form rulemaking for certain covered sources under 40 CFR Part 60, Subparts OOOO and OOOOa. Certain owners or operators may likely be in compliance with the requirements of this final-form rulemaking through compliance with existing operating permits, general permits, or exemption requirements. It is important that an owner or operator compare the requirements of this final-form rulemaking and their current requirements and insure they comply with the more stringent VOC emission control requirements.

(16) List the persons, groups or entities, including small businesses, that will be required to comply with the regulation. Approximate the number that will be required to comply.

This final-form rulemaking will apply statewide to owners or operators of one or more of the following oil and natural gas sources of VOC emissions which were constructed on or before the effective date of this final-form rulemaking: storage vessels in all segments except natural gas distribution, natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps, centrifugal compressors and reciprocating compressors and fugitive emission components.

As discussed in detail in Question 15, the Department identified 5,039 client ID numbers for owners or operators of the approximately 31,149 facilities in this Commonwealth. Based on the analysis described in the response to Question 15, approximately 3,834 of the 5,039 owners or operators may meet the definition of small business as defined in Section 3 of the Regulatory Review Act. Based on information supplied by commentators, the Oil and Gas Production Report, and AIMS, the Department estimates there are 30,648 well sites, 486 gathering and boosting stations, 15 processing plants, and 121 transmission stations. The Department estimates that these owners or operators have at least 51 storage vessels at 18 facilities, 34,856 pneumatic controllers at 31,134 facilities, and 40 pneumatic pumps at 17 facilities will be subject to requirements under this final-form rulemaking. The owners or operators of approximately 2,711 of 30,648 well sites will be required to implement instrument-based LDAR inspections or increase the current instrument-based LDAR inspection frequency under this final-form rulemaking. The owners or operators of approximately 263 of 486 gathering and boosting stations and 1 of 15 processing plants will be required to implement a new instrument-based LDAR inspection program or will be subject to new requirements under this final-form rulemaking.

(17) Identify the financial, economic and social impact of the regulation on individuals, small businesses, businesses and labor communities and other public and private organizations. Evaluate the benefits expected as a result of the regulation.

The Department estimates that the total industry-wide cost of complying with this final-form rulemaking will be about $31.7 million per year. However, implementation of the control measures will also potentially save owners or operators in the oil and natural gas industry about $20.3 million per year due to a lower natural gas loss rate during production. This cost estimate consists of two major categories of data. The first is the annual

cost to implement the RACT requirements for each affected source or affected facility as provided by the EPA in the 2016 O&G CTG and from the Department's own additional analysis. The second is the number of potentially affected facilities, which was obtained from several data sources including the Department's Oil and Gas Production Report, eFACTS, and AIMS. For the owners or operators of facilities in the oil and natural gas industry, the anticipated annual cost to comply with the requirements will be based on the type of sources present at the site, the requirements that apply to those sources, and the type of control used to comply.

Most of the anticipated costs are due to new regulatory requirements but many of the costs associated with this final-form rulemaking are from common sense practices and controls, some of which owners or operators may already be implementing due to regulatory requirements or voluntary emission reduction programs. An example includes periodic AVO inspections which can prevent natural gas releases, which in turn prevents environmental damage and significant financial losses for the operator. The Department anticipates there will be areas of cost savings that will occur as a result of this final-form rulemaking. The Department estimates a majority of small business stationary sources will be below the applicability thresholds. However, affected small businesses may incur minimal cost as a result of this final-form rulemaking; net costs of approximately $366 per facility or, on average, $2,263 per owner or operator as discussed in Question 15. Overall, the Department does not anticipate that this final-form rulemaking will result in any significant adverse impact on small oil and gas operators.

The Department estimates that implementation of the proposed control measures could reduce VOC emissions by as much as 12,068 TPY. Approximately 714 TPY of these VOC emission reductions are due to the RACT determinations by the Department that reduce emissions over and above the EPA's RACT recommendations. 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 by reducing the amount of ground-level ozone air pollution resulting from these sources.

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 gas operations. 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. The control measures implemented for VOC emissions simultaneously control methane emissions and could reduce methane emissions by as much as 221,066 TPY with 41 TPY from the installation of controls for storage vessels, 175,171 TPY from pneumatic controllers, 135 TPY from pneumatic pumps, 1,172 TPY from replacement of reciprocating compressor rod packings at well sites, and 44,547 TPY from fugitive emissions components through the performance of LDAR inspections. Approximately 11,913 TPY of the methane emission reductions are due to the technically and economically feasible VOC RACT determination by the Department that is over and above the reductions from EPA's VOC RACT recommendations.

As discussed in the responses to Questions 8 and 10, adoption of the VOC emission control measures and other requirements in this final-form rulemaking 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 proposed VOC emission reduction measures would also assist the Commonwealth in reducing the levels of ozone precursor emissions that contribute to potential nonattainment of the 2015 ozone NAAQS. As a result, the VOC emission control measures 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.

In addition, as discussed in the response to Question 10, the reductions of ozone are estimated to have a health benefit to the residents of the Commonwealth ranging from $63 million to $189 million. The Department is not stating that these estimated monetized health benefits would all be the result of implementing the RACT measures, but the EPA estimates are indicative of the benefits to Commonwealth residents of attaining the 2015 8-hour ozone NAAQS through the implementation of a suite of measures to control VOC emissions in the aggregate from different source categories. Reducing VOC and attaining the 2015 ozone NAAQS will serve to protect over 600,000 jobs and $163 billion in revenue in the agriculture and forestry industry according to information provided to the Department by the Pennsylvania Department of Agriculture (PDA).[6]

(18) Explain how the benefits of the regulation outweigh any cost and adverse effects.

As discussed in the response to Question 9, VOC emissions are precursors to the formation of ground-level ozone, a public health, welfare and environmental hazard. Benefits of implementing the requirements of this final-form rulemaking include natural gas savings of $20.3 million for the oil and natural gas industry. Additional benefits include making progress toward achieving between $63 million to $189 million in health benefits to the residents of this Commonwealth as a result of attaining the 2015 8-hour ozone NAAQS, and protecting over 600,000 jobs and $163 billion in revenue in the agriculture and forestry industries.[4,6] Costs of implementing the requirements of this final-form rulemaking include $31.7 million to the oil and natural gas industry. Industry therefore will incur a net cost of $11.4 million, while the Commonwealth as a whole will incur a net benefit of at least $51.6 million when using a baseline minimum of $63 million in public health benefits, plus additional benefit from the preservation of jobs and revenue from the agriculture and forestry industries.

Ozone precursor emission reductions achieved through the implementation of RACT requirements and RACT emission limitations for the affected sources would help the Commonwealth attain and maintain the 1997, 2008 and 2015 ozone NAAQS. Given that implementation of RACT requirements is federally required, the Department estimates that the RACT requirements and RACT emission limitations would achieve greater VOC emission reductions at a reasonable cost to the affected owners and operators and to the Commonwealth than not implementing 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 gas operations. As detailed in the response to Question 17, the control measures implemented for VOC emissions simultaneously control methane emissions and provide VOC emission reductions of approximately 12,068 TPY and methane emission reductions of approximately 221,066 TPY. The technically and economically feasible RACT determinations in this final-form rulemaking for storage vessels, reciprocating compressors at well sites, and fugitive emissions components result in a greater reduction of VOC emissions than implementing the EPA's RACT recommendations from the 2016 O&G CTG resulting in an additional 714 TPY of VOC and 11,913 TPY of methane emissions reductions. As discussed in the response to Question 10, the co-benefit methane reductions will help achieve Governor Tom Wolf's Methane Reduction Strategy, resulting in associated health and environmental benefits.

The improvements in ground-level ozone air quality and groundwater quality through reduced emissions of VOCs 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 see the beautiful natural areas of this Commonwealth.

This final-form rulemaking may create economic opportunities for VOC emission control technology innovators, manufacturers, and distributors through an increased demand for new or improved equipment. In addition, the owners or operators of regulated facilities may be required to install and operate an emissions monitoring system or equipment necessary for an emissions monitoring method to comply with this final-form rulemaking, thereby creating an economic opportunity for the emissions monitoring industry.

(19) Provide a specific estimate of the costs and/or savings to the regulated community associated with compliance, including any legal, accounting or consulting procedures which may be required. Explain how the dollar estimates were derived.

Compliance costs will vary for each facility depending on which compliance option is chosen by the owner or operator.

Storage vessels

The annualized cost of $25,194 in 2012 dollars to control one storage vessel with a control device is based on the data in the 2016 O&G CTG, which is equivalent to $30,909 in 2021 dollars. The Department's additional analysis demonstrated that the annualized cost of routing emissions from a storage vessel to a control device ranges from $9,501 to $22,871 in 2021 dollars based on the data in the Department's Technical Support Document (TSD) for the General Plan Approval/General Operating Permit BAQ-GPA/BP-5 (GP-5) for natural gas compression stations, processing plants, and transmission stations and the General Plan Approval/General Operating Permit BAQ-GPA/GP-5A (GP-5A) for unconventional natural gas well site operations and remote pigging stations.[27] The Department used the EPA's annualized cost estimate of $30,909 in 2021 dollars to be conservative when estimating the effect on the oil and natural gas industry. The Department identified a total of 31,270 facilities with storage vessels from the Department's databases. There are 18 facilities with 51 storage vessels that emit 2.7 TPY or more of VOC with a total industry cost of $556,359 per year. The Department estimates that implementation of the final-form rulemaking control measures could reduce VOC emissions by as much as 282 TPY from the installation of controls for storage vessels. This results in an average cost of approximately $1,973 per ton of VOC emissions reduced per year. Approximately 18 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.

Natural gas-driven continuous bleed pneumatic controllers

The annualized cost of $296 in 2012 dollars to replace a continuous high-bleed pneumatic controller with a low-bleed pneumatic controller is based on the data in the 2016 O&G CTG, which is $347 per year in 2021 dollars. The Department identified a total of 31,134 facilities with an estimated 34,856 affected pneumatic controllers. The total industry cost is $12,085,272 per year. Using the EPA's estimate of natural gas emissions per controller and this Commonwealth's average natural gas composition, the Department estimates that implementation of the final-form rulemaking control measures could reduce VOC emissions by

[27] DEP, Technical Support Document For the General Plan Approval and/or General Operating Permit for Unconventional Natural Gas Well Site Operations and Remote Pigging Stations (BAQ-GPA/GP-5A, 2700-PM-BAQ0268) And the Revisions to the General Plan Approval and/or General Operating Permit for Natural Gas Compressor Stations, Processing Plants, and Transmission Stations (BAQ-GPA/GP-5, 2700-PM-BAQ0267), June 2018, http://www.depgreenport.state.pa.us/elibrary/GetDocument?docId=19616&DocName=02%20FINAL%20TECHNICAL%20SUPPORT%20DOCUMENT%20FOR%20GP-5%20(2700-PM-BAQ0267)%20AND%20GP-5A%20(2700-PM-BAQ0268).PDF%20%20%3Cspan%20style%3D%22color%3Agreen%3B%22%3E%3C%2Fspan%3E%20%3Cspan%20style%3D%22color%3Ablue%3B%22%3E%3C%2Fspan%3E

as much as 9,102 TPY from pneumatic controllers located at these facilities. The requirements for natural gas-driven continuous bleed pneumatic controllers are identical to the EPA's 2016 O&G CTG recommendation which the EPA has determined to be cost effective.

Natural gas-driven diaphragm pumps

The annualized cost of $774 in 2012 dollars to control one natural gas-driven diaphragm pump is based on the data in the 2016 O&G CTG, which is $907 per year in 2021 dollars. The Department identified 17 well sites with an estimated 40 affected diaphragm pumps. The total industry cost is $36,265 per year. Using the EPA's estimate of natural gas emissions per pump, this Commonwealth's average natural gas composition, and a 95% emissions reduction, the Department estimates that implementation of the final-form rulemaking 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 the EPA's 2016 O&G CTG recommendation which the EPA has determined to be cost-effective.

Reciprocating compressors

The annualized cost of $782 in 2021 dollars to replace the rod packings for one reciprocating compressor at a well site is based on the data in the Department's TSD for 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. 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 is only $782 per year, which is the sum of the annualized capital cost and the annual operating expenses. 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.

There are an estimated 423 gathering and boosting stations with at least 527 reciprocating compressors and an estimated 11 natural gas processing plants with at least 30 reciprocating compressors. The Department assumes that the owners or operators of these facilities are complying with the requirements of Subparts OOOO and OOOOa as none of these facilities were constructed prior to 2011. Therefore, they would have to do nothing further under this final-form rulemaking.

Centrifugal compressors

The annualized cost of $2,553 in 2012 dollars to control one wet seal degassing system for a centrifugal compressor is based on the data in the 2016 O&G CTG which is $2,990 in 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. If one or more of these compressors is a wet seal centrifugal compressor, the owner or operator would be subject to the applicable wet seal degassing system VOC emission control requirements of this final-form rulemaking. VOC emissions would be reduced by 95% at a cost of $2,990 per year per wet seal degassing system in 2021 dollars. The requirements for wet seal centrifugal compressor degassing systems

are identical to the EPA's 2016 O&G CTG recommendation which the EPA has determined to be cost effective.

Fugitive Emissions Components

In the 2016 O&G CTG, the annualized cost in 2012 dollars to conduct annual LDAR inspections at a well site is $1,318, to conduct quarterly LDAR inspections at a well site is $4,220, and to conduct quarterly LDAR inspections at a gathering and boosting station is $25,049. These costs are $1,554, $4,937, and $29,307 in 2021 dollars, respectively. The Department's TSD for GP-5 and GP-5A also contained cost data for implementing LDAR programs, which are more conservative than the annual costs in EPA's 2016 O&G CTG as the costs in the TSD are based on a contractor's quote. The annual cost for implementing an annual LDAR inspection program is $1,681 in 2021 dollars at a well site. The annual cost, in 2021 dollars, for implementing a quarterly LDAR inspection program is $6,723 at a well site and $13,447 for a gathering and boosting station or natural gas processing plant. It should be noted that the estimates for well sites assumed there are 1,000 components to monitor and that for gathering and boosting stations or natural gas processing plants there are 2,000 components to monitor. EPA's assumptions for the number of components to monitor are between 127 and 671 for well sites and 3,091 for gathering and boosting stations or processing plants.

The Department identified a total of 31,149 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 cost of $1.70/Mcf of natural gas in 2021 dollars.

There are approximately 37 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 $62,192, reducing VOC emissions by approximately 136 TPY for a total cost per ton of VOC reduced of $1,457. The 136 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 1,525 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 $10,253,276, reducing VOC emissions by approximately 1,163 TPY. The Department has determined this requirement to be cost-effective since the annualized cost is only $6,723 per year. Approximately 291 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, reducing VOC emissions by approximately 314 TPY. The Department has determined this requirement to be cost-effective since the incremental annualized cost is only $5,042 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, reducing VOC emissions by approximately 517 TPY. The Department has determined this requirement to be cost-effective since the incremental annualized cost is only $3,361 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. Using the EPA's estimate of fugitive natural gas emissions per gathering and boosting station and this Commonwealth'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 the EPA's 2016 O&G CTG recommendation which the 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 the EPA's 2016 O&G CTG recommendation which the 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 reducing VOC emissions by approximately 12 TPY for a total cost per ton of VOC reduced of $1,121.

The total industry cost is approximately $18,576,941 in 2021 dollars. The Department estimates that the final-form control measures could reduce VOC emissions by 2,616 TPY or more from the subject fugitive emissions components due to implementation of the required LDAR inspection program at these facilities.

Based on the above compliance costs, and the number of applicable sources, the Department estimates that this final-form rulemaking will cost affected owners or operators approximately $31.7 million (based on 2021 dollars) per year without consideration of the economic benefit of the saved natural gas. The value of the saved natural gas, assuming a natural gas price of $1.70 per Mcf in 2021 dollars, yields a savings of approximately $20.3 million, resulting in a total net cost of approximately $11.4 million for this final-form rulemaking.

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 GP-5 and GP-5A, as detailed in the response to Question 17. 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 located in this Commonwealth. The costs for each category of sources were added together to come up with a final estimated cost and savings.

The VOC RACT requirements established by this final-form rulemaking will not require the owner or operator to obtain an operating permit or submit an application for amendments to an existing operating permit. These requirements will be incorporated into the existing operating permit when the permit is renewed, if less than 3 years remain in the permit term, as specified under 25 Pa. Code § 127.463(c) (relating to operating permit revisions to incorporate applicable standards). 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 this final-form rulemaking, as required under § 127.463(b).

(20) Provide a specific estimate of the costs and/or savings to the local governments associated with compliance, including any legal, accounting or consulting procedures which may be required. Explain how the dollar estimates were derived.

It is not anticipated that local governments will incur additional costs as a result of this final-form rulemaking.

(21) Provide a specific estimate of the costs and/or savings to the state government associated with the implementation of the regulation, including any legal, accounting, or consulting procedures which may be required. Explain how the dollar estimates were derived.

State government costs would include permit engineer review time for applications of plan approvals or operating permits as a result of any modifications or additions of infrastructure at oil and natural gas facilities required to comply with this final-form rulemaking. The Department would collect fees associated with applications submitted to cover these costs. See 25 Pa. Code Chapter 127 for more information on fees.

(22) For each of the groups and entities identified in items (19)-(21) above, submit a statement of legal, accounting or consulting procedures and additional reporting, recordkeeping or other paperwork, including copies of forms or reports, which will be required for implementation of the regulation and an explanation of measures which have been taken to minimize these requirements.

No new legal, accounting or consulting procedures are required to implement this final-form rulemaking.

(22a) Are forms required for implementation of the regulation?

No new forms would be required for the implementation of this final-form rulemaking. Forms needed to implement this final-form rulemaking exist and are currently part of the Air Quality program.

(22b) If forms are required for implementation of the regulation, attach copies of the forms here. If your agency uses electronic forms, provide links to each form or a detailed description of the information required to be reported. Failure to attach forms, provide links, or provide a detailed description of the information to be reported will constitute a faulty delivery of the regulation.

Not applicable, because no new forms are required for the implementation of this final-form rulemaking.

(23) In the table below, provide an estimate of the fiscal savings and costs associated with implementation and compliance for the regulated community, local government, and state government for the current year and five subsequent years.

As discussed in the response to Question 19, the Department estimates that this final-form rulemaking will cost affected owners or operators approximately $31.7 million in 2021 dollars per year without consideration of the economic benefit of the saved natural gas due to the reduced losses of uncontrolled emissions. The value of the saved natural gas, assuming a natural gas price of $1.70 per Mcf in 2021 dollars, yields a savings of approximately $20.3 million, resulting in a total net cost of approximately $11.4 million for this final-form rulemaking.

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 GP-5 and GP-5A, as detailed in the response to Question 19. 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 for each affected source was multiplied by the number of each piece of equipment or affected site in the State. The costs for each category of sources were added together to come up with a final estimated cost and savings for the current fiscal year as shown in the Table below.

	Current FY (21/22)	FY+1 (22/23)	FY+2 (23/24)	FY+3 (24/25)	FY+4 (25/26)	FY+5 (26/27)
SAVINGS:	$	$	$	$	$	$
Regulated Community	20,270,177	20,675,581	21,089,092	21,510,874	21,941,092	22,379,914
Local Government	0.00	0.00	0.00	0.00	0.00	0.00
State Government	0.00	0.00	0.00	0.00	0.00	0.00
Total Savings	20,270,177	20,675,581	21,089,092	21,510,874	21,941,092	22,379,914
COSTS:						
Regulated Community	31,673,294	32,306,760	32,952,895	33,611,953	34,284,192	34,969,876
Local Government	0.00	0.00	0.00	0.00	0.00	0.00
State Government	0.00	0.00	0.00	0.00	0.00	0.00
Total Costs	31,673,294	32,306,760	32,952,895	33,611,953	34,284,192	34,969,876
REVENUE LOSSES:						
Regulated Community	0	0	0	0	0	0
Local Government	0.00	0.00	0.00	0.00	0.00	0.00
State Government	0.00	0.00	0.00	0.00	0.00	0.00
Total Revenue Losses	0	0	0	0	0	0

(23a) Provide the past three-year expenditure history for programs affected by the regulation.

Program	FY-3 (18/19)	FY-2 (19/20)	FY-1 (20/21)	Current FY (21/22)
Environmental Program Management (161-10382)	$30,932,000	$27,920,000	$32,041,000	$34,160,000
Clean Air Fund - Major Emission Facilities (215-20077)	$17,878,000	$18,759,000	$20,801,000	$20,083,000
Clean Air Fund - Mobile and Area Facilities (233-20084)	$9,369,000	$9,900,000	$11,290,000	$10,153,000

(24) For any regulation that may have an adverse impact on small businesses (as defined in Section 3 of the Regulatory Review Act, Act 76 of 2012), provide an economic impact statement that includes the following:

(a) An identification and estimate of the number of small businesses subject to the regulation.

The Department expects a maximum of about 5,039 owners or operators of affected oil and natural gas sources may be subject to this final-form rulemaking. Of these potential 5,039 owners or operators, approximately 3,834 may meet the definition of small business as defined in Section 3 of the Regulatory Review Act. It is possible that far fewer than the 5,039 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. Please see the response to Question 15 for details about how the Department determined the number of potentially affected small businesses.

(b) The projected reporting, recordkeeping and other administrative costs required for compliance with the proposed regulation, including the type of professional skills necessary for preparation of the report or record.

The recordkeeping and reporting requirements for owners or operators of applicable sources under this final-form rulemaking are minimal because the records required are in line with the records already required to be kept for emission inventory purposes and for other Federal and State requirements.

Some of the affected facility owners or operators are subject to requirements under 40 CFR Part 60, Subpart OOOO, which has an effective date of August 23, 2011, or 40 CFR Part 60, Subpart OOOOa which has an effective date of September 18, 2015. The owners or operators of sources installed prior to August 23, 2011 would be required to determine applicability of this final-form rulemaking to all affected sources, keep additional records, and submit an annual report to demonstrate compliance with this final-form rulemaking. The owners or operators of sources installed after August 23, 2011 and prior to September 18, 2015 would be required to determine whether their storage vessels are affected sources based on the lowered applicability threshold in this final-form rulemaking, their natural gas-driven diaphragm pumps at their well sites or processing plants are affected sources, their reciprocating compressors at well sites are affected sources, and whether their fugitive emissions components at well sites are affected sources under this final-form rulemaking. This category would also be required under § 129.130 to keep additional records and submit additional information in their reports to show compliance with this final-form rulemaking. The owners or operators of sources installed after September 18, 2015, would be required to determine whether their storage vessels are affected sources based on the lowered applicability threshold in this final-form rulemaking, their reciprocating compressors at well sources are affected sources, and whether their fugitive emissions components at well sites are affected sources under this final-form rulemaking. This category would also be required under § 129.130 to keep additional records and submit additional information in their reports to show compliance with this final-form rulemaking. No special skills are required, and the Department only anticipates minimal administrative costs for those already complying with Subpart OOOO or Subpart OOOOa.

(c) A statement of probable effect on impacted small businesses.

The requirements of this final-form rulemaking apply to the owners or operators of the following types of oil and natural gas sources: storage vessels in all segments except natural gas distribution; natural gas-driven

continuous bleed pneumatic controllers; natural gas-driven diaphragm pumps; reciprocating compressors and centrifugal compressors; and fugitive emissions components.

The Department identified 5,039 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 30,648 well sites, 486 gathering and boosting stations, and 15 natural gas processing facilities in this Commonwealth. The Department estimates that approximately 3,843 of the 5,039 owners or operators identified in eFACTS may meet the definition of small business as defined in Section 3 of the Regulatory Review Act. Please see the response to Question 15 for details about how the Department determined the number of potentially affected small businesses.

As discussed in detail in the response to Question 16, the Department estimates that these owners or operators have at least 51 storage vessels at 18 facilities, 34,856 pneumatic controllers at 31,134 facilities, and 40 pneumatic pumps at 17 facilities will be subject to requirements under this final-form rulemaking. The owners or operators of approximately 2,711 of 30,648 well sites will be required to implement instrument-based LDAR inspections or increase the current instrument-based LDAR inspection frequency under this final-form rulemaking. The owners or operators of approximately 263 of 486 gathering and boosting stations and 1 of 15 processing plants will be required to implement a new instrument-based LDAR inspection program or will be subject to new requirements under this final-form rulemaking.

As described in the response to Question 24(b), small businesses will have to determine applicability of their affected sources to this final-form rulemaking, keep new or additional records, and submit new reports or reports with additional information. No special skills are required, and the Department only anticipates minimal administrative costs for those already complying with Subpart OOOO or Subpart OOOOa.

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. Some examples include periodic inspections, which can prevent releases of natural gas emissions, which in turn prevent environmental damage and significant financial losses for the affected owner or operator. The Department also anticipates there may be areas of cost savings that may occur as a result of the implementation of the control measures in this final-form rulemaking. In addition, the Department estimates most small business-sized stationary sources will be below the applicability thresholds. However, the owners or operators of affected small businesses may incur minimal costs as a result of this final-form rulemaking. Overall, the Department does not anticipate that this final-form rulemaking will result in any significant adverse impact on small business-sized owners or operators.

The Department plans to educate and assist the public and the regulated community in understanding the final-form 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 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 Pennsylvania Small Business and Household Pollution Prevention Program Act (35 P.S. §§ 6029.201—6029.209). In addition to providing one-on-one consulting assistance and on-site assessments, EMAP also operates a toll-free phone line to field questions from this Commonwealth's small businesses, as well as businesses wishing to start up in or relocate to this Commonwealth. EMAP operates and maintains a resource-rich environmental assistance website and

distributes an electronic newsletter to educate and inform small businesses about a variety of environmental compliance issues.

(d) A description of any less intrusive or less costly alternative methods of achieving the purpose of the proposed regulation.

There are no less intrusive or less costly alternative regulatory provisions available.

The requirement to adopt and implement RACT requirements is Federally mandated. In accordance with sections 172(c)(1), 182(b)(2)(A) and 184(b)(1)(B) of the CAA, this final-form rulemaking establishes VOC emission limitations and other requirements consistent with the recommendations of the 2016 O&G CTG as RACT for natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps, and centrifugal compressors in this Commonwealth. The Department's 2020 reanalysis has determined that the technically and economically feasible requirements for storage vessels, reciprocating compressors at well sites, and fugitive emissions components at well sites are RACT. The owners or operators of affected facilities, whether or not meeting the designation of small business, are required to control VOC emissions to meet the levels established in this final-form rulemaking. The owners or operators of many potentially affected facilities will likely not require additional control measures to comply with the RACT requirements established in this final-form rulemaking, as discussed in the response to Question 24(b).

(25) List any special provisions which have been developed to meet the particular needs of affected groups or persons including, but not limited to, minorities, the elderly, small businesses, and farmers.

No special provisions were developed. In accordance with sections 172(c)(1), 182(b)(2)(A) and 184(b)(1)(B) of the CAA, this final-form rulemaking establishes VOC emission limitations and other requirements consistent with the recommendations of the 2016 O&G CTG as RACT for natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps, and centrifugal compressors in this Commonwealth. The Department's 2020 reanalysis has determined that the technically and economically feasible requirements for storage vessels, reciprocating compressors at well sites, and fugitive emissions components at well sites are RACT.

The Department has established a small business assistance program that is available to provide confidential assistance to affected small business-sized owners or operators. The owners or operators of affected oil and natural gas sources, including small business-sized entities, minorities, the elderly, and farmers are subject to the applicable requirements of this final-form rulemaking.

(26) Include a description of any alternative regulatory provisions which have been considered and rejected and a statement that the least burdensome acceptable alternative has been selected.

The Department is required under the CAA to promulgate this final-form rulemaking. No alternative regulatory provisions were considered. This final-form rulemaking is the least burdensome acceptable alternative.

(27) In conducting a regulatory flexibility analysis, explain whether regulatory methods were considered that will minimize any adverse impact on small businesses (as defined in Section 3 of the Regulatory Review Act, Act 76 of 2012), including:

(a) The establishment of less stringent compliance or reporting requirements for small businesses.

Less stringent compliance or reporting requirements are not available exclusively for small businesses. In accordance with sections 172(c)(1), 182(b)(2)(A) and 184(b)(1)(B) of the CAA, this final-form rulemaking establishes VOC emission limitations and other requirements consistent with the recommendations of the 2016 O&G CTG as RACT for natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps, and centrifugal compressors in this Commonwealth. The Department's 2020 reanalysis has determined that the technically and economically feasible requirements for storage vessels, reciprocating compressors at well sites, and fugitive emissions components at well sites are RACT. However, in this final-form rulemaking the Department also included an option for the owner or operator of a well site producing, on average, equal to or greater than 15 barrels of oil equivalent per day that also has and at least one well producing, on average, equal to or greater than 5 barrels of oil equivalent per day but less than 15 barrels of oil equivalent per day to submit to the Department a request for an exemption from the annual instrument-based LDAR requirement. The Department assumes that many of the owners or operators that would qualify for this exemption would be a small business. Owners or operators of subject small business-sized VOC emitting facilities will have to comply with the RACT requirements in this final-form rulemaking. The Department has established a small business assistance program that is available to provide confidential assistance to small businesses.

(b) The establishment of less stringent schedules or deadlines for compliance or reporting requirements for small businesses.

As explained in the response to Question 9, this final-form rulemaking is overdue to be submitted to the EPA for approval as a SIP revision. Further delay of implementation is not feasible. The Department 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 when this final-form rulemaking becomes effective upon publication in the *Pennsylvania Bulletin* as a final-form regulation. Additionally, many potentially impacted entities may already be complying with the final-form requirements as a result of implementing best management practices or already implementing instrument-based LDAR inspections. Therefore, less stringent schedules or deadlines for compliance or reporting for small businesses are not incorporated into this final-form rulemaking.

(c) The consolidation or simplification of compliance or reporting requirements for small businesses.

Recordkeeping and reporting requirements are the same for all owners or operators of affected facilities. RACT is Federally mandated. Owners or operators of subject small business-sized VOC emitting facilities will have to comply with the RACT requirements in this final-form rulemaking. The Department has established a small business assistance program that is available to provide confidential assistance to small businesses. Furthermore, for the instrument-based LDAR requirement specifically, in this final-form rulemaking the Department also included an option for the owner or operator of a well site producing, on average, equal to or greater than 15 barrels of oil equivalent per day that also has and at least one well producing, on average, equal to or greater than 5 barrels of oil equivalent per day but less than 15 barrels of oil equivalent per day to submit to the Department a request for an exemption. The Department assumes that many of the owners or operators that would qualify for this exemption would be a small business.

(d) The establishment of performance standards for small businesses to replace design or operational standards required in the regulation.

No special provisions are included for small businesses. The standards included in this final-form rulemaking are consistent with the recommendations of the 2016 O&G CTG for natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps, and centrifugal compressors in this

Commonwealth. The Department's 2020 reanalysis has determined that the technically and economically feasible requirements for storage vessels, reciprocating compressors at well sites, and fugitive emissions components at well sites are RACT. There are no provisions which allow a different type of standard for small businesses. The Department has established a small business assistance program that is available to provide confidential assistance to small businesses.

(c) The exemption of small businesses from all or any part of the requirements contained in the regulation.

This final-form rulemaking does not exempt owners or operators of affected small businesses. There are no provisions which allow a different type of standard for small businesses; however, it is likely that many small business owners or operators will have facilities below the applicability thresholds. See the response to Question 16 for more information. The Department has established a small business assistance program that is available to provide confidential assistance to small businesses. See the response to question 24(c) for more information on the small business impact.

(28) If data is the basis for this regulation, please provide a description of the data, explain in detail 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. Please submit data or supporting materials with the regulatory package. If the material exceeds 50 pages, please provide it in a searchable electronic format or provide a list of citations and internet links that, where possible, can be accessed in a searchable format in lieu of the actual material. If other data was considered but not used, please explain why that data was determined not to be acceptable.

The Department reviews its own ambient air quality ozone monitoring data for purposes of reporting to the EPA to establish attainment and maintenance of the NAAQS for all areas of this Commonwealth as discussed in the response to Question 9. The Commonwealth's Ambient Air Monitoring Network is operated in accordance with all network design, siting, monitoring and quality assurance requirements set forth in 40 CFR Part 58 (relating to ambient air quality surveillance).

The EPA's data and analysis in the Control Techniques Guidelines for the Oil and Natural Gas Industry, EPA-453/B-16-001, October 2016 is located at https://www.epa.gov/sites/default/files/2016-10/documents/2016-ctg-oil-and-gas.pdf

This final-form rulemaking uses some of the cost data and justifications provided in GP-5, GP-5A, and Exemption 38, which can be found in the TSD located at http://www.depgreenport.state.pa.us/elibrary/GetDocument?docId=19616&DocName=02%20FINAL%20TECHNICAL%20SUPPORT%20DOCUMENT%20FOR%20GP-5%20(2700-PM-BAQ0267)%20AND%20GP-5A%20(2700-PM-BAQ0268).PDF%20%20%3Cspan%20style%3D%22color%3Agreen%3B%22%3E%3C%2Fspan%3E%20%3Cspan%20style%3D%22color%3Ablue%3B%22%3E%3C%2Fspan%3E

Information on oil and natural gas well production for the 2020 reporting year can be found at the Department's Oil and Gas Well Production Report, located at https://www.depgreenport.state.pa.us/ReportExtracts/OG/OilGasWellProdReport

Air emissions for the 2020 reporting year can be found at the Department's Air Emissions Report, located at http://cedatareporting.pa.gov/reports/powerbi/Public/DEP/AQ/PBI/Air_Emissions_Report

For facility types or sources that were not reported to the Department, estimations were derived using published emissions factors or from calculated emissions factors. The Air Emission Report is compiled from the AIMS (an internal Department database) and the public-facing eFACTS database, located at https://www.ahs.dep.pa.gov/eFACTSWeb/default.aspx/default.aspx

(29) Include a schedule for review of the regulation including:

A. The length of the public comment period:	66 days
B. The date or dates on which any public meetings or hearings were held:	June 23, 24, and 25, 2020
C. The expected date of delivery of the final-form regulation:	Quarter 1, 2022
D. The expected effective date of the final-form regulation:	Upon publication in the *Pennsylvania Bulletin*
E. The expected date by which compliance with the final-form regulation will be required:	Upon publication in the *Pennsylvania Bulletin*
F. The expected date by which required permits, licenses or other approvals must be obtained:	1 year after the effective date

(30) Describe the plan developed for evaluating the continuing effectiveness of the regulations after its implementation.

The Board is not establishing a sunset date for this final-form rulemaking, since it is needed for the Department to carry out its statutory authority. The Department will closely monitor this final-form rulemaking after promulgation in the *Pennsylvania Bulletin* for its effectiveness and recommend updates to the Board as necessary.

CDL-1

RECEIVED

MAR 15 2022

Independent Regulatory Review Commission

FACE SHEET FOR FILING DOCUMENTS WITH THE LEGISLATIVE REFERENCE BUREAU

(Pursuant to Commonwealth Documents Law)

DO NOT WRITE IN THIS SPACE

Copy below is hereby approved as to form and legality. Attorney General

By: (Deputy Attorney General)

DATE OF APPROVAL

☐ Check if applicable
Copy not approved. Objections attached.

Copy below is hereby certified to be true and correct copy of a document issued, prescribed or promulgated by:

DEPARTMENT OF ENVIRONMENTAL PROTECTION
ENVIRONMENTAL QUALITY BOARD

(AGENCY)

DOCUMENT/FISCAL NOTE NO. 7-544

DATE OF ADOPTION March 15, 2022

BY

TITLE PATRICK MCDONNELL
CHAIRPERSON

EXECUTIVE OFFICER CHAIRPERSON OR SECRETARY

Copy below is hereby approved as to form and legality Executive or Independent Agencies

BY

March 10, 2022

DATE OF APPROVAL

(Deputy General Counsel)
~~(Chief Counsel – Independent Agency)~~
(Strike inapplicable title)

☐ Check if applicable. No Attorney General Approval or objection within 30 days after submission.

NOTICE OF FINAL RULEMAKING

DEPARTMENT OF ENVIRONMENTAL PROTECTION
ENVIRONMENTAL QUALITY BOARD

Control of VOC Emissions from Oil and Natural Gas Sources

25 Pa. Code Chapters 121 and 129

FINAL-FORM RULEMAKING
ENVIRONMENTAL QUALITY BOARD
[25 PA. CODE CHS. 121 AND 129]

Control of VOC Emissions from Oil and Natural Gas Sources

The Environmental Quality Board (Board) amends Chapters 121 and 129 (relating to general provisions; and standards for sources) to read as set forth in Annex A. This final-form rulemaking adds §§ 129.121—129.131 to adopt reasonably available control technology (RACT) requirements and RACT emission limitations for oil and natural gas sources of volatile organic compound (VOC) emissions. These sources include natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps, reciprocating compressors, centrifugal compressors, fugitive emissions components, and storage vessels in all segments except natural gas distribution. The Board adds definitions, acronyms and United States Environmental Protection Agency (EPA) methods to § 129.122 (relating to definitions, acronyms and EPA methods) to support the implementation of the control measures, as well as amends certain terms in and adds an abbreviation to § 121.1 (relating to definitions) to support the amendments to Chapter 129.

This final-form rulemaking will be submitted to the EPA for approval as a revision to the Commonwealth's State Implementation Plan (SIP) following promulgation of the final-form regulation.

This final-form rulemaking was adopted by the Board at its meeting on March 15, 2022.

A. *Effective Date*

This final-form rulemaking will be effective upon publication in the *Pennsylvania Bulletin*.

B. *Contact Persons*

For further information, contact Viren Trivedi, Chief, Division of Permits, Bureau of Air Quality, Rachel Carson State Office Building, P.O. Box 8468, Harrisburg, PA 17105-8468, (717) 783-9476; or Jennie Demjanick, Assistant Counsel, Bureau of Regulatory Counsel, Rachel Carson State Office Building, P.O. Box 8464, Harrisburg, PA 17105-8464, (717) 787-7060. Persons with a disability may use the Pennsylvania Hamilton Relay Service, (800) 654-5984 (TDD users) or (800) 654-5988 (voice users). This final-form rulemaking is available on the Department of Environmental Protection's (Department) web site at www.dep.pa.gov (select "Public Participation," then "Environmental Quality Board" and then navigate to the Board meeting of March 15, 2022).

C. *Statutory Authority*

This final-form rulemaking is authorized under section 5(a)(1) of the Air Pollution Control Act (APCA) (35 P.S. § 4005(a)(1)), which grants the Board the authority to adopt rules and regulations for the prevention, control, reduction and abatement of air pollution in this

Commonwealth and section 5(a)(8) of the APCA (35 P.S. § 4005(a)(8)), which grants the Board the authority to adopt rules and regulations designed to implement the provisions of the Clean Air Act (CAA) (42 U.S.C.A. §§ 7401—7671q).

D. *Background and Purpose*

The purpose of this final-form rulemaking is to implement control measures to reduce VOC emissions from oil and natural gas sources in this Commonwealth. Five air contamination source categories are affected by this final-form rulemaking: storage vessels; natural gas-driven continuous bleed pneumatic controllers; natural gas-driven diaphragm pumps; reciprocating and centrifugal compressors; and fugitive emissions components. These sources were selected by the EPA because data and information has indicated that they are significant sources of VOC emissions.

In accordance with sections 172(c)(1), 182(b)(2)(A) and 184(b)(1)(B) of the CAA (42 U.S.C.A. §§ 7502(c)(1), 7511a(b)(2)(A) and 7511c(b)(1)(B)), this final-form rulemaking establishes the VOC emission limitations and other RACT requirements consistent with the EPA's recommendations in the "Control Techniques Guidelines for the Oil and Natural Gas Industry," EPA 453/B-16-001, Office of Air Quality Planning and Standards, EPA, October 2016 (2016 O&G CTG) as RACT for these sources this Commonwealth. See 81 FR 74798 (October 27, 2016). 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." See 44 FR 53761 (September 17, 1979).

Background on the ozone National Ambient Air Quality Standards (NAAQS)

Under section 108 of the CAA (42 U.S.C.A. § 7408), the EPA is responsible for establishing National Ambient Air Quality Standards (NAAQS), or maximum allowable concentrations in the ambient air, for six criteria pollutants considered harmful to public health and the environment: ground-level ozone; particulate matter; nitrogen oxides (NO_x); carbon monoxide; sulfur dioxide; and lead. Section 109 of the CAA (42 U.S.C.A. § 7409) established two types of NAAQS: primary standards, which are limits set to protect public health; and secondary standards, which are limits set to protect public welfare and the environment. In section 302(h) of the CAA (42 U.S.C.A. § 7602(h)), effects on welfare are defined to include protection against visibility impairment and from damage to animals, crops, vegetation and buildings. The EPA established primary and secondary ground-level ozone NAAQS to protect public health and public welfare, including the environment.

On April 30, 1971, the EPA promulgated primary and secondary NAAQS for photochemical oxidants, which include ground-level ozone, under section 109 of the CAA. See 36 FR 8186 (April 30, 1971). These standards were set at an hourly average of 0.08 parts per million (ppm) total photochemical oxidants not to be exceeded more than 1 hour per year. On February 8, 1979, the EPA revised the level of the primary 1-hour ozone standard from 0.08 ppm to 0.12 ppm and set the secondary standard identical to the primary standard. See 44 FR 8202 (February 8, 1979). This revised 1-hour standard was reaffirmed on March 9, 1993. See 58 FR 13008 (March 9, 1993).

On July 18, 1997, the EPA concluded that revisions to the then-current 1-hour ozone primary standard to provide increased public health protection were appropriate to protect public health with an adequate margin of safety. Further, the EPA determined that it was appropriate to establish a primary standard of 0.08 ppm averaged over 8 hours. At this time, the EPA also established a secondary standard equal to the primary standard. See 62 FR 38856 (July 18, 1997). In 2004, the EPA designated 37 counties in this Commonwealth as 8-hour ozone nonattainment areas for the 1997 8-hour ozone NAAQS. See 69 FR 23858, 23931 (April 30, 2004). 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 1997 8-hour ozone NAAQS.

In March 2008, the EPA lowered the primary and secondary ozone NAAQS to 0.075 ppm (75 parts per billion (ppb)) averaged over 8 hours to provide greater protection for children, other at-risk populations and the environment against the array of ozone-induced adverse health and welfare effects. See 73 FR 16436 (March 27, 2008). In May 2012, the EPA designated five areas in this Commonwealth as marginal nonattainment for the 2008 ozone NAAQS with the rest of this Commonwealth designated as attainment. See 77 FR 30088, 30143 (May 21, 2012). The five designated 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. Per the 1997 ozone NAAQS, the Department must ensure that the 2008 ozone NAAQS is attained and maintained by implementing permanent and enforceable control measures. 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. Adoption of the VOC emission control measures in this final-form rulemaking would allow the Commonwealth to continue its progress in 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 as attainment. See 83 FR 25776 (June 4, 2018). The Department must ensure that the 2015 8-hour ozone NAAQS is attained and maintained by implementing permanent and federally enforceable control measures. 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. 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 2015 ozone NAAQS.

Clean Air Act (CAA) requirements: Implementation of permanent and Federally enforceable control measures for attaining and maintaining the ozone NAAQS

Section 101(a)(3) of the CAA (42 U.S.C.A. § 7401(a)(3)) provides that air pollution prevention (that is, the reduction or elimination, through any measures, of the amount of pollutants produced or created at the source) and air pollution control at its source is the primary responsibility of States and local governments. Section 110(a) of the CAA (42 U.S.C.A. § 7410(a)) gives states the primary responsibility for achieving the NAAQS in nonattainment areas and for maintaining the NAAQS in areas of the state that are in attainment. Section 110(a) of the CAA provides that each state shall adopt and submit to the EPA a plan (a SIP) for implementation, maintenance and enforcement of the NAAQS or a revision to the NAAQS promulgated under section 109(b) of the CAA. Additionally, section 110(a) provides that the plan shall contain adequate provisions to prevent emissions activity within a state from contributing significantly to nonattainment in, or interference with maintenance by, any other state with respect to a NAAQS. The entirety of the 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 and incorporated into the state's SIP, the measures of a SIP are legally enforceable under both Federal and state law.

Section 172(c)(1) of the CAA (42 U.S.C.A. § 7502(c)(1)) provides that a SIP for states with nonattainment areas must include "reasonably available control measures," including RACT, for affected sources of VOC and NO_x emissions. Upon submittal to the EPA, state regulations to control VOC emissions from affected sources are reviewed by the EPA to determine if the provisions meet the RACT requirements of the CAA and its implementing regulations designed to attain and maintain the ground-level ozone NAAQS. If the EPA determines that the provisions meet the applicable requirements of the CAA, the provisions are approved and incorporated as amendments to the state's SIP.

Section 182 of the CAA (42 U.S.C.A. § 7511a) requires that, for areas which exceed the ground-level ozone NAAQS, states must develop and implement a program that mandates certain major stationary sources develop and implement a RACT emission reduction program. Section 182(b)(2) of the CAA provides that for moderate ozone nonattainment areas, a state must revise its SIP to include RACT for sources of VOC emissions covered by a Control Techniques Guidelines (CTG) document issued by the EPA prior to the area's date of attainment of the applicable ozone NAAQS. CTG documents provide states with information about a VOC emission source category and recommendations of what the EPA considers to be RACT for the source category to attain and maintain the applicable ozone NAAQS. State air pollution control agencies may use the Federal recommendations provided in the CTG to inform their own determination as to what constitutes RACT for VOC emissions from the covered source category for subject sources located within the state. State air pollution control agencies may implement other technically-sound approaches that are consistent with the CAA requirements and the EPA's implementing regulations or guidelines.

Although the designated nonattainment areas in this Commonwealth for the 2008 and 2015 ground-level ozone NAAQS are classified as "marginal" nonattainment, this entire Commonwealth is treated as a "moderate" ozone nonattainment area for RACT purposes because

this Commonwealth is included in the Ozone Transport Region (OTR) established by operation of law under sections 176A and 184 of the CAA (42 U.S.C.A. §§ 7506a and 7511c). Section 176A grants the Administrator of the EPA the authority to establish an interstate transport region and the associated transport commission. Section 184(a) of the CAA established the OTR comprised of the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont and the Consolidated Metropolitan Statistical Area that includes the District of Columbia. 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 major stationary sources of VOC emissions in the state covered by a specific CTG and not just for those sources that are located in designated nonattainment areas of the state.

Consequently, the Commonwealth's SIP must include regulations implementing RACT requirements Statewide to control VOC emissions from the oil and natural gas sources covered by the 2016 O&G CTG. These sources, which are not regulated elsewhere in Chapter 129, were selected by the EPA because data and information has indicated that they are significant sources of VOC emissions. Significantly, this final-form rulemaking should achieve VOC emission reductions and lowered concentrations of ground-level ozone locally as well as in downwind states. Additionally, 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. This final-form rulemaking will be submitted to the EPA for approval as a revision to the Commonwealth's SIP following promulgation of the final-form rulemaking.

Need to limit VOC emissions and ground-level ozone pollution

VOC emissions are precursors to the formation of ground-level ozone, a public health, welfare and environmental hazard. However, ground-level ozone is not emitted directly to the atmosphere from any sources, including oil and natural gas sources. Ground-level ozone is formed by a photochemical reaction between emissions of VOC and NO_x in the presence of sunlight; oil and gas sources do emit these two pollutants. Ground-level ozone is a highly reactive gas, which at sufficiently high concentrations can produce a wide variety of effects harmful to public health and welfare and the environment. Additionally, climate change may exacerbate the need to address ground-level ozone. According to the EPA, atmospheric warming, as a result of climate change, may increase ground-level ozone in regions across the United States. This impact could also be an issue for states trying to comply with future ozone standards.

Ground-level ozone is a respiratory irritant and repeated exposure to high ambient concentrations of ground-level ozone pollution, for both healthy people and those with existing conditions, may cause a variety of adverse health effects, including difficulty in breathing, chest pains, coughing, nausea, throat irritation and congestion. In addition, people with bronchitis, heart disease, emphysema, asthma and reduced lung capacity may have their symptoms exacerbated by high ambient concentrations of ground-level ozone pollution. Asthma, in particular, is a significant and growing threat to children and adults in this Commonwealth.

Ozone can also cause both physical and economic damage to important food crops, forests and wildlife, as well as materials such as rubber and plastics.

The implementation of additional measures to address ozone precursor emissions impacts on air quality in this Commonwealth is necessary to protect the public health and welfare and the environment. Because VOC emissions are precursors for ground-level ozone formation, adoption of the VOC emission control measures and other requirements in this final-form rulemaking is in the public interest as it will allow the Commonwealth to continue to make substantial progress in maintaining the 1997 and 2008 NAAQS as well as attaining and maintaining the 2015 8-hour ozone NAAQS Statewide. Implementation of and compliance with the final-form VOC emission reduction measures will assist the Commonwealth in reducing the levels of ozone precursor emissions that contribute to potential nonattainment of the 2015 ozone NAAQS in downwind states. As a result, the VOC emission control measures 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 EPA's Control Techniques Guidelines for the Oil and Natural Gas Industry

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. On October 27, 2016, the EPA issued the 2016 O&G CTG which provided information to assist states in determining what constitutes RACT for VOC emissions from select oil and natural gas industry emission sources. See 81 FR 74798 (October 27, 2016). On March 9, 2018, the EPA had proposed to withdraw the 2016 O&G CTG in its entirety because the CTG had relied upon underlying data and conclusions made in the 2016 new source performance standards which the EPA was reconsidering. See 83 FR 10478 (March 9, 2018). However, on March 5, 2020, the EPA announced in the U.S. Office of Management and Budget's Spring 2020 Unified Agenda and Regulatory Plan that the EPA was no longer pursuing the action to withdraw the CTG and "the CTG will remain in place as published on October 27, 2016." See Supplemental Notice of Potential Withdrawal of the Control Techniques Guidelines for the Oil and Natural Gas Industry, https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=202004&RIN=2060-AT76.

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. In other words, 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 obliviate 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.

Findings of Failure to Submit, sanctions and deadline for action

If the EPA finds that a state has failed to submit an approvable SIP revision or has failed to implement the requirements of an approved measure in the SIP, the EPA issues a "finding of failure to submit notice." 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 National Ambient Air Quality Standards (NAAQS) and for States in the Ozone Transport Region," with an effective date of December 16, 2020. 85 FR 72963 (November 16, 2020). This Commonwealth was one of the five states issued a finding of failure to submit a SIP revision addressing the RACT requirements associated with the 2016 O&G CTG by October 27, 2018. The EPA's finding triggers the sanction clock under section 179 of the CAA (42 U.S.C.A. § 7509). However, sanctions cannot be imposed until 18 months after the EPA makes the determination, and sanctions cannot be imposed if a deficiency has been corrected within the 18-month period. Thus, the Commonwealth must submit this final-form rulemaking as a SIP revision and the EPA must determine that the submittal is complete by June 16, 2022, or sanctions could take effect.

On December 16, 2021, the EPA issued "Findings of Failure to Submit SIP Revisions for the 2016 O&G CTG for the 2015 Ozone NAAQS and for states in the OTR," with an effective date of January 18, 2022. 86 FR 71385 (December 16, 2021). This finding also triggers the sanction clock under section 179 of the CAA and the Commonwealth must submit a SIP revision and the EPA must determine that the submittal is complete by July 18, 2023.

Section 179 of the CAA authorizes the EPA to use two types of sanctions: 1) imposing what are called "2:1 offsets" on new or modified sources of emissions; and 2) withholding of certain Federal highway funds. Under section 179 of the CAA and its implementing regulations, the Administrator first imposes "2:1 offsets" sanctions for new or modified major stationary sources in the nonattainment area, and then, if the deficiency has not been corrected within 6 months, also applies Federal highway funding sanctions. See 40 CFR 52.31 (relating to selection of sequence of mandatory sanctions for findings made pursuant to section 179 of the Clean Air Act). The Commonwealth receives Federal transportation funding annually: $1.8 billion in 2020 and 2021.

Additionally, the findings trigger an obligation under section 110(c) of the CAA for the EPA to promulgate a Federal Implementation Plan (FIP) no later than 2 years after the effective date of the finding of failure to submit if the Commonwealth has not submitted, and the EPA has not approved, the required SIP submittal. If the EPA promulgates a FIP, the EPA could, in its discretion, also withhold a portion of the Department's air pollution grant funds provided for in section 105 of the CAA. However, if the Commonwealth makes the required SIP submittal and

the EPA takes final action to approve the submittal within 2 years of the effective date of these findings, the EPA is not required to promulgate a FIP.

This final-form rulemaking will address both the December 2021 and the November 2020 findings of failure to submit SIP revisions by addressing the RACT requirements associated with the 2016 O&G CTG. This final-form rulemaking is being promulgated to attain and maintain both the 2008 and the 2015 ozone NAAQS and will be submitted to the EPA for approval as a revision to the Commonwealth's SIP following promulgation. The Department is working toward completing the submittal by June 16, 2022, to avoid any sanctions.

VOC RACT requirements in this final-form rulemaking

Under section 4.2(b)(1) of the APCA (35 P.S. § 4004.2(b)(1)), the Board has the authority to adopt control measures that are more stringent than those required by the CAA if the Board determines that it is reasonably necessary for the control measure to exceed minimum CAA requirements for the Commonwealth to achieve or maintain NAAQS. To the extent that a requirement in this final-form rulemaking is more stringent than the recommendations of the 2016 O&G CTG, the more stringent requirement is 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 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, based on analysis of data available to the Department during the development of the proposed rulemaking as well as additional and updated data available during the final-form rulemaking development phase, the Department determined in three cases that RACT requirements more stringent than the recommendations in the 2016 O&G CTG are cost-effective and necessary to continue the Commonwealth's progress in attaining and maintaining the ground-level ozone NAAQS.

In the first case, the Department established in the proposed § 129.123(a)(1)(i)—(vi) (relating to storage vessels) a tiered emissions threshold based on the potential to emit for affected owners or operators of subject storage vessels to prevent backsliding on the amount of controlled emissions for storage vessels subject to the Department's Air Quality Permit Exemptions 38(b) or 38(c). The tiered emission threshold established in proposed § 129.123(a)(1)(i) and (ii) was the potential to emit 6.0 tons per year (TPY) or greater VOC emissions for a storage vessel installed at a conventional well site or at an unconventional well site before August 10, 2013. The tiered emission threshold established in proposed § 129.123(a)(1)(iii)—(vi) was the potential to emit 2.7 TPY or greater VOC emissions for a storage vessel installed at an unconventional well site on or after August 10, 2013, a storage vessel installed at a gathering and boosting station, a storage vessel installed at a natural gas processing plant and a storage vessel installed at a facility in the natural gas transmission and storage segment.

However, during the development of this final-form rulemaking, the Department performed additional analysis which shows that the 2.7 TPY VOC emission threshold for storage vessels is

RACT as it is technically and economically feasible for both potential to emit and actual emissions from all covered storage vessels at both conventional and unconventional well sites. The analysis examined the sensitivity to the initial capital cost of the control device and found that the total cost per ton of VOC reduced is below the RACT benchmark of $6,600 per ton reduced. Therefore, a single 2.7 TPY VOC emission threshold is established in § 129.123(a)(1) in this final-form rulemaking that applies to affected owners or operators of storage vessels in all segments except natural gas distribution. The tiered emissions thresholds in proposed § 129.123(a)(1)(i)—(vi) are deleted in this final-form rulemaking.

In the second case, the proposed rulemaking included an exemption in § 129.126(d) for the owner or operator of a reciprocating compressor or a centrifugal compressor located at a well site or located at an adjacent well site and servicing more than one well site. However, the Department's additional analysis, further detailed in the Regulatory Analysis Form (RAF), for this final-form rulemaking shows that it is both technically and economically feasible to require reciprocating compressor rod packing replacements every 26,000 hours of operation or every three years for reciprocating compressors located at well sites. The analysis showed that the cost-effectiveness of the rod packing replacement is highly sensitive to the emissions factor used to represent emissions from reciprocating compressors. Using the average of several emission factors from the University of Texas at Austin's Emission Factor Improvement Study, the cost per ton of VOC reduced is approximately $6,600 which is consistent with the RACT benchmark. See Harrison, M., Galloway, K., Hendler, A., Shires, T., Allen, D., Foss, M., Thomas, J., Spinhirne, J., Natural Gas Industry Methane Emission Factor Improvement Study Final Report Cooperative Agreement No. XA-83376101, Dec. 2011, https://dept.ceer.utexas.edu/ceer/GHG/files/FReports/XA_83376101_Final_Report.pdf. Therefore, the exemption in proposed § 129.126(d) for reciprocating compressors is deleted in this final-form rulemaking, meaning this final-form rulemaking requires affected owners or operators to implement reciprocating compressor rod packing replacements on reciprocating compressors located at well sites. This is a new requirement that was not included in the proposed rulemaking and was not one of the recommendations in the 2016 O&G CTG.

In the third case, the Department established a requirement in proposed § 129.127(b)(1)(ii)(A) and (B) (relating to fugitive emissions components) that affected owners or operators shall conduct monthly audible, visual, and olfactory (AVO) inspections and quarterly instrument-based leak detection and repair (LDAR) inspections of fugitive emissions components for well sites with at least one well that produces, on average, 15 barrels of oil equivalent (BOE) per day. In proposed § 129.127(b)(2), the Department also established a stepdown provision which enabled affected owners or operators to track the percentage of leaking components at each inspection and if, in two consecutive quarterly inspections, less than 2% of components were leaking emissions, the owner or operator could reduce the quarterly schedule of instrument-based LDAR inspections to semiannual.

This final-form rulemaking deletes the stepdown provisions of proposed § 129.127(b)(2)(i) and (ii). The Department's additional analysis shows that it is both technically and economically feasible for an affected owner or operator to implement instrument-based LDAR inspections at a well site with an average production of 15 BOE or more per day, with the frequency of inspections based on the production from each individual well at the well site. The owner or

operator of a well site with an average production of 15 BOE or more per day and with at least one individual well producing 15 BOE or more per day, on average, shall conduct quarterly instrument-based LDAR inspections. The owner or operator of a well site with an average of 15 BOE or more per day and at least one individual well producing 5 BOE or more but less than 15 BOE per day, on average, shall conduct annual instrument-based LDAR inspections. In this final-form rulemaking the Department also included an option for the owner or operator of a well site producing, on average, equal to or greater than 15 BOE per day, and at least one well producing, on average, equal to or greater than 5 BOE per day but less than 15 BOE per day to submit to the Department a request for an exemption from the annual instrument-based LDAR requirement. However, the request must include, among other information, a demonstration that the annual LDAR requirement is not RACT (technically or economically feasible) for the well site. If approved, this exemption request will be submitted to EPA as a revision to the Pennsylvania SIP.

In addition to the technically and economically feasible RACT requirements detailed previously, the Commonwealth is responsible for ensuring that the 2015 8-hour ozone NAAQS is attained and maintained by implementing permanent and Federally enforceable control measures. This final-form rulemaking is a primary component of the Commonwealth's strategy of ensuring that the ozone NAAQS are attained and maintained across this Commonwealth. Reductions in VOC emissions, that are achieved following the adoption and implementation of RACT VOC emission control measures for the select oil and natural gas 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 a requirement in this final-form rulemaking is more stringent than the recommendations of the 2016 O&G CTG, the more stringent requirement is 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.

VOC and methane emission reduction benefits

The Department estimates that in 2020, sources in the oil and natural gas industry emitted 24,619 TPY VOC and that implementation of the control measures in this final-form rulemaking could reduce VOC emissions by as much as 12,068 TPY. These VOC emission reductions will contribute to reductions in the formation of ground-level ozone and to achieving and maintaining the ozone NAAQS.

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 gas operations. 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 greenhouse gas emitted in the United States from human activities. The Department estimates that the oil and natural gas industry emitted 467,400 TPY methane in 2020, and that the co-benefit methane emissions reduction from this final-form rulemaking may be as much as 221,066 TPY.

Furthermore, the technically and economically feasible RACT determinations in this final-form rulemaking for storage vessels, reciprocating compressors at well sites and fugitive emissions components result in a greater reduction of VOC emissions than implementing the EPA's RACT recommendations from the 2016 O&G CTG resulting in an additional 714 TPY of VOC and 11,913 TPY of methane emissions reductions.

This final-form rulemaking is also consistent with Governor Tom Wolf's strategy to reduce emissions of methane from the oil and natural gas industry in this Commonwealth. In the strategy, announced on January 19, 2016, the Department committed to developing a regulation for existing sources to reduce leaks at existing oil and natural gas facilities. The strategy also states that the Commonwealth will reduce emissions by requiring LDAR inspections and more frequent use of leak-sensing technologies. This final-form rulemaking fulfills those parts of the strategy.

Applicability of this final-form rulemaking

This final-form rulemaking will apply statewide to owners or operators of one or more of the following oil and natural gas sources of VOC emissions which were constructed on or before the effective date of this final-form rulemaking: storage vessels in all segments except natural gas distribution, natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps, centrifugal compressors, reciprocating compressors and fugitive emission components.

The Department identified 5,039 owners or operators of approximately 31,149 facilities in this Commonwealth that may be affected by this final-form rulemaking. Approximately 3,834 of the 5,039 owners or operators may meet the definition of small business as defined in section 3 of the Regulatory Review Act (71 P.S. § 745.3). Based on information supplied by commentators, the Oil and Gas Production Report, and the Department's Air Information Management System (AIMS) database, the Department estimates there are 30,648 well sites, 486 gathering and boosting stations, 15 processing plants, and 121 transmission stations. The Department estimates that these owners or operators have at least 51 storage vessels at 18 facilities, 34,856 pneumatic controllers at 31,134 facilities, and 40 pneumatic pumps at 17 facilities that will be subject to requirements under this final-form rulemaking. The owners or operators of approximately 2,711 of 30,648 well sites will be required to implement instrument-based LDAR inspections or increase the current instrument-based LDAR inspection frequency under this final-form rulemaking. The owners or operators of approximately 263 of 486 gathering and boosting stations and 1 of 15 processing plants will be required to implement a new instrument-based LDAR inspection program or will be subject to new requirements under this final-form rulemaking.

The Department estimates that the total industry-wide cost of complying with this final-form rulemaking will be about $31.7 million per year. However, implementation of the control measures will also potentially save owners or operators in the oil and natural gas industry about $20.3 million per year due to a lower natural gas loss rate during production. This cost estimate consists of two major categories of data. The first is the annual cost to implement the RACT requirements for each affected source or affected facility as provided by the EPA in the 2016

O&G CTG and from the Department's own additional analysis. The second is the number of potentially affected facilities, which was obtained from several data sources including the Department's Oil and Gas Production Report, Environmental Facility Application Compliance Tracking System (eFACTS) database and AIMS. For the owners or operators of facilities in the oil and natural gas industry, the anticipated annual cost to comply with the requirements will be based on the type of sources present at the site, the requirements that apply to those sources, and the type of control used to comply.

Most of the anticipated costs are due to new regulatory requirements but many of the costs associated with this final-form rulemaking are from common sense practices and controls, some of which owners or operators may already be implementing due to regulatory requirements or voluntary emission reduction programs. An example includes periodic AVO inspections which can prevent natural gas releases, which in turn prevents environmental damage and significant financial losses for the operator. The Department anticipates there will be areas of cost savings that will occur as a result of this final-form rulemaking. The Department estimates a majority of small business stationary sources will be below the applicability thresholds. However, affected small businesses may incur minimal cost as a result of this final-form rulemaking; net costs of approximately $366 per facility or, on average, $2,263 per owner or operator. Overall, the Department does not anticipate that this final-form rulemaking will result in any significant adverse impact on small oil and gas operators.

Public Outreach

The Department consulted with the Air Quality Technical Advisory Committee (AQTAC) and the Small Business Compliance Advisory Committee (SBCAC) in the development of the proposed rulemaking. On December 14, 2017, the Department presented concepts to AQTAC on a potential rulemaking incorporating the 2016 O&G CTG recommendations. The Department returned to AQTAC on December 13, 2018, for an informational presentation on a preliminary draft Annex A. The proposed rulemaking was presented for a vote to AQTAC on April 11, 2019, and SBCAC on April 17, 2019. Both committees concurred with the Department's recommendation to move the proposed rulemaking forward to the Board for consideration.

The Department also conferred with the Citizens Advisory Council's (CAC) Policy and Regulatory Oversight Committee concerning the proposed rulemaking on May 7, 2019. On June 18, 2019, the full CAC concurred with the Department's recommendation to move the proposed rulemaking forward to the Board for consideration.

The Department also met with industry and environmental stakeholders to receive additional input on the proposed rulemaking. On January 24, 2019, the Department updated the Pennsylvania Grade Crude Development Advisory Council (CDAC) on the status of the proposed rulemaking. On March 21, 2019, the Department provided an informational presentation to the Oil and Gas Technical Advisory Board. On July 8, 2019, the Department met with industry stakeholders, including representatives from the Marcellus Shale Coalition, Penn Energy, Southwestern Energy, Range Resources, and Chesapeake Energy. On August 27, 2019, the Department met with environmental stakeholders, including representatives from PennFuture, Environmental Defense Fund, and the Clean Air Council.

This final-form rulemaking was presented to AQTAC on December 9, 2021, the CAC Policy and Regulatory Oversight Committee on January 12, 2022, and the full CAC on January 18, 2022, and SBCAC on January 27, 2022.

E. *Summary of Final-Form Rulemaking and Changes from Proposed to Final-Form Rulemaking*

§ 121.1. Definitions

This section contains definitions relating to the air quality regulations. This final-form rulemaking amends the terms ''CPMS—continuous parameter monitoring system,'' ''fugitive emissions'' and ''responsible official,'' and adds the abbreviation ''ppm'' to support the proposed amendments to Chapter 129.

No change is made to this section from proposed to final-form rulemaking.

§ 129.121. General provisions and applicability

Subsection (a) establishes that this final-form rulemaking will apply statewide to the owner or operator of the following: a storage vessel in all segments except natural gas distribution; natural gas-driven continuous bleed pneumatic controller; natural gas-driven diaphragm pump; reciprocating compressor; centrifugal compressor; or fugitive emissions component.

Subsection (a) is amended in this final-form rulemaking to replace "in existence" with "constructed" to clarify that the existing sources applicable under this final-form rulemaking are those that are constructed on or before the date of final publication. Subsection (a)(2) is also amended in this final-form rulemaking to add "continuous bleed" to clarify that the natural gas-driven pneumatic controllers applicable under this final-form rulemaking as a source of VOC emissions are continuous bleed.

Subsection (b) provides that compliance with the requirements of this final-form rulemaking assures compliance with the requirements of a permit issued under §§ 129.91—129.95 (relating to stationary sources of NO_x and VOCs) or §§ 129.96—129.100 (relating to additional RACT requirements for major sources of NO_x and VOCs) except to the extent the operating permit contains more stringent requirements.

No change is made to subsection (b) from proposed to final-form rulemaking.

§ 129.122. Definitions, acronyms and EPA methods

Section 129.122 adds definitions, acronyms and EPA methods applicable to this final-form rulemaking.

Subsection (a) is amended in this final-form rulemaking to make clarifying edits to the following terms: "bleed rate," "connector," "first attempt at repair," "flare," "flow line," "fugitive emissions component," "in-house engineer," "leak," "natural gas-driven continuous

bleed pneumatic controller," "natural gas processing plant," "natural gas transmission and storage segment," "TOC-total organic compounds," "VRU-vapor recovery unit" and "well site."

Subsection (a) is also amended in this final-form rulemaking to remove the following unnecessary terms: "completion combustion device," "compressor station," "continuous bleed," "fuel gas," "fuel gas system," "natural gas and oil production segment," "natural gas processing segment," "transmission compression station" and "underground storage vessel."

Subsection (a) is further amended in this final-form rulemaking to add the following terms: "UIC," "UIC class I oilfield disposal well" and "UIC class II oilfield disposal well."

Subsection (b) lists the EPA methods referenced in this final-form rulemaking. No change is made to subsection (b) from proposed to final-form rulemaking.

§ 129.123. Storage vessels

Subsection (a)(1) establishes the applicability threshold for the owner or operator of a storage vessel based on potential VOC emissions.

Subsection (a)(1) is amended in this final-form rulemaking to remove the various potential to emit amounts and installation dates included in the proposed rulemaking and to instead have this final-form rulemaking apply to owners or operators of storage vessels that have the potential to emit 2.7 TPY or greater VOC emissions. The more stringent 2.7 TPY threshold is based on the threshold used under Exemption 38(b) of the Air Quality Permit Exemptions List, which has been in effect since August 10, 2013.

Subsection (a)(2) establishes the methodology required for calculating the potential VOC emissions of a storage vessel. Subsection (a)(2)(i) is amended in this 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. Subsection (a)(2)(ii) is amended in this final-form rulemaking to replace "must" with "may" to be consistent with the stringency in the 2016 O&G CTG.

Subsection (b) establishes the compliance requirements for the owner or operator of a storage vessel to reduce VOC emissions by 95.0% by weight or greater by either routing emissions to a control device or installing a floating roof that meets the requirements of 40 CFR Part 60, Subpart Kb (relating to standards of performance for volatile organic liquid storage vessels (including petroleum liquid storage vessels) for which construction, reconstruction, or modification commenced after July 23, 1984). If the owner or operator decides to route emissions to a control device, then the cover and closed vent systems must meet the requirements in § 129.128 (relating to covers and closed vent systems).

No change is made to subsection (b) from the proposed to the final-form rulemaking.

Subsection (c) provides for exceptions to the emissions limitations and control requirements in subsection (b) based on the actual VOC emissions of a storage vessel and lists compliance demonstration requirements for owners or operators claiming an exception.

Subsection (c)(1) is amended in this final-form rulemaking to remove subparagraph (i) which had provided an exception for storage vessels with a VOC potential to emit limit of 6.0 TPY, if actual VOC emissions are less than 4.0 TPY as determined on a 12-month rolling basis. Clarifying edits were also made to the exception in subparagraph (ii) due to the removal of subparagraph (i) and to have the actual VOC emissions determined on a 12-month rolling sum instead of basis.

Subsection (c)(2)(i) is amended in this final-form rulemaking to require the calculation of actual VOC emissions once per calendar month instead of monthly beginning on or before 30 days after final publication. The monthly calculations must also be separated by at least 15 calendar days but not more than 45 calendar days instead of 30 calendar days and be based on the monthly average throughput instead of the maximum daily throughput. Subparagraph (ii) is also amended to require compliance with subsection (b) within 1 year of the date of the monthly calculation instead of 30 calendar days and to remove language that is no longer needed. Additionally, subparagraph (iii) was removed in this final-form rulemaking.

Subsection (d) lists three categorical exemptions from the emissions limitations and control requirements of subsection (b).

No change is made to subsection (d) from the proposed to the final-form rulemaking.

Subsection (e) lists the requirements for removing a storage vessel from service. No change is made to subsection (e) from the proposed to the final-form rulemaking.

Subsection (f) lists the requirements for a storage vessel returned to service. No change is made to subsection (f) from the proposed to the final-form rulemaking.

Subsection (g) references the recordkeeping and reporting requirements under § 129.130(b) (relating to recordkeeping and reporting) and § 129.130(k)(1) for owners or operators of storage vessels subject to this section. No change is made to subsection (g) from the proposed to the final-form rulemaking.

§ 129.124. Natural gas-driven continuous bleed pneumatic controllers

Subsection (a) establishes the applicability for the owner or operator of a natural gas-driven pneumatic controller based on the controller's location. Subsection (b) provides for certain exceptions related to this subsection. Subsection (c) establishes VOC emissions limitation requirements. Subsection (d) sets forth compliance demonstration requirements. Subsection (e) identifies the recordkeeping and reporting requirements.

This section is amended in this final-form rulemaking to add "continuous bleed" to all references to natural gas-driven pneumatic controllers as the Board further clarified under §

129.121 that this final-form rulemaking applies to natural gas-driven continuous bleed pneumatic controllers. Subsection (c) is also amended to clarify that only natural gas-driven continuous bleed pneumatic controllers with a natural gas bleed rate greater than 6.0 standard cubic feet per hour, at a location other than a natural gas processing plant, are required to maintain a natural gas bleed rate of less than or equal to 6.0 standard cubic feet per hour. Additionally, the Board made a revision to clarify that all natural gas-driven continuous bleed pneumatic controllers are required to maintain a natural gas bleed rate of zero standard cubic feet per hour, if they are located at a natural gas processing plant. These changes were made to ensure that the requirement is consistent with the Federal NSPS requirements. Subsections (d) and (e) are also amended to clarify that the tagging and recordkeeping and reporting requirements are only for natural gas-driven continuous bleed pneumatic controllers affected under subsection (c).

§ 129.125. Natural gas-driven diaphragm pumps

Subsection (a) establishes the applicability for the owner or operator of a natural gas-driven diaphragm pump based on the pump's location. No change is made to subsection (a) from the proposed to the final-form rulemaking.

Subsection (b) establishes the compliance requirements for the owner or operator of a natural gas-driven diaphragm pump to reduce VOC emissions by 95.0% by weight or greater. For natural gas-driven diaphragm pumps located at a well site, the owner or operator shall reduce VOC emissions by connecting the natural gas-driven diaphragm pump to a control device through a closed vent system that meets the requirements of § 129.128(b) and routing the emissions to a control device or process that meets the requirements of § 129.129 (relating to control devices). For natural gas-driven diaphragm pumps located at a natural gas processing plant, the owner or operator shall reduce VOC emissions by maintaining an emission rate of zero standard cubic feet per hour.

Subsection (b) is amended in this final-form rulemaking to remove the phrase "reduce the VOC emissions by 95.0% by weight or greater. The owner or operator shall" from subsection (b) and add it to subsection (b)(1).

Subsection (c) provides for three exceptions to the emissions limitations and control requirements in subsection (b) based on the presence of a control device, the capability of the control device, or technical infeasibility of routing emissions to the control device.

Subsection (c) is amended in this final-form rulemaking to correct references, to make a few slight formatting changes and to renumber due to those changes.

Subsection (d) provides for a categorical exemption for the owner or operator of a natural gas-driven diaphragm pump located at a well site which operates less than 90 days per calendar year, so long as the owner or operator maintains records of the operating days.

Subsection (e) establishes the compliance requirements for the owner or operator when removing a control device or process to which emissions from a natural gas-driven diaphragm pump are routed.

Subsection (f) references the recordkeeping and reporting requirements listed under § 129.130(d) and (k)(3) for owners or operators of natural gas-driven diaphragm pumps.

No changes are made to subsections (d)—(f) from the proposed to the final-form rulemaking.

§ 129.126. Compressors

Subsection (a) establishes the applicability for the owner or operator of a reciprocating compressor or centrifugal compressor based on the compressor's location.

No change is made to subsection (a) from the proposed to the final-form rulemaking.

Subsection (b) establishes the compliance requirements for the owner or operator of a reciprocating compressor choosing to either replace the rod packing or use a rod packing emissions collection system.

Subsection (b) is amended in this final-form rulemaking to delete "[e]xcept as specified in subsection (d)" from subsection (b) and to add further clarifying language to subsection paragraph (2).

Subsection (c) establishes the compliance requirements for the owner or operator of a centrifugal compressor to reduce VOC emissions by 95.0% by weight or greater by connecting to a control device through a cover and closed vent system that meets the requirements of § 129.128.

Subsection (c) is amended in this final-form rulemaking to remove a relating to reference that is no longer needed.

Subsection (d) lists a categorical exemption from the emissions limitation and control requirements of subsection (c) for centrifugal compressors located at a well site or at an adjacent well site where the compressor services more than one well site.

Subsection (d) is amended in this final-form rulemaking to remove the categorical exemption from the emissions limitation and control requirements of subsection (b) and to only allow the categorical exemption from the emissions limitation and control requirements of subsection (c) to apply to the owner or operator of a centrifugal compressor. In this final-form rulemaking, the owner or operator of a reciprocating compressor is no longer applicable under the exemption.

Subsection (e) references the recordkeeping and reporting requirements listed under § 129.130(e) and (k)(4) for owners or operators of reciprocating compressors and under § 129.130(f) and (k)(5) for owners or operators of centrifugal compressors.

No change is made to subsection (e) from the proposed to the final-form rulemaking.

§ 129.127. Fugitive emissions components

This section was renumbered in this final-form rulemaking due to the Board's addition of the average production calculation procedure for a well site in subsection (b).

Subsection (a) establishes the applicability for the owner or operator of a fugitive emissions component based on the component's location. This subsection also establishes that a fugitive emissions component at a well site with a well that produces less than 15 barrels of oil equivalent per day is not subject to this section.

Subsection (a) is amended in this final-form rulemaking to remove the phrase "with a well that produces, on average, greater than 15 barrels of oil equivalent per day" from subsection (a)(1).

Subsection (b) is added to this final-form rulemaking and establishes the average production calculation procedure for a well site.

Subsection (c), formerly subsection (b) on proposed, establishes the compliance requirements for well sites based on the gas to oil ratio (GOR) of the well.

Subsection (c) is amended in this final-form rulemaking to renumber due to formatting changes, remove the word "producing" from "requirements for a producing well site" and to remove "the owner or operator of a producing well site shall perform the following." The Board also removed "determine the GOR of the well using generally accepted methods" and replaced it with "for a well site consisting of only oil wells, the owner or operator shall" in paragraph (1). The Board added new language to paragraph (1)(i) and added "of the oil well site" and removed "the owner or operator shall" in paragraph (1)(ii). The Board also added "of the oil well site," removed "the owner or operator shall perform the following:" and added "meet the requirements of paragraph (2) or paragraph (3) based on the results of subsection (b)(1)" in paragraph (1)(iii). The Board also added new language in paragraph (2). The Board added the word" initial" before AVO inspection and removed "within 60 days after" and replaced it with "on or before" 60 days after final publication in paragraph (2)(i). The Board also added "thereafter" to indicate that the monthly inspections occur after the initial AVO inspections and extended the time period between the monthly inspections from 30 calendar days to 45 in paragraph (2)(i). Additionally, the Board added the word "initial" before LDAR inspection and removed "within 60 days after" and replaced it with "on or before" 60 days after final publication in paragraph (2)(ii). The Board also added "thereafter" to indicate that the quarterly inspections occur after the initial LDAR inspections and extended the time period between the quarterly inspections from 90 calendar days to 120 in paragraph (2)(ii).

Under subsection (c)(3), the Board also added new AVO and LDAR inspection requirements for a well site producing, on average, equal to or greater than 15 barrels of oil equivalent per day, with at least one well producing, on average, equal to or greater than 5 barrels of oil equivalent per day but less than 15 barrels of oil equivalent per day.

Under subsection (c)(4), subsection (c)(2) on proposed, the Board removed "the owner or operator of a producing well site required to conduct an LDAR inspection under paragraph

(1)(ii)(B) may track the percentage of leaking components identified during the LDAR inspection;" added "of a producing well site shall calculate the average production of the well site under subsection (b) for the previous calendar year not later than February 15 and;" added the word "required" before LDAR inspection; and removed "required under paragraph (1)(ii)(B)."

Under subsection (c)(4)(i), the Board also removed "if the percentage of leaking components is less than 2% for two consecutive quarterly inspections, the owner or operator may reduce the LDAR inspection frequency to semiannually with inspections separated by at least 120 calendar days but not more than 180 calendar days" and replaced it with "if two consecutive calculations show reduced production, the owner or operator may adopt the requirements applicable to the reduced production level."

Under subsection (c)(4)(ii), the Board also removed "if the percentage of leaking components is equal to or greater than 2%, the owner or operator shall resume the LDAR inspection frequency specified in paragraph (1)(ii)(B)" and replaced it with "if a calculation shows higher production, the owner or operator shall adopt the requirements applicable to the higher production level immediately."

Additionally, the Board added subsection (c)(5) at final-form to include an option for the owner or operator of a well site producing, on average, equal to or greater than 15 barrels of oil equivalent per day, with at least one well producing, on average, equal to or greater than 5 barrels of oil equivalent per day but less than 15 barrels of oil equivalent per day to request an exemption from the new LDAR inspection requirements of paragraph (3)(ii). Subsection (c)(5) outlines the process and requirements for submitting a written request for an exemption. The Department will submit each exemption determination to the Administrator of the EPA for approval as a revision to the SIP and the owner or operator shall bear the costs of public hearings and notifications, including newspaper notices, required for the SIP submittal. In accordance with section 7.5(b) of the APCA (35 P.S. § 4007.5(b)), the Department will also provide public notice of each SIP revision in the *Pennsylvania Bulletin*.

Subsection (d) establishes the LDAR inspection requirements for shut-in well sites.

Subsection (d), formerly subsection (c) in the proposed rulemaking, is amended in this final-form rulemaking to add the word "site" after "well" to clarify that the LDAR inspection requirements are for the well site as a whole and not an individual well. The Board also added "after the well site is put into production" in paragraph (2).

Subsection (e), formerly subsection (d) in the proposed rulemaking, establishes the compliance requirements for the owner or operator of a natural gas gathering and boosting station or natural gas processing plant to implement monthly AVO inspections and quarterly LDAR inspections.

Subsection (e) is amended in this final-form rulemaking to add the word "initial" before AVO inspection and remove "within 30 days after" and replace it with "on or before" 60 days after final publication in paragraph (1). The Board also added "thereafter" to indicate that the monthly

inspections occur after the initial AVO inspections and extended the time period between the monthly inspections from 30 calendar days to 45 in paragraph (1). Additionally, the Board added the word "initial" before LDAR inspection and removed "within 60 days after" and replaced it with "on or before" 60 days after final publication in paragraph (2). The Board also added "thereafter" to indicate that the quarterly inspections occur after the initial LDAR inspections and extended the time period between the quarterly inspections from 90 calendar days to 120 in paragraph (2).

Subsection (f), formerly subsection (e) in the proposed rulemaking, provides an option for owners or operators to request an extension of the LDAR inspection interval. No change is made to subsection (f) from the proposed to the final-form rulemaking.

Subsection (g), formerly subsection (f) in the proposed rulemaking, establishes the requirement for owners or operators to develop and maintain a written fugitive emissions monitoring plan. Subsection (g) is amended in this final-form rulemaking to correct cross references in paragraph (6)(i)—(iii). The Board also increased the one survey per year requirement from no more than 12 months apart to no more than 13 months apart in paragraph (10)(iii).

Subsection (h), formerly subsection (g) in the proposed rulemaking, establishes the verification procedures for optical gas imaging (OGI) equipment identified in the fugitive emissions monitoring plan. Subsection (h) is amended in this final-form rulemaking to correct a cross reference. The Board also removed the word "daily" and added "each day prior to use" in paragraph (2). Additionally, the Board removed "that determines how the equipment operator will perform the" and added "by using the" and "procedures" in paragraph (5). The Board also made grammatical corrections in paragraph (5)(i)—(iii).

Subsection (i), formerly subsection (h) in the proposed rulemaking, establishes the verification procedures for gas leak detection equipment using EPA Method 21 identified in the fugitive emissions monitoring plan.

Subsection (i) is amended in this final-form rulemaking to correct a cross reference.

Subsection (j), formerly subsection (i) in the proposed rulemaking, establishes the requirement for a fugitive emissions detection device to be operated and maintained in accordance with the manufacturer-recommended procedures and as required by the test method or a Department approved method. No change is made to subsection (j) from the proposed to the final-form rulemaking.

Subsection (k), formerly subsection (j) in the proposed rulemaking, establishes that the owner or operator may opt to perform the no detectable emissions procedure of section 8.3.2 of EPA Method 21. No change is made to subsection (k) from the proposed to the final-form rulemaking.

Subsection (l), formerly subsection (k) in the proposed rulemaking, establishes the requirements to repair a leak detected from a fugitive emissions component and to resurvey the fugitive emissions component within 30 days of the leak repair. The LDAR inspection

requirements in this final-form rulemaking are in line with the LDAR inspection requirements listed in 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. The EPA recognized the Commonwealth's LDAR inspection requirements in GP-5A and GP-5 as an alternative means of emission limitation (AMEL) under the reconsideration of the 2016 new source performance standards (NSPS). Since the LDAR inspection program is recognized as AMEL for the 2016 NSPS, and the requirements of the 2016 NSPS and the 2016 O&G CTG are identical, the EPA should also accept the Commonwealth's LDAR inspection program in this proposed rulemaking as AMEL. By establishing consistent LDAR inspection requirements for both new and existing sources, the Department is providing owners and operators with the ability to merge both types of sources into one LDAR inspection program.

Subsection (l) is amended in the final-form rulemaking to remove "there are no detectable emissions consistent with section 8.3.2 of EPA method 21" and replace it with "there is no visible leak image when using OGI equipment calibrated according to subsection (h)" in paragraph (4)(i). The Board also corrected a cross reference in paragraph (4)(ii). Additionally, the Board removed "there is no visible leak image when using OGI equipment calibrated according to subsection (g)" and replaced it with "there are no detectable emissions consistent with section 8.3.2 of EPA method 21" in paragraph (4)(iii).

Subsection (m), formerly subsection (l) in the proposed rulemaking, references the recordkeeping and reporting requirements for owners or operators of fugitive emissions components listed under § 129.130(g) and (k)(6). No change is made to subsection (m) from the proposed to the final-form rulemaking.

§ 129.128. Covers and closed vent systems

Subsection (a) establishes the requirements for the owner or operator of a cover on a storage vessel, reciprocating compressor or centrifugal compressor, including a monthly AVO inspection requirement. The monthly AVO inspection requirement is consistent with the AVO inspection requirement for fugitive emissions components.

Subsection (a) is amended in this final-form rulemaking to add the word "initial" before AVO inspection and to remove "within 30 days after" and replace it with "on or before" 60 days after final publication to extend the time period to conduct the initial AVO inspection in paragraph (4). The Board also added "thereafter" to indicate that the monthly inspections occur after the initial AVO inspections and extended the time period between the monthly inspections from 30 calendar days to 45 in paragraph (4). Additionally, the Board corrected a cross reference in paragraph (6).

Subsection (b) establishes the design, operation and repair requirements for the owner or operator of a closed vent system installed on a subject source.

Subsection (b) is amended in this final-form rulemaking to add the word "initial" before AVO inspection and to remove "within 30 days after" and replace it with "on or before" 60 days after final publication to extend the time period to conduct the initial AVO inspection in paragraph (2)(i). The Board also added "thereafter" to indicate that the monthly inspections occur after the initial AVO inspections and extended the time period between the monthly inspections from 30 calendar days to 45 in paragraph (2)(i). The Board also removed "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 quarterly inspections separated by at least 60 calendar days but not more than 90 calendar days" and replaced it with "during the facility's scheduled LDAR inspection in accordance with § 129.127(c)(2)(ii), (c)(3)(ii) or (e)(2)" in paragraph (2)(ii). The Board also removed "within 30 days after" and replaced it with "on or before" 60 days after final publication to extend the time period to verify the valve is maintained and extended the time period between the monthly inspections from 30 calendar days to 45 in paragraph (4)(ii)(B).

Additionally, the Board also corrected a cross reference in subsection (b) and paragraph (3).

Subsection (c) establishes the requirement that the owner or operator of a closed vent system perform a design and capacity assessment and allows either a qualified professional engineer or an in-house engineer, as defined in § 129.122, to perform the assessment as proposed in the 2016 NSPS reconsideration. No change is made to subsection (c) from the proposed to the final-form rulemaking.

Subsection (d) establishes the requirement that the owner or operator conduct a no detectable emissions test procedure under section 8.3.2 of EPA Method 21.

Subsection (d) is amended in this final-form rulemaking to remove "test procedure under Section 8.3.2 of EPA Method 21" and replace it with "inspection required under subsection (b)(2)(ii) by performing one of the following." The Board also removed "the owner or operator shall perform the following:" and replaced it with "use OGI equipment that meets § 129.127(h)" in paragraph (1). The Board also corrected a cross reference and added "the owner or operator may adjust the gas leak detection instrument readings as specified in § 129.127(k)" to paragraph (2), which was previously paragraph (1)(i) on proposed. The Board also added paragraph (3) which states "use another leak detection method approved by the department." Additionally, paragraph (1)(ii) in the proposed rulemaking is now paragraph (4) in the final-form rulemaking. The Board also removed the language that was in paragraph (2) in the proposed rulemaking.

§ 129.129. Control devices

Subsection (a) establishes the applicability for the owner or operator of a control device based on whether the control device receives a liquid, gas, vapor or fume from one or more subject storage vessel, natural gas-driven diaphragm pump or wet seal centrifugal compressor degassing system. The owner or operator must operate each control device whenever a liquid, gas, vapor or fume is routed to the device and must maintain the records under § 129.130(j) and submit reports under § 129.130(k)(9). No change is made to subsection (a) from the proposed to the final-form rulemaking.

Subsection (b) establishes the general compliance requirements for the owner or operator of a control device. Subsections (c)—(i) outline specific requirements that apply for each type of control device in addition to the general requirements in subsection (b).

Subsection (b) is amended in this final-form rulemaking to lengthen the calendar days allowed between monthly inspections of control devices in paragraph (2) from 30 calendar days in the proposed rulemaking to 45 calendar days in the final-form rulemaking. The Board also amended paragraph (4)(i) to lengthen the calendar days allowed between monthly visible emissions tests from 30 calendar days in the proposed rulemaking to 45 calendar days in this final-form rulemaking. Additionally, the Board amended paragraph (5)(ii) to remove the language "outlined in the control device inspection and maintenance plan of paragraph (1)" and replace it with "applicable to the control device if the manufacturer's repair instructions are not available."

Subsection (c) lists the compliance requirements for a manufacturer-tested combustion device, meaning a control device tested under 40 CFR 60.5413a(d) (relating to what are the performance testing procedures for control devices used to demonstrate compliance at my centrifugal compressor and storage vessel affected facilities?). The performance testing procedure in 40 CFR 60.5413a(d) is incorporated by reference in Chapter 122 (relating to national standards of performance for new stationary sources).

Subsection (c) is amended in this final-form rulemaking to add "to demonstrate that the mass content of VOC in the gases vented to the device is reduced by 95.0% by weight or greater" to paragraph (c)(1)(ii).

Subsection (d) lists the compliance requirements for an enclosed combustion device. No change is made to subsection (d) from the proposed to the final-form rulemaking.

Subsection (e) lists the compliance requirements for a flare. The flare must meet the requirements under 40 CFR 60.18(b) (relating to general control device and work practice requirements). No change is made to subsection (e) from the proposed to the final-form rulemaking.

Subsection (f) lists the compliance requirements for a carbon adsorption system.

Subsection (f) is amended in this final-form rulemaking to remove "or authorization by the Department's Bureau of Waste Management" and replace it with "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)" in paragraph (4)(i)(A). The Board also removed "or authorization by the Department's Bureau of Waste Management" and replaced it with "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)" in paragraph (4)(ii)(B). Additionally, the Board removed an unnecessary cross-reference from paragraph (4)(ii)(C).

Subsection (g) lists specific compliance requirements for a regenerative carbon adsorption system.

Subsection (g) is amended in this final-form rulemaking to change the number of calendar days in paragraph (1)(i)(A) from 30 to 45, and in paragraph (1)(i)(B) and (C) from 90 to 120.

Subsection (h) lists specific compliance requirements for a non-regenerative carbon adsorption system. No change is made to subsection (h) from the proposed to the final-form rulemaking.

Subsection (i) lists the compliance requirements for condensers and other non-destructive control devices. No change is made to subsection (i) from the proposed to the final-form rulemaking.

Subsection (j) identifies the general performance test requirements.

Subsection (j) is amended in this final-form to renumber due to formatting changes. Subsection (j) is also amended in this final-form rulemaking to remove "conduct an initial performance test within 180 days after _____ (*editor's note*: the blank refers to the effective date of this rulemaking, when published as a final-form rulemaking.) unless the owner or operator" and replace it with "the owner or operator shall do the following, as applicable" under paragraph (1). The Board also added new performance test requirements under paragraph (1)(i) — (iii).

Subsection (k) identifies the performance test method for demonstrating compliance with the control device percent VOC emission reduction requirements referenced in subsections (c), (d), (f) and (i). No change is made to subsection (k) from the proposed to the final-form rulemaking.

Subsection (l) identifies the performance test method for demonstrating compliance with the outlet concentration requirements referenced in subsections (d), (f) and (i). No change is made to subsection (l) from the proposed to the final-form rulemaking.

Subsection (m) lists the continuous parameter monitoring system requirements (CPMS) for control devices that are required to install CPMS. No change is made to subsection (m) from the proposed to the final-form rulemaking.

§ 129.130. Recordkeeping and reporting

In an effort to assist the regulated community, the Department created a separate section for all the applicable recordkeeping and reporting requirements pertaining to each regulated source.

Subsection (a) establishes the general requirement for all owners or operators of regulated sources to maintain applicable records onsite or at the nearest local field office for 5 years and for the records to be made available to the Department upon request. No change is made to subsection (a) from the proposed to the final-form rulemaking.

Subsection (b) establishes the specific recordkeeping requirements for storage vessels.

Subsection (b) is amended in this final-form rulemaking to remove "the applicable VOC emission threshold on" and replace it with "2.7 TPY determined as," as well as remove "basis"

and replace it with "sum" in paragraph (6)(iii). The Board also corrected a cross reference in paragraph (7).

Subsection (c) establishes the specific recordkeeping requirements for natural gas-driven pneumatic controllers.

Subsection (c) is amended in this final-form rulemaking to add "continuous bleed" to all references to natural gas-driven pneumatic controllers as the Board further clarified under § 129.121 that this final-form rulemaking applies to natural gas-driven continuous bleed pneumatic controllers. The Board also amended subsection (c) to add "required compliance" before "date" in paragraph 1. The Board also clarified that the recordkeeping requirements apply to natural gas-driven continuous bleed pneumatic controllers under § 129.124(c).

Subsection (d) establishes the specific recordkeeping requirements for natural gas-driven diaphragm pumps.

Subsection (d) is amended in this final-form rulemaking to add "required compliance" before "date" in paragraph 1 and to correct cross references in paragraph (7).

Subsection (e) establishes the specific recordkeeping requirements for reciprocating compressors.

Subsection (e) is amended in this final-form rulemaking to add "control device or a" to paragraph (3)(i) to further clarify where the emissions from the rod packing are being routed.

Subsection (f) establishes the specific recordkeeping requirements for centrifugal compressors. No change is made to subsection (f) from the proposed to the final-form rulemaking.

Subsection (g) establishes the specific recordkeeping requirements for fugitive emissions components.

Subsection (g) is amended in this final-form rulemaking to correct cross references and make minor edits in paragraphs (1) and (3). The Board also added a new paragraph (2) which states "for each well site, the average production calculations required under § 129.127(b)(1) and § 129.127(c)(4)." Additionally, the Board deleted the following language "for a well site subject to § 129.127(b)(1)(ii) for which the owner or operator opts to comply with § 129.127(b)(2), the calculations demonstrating the percentage of leaking components" from what was paragraph (3) in the proposed rulemaking.

Subsection (h) establishes the specific recordkeeping requirements for covers.

Subsection (h) is amended in this final-form rulemaking to make a minor grammar edit.

Subsection (i) establishes the specific recordkeeping requirements for closed vent systems.

Subsection (i) is amended in this final-form rulemaking to correct a cross reference in paragraph (2).

Subsection (j) establishes the specific recordkeeping requirements for control devices. Subsection (j) is amended in this final-form rulemaking to add "that owns or operates the control device" after the name of the company in paragraph (5)(iv)(A), as well as "and affiliation" in paragraph (5)(iv)(C).

Subsection (k) establishes the reporting requirements for all owners or operators of regulated sources to submit an initial report 1 year after the effective date of this rulemaking and subsequent annual reports, including an option to extend the due date of the initial report.

Subsection (k) is amended in this final-form rulemaking to make a few clarifying edits, renumber due to formatting changes and to add "continuous bleed" to the term natural gas-driven continuous bleed pneumatic controllers. Subsection (k)(1) is also amended to require the owner or operator of a source subject to § 129.121(a) to submit a report to the Air Program Manager of the appropriate Department Regional Office annually on or before June 1. The Board also added language to subsection (k)(1) providing for the reports to be submitted in a manner prescribed by the Department and to submit the information specified in subparagraphs (i)—(ix) for each report as applicable:

F. *Summary of Comments and Responses on the Proposed Rulemaking*

The Board adopted the proposed rulemaking at its meeting on December 17, 2019. On May 23, 2020, the proposed rulemaking was published for a 66-day comment period at 50 Pa.B. 2633 (May 23, 2020). Three public hearings were held virtually on June 23, 24, and 25, 2020. Over 100 individuals provided verbal testimony. The comment period closed on July 27, 2020. The Board received over 4,500 comments, including comments from the House and Senate Environmental Resources and Energy Committees (ERE Committees), members of the General Assembly and the Independent Regulatory Review Commission (IRRC). The majority of the commentators expressed their support of the VOC RACT requirements, noting the need to address air emissions from the oil and gas sector. The comments received on the proposed rulemaking are summarized in this section and are addressed in a comment and response document which is available on the Department's website.

IRRC states that section 2 of the Regulatory Review Act (RRA) (71 P.S. § 745.2) explains why the General Assembly felt it was necessary to establish a regulatory review process. IRRC also notes that section 2(a) of the RRA states, "[t]o 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." The vast majority of public comments are from individuals and environmental advocacy organizations in support of the proposal, but still urging the Department to adopt more restrictive requirements in this final-form rulemaking. Numerous comments were also from parties representing the oil and gas industries who 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 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.

In response, the Board and the Department have and 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 Board and the Department consistently seek 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.

1. This final-form rulemaking satisfies the criteria under the Regulatory Review Act.

a. This final-form rulemaking is supported by acceptable data.

IRRC states that Section 28 of the 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. IRRC notes that 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 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 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 gas industries in this Commonwealth.

In response, the Board notes that this final-form rulemaking does not apply to conventional oil and gas wells. Instead, 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. Additionally, the 2016 O&G CTG does not provide definitions of conventional and unconventional wells and the EPA does not establish definitions of conventional and unconventional wells in the NSPS codified at 40 CFR Part 60, Subpart OOOO (relating to standards of performance for crude oil and natural gas facilities for which construction, modification, or reconstruction commenced after August 23, 2011, and on or before September 18, 2015) or 40 CFR Part 60, Subpart OOOOa (relating to standards of performance for crude oil and natural gas facilities for which construction, modification or reconstruction commenced after September 18, 2015). Rather, the

recommendations of the 2016 O&G CTG are applicable to the control of VOC emissions from certain categories of sources used by owners or operators at both conventional and unconventional well sites in the onshore production and processing segments of the oil and natural gas industry and are not specific to the operation of a conventional well or an unconventional well.

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 website.

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 during the public comment period and from the 2020 oil and gas production data and air emissions data, which was used in a cost/benefit reanalysis (2020 reanalysis) to establish the RACT determinations in this final-form rulemaking.

b. This final-form rulemaking sufficiently protects public health, safety and welfare and this Commonwealth's natural resources.

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 (71 P.S. § 745.5b(b)(2)) 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.

In response, the Board maintains that 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 12,068 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. In addition to causing adverse human and animal health effects, the EPA has concluded that ground-level ozone affects vegetation and ecosystems, leading to reductions in agricultural crop and commercial forest yields. Furthermore, the same measures in this final-form rulemaking that control VOC emissions will also control methane emissions. When fully implemented, the control measures for VOCs are anticipated to reduce 221,066 TPY of methane as a co-benefit. Methane is a potent greenhouse gas (GHG) with a higher global warming potential than carbon dioxide (CO_2).

c. This final-form rulemaking will not have a negative economic or fiscal impact to this Commonwealth.

IRRC notes that the fiscal analysis provided by the Board estimates that the proposed regulation will cost operators approximately $35.3 million (based on 2012 dollars) without consideration of the economic benefit of the saved natural gas. The value of the saved natural gas, in 2012 dollars, will yield a savings of approximately $9.9 million, 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 this Commonwealth's oil and gas industry. IRRC agrees with the concerns raised by interested parties. In order for IRRC to determine whether this rulemaking is in the public interest, the Board must submit a revised estimate of the costs and/or savings to the regulated community using data that is current and Commonwealth industry specific.

In response, the Board provides a revised estimate of the cost and savings to the regulated community using current and Commonwealth-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 $31.7 million (2021 dollars) without consideration of the economic benefit of the saved natural gas. The value of the saved natural gas using $1.70 per thousand cubic feet (Mcf) as suggested by several commentators yields a savings of $20.3 million (2021 dollars). This results in a total net cost of $11.4 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 per Mcf during the 2020/2021 timeframe for the development of this final-form rulemaking, the impact on industry is a net benefit. Although the natural gas saved as a result of implementation of this final-form

rulemaking is significant, 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.

d. This final-form rulemaking does not conflict with existing statutes or regulations.

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, IRRC asks the Board to clarify the intent of this provision, including the problem or situation that is being addressed, why it is needed and whether the term "*in-house engineer*" should be retained or, as some commentators have suggested, be replaced with "*qualified engineer.*" IRRC also asks the Board 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. Additionally, IRRC requests that the Board include a fiscal analysis that compares the costs of using an "*in-house engineer*" versus a "*qualified professional engineer*" under these sections. Finally, IRRC states that the Board should explain how permitting an unlicensed individual to certify the system he or she may have designed is in the public interest.

In response, the Board explains that the EPA added the term "*In-house engineer*" to the Reconsideration of Subpart OOOOa 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 Board 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 Board proposed the definition given. Based on comments received, the Board 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.

e. The requirements, implementation procedures and timetables for compliance of this final-form rulemaking are reasonable.

IRRC notes that 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 or 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 or 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 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 Board to work with the regulated community to resolve issues pertaining to inspection timeframes and recommends 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.

In 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 to provide affected owners or operators sufficient time to identify and comply with the applicable requirements.

IRRC notes that 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." IRRC asks how the process to incorporate the requirements into an existing permit will 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 Board to provide a more detailed explanation of the process contained in this section and how it will be implemented.

In response, the Board explains that 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).

IRRC states that interested parties representing environmental concerns commend the Board for including alternative leak detection methods in the rulemaking. IRRC asks the Board to explain the approval process for alternative leak detection methods and whether alternative leak detection methods will be required to achieve equivalent emission reductions as currently allowed devices or methods. Additionally, IRRC asks the Board to describe the requirements and approval process for alternative leak detection methods in the Preamble to the final-form rulemaking.

In response, the Board explains that 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 (relating to monitoring and QA/QC requirements) 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.

f. This final-form rulemaking is needed.

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 operations 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 what data was used to justify the exemptions. Section 11 of the RAF also states that the Department determined that owners or 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 Board 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 what data was used to the justify the exemptions or more stringent regulations.

In response, the Board explains that 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 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 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 the inspection frequency immediately if the production calculations show an increase that is subject to more frequent inspections.

IRRC notes that representatives from the oil and gas industry observe that no analysis has been shared by the Board to support the Department's conclusion that the proposed requirements that are more stringent than the 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 this Commonwealth 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.

In response, the Board 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 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 obliviate 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 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 from the public comment period.

The quarterly LDAR inspection requirement for 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 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 Board 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 Board 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).

g. This final-form rulemaking will not negatively impact small businesses.

IRRC notes that section 5(a)(12.1) of the RRA (71 P.S. § 745.5(a)(12.1)) 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 Board 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 in the RAF. It is unclear from the RAF whether the 303 conventional wells subject to LDAR inspections are owned by small businesses. However, commentators believe most, if not all, are small businesses and strongly disagree that they will incur minimal costs as a result of the proposed rulemaking. In Section 15 of the RAF, the Board states that "further analysis is required to determine if any of the affected

sources are owned or operated by small businesses." IRRC asks how the Board determined that costs would be minimal if it is unknown whether any of the affected sources are owned by small businesses. IRRC agrees with the commentators that further analysis is needed to determine the financial impact on small businesses and asks the Board to provide the required regulatory flexibility analysis when it submits the final-form rulemaking.

In response, the Board notes that 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 Board, 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 Board 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 Board's cost analysis for quarterly LDAR was based on hiring a contractor, not purchasing equipment, hiring and training personnel, and conducting quarterly surveys.

The Board identified 5,039 client ID numbers for potentially affected owners or operators of facilities in this Commonwealth using the Department's eFACTS and AIMS databases and the NAICS codes covered by the 2016 O&G CTG. These facilities include approximately 30,648 well sites, 486 gathering and boosting stations, and 15 natural gas processing facilities in this Commonwealth. Of these potential 5,039 owners or operators, approximately 3,834 may meet the definition of small business as defined in section 3 of the RRA. However, it is possible that far fewer than the 5,039 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 Board believes are best management practices and controls that affected owners or operators may already be implementing. Additionally, the Board notes that the EPA did not distinguish between unconventional and conventional sources of emissions in the 2016 O&G CTG, and the Board does not have the authority to exempt sources from Federal requirements.

In this final-form rulemaking, the Board estimates that there are 27,260 conventional well sites with 68,519 producing conventional wells. Based on comments, the Board estimates there is approximately 1 storage vessel per well site; of these, only 6 are estimated to have VOC emissions that would require control, for a cost of approximately $185,453 (2021 dollars) and reducing 71 TPY VOC yielding $2,612 per ton reduced. For natural gas continuous bleed pneumatic controllers, based on comments and assuming those that are subject to Federal regulation are in compliance, the Board estimates there are 26,284 natural gas-driven continuous bleed pneumatic controllers that would require replacement. The cost to replace these natural gas-driven continuous bleed pneumatic controllers is estimated to be $9.1 million (2021 dollars). This would result in a VOC emission reduction of 8,336 TPY at a cost of $1,093 per ton reduced

and an estimated savings in natural gas of $14.3 million (2021 dollars), or $546 in savings per natural gas-driven continuous bleed pneumatic controller replaced.

Of the 27,260 conventional well sites, the Board estimates that 64 well sites with 289 wells would be required to implement quarterly instrument-based LDAR and 31 well sites with 970 wells would be required to implement annual instrument-based LDAR. This would cost an estimated $482,408 (2021 dollars) and result in approximately 797 TPY VOC emissions reduction or $605 per ton reduced. The Board estimates that implementation of LDAR at these well sites would result in an estimated savings in natural gas of approximately $1.4 million (2021 dollars), or $14,447 in savings per facility conducting LDAR. These cost and savings figures represent a net benefit to the conventional industry of $889,129 which implies a financial benefit, not an impact, to the conventional industry. Therefore, the Board estimates total industry costs for conventional operators will be 9.8 million (in 2021 dollars), the total industry savings will be $15.7 million, for a total net benefit of $5.9 million.

In addition, those well sites all have one or more high producing wells. High producing wells generate the most oil, which leads to higher revenue and profits. In other words, for the conventional O&G industry, only the 95 highest producing well sites out of 27,260 well sites will be subject to the LDAR requirements. To the extent that the regulated well sites, which represent the 0.3% highest producing well sites, are small businesses, the economic burden will be small because these are among the very highest revenue generating well sites. 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.

2. Act 52 of 2016 does not apply to this final-form rulemaking.

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.

In response, the Board clarifies that Act 52 does not apply to this final-form rulemaking and therefore, the Board is not required to develop a separate rulemaking and regulatory analysis form for the requirements for conventional oil and gas wells.

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.

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.

In response, the Board explains that 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 in all segments of oil and gas operations except natural gas distribution, natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps, reciprocating and centrifugal compressors, and fugitive emissions components. 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. Some conventional owners or operators may need to implement control measures if they own or operate regulated sources emitting above the VOC emission threshold. 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 did not state that this rulemaking would not apply to sources used in the conventional oil and gas industry.

In terms of whether this final-form rulemaking applies to the conventional industry, based on information from the Department's oil and gas production database, the Department estimates that approximately 95 of the 27,193 conventional well sites may need to implement a new LDAR program because those well sites produce at least 15 BOE per day with at least one well producing a minimum of 5 BOE. Based on the Department's record of when conventional well sites were drilled, the Department assumes that 67 conventional well sites are subject to Subpart OOOOa, which applies to oil and natural gas facilities constructed, modified or reconstructed after September 18, 2015. Of the approximately 95 conventional well sites that may be required to implement a new LDAR program under this final-form rulemaking, 31 would have to meet the

annual instrument-based inspection requirement and the remaining 64 would have to meet the quarterly instrument-based inspection requirement.

To the extent that this final-form rulemaking applies to the conventional industry, the owners or operators are required to confirm this applicability determination.

3. The EPA is no longer withdrawing the 2016 O&G CTG.

IRRC notes that the Board states in Section 9 of the RAF that "[e]ven though a finalized withdrawal of the 2016 O&G CTG would relieve the state of the requirement to address RACT for existing oil and 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 CAA. 42 U.S.C.A. § 7410." Commentators have asked the Board to consider another public comment period should the Federal regulations or guidelines be significantly changed before promulgation of the final-form rulemaking. IRRC asks the Board 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.

In response, the Board explains that 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 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.

4. Provisions of this final-form rulemaking were amended for clarity.

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.

In response, the Board revised the applicability section, § 129.121(a), of this final-form rulemaking by removing the phrase "in existence" and replacing it 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.

IRRC mentions that 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. IRRC requests that the Board clarify this definition because commentators have asked the Board to make clear that failure to meet a limit or standard should not be considered a "*Deviation*" if permit conditions are met.

In response, the Board explains that 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 Board 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.

IRRC suggests that for consistency, the definition of "*First attempt at repair*" should be revised to replace "organic material" with "VOCs."

In response, the Board 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 Board revised the definition from proposed to final-form rulemaking. The Board 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 Board 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.

IRRC asks what the Board means by the phrase "an engineering judgment" in the definition of "*In-house engineer*" and suggests that the Board define this term or explain why it is unnecessary to do so.

In response, the Board 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 Board 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.

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**..."

In response, the Board 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 Board further clarified the definition of "*Leak*" by adding that it is "an emission detected" and providing for methods for detecting the emission. Additionally, the Board 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."

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. In response, the Board 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.

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." In response, the Board explains that 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.

IRRC recommends that the definitions of "conventional well" and "unconventional well" as defined in 25 Pa. Code §§ 78.1 and 78a.1 be included by reference in § 129.122(a). In response, the Board 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. Since the terms were removed, the Board determined that there was no need to add the reference to the definitions in 25 Pa. Code §§ 78.1 and 78a.1. As explained in other responses, the Board is not regulating conventional or unconventional wells in this final-form rulemaking. Additionally, the Board revised § 129.123(a) to reflect the Department's analysis which shows that it is cost-effective for the owner or operator of a storage vessel to control by 95% those storage vessels with a potential to emit 2.7 TPY or greater VOC emissions and that it is not necessary to include requirements based on where that storage vessel is installed.

IRRC notes that § 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. However, commentators stated that use of past maximum averages that are no longer representative of the facilities throughputs will not provide an accurate emissions profile to justify the proposed compliance requirements. IRRC requests that the Board explain its rationale for and the reasonableness of the provision relating to historical data.

In response, the Board 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.

IRRC notes that § 129.123(a)(2)(ii) provides that the determination of potential VOC emissions 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 Board explain in the Preamble to the final-form regulation whether state permitting programs such as GP-5, GP-5A, and Exemption 38 of the Air Quality Permit Exemptions list will be considered satisfactory for this requirement.

In response, the Board explains that 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 the EPA's recommendation, nor the Board'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.

IRRC notes that § 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 Board explain the intent of the proposed language and revise it if necessary. IRRC also notes that similar language appears in §§ 129.125(b)(1)(ii), 129.126(c)(2), 129.128(a)(2)(ii) and 129.128(b)(1).

In response, the Board explains that the requirements for "processes" can be found in § 129.129(d) of this final-form rulemaking. In particular, § 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 Board retained this requirement in this final-form rulemaking.

IRRC notes that § 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. In response, the Board explains that 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, and is not overly burdensome.

IRRC asks the Board to specify a timeframe in § 129.127(a) 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. In response, the Board added a calculation procedure to estimate the average production of a well site in § 129.127(b) of this final-form rulemaking. The owner or operator of a 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.

IRRC asks the Board to clarify whether the adjustments to the LDAR inspection intervals in proposed § 129.127(b) are required under proposed § 129.127(e). In response, the Board explains that 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 § 129.127(e) on proposed.

IRRC notes that § 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.

In response, the Board notes that proposed § 129.127(e) is now § 129.127(f) in this final-form rulemaking. The Board 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.

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 Board to clarify the intent of this subparagraph and revise, if necessary. In response, the Board 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.

IRRC asks the Board to delete the reference to subsection (c)(l)(ii) in § 129.129(k)(5) since subsection (c)(l)(ii) does not require or refer to a weight-percent VOC emission reduction requirement. In response, the Board did not remove the reference to subsection (c)(l)(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.

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.

In response, the Board explains that 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.

IRRC notes that § 129.130(d)(I) requires the records for each natural gas-driven diaphragm pump to include the date, location and manufacturer specifications for each pump. IRRC requests that the Board revise this section to clarify the date referenced. In response, the Board revised the language of § 129.130(d)(1) from proposed to final-form rulemaking to clarify that the date is the "required compliance" date.

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 should be revised for consistency to account for leaks that are detected with OGI equipment. In response, the Board did not revise this subsection and explains that the instrument reading for OGI equipment is a visible leak.

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. IRRC recommends that the Board either include in the chart as described in the RAF for the final-form regulation or remove this statement if one does not exist.

In response, the Board revised the response to Question 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 Question 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 Question 23 still provides a breakdown of the total costs to the industry. Additionally, the Board removed the reference in the response to Question 15 to the table in the response to Question 23 as suggested.

IRRC recommends that in § 121.1, under the term "*Responsible official*" subparagraph (iv) clause (B) after "or Chapter 129," the Board should include parentheses containing a description of what the chapter is relating to. In response, the Board 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.

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, IRRC recommends deleting "section" replacing it with "chapter" in the definitions for "*Deviation*" and "*TOC –Total organic compounds*."

In response, the Board 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.

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*." IRRC suggests that these terms and definitions be deleted. In response, the Board agrees with this suggestion and deleted these terms from this final-form rulemaking.

IRRC recommends that for consistency the Board include a reference to the recordkeeping and reporting requirements found in § 129.130(i)(2) in § 129.128(d). In response, the Board 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).

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." In response, the Board agrees with this recommendation and revised § 129.130(k)(1)(ii) to replace "can" with "may."

5. The Board has fulfilled its duties as a trustee as set forth in Article I, Section 27 of the Pennsylvania Constitution.

Commentators, including members of the General Assembly, referenced the Commonwealth's Environmental Rights Amendment in Article I, Section 27 of the Pennsylvania Constitution, Pa.Const. Art. I, § 27, and note that it 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." They commented that the Board and the Department must satisfy their constitutional responsibilities.

In response, the Board 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 the rights of this Commonwealth's residents 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 and other benefits, the Department is satisfied that its Article I, Section 27 obligations have been met with development of this final-form rulemaking.

G. *Benefits, Costs and Compliance*

Benefits

The Department estimates that implementation of the proposed control measures could reduce VOC emissions by as much as 12,068 TPY. Approximately 714 TPY of these VOC emission reductions are due to the RACT determinations by the Department that reduce emissions over and above the EPA's RACT recommendations. 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 by reducing the amount of ground-level ozone air pollution resulting from these sources.

Adoption of the VOC emission control measures and other requirements in this final-form rulemaking 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 proposed VOC emission reduction measures would also assist the Commonwealth in reducing the levels of ozone precursor emissions that contribute to potential nonattainment of the 2015 ozone NAAQS. As a result, the VOC emission control measures 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. Achieving and maintaining the ground-level ozone NAAQS provides healthful air quality which attracts and retains residents and industry, supports healthy environmental conditions for agriculture and the ecosystems of this Commonwealth, and reduces transport of VOC emissions and ground-level ozone to downwind states.

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 gas operations. 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. The control measures implemented for VOC emissions simultaneously control methane emissions and could reduce methane emissions by as much as 221,066 TPY with 41 TPY from the installation of controls for storage vessels, 175,171 TPY from pneumatic controllers, 135 TPY from pneumatic pumps, 1,172 TPY from replacement of reciprocating compressor rod packings at well sites, and 44,547 TPY from fugitive emissions components through the performance of LDAR inspections. Approximately 11,913 TPY of the methane emission reductions are due to the technically and economically feasible VOC RACT determination by the Department that is over and above the reductions from EPA's VOC RACT recommendations.

Additionally, as previously discussed, this final-form rulemaking is consistent with Governor Tom 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 greenhouse gas emitted in the United States from human activities. According to Federal estimates, the natural gas and oil industries account for a quarter of United States methane emissions. In addition to climate change impacts, methane and VOC emissions have harmful effects on air quality and human health. Thus, reducing methane leaks from oil and natural gas sources is essential to reducing global greenhouse gas emissions and protecting public health.

Adverse health and welfare effects of ground-level ozone on humans, animals, and the environment

Exposure to high levels of ground-level ozone air pollution correlates to increased respiratory disease and higher mortality rates. Ozone can inflame and damage the lining of the lungs. Within a few days, the damaged cells are shed and replaced. Over a long time period, lung tissue may become permanently scarred, resulting in permanent loss of lung function and a lower quality of life. When ambient ozone levels are high, more people with asthma have attacks that require a doctor's attention or use of medication. Ozone also makes people more sensitive to allergens including pet dander, pollen and dust mites, all of which can trigger asthma attacks. The EPA has concluded that there is an association between high levels of ambient ozone and increased hospital admissions for respiratory ailments including asthma. While children, the elderly and those with respiratory problems are most at risk, even healthy individuals may experience increased respiratory ailments and other symptoms when they are exposed to high levels of ambient ozone while engaged in activities that involve physical exertion. High levels of ground-level ozone also affect animals including pets, livestock and wildlife, in ways similar to humans.

In addition to causing adverse human and animal health effects, the EPA has concluded that ground-level ozone affects vegetation and ecosystems, leading to reductions in agricultural crop and commercial forest yields. Ozone damage to the foliage of trees and other plants can decrease the aesthetic value of ornamental species used in residential landscaping, as well as the natural beauty of parks and recreation areas. Through deposition, ground-level ozone also contributes to pollution in the Chesapeake Bay. These effects can have adverse impacts including loss of species diversity and changes to habitat quality and water and nutrient cycles. The implementation of additional measures to address ground-level ozone precursor emissions impacts on air quality in this Commonwealth is necessary to protect the public health and welfare and the environment.

Adverse effects of ground-level ozone on this Commonwealth's economy

The economic value of the impacts of ground-level ozone on this Commonwealth's farm crops, fruit industries, forests, parks and timber due to high concentrations of ground-level ozone can be calculated, through things such as crop yield loss from both reduced growth and smaller, lower-quality seeds and tubers with less oil or protein. If ozone episodes last a few days, visible injury to some leaf crops, including lettuce, spinach and tobacco, as well as visible injury to the

leaves of ornamental plants, including grass, flowers and shrubs, can appear. Other types of welfare loss may not be quantifiable, such as the reduced aesthetic value of trees growing in heavily visited parks.

Information about the economic benefit of the agricultural industry to this Commonwealth is provided by the Pennsylvania Department of Agriculture. In 2019, this Commonwealth had more than 53,157 farms occupying more than 7.3 million acres of farmland which account for 75,475 direct jobs and $9.0 billion in direct economic output from production agriculture. In addition to production agriculture, the industry also raises revenue and supplies jobs through support services such as food and beverage processing, marketing, transportation, farm equipment, forestry production and processing, and landscaping. In total, production agriculture and agribusiness support 232,463 direct jobs and contribute $59.7 billion to this Commonwealth's economy. The agriculture industry, including forestry, contributes 593,600 total direct, indirect, and induced jobs and $132.5 billion in total direct, indirect, and induced output. Reducing ground-level ozone concentrations will serve to protect agricultural yield and reduce losses to production agriculture and agribusiness in this Commonwealth.

This Commonwealth is forested over a total of 16.6 million acres, which represents 58% of its land area. Federal, state, and local government hold 5.1 million acres in public ownership, with the remaining 11.7 million acres in private ownership. The forest product industry only owns 0.4 million acres of forest, with the remainder held by an estimated 750,000 individuals, families, partnerships, or corporations. This Commonwealth leads the Nation in volume of hardwood with over 120.5 billion board feet of standing sawtimber. Recent data shows that the state's forest growth-to-harvest rate is better than 2 to 1. As the leading producer of hardwood lumber in the United States, this Commonwealth also leads in the export of hardwood lumber, exporting nearly $463 million in 2019, and over $1.1 billion in lumber, logs, furniture and paper products to more than 70 countries around the world. Production is estimated at 1 billion board feet of lumber annually. This vast renewable resource puts the hardwoods industry at the forefront of manufacturing in this Commonwealth. Forestry production and processing account for 69,437 direct jobs and $21.8 billion in direct economic output and direct value added to this Commonwealth's economy. Reducing ground-level ozone concentrations will serve to protect the Commonwealth's position as the leader of growing volume of hardwood species and producer of hardwood lumber in Nation.

The Department of Conservation and Natural Resources (DCNR) is the steward of the State-owned forests and parks. DCNR awards millions of dollars in construction contracts each year to build and maintain the facilities in its parks and forests. Hundreds of concessions throughout the park system help complete the park experience for both state and out-of-state visitors. State forests, parks and game lands make up 3.9 million acres of forest land. This Commonwealth's 2.2 million-acre state forest system, found in 48 of this Commonwealth's 67 counties, comprises 13% of the forested area in this Commonwealth. The state forest represents one of the largest expanses of public forestland in the eastern United States, making it a priceless public asset. Ozone damage to the foliage of trees and other plants can decrease the aesthetic value of ornamental species used in residential landscaping, as well as the natural beauty of parks and recreation areas. However, the effects of the reduced aesthetic value of trees in heavily visited

parks may not be quantifiable. Reducing the concentration of ground-level ozone will help maintain the benefits to this Commonwealth's economy due to tourism.

In sum, adoption and implementation of the VOC emission control measures in this final-form rulemaking for the owners or operators of certain sources in the oil and natural gas industry is reasonably necessary to allow the Commonwealth to continue its progress in attaining and maintaining the public health-based and welfare-based 8-hour ozone NAAQS and to satisfy related CAA requirements. The VOC emission reductions achieved through implementation of the regulatory requirements established in this final-form rulemaking and the associated decrease in formation of ground-level ozone will benefit the health and welfare of the residents of this Commonwealth as well as the health of tourists and visitors, with improved ambient air quality and healthier environments. The decrease in ground-level ozone formation will also benefit farmers, loggers, hunters and outdoor enthusiasts and the numerous animals, crops, vegetation and natural areas of this Commonwealth. The agriculture and timber industries and related businesses will benefit directly from reduced economic losses that result from ozone damage to crops and timber. Likewise, the natural areas and infrastructure within this Commonwealth and downwind states will benefit directly from reduced environmental damage and economic losses due to ground-level ozone.

Additionally, this final-form rulemaking may create economic opportunities for VOC emission control technology innovators, manufacturers, and distributors through an increased demand for new or improved equipment. In addition, the owners or operators of regulated facilities may be required to install and operate an emissions monitoring system or equipment necessary for an emissions monitoring method to comply with this final-form rulemaking, thereby creating an economic opportunity for the emissions monitoring industry.

Monetized public health benefits of attaining the 2015 ozone NAAQS

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 Department is not stating that these estimated monetized health benefits would all be the result of implementing the RACT measures, but the EPA estimates are indicative of the benefits to Commonwealth residents of attaining the 2015 8-hour ozone NAAQS through the implementation of a suite of measures to control VOC emissions in the aggregate from different source categories.

Compliance costs

Compliance costs will vary for each facility depending on which compliance option is chosen by the owner or operator. The costs were adjusted to 2021 dollars using the CPI adjustment using May as the reference month.

The annualized cost of $25,194 in 2012 dollars to control one storage vessel with a control device is based on the data in the 2016 O&G CTG, which is equivalent to $30,909 in 2021 dollars. The Department's additional analysis demonstrated that the annualized cost of routing

emissions from a storage vessel to a control device ranges from $9,501 to $22,871 in 2021 dollars based on the data in the Department's Technical Support Document (TSD) for the General Plan Approval/General Operating Permit BAQ-GPA/BP-5 (GP-5) for natural gas compression stations, processing plants, and transmission stations and the General Plan Approval/General Operating Permit BAQ-GPA/GP-5A (GP-5A) for unconventional natural gas well site operations and remote pigging stations. The Department used the EPA's annualized cost estimate of $30,909 in 2021 dollars to be conservative when estimating the effect on the oil and natural gas industry. The Department identified a total of 31,270 facilities with storage vessels from the Department's databases. There are 18 facilities with 51 storage vessels that emit 2.7 TPY or more of VOC with a total industry cost of $556,359 per year. The Department estimates that implementation of the final-form control measures could reduce VOC emissions by as much as 282 TPY from the installation of controls for storage vessels. This results in an average cost of approximately $1,973 per ton of VOC emissions reduced per year. Approximately 18 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 annualized cost of $296 in 2012 dollars to replace a continuous high-bleed pneumatic controller with a low-bleed pneumatic controller is based on the data in the 2016 O&G CTG, which is $347 per year in 2021 dollars. The Department identified a total of 31,134 facilities with an estimated 34,856 affected pneumatic controllers. The total industry cost is $12,085,272 per year. Using the EPA's estimate of natural gas emissions per controller and this Commonwealth's average natural gas composition, the Department estimates that implementation of the final-form control measures could reduce VOC emissions by as much as 9,102 TPY from pneumatic controllers located at these facilities. The requirements for natural gas-driven continuous bleed pneumatic controllers are identical to the EPA's 2016 O&G CTG recommendation which the EPA has determined to be cost-effective.

The annualized cost of $774 in 2012 dollars to control one natural gas-driven diaphragm pump is based on the data in the 2016 O&G CTG, which is $907 per year in 2021 dollars. The Department identified 17 well sites with an estimated 40 affected diaphragm pumps. The total industry cost is $36,265 per year. Using the EPA's estimate of natural gas emissions per pump, this Commonwealth'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 the EPA's 2016 O&G CTG recommendation which the EPA has determined to be cost-effective.

The annualized cost of $782 in 2021 dollars to replace the rod packings for one reciprocating compressor at a well site is based on the data in the Department's TSD for 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. 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 the EPA's RACT recommendations.

There are an estimated 423 gathering and boosting stations with at least 527 reciprocating compressors and an estimated 11 natural gas processing plants with at least 30 reciprocating compressors. The Department assumes that the owners or operators of these facilities are complying with the requirements of Subparts OOOO and OOOOa as none of these facilities were constructed prior to 2011. Therefore, they would have to do nothing further under this final-form rulemaking.

The annualized cost of $2,553 in 2012 dollars to control one wet seal degassing system for a centrifugal compressor is based on the data in the 2016 O&G CTG which is $2,990 in 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. If one or more of these compressors is a wet seal centrifugal compressor, the owner or operator would be subject to the applicable wet seal degassing system VOC emission control requirements of this final-form rulemaking. VOC emissions would be reduced by 95% at a cost of $2,990 per year per wet seal degassing system in 2021 dollars. The requirements for wet seal centrifugal compressor degassing systems are identical to the EPA's 2016 O&G CTG recommendation which the EPA has determined to be cost effective.

In the 2016 O&G CTG, the annualized cost in 2012 dollars to conduct annual LDAR inspections at a well site is $1,318, to conduct quarterly LDAR inspections at a well site is $4,220, and to conduct quarterly LDAR inspections at a gathering and boosting station is $25,049. These costs are $1,554, $4,937, and $29,307 in 2021 dollars, respectively. The Department's TSD for GP-5 and GP-5A also contained cost data for implementing LDAR programs, which are more conservative than the annual costs in the EPA's 2016 O&G CTG as the costs in the TSD are based on a contractor's quote. The annual cost for implementing an annual LDAR inspection program is $1,681 in 2021 dollars at a well site. The annual cost, in 2021 dollars, for implementing a quarterly LDAR inspection program is $6,723 at a well site and $13,447 for a gathering and boosting station or natural gas processing plant. It should be noted that the estimates for well sites assumed there are 1,000 components to monitor and that for gathering and boosting stations or natural gas processing plants there are 2,000 components to monitor. The EPA's assumptions for the number of components to monitor are between 127 and 671 for well sites and 3,091 for gathering and boosting stations or processing plants.

The Department identified a total of 31,149 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 cost of $1.70 per Mcf of natural gas in 2021 dollars.

There are approximately 37 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 $62,192 reducing VOC emissions by approximately 136 TPY for a total cost per ton of VOC reduced of $457. The 136 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 the EPA's RACT recommendations.

There are approximately 1,525 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 $10,253,276 reducing VOC emissions by approximately 1,163 TPY. The Department has determined this requirement to be cost-effective since the annualized cost is only $6,723 per year. Approximately 291 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 the 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 reducing VOC emissions by approximately 314 TPY. The Department has determined this requirement to be cost-effective since the incremental annualized cost is only $5,042 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 the 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 reducing VOC emissions by approximately 517. The Department has determined this requirement to be cost-effective since the incremental annualized cost is only $3,361 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 the 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. Using the EPA's estimate of fugitive natural gas emissions per gathering and boosting station and this Commonwealth'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 the EPA's 2016 O&G CTG recommendation which the 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 the EPA's 2016 O&G CTG recommendation which the 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 reducing VOC emissions by approximately 12 TPY for a total cost per ton of VOC reduced of $1,121.

The total industry cost is approximately $18,576,941 in 2021 dollars. The Department estimates that the final-form control measures could reduce VOC emissions by 2,616 TPY or more from the subject fugitive emissions components due to implementation of the required LDAR inspection program at these facilities.

Based on the above compliance costs, and the number of applicable sources, the Department estimates that this final-form rulemaking will cost affected owners or operators approximately $31.7 million (based on 2021 dollars) per year without consideration of the economic benefit of the saved natural gas. The value of the saved natural gas, assuming a natural gas price of $1.70 per Mcf in 2021 dollars, yields a savings of approximately $20.3 million, resulting in a total net cost of approximately $11.4 million for this final-form rulemaking.

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 GP-5 and GP-5A, as detailed in the response to Question 17. 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.

The VOC RACT requirements established by this final-form rulemaking will not require the owner or operator to obtain an operating permit or submit an application for amendments to an existing operating permit. These requirements will be incorporated into the existing operating permit when the permit is renewed, if less than 3 years remain in the permit term, as specified under 25 Pa. Code § 127.463(c) (relating to operating permit revisions to incorporate applicable standards). 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 this final-form rulemaking, as required under § 127.463(b).

Compliance assistance plan

The Department will continue to educate and assist the public and the regulated community in understanding the requirements and how to comply with them throughout the rulemaking process. 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 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.

Paperwork requirements

The recordkeeping and reporting requirements for owners and operators of applicable sources under this final-form rulemaking are minimal because the records required align with the records already required to be kept for emission inventory purposes and for other Federal and State requirements. To minimize the burden of these requirements, the Department allows electronic submission of most planning, reporting and recordkeeping forms required by this final-form rulemaking.

H. *Pollution Prevention*

The Pollution Prevention Act (42 U.S.C.A. §§ 13101—13109) established a National policy that promotes pollution prevention as the preferred means for achieving state environmental protection goals. The Department encourages pollution prevention, which is the reduction or elimination of pollution at its source, through the substitution of environmentally friendly materials, more efficient use of raw materials and the incorporation of energy efficiency strategies. Pollution prevention practices can provide greater environmental protection with greater efficiency because they can result in significant cost savings to facilities that permanently achieve or move beyond compliance.

This final-form rulemaking helps to ensure that the residents of this Commonwealth benefit from reduced emissions of VOC and methane from regulated sources. Reduced levels of VOC and methane promote healthful air quality and ensure the continued protection of the environment and public health and welfare.

I. *Sunset Review*

This Board is not establishing a sunset date for this final-form rulemaking because it is needed for the Department to carry out its statutory authority. If published as a final-form rulemaking in the *Pennsylvania Bulletin*, the Department will closely monitor its effectiveness and recommend updates to the Board as necessary.

J. *Regulatory Review*

Under section 5(a) of the Regulatory Review Act (71 P.S. § 745.5(a)), on April 27, 2020, the Department submitted a copy of the notice of proposed rulemaking, published at 50 Pa.B. 2633, to IRRC and to the Chairpersons of the House and Senate Environmental Resources and Energy Committees for review and comment.

Under section 5(c) of the Regulatory Review Act, IRRC and the House and Senate Committees were provided with copies of the comments received during the public comment period, as well as other documents when requested. In preparing this final-form rulemaking, the Department has considered all comments from IRRC, the House and Senate Committees and the public.

Under section 5.1(j.2) of the Regulatory Review Act (71 P.S. § 745.5a(j.2)), on DATE, 2022, this final-form rulemaking was deemed approved by the House and Senate Committees. Under section 5.1(e) of the Regulatory Review Act, IRRC met on DATE, 2022, and approved this final-form rulemaking.

K. *Findings of the Board*

The Board finds that:

(1) Public notice of proposed rulemaking was given under sections 201 and 202 of the act of July 31, 1968 (P.L. 769, No. 240) (45 P.S. §§ 1201 and 1202), known as the Commonwealth Documents Law, and regulations promulgated thereunder at 1 Pa. Code §§ 7.1 and 7.2 (relating to notice of proposed rulemaking required; and adoption of regulations).

(2) At least a 60-day public comment period was provided as required by law and all comments were considered.

(3) This final-form rulemaking does not enlarge the purpose of the proposed rulemaking published at 50 Pa.B. 2633.

(4) These regulations are reasonably necessary and appropriate for administration and enforcement of the authorizing acts identified in section C of this order.

(5) These regulations are reasonably necessary to attain and maintain the ozone NAAQS and to satisfy related CAA requirements.

L. *Order of the Board*

The Board, acting under the authorizing statutes, orders that:

(a) The regulations of the Department, 25 Pa. Code Chapters 121 and 129, are amended by amending § 121.1 and adding §§ 129.121—129.131 to read as set forth in Annex A, with ellipses referring to the existing text of the regulations.

(*Editor's Note*: Proposed § 129.124 was renamed from natural gas-driven pneumatic controllers to natural gas-driven continuous bleed pneumatic controllers.)

(b) The Chairperson of the Board shall submit this final-form regulation to the Office of General Counsel and the Office of Attorney General for review and approval as to legality and form, as required by law.

(c) The Chairperson of the Board shall submit this final-form regulation to IRRC and the House and Senate Committees as required by the Regulatory Review Act (71 P.S. §§ 745.1—745.14).

(d) The Chairperson of the Board shall certify this final-form regulation and deposit it with the Legislative Reference Bureau as required by law.

(e) This final-form regulation will be submitted to the EPA as a revision to the Commonwealth's SIP.

(f) This final-form regulation shall take effect immediately upon publication in the *Pennsylvania Bulletin*.

PATRICK McDONNELL,
Chairperson

Annex A
TITLE 25. ENVIRONMENTAL PROTECTION
PART I. DEPARTMENT OF ENVIRONMENTAL PROTECTION
Subpart C. PROTECTION OF NATURAL RESOURCES
ARTICLE III. AIR RESOURCES
CHAPTER 121. GENERAL PROVISIONS

§ 121.1. Definitions.

The definitions in section 3 of the act (35 P.S. § 4003) apply to this article. In addition, the following words and terms, when used in this article, have the following meanings, unless the context clearly indicates otherwise:

* * * * *

CPMS—Continuous parameter monitoring system—**[For purposes of Chapter 127, Subchapter E, all of the]** **The** equipment necessary to meet the data acquisition and availability requirements to monitor process and control device operational parameters (for example, control device secondary voltages and electric currents), and other information (for example, gas flow rate, O_2 or CO_2 concentrations), and to record average operational parameter values on a continuous basis.

* * * * *

Fugitive emissions—**[For purposes of Chapter 127 (relating to construction, modification, reactivation and operation of sources), those emissions]** **Emissions** which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening.

* * * * *

PM-10—Particulate matter with an effective aerodynamic diameter of less than or equal to a nominal 10 micrometer body as measured by the applicable reference method or an equal method.

***ppm*—Parts per million.**

ppmvd—Parts per million dry volume.

* * * * *

Responsible official—An individual who is:

(i) For a corporation: a president, secretary, treasurer or vice president of the corporation in charge of a principal business function, or another person who performs similar policy or decision making functions for the corporation, or an authorized representative of the person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for, or subject to, a permit and one of the following applies:

(A) The facility employs more than 250 persons or has gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars).

(B) The delegation of authority to the representative is approved, in advance, in writing, by the Department.

(ii) For a partnership or sole proprietorship: a general partner or the proprietor, respectively.

(iii) For a municipality, State, Federal or other public agency: a principal executive officer or ranking elected official. A principal executive officer of a Federal agency includes the chief executive officer having responsibility for the overall operations of a principal geographic unit of the agency—for example, a regional administrator of the EPA.

(iv) For affected sources:

(A) The designated representatives in so far as actions, standards, requirements or prohibitions under Title IV of the Clean Air Act (42 U.S.C.A. §§ 7641 and 7642) or the regulations thereunder are concerned.

(B) The designated representative or a person meeting provisions of subparagraphs (i)—(iii) for any other purpose under 40 CFR Part 70 (relating to operating permit programs) **[or]**, Chapter 127 (relating to construction, modification, reactivation and operation of sources) **or Chapter 129**.

* * * * *

CHAPTER 129. STANDARDS FOR SOURCES

Control of VOC Emissions from Oil and Natural Gas Sources

(*Editor's Note*: Sections 129.121—129.130 are proposed to be added and are printed in regular type to enhance readability.)

§ 129.121. General provisions and applicability.

(a) *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 oil and natural gas sources of VOC emissions in this Commonwealth which were ~~in existence~~ **CONSTRUCTED** on or before _____(*Editor's Note*: The blank refers to the effective date of this rulemaking, when published as a final-form rulemaking.):

(1) Storage vessels in all segments except natural gas distribution.

(2) Natural gas-driven **CONTINUOUS BLEED** pneumatic controllers.

(3) Natural gas-driven diaphragm pumps.

(4) Reciprocating compressors and centrifugal compressors.

(5) Fugitive emissions components.

(b) *Existing RACT permit.* Compliance with the requirements of this section and §§ 129.122—129.130 assures compliance with the requirements of a permit issued under §§ 129.91—129.95 (relating to stationary sources of NO_x and VOCs) or §§ 129.96—129.100 (relating to additional RACT requirements for major sources of NO_x and VOCs) to the owner or operator of a source subject to subsection (a) prior to _____(*Editor's Note*: The blank refers to the effective date of this rulemaking, when published as a final-form rulemaking.), to control, reduce or minimize VOC emissions from oil and natural gas sources listed in subsection (a), except to the extent the operating permit contains more stringent requirements.

§ 129.122. Definitions, acronyms and EPA methods.

(a) *Definitions and acronyms.* The following words and terms, when used in this section, §§ 129.121 **(RELATING TO GENERAL PROVISIONS AND APPLICABILITY)** and 129.123—129.130, have the following meanings, unless the context clearly indicates otherwise:

AVO—Audible, visual and olfactory.

Bleed rate—The rate in standard cubic feet per hour at which natural gas is continuously vented from a **NATURAL GAS-DRIVEN CONTINUOUS BLEED** pneumatic controller.

Centrifugal compressor—

(i) A machine for raising the pressure of natural gas by drawing in low-pressure natural gas and discharging significantly higher pressure natural gas by means of mechanical rotating vanes or impellers.

(ii) The term does not include a screw compressor, sliding vane compressor or liquid ring compressor.

Closed vent system—A system that is not open to the atmosphere and that is composed of hard-piping, ductwork, connections and, if necessary, flow-inducing devices that transport gas or vapor from a piece or pieces of equipment to a control device or back to a process.

~~*Completion combustion device*—~~

~~(i) An ignition device, installed horizontally or vertically, used in exploration and production operations to combust otherwise vented emissions from completions.~~

~~(ii) The term includes pit flares.~~

~~*Compressor station*—~~

~~(i) A permanent combination of one or more compressors that move natural gas at increased pressure through a gathering or transmission pipeline or into or out of storage.~~

~~(ii) The term includes a gathering and boosting station and a transmission compressor station.~~

~~(iii) The term does not include the combination of one or more compressors located at a well site or located at an onshore natural gas processing plant.~~

Condensate—Hydrocarbon liquid separated from natural gas that condenses due to changes in the temperature, pressure, or both, and remains liquid at standard conditions.

Connector—

(i) A flanged fitting, screwed fitting or other joined fitting used to connect two ~~pipelines~~ **PIPES** or a ~~pipeline~~ **PIPE** and a piece of process equipment or that closes an opening in a pipe that could be connected to another pipe.

(ii) The term does not include a joined fitting welded completely around the circumference of the interface.

~~*Continuous bleed*—A continuous flow of pneumatic supply natural gas to a pneumatic controller.~~

Control device—An enclosed combustion device, vapor recovery system or flare.

Custody transfer—The transfer of natural gas after processing or treatment, or both, in the producing operation or from a storage vessel or an automatic transfer facility or other equipment, including a product loading rack, to a pipeline or another form of transportation.

Deviation—An instance in which the owner or operator of a source subject to this section, §§ 129.121 and 129.123—129.130 fails to meet one or more of the following:

(i) A requirement or an obligation established in this section, § 129.121 or §§ 129.123—129.130, including an emission limit, operating limit or work practice standard.

(ii) A term or condition that is adopted to implement an applicable requirement in this section, § 129.121 or §§ 129.123—129.130 and which is included in the operating permit for the affected source.

(iii) An emission limit, operating limit or work practice standard in this section, § 129.121 or §§ 129.123—129.130 during startup, shutdown or malfunction, regardless of whether a failure is permitted by this section, § 129.121 or §§ 129.123—129.130.

FID—Flame ionization detector.

First attempt at repair—~~Action taken for the purpose of stopping or reducing leakage of organic material to the atmosphere using best practices.~~ **FOR PURPOSES OF § 129.127 (RELATING TO FUGITIVE EMISSIONS COMPONENTS):**

(i) AN ACTION USING BEST PRACTICES TAKEN TO STOP OR REDUCE FUGITIVE EMISSIONS TO THE ATMOSPHERE.

(ii) THE TERM INCLUDES:

(A) TIGHTENING BONNET BOLTS.

(B) REPLACING BONNET BOLTS.

(C) TIGHTENING PACKING GLAND NUTS.

(D) INJECTING LUBRICANT INTO LUBRICATED PACKING.

Flare—

(i) A thermal oxidation system using an open flame without an enclosure.

(ii) The term does not include a ~~completion combustion device~~ **HORIZONTALLY OR VERTICALLY INSTALLED IGNITION DEVICE OR PIT FLARE USED TO COMBUST OTHERWISE VENTED EMISSIONS FROM COMPLETIONS.**

Flow line—A pipeline used to transport oil or gas, or both, to ~~a processing facility~~ **PROCESSING EQUIPMENT, COMPRESSION EQUIPMENT, STORAGE VESSEL OR OTHER COLLECTION SYSTEM FOR FURTHER HANDLING** or **TO** a mainline pipeline.

~~*Fuel gas*—A gas that is combusted to derive useful work or heat.~~

~~*Fuel gas system*—The offsite and onsite piping and flow and pressure control system that gathers one or more gaseous streams generated by onsite operations, may blend them with other sources of gas and transports the gaseous stream for use as fuel gas in combustion devices or in process combustion equipment, such as furnaces and gas turbines, either singly or in combination.~~

Fugitive emissions component—

(i) 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, including the following:

(A) A valve.

(B) A connector.

(C) A pressure relief device.

(D) An open-ended line.

(E) A flange.

(F) A compressor.

(G) An instrument.

(H) A meter.

(I) A cover or closed vent system not subject to § 129.128 (relating to covers and closed vent systems).

(J) A thief hatch or other opening on a controlled storage vessel not subject to § 129.123 (relating to storage vessels).

(ii) The term does not include 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.

GOR—Gas-to-oil ratio—The ratio of the volume of gas at standard temperature and pressure that is produced from a volume of oil when depressurized to standard temperature and pressure.

Gathering and boosting station—

(i) A permanent combination of one or more compressors that collects natural gas from one or more well sites and moves the natural gas at increased pressure into a gathering pipeline to the natural gas processing plant or into the pipeline.

(ii) The term does not include the combination of one or more compressors located at a well site or located at an onshore natural gas processing plant.

Hard-piping—Pipe or tubing that is manufactured and properly installed using good engineering judgment and standards.

Hydraulic fracturing—The process of directing pressurized fluids containing a combination of water, proppant and added chemicals to penetrate tight formations, such as shale or coal formations, that subsequently require high rate, extended flowback to expel fracture fluids and solids during a completion.

Hydraulic refracturing—Conducting a subsequent hydraulic fracturing operation at a well that has previously undergone a hydraulic fracturing operation.

In-house engineer—An individual who is ~~qualified~~ **BOTH OF THE FOLLOWING:**

(i) EMPLOYED BY THE SAME OWNER OR OPERATOR AS THE RESPONSIBLE OFFICIAL THAT SIGNS THE CERTIFICATION REQUIRED UNDER § 129.130(k) (RELATING TO RECORDKEEPING AND REPORTING).

(ii) QUALIFIED by education, technical knowledge and ~~experience to make an engineering judgment and the required specific~~ **EXPERTISE IN THE DESIGN AND OPERATION OF A NATURAL GAS-DRIVEN DIAPHRAGM PUMP OR CLOSED VENT SYSTEM TO MAKE THE** technical certification **REQUIRED UNDER § 129.125(c)(3)(ii) (RELATING TO NATURAL GAS-DRIVEN DIAPHRAGM PUMPS) OR § 129.128(c)(3), OR BOTH, AS APPLICABLE.**

Intermediate hydrocarbon liquid—A naturally occurring, unrefined petroleum liquid.

LDAR—Leak detection and repair.

Leak—**AN EMISSION DETECTED USING ONE OR MORE OF THE FOLLOWING METHODS:**

(i) ~~A positive indication, whether audible, visual or odorous, determined~~ **THROUGH AUDIBLE, VISUAL OR ODOROUS EVIDENCE** during an AVO inspection.

(ii) ~~An emission detected by~~ **BY** OGI equipment calibrated according to ~~§ 129.127(g)~~ **§ 129.127(h)** (relating to fugitive emissions components).

(iii) ~~An emission detected with~~ **WITH** a concentration of 500 ppm or greater as methane or equivalent~~, detected~~ by a gas leak detector calibrated according to ~~§ 129.127(h)~~ § 129.127(i).

(iv) USING AN ALTERNATIVE LEAK DETECTION METHOD APPROVED BY THE DEPARTMENT IN § 129.127(c)(2)(ii)(C), (c)(3)(ii)(C) or (e)(2)(iii).

Maximum average daily throughput—The single highest daily average throughput during the 30-day potential to emit evaluation period employing generally accepted methods.

Monitoring system malfunction—

(i) A sudden, infrequent, not reasonably preventable failure of the monitoring system to provide valid data.

(ii) The term does not include a system failure caused by poor maintenance or careless operation.

~~*Natural gas and oil production segment*—~~

~~(i) The well and all related processes used in the extraction, production, recovery, lifting, stabilization, separation or treating of natural gas, condensate or oil.~~

~~(ii) A stand-alone site where natural gas, condensate, oil and produced water from several wells may be separated, stored and treated.~~

~~(iii) A low-pressure, small 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.~~

Natural gas distribution segment—The delivery of natural gas to the end user by a distribution company after the distribution company receives the natural gas from the natural gas transmission and storage segment.

Natural gas-driven diaphragm pump—

(i) A positive displacement pump powered by pressurized natural gas that uses the reciprocating action of flexible diaphragms in conjunction with check valves to pump a fluid.

(ii) The term does not include either of the following:

(A) A pump in which a fluid is displaced by a piston driven by a diaphragm.

(B) A lean glycol circulation pump that relies on energy exchange with the rich glycol from the contactor.

Natural gas-driven ***CONTINUOUS BLEED*** *pneumatic controller*—An 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.

Natural gas liquids—The hydrocarbons, such as ethane, propane, butane and pentane that are extracted from field gas.

Natural gas processing plant ~~*or gas plant*~~—

(i) A processing site engaged in the extraction of natural gas liquids from field gas, fractionation of mixed natural gas liquids to natural gas products, or both.

(ii) The term does not include a Joule-Thompson valve, a dew point depression valve or an isolated or standalone Joule-Thompson skid.

~~*Natural gas processing segment*—The separation and recovery of natural gas liquids or other non-methane gases and liquids from a stream of produced natural gas to produce pipeline quality dry natural gas.~~

Natural gas transmission and storage segment—~~The pipelines, compressor stations, and~~ **THE TERM INCLUDES THE FOLLOWING:**

(i) THE PIPELINES USED FOR THE LONG-DISTANCE TRANSPORT OF NATURAL GAS, EXCLUDING PROCESSING.

(ii) THE NATURAL GAS TRANSMISSION STATIONS WHICH INCLUDE THE FOLLOWING:

(A) THE LAND, MAINS, VALVES, METERS, BOOSTERS, REGULATORS, STORAGE VESSELS, DEHYDRATORS AND COMPRESSORS.

(B) THE DRIVING UNITS AND APPURTENANCES ASSOCIATED WITH THE ITEMS LISTED IN CLAUSE (A).

(C) THE EQUIPMENT USED FOR TRANSPORTING GAS FROM A PRODUCTION PLANT, DELIVERY POINT OF PURCHASED GAS, GATHERING SYSTEM, STORAGE AREA OR OTHER WHOLESALE SOURCE OF GAS TO ONE OR MORE DISTRIBUTION AREAS.

(iii) THE aboveground storage facilities and underground storage facilities that transport and store natural gas between the natural gas processing plant and natural gas distribution segment.

OGI—Optical gas imaging.

Open-ended valve or *line*—A valve, except a safety relief valve, having one side of the valve seat in contact with process fluid and one side open to the atmosphere, either directly or through open piping.

Produced water—Water that is extracted from the earth from an oil or natural gas production well or that is separated from crude oil, condensate or natural gas after extraction.

Qualified professional engineer—

(i) 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 required specific technical certification.

(ii) 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.

Quality assurance or *quality control activity*—An activity such as a system accuracy audit and a zero and span adjustment that ensures the proper calibration and operation of monitoring equipment.

Reciprocating compressor—A piece of equipment that employs linear movement of a driveshaft to increase the pressure of a process gas by positive displacement.

Reciprocating compressor rod packing—

(i) A series of flexible rings in machined metal cups that fit around the reciprocating compressor piston rod to create a seal limiting the amount of compressed natural gas that escapes to the atmosphere.

(ii) Another mechanism that provides the same function.

Removed from service—A storage vessel that has been physically isolated and disconnected from the process for a purpose other than maintenance.

Repaired—A piece of equipment that is adjusted or otherwise altered to eliminate a leak and is remonitored to verify that emissions from the equipment are at or below the applicable leak limitation.

Returned to service—A storage vessel that was removed from service which has been:

(i) Reconnected to the original source of liquids or has been used to replace another storage vessel.

(ii) Installed in another location and introduced with crude oil, condensate, intermediate hydrocarbon liquids or produced water.

Routed to a process or *route to a process*—The emissions are conveyed by means of a closed vent system to an enclosed portion of a process that is operational where the emissions are controlled in one or more of the following ways:

(i) Predominantly recycled or consumed, or both, in the same manner as a material that fulfills the same function in the process.

(ii) Transformed by chemical reaction into materials that are not regulated.

(iii) Incorporated into a product.

(iv) Recovered for beneficial use.

Sensor—A device that measures a physical quantity or the change in a physical quantity such as temperature, pressure, flow rate, pH or liquid level.

Storage vessel—

(i) A container used to collect crude oil, condensate, intermediate hydrocarbon liquids or produced water that is constructed primarily of non-earthen materials which provide structural support.

(ii) The term includes a container described in subparagraph (i) that is skid-mounted or permanently attached to something that is mobile which has been located at a site for 180 or more consecutive days.

(iii) The term does not include the following:

(A) A process vessel such as a surge control vessel, bottoms receiver or knockout vessel.

(B) A pressure vessel used to store a liquid or a gas and is designed to operate in excess of 204.9 kilopascals (29.7 pounds per square inch, absolute) and to not vent to the atmosphere as a result of compression of the vapor headspace during filling of the vessel.

(C) A container described in subparagraph (i) with a capacity greater than 100,000 gallons used to recycle water that has been passed through two-stage separation.

Surface site—A combination of one or more graded pad sites, gravel pad sites, foundations, platforms or the immediate physical location upon which equipment is physically affixed.

TOC—Total organic compounds—~~For purposes of this section, §§ 129.121 and 129.123—129.130, the~~ **THE** results of EPA Method 25A.

~~*Transmission compression station*—~~

~~—(i) The pipelines used for the long-distance transport of natural gas, excluding processing.~~

~~—(ii) 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 a production plant, delivery point of purchased gas, gathering system, storage area or other wholesale source of gas to one or more distribution areas.~~

~~*Underground storage vessel*—A storage vessel stored below ground.~~

UIC—**UNDERGROUND INJECTION CONTROL.**

UIC CLASS I OILFIELD DISPOSAL WELL—**A WELL WITH A UIC CLASS I PERMIT THAT MEETS THE DEFINITION IN 40 CFR 144.6(a)(2) (RELATING TO CLASSIFICATION OF WELLS) AND RECEIVES ELIGIBLE FLUIDS FROM OIL AND NATURAL GAS EXPLORATION AND PRODUCTION OPERATIONS.**

UIC CLASS II OILFIELD DISPOSAL WELL—**A WELL WITH A UIC CLASS II PERMIT WHERE WASTEWATER RESULTING FROM OIL AND NATURAL GAS PRODUCTION OPERATIONS IS INJECTED INTO UNDERGROUND POROUS ROCK FORMATIONS NOT PRODUCTIVE OF OIL OR GAS AND SEALED ABOVE AND BELOW BY UNBROKEN, IMPERMEABLE STRATA.**

VRU—Vapor recovery unit—A device used to ~~**route a vapor from a storage or other vessel either back to the vessel or to a line carrying hydrocarbon fluids**~~ **RECOVER VAPOR AND ROUTE IT TO A PROCESS, FLOW LINE OR OTHER EQUIPMENT.**

Well—A hole drilled for producing oil or natural gas or into which a fluid is injected.

Wellhead—

(i) The piping, casing, tubing and connected valves protruding above the earth's surface for an oil or natural gas well.

(ii) The wellhead ends where the flow line connects to a wellhead valve.

(iii) The term does not include other equipment at the well site except for a conveyance through which gas is vented to the atmosphere.

Well site—

(i) One or more surface sites that are constructed for the drilling and subsequent operation of an oil well, natural gas well or injection well.

(ii) For purposes of the fugitive emissions standards in § 129.127, the term also means a separate tank battery surface site collecting crude oil, condensate, intermediate hydrocarbon liquids or produced water from a well not located at the well site, for example, a centralized tank battery.

(iii) FOR PURPOSES OF THE FUGITIVE EMISSIONS STANDARDS IN § 129.127, THE TERM DOES NOT INCLUDE:

(A) A UIC CLASS I OILFIELD DISPOSAL WELL.

(B) A UIC CLASS II OILFIELD DISPOSAL WELL AND DISPOSAL FACILITY.

(C) THE FLANGE IMMEDIATELY UPSTREAM OF THE CUSTODY METER ASSEMBLY.

(D) EQUIPMENT, INCLUDING FUGITIVE EMISSIONS COMPONENTS, LOCATED DOWNSTREAM OF THE FLANGE IN CLAUSE (C).

(b) *EPA methods*. The EPA methods referenced in this section and §§ 129.123—129.130, are those listed as follows, unless the context clearly indicates otherwise:

EPA Method 1—EPA Method 1, 40 CFR Part 60, Appendix A-1 (relating to test methods 1 through 2F), regarding sample and velocity traverses for stationary sources.

EPA Method 1A—EPA Method 1A, 40 CFR Part 60, Appendix A-1, regarding sample and velocity traverses for stationary sources with small stacks or ducts.

EPA Method 2—EPA Method 2, 40 CFR Part 60, Appendix A-1, regarding determination of stack gas velocity and volumetric flow rate (Type S pitot tube).

EPA Method 2A—EPA Method 2A, 40 CFR Part 60, Appendix A-1, regarding direct measurement of gas volume through pipes and small ducts.

EPA Method 2C—EPA Method 2C, 40 CFR Part 60, Appendix A-1, regarding determination of gas velocity and volumetric flow rate in small stacks or ducts (standard pitot tube).

EPA Method 2D—EPA Method 2D, 40 CFR Part 60, Appendix A-1, regarding measurement of gas volume flow rates in small pipes and ducts.

EPA Method 3A—EPA Method 3A, 40 CFR Part 60, Appendix A-2 (relating to test methods 2G through 3C), regarding determination of oxygen and carbon dioxide concentrations in emissions from stationary sources (instrumental analyzer procedure).

EPA Method 3B—EPA Method 3B, 40 CFR Part 60, Appendix A-2, regarding gas analysis for the determination of emission rate correction factor or excess air.

EPA Method 4—EPA Method 4, 40 CFR Part 60, Appendix A-3 (relating to test methods 4 through 5I), regarding determination of moisture content in stack gases.

EPA Method 18—EPA Method 18, 40 CFR Part 60, Appendix A-6 (relating to test methods 16 through 18), regarding measurement of gaseous organic compound emissions by gas chromatography.

EPA Method 21—EPA Method 21, 40 CFR Part 60, Appendix A-7 (relating to test methods 19 through 25E), regarding determination of volatile organic compound leaks.

EPA Method 22—EPA Method 22, 40 CFR Part 60, Appendix A-7, regarding visual determination of fugitive emissions from material sources and smoke emissions from flares.

EPA Method 25A—EPA Method 25A, 40 CFR Part 60, Appendix A-7, regarding determination of total gaseous organic concentration using a flame ionization analyzer.

§ 129.123. Storage vessels.

(a) *Applicability.*

(1) *Potential VOC emissions.* Except as specified in subsections (c) and (d), this section applies to the owner or operator of a storage vessel subject to § 129.121(a)(1) (relating to general provisions and applicability) that ~~meets one of the following:~~ **HAS THE POTENTIAL TO EMIT 2.7 TPY OR GREATER VOC EMISSIONS.**

~~(i) Is installed at a conventional well site and has the potential to emit 6.0 TPY or greater VOC emissions.~~

~~(ii) Is installed at an unconventional well site before August 10, 2013, and has the potential to emit 6.0 TPY or greater VOC emissions.~~

~~(iii) Is installed at an unconventional well site on or after August 10, 2013, and has the potential to emit 2.7 TPY or greater VOC emissions.~~

~~(iv) Is installed at a gathering and boosting station and has the potential to emit 2.7 TPY or greater VOC emissions.~~

~~(v) Is installed at a natural gas processing plant and has the potential to emit 2.7 TPY or greater VOC emissions.~~

~~(vi) Is installed at a facility in the natural gas transmission and storage segment and has the potential to emit 2.7 TPY or greater VOC emissions.~~

(2) *Calculation of potential VOC emissions.*

(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.

(ii) The determination of potential VOC emissions ~~must~~ **MAY** consider requirements under a legally and practically enforceable limit established in an operating permit or plan approval approved by the Department.

(iii) Vapor from the storage vessel that is recovered and routed to a process through a VRU is not required to be included in the determination of potential VOC emissions for purposes of determining applicability, if the owner or operator meets the following:

(A) The cover requirements in § 129.128(a) (relating to covers and closed vent systems).

(B) The closed vent system requirements in § 129.128(b).

(iv) If the apparatus that recovers and routes vapor to a process is removed from operation or is operated inconsistently with § 129.128, the owner or operator shall determine the storage vessel's potential VOC emissions under this paragraph within 30 calendar days of the date of apparatus removal or inconsistent operation.

(b) *VOC emissions limitations and control requirements.* Except as specified in subsections (c) and (d), beginning _____ (*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.), the owner or operator of a storage vessel subject to this section shall reduce VOC emissions by 95.0% by weight or greater. The owner or operator shall comply with paragraph (1) or paragraph (2) as applicable.

(1) *Route the VOC emissions to a control device.* The owner or operator shall do the following:

(i) Equip the storage vessel with a cover that meets the requirements of § 129.128(a).

(ii) Connect the storage vessel to a control device or process through a closed vent system that meets the requirements of § 129.128(b).

(iii) Route the emissions from the storage vessel to a control device or a process that meets the applicable requirements of § 129.129 (relating to control devices).

(iv) Demonstrate that the VOC emissions are reduced as specified in § 129.129(k).

(2) *Equip the storage vessel with a floating roof.* The owner or operator shall install a floating roof that meets the requirements of 40 CFR 60.112b(a)(1) or (2) (relating to standard for volatile organic compounds (VOC)) and the relevant monitoring, inspection, recordkeeping and reporting requirements in 40 CFR Part 60, Subpart Kb (relating to standards of performance for volatile organic liquid storage vessels (including petroleum liquid storage vessels) for which construction, reconstruction, or modification commenced after July 23, 1984).

(c) *Exceptions.*

(1) The emissions limitations and control requirements in subsection (b) do not apply to the owner or operator of a storage vessel that ~~meets one or more of the following:~~

~~(i) Has a VOC potential to emit limit of 6.0 TPY, if actual VOC emissions are less than 4.0 TPY as determined on a 12-month rolling basis. 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.~~

~~(ii) Has a VOC potential to emit limit of 2.7 TPY, if~~ **MAINTAINS** actual VOC emissions ~~are~~ less than 2.7 TPY ~~as~~ determined ~~on~~ **AS** a 12-month rolling ~~basis~~ **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.

(2) The owner or operator of a storage vessel claiming exception under this subsection shall perform the following:

(i) ~~Calculate~~ **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 ~~monthly~~ **ONCE PER CALENDAR MONTH** using a generally accepted model or calculation methodology. The monthly calculations must meet the following:

(A) Be separated by at least 15 calendar days but not more than ~~30~~ **45** calendar days.

(B) Be based on the ~~maximum daily~~ **MONTHLY** average throughput for the previous 30 calendar days.

(ii) Comply with subsection (b) within ~~30 calendar days~~ **1 YEAR** of the date of the monthly calculation showing that **ACTUAL** VOC emissions from the storage vessel have increased to ~~the applicable actual VOC emission threshold~~ **2.7 TPY VOC** or greater ~~and the increase is not associated with hydraulically fracturing or refracturing a well feeding the storage vessel.~~

~~(iii) If a well feeding a subject storage vessel undergoes fracturing or refracturing, comply with subsection (b) as soon as liquids from the well following fracturing or refracturing are routed to the storage vessel.~~

(d) *Exemptions.* The emissions limitations and control requirements in subsection (b) do not apply to the owner or operator of a storage vessel that meets one or more of the following:

(1) Is skid-mounted or permanently attached to something that is mobile for which records are available to document that it has been located at a site for less than 180 consecutive days. An owner or operator claiming this exemption shall maintain the records under subsection (g), as applicable.

(2) Is used in the natural gas distribution segment.

(3) Is controlled under 40 CFR Part 60, Subpart Kb or 40 CFR Part 63, Subpart G, Subpart CC, Subpart HH or Subpart WW.

(e) *Requirements for a storage vessel removed from service.* A storage vessel subject to this section that is removed from service is not an affected source for the period that it is removed from service if the owner or operator performs the following:

(1) Completely empties and degasses the storage vessel so that the storage vessel no longer contains crude oil, condensate, produced water or intermediate hydrocarbon liquids. A storage vessel where liquid is left on walls, as bottom clingage or in pools due to floor irregularity is considered to be completely empty.

(2) Submits a notification in the next annual report required under § 129.130(k)(1) (relating to recordkeeping and reporting) identifying each storage vessel removed from service during the reporting period and the date of its removal from service.

(f) *Requirements for a storage vessel returned to service.* The owner or operator of a storage vessel identified in subsection (e) that is returned to service shall submit a notification in the next annual report required under § 129.130(k)(1) identifying each storage vessel that has been returned to service during the reporting period and the date of its return to service.

(g) *Recordkeeping and reporting requirements.* The owner or operator of a storage vessel subject to this section shall maintain the records under § 129.130(b) and submit the reports under § 129.130(k)(1).

§ 129.124. Natural gas-driven CONTINUOUS BLEED pneumatic controllers.

(a) *Applicability.* 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.

(b) *Exception.* An owner or operator may use a natural gas-driven **CONTINUOUS BLEED** pneumatic controller subject to this section with a bleed rate greater than the applicable requirements in subsection (c) based on functional requirements. An owner or operator claiming this exception shall perform the compliance demonstration requirements under subsection (d) and maintain the records under subsection (e), as applicable.

(c) *VOC emissions limitation requirements.* Except as specified in subsection (b), beginning _____ (*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.), the owner or operator of a natural gas-driven **CONTINUOUS BLEED** pneumatic controller subject to this section shall do the following:

(1) Ensure ~~the~~ **EACH** natural gas-driven **CONTINUOUS BLEED** pneumatic controller ~~has~~ **WITH A NATURAL GAS BLEED RATE GREATER THAN 6.0 STANDARD CUBIC FEET PER HOUR, AT A LOCATION OTHER THAN A NATURAL GAS PROCESSING PLANT, MAINTAINS** a natural gas bleed rate~~:~~

~~(i) Of~~ **OF** less than or equal to 6.0 standard cubic feet per hour~~, if located between a wellhead and either of the following:~~.

~~(A) A natural gas processing plant.~~

~~(B) A point of custody transfer to an oil pipeline.~~

~~(ii)~~ **(2) ENSURE EACH NATURAL GAS-DRIVEN CONTINUOUS BLEED PNEUMATIC CONTROLLER MAINTAINS A NATURAL GAS BLEED RATE ~~Of~~ OF** zero standard cubic feet per hour, if located at a natural gas processing plant.

~~(2)~~ **(3)** Perform the compliance demonstration requirements under subsection (d).

(d) *Compliance demonstration requirements.* The owner or operator shall tag each ~~affected~~ natural gas-driven **CONTINUOUS BLEED** pneumatic controller **AFFECTED UNDER SUBSECTION (c)** with the following:

(1) The date the natural gas-driven **CONTINUOUS BLEED** pneumatic controller is required to comply with this section.

(2) An identification number that ensures traceability to the records for that natural gas-driven **CONTINUOUS BLEED** pneumatic controller.

(e) *Recordkeeping and reporting requirements.* The owner or operator of a natural gas-driven **CONTINUOUS BLEED** pneumatic controller ~~subject to this section~~ **AFFECTED UNDER SUBSECTION (c)** shall maintain the records under § 129.130(c) (relating to recordkeeping and reporting) and submit the reports under § 129.130(k)(2).

§ 129.125. Natural gas-driven diaphragm pumps.

(a) *Applicability.* This section applies to the owner or operator of a natural gas-driven diaphragm pump subject to § 129.121(a)(3) (relating to general provisions and applicability) located at a well site or natural gas processing plant.

(b) *VOC emissions limitation and control requirements.* Except as specified in subsections (c) and (d), beginning _____ (*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.), the owner or operator of a natural gas-driven diaphragm pump subject to this section shall ~~reduce the VOC emissions by 95.0% by weight or greater. The owner or operator shall~~ comply with the following:

(1) *Well site.* The owner or operator of a natural gas-driven diaphragm pump located at a well site shall **REDUCE THE VOC EMISSIONS BY 95.0% BY WEIGHT OR GREATER. THE OWNER OR OPERATOR SHALL** do the following:

(i) Connect the natural gas-driven diaphragm pump to a control device or process through a closed vent system that meets the applicable requirements of § 129.128(b) (relating to covers and closed vent systems).

(ii) Route the emissions from the natural gas-driven diaphragm pump to a control device or a process that meets the applicable requirements of § 129.129 (relating to control devices).

(iii) Demonstrate that the VOC emissions are reduced as specified in § 129.129(k).

(2) *Natural gas processing plant*. The owner or operator of a natural gas-driven diaphragm pump located at a natural gas processing plant shall maintain an emission rate of zero standard cubic feet per hour.

(c) *Exceptions*. 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 meets one or more of the following:

(1) Routes emissions to a control device which is unable to reduce VOC emissions by 95.0% by weight or greater and there is no ability to route VOC emissions to a process. **AN OWNER OR OPERATOR THAT CLAIMS THIS EXCEPTION SHALL DO THE FOLLOWING:**

(i) ~~An owner or operator that claims this exception shall do the following:~~

~~(A)~~ Maintain the records under ~~§ 129.130(d)(7)~~ **§ 129.130(d)(4)** (relating to recordkeeping and reporting).

~~(B)~~ **(ii)** Connect the natural gas-driven diaphragm pump to the control device through a closed vent system that meets the requirements of § 129.128(b).

~~(C)~~ **(iii)** Demonstrate the percentage by which the VOC emissions are reduced as specified in § 129.129(k).

(2) Has no available control device or process. **AN OWNER OR OPERATOR THAT CLAIMS THIS EXCEPTION SHALL DO THE FOLLOWING:**

(i) ~~An owner or operator that claims this exception shall do the following:~~

~~(A)~~ Maintain the records under § 129.130(d)(5).

~~(B)~~ **(ii)** Certify that there is no available control device or process in the next annual report required by § 129.130(k)(3)(ii).

~~(C)~~ **(iii)** Route emissions from the natural gas-driven diaphragm pump within 30 days of the installation of a control device or process. Once the emissions are routed to a control device or process, the certification of ~~clause (B)~~ **SUBPARAGRAPH (ii)** is no longer required and the applicable requirements of this section shall be met.

(3) Is technically infeasible of connecting to a control device or process. **AN OWNER OR OPERATOR THAT CLAIMS THIS EXCEPTION SHALL DO THE FOLLOWING:**

(i) ~~An owner or operator claiming this exception shall maintain~~ **MAINTAIN** the records under § 129.130(d)(6).

(ii) ~~An owner or operator that claims this exception shall perform~~ **PERFORM** an assessment of technical infeasibility which must ~~include~~ **MEET** the following:

(A) Be prepared under the supervision of an in-house engineer or qualified professional engineer.

(B) Include a technical analysis of safety considerations, the distance from an existing control device, the pressure losses and differentials in the closed vent system and the ability of the control device to handle the increase in emissions routed to them.

(C) Be certified, signed, and dated by the engineer supervising the assessment, including the statement: "I certify that the assessment of technical infeasibility was prepared under my supervision. I further certify that the assessment was conducted, and this report was prepared under the requirements of 25 Pa. Code § 129.125(c)(3). Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

(d) *Exemptions.* 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 days per calendar year. An owner or operator claiming this exemption shall maintain the records under § 129.130(d)(3).

(e) *Removal of control device or process.* The owner or operator of a natural gas-driven diaphragm pump located at a well site that routes emissions to a control device or process which is removed or is no longer available shall comply with one of the exceptions in subsection (c), as applicable.

(f) *Recordkeeping and reporting requirements.* The owner or operator of a natural gas-driven diaphragm pump subject to this section shall maintain the records under § 129.130(d) and submit the reports under § 129.130(k)(3).

§ 129.126. Compressors.

(a) *Applicability.* This section applies to the owner or operator of a reciprocating compressor or centrifugal compressor subject to § 129.121(a)(4) (relating to general provisions and applicability) that meets the following:

(1) *Reciprocating compressor.* Each reciprocating compressor located between the wellhead and point of custody transfer to the natural gas transmission and storage segment.

(2) *Centrifugal compressor.* Each centrifugal compressor using wet seals that is located between the wellhead and point of custody transfer to the natural gas transmission and storage segment.

(b) *VOC emissions control requirements for a reciprocating compressor.* ~~**Except as specified in subsection (d), beginning**~~ **BEGINNING** _____ (*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.), the

owner or operator of a reciprocating compressor subject to this section shall meet one of the following:

(1) Replace the reciprocating compressor rod packing on or before one of the following:

(i) The reciprocating compressor has operated for 26,000 hours. The number of hours of operation must be continuously monitored beginning on the later of:

(A) The date of the most recent reciprocating compressor rod packing replacement.

(B) _____ (*Editor's Note*: The blank refers to the effective date of this rulemaking, when published as a final-form rulemaking.), for a reciprocating compressor rod packing that has not yet been replaced.

(ii) The reciprocating compressor has operated for 36 months. The number of months of operation must be continuously monitored beginning on the later of:

(A) The date of the most recent reciprocating compressor rod packing replacement.

(B) _____ (*Editor's Note*: The blank refers to the date 36 months after the effective date of this rulemaking, when published as a final-form rulemaking.), for a reciprocating compressor rod packing that has not yet been replaced.

(2) 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).

(c) *VOC emissions limitation and control requirements for a centrifugal compressor*. Except as specified in subsection (d), the owner or operator of a centrifugal compressor subject to this section shall perform the following:

(1) Reduce the VOC emissions from each centrifugal compressor wet seal fluid degassing system by 95.0% by weight or greater.

(2) Equip the wet seal fluid degassing system with a cover that meets the requirements of § 129.128(a) through a closed vent system that meets the requirements of § 129.128(b) to a control device or a process that meets the applicable requirements of § 129.129~~ (relating to control devices)~~.

(3) Demonstrate that the VOC emissions are reduced as specified in § 129.129(k).

(d) *Exemptions*. ~~Subsections (b) and (c) do~~ **SUBSECTION (c) DOES** not apply to the owner or operator of a ~~reciprocating compressor or a~~ centrifugal compressor that meets the following:

(1) Is located at a well site.

(2) Is located at an adjacent well site and services more than one well site.

(e) *Recordkeeping and reporting requirements.* The owner or operator of a reciprocating compressor or centrifugal compressor subject to this section shall do the following, as applicable:

(1) For a reciprocating compressor, maintain the records under § 129.130(e) (relating to recordkeeping and reporting) and submit the reports under § 129.130(k)(4).

(2) For a centrifugal compressor, maintain the records under § 129.130(f) and submit the reports under § 129.130(k)(5).

§ 129.127. Fugitive emissions components.

(a) *Applicability.* This section applies to the owner or operator of a fugitive emissions component subject to § 129.121(a)(5) (relating to general provisions and applicability), located at one or more of the following:

(1) A well site ~~**with a well that produces, on average, greater than 15 barrels of oil equivalent per day**~~.

(2) A natural gas gathering and boosting station.

(3) A natural gas processing plant.

(b) *AVERAGE PRODUCTION CALCULATION PROCEDURE FOR A WELL SITE.* 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.):

(1) THE OWNER OR OPERATOR OF A WELL SITE SUBJECT TO SUBSECTION (a)(1) SHALL CALCULATE THE AVERAGE PRODUCTION IN BARRELS OF OIL EQUIVALENT PER DAY OF THE WELL SITE USING THE PREVIOUS 12 CALENDAR MONTHS OF OPERATION AS REPORTED TO THE DEPARTMENT AND THEREAFTER AS SPECIFIED IN SUBSECTION (c)(4) FOR THE PREVIOUS CALENDAR YEAR. THE OWNER OR OPERATOR SHALL DO THE FOLLOWING:

(i) FOR EACH WELL AT THE WELL SITE WITH PRODUCTION REPORTED TO THE DEPARTMENT:

(A) RECORD THE BARRELS OF OIL PRODUCED FOR EACH ACTIVE WELL.

(B) CONVERT THE NATURAL GAS PRODUCTION FOR EACH ACTIVE WELL TO EQUIVALENT BARRELS OF OIL BY DIVIDING THE STANDARD CUBIC FEET

OF NATURAL GAS PRODUCED BY 6,000 STANDARD CUBIC FEET PER BARREL OF OIL EQUIVALENT.

(C) CONVERT THE CONDENSATE PRODUCTION FOR EACH ACTIVE WELL TO EQUIVALENT BARRELS OF OIL BY MULTIPLYING THE BARRELS OF CONDENSATE BY 0.9 BARRELS OF OIL EQUIVALENT PER BARREL OF CONDENSATE.

(ii) CALCULATE THE TOTAL PRODUCTION FOR EACH ACTIVE WELL, IN BARRELS OF OIL EQUIVALENT, BY ADDING THE RESULTS OF SUBPARAGRAPH (i)(A)—(C) FOR EACH ACTIVE WELL.

(iii) SUM THE RESULTS OF SUBPARAGRAPH (ii) FOR ALL ACTIVE WELLS AT THE WELL SITE AND DIVIDE BY 365 OR 366 DAYS FOR THE PREVIOUS 12 CALENDAR MONTHS OR THE PREVIOUS CALENDAR YEAR, AS APPLICABLE.

(2) IF THE OWNER OR OPERATOR DOES NOT KNOW THE PRODUCTION OF AN INDIVIDUAL WELL AT THE WELL SITE, THE OWNER OR OPERATOR SHALL COMPLY WITH SUBSECTION (c)(2).

~~(b)~~ **(c)** *Requirements for a ~~producing~~ well site.* ~~The owner or operator of a producing well site shall perform the following:~~

(1) ~~Determine the GOR of the well using generally accepted methods.~~ **FOR A WELL SITE CONSISTING OF ONLY OIL WELLS, THE OWNER OR OPERATOR SHALL:**

(i) DETERMINE THE GOR OF THE OIL WELL SITE USING GENERALLY ACCEPTED METHODS.

~~(i)~~ **(ii)** If the GOR **OF THE OIL WELL SITE** is less than 300 standard cubic feet of gas per barrel of oil produced, ~~the owner or operator shall~~ maintain the records under § 129.130(g)(1) (relating to recordkeeping and reporting).

~~(ii)~~ **(iii)** If the GOR **OF THE OIL WELL SITE** is equal to or greater than 300 standard cubic feet of gas per barrel of oil produced, ~~the owner or operator shall perform the following:~~ **MEET THE REQUIREMENTS OF PARAGRAPH (2) OR PARAGRAPH (3) BASED ON THE RESULTS OF SUBSECTION (b)(1).**

(2) FOR A WELL SITE PRODUCING, ON AVERAGE, EQUAL TO OR GREATER THAN 15 BARRELS OF OIL EQUIVALENT PER DAY, WITH AT LEAST ONE WELL PRODUCING, ON AVERAGE, EQUAL TO OR GREATER THAN 15 BARRELS OF OIL EQUIVALENT PER DAY, THE OWNER OR OPERATOR SHALL:

~~(A)~~ **(i)** Conduct an **INITIAL** AVO inspection ~~within 30 days after~~ **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 ~~30~~ **45** calendar days.

~~(B)~~ **(ii)** Conduct an **INITIAL** LDAR inspection program ~~within 60 days after~~ **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 ~~90~~ **120** calendar days using one or more of the following:

~~(I)~~ **(A)** OGI equipment.

~~(II)~~ **(B)** A gas leak detector that meets the requirements of EPA Method 21.

~~(III)~~ **(C)** Another leak detection method approved by the Department.

(3) FOR A WELL SITE PRODUCING, ON AVERAGE, EQUAL TO OR GREATER THAN 15 BARRELS OF OIL EQUIVALENT PER DAY, AND AT LEAST ONE WELL PRODUCING, ON AVERAGE, EQUAL TO OR GREATER THAN 5 BARRELS OF OIL EQUIVALENT PER DAY BUT LESS THAN 15 BARRELS OF OIL EQUIVALENT PER DAY, THE OWNER OR OPERATOR SHALL:

(i) 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.

(ii) 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:

(A) OGI EQUIPMENT.

(B) A GAS LEAK DETECTOR THAT MEETS THE REQUIREMENTS OF EPA METHOD 21.

(C) ANOTHER LEAK DETECTION METHOD APPROVED BY THE DEPARTMENT.

~~(2)~~**(4)** ~~The owner or operator of a producing well site required to conduct an LDAR inspection under paragraph (1)(ii)(B) may track the percentage of leaking components identified during the LDAR inspection.~~ The owner or operator **OF A PRODUCING WELL SITE SHALL CALCULATE THE AVERAGE PRODUCTION OF THE WELL SITE**

UNDER SUBSECTION (b) FOR THE PREVIOUS CALENDAR YEAR NOT LATER THAN FEBRUARY 15 AND may adjust the frequency of the **REQUIRED** LDAR inspection ~~required under paragraph (1)(ii)(B)~~ as follows:

(i) ~~If the percentage of leaking components is less than 2% for two consecutive quarterly inspections, the owner or operator may reduce the LDAR inspection frequency to semiannually with inspections separated by at least 120 calendar days but not more than 180 calendar days.~~ **IF TWO CONSECUTIVE CALCULATIONS SHOW REDUCED PRODUCTION, THE OWNER OR OPERATOR MAY ADOPT THE REQUIREMENTS APPLICABLE TO THE REDUCED PRODUCTION LEVEL.**

(ii) ~~If the percentage of leaking components is equal to or greater than 2%, the owner or operator shall resume the LDAR inspection frequency specified in paragraph (1)(ii)(B).~~ **IF A CALCULATION SHOWS HIGHER PRODUCTION, THE OWNER OR OPERATOR SHALL ADOPT THE REQUIREMENTS APPLICABLE TO THE HIGHER PRODUCTION LEVEL IMMEDIATELY.**

(5) THE OWNER OR OPERATOR OF A WELL SITE SUBJECT TO PARAGRAPH (3) MAY SUBMIT TO THE APPROPRIATE DEPARTMENT REGIONAL OFFICE A REQUEST, IN WRITING, FOR AN EXEMPTION FROM THE REQUIREMENTS OF PARAGRAPH (3)(ii).

(i) THE WRITTEN REQUEST MUST INCLUDE THE FOLLOWING:

(A) NAME AND LOCATION OF THE WELL SITE.

(B) A DEMONSTRATION THAT THE REQUIREMENTS OF PARAGRAPH (3)(ii) ARE NOT TECHNICALLY OR ECONOMICALLY FEASIBLE FOR THE WELL SITE.

(C) SUFFICIENT METHODS FOR DEMONSTRATING COMPLIANCE WITH ALL APPLICABLE STANDARDS OR REGULATIONS PROMULGATED UNDER THE CLEAN AIR ACT OR THE ACT.

(D) SUFFICIENT METHODS FOR DEMONSTRATING COMPLIANCE WITH THIS SECTION, §§ 129.121—129.126 AND 129.128—129.130.

(ii) THE DEPARTMENT WILL REVIEW THE COMPLETE WRITTEN REQUEST SUBMITTED IN ACCORDANCE WITH SUBPARAGRAPH (i) AND APPROVE OR DENY THE REQUEST IN WRITING.

(iii) THE DEPARTMENT WILL SUBMIT EACH EXEMPTION DETERMINATION APPROVED UNDER SUBPARAGRAPH (ii) TO THE ADMINISTRATOR OF THE EPA FOR APPROVAL AS A REVISION TO THE SIP. THE OWNER OR OPERATOR SHALL BEAR THE COSTS OF PUBLIC HEARINGS AND NOTIFICATIONS, INCLUDING NEWSPAPER NOTICES, REQUIRED FOR THE SIP SUBMITTAL.

(iv) THE OWNER OR OPERATOR OF THE WELL SITE IDENTIFIED IN SUBPARAGRAPH (i)(A) SHALL REMAIN SUBJECT TO THE REQUIREMENTS OF PARAGRAPHS (1), (3)(i) AND (4).

~~(c)~~ **(d)** *Requirements for a shut-in well* ***SITE.*** The owner or operator of a well **SITE** that is temporarily shut-in is not required to perform an LDAR inspection of the well **SITE** until one of the following occurs, whichever is first:

(1) Sixty days after the well **SITE** is put into production.

(2) The date of the next required LDAR inspection **AFTER THE WELL SITE IS PUT INTO PRODUCTION.**

~~(d)~~ **(e)** *Requirements for a natural gas gathering and boosting station or a natural gas processing plant.* The owner or operator of a natural gas gathering and boosting station or a natural gas processing plant shall conduct the following:

(1) An **INITIAL** AVO inspection ~~**within 30 days after**~~ **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 ~~**30**~~ **45** calendar days.

(2) An **INITIAL** LDAR inspection program ~~**within 60 days after**~~ **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 ~~**90**~~ **120** calendar days using one or more of the following:

(i) OGI equipment.

(ii) A gas leak detector that meets the requirements of EPA Method 21.

(iii) Another leak detection method approved by the Department.

~~(e)~~ **(f)** *Requirements for extension of the LDAR inspection interval.* The owner or operator of an affected facility may request, in writing, an extension of the LDAR inspection interval from the Air Program Manager of the appropriate Department Regional Office.

~~(f)~~ **(g)** *Fugitive emissions monitoring plan.* The owner or operator shall develop, in writing, an emissions monitoring plan that covers the collection of fugitive emissions components at the subject facility within each company-defined area. The written plan must include the following elements:

(1) The technique used for determining fugitive emissions.

(2) A list of fugitive emissions detection equipment, including the manufacturer and model number, that may be used at the facility.

(3) A list of personnel that may conduct the monitoring surveys at the facility, including their training and experience.

(4) The procedure and timeframe for identifying and fixing a fugitive emissions component from which fugitive emissions are detected, including for a component that is unsafe-to-repair.

(5) The procedure and timeframe for verifying fugitive emissions component repairs.

(6) The procedure and schedule for verifying the fugitive emissions detection equipment is operating properly.

(i) For OGI equipment, the verification must be completed as specified in subsection ~~(g)~~ **(h)**.

(ii) For gas leak detection equipment using EPA Method 21, the verification must be completed as specified in subsection ~~(h)~~ **(i)**.

(iii) For a Department-approved method, a copy of the request for approval that shows the method's equivalence to ~~subsection (g) or~~ subsection (h) **OR SUBSECTION (i)**.

(7) A sitemap.

(8) If using OGI, a defined observation path that meets the following:

(i) Ensures that all fugitive emissions components are within sight of the path.

(ii) Accounts for interferences.

(9) If using EPA Method 21, a list of the fugitive emissions components to be monitored and an identification method to locate them in the field.

(10) A written plan for each fugitive emissions component designated as difficult-to-monitor or unsafe-to-monitor which includes the following:

(i) A method to identify a difficult-to-monitor or unsafe-to-monitor component in the field.

(ii) The reason each component was identified as difficult-to-monitor or unsafe-to-monitor.

(iii) 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 ~~12~~ **13** months apart.

~~(g)~~ **(h)** *Verification procedures for OGI equipment.* An owner or operator that identifies OGI equipment in the fugitive emissions monitoring plan in subsection ~~(f)(6)(i)~~ **(g)(6)(i)** shall complete the verification by doing the following:

(1) Demonstrating that the OGI equipment is capable of imaging a gas:

(i) In the spectral range for the compound of highest concentration in the potential fugitive emissions.

(ii) That is half methane, half propane at a concentration of 10,000 ppm at a flow rate of less than or equal to 60 grams per hour (2.115 ounces per hour) from a 1/4-inch diameter orifice.

(2) Performing a ~~daily~~ verification check **EACH DAY PRIOR TO USE.**

(3) Determining the equipment operator's maximum viewing distance from the fugitive emissions component and how the equipment operator will ensure that this distance is maintained.

(4) Determining the maximum wind speed during which monitoring can be performed and how the equipment operator will ensure monitoring occurs only at wind speeds below this threshold.

(5) Conducting the survey ~~that determines how the equipment operator will perform the~~ **BY USING THE** following **PROCEDURES:**

(i) ~~Ensure~~ **ENSURING** an adequate thermal background is present to view potential fugitive emissions.

(ii) ~~Deal~~ **DEALING** with adverse monitoring conditions, such as wind.

(iii) ~~Deal~~ **DEALING** with interferences, such as steam.

(6) Following the manufacturer's recommended calibration and maintenance procedures.

~~(h)~~ **(i)** *Verification procedures for gas leak detection equipment using EPA Method 21.* An owner or operator that identifies gas leak detection equipment using EPA Method 21 in the fugitive emissions monitoring plan in subsection ~~(f)(6)(ii)~~ **(g)(6)(ii)** shall complete the verification by doing the following:

(1) Verifying that the gas leak detection equipment meets:

(i) The requirements of Section 6.0 of EPA Method 21 with a fugitive emissions definition of 500 ppm or greater calibrated as methane using an FID-based instrument.

(ii) A site-specific fugitive emission definition that would be equivalent to subparagraph (i) for other equipment approved for use in EPA Method 21 by the Department.

(2) Using the average composition of the fluid, not the individual organic compounds in the stream, when performing the instrument response factor of Section 8.1.1 of EPA Method 21.

(3) Calculating the average stream response factor on an inert-free basis for process streams that contain nitrogen, air or other inert gases that are not organic hazardous air pollutants or VOCs.

(4) Calibrating the gas leak detection instrument in accordance with Section 10.1 of EPA Method 21 on each day of its use using zero air, defined as a calibration gas with less than 10 ppm by volume of hydrocarbon in air, and a mixture of methane in air at a concentration less than 10,000 ppm by volume as the calibration gases.

(5) Conducting the surveys, which at a minimum, must comply with the relevant sections of EPA Method 21, including Section 8.3.1.

~~(i)~~ **(j)** *Fugitive emissions detection devices.* Fugitive emissions detection devices must be operated and maintained in accordance with manufacturer-recommended procedures and as required by the test method or a Department-approved method.

~~(j)~~ **(k)** *Background adjustment.* For LDAR inspections using a gas leak detector in accordance with EPA Method 21, the owner or operator may choose to adjust the gas leak detection instrument readings to account for the background organic concentration level as determined by the procedures of Section 8.3.2 of EPA Method 21.

~~(k)~~ **(l)** *Repair and resurvey provisions.* The owner or operator shall repair a leak detected from a fugitive emissions component as follows:

(1) A first attempt at repair must be made within 5 calendar days of detection, and repair must be completed no later than 15 calendar days after the leak is detected unless:

(i) The purchase of a part is required. The repair must be completed no later than 10 calendar days after the receipt of the purchased part.

(ii) The repair is technically infeasible because of one of the following reasons:

(A) It requires vent blowdown.

(B) It requires facility shutdown.

(C) It requires a well shut-in.

(D) It is unsafe to repair during operation of the unit.

(iii) A repair that is technically infeasible under subparagraph (ii) must be completed at the earliest of the following:

(A) After a planned vent blowdown.

(B) The next facility shutdown.

(C) Within 2 years.

(2) The owner or operator shall resurvey the fugitive emissions component no later than 30 calendar days after the leak is repaired.

(3) For a repair that cannot be made during the monitoring survey when the leak is initially found, the owner or operator shall do one of the following:

(i) Take a digital photograph of the fugitive emissions component which includes:

(A) The date the photo was taken.

(B) Clear identification of the component by location, such as by latitude and longitude or other descriptive landmarks visible in the picture.

(ii) Tag the component for identification purposes.

(4) A gas leak is considered repaired if:

(i) ~~There are no detectable emissions consistent with Section 8.3.2 of EPA Method 21.~~ **THERE IS NO VISIBLE LEAK IMAGE WHEN USING OGI EQUIPMENT CALIBRATED ACCORDING TO SUBSECTION (h).**

(ii) A leak concentration of less than 500 ppm as methane is detected when the gas leak detector probe inlet is placed at the surface of the fugitive emissions component for a gas leak detector calibrated according to subsection ~~(h)~~ **(i)**.

(iii) ~~There is no visible leak image when using OGI equipment calibrated according to subsection (g).~~ **THERE ARE NO DETECTABLE EMISSIONS CONSISTENT WITH SECTION 8.3.2 OF EPA METHOD 21.**

(iv) There is no bubbling at the leak interface using the soap solution bubble test specified in Section 8.3.3 of EPA Method 21.

~~(l)~~ **(m)** *Recordkeeping and reporting requirements*. The owner or operator of a fugitive emissions component subject to this section shall maintain the records under § 129.130(g) and submit the reports under § 129.130(k)(6).

§ 129.128. Covers and closed vent systems.

(a) *Requirements for a cover on a storage vessel, reciprocating compressor or centrifugal compressor*. The owner or operator shall perform the following for a cover of a source subject to § 129.123(b)(1)(i) or § 129.126(b)(2) or (c)(2) (relating to storage vessels; and compressors), as applicable:

(1) Ensure that the cover and all openings on the cover form a continuous impermeable barrier over each subject source as follows:

(i) The entire surface area of the liquid in the storage vessel.

(ii) The entire surface area of the liquid in the wet seal fluid degassing system of a centrifugal compressor.

(iii) The rod packing emissions collection system of a reciprocating compressor.

(2) Ensure that each cover opening is covered by a gasketed lid or cap that is secured in a closed, sealed position except when it is necessary to use an opening for one or more of the following:

(i) To inspect, maintain, repair or replace equipment.

(ii) To route a liquid, gas, vapor or fume from the source to a control device or a process that meets the applicable requirements of § 129.129 (relating to control devices) through a closed vent system designed and operated in accordance with subsection (b).

(iii) To inspect or sample the material in a storage vessel.

(iv) To add material to or remove material from a storage vessel, including openings necessary to equalize or balance the internal pressure of the storage vessel following changes in the level of the material in the storage vessel.

(3) Ensure that each storage vessel thief hatch is equipped, maintained and operated with the following:

(i) A mechanism to ensure that the lid remains properly seated and sealed under normal operating conditions, including when working, standing or breathing, or when flash emissions may be generated.

(ii) A gasket made of a suitable material based on the composition of the fluid in the storage vessel and weather conditions.

(4) Conduct an **INITIAL** AVO inspection ~~**within 30 days after**~~ **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 ~~**30**~~ **45** calendar days for defects that could result in air emissions. Defects include the following:

(i) A visible crack, hole or gap in the cover.

(ii) A visible crack, hole or gap between the cover and the separator wall.

(iii) A broken, cracked or otherwise damaged seal or gasket on a closure device.

(iv) A broken or missing hatch, access cover, cap or other closure device.

(5) Inspect only those portions of the cover that extend to or above the surface and the connections on those portions of the cover, including fill ports, access hatches and gauge wells that can be opened to the atmosphere for a storage vessel that is partially buried or entirely underground.

(6) Repair a detected leak or defect as specified in ~~§ 129.127(k)~~ **§ 129.127(l)** (relating to fugitive emissions components).

(7) Maintain the records under § 129.130(h) (relating to recordkeeping and reporting) and submit the report under § 129.130(k)(7).

(b) *Requirements for a closed vent system.* The owner or operator shall perform the following for each closed vent system installed on a source subject to **§ 129.123(b)(1)(ii),** § 129.125(b)(1)(i) or ~~(e)(1)(i)(B)~~ **(c)(1)(ii)** (relating to natural gas-driven diaphragm pumps) or § 129.126(b)(2) or (c)(2):

(1) Design the closed vent system to route the liquid, gas, vapor or fume emitted from the source to a control device or process that meets the applicable requirements in § 129.129.

(2) Operate the closed vent system with no detectable emissions as determined by the following:

(i) Conduct an **INITIAL** AVO inspection ~~within 30 days after~~ **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 ~~30~~ **45** calendar days for defects that could result in air emissions. Defects include the following:

(A) A visible crack, hole or gap in piping.

(B) A loose connection.

(C) A liquid leak.

(D) A broken or missing cap or other closure device.

(ii) Conducting a no detectable emissions 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 quarterly inspections separated by at least 60 calendar days but not more than 90 calendar days~~ **DURING THE FACILITY'S SCHEDULED LDAR INSPECTION IN ACCORDANCE WITH § 129.127(c)(2)(ii), (c)(3)(ii) or (e)(2).**

(3) Repair a detected leak or defect as specified in ~~§ 129.127(k)~~ **§ 129.127(l).**

(4) Except as specified in subparagraph (iii), if the closed vent system contains one or more bypass devices that could be used to divert the liquid, gas, vapor or fume from routing to the control device or to the process under paragraph (1), perform one or more of the following:

(i) Install, calibrate, operate and maintain a flow indicator at the inlet to the bypass device so when the bypass device is open it does one of the following:

(A) Sounds an alarm.

(B) Initiates a notification by means of a remote alarm to the nearest field office.

(ii) Secure the bypass device valve installed at the inlet to the bypass device in the non-diverting position using the following procedure:

(A) Installing either of the following:

(I) A car-seal.

(II) A lock-and-key configuration.

(B) Visually inspecting the mechanism in clause (A) to verify that the valve is maintained in the non-diverting position ~~within 30 days after~~ **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 ~~30~~ **45** calendar days.

(C) Maintaining the records under § 129.130(i)(4).

(iii) Subparagraphs (i) and (ii) do not apply to a low leg drain, high point bleed, analyzer vent, open-ended valve or line, or safety device.

(5) Conduct an assessment that meets the requirements of subsection (c).

(6) Maintain the records under § 129.130(i) and submit the reports under § 129.130(k)(8).

(c) *Requirements for closed vent system design and capacity assessment.* An owner or operator that installs a closed vent system under subsection (b) shall perform a design and capacity assessment which must include the following:

(1) Be prepared under the supervision of an in-house engineer or qualified professional engineer.

(2) Verify the following:

(i) That the closed vent system is of sufficient design and capacity to ensure that the emissions from the emission source are routed to the control device or process.

(ii) That the control device or process is of sufficient design and capacity to accommodate the emissions from the emission source.

(3) Be certified, signed, and dated by the engineer supervising the assessment, including the statement: "I certify that the closed vent design and capacity assessment was prepared under my supervision. I further certify that the assessment was conducted, and this report was prepared under the requirements of 25 Pa. Code § 129.128(c). Based on my professional knowledge and experience, and inquiry of personnel involved in the assessment, the certification submitted herein is true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information."

(d) *No detectable emissions procedures.* The owner or operator shall conduct the no detectable emissions ~~test procedure under Section 8.3.2 of EPA Method 21.~~ **INSPECTION REQUIRED UNDER SUBSECTION (b)(2)(ii) BY PERFORMING ONE OF THE FOLLOWING:**

(1) ~~The owner or operator shall perform the following:~~ **USE OGI EQUIPMENT THAT MEETS § 129.127(h).**

~~(i)~~ **(2)** Use a gas leak detection instrument that meets ~~§ 129.127(h)~~ **§ 129.127(i). THE OWNER OR OPERATOR MAY ADJUST THE GAS LEAK DETECTION INSTRUMENT READINGS AS SPECIFIED IN § 129.127(k).**

(3) USE ANOTHER LEAK DETECTION METHOD APPROVED BY THE DEPARTMENT.

~~(ii)~~ **(4)** Determine if a potential leak interface operates with no detectable emissions, if the gas leak detection instrument reading is not a leak as defined in § 129.122(a) (relating to definitions, acronyms and EPA methods).

~~(2) The owner or operator may adjust the gas leak detection instrument readings in paragraph (1)(ii) as specified in § 129.127(j).~~

§ 129.129. Control devices.

(a) *Applicability*. This section applies to the owner or operator of each control device that receives a liquid, gas, vapor or fume from a source subject to § 129.123(b)(1)(iii), § 129.125(b)(1)(ii) or (c)(1), or § 129.126(b)(2) or (c)(2) (relating to storage vessels; natural gas-driven diaphragm pumps; and compressors).

(1) The owner or operator shall perform the following:

(i) Operate each control device whenever a liquid, gas, vapor or fume is routed to the control device.

(ii) Maintain the records under § 129.130(j) (relating to recordkeeping and reporting) and submit the reports under § 129.130(k)(9).

(2) The owner or operator may route the liquid, gas, vapor or fume from more than one source subject to § 129.123(b)(1)(iii), § 129.125(b)(1)(ii) or (c)(1), or § 129.126(b)(2) or (c)(2) to a control device installed and operated under this section.

(b) *General requirements for a control device*. The owner or operator of a control device subject to this section shall install and operate one or more control devices listed in subsections (c)—(i). The owner or operator shall meet the following requirements, as applicable:

(1) Operate the control device following the manufacturer's written operating instructions, procedures and maintenance schedule to ensure good air pollution control practices for minimizing VOC emissions.

(2) 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 ~~30~~ **45** calendar days.

(3) Maintain a pilot flame while operating the control device and monitor the pilot flame by installing a heat sensing CPMS as specified under subsection (m)(3). If the heat sensing CPMS indicates the absence of the pilot flame or if the control device is smoking or shows other signs of improper equipment operation, ensure the control device is returned to proper operation by performing the following procedures:

(i) Checking the air vent for obstruction and clearing an observed obstruction.

(ii) Checking for liquid reaching the combustor.

(4) Operate the control device with no visible emissions, except for periods not to exceed a total of 1 minute during a 15-minute period as determined by conducting a visible emissions test according to Section 11 of EPA Method 22.

(i) Each monthly visible emissions test shall be separated by at least 15 calendar days but not more than ~~30~~ **45** calendar days.

(ii) The observation period for the test in subparagraph (i) shall be 15 minutes.

(5) Repair the control device if it fails the visible emissions test of paragraph (4) as specified in subparagraph (i) or subparagraph (ii) and return the control device to compliant operation.

(i) The manufacturer's repair instructions, if available.

(ii) The best combustion engineering practice ~~outlined in the control device inspection and maintenance plan of paragraph (1)~~ **APPLICABLE TO THE CONTROL DEVICE IF THE MANUFACTURER'S REPAIR INSTRUCTIONS ARE NOT AVAILABLE.**

(6) Ensure the control device passes the EPA Method 22 visual emissions test described in paragraph (4) following return to operation from a maintenance or repair activity.

(7) Record the inspection, repair and maintenance activities for the control device in a maintenance and repair log.

(c) *Compliance requirements for a manufacturer-tested combustion device.* The owner or operator of a control device subject to this section that installs a control device tested under 40 CFR 60.5413a(d) (relating to what are the performance testing procedures for control devices used to demonstrate compliance at my centrifugal compressor and storage vessel affected facilities?) shall meet subsection (b)(1)—(7) and the following:

(1) Maintain the inlet gas flow rate at less than or equal to the maximum flow rate specified by the manufacturer. This is confirmed by one of the following:

(i) Installing, operating and maintaining a flow CPMS that meets subsection (m)(1) and (2)(i) to measure gas flow rate at the inlet to the control device.

(ii) 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 IS REDUCED BY 95.0% BY WEIGHT OR GREATER.**

(2) Submit an electronic copy of the performance test results to the EPA as required by 40 CFR 60.5413a(d) in accordance with 40 CFR 60.5413a(e)(6).

(d) *Compliance requirements for an enclosed combustion device.* The owner or operator of a control device subject to this section that installs an enclosed combustion device, such as a thermal vapor incinerator, catalytic vapor incinerator, boiler or process heater, shall meet subsection (b)(1)—(7) and the following:

(1) Ensure the enclosed combustion control device is designed and operated to meet one of the following performance requirements:

(i) To reduce the mass content of VOC in the gases vented to the device by 95.0% by weight or greater, as determined under subsection (k).

(ii) To reduce the concentration of TOC in the exhaust gases at the outlet to the device to a level less than or equal to 275 ppmvd as propane corrected to 3% oxygen as determined under subsection (l).

(iii) To operate at a minimum temperature of 760 °Celsius (1,400 °Fahrenheit), if it is demonstrated during the performance test conducted under subsection (k) that combustion zone temperature is an indicator of destruction efficiency.

(iv) To introduce the vent stream into the flame zone of the boiler or process heater if a boiler or process heater is used as the control device.

(2) Install, calibrate, operate and maintain a CPMS according to the manufacturer's specifications and subsection (m) to measure the values of the operating parameters appropriate to the control device as follows:

(i) For a thermal vapor incinerator that demonstrates under subsection (m)(6)(i) that combustion zone temperature is an accurate indicator of performance, a temperature CPMS that meets subsection (m)(1) and (4) with the temperature sensor installed at a location representative of the combustion zone temperature.

(ii) For a catalytic vapor incinerator, a temperature CPMS capable of monitoring temperature at two locations and that meets subsection (m)(1) and (4) with one temperature sensor installed in the vent stream at the nearest feasible point to the catalyst bed inlet and a second temperature sensor installed in the vent stream at the nearest feasible point to the catalyst bed outlet.

(iii) For a boiler or process heater that demonstrates under subsection (m)(6)(i) that combustion zone temperature is an accurate indicator of performance, a temperature CPMS that meets subsection (m)(1) and (4) with the temperature sensor installed at a location representative of the combustion zone temperature. The monitoring requirements do not apply if the boiler or process heater meets either of the following:

(A) Has a design heat input capacity of 44 megawatts (150 MMBtu per hour) or greater.

(B) Introduces the vent stream with the primary fuel or uses the vent stream as the primary fuel.

(iv) For a control device complying with paragraph (1)(ii), an organic concentration CPMS that meets subsection (m)(1) and (5) that measures the concentration level of organic compounds in the exhaust vent stream from the control device.

(3) Operate the control device in compliance with the operating parameter value established under subsection (m)(6).

(4) Calculate the daily average of the monitored operating parameter for each operating day, using the valid data recorded by the monitoring system under subsection (m)(7).

(5) Ensure that the daily average of the monitoring parameter value calculated under paragraph (4) complies with the parameter value established under paragraph (3) as specified in subsection (m)(9).

(6) Operate the CPMS installed under paragraph (2) whenever the source is operating, except during the times specified in subsection (m)(8)(iii).

(e) *Compliance requirements for a flare.* The owner or operator of a control device subject to this section that installs a flare designed and operated in accordance with 40 CFR 60.18(b) (relating to general control device and work practice requirements) shall meet subsection (b)(3)—(7).

(f) *Compliance requirements for a carbon adsorption system.* The owner or operator of a control device subject to this section that installs a carbon adsorption system shall meet subsection (b)(1) and (2) and the following:

(1) Design and operate the carbon adsorption system to reduce the mass content of VOC in the gases vented to the device as demonstrated by one of the following:

(i) Determining the VOC emission reduction is 95.0% by weight or greater as specified in subsection (k).

(ii) Reducing the concentration of TOC in the exhaust gases at the outlet to the device to a level less than or equal to 275 ppmvd as propane corrected to 3% oxygen as determined under subsection (l).

(iii) Conducting a design analysis in accordance with subsection (g)(6) or subsection (h)(2) as applicable.

(2) Include a carbon replacement schedule in the design of the carbon adsorption system.

(3) Replace the carbon in the control device with fresh carbon on a regular schedule that is no longer than the carbon service life established according to the design analysis in subsection (g)(6) or subsection (h)(2) or according to the replacement schedule in paragraph (2).

(4) Manage the spent carbon removed from the carbon adsorption system in paragraph (3) by one of the following:

(i) Regenerating or reactivating the spent carbon in one of the following:

(A) 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~~ **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).

(B) A unit equipped with operating organic air emission controls in accordance with an emissions standard for VOC under a subpart in 40 CFR Part 60 (relating to standards of performance for new stationary sources) or 40 CFR Part 63 (relating to national emission standards for hazardous air pollutants for source categories).

(ii) Burning the spent carbon in one of the following:

(A) A hazardous waste incinerator, boiler or industrial furnace for which the owner or operator complies with the requirements of 40 CFR Part 63, Subpart EEE (relating to national emission standards for hazardous air pollutants from hazardous waste combustors) and has submitted a Notification of Compliance under 40 CFR 63.1207(j) (relating to what are the performance testing requirements?).

(B) An industrial furnace for which the owner or operator has been issued a permit ~~or authorization by the Department's Bureau of Waste Management~~ **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).**

(C) An industrial furnace designed and operated in accordance with the interim status requirements of 40 CFR Part 266, Subpart H ~~(relating to hazardous waste burned in boilers and industrial furnaces)~~.

(g) *Additional compliance requirements for a regenerative carbon adsorption system.* The owner or operator of a control device subject to this section that installs a regenerative carbon adsorption system shall meet subsection (f) and the following:

(1) Install, calibrate, operate and maintain a CPMS according to the manufacturer's specifications and the applicable requirements of subsection (m) to measure the values of the operating parameters appropriate to the control device as follows:

(i) For a source complying with subsection (f)(1)(i), a flow CPMS system that meets the requirements of subsection (m)(1) and (2)(ii) to measure and record the average total regeneration steam mass flow or volumetric flow during each carbon bed regeneration cycle. The owner or operator shall inspect the following:

(A) The mechanical connections for leakage with monthly inspections separated by at least 15 calendar days but not more than ~~30~~ **45** calendar days.

(B) The components of the flow CPMS for physical and operational integrity if the flow CPMS is not equipped with a redundant flow sensor with quarterly inspections separated by at least 60 calendar days but not more than ~~90~~ **120** calendar days.

(C) The electrical connections of the flow CPMS for oxidation and galvanic corrosion if the flow CPMS is not equipped with a redundant flow sensor with quarterly inspections separated by at least 60 calendar days but not more than ~~90~~ **120** calendar days.

(ii) For a source complying with subsection (f)(1)(i), a temperature CPMS that meets the requirements of subsection (m)(1) and (4) to measure and record the average carbon bed temperature for the duration of the carbon bed steaming cycle and measure the actual carbon bed temperature after regeneration and within 15 minutes of completing the cooling cycle.

(iii) For a source complying with subsection (f)(1)(ii), an organic concentration CPMS that meets subsection (m)(1) and (5) that measures the concentration level of organic compounds in the exhaust vent stream from the control device.

(2) Operate the control device in compliance with the operating parameter value established under subsection (m)(6).

(3) Calculate the daily average of the applicable monitored operating parameter for each operating day, using the valid data recorded by the CPMS as specified in subsection (m)(7).

(4) Ensure that the daily average of the monitoring parameter value calculated under paragraph (3) complies with the parameter value established under paragraph (2) as specified in subsection (m)(9).

(5) Operate the CPMS installed in paragraph (1) whenever the source is operating, except during the times specified in subsection (m)(8)(iii).

(6) Ensure that the design analysis to meet subsection (f)(1)(iii) and (2) for the regenerable carbon adsorption system meets the following:

(i) Includes an analysis of the vent stream, including the following information:

(A) Composition.

(B) Constituent concentrations.

(C) Flowrate.

(D) Relative humidity.

(E) Temperature.

(ii) Establishes the following parameters for the regenerable carbon adsorption system:

(A) Design exhaust vent stream organic compound concentration level.

(B) Adsorption cycle time.

(C) Number and capacity of carbon beds.

(D) Type and working capacity of activated carbon used for the carbon beds.

(E) Design total regeneration stream flow over the period of each complete carbon bed regeneration cycle.

(F) Design carbon bed temperature after regeneration.

(G) Design carbon bed regeneration time.

(H) Design service life of the carbon.

(h) *Additional compliance requirements for a non-regenerative carbon adsorption system.* The owner or operator of a control device subject to this section that installs a non-regenerative carbon adsorption system shall meet subsection (f) and the following:

(1) Monitor the design carbon replacement interval established in subsection (f)(2) or paragraph (2). The design carbon replacement interval must be based on the total carbon working capacity of the control device and the source operating schedule.

(2) Ensure that the design analysis to meet subsection (f)(1)(iii) and (2) for a non-regenerable carbon adsorption system, such as a carbon canister, meets the following:

(i) Includes an analysis of the vent stream including the following information:

(A) Composition.

(B) Constituent concentrations.

(C) Flowrate.

(D) Relative humidity.

(E) Temperature.

(ii) Establishes the following parameters for the non-regenerable carbon adsorption system:

(A) Design exhaust vent stream organic compound concentration level.

(B) Capacity of the carbon bed.

(C) Type and working capacity of activated carbon used for the carbon bed.

(D) Design carbon replacement interval based on the total carbon working capacity of the control device and the source operating schedule.

(iii) Incorporates dual carbon canisters in case of emission breakthrough occurring in one canister.

(i) *Compliance requirements for a condenser or non-destructive control device.* The owner or operator of a control device subject to this section that installs a condenser or other non-destructive control device shall meet subsection (b)(1) and (2) and the following:

(1) Design and operate the condenser or other non-destructive control device to reduce the mass content of VOC in the gases vented to the device as demonstrated by one of the following:

(i) Determining the VOC emissions reduction is 95.0% by weight or greater under subsection (k).

(ii) Reducing the concentration of TOC in the exhaust gases at the outlet to the device to a level less than or equal to 275 ppmvd as propane corrected to 3% oxygen as determined under subsection (l).

(iii) Conducting a design analysis in accordance with paragraph (7).

(2) Prepare a site-specific monitoring plan that addresses the following CPMS design, data collection, and quality assurance and quality control elements:

(i) The performance criteria and design specifications for the CPMS equipment, including the following:

(A) The location of the sampling interface that allows the CPMS to provide representative measurements. For a temperature CPMS that meets the requirements of subsection (m)(1) and (4) the sensor must be installed in the exhaust vent stream as detailed in the procedures of the site-specific monitoring plan.

(B) Equipment performance checks, system accuracy audits or other audit procedures.

(I) Performance evaluations of each CPMS shall be conducted in accordance with the site-specific monitoring plan.

(II) CPMS performance checks, system accuracy audits or other audit procedures specified in the site-specific monitoring plan shall be conducted at least once every 12 months.

(ii) Ongoing operation and maintenance procedures in accordance with 40 CFR 60.13(b) (relating to monitoring requirements).

(iii) Ongoing reporting and recordkeeping procedures in accordance with 40 CFR 60.7(c), (d) and (f) (relating to notification and record keeping).

(3) Install, calibrate, operate and maintain a CPMS according to the site-specific monitoring plan described in paragraph (2) and the applicable requirements of subsection (m) to measure the values of the operating parameters appropriate to the control device as follows:

(i) For a source complying with paragraph (1)(i), a temperature CPMS that meets subsection (m)(1) and (4) to measure and record the average condenser outlet temperature.

(ii) For a source complying with paragraph (1)(ii), an organic concentration CPMS that meets subsection (m)(1) and (5) that measures the concentration level of organic compounds in the exhaust vent stream from the control device.

(4) Operate the control device in compliance with the operating parameter value established under subsection (m)(6).

(5) Calculate the daily average of the applicable monitored operating parameter for each operating day, using the valid data recorded by the CPMS as follows:

(i) For a source complying with paragraph (1)(i), use the calculated daily average condenser outlet temperature as specified in subsection (m)(7) and the condenser performance curve established under subsection (m)(6)(iii) to determine the condenser efficiency for the current operating day. Calculate the 365-day rolling average TOC emission reduction, as appropriate, from the condenser efficiencies as follows:

(A) If there is less than 120 days of data for determining average TOC emission reduction, calculate the average TOC emission reduction for the first 120 days of operation. Compliance is demonstrated with paragraph (1)(i) if the 120-day average TOC emission reduction is equal to or greater than 95.0% by weight.

(B) After 120 days and no more than 364 days of operation, calculate the average TOC emission reduction as the TOC emission reduction averaged over the number of days of operation for which there is data. Compliance is demonstrated with paragraph (1)(i) if the average TOC emission reduction is equal to or greater than 95.0% by weight.

(C) If there is data for 365 days or more of operation, compliance is demonstrated with the TOC emission reduction if the rolling 365-day average TOC emission reduction calculated in subparagraph (i) is equal to or greater than 95.0% by weight.

(ii) For a source complying with paragraph (1)(ii), calculate the daily average concentration for each operating day, using the data recorded by the CPMS as specified in subsection (m)(7). Compliance is demonstrated with paragraph (1)(ii) if the daily average concentration is less than the operating parameter under paragraph (4) as specified in subsection (m)(9).

(6) Operate the CPMS installed in accordance with paragraph (3) whenever the source is operating, except during the times specified in subsection (m)(8)(iii).

(7) Ensure that the design analysis to meet paragraph (1)(iii) for a condenser or other non-destructive control device meets the following:

(i) Includes an analysis of the vent stream including the following information:

(A) Composition.

(B) Constituent concentrations.

(C) Flowrate.

(D) Relative humidity.

(E) Temperature.

(ii) Establishes the following parameters for the condenser or other non-destructive control device:

(A) Design outlet organic compound concentration level.

(B) Design average temperature of the condenser exhaust vent stream.

(C) Design average temperatures of the coolant fluid at the condenser inlet and outlet.

(j) *General performance test requirements*. The owner or operator shall meet the following performance test requirements:

(1) ~~Conduct an initial performance test within 180 days after _____ (*Editor's Note*: The blank refers to the effective date of this rulemaking, when published as a final-form rulemaking.) unless the owner or operator~~ **THE OWNER OR OPERATOR SHALL DO THE FOLLOWING, AS APPLICABLE:**

(i) EXCEPT AS SPECIFIED IN SUBPARAGRAPH (iii), CONDUCT AN INITIAL PERFORMANCE TEST WITHIN 180 DAYS AFTER INSTALLATION OF A CONTROL DEVICE.

(ii) EXCEPT AS SPECIFIED IN SUBPARAGRAPH (iii), CONDUCT A PERFORMANCE TEST OF AN EXISTING CONTROL DEVICE ON OR BEFORE _____ (*EDITOR'S NOTE*: THE BLANK REFERS TO THE DATE 240 DAYS AFTER THE EFFECTIVE DATE OF THIS RULEMAKING, WHEN PUBLISHED AS A FINAL-FORM RULEMAKING.) UNLESS THE OWNER OR OPERATOR OF THE CONTROL DEVICE IS COMPLYING WITH AN ESTABLISHED PERFORMANCE TEST INTERVAL, IN WHICH CASE THE CURRENT SCHEDULE SHOULD BE MAINTAINED.

(iii) THE PERFORMANCE TEST IN SUBPARAGRAPH (i) OR SUBPARAGRAPH (ii) IS NOT REQUIRED IF THE OWNER OR OPERATOR MEETS ONE OR MORE OF THE FOLLOWING:

~~(i)~~ **(A)** Installs a manufacturer-tested combustion device that meets the requirements of subsection (c).

~~(ii)~~ **(B)** Installs a flare that meets the requirements of subsection (e).

~~(iii)~~ **(C)** Installs a boiler or process heater with a design heat input capacity of 44 megawatts (150 MMBtu per hour) or greater.

~~(iv)~~ **(D)** Installs a boiler or process heater which introduces the vent stream with the primary fuel or uses the vent stream as the primary fuel.

~~(v)~~ **(E)** Installs a boiler or process heater which burns hazardous waste that meets one or more of the following:

~~(A)~~ **(I)** For which an operating permit was issued under 40 CFR Part 270 (relating to EPA administered permit programs: the hazardous waste permit program) and complies with the requirements of 40 CFR Part 266, Subpart H.

~~(B)~~ **(II)** For which compliance with the interim status requirements of 40 CFR Part 266, Subpart H has been certified.

~~(C)~~ **(III)** Which complies with 40 CFR Part 63, Subpart EEE and for which a Notification of Compliance under 40 CFR 63.1207(j) was submitted to the Department.

~~(D)~~ **(IV)** Which complies with 40 CFR Part 63, Subpart EEE and for which a Notification of Compliance under 40 CFR 63.1207(j) will be submitted to the Department within 90 days of the completion of the initial performance test report unless a written request for an extension is submitted to the Department.

~~(vi)~~ **(F)** Installs a hazardous waste incinerator which meets the requirements of 40 CFR Part 63, Subpart EEE and for which the Notification of Compliance under 40 CFR 63.1207(j):

~~(A)~~ **(I)** Was submitted to the Department.

~~(B)~~ **(II)** Will be submitted to the Department within 90 days of the completion of the initial performance test report unless a written request for an extension is submitted to the Department.

~~(vii)~~ **(G)** Requests the performance test be waived under 40 CFR 60.8(b) (relating to performance tests).

(2) Conduct a periodic performance test no more than 60 months after the most recent performance test unless the owner or operator:

(i) Monitors the inlet gas flow for a manufacturer-tested combustion device under subsection (c)(1)(i).

(ii) Installs a control device exempt from testing requirements under paragraph (1)(ii)—(vii).

(iii) Establishes a correlation between firebox or combustion chamber temperature and the VOC performance level for an enclosed combustion device under subsection (d)(2)(iii).

(3) Conduct a performance test when establishing a new operating limit.

(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 (c)(1)(ii), (d)(1)(i), (f)(1)(i) and (i)(1)(i) by meeting subsection (j) and the following:

(1) Conducting a minimum of three test runs of at least 1-hour duration.

(2) Using EPA Method 1 or EPA Method 1A, as appropriate, to select the sampling sites which must be located at the inlet of the first control device and at the outlet of the final control device. References to particulate mentioned in EPA Method 1 or EPA Method 1A do not apply to this paragraph.

(3) Using EPA Method 2, EPA Method 2A, EPA Method 2C or EPA Method 2D, as appropriate to determine the gas volumetric flowrate.

(4) Using EPA Method 25A to determine compliance with the control device percent VOC emission reduction performance requirement using the following procedure:

(i) Convert the EPA Method 25A results to a dry basis, using EPA Method 4.

(ii) Compute the mass rate of TOC using the following equations:

$$E_i = K_2 C_i M_i Q_i$$

$$E_o = K_2 C_o M_i Q_o$$

Where:

E_i = Mass rate of TOC at the inlet of the control device on a dry basis, in kilograms per hour (pounds per hour).

E_o = Mass rate of TOC at the outlet of the control device on a dry basis, in kilograms per hour (pounds per hour).

K_2 = Constant, 2.494×10^{-6} (ppm) (mole per standard cubic meter) (kilogram per gram) (minute per hour) where standard temperature (mole per standard cubic meter) is 20° Celsius

Or

K_2 = Constant, 1.554×10^{-7} (ppm) (lb-mole per standard cubic feet) (minute per hour), where standard temperature (lb-mole per standard cubic feet) is 68° Fahrenheit.

C_i = Concentration of TOC, as propane, of the gas stream as measured by EPA Method 25A at the inlet of the control device, ppmvd.

C_o = Concentration of TOC, as propane, of the gas stream as measured by EPA Method 25A at the outlet of the control device, ppmvd.

M_p = Molecular weight of propane, 44.1 gram per mole (pounds per lb-mole).

Q_i = Flowrate of gas stream at the inlet of the control device in dry standard cubic meter per minute (dry standard cubic feet per minute).

Q_o = Flowrate of gas stream at the outlet of the control device in dry standard cubic meter per minute (dry standard cubic feet per minute).

(iii) Calculate the percent reduction in TOC as follows:

$$R_{cd} = \frac{E_i - E_o}{E_i} * 100\%$$

Where:

R_{cd} = Control efficiency of control device, percent.

E_i = Mass rate of TOC at the inlet to the control device as calculated in subparagraph (ii), kilograms per hour (pounds per hour).

E_o = Mass rate of TOC at the outlet of the control device as calculated in subparagraph (ii), kilograms per hour (pounds per hour).

(iv) If the vent stream entering a boiler or process heater with a performance testing requirement is introduced with the combustion air or as a secondary fuel, the owner or operator shall:

(A) Calculate E_i in subparagraph (ii) by using the TOC concentration in all combusted vent streams, primary fuels and secondary fuels as C_i.

(B) Calculate E_o in subparagraph (ii) by using the TOC concentration exiting the device as C_o.

(C) Determine the weight-percent reduction of TOC across the device in accordance with subparagraph (iii).

(5) The weight-percent reduction of TOC across the control device represents the VOC weight-percent reduction for demonstration of compliance with subsections (c)(1)(ii), (d)(1)(i), (f)(1)(i) and (i)(1)(i).

(l) *Performance test method for demonstrating compliance with an outlet concentration requirement*. Demonstrate compliance with the TOC concentration requirement of subsections (d)(1)(ii), (f)(1)(ii) and (i)(1)(ii) by meeting subsection (j) and the following:

(1) Conducting a minimum of three test runs of at least 1-hour duration.

(2) Using EPA Method 1 or EPA Method 1A, as appropriate, to select the sampling sites which must be located at the outlet of the control device. References to particulate mentioned in EPA Method 1 or EPA Method 1A do not apply to this paragraph.

(3) Using EPA Method 2, EPA Method 2A, EPA Method 2C, or EPA Method 2D, as appropriate to determine the gas volumetric flowrate.

(4) Using EPA Method 25A to determine compliance with the TOC concentration requirement using the following procedures:

(i) Measure the TOC concentration, as propane.

(ii) For a control device subject to subsection (f) or subsection (i), the results of EPA Method 25A in subparagraph (i) may be adjusted by subtracting the concentration of methane and ethane measured using EPA Method 18 taking either:

(A) An integrated sample.

(B) A minimum of four grab samples per hour using the following procedures:

(I) Taking the samples at approximately equal intervals in time, such as 15-minute intervals during the run.

(II) Taking the samples during the same time as the EPA Method 25A sample.

(III) Determining the average methane and ethane concentration per run.

(iii) The TOC concentration must be adjusted to a dry basis, using EPA Method 4.

(iv) The TOC concentration must be corrected to 3% oxygen as follows:

(A) The oxygen concentration must be determined using the emission rate correction factor for excess air, integrated sampling and analysis procedures from one of the following methods:

(I) EPA Method 3A.

(II) EPA Method 3B.

(III) ASTM D6522-00.

(IV) ANSI/ASME PTC 19.10-1981, Part 10.

(B) The samples for clause (A) must be taken during the same time that the samples are taken for determining the TOC concentration.

(C) The TOC concentration for percent oxygen must be corrected as follows:

$$C_c = C_m \left(\frac{17.9}{20.9 - \%O_{2m}} \right)$$

Where:

C_c = TOC concentration, as propane, corrected to 3% oxygen, ppmvd.

C_m = TOC concentration, as propane, ppmvd.

$\%O_{2m}$ = Concentration of oxygen, percent by volume as measured, dry.

(m) *Continuous parameter monitoring system requirements.* The owner or operator of a source subject to § 129.121(a) (relating to general provisions and applicability) and controlled by a device listed in subsections (c)—(i) that is required to install a CPMS shall:

(1) Ensure the CPMS measures the applicable parameter at least once every hour and continuously records either:

(i) The measured operating parameter value.

(ii) The block average operating parameter value for each 1-hour period calculated using the following procedures:

(A) The block average from all measured data values during each period.

(B) If values are measured more frequently than once per minute, a single value for each minute may be used instead of all measured values.

(2) Ensure the flow CPMS has either:

(i) An accuracy of ±2% or better at the maximum expected flow rate.

(ii) A measurement sensitivity of 5% of the flow rate or 10 standard cubic feet per minute, whichever is greater.

(3) Ensure the heat-sensing CPMS indicates the presence of the pilot flame while emissions are routed to the control device. Heat-sensing CPMS are exempt from the calibration, quality assurance and quality control requirements in this section.

(4) Ensure the temperature CPMS has a minimum accuracy of ±1% of the temperature being monitored in °Celsius (±1.8% in °Fahrenheit) or ±2.5 °Celsius (±4.5 °Fahrenheit), whichever value is greater.

(5) Ensure the organic concentration CPMS meets the requirements of Performance Specification 8 or 9 of 40 CFR Part 60, Appendix B (relating to performance specifications).

(6) Establish the operating parameter value to define the conditions at which the control device must be operated to continuously achieve the applicable performance requirement as follows:

(i) For a parameter value established while conducting a performance test under subsection (k) or subsection (l):

(A) Base each minimum operating parameter value on the value established while conducting the performance test and supplemented, as necessary, by the design analysis of subsection (g)(6), subsection (h)(2) or subsection (i)(7), the manufacturer's recommendations, or both.

(B) Base each maximum operating parameter value on the value established while conducting the performance test and supplemented, as necessary, by the design analysis of subsection (g)(6), subsection (h)(2) or subsection (i)(7), the manufacturer's recommendations, or both.

(ii) Except as specified in clause (C), for a parameter value established using a design analysis in subsection (g)(6), subsection (h)(2) or subsection (i)(7):

(A) Base each minimum operating parameter value on the value established in the design analysis and supplemented, as necessary, by the manufacturer's recommendations.

(B) Base each maximum operating parameter value on the value established in the design analysis and supplemented, as necessary, by the manufacturer's recommendations.

(C) If the owner or operator and the Department do not agree on a demonstration of control device performance using a design analysis as specified in clause (A) or (B), then the owner or

operator shall perform a performance test under subsection (k) or subsection (l) to resolve the disagreement. The Department may choose to have an authorized representative observe the performance test.

(iii) For a condenser, establish a condenser performance curve showing the relationship between condenser outlet temperature and condenser control efficiency that demonstrates the condenser complies with the applicable performance requirements in subsection (i)(1) as follows:

(A) Based on the value measured while conducting a performance test under subsection (k) or subsection (l) and supplemented, as necessary, by a condenser design analysis performed under subsection (i)(7), the manufacturer's recommendations, or both.

(B) Based on the value from a condenser design analysis performed under subsection (i)(7) supplemented, as necessary, by the manufacturer's recommendations.

(7) Except for the CPMS in paragraphs (2) and (3), calculate the daily average for each monitored parameter for each operating day using the data recorded by the CPMS. Valid data points must be available for 75% of the operating hours in an operating day to compute the daily average where the operating day is:

(i) A 24-hour period if the control device operation is continuous.

(ii) The total number of hours of control device operation per 24-hour period.

(8) Except as specified in subparagraph (iii), do both of the following:

(i) Ensure the data recorded by the CPMS is used to assess the operation of the control device and associated control system.

(ii) Report the failure to collect the required data in paragraph (1) as a deviation of the monitoring requirements.

(iii) The requirements of subparagraphs (i) and (ii) do not apply during:

(A) A monitoring system malfunction.

(B) A repair associated with a monitoring system malfunction.

(C) A required monitoring system quality assurance or quality control activity.

(9) Determine compliance with the established parameter value by comparing the calculated daily average to the established operating parameter value as follows:

(i) For a minimum operating parameter established in paragraph (6)(i)(A) or paragraph (6)(ii)(A), the control device is in compliance if the calculated value is equal to or greater than the established value.

(ii) For a maximum operating parameter established in paragraph (6)(i)(B) or paragraph (6)(ii)(B), the control device is in compliance if the calculated value is less than or equal to the established value.

§ 129.130. Recordkeeping and reporting.

(a) *Recordkeeping*. The owner or operator of a source subject to §§ 129.121—129.129 shall maintain the applicable records onsite or at the nearest local field office for 5 years. The records shall be made available to the Department upon request.

(b) *Storage vessels*. The records for each storage vessel must include the following, as applicable:

(1) The identification and location of each storage vessel subject to § 129.123 (relating to storage vessels). The location of the storage vessel shall be in latitude and longitude coordinates in decimal degrees to an accuracy and precision of 5 decimals of a degree using the North American Datum of 1983.

(2) Each deviation when the storage vessel was not operated in compliance with the requirements specified in § 129.123.

(3) The identity of each storage vessel removed from service under § 129.123(e) and the date on which it was removed from service.

(4) The identity of each storage vessel returned to service under § 129.123(f) and the date on which it was returned to service.

(5) The identity of each storage vessel and the VOC potential to emit calculation under § 129.123(a)(2).

(6) The identity of each storage vessel and the actual VOC emission calculation under § 129.123(c) including the following information:

(i) The date of each monthly calculation performed under § 129.123(c)(1).

(ii) The calculation determining the actual VOC emissions each month.

(iii) The calculation demonstrating that the actual VOC emissions are less than ~~the applicable VOC emission threshold on~~ **2.7 TPY DETERMINED AS** a 12-month rolling ~~basis~~ **SUM**.

(7) The records documenting the time the skid-mounted or mobile storage vessel under ~~§ 129.123(d)(3)~~ **§ 129.123(d)(1)** is located on site. If a skid-mounted or mobile storage vessel is removed from a site and either returned or replaced within 30 calendar days to serve the same or similar function, count the entire period since the original storage vessel was removed towards the number of consecutive days.

(8) The identity of each storage vessel required to reduce VOC emissions under § 129.123(b)(1) and the demonstration under § 129.123(b)(1)(iv).

(c) *Natural gas-driven **CONTINUOUS BLEED** pneumatic controllers.* The records for each natural gas-driven **CONTINUOUS BLEED** pneumatic controller must include the following, as applicable:

(1) The **REQUIRED COMPLIANCE** date, identification, location and manufacturer specifications for each natural gas-driven **CONTINUOUS BLEED** pneumatic controller subject to § 129.124**(c)** (relating to natural gas-driven **CONTINUOUS BLEED** pneumatic controllers).

(2) Each deviation when the **NATURAL GAS-DRIVEN CONTINUOUS BLEED** pneumatic controller was not operated in compliance with the requirements specified in § 129.124**(c)**.

(3) If the **NATURAL GAS-DRIVEN CONTINUOUS BLEED** pneumatic controller is located at a natural gas processing plant, the documentation that the natural gas bleed rate is zero.

(4) For a natural gas-driven **CONTINUOUS BLEED** pneumatic controller under § 129.124(b), the determination based on a functional requirement for why a natural gas bleed rate greater than the applicable standard is required. A functional requirement includes one or more of the following:

(i) Response time.

(ii) Safety.

(iii) Positive actuation.

(d) *Natural gas-driven diaphragm pumps.* The records for each natural gas-driven diaphragm pump must include the following, as applicable:

(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).

(2) Each deviation when the natural gas-driven diaphragm pump was not operated in compliance with the requirements specified in § 129.125.

(3) For a natural gas-driven diaphragm pump under § 129.125(d), the records of the days of operation each calendar year. Any period of operation during a calendar day counts toward the 90-calendar-day threshold.

(4) For a natural gas-driven diaphragm pump under § 129.125(c)(1), maintain the following records:

(i) The records under subsection (j) for the control device type.

(ii) One of the following:

(A) The results of a performance test under § 129.129(k) or (l) (relating to control devices).

(B) A design evaluation indicating the percentage of VOC emissions reduction the control device is designed to achieve.

(C) The manufacturer's specifications indicating the percentage of VOC emissions reduction the control device is designed to achieve.

(5) For a well site with no available control device or process under § 129.125(c)(2), maintain a copy of the certification submitted under subsection (k)(3)(ii)(B).

(6) The engineering assessment substantiating a claim under § 129.125(c)(3), including the certification under § 129.125(c)(3)(ii)(C).

(7) For a natural gas-driven diaphragm pump required to reduce VOC emissions under ~~§ 129.125(e)(1)~~ **§ 129.125(b)(1)**, the demonstration under ~~§ 129.125(e)(1)(iii)~~ **§ 129.125(b)(1)(iii)**.

(e) *Reciprocating compressors*. The records for each reciprocating compressor must include the following, as applicable:

(1) For a reciprocating compressor under § 129.126(b)(1)(i) (relating to compressors), the following records:

(i) The cumulative number of hours of operation.

(ii) The date and time of each rod packing replacement.

(2) For a reciprocating compressor under § 129.126(b)(1)(ii), the following records:

(i) The number of months since the previous replacement of the rod packing.

(ii) The date of each rod packing replacement.

(3) For a reciprocating compressor under § 129.126(b)(2), the following records:

(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.

(ii) The date of installation of a rod packing emissions collection system and closed vent system as specified in § 129.126(b)(2).

(4) Each deviation when the reciprocating compressor was not operated in compliance with § 129.126(b).

(f) *Centrifugal compressors*. The records for each centrifugal compressor must include the following, as applicable:

(1) An identification of each existing centrifugal compressor using a wet seal system subject to § 129.126(c).

(2) Each deviation when the centrifugal compressor was not operated in compliance with § 129.126(c).

(3) For a centrifugal compressor required to reduce VOC emissions under § 129.126(c)(1), the demonstration under § 129.126(c)(3).

(g) *Fugitive emissions components*. The records for each fugitive emissions component must include the following, as applicable:

(1) For ~~a~~ **AN OIL** well site subject to ~~§ 129.127(b)(1)(i)~~ **§ 129.127(c)(1)(ii)** (relating to fugitive emissions components):

(i) The location of ~~the~~ **EACH** well and ~~the~~ **ITS** United States Well ID Number.

(ii) The ~~annual~~ analysis documenting a GOR of less than 300 standard cubic feet of gas per ~~stock~~ barrel of oil produced, conducted using generally accepted methods. The analysis must be signed by and include a certification by the responsible official stating that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate and complete.

(2) FOR EACH WELL SITE, THE AVERAGE PRODUCTION CALCULATIONS REQUIRED UNDER § 129.127(b)(1) AND § 129.127(c)(4).

(3) For a well site subject to ~~§ 129.127(b)(2)~~ **§ 129.127(c)(2) OR (c)(3)**, a natural gas gathering and boosting station ~~and~~ **OR** a natural gas processing plant:

(i) The fugitive emissions monitoring plan under ~~§ 129.127(f)~~ **§ 129.127(g)**.

(ii) The records of each monitoring survey conducted under ~~§ 129.127(b)(1)(ii) or § 129.127(d)(2)~~ **§ 129.127(c)(2)(ii), (c)(3)(ii) OR (e)(2)**. The monitoring survey must include the following information:

(A) The facility name and location.

(B) The date, start time and end time of the survey.

(C) The name of the equipment operator performing the survey.

(D) The monitoring instrument used.

(E) The ambient temperature, sky conditions and maximum wind speed at the time of the survey.

(F) Each deviation from the monitoring plan or a statement that there were none.

(G) Documentation of each fugitive emission including:

(I) The identification of each component from which fugitive emissions were detected.

(II) The instrument reading of each fugitive emissions component that meets the definition of a leak under § 129.122(a) (relating to definitions, acronyms and EPA methods).

(III) The repair methods applied in each attempt to repair the component.

(IV) The tagging or digital photographing of each component not repaired during the monitoring survey in which the fugitive emissions were discovered.

(V) The reason a component was placed on delay of repair.

(VI) The date of successful repair of the component.

(VII) If repair of the component was not completed during the monitoring survey in which the fugitive emissions were discovered, the information on the instrumentation or the method used to resurvey the component after repair.

~~(3) For a well site subject to § 129.127(b)(1)(ii) for which the owner or operator opts to comply with § 129.127(b)(2), the calculations demonstrating the percentage of leaking components.~~

(h) *Covers.* The records for each cover ~~includes~~ **INCLUDE** the results of each cover inspection under § 129.128(a) (relating to covers and closed vent systems).

(i) *Closed vent systems.* The records for each closed vent system must include the following, as applicable:

(1) The results of each closed vent system inspection under § 129.128(b)(2).

(2) For the no detectable emissions inspections of § 129.128(d), a record of the monitoring survey as specified under subsection ~~(g)(2)(ii)~~ (g)(3)(ii).

(3) The engineering assessment under § 129.128(c), including the certification under § 129.128(c)(3).

(4) If the closed vent system includes a bypass device subject to § 129.128(b)(4), a record of:

(i) Each time the alarm is activated.

(ii) Each time the key is checked out, as applicable.

(iii) Each inspection required under § 129.128(b)(4)(ii)(B).

(j) *Control devices.* The records for each control device must include the following, as applicable:

(1) Make, model and serial number of the purchased device.

(2) Date of purchase.

(3) Copy of purchase order.

(4) Location of the control device in latitude and longitude coordinates in decimal degrees to an accuracy and precision of 5 decimals of a degree using the North American Datum of 1983.

(5) For the general requirements under § 129.129(b):

(i) The manufacturer's written operating instructions, procedures and maintenance schedule to ensure good air pollution control practices for minimizing emissions under § 129.129(b)(1).

(ii) The results of each monthly physical integrity check performed under § 129.129(b)(2).

(iii) The CPMS data which indicates the presence of a pilot flame during the device's operation under § 129.129(b)(3).

(iv) The results of the visible emissions test under § 129.129(b)(4) using Figure 22-1 in EPA Method 22 or a form which includes the following:

(A) The name of the company **THAT OWNS OR OPERATES THE CONTROL DEVICE.**

(B) The location of the control device.

(C) The name **AND AFFILIATION** of the person performing the observation.

(D) The sky conditions at the time of observation.

(E) Type of control device.

(F) The clock start time.

(G) The observation period duration, in minutes and seconds.

(H) The accumulated emission time, in minutes and seconds.

(I) The clock end time.

(v) The results of the visible emissions test required in § 129.129(b)(6) under subparagraph (iv) following a return to operation from a maintenance or repair activity performed under § 129.129(b)(5).

(vi) The maintenance and repair log under § 129.129(b)(7).

(6) For a manufacturer-tested combustion control device under § 129.129(c), maintain the following records:

(i) The records specified in paragraph (5)(i)—(vi).

(ii) The manufacturer's specified inlet gas flow rate.

(iii) The CPMS results under § 129.129(c)(1)(i).

(iv) The results of each performance test conducted under § 129.129(c)(1)(ii) as performed under § 129.129(k).

(7) For an enclosed combustion device in § 129.129(d):

(i) The records specified in paragraph (5)(i)—(vi).

(ii) The results of each performance test conducted under § 129.129(d)(1)(i) as performed under § 129.129(k).

(iii) The results of each performance test conducted under § 129.129(d)(1)(ii) as performed under § 129.129(l).

(iv) The data and calculations for the CPMS installed, operated or maintained under § 129.129(d)(2).

(8) For a flare in § 129.129(e), the records specified in paragraph (5)(iii)—(vi).

(9) For a regenerative carbon adsorption device in § 129.129(g):

(i) The records specified in paragraph (5)(i) and (ii).

(ii) The results of the performance test conducted under § 129.129(f)(1)(i) as performed under § 129.129(k).

(iii) The results of the performance test conducted under § 129.129(f)(1)(ii) as performed under § 129.129(l).

(iv) The control device design analysis, if one is performed under § 129.129(g)(6).

(v) The data and calculations for a CPMS installed, operated or maintained under § 129.129(g)(1)—(5).

(vi) The schedule for carbon replacement, as determined by § 129.129(f)(2) or the design analysis requirements of § 129.129(g)(6) and records of each carbon replacement under § 129.129(f)(3) and (4).

(10) For a non-regenerative carbon adsorption device in § 129.129(h):

(i) The records specified in paragraph (5)(i) and (ii).

(ii) The results of the performance test conducted under § 129.129(f)(1)(i) as performed under § 129.129(k).

(iii) The results of the performance test conducted under § 129.129(f)(1)(ii) as performed under § 129.129(l).

(iv) The control device design analysis, if one is performed under § 129.129(h)(2).

(v) The schedule for carbon replacement, as determined by § 129.129(f)(2) or the design analysis requirements of § 129.129(h)(2) and records of each carbon replacement under § 129.129(f)(3) and (4).

(11) For a condenser or other non-destructive control device in § 129.129(i):

(i) The records specified in paragraph (5)(i) and (ii).

(ii) The results of the performance test conducted under § 129.129(i)(1)(i) as performed under § 129.129(k).

(iii) The results of the performance test conducted under § 129.129(i)(1)(ii) as performed under § 129.129(l).

(iv) The control device design analysis, if one is performed under § 129.129(i)(7).

(v) The site-specific monitoring plan under § 129.129(i)(2).

(vi) The data and calculations for a CPMS installed, operated or maintained under § 129.129(i)(3)—(5).

(k) *Reporting.* The owner or operator of a source subject to § 129.121(a) (relating to general provisions and applicability) shall ~~submit~~ **DO THE FOLLOWING:**

(1) SUBMIT an initial **ANNUAL** report to the Air Program Manager of the appropriate Department Regional Office by _____ (*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.) and annually thereafter **ON OR BEFORE JUNE 1.**

(i) The responsible official must sign, date and certify compliance and include the certification in the initial report and each subsequent annual report.

(ii) The due date of the initial report ~~can~~ **MAY** be extended with the written approval of the Air Program Manager of the appropriate Department Regional Office.

(2) SUBMIT THE REPORTS UNDER PARAGRAPH (3) IN A MANNER PRESCRIBED BY THE DEPARTMENT.

(3) SUBMIT THE INFORMATION SPECIFIED IN SUBPARAGRAPHS (i)—(ix) FOR EACH REPORT AS APPLICABLE:

~~(1)~~ **(i)** *Storage vessels.* The report for each storage vessel must include the information specified in subsection (b)(1)—(4) for the reporting period, as applicable.

~~(2)~~ **(ii)** *Natural gas-driven **CONTINUOUS BLEED** pneumatic controllers.* The initial report for each natural gas-driven **CONTINUOUS BLEED** pneumatic controller must include the information specified in subsection (c), as applicable. Subsequent reports must include the following:

~~(i)~~ **(A)** The information specified in subsection (c)(1) and (2) for each natural gas-driven **CONTINUOUS BLEED** pneumatic controller.

~~(ii)~~ **(B)** The information specified in subsection (c)(3) and (4) for each natural gas-driven **CONTINUOUS BLEED** pneumatic controller installed during the reporting period.

~~(3)~~ **(iii)** *Natural gas-driven diaphragm pumps.* The report for each natural gas-driven diaphragm pump must include the following:

~~(i)~~ **(A)** The information specified in subsection (d)(1) and (2) for the reporting period, as applicable.

~~(ii)~~ **(B)** A certification of the compliance status of each natural gas-driven diaphragm pump during the reporting period using one of the following:

~~(A)~~ **(I)** A certification that the emissions from the natural gas-driven diaphragm pump are routed to a control device or process under § 129.125(b)(1)(ii) or (c)(1). If the control device is installed during the reporting period under ~~§ 129.125(c)(2)(i)(C)~~ **§ 129.125(c)(2)(iii)**, include the information specified in subsection (d)(4).

~~(B)~~ **(II)** A certification under § 129.125(c)(2) that there is no control device or process available at the facility during the reporting period. This includes if a control device or process is removed from the facility during the reporting period.

~~(C)~~ **(III)** A certification according to § 129.125(c)(3)(ii)(C) that it is technically infeasible to capture and route emissions from:

~~(I)~~ **(-a-)** A natural gas-driven diaphragm pump installed during the reporting period to an existing control device or process.

~~(II)~~ **(-b-)** An existing natural gas-driven diaphragm pump to a control device or process installed during the reporting period.

~~(III)~~ **(-c-)** An existing natural gas-driven diaphragm pump to another control device or process located at the facility due to the removal of the original control device or process during the reporting period.

~~(4)~~ **(iv)** *Reciprocating compressors*. The report for each reciprocating compressor must include the information specified in subsection (e) for the reporting period, as applicable.

~~(5)~~ **(v)** *Centrifugal compressors*. The report for each centrifugal compressor must include the information specified in subsection (f) for the reporting period, as applicable.

~~(6)~~ **(vi)** *Fugitive emissions components*. The report for each fugitive emissions component must include the records of each monitoring survey conducted during the reporting period as specified in subsection ~~(g)(2)(ii)~~ **(g)(3)(ii)**.

~~(7)~~ **(vii)** *Covers*. The report for each cover must include the information specified in subsection (h) for the reporting period, as applicable.

~~(8)~~ **(viii)** *Closed vent systems*. The report for each closed vent system must include the information specified in subsection (i)(1) and (2) for the reporting period, as applicable. The information specified in subsection (i)(3) is only required **FOR THE INITIAL REPORT OR** if the closed vent system was installed during the reporting period.

~~(9)~~ **(ix)** *Control devices*. The report for each control device must include the information specified in subsection (j), as applicable.

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Bureau of Air Quality

COMMENT AND RESPONSE DOCUMENT

Control of VOC Emissions from 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 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 proposed to add §§ 129.121—129.130 to adopt reasonably available control technology (RACT) requirements and RACT emission limitations for 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, and fugitive emissions components. The Board also proposed to add definitions and acronyms and to list 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 proposed to amend certain terms in and add an abbreviation to § 121.1 (relating to definitions) to support the proposed amendments to Chapter 129.

The Board held three virtual public hearings for the purpose of accepting comments on this 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.

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_2S	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 does not apply to conventional oil and gas wells. Instead, 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. Additionally, the 2016 O&G CTG does not provide definitions of conventional and unconventional wells and the EPA does not establish definitions of conventional and unconventional wells in the New Source Performance Standards (NSPS) codified at 40 CFR Part 60, Subpart OOOO or 40 CFR Part 60, Subpart OOOOa. Rather, the recommendations of the 2016 O&G CTG are applicable to the control of VOC emissions from certain categories of sources used by owners or operators at both conventional and unconventional well sites in the onshore production and processing segments of the oil and natural gas industry and are not specific to the operation of a conventional well or an unconventional well.

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:

In response, the Board clarifies that Act 52 does not apply to this final-form rulemaking and therefore, the Board is not required to develop a separate rulemaking and regulatory analysis form for the requirements for conventional oil and gas wells.

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 polices 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 12,068 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 221,066 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 $31.7 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 $20.3 million (2021 dollars). This results in a total net cost of $11.4 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 is a net benefit. 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.

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 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 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 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.

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:

In response, the Board explains that 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 in all segments of oil and gas operations except natural gas distribution, natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps, reciprocating and centrifugal compressors, and fugitive emissions components. 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. Some conventional owners or operators may need to implement control measures if they own or operate regulated sources emitting above the VOC emission threshold. 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 did not state that this rulemaking would not apply to sources used in the conventional oil and gas industry.

In terms of whether this final-form rulemaking applies to the conventional industry, based on information from the Department's oil and gas production database, the Department estimates that approximately 95 of the 27,193 conventional well sites may need to implement a new LDAR program because those well sites produce at least 15 BOE per day with at least one well producing a minimum of 5 BOE. Based on the Department's record of when conventional well sites were drilled, the Department assumes that 67 conventional well sites are subject to Subpart OOOOa, which applies to oil and natural gas facilities constructed, modified or reconstructed after September 18, 2015. Of the approximately 95 conventional well sites that may be required to implement a new LDAR program under this final-form rulemaking, 31 would have to meet the annual instrument-based inspection requirement and the remaining 64 would have to meet the quarterly instrument-based inspection requirement.

To the extent that this final-form rulemaking applies to the conventional industry, the owners or operators are required to confirm this applicability determination.

8. Comment: IRRC 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. IRRC 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 the 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 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 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 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 the 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 obliviate 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 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 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.

The Department identified 5,039 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 30,648 well sites, 486 gathering and boosting stations, and 15 natural gas processing facilities in this Commonwealth. Of these potential 5,039 owners or operators, approximately 3,834 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 5,039 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. Additionally, the Department notes that 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.

In this final-form rulemaking, the Department estimates that there are 27,260 conventional well sites with 68,519 producing conventional wells. Based on comments, the Department estimates there is approximately 1 storage vessel per well site; of these, only 6 are estimated to have VOC emissions that would require control, for a cost of approximately $185,453 (2021 dollars) and reducing 71 TPY VOC yielding $2,612 per ton reduced. For natural gas continuous bleed pneumatic controllers, based on comments and assuming those that are subject to Federal regulation are in compliance, the Department estimates there are 26,284 natural gas-driven continuous bleed pneumatic controllers that would require replacement. The cost to replace these natural gas-driven continuous bleed pneumatic controllers is estimated to be $9.1 million (2021 dollars). This would result in a VOC emission reduction of 8,336 TPY at a cost of $1,093 per ton reduced and an estimated savings in natural gas of $14.3 million (2021 dollars), or $546 in savings per natural gas-driven continuous bleed pneumatic controller replaced.

Of the 27,260 conventional well sites, the Department estimates that 64 well sites with 289 wells would be required to implement quarterly instrument-based LDAR and 31 well sites with 970 wells would be required to implement annual instrument-based LDAR. This would cost an estimated $482,408 (2021 dollars) and result in approximately 797 TPY VOC emissions reduction or $605 per ton reduced. The Department estimates that implementation of LDAR at these well sites would result in an estimated savings in natural gas of approximately $1.4 million (2021 dollars), or $14,447 in savings per facility conducting LDAR. These cost and savings figures represent a net benefit to the conventional industry of $889,129 which implies a financial benefit, not an impact, to the conventional industry. Therefore, the Department estimates total industry costs for conventional operators will be 9.8 million (in 2021 dollars), the total industry savings will be $15.7 million, for a total net benefit of $5.9 million.

In addition, those well sites all have one or more high producing wells. High producing wells generate the most oil, which leads to higher revenue and profits. In other words, for the conventional O&G industry, only the 95 highest producing well sites out of 27,260 well sites

will be subject to the LDAR requirements. To the extent that the regulated well sites, which represent the 0.3% highest producing well sites, are small businesses, the economic burden will be small because these are among the very highest revenue generating well sites.

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. Since the terms were removed, the Department determined that there was no need to add the reference to the definitions in 25 Pa. Code §§ 78.1 and 78a.1. As explained in other responses, the Department is not regulating conventional or unconventional wells in this final-form rulemaking. Additionally, the Department revised § 129.123(a) to reflect the Department's analysis which shows that it is cost-effective for the owner or operator of a storage vessel to control by 95% those storage vessels with a potential to emit 2.7 TPY or greater VOC emissions and that it is not necessary to include requirements based on where that storage vessel is installed.

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 a well site in a new subsection, § 129.127(b), of this final-form rulemaking. The owner or operator of a 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. The 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)(l)(ii) in § 129.129(k)(5) since subsection (c)(l)(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)(l)(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)(l) 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. This final-form rulemaking adopts RACT requirements for five specific air emission source categories – storage vessels in all segments except natural gas distribution; natural gas-driven continuous bleed pneumatic controllers; natural gas-driven diaphragm pumps; reciprocating and centrifugal compressors; and fugitive emissions components. These sources are the same whether they are used by the conventional or the unconventional oil and natural gas industry.

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: 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 in all segments except natural gas distribution, natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps, reciprocating and centrifugal compressors, and fugitive emissions components. 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. While the Department provided an estimate of the number of conventional oil and gas wells that may be required to implement control measures for these sources in the proposed rulemaking documents, the Department has clarified in the final rulemaking documents that this final-form rulemaking does not regulate conventional oil and gas wells. However, some conventional owners or operators may need to implement control measures if they own or operate regulated sources emitting above the VOC emission threshold. 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.

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 has not stated that this rulemaking would not apply to sources used in the conventional oil and gas industry.

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: 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.

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 in all segments except natural gas distribution, natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps, reciprocating and centrifugal compressors, and fugitive emissions components. 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. While the Department provided an estimate of the number of conventional oil and gas wells that may be required to implement control measures for these sources in the proposed rulemaking documents, the Department has clarified in the final rulemaking documents that this final-form rulemaking does not regulate conventional oil and gas wells. However, some conventional owners or operators may need to implement control measures if they own or

operate regulated sources emitting above the VOC emission threshold. 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.

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 has not stated that this rulemaking would not apply to sources used in the conventional oil and gas industry.

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 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 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 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 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 all 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 12,068 TPY of VOC emissions, with approximately 714 TPY attributed to the Department's more stringent requirements. This proposed rulemaking is estimated to reduce 221,066 TPY of methane as a co-benefit, with approximately 11,913 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 221,066 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.

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 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 the final-form rulemaking have been determined by the Department to be technically and economically feasible. Please also see the response to Comment 11 for information on the economic impact of this final-form rulemaking.

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 $20.3 million (2021 dollars). The total industry cost to implement the requirements of the final-form rulemaking are $31.7 million (2021 dollars), for a net cost to the industry of $11.4 million (2021 dollars). This results in a total estimated VOC emissions reduction of 12,068 tons, for an average net cost of $945 per ton of VOC reduced. In addition, the economics of this final-form rulemaking improves to a net cost of $1.9 million (2021 dollars) at $2.50 per Mcf and a net benefit of $27.9 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 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 499 TPY of VOC emission reductions and 8,118 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 136 TPY of VOC emission reductions and 2,607 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 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 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 221,066 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 221,066 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 phone 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 221,066 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 "model plant" for each individual well site was based on the number of wells at the well site and equipment counts based on the number of wells at the well site. This information was used to estimate the number of affected fugitive emissions components at each well site and therefore 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 (or unconventional) oil and natural gas wells; instead it controls harmful VOC emissions from five specific categories of air emission sources as required by the EPA in the 2016 O&G CTG. These sources are the same pieces of equipment irrespective of whether they are used by the unconventional or conventional oil and natural gas industry.

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 18 facilities with 51 storage vessels that emit 2.7 TPY or more of VOC with a total industry cost of $556,359 (2021 dollars) per year. The Department estimates that implementation of the final-form control measures could reduce VOC emissions by as much as 282 TPY from the installation of controls for storage vessels. This results in an average cost of approximately $1,973 (2021 dollars) per ton of VOC emissions reduced per year. Approximately 18 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 31,134 facilities with an estimated 34,856 affected pneumatic controllers. The total industry cost is $12,085,272 (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 9,102 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 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 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 31,149 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 total industry cost is approximately $18,576,941 (2021 dollars) and total VOC emissions will be reduced by as much as 2,616 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 37 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 $62,192 (2021 dollars). The Department estimates VOC emissions will be reduced by as much as 136 TPY. This results in an average cost of approximately $457 (2021 dollars) per ton of VOC emissions reduced per year. The Department estimates there are 2,674 well sites that will be required to implement quarterly LDAR inspections with annualized costs ranging between $3,361 and $6,723 (2021 dollars) per year for a total annualized cost of $ 14,954,656 (2021 dollars). The Department estimates VOC emissions will be reduced by as much as 1,994 TPY. The Department estimates there are 263 gathering and boosting stations that will be required to implement quarterly LDAR inspections at a cost of $13,447 (2021 dollars) for a total annualized cost of $3,536,561 (2021 dollars). The Department estimates VOC emissions will be reduced by as much as 473 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 (SO_2), 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. SO_2 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, SO_2 emissions are down 93%, nitrogen dioxide (NO_2) 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.

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.

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.

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 disagrees with the Commentator's characterization of the scope of this final-form rulemaking. While this final-form rulemaking does not apply to conventional oil and natural gas wells, this final-form rulemaking does apply to the owners or operators of components in five categories of sources of air emissions which may be used in the conventional oil and natural gas industry. These five categories of sources include storage vessels; natural gas-driven continuous bleed pneumatic controllers; natural gas-driven diaphragm pumps; reciprocating and centrifugal compressors; and fugitive emissions components. 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 disagrees with the Commentator's characterization of the scope of this final-form rulemaking. 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. 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 strongly disagrees and is appropriately implementing the federal RACT requirements. This rulemaking controls emissions from categories of sources that may be located at conventional or unconventional well sites. These sources are the same whether they are used by the conventional or the unconventional oil and natural gas industry.

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 all 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 714 tons per year and in an additional methane emission reduction of 11,913 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 all 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: The Department does not have the authority to exempt sources from Federal requirements and the Department is federally required to implement VOC RACT requirements for the sources identified in the 2016 O&G CTG. The EPA does not distinguish between unconventional and conventional sources of emissions, both are covered under the 2016 O&G CTG. The Department is obligated under sections 171(c)(1), 184(a), and 184(b) of 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 are "reasonably available." This final-form rulemaking applies to five categories of air emission sources used by the oil and natural gas industry. 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 also provides that it has the authority under sections 5(a)(1) and 5(a)(8) of the APCA to promulgate this final-form rulemaking. Additionally, 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.

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 714 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: Please see the response to Comment 70. 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 Pennsylvania. 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 Pennsylvania. The Department's 2020 reanalysis to determine what RACT would be for these three classes of sources is described in the response to Comment 5.

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 (CO_2) of $42 per ton in 2007 dollars. Given that methane has a global warming potential of between 28 and 86 times that of CO_2, 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 221,066 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 emission by approximately 12,068 TPY and methane emissions by approximately 221,066 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 12,068 TPY of VOC emissions and estimated to reduce 221,066 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, SO_2, NO_2, oxides of nitrogen (NO_X), carbon monoxide (CO), $PM_{2.5}$, and particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}). 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 12,068 TPY of VOC emission reductions and 221,066 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 12,068 TPY of VOC emissions and estimated to reduce 221,066 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 12,068 TPY of VOC emissions and estimated to reduce 221,066 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 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 12,068 TPY and methane emissions by 221,066 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 12,068 TPY and methane emissions by 221,066 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 12,068 TPY of VOC emissions and estimated to reduce 221,066 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 12,068 TPY of VOC emissions, with approximately 714 TPY attributed to the Department's more stringent requirements. This proposed rulemaking is estimated to reduce 221,066 TPY of methane as a co-benefit, with approximately 11,913 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 12,068 TPY of VOC emissions and estimated to reduce 221,066 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 12,068 TPY of VOC emissions and estimated to reduce 221,066 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 12,068 TPY of VOC emissions and estimated to reduce 221,066 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, SO_2, NO_2, NO_X, CO, $PM_{2.5}$, and PM_{10}.

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%, SO_2 emissions have declined by 93%, and NO_X emissions have declined by 80% from the power generation sector. From 2010 through 2017, CO_2 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%; PM_{10} - 45%; SO_2 - 90%; CO - 69%; and CO_2 - 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 CO_2 equivalent per barrel of oil equivalent, declined in the Appalachian region between 2011 and 2017 by 82%. Furthermore, CO_2 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 CO_2 emissions could be reduced by 50% to 60% by switching from coal to natural gas. While burning natural gas does produce less CO_2 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 12,068 TPY and methane emissions by 221,066 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 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 Department also notes that this final-form rulemaking is only applicable to a very small percentage of conventional oil and natural gas operators, specifically the largest producers of oil and natural gas.

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 (Mcfd) 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 Mcfd 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: EPA does not differentiate between conventional and unconventional wells in 40 CFR Part 60 Subparts OOOO or OOOOa. While there are some requirements that involve hydraulic fracturing (well completions and control of storage vessels), all of the other source categories (storage vessels, pneumatic controllers, pneumatic pumps, and fugitive emissions components) apply "...to the control of volatile organic compounds (VOC) and sulfur dioxide (SO_2) emissions from affected facilities in the crude oil and natural gas production source category that commence construction, modification, or reconstruction after August 23, 2011."

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 inspection requirements of this final-form rulemaking should not affect the availability of conventional natural gas. Based on information from the Department's oil and gas production database, 95 of 27,193 conventional well sites would need to implement a new LDAR program under this final-form rulemaking. The Department assumes that 67 conventional well sites are subject to Subpart OOOOa, based on the spud dates of the wells. Of the 95 conventional well sites required to implement a new LDAR program under this final-form rulemaking, 31 would have to meet the annual instrument-based inspection requirement and the remaining 64 would have to meet the quarterly instrument-based inspection requirement. The costs are approximately $0.5 million (2021 dollars) with an estimated savings of $1.4 million (2021 dollars) of natural gas based on $1.70/Mcf natural gas prices, for a net benefit of $0.9

million (2021 dollars). The Department also notes that conventional natural gas production is approximately 10% that of unconventional natural gas production in this Commonwealth.

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: According to the 2020 reanalysis, the average cost per owner or operator is $6,285, which with the average net cost per owner or operator at $1.70 per Mcf is $2,262. The average

net cost per owner or operator at $2.50 per Mcf is $370 and at $5.00 per Mcf is an average net benefit per owner or operator of $5,546.

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 well sites with an average production of 15 BOE per day, with the frequency based on individual well production on the well site. For 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 221,066 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 221,066 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 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 oil and natural gas sources by finalizing this rulemaking. Please also see the response to Comment 201 0for 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 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 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 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 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 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 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 221,066 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 $20.3 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 221,066 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 3,834 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 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 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 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: Consistent with the 2016 O&G CTG, the owner or operator will need to determine the applicability of the regulatory requirements. 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.

EPA's justification for the recommended guidance is stated in the technical support document for the 2016 O&G CTG.

In this final-form rulemaking, the Department altered the production thresholds and removed the LDAR stepdown provision. The threshold for determining whether this final-form rulemaking is applicable is well site production. The threshold is 15 barrels of oil (or its equivalent in natural gas). Production is a statistic that operators need to track for a variety of reasons, so the information is readily available for operators to determine if this final-form rulemaking applies to their well sites. If an operator did not track their own well site's production directly, then the data could easily be obtained from statements from the sales of oil, tax records, etc.

The Department's 2020 reanalysis shows that it is cost effective to implement instrument based LDAR at 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 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.

It is the Department's understanding that conventional well sites generally have a single storage vessel, a single pneumatic controller, and one or more wells. Because many of these facilities have already been required by EPA to determine their applicability to 40 CFR Part 60, Subparts OOOO or OOOOa as well as other State and Federal requirements, it is highly likely that all of the information necessary to determine applicability to this final-form rulemaking is already in the possession of the owners or operators. In addition, operators are already collecting information such as well production for their business purposes, as well as to comply with 25 Pa. Code §§ 78.121 and 78a.121, that further reduce any burdens on determining applicability.

It should not be burdensome to determine the applicability of a single storage vessel as the potential VOC emissions can be determined using the storage vessel throughput, which the owner or operator should be tracking, and EPA's *Compilation of Air Pollutant Emissions Factors* (AP-42). It should not be burdensome to determine the applicability of a single pneumatic controller as the owner or operator should be aware of the manufacturer's specifications for their controller. It should not be burdensome to determine the production of a single well site, or the individual wells on the well site, as the owner or operator is already required to report this data under 25 Pa. Code §§ 78.121 and 78a.121.

As the Commentator notes, production declines as the wells age. Therefore, many of the older wells should already be exempt from LDAR requirements based on their calculations. Also, as they continue to age, their production should fall providing relief from frequent LDAR inspections as the wells become less productive. 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.

While the administrative cost to an owner or operator is cumulative based on the number of well sites, it is not excessive on a per site basis. The submitted comment did not include any relevant data for the Department to consider.

The Commonwealth is required to comply with Federal law and issue a regulation in response to the 2016 O&G CTG, regardless of the Department's current staffing and funding levels. Failure to do so will result in sanctions and a reduction of Federal highway funding. However, the Commentator's concern that the Department should have sufficient staff and funding to perform its statutory duties is noted. See also the responses to Comments 171 and 174.

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 notes that 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. The determination of applicability of this final-form rulemaking should be able to be accomplished by all owners or operators regardless of their classification as a small business. Based on the information available to the Department,

very few conventional well sites would be required to install controls for their storage vessels or to implement an LDAR program as only 95 well sites meet the criteria for either quarterly LDAR or annual LDAR. 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. 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, disproportionally impacts conventional operations and small businesses in Pennsylvania, and fails to comply with the plain directives of Act 52.

Response: The determination of applicability should be able to be accomplished by all owners or operators regardless of their classification of a small business. Based on the information available to the Department, very few conventional well sites would be required to install controls for their storage vessels or to implement an LDAR program as only 95 well sites meet the criteria for either quarterly LDAR or annual LDAR. 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. 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 EPA does not distinguish between unconventional and conventional sources of emissions and the Department does not have the authority to exempt sources from Federal requirements. Regarding Act 52, please see the response to Comment 70.

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: 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 fracking 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 (H_2S)), $PM_{2.5}$, 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 H_2S 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: 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. 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 EPA does not distinguish between unconventional and conventional sources of emissions and the Department does not have the authority to exempt sources from Federal requirements. Therefore, this final-form rulemaking applies to all applicable sources in the oil and natural gas industry, including those at both conventional and unconventional production sites. 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 $31.7 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 $20.3 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 $366 per facility or, on average, $2,263 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 18 facilities with 51 storage vessels that emit 2.7 TPY or more of VOC with a total industry cost of $556,359 per year (2021 dollars). The Department estimates that implementation of the final-form control measures could reduce VOC emissions by as much as 282 TPY from the installation of controls for storage vessels. This results in an average cost of approximately $1,973 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 31,134 facilities with an estimated 34,856 affected pneumatic controllers. The total industry cost is $12,085,272 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 9,102 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 well sites. The annualized cost to replace the rod packings for one reciprocating compressor at a 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 well sites with an average production of 15 BOE per day, with the frequency based on individual well production on the well site. For 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 31,149 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 $18,576,941 (2021 dollars). The Department estimates that the final-form control measures could reduce VOC emissions by 2,616 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 $4.5 million

(2021 dollars) at $1.70 per Mcf, $6.6 million (2021 dollars) at $2.50 per Mcf, or $13.2 million (2021 dollars) at $5.00 per Mcf.

There are approximately 37 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 $62,192 (2021 dollars) reducing VOC emissions by approximately 136 TPY for a total cost per ton of VOC reduced of $457. The 136 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 1,525 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 $10,253,276 (2021 dollars) reducing VOC emissions by approximately 1,163 TPY. The Department has determined this requirement to be cost-effective since the annualized cost is only $6,723 per year. Approximately 291 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 $5,042 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 $3,361 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 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 221,066 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 221,066 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 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 221,066 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 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 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 well sites with an average production of 15 BOE per day, with the frequency based on individual well production on the well site. For 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.

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: 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: 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 221,066 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 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 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 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.

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 do so 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 221,066 TPY. These anticipated methane emission reductions are a significant and meaningful co-benefit. To explain how the Department estimated the methane emissions associated with conventional and unconventional well sites 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 conventional well sites ranged between 0.35-91% with a median of 11% and 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, conventional well sites emitted approximately 365,103 tons of methane and unconventional well sites emitted approximately 83,287 tons of methane. The requirements in this final-form rulemaking are estimated to reduce methane emissions from conventional well sites by 175,788 tons, or approximately 52%, and from unconventional well sites by 34,274 tons, or approximately 59%. The reductions from unconventional well sites are less on a percentage basis due to the applicability of Subparts OOOO and OOOOa and requirements under Exemption 38 and GP-5A for a large portion of the well sites.

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 oil and natural gas industry emits approximately 24,619 tons of VOC. The requirements in this final-form rulemaking are estimated to reduce VOC emissions by 12,068 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 scope of this final-form rulemaking is to reduce VOC emissions from sources in the oil and natural gas industry, which includes both conventional and unconventional well sites. Methane is reduced as a co-benefit to the VOC emissions reductions.

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 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 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.

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 (Mcfd)	< 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 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 of 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 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: 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, both unconventional and conventional. The EPA does not distinguish between unconventional and conventional oil and natural gas industry sources of emissions and the Department does not have the authority to exempt the owners and operators of regulated sources from Federal requirements.

The Department has regulated unconventional well sites since August 10, 2013 through facility wide VOC emission requirements, requiring LDAR, and requiring control on storage vessels and other equipment. The final-form rulemaking will tighten some of those requirements, but overall, the reductions are expected to be of a lesser magnitude than those resulting from their application to the conventional industry. The conventional industry has had minimal state requirements for VOC emissions and have only had to comply with federal requirements since August 23, 2011. As such, the conventional industry's compliance with the requirements in final-form rulemaking should result in a greater environmental benefit.

The Department has determined from the Oil and Gas Database that, as of 2020, there are 68,519 active and producing conventional wells on an estimated 27,260 well sites; all of the associated well sites would be required to meet the storage vessel, natural gas-driven continuous bleed pneumatic controller, and natural gas-driven diaphragm pump requirements. Any producing conventional well site with production equal to or greater than 15 BOE per day would be required to comply with the LDAR requirements based on the production of individual wells located at the well site. The changes from the proposed rulemaking to the final-form rulemaking will increase the estimated 33 TPY of VOC emissions reductions from the proposed rulemaking to 797 TPY of VOC emissions reductions, which is a significant contribution to attaining and maintaining the 1997, 2008, and 2015 ozone NAAQS. Any of the approximately 45,000 active wells with no production mentioned by the Commentator would be required to comply with the storage vessel, natural gas-driven continuous bleed pneumatic controller, and natural gas-driven diaphragm pump requirements, and upon resuming production, comply with the LDAR requirements, if appropriate.

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 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 oil and natural gas sources of VOC emissions 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 facility 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 facility 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 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 well sites or at an adjacent 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 well sites are in § 129.126(d); subsection (d) has been revised in the final-form rulemaking to reflect that reciprocating compressors at a well site have requirements under the final-form rulemaking. Centrifugal compressors at a 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: 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 has determined that the control of VOC emissions from storage vessels is cost effective from 2.7 TPY for all storage vessels in the oil and natural gas industry. The language in § 129.123(a)(1) of the final-form rulemaking has been revised to read:

> "(1) *Potential VOC emissions.* Except as specified in subsections (c) and (d), this section applies to the owner or operator of a storage vessel subject to § 129.121(a)(1) (relating to general provisions and applicability) that has the potential to emit 2.7 TPY or greater VOC emissions."

Based on the estimates from the Department's 2020 reanalysis, there are only 6 storage vessels at conventional well sites that exceed the 2.7 TPY actual VOC emission threshold. However, owners or operators should determine applicability based on their actual facility emissions rather than DEP's estimate.

The EPA did not account for electricity in their cost analysis for combustors or VRUs, therefore the costs do not account for availability of electricity or annual usage of electricity.

A storage vessel's VOC PTE threshold is 2.7 TPY regardless of the number of wells that are served by it. The determination of applicability must be performed in accordance with § 129.123(a)(2).

Testing is required for the control device, not the storage vessel. Multiple storage vessels served by the same control device would only require one test every five years unless the device is a manufacturer tested model. Performance tests must be conducted in accordance with §§ 129.129(j) through (l) and the Source Testing Manual of Chapter 139.

The recordkeeping and reporting requirements for storage vessels are in §§ 129.130(b) and (k)(1). The recordkeeping and reporting requirements for the control are in §§ 129.130(j) and (k)(9).

The maximum average daily throughput of § 129.123(a)(2)(i) is defined as "The single highest daily average throughput during the 30-day potential to emit evaluation period employing generally accepted methods." The definition of "*Maximum average daily throughput*" is found in § 129.122.

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 language in the final-form rulemaking has been revised to read:

> "(1) *Potential VOC emissions.* Except as specified in subsections (c) and (d), this section applies to the owner or operator of a storage vessel subject to § 129.121(a)(1) (relating to general provisions and applicability) that **has the potential to emit 2.7 TPY or greater VOC emissions.**"

The potential to emit VOC emissions threshold applies to the owners and operators of storage vessels at all well sites, gathering and boosting stations, natural gas processing plants, and in the natural gas transmission and storage segment regardless of the size, throughput, or contents of the storage vessel. The owner or operator of the affected storage vessel is required to calculate the potential VOC emissions in accordance with § 129.123(a)(2) or the actual VOC emissions in accordance with § 129.123(c)(1) to determine if the storage vessel is subject to the control requirements. Testing is not required to determine the volume or rate of VOC emissions, although it would be considered a generally accepted method.

The EPA does not distinguish between unconventional and conventional oil and natural gas industry sources of emissions and the Department does not have the authority to exempt the owners and operators of regulated sources from Federal requirements, so the provisions of this final-form rulemaking apply to both the unconventional and conventional oil and natural gas industries.

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 references to "conventional well" and "unconventional well" in § 129.123(a)(1) have been removed and a consistent applicability threshold applied based on the Department's 2020 reanalysis; therefore, there is no need to define these terms.

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: 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.

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 in this final-form rulemaking, 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 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: In the proposed rulemaking, all compressors located at well sites or an adjacent well site and servicing multiple wells were not subject to the VOC RACT requirements. The Department's 2020 reanalysis of reciprocating compressors at well sites or an adjacent well site and servicing more than one well site shows the annualized cost of $782 per year (2021 dollars). This is cost effective under the VOC RACT.

Therefore, the applicability for reciprocating compressors in § 129.126(d) has been revised to remove their exemption to read:

> "*Exemptions.* Subsection (c) does not apply to the owner or operator of a centrifugal compressor that meets the following:"

Therefore, only centrifugal compressors at a conventional well site or an adjacent conventional well site would be exempt. All compressors at a "*Gathering and boosting station*" or "*Natural gas processing plant*" are subject to the requirements of §§ 129.126(b) and (c), as applicable.

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 off § 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 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 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 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 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 well site would be subject to a lower frequency are required before reducing the LDAR frequency. A calculation that shows that the 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 requires instrument based LDAR inspections depending upon the 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.

Of the estimated 27,260 conventional well sites, owners or operators would only be required to perform quarterly LDAR at 64. The owners or operators of another 31 conventional well sites would be required to perform annual LDAR under the final-form rulemaking.

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: A procedure to estimate a well site's production has been written into the final-form rulemaking at § 129.127(b). The owner or operator of a producing 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. 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 number of total conventional and unconventional wells is as stated in the RAF, based on 2017 reported data. The estimated number of affected conventional wells was determined by comparing the 71,229 conventional wells to their reported production in 2017. This gave approximately 303 conventional wells subject to a requirement in § 129.127(b) of the proposed rulemaking. Estimating the GOR based on natural gas and oil production reported from the 303 wells resulted in only 199 of the wells being subject to the LDAR requirements. The other 104 have a requirement to track their GOR to ensure they remain below the 300 scf of natural gas per barrel of oil. If a well is subject to LDAR requirements, all fugitive emissions components at the well site are required to be inspected.

The requirements of the final-form rulemaking have changed, requiring that all well sites that produce equal to or greater than 15 BOE per day with individual wells on site that produce

greater than or equal to 5 BOE per day must perform monthly AVO and instrument based LDAR inspections at a frequency based on the most productive individual well. In the 2020 reanalysis and using the requirements of the final-form rulemaking, the Department determined that 2,674 well sites with 10,874 wells would be subject to the quarterly instrument based LDAR requirements and 38 well sites with 993 wells would be subject to the annual instrument based LDAR requirements.

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 oil producer 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)(6). 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.

Regarding the question of how an oil producer who owns five wells and one compressor could afford the equipment, the Department notes that the regulation is only applicable to certain well sites that generate at least 15 BOE per day, which represents the top 0.3% of all conventional well sites.

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 a well site's production in § 129.127(b) of the final-form rulemaking. The owner or operator of a producing 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 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 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 2,130 TPY and co-benefit methane emissions by 35,078 TPY from all 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 23,614 TPY and methane to be 451,403 TPY. The Commentators' estimated emissions reductions are approximately double the total VOC emissions and approximately equal to 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 estimated, based on the 2020 reporting year in the Oil and Gas Production database, that the 68,519 conventional wells active and reporting production in the Commonwealth are located at 27,260 well sites. There are 64 conventional well sites with production above the 15 BOE per day threshold with at least one individual well equal to or greater than 15 BOE per day and therefore required to conduct quarterly LDAR. There are 31

conventional well sites with production above the 15 BOE per day threshold with at least one individual well less than 15 BOE per day and equal to or greater than 5 BOE per day and therefore required to conduct annual LDAR.

The Department has determined that the administrative costs for the estimation of the production for individual wells and the GOR calculations are acceptable and necessary to determine applicability and compliance. In addition, it is the Department's understanding that operators are already gathering and reporting this data to the Office of Oil and Gas Management. The operators are not required to hire environmental consultants to determine applicability but may do so if they so desire.

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 agrees that the proposed rulemaking did not provide an exception for conventional oil and natural gas wells and that it is possible that conventional oil and natural gas well sites may be subject to the LDAR requirements of the final-form rulemaking. According to the conventional well owners or operators that report production in accordance

with 25 Pa. Code § 78.121, there are several that have wells that produce, on average, greater than 15 BOE per day. The Department has revised the proposed rulemaking to include a procedure to estimate a well site's production in the final-form rulemaking at § 129.127(b). The owner or operator of a producing 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.

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 definition of "*Gathering and boosting station*" includes all gathering and boosting operations in Pennsylvania. There is no exemption for gathering and boosting operations based on their association with conventional operations in Pennsylvania. This is evidenced by DEP's implementation of Exemption 38 where "production facilities" does not include compressor stations and the DEP's requirement for compressor stations to report to the Air Emissions Inventory "...regardless of whether the natural gas was processed at a conventional or unconventional well site. Complete source reports should be submitted for these activities as well." (42 Pa.B. 7865)

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 owner or operator of an unconventional well site shall comply with the more stringent AVO and LDAR requirement. For example, a 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 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 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 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 well site would be subject to a lower frequency are required before reducing the LDAR frequency. If a calculation shows that the 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 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 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 well sites that produce, on average less than 15 BOE per day and for 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 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 well sites that produce, on average less than 15 BOE per day and for 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 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 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 well site would be subject to a lower frequency are required before reducing the LDAR frequency. A calculation that shows that the 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 most 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 homogenously 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 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 a 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 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 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)(l)(ii) should be deleted since subsection (c)(l)(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)(l)(i), (f)(l)(i), and (i)(l)(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 ensures public access to emissions reporting for the conventional industry, as it does with emissions data for the unconventional shale industry.

Response: 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 a 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 well site, compressor station, or 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 well site compression. Any time a new natural gas-fired engine or turbine compression system is added to an existing 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 Deparment 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 PM_{10}, 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 five categories of air emission sources used by the oil and natural gas industry. This final-form rulemaking is estimated to reduce 12,068 TPY of VOC emissions and estimated to reduce 221,066 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 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 fracking 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) CO_2e in 2015. To achieve the Governor's goal for 2025 will require a reduction of 3.07 MMT CO_2e, 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 221,066 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 CO_2e for Gross Production Emissions, including CO_2, 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 ($MMTCO_2e$) 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 $MMTCO_2e$ 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 221,066 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 CO_2, thus slowing the rate of warming over the next few decades while society works to

reduce the emissions of longer-lasting gases such as CO_2. 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: This final-form rulemaking is applicable to the regulated sources in all sectors of the oil and natural gas industry, including those at conventional well sites. The Department estimates that the control measures of this final-form rulemaking, if implemented, will reduce VOC emissions by 12,068 TPY and as a co-benefit, reduce methane emissions by 221,066 TPY. Of the total emissions reduced, reductions at conventional well sites will account for 9,204 TPY of VOC and 175,788 TPY of methane.

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 221,066 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 CO_2 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 though 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.

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMENT AND RESPONSE DOCUMENT

Appendix: List of Commentators

Control of VOC Emissions from Oil and Natural Gas Sources

25 Pa. Code Chapters 121 and 129E
50 Pa.B. 2633 (May 23, 2020)
Environmental Quality Board Regulation #7-544
(Independent Regulatory Review Commission #3256)

*Commentators denoted with an asterisk provided testimony at one of the public hearings, but no written copy of their testimony was received. Please refer to the public hearing transcripts for a verbatim copy of their comments, available under Regulation #7-544 in eComment, https://www.ahs.dep.pa.gov/eComment/.

First Name	Last Name	Affiliation	City	State
David	Sumner	IRRC	Harrisburg	PA
Sen. Gene	Yaw	PA Senate Environmental Resources & Energy Cmte.	Harrisburg	PA
Sen. Scott	Hutchinson	Senate of Pennsylvania - 21st District	Oil City	PA
Sen. Steve	Santarsiero	Senate of Pennsylvania - 10th District	Harrisburg	PA
Rep. Carolyn	Comitta	PA House of Representatives, 156th District	Harrisburg	PA
Rep. Daryl D.	Metcalfe	PA House of Representatives, 12th District	Harrisburg	PA
H.	A.		Blue Bell	PA
Barbara	Abbott		Ardmore	PA
K.	Abbott		Philadelphia	PA
Kim	Abbott		Philadelphia	PA
Rachel	Abbott		Philadelphia	PA
Khalil Nasur-Din	Abdus-Salaam		Philadelphia	PA
Chastity	Abel		Dover	PA
Denise	Abney		Philadelphia	PA
Warren	Abrahamson		Lewisburg	PA
Renee	Abrams		Pittsburgh	PA
Victoria	Abramson		Lancaster	PA
Barbara	Achey		Union Dale	PA
James	Achey		Union Dale	PA
Peggy	Acosta		Womelsdorf	PA
Barbara	Adams		Greensburg	PA
Peter	Adams		Pittsburgh	PA
Linda	Addis		Hermitage	PA
Mark	Advocate		Plymouth Meeting	PA
Eugenia	Ahern		Philadelphia	PA
Christopher	Ahlers		Philadelphia	PA
Amanda	Ahlersmeyer		Philadelphia	PA
Heidy	Aimee		Philadelphia	PA
Damon	Albert		Philadelphia	PA
Jack	Albert		Allison Park	PA
Jordy	Albert		York	PA
Etta	Albright		Cresson	PA
Brigitte	Alexander		Kennett Square	PA
Diane	Alexanderson		Doylestown	PA
Eliza	Alford		Philadelphia	PA
Arianne	Allan		Wallingford	PA
Lisa	Allarde		Kunkletown	PA
Arianne	Allen		Wallingford	PA
Carol	Allen		Gladwyne	PA
Charlie	Allen		Freeport	PA
Jeanne	Allen		Philadelphia	PA

First Name	Last Name	Affiliation	City	State
Kerri	Allen		Pittsburgh	PA
Kimberly	Allen		Philadelphia	PA
Nancy	Allen		Freeport	PA
Russ	Allen		Jenkintown	PA
Paul	Allesio		Pittsburgh	PA
Jeff	Alper		Melrose Park	PA
Robert	Altenburg	PennFuture	Harrisburg	PA
Dan	Alters		Bellefonte	PA
Michelle	Alvare		Havertown	PA
George	Aman		Newtown Square	PA
Wilbur	Amand		West Chester	PA
Vincent	Amatangelo		Allison Park	PA
Karen	Ames-Caylor		Mayport	PA
Erik	Ammon		Fleetwood	PA
Gail	Amshel		Pittsburgh	PA
Helene	Amster		Philadelphia	PA
Sidney	Amster		Philadelphia	PA
Elizabeth	Anderson		Haverford	PA
Lynn A.	Anderson		New Milford	PA
Megan	Anderson		Pittsburgh	PA
Rhonda	Anderson		Kennett Square	PA
William	Anderson		Narberth	PA
Mary	Andiorio		Pittsburgh	PA
Ed	Andjeski		Malvern	PA
J. Kathleen	Andrews		Freedom	PA
Maureen	Andrews		Charleroi	PA
Julia	Andrulewich		Philadelphia	PA
Michelle	Angelico		Breinigsville	PA
JL	Angell		Rescue	CA
Gabriel	Angeloni		Philadelphia	PA
Ray	Applegate		Bloomsburg	PA
Sally	Archibald		Grove City	PA
Danielle	Argueta		Exton	PA
Giselle	Aris		Philadelphia	PA
Melvin	Armolt		Chambersburg	PA
Chara	Armon		Wallingford	PA
Michelle	Armour		Philadelphia	PA
Mary	Armstrong		Newtown Square	PA
Stephan	Armstrong		Watsontown	PA
Daytona	Arnold		Exton	PA
Nancy	Aronson		Pittsburgh	PA
Valerie	Arrington		Harrisburg	PA
Evrim	Artman		Royersford	PA
Nancy	Artus		Downingtown	PA
Heath	Asbury		Aspinwall	PA
Tracey	Ash		Enola	PA
Ina	Asher		Merion	PA

First Name	Last Name	Affiliation	City	State
Caroline	Ashurst		Philadelphia	PA
Chris	Aspite		West Chester	PA
Marianne	Atkinson		Du Bois	PA
Lynn	Atwood		Slippery Rock	PA
Thomas	Au*		Harrisburg	PA
J G	Augustson		State College	PA
Michele	Auker		Mohnton	PA
Greta	Aul		Lancaster	PA
Gary	Aull		McMurray	PA
Daniel	Aunkst		Watsontown	PA
Joann	Aurand		Pittsburgh	PA
Zarah	Austin		Ogden	UT
Emerson	Avery		Philadelphia	PA
Nancy	Avolese		Middletown	PA
Frank	Ayers		Altoona	PA
Frank	Ayers		Altoona	PA
Susan	Babbitt		Philadelphia	PA
Michael	Babitch		Kimberton	PA
Robert	Bachman		Lincoln University	PA
Heidi	Bachner		Pittsburgh	PA
Max	Bader		Munhall	PA
William	Bader		Bethlehem	PA
Chris	Baer		Bakerstown	PA
Michael	Bagdes-Canning*		Emlenton	PA
Elizabeth	Bagi		Oreland	PA
Sidne	Baglini		Malvern	PA
John	Baillie	Group Against Smog and Pollution	Pittsburgh	PA
Janice	Baker		Blue Bell	PA
Jeanne	Baker		Altoona	PA
Linda	Baker		Kimberton	PA
Paula	Baker		Burnt Cabins	PA
Mike	Balabon		Marlton	NJ
Bernard	Balbot		Pittsburgh	PA
James	Baldassarre		Doylestown	PA
Christine	Baldonieri		Latrobe	PA
John	Balicki		Acme	PA
Matt	Balitsaris		Pipersville	PA
Terrie	Balko		West Newton	PA
Annette	Ballard		Philadelphia	PA
Alana	Balogh		Revere	PA
Dr. Michael	Balsai		Philadelphia	PA
Letizia	Balsamo		Catasauqua	PA
Janice	Banks		Center Barnstead	NH
Mark	Barbash		Philadelphia	PA
Luther	Barber		Harrisburg	PA
Zachary	Barber		Pittsburgh	PA

First Name	Last Name	Affiliation	City	State
Carrie	Barcomb		Media	PA
Patricia	Barilla		Pittsburgh	PA
Lissa	Barker		Mt. Lebanon	PA
Allison	Barnes		Exton	PA
Ann	Barnes		Russell	PA
Gail	Barnhart		Ligonier	PA
Bruce	Barr		Devon	PA
Irene	Barrie		Bulger	PA
Paula	Barron		Philadelphia	PA
Paul	Barros-Ruof		Bethlehem	PA
John J	Barrows Jr.		Wellsboro	PA
Linda	Barry		Confluence	PA
Nancy	Bartley		Chester Springs	PA
Karen	Barton		Bryn Mawr	PA
Philippe	Barzin		Bethlehem	PA
Suzanne	Bates		Baden	PA
Edwin	Bauer		Lionville	PA
Tamara	Bauer		Sewickley	PA
Athena	Bauerle		Sellersville	PA
Hilary	Baum	Environmental Cmte of Phila. Neighborhoods Network	Philadelphia	PA
Terrie	Baumgardner		Aliquippa	PA
Nicolette	Beahm		Philadelphia	PA
Karen	Beall		Lebanon	PA
Ashley	Bean		Scranton	PA
Shannon	Bearman		Haverford	PA
Bill	Bechtel		Carlisle	PA
Jean	Bechtel		Philadelphia	PA
Ann	Beck		Chalfont	PA
Randal	Beck		Newtown	PA
Catherine	Becker		Harrisburg	PA
Peggy	Becker		Fountain Hill	PA
Ruth	Becker		Cranberry Township	PA
Dr. Ira	Beckerman		New Cumberland	PA
Emma	Beckers		Collegeville	PA
Timothy	Beckham		Glenside	PA
Cindy	Beckler		Pottstown	PA
Ray	Beckler		Pottstown	PA
Cathy	Beers		Lewistown	PA
Dan	Behl		Glen Mills	PA
Ken	Beiser		Philadelphia	PA
Laurel	Beitsinger		Freedom	PA
John	Belch		Pittsburgh	PA
Camille	Bell		Conshohocken	PA
Edward	Bell		Philadelphia	PA
Jessica	Bellas		Pittsburgh	PA
Kevin	Bellew		Bethlehem	PA

First Name	Last Name	Affiliation	City	State
Karen	Belli		Dallas	PA
Jessica	Bellwoar		Philadelphia	PA
Nancy	Bender		Schwenksville	PA
Gloria	Bennett		Monroeville	PA
Kevin	Bennett		Mountain Top	PA
Nathan	Bennett		Pittsburgh	PA
Sharon	Bennett		Paoli	PA
Haley	Benson		Philadelphia	PA
Jennifer	Bentsen		Breinigsville	PA
Marilyn	Berberich		Newtown Square	PA
Alice	Berenden		Green Lane	PA
Neil	Beresin		Philadelphia	PA
Susan	Berg		Glenshaw	PA
Linda	Berger		Philadelphia	PA
Susan	Berger		Pittsburgh	PA
Paul	Bergeron		Bensalem	PA
Joy	Bergey	Chestnut Hill United Church	Flourtown	PA
Nancy	Bergey		New Wilmington	PA
Grace	Bergin		Du Bois	PA
Henry	Berkowitz		Sabinsville	PA
Adam	Berman		Rydal	PA
Karen	Bernard		Glenshaw	PA
Blaire	Bernstein		Philadelphia	PA
Nancy	Bernstein		Pittsburgh	PA
Marian	Berray		Lafayette Hill	PA
Karen	Berry		Bethlehem	PA
Karen	Berry		Bethlehem	PA
David	Bertenthal*		Pittsburgh	PA
Andrea	Bertram		Johnstown	PA
Linda	Bescript		Langhorne	PA
Joan	Betesh		Bala Cynwyd	PA
Martha	Betton		North Wales	PA
Ajay	Bhatt		Philadelphia	PA
Sue	Bialostosky		Pittsburgh	PA
Sister Dominica Lo	Bianco		Aston	PA
Rio	Bibeau		Philadelphia	PA
Lee	Bible		Abbottstown	PA
Kenneth	Bickel		Pittsburgh	PA
Kristina	Bickford		Elkins Park	PA
David	Biddison		Phoenixville	PA
Michelle	Bilbrough		Aston	PA
Madeleine	Biletz		Lansdale	PA
Clare	Billett		Philadelphia	PA
Jean	Billings		Chesterbrook	PA
Dave	Bindewald		Pittsburgh	PA
Carol	Bingaman		Harrisburg	PA

First Name	Last Name	Affiliation	City	State
William	Bird		Philadelphia	PA
Francis	Bires		Sandy Lake	PA
Margaret	Birge-Caracappa		Philadelphia	PA
Celeste	Bish		Perkiomenville	PA
Paul	Bisio		Lansdale	PA
Heather	Bitner		Harding	PA
Kim	Bjarkman		Lewisburg	PA
Elizabeth Lea	Black		Pittsburgh	PA
Garret	Black		Erie	PA
Jim	Black		Philadelphia	PA
Margaret	Blades		Wayne	PA
Martin	Blank		Philadelphia	PA
Janice	Blanock		Cecil	PA
Erica	Blanton		New Cumberland	PA
Louis	Blau		Brownsville	PA
Laura	Blayney		Phoenixville	PA
Barbara	Bloomfield		Philadelphia	PA
Anita	Bloovman		Bala Cynwyd	PA
Ashley	Blose		Allentown	PA
Kathryn	Bluhm		Hollsopple	PA
Phyllis	Blumberg		Bala Cynwyd	PA
Adam	Blumenthal		Madison	WI
David	Blumenthal		Narberth	PA
Barry	Blust		Glenmoore	PA
Linda	Blythe		Philadelphia	PA
Katherine	Boas		Lancaster	PA
Santiago	Bobadilla		Lancaster	PA
Jacqueline	Bobnick		Lawrence	PA
Stan	Bochnak		Warminster	PA
Merrilee	Bodzin		Philadelphia	PA
Kenny	Boecker*		Bethlehem	PA
Roelfien	Boerema		Wayne	PA
Lance	Bogash		Lincoln University	PA
Judith	Bohler		Ephrata	PA
Judith	Bohne		Womelsdorf	PA
Alex	Bomstein		Philadelphia	PA
Joseph	Bonidie		Pittsburgh	PA
Denise	Bonk		Philadelphia	PA
Carol	Book		York	PA
Donna	Bookheimer		Douglassville	PA
Lowell	Booth		Willow Grove	PA
Dominic	Bordelon		Pittsburgh	PA
Alana	Borges		Fleetwood	PA
Anna	Borges		East Stroudsburg	PA
Michael	Borrasso		Philadelphia	PA
Dara	Bortman		Yardley	PA
Anthony	Borzotta		Philadelphia	PA

First Name	Last Name	Affiliation	City	State
Shirley	Boscov		Wyomissing	PA
Erin	Bosniak		Pittsburgh	PA
Donald	Bosworth		Wyncote	PA
Rita	Botts		Pittsburgh	PA
Cassidy	Boulan		Philadelphia	PA
Joanna	Bouldin		Pittsburgh	PA
George	Bourlotos		Morris Plains	NJ
Roger	Bove		West Chester	PA
Lois	Bower-Bjornson	Clean Air Council		PA
Linda	Bowers		New Hope	PA
Jocolyn	Bowser-Bostick		Chester	PA
Nancy	Boxer	Association for Climate Health	Havertown	PA
Jessica	Boyer		Harrisburg	PA
James	Boylan		Philadelphia	PA
Anne	Boyle		Royersford	PA
Frances	Boyle		Merion Station	PA
Marya	Bradley		Rose Valley	PA
Barbara	Bradshaw		Springfield	PA
Thomas	Brandes		Grants Pass	OR
Barbara	Brandom		Pittsburgh	PA
Alex	Brandt		Philadelphia	PA
Joy	Braunstein		Pittsburgh	PA
Susan	Brede		Wayne	PA
Dianna	Brendle		New Oxford	PA
Thurman	Brendlinger		Swarthmore	PA
Anne	Brennan		Philadelphia	PA
Terry	Brennan		Aliquippa	PA
Rebecca	Brenner		Mohnton	PA
Thomas	Brenner		Hollidaysburg	PA
David	Bressler		West Chester	PA
June	Bricker		Mifflintown	PA
Vicki	Brickner		Carlisle	PA
Joseph	Bridy		Philadelphia	PA
Katie	Briggs		Philadelphia	PA
Barbara	Brigham		Philadelphia	PA
Christine	Brill		Pittsburgh	PA
Mary Jo	Brinker		Ellwood City	PA
William	Brinkman		Philadelphia	PA
Lisa	Brinton		Cochranville	PA
Keith	Brintzenhoff		Kutztown	PA
Dorothy	Briscoe		Wayne	PA
Joan	Bristol		Coatesville	PA
Keith	Britton		Cheltenham	PA
Yolanda Stern	Broad, Ph.D.		Indiana	PA
Ella	Brockway		Philadelphia	PA
Nathaniel	Brodsky		Pittsburgh	PA

First Name	Last Name	Affiliation	City	State
Mark	Brody		Wayne	PA
Clarence	Brommer		Allentown	PA
Norma	Bronder		Pittsburgh	PA
Gregory	Brooks		Norristown	PA
Regina	Brooks		Pittsburgh	PA
Suzanne	Brophy		Pittsburgh	PA
Amy	Brosey		York	PA
Jim	Brosius		Lewisburg	PA
Beatrice	Broughton		Avondale	PA
Brian	Brown		Lewisburg	PA
Brian	Brown		Lewisburg	PA
Bruce	Brown		Bryn Mawr	PA
Edward	Brown		Philadelphia	PA
Eleanor	Brown		Orcland	PA
Gail	Brown		Clarks Summit	PA
Isaac	Brown	Center for Methane Emissions Solutions	Washington	DC
James	Brown		Havertown	PA
John	Brown		Camp Hill	PA
John	Brown		Camp Hill	PA
Kenneth	Brown		Lititz	PA
Paul	Brown		Pittsburgh	PA
Paul	Brown		Pittsburgh	PA
Sherrill	Brown		Gettysburg	PA
Harry	Brownfield		Newport	PA
Jill	Brownfield		Newport	PA
Scott	Browning		Philadelphia	PA
Sandy	Brubaker		Philadelphia	PA
Barbara H	Bruce		Johnstown	PA
Amy	Bruckner		Downingtown	PA
Susan and Martin	Bruegel		West Chester	PA
John	Brunt		Port Reading	NJ
Ann	Bryan		Beaver	PA
Christopher	Bryan		Philadelphia	PA
Ellen	Bryer		Philadelphia	PA
John	Bryner		Chambersburg	PA
Jo Anne	Buchanan		Pittsburgh	PA
Michael	Buchanan		Carlisle	PA
Deborah	Buckler		Monroeville	PA
Florence	Buckley		Philadelphia	PA
Irene	Bucko		Collegeville	PA
Julie	Buczek		Erie	PA
Carolyn	Buffenmyer		Palmyra	PA
Anita	Buffer		Warminster	PA
Marilyn	Bullock		Wallingford	PA
Karen	Burden		White Haven	PA
Amanda	Burdick		Shinglehouse	PA

First Name	Last Name	Affiliation	City	State
Richard	Burdo		Phoenixville	PA
Theodore	Burger		Bethlehem	PA
Debra	Burk		Brogue	PA
Susan	Burke		Morrisville	PA
Janis	Burkhardt		Ardmore	PA
Kathryn	Burkhart		Lancaster	PA
Jessica	Burns		Philadelphia	PA
Linda	Burns		Pennsylvania Furnace	PA
Phoebe	Burns		Philadelphia	PA
Miriam	Burstein		Paoli	PA
Duane	Burtner		Butler	PA
Angeline	Burton		Pittsburgh	PA
LaDonna	Burton		Somerset	PA
Jim	Burtt		Willow Grove	PA
Amy	Bush		Philadelphia	PA
Beth	Bush		Pittsburgh	PA
John	Bush		Coatesville	PA
George	Busse		Waynesboro	PA
Janet	Busse		Philadelphia	PA
Anthony	Butel		Scranton	PA
Nicholas	Butterfield		Allentown	PA
Stacey	Butterfield		Philadelphia	PA
Anne	Buzzelli		Pittsburgh	PA
Jackson	Byerly		Philadelphia	PA
Susan	Byrd		Pittsburgh	PA
Chris	Byrne		State College	PA
Alexander	Cacioppo		Oakland	CA
Jess	Cadorette		Phoenixville	PA
Mira	Cahill		Cranberry Twp	PA
Natasha	Cahill		Philadelphia	PA
Abbie	Cain		Pottstown	PA
John	Cairns		Lansdale	PA
Thalia	Caldwell		Philadelphia	PA
Diane	Calkins		Philadelphia	PA
Murray	Callahan		Havertown	PA
Dorothy Li	Calzi		Philadelphia	PA
Don	Camera		Philadelphia	PA
Theresa	Camerota		Wyncote	PA
Eileen	Cammarata		Pittsburgh	PA
Jaquelin	Camp		King of Prussia	PA
Roberta	Camp		Philadelphia	PA
Thomas	Campanini		York	PA
Benita	Campbell		Burgettstown	PA
Jeffrey	Campbell		Pittsburgh	PA
Tiara	Campbell		Drexel Hill	PA
Clifford	Campen		Pittsburgh	PA
Gail	Canizares		Gibsonia	PA

First Name	Last Name	Affiliation	City	State
Zane	Cannon		Pittsburgh	PA
Steven	Cantner		Bryn Mawr	PA
Garlen	Capita		Philadelphia	PA
John	Capowski		Camp Hill	PA
Paulette	Capperis		Warrensville Heights	OH
Desiree	Carbone		Pittsburgh	PA
Roy	Card		Lawrenceville	PA
Dorothy	Cardlin		Yardley	PA
Flora	Cardoni		Philadelphia	PA
Kathleen	Carlson		Portersville	PA
Rev. Carol	Carlson		Mount Jewett	PA
Ross	Carmichael		Pittsburgh	PA
Caroline	Carney		Philadelphia	PA
Marie	Carota		Doylestown	PA
Amy	Carothers		McKeesport	PA
David	Carpenter		Gibsonia	PA
Barbara	Carr		Kingsville	MD
Denise	Carr		Chadds Ford	PA
Tyree	Carr		Philadelphia	PA
Bridget	Carroll		Media	PA
Dianne	Carroll		Pittsburgh	PA
Laurence	Carroll		Lancaster	PA
Martin	Carroll		Bala Cynwyd	PA
Carrie	Carter		Pittsburgh	PA
Teresa	Caruthers		Ephrata	PA
Rich	Casagranda		Bethel Park	PA
Elisabeth	Casale		Mechanicsburg	PA
Ann	Case		Coplay	PA
Brian	Case		Coplay	PA
Nathan	Case		Moon Township	PA
Bridget	Casey		Jenkintown	PA
Jenifer	Casey		Carbondale	PA
Elizabeth	Casman		Pittsburgh	PA
Sarah	Caspar		Downingtown	PA
Linda	Castagna		Philadelphia	PA
James	Castellan		Rose Valley	PA
Adam	Castelli		Pittsburgh	PA
Dr. Loretta Flanagan	Cato		Merion Station	PA
Debra	Caudill		Rices Landing	PA
Ashlee	Caul		Clinton	PA
Catherine	Cavagnaro		Bethel Park	PA
Janet	Cavallo		Secane	PA
Suzanne	Cawley		Pittsburgh	PA
Jane	Cease		Allentown	PA
Tina	Ceaser		Pittsburgh	PA
Ronald J.	Cehelsky		Butler	PA

First Name	Last Name	Affiliation	City	State
Mary	Cellucci		Broomall	PA
Mary	Centola		Carlisle	PA
Shannon	Cerra		Aspinwall	PA
Jessa	Chabeau		Beechview	PA
Ann	Chadwell		Camp Hill	PA
Ronald	Chamberlain		Ephrata	PA
Makalynn	Chambers		Johnstown	PA
Dr. Catherine	Chamblee		Springfield	PA
Berry	Chamness		Jenkintown	PA
Cheryl	Champy		Media	PA
Harvey	Chanin		Philadelphia	PA
Ed	Chapman		Canonsburg	PA
Kathryn	Chapman		Benton	PA
Margaret	Chapman		Hampton Township	PA
RoseMary	Chapman		Fort Washington	PA
Donald	Charles		Huntingdon Valley	PA
Maura	Chazin		Feasterville	PA
Nina	Chen-Langenmayr		Philadelphia	PA
Rev. J. Howard	Cherry		Pittsburgh	PA
Linsey	Cheshire		Paoli	PA
Christine	Chesire		Phoenixville	PA
Gayle	Chesley		Philadelphia	PA
Marcy	Chestnut		Downingtown	PA
Eric	Cheung		Philadelphia	PA
Theresa	Chiarenza		Philadelphia	PA
Joan and Joel	Chinitz		Philadelphia	PA
Laura	Chinofsky		Southampton	PA
Samuel	Chiodo		Bridgeville	PA
Susan	Chopnick		Wynnewood	PA
Susan	Chorvat		Chadds Ford	PA
Sandra	Choukroun		Penn Valley	PA
Kathleen	Chovit		Bellefonte	PA
Kathryn	Christiana		Ambler	PA
Eric	Christiansen		Exton	PA
William	Christine		Bethlehem	PA
Linda	Christman	Save Carbon County	Lehighton	PA
Mary Ellen	Christman		Buck Hill Falls	PA
Michael	Chung		Stroudsburg	PA
Margaret	Church		Bethlehem	PA
Don	Cianelli		Newtown Square	PA
Adrianne	Ciccarelli		Verona	PA
Diane	Cicco		Pittsburgh	PA
Joyce	Ciotti		Pittsburgh	PA
Larry	Cirks		Wayne	PA
David	Citron		Martinsburg	PA
Jennifer	Clark		Rose Valley	PA
Sandra	Clark		Erie	PA

First Name	Last Name	Affiliation	City	State
William	Clark		Fairless Hills	PA
Judith	Clarke		New Hope	PA
Tim	Clarke		Upper Black Eddy	PA
Susan	Clarke-Mahoney		Thornton	PA
Todd	Clay		York	PA
Sarah	Clemency		Philadelphia	PA
David	Clemens		Milton	PA
Cheryl	Cler		Yardley	PA
Alyssa	Cleve		Pittsburgh	PA
Barbara	Clifford		Montrose	PA
William	Clifford		Harrisburg	PA
Fred	Clime		Chalfont	PA
Thomas	Clinefelter		Oreland	PA
April	Clisura		Pittsburgh	PA
Christina	Cobourn Herman		New York	NY
Lois	Coccodrilli		Havertown	PA
Tammi	Cochran		West Newton	PA
Judy	Coe		Maple Glen	PA
James	Coffey		Green Lane	PA
James	Coffey		Green Lane	PA
Dean	Coffin		Jenkintown	PA
Albert	Coffman		Perkasie	PA
Al	Cohen		Hummelstown	PA
Anne Marie	Cohen		Emmaus	PA
Elaine	Cohen		Jenkintown	PA
Susan	Cohen		Allison Park	PA
Francine	Cohen		Philadelphia	PA
Robert M	Cohen, MD		Philadelphia	PA
Melanie	Cohick		Boiling Springs	PA
Richard	Colberg		Lancaster	PA
Greg	Colburn		Hanover	PA
Ellen	Cole		Chalfont	PA
Jeanne	Cole		Honesdale	PA
Richard	Cole		Eagleville	PA
Allegra	Coleman		Penn Valley	PA
Rick	Coleman		Mechanicsburg	PA
Joan	Colgan-Davis		Philadelphia	PA
John	Colgan-Davis		Philadelphia	PA
Gary	Coller		West Lawn	PA
John	Collier		Coatesville	PA
Sarah	Collier		Wayne	PA
Annemarie	Collins		Newtown Square	PA
Jackie	Collins		Canonsburg	PA
Kathleen	Colwill		Berwyn	PA
John	Comella		Philadelphia	PA
Martha	Comer		Swarthmore	PA
Dr. Tom	Comerci		Wynnewood	PA

First Name	Last Name	Affiliation	City	State
Karina	Conkrite		Philadelphia	PA
Shawn	Conlon		Avalon	PA
Laurie Pisarcik	Connolly		Middletown	PA
Katlyn	Connor		Richboro	PA
Agnes	Connors		Bryn Mawr	PA
Ellen	Conrad		Pittsburgh	PA
Kathryn	Conrad		Duncannon	PA
Pamela	Consorti		Media	PA
Susan	Constantine		North Abington Township	PA
Brian	Cooke		Philadelphia	PA
Chris	Cooke		King of Prussia	PA
John	Cooke		Haverford	PA
Maren	Cooke		Pittsburgh	PA
Robert	Cooke		Mount Joy	PA
Bruce	Cooper		Cranberry Twp	PA
Carle	cooper		Allison Park	PA
Deborah	Cooper		Cranberry Township	PA
John	Cooper		Lewisburg	PA
Julianna	Cooper		Lewisburg	PA
William	Cooper		Mt. Lebanon	PA
Lori	Cooper-Ott		West York	PA
Ben	Corbett		Philadelphia	PA
Donna	Cordner		Philadelphia	PA
Gabrielle	Corson		Pittsburgh	PA
Joann	Cortes		Downingtown	PA
Paula	Cosden		Ambler	PA
Donna	Cosgrove		Philadelphia	PA
Paul	Costa		Merion Station	PA
Denise	Costello		Philadelphia	PA
Maureen	Cotton		Seneca	PA
Caroline	Cotugno		Croydon	PA
Randall	Couch		Philadelphia	PA
Rev. J.	Coughlin		Norristown	PA
Susan	Coulson		Carlisle	PA
Patricia	Covato		Pittsburgh	PA
Phillip	Covert		York	PA
Rosalie	Cox		Berwyn	PA
Victoria	Cox		Pottstown	PA
Victoria	Cox		Sanatoga	PA
Peter	Coyne		Easton	PA
Barbara	Craig		Dallas	PA
Claudia	Crane		Philadelphia	PA
Nancy	Crane		State College	PA
Annalisa	Crannell		Lancaster	PA
Josh	Craven		Ambler	PA
Alan	Crawford		Uniontown	PA

First Name	Last Name	Affiliation	City	State
Jason	Crawford		Lancaster	PA
Patricia	Craychee		Pittsburgh	PA
Laurie	Cressman		Muncy	PA
Sandra	Creswell		Huntingdon	PA
Margaret	Cristofalo		Narberth	PA
Janelle	Croissette		Quakertown	PA
Benjamin	Cromie		Philadelphia	PA
Em	Crone		Downingtown	PA
Jason	Crook		Philadelphia	PA
BJ	Cross-Tedesco		Media	PA
Jesse	Crouse		West Chester	PA
Terri	Crouse		Glenmoore	PA
Susan	Crowle		Auburn	PA
Thomas	Crown		Pittsburgh	PA
Janice	crum		Pittsburgh	PA
John	Crum		Upper Black Eddy	PA
Laurie	Cruz		Lansdale	PA
Valerie	Cruz		Kunkletown	PA
John	Csaszar		Fleetwood	PA
John	Cuda		Allison Park	PA
L.	Cuevas		Hawley	PA
Shane	Culgan		Pittsburgh	PA
Brinton	Culp		Lititz	PA
Doreen	Cunningham		Berwyn	PA
Margot	Cunningham		Nether Providence Township	PA
Mary Jean	Cunningham		Philadelphia	PA
Dona	Cuppett		Telford	PA
Michael	Currera		Norristown	PA
Susan	Curry		Elizabethtown	PA
Susan	Curry-Daniels		Ambler	PA
Judy	Curtin		West Chester	PA
James	Curtis		Port Matilda	PA
Jason	Curtis		Philadelphia	PA
Zelda	Curtiss		Pittsburgh	PA
Meagan	Cusack		Philadelphia	PA
Dan	Cush		Aspinwall	PA
Susan	Cushing		Roseto	PA
L.	Custer		Warrington	PA
Francis	Cuthbertson		Philadelphia	PA
Barry	Cutler		Springfield	PA
Cheryl	Cutler		Laverock	PA
Aaron	Cylinder		Upper Providence Township	PA
G.	D.		Philadelphia	PA
Kathy	Dabanian		Sellersville	PA
Lawrence	Dagna		Orwigsburg	PA

First Name	Last Name	Affiliation	City	State
Lawrence	Dagna		Orwigsburg	PA
Diana	Dakey	Protect Northern PA	Wyalusing	PA
Eric	Dale		Philadelphia	PA
Francis X	Daley		Philadelphia	PA
Matthew	Daley		Ambler	PA
Paula	Daley		Norristown	PA
Lynn	Dalton		Pittsburgh	PA
Christopher	Daly		Bryn Mawr	PA
Cynthia	D'Ambrosio		Norristown	PA
Steven	Damm		McKees Rocks	PA
Amanda	Dandrea		Gibsonia	PA
Raymond	Dandrea	Clean Air Council	West Chester	PA
Olivia	D'Andrea		Blue Bell	PA
Michele	Dane		Philadelphia	PA
Patricia	Dangle		Montoursville	PA
Robert	Daniel		Havertown	PA
Angie	Danielle		Philadelphia	PA
Frank	Dannert		Luzerne	PA
K.	Danowski		Pittsburgh	PA
Patricia	Danzon		Bryn Mawr	PA
Partha	Dass		Blue Bell	PA
Sheila	Dattilo		Freedom	PA
Theresa	Davella		Lancaster	PA
Clifford	David		Ambler	PA
Susan	David		Philadelphia	PA
Lauri	Davidson		Pittsburgh	PA
Phyllis	Davidson		Pittsburgh	PA
Sarah	Davidson		Philadelphia	PA
Audrey	Davis		Wyomissing	PA
Betsy	Davis		Coraopolis	PA
Carey	Davis		Philadelphia	PA
Glenn	Davis		Apollo	PA
Jolynn	Davis		Trout Run	PA
Karen	Davis		Warren	PA
Kenneth	Davis		Warriors Mark	PA
Richard	Davis		Cochranville	PA
Susan	Davis		Bala Cynwyd	PA
Susanna	Davison		Kennett Square	PA
Debbie	Dawson		Folsom	PA
Daniel	Dayton		Bensalem	PA
R.A.	Dayton		Pittsburgh	PA
Tina	DeCarla		Telford	PA
Tony	DeCasper		Clearfield	PA
Darlene	Dech		Sewickley	PA
D. Richard	Decker		Bethlehem	PA
Ashleigh	Deemer		Cranberry Twp	PA
Patricia	Defibaugh		Roaring Spring	PA

First Name	Last Name	Affiliation	City	State
Patricia	Deguzman		New Cumberland	PA
David	DeHaven		Bethel Park	PA
Neena	Deibler		Upper Chichester	PA
David	Deihl		Camp Hill	PA
Mitzi	Deitch		Feasterville-trevose	PA
Bradley	Deiter		Harrisburg	PA
Enrique	Del Castillo		State College	PA
Donna	Delany		Chester Springs	PA
Tony	DelGrosso		Bethlehem	PA
Tina	Delia		Philadelphia	PA
Betsy	Delisle		Lancaster	PA
Mike	DellaPenna		Malvern	PA
Tracey	Dellinger		Pequea	PA
Rosemary	Delpino		Baden	PA
Patricia	Demarco		Pittsburgh	PA
David	DeMaria		Warrington	PA
Stacey	Dembele		Chesterbrook	PA
Fran	DeMillion		Kennett Square	PA
Kelli	Dendler		Womelsdorf	PA
Steven	Denisevicz		Philadelphia	PA
Thomas	Dennery		Jenkintown	PA
Beth	Dennis		Howard	PA
Lynn B.	Denton		Philadelphia	PA
Rick	Denzien		Ambler	PA
Sheri	DeOrio		Pittsburgh	PA
Mildred	DePaolis		Pittsburgh	PA
Geraldine	DePaula		Flourtown	PA
Robert	Depew		Newtown	PA
Pam	Derfler		Allentown	PA
Judith	DeRicco		Boiling Springs	PA
Carol	Desanto		Forksville	PA
Roberto	DeSanzo		Beaver Falls	PA
Roger	Desy		Verona	PA
John	Detisch		New Salem	PA
Geneeva	Detman		Verona	PA
John	Detweiler		Camp Hill	PA
Peter	Deutsch		Aliquippa	PA
Robin	Devaney		Middletown	PA
Anne	Devenport		Philadelphia	PA
Deborah	Devers		York	PA
Linda	DeWalt		Boyertown	PA
Pat	DeWolfe		Allentown	PA
Barbara	Diamant		Bethlehem	PA
Nina	Diamond		Philadelphia	PA
Mario	DiCioccio		Narberth	PA
Nicole	Dickey		Philadelphia	PA
Paul	Dickey		Bethlehem	PA

First Name	Last Name	Affiliation	City	State
Thomas	Diehl		Stroudsburg	PA
Christopher	Diem		Philadelphia	PA
Stephanie	Dietrich		Jenkintown	PA
Diane	DiFante		West Decatur	PA
Michael	DiGiacomo		Morgantown	PA
Teri	Dignazio		Oxford	PA
Brock	Dilling		Alexandria	PA
Stacey	Dillingham		Louisville	KY
Peggy	Dillman		Brookville	PA
Sue	DiMoia		Levittown	PA
Michael	DiMonte	St. Paul's Working for Justice Ministry	Cranberry Township	PA
Deborah	Dina		Southampton	PA
Janet	Dingle		Philadelphia	PA
Sherry	Dinnen		Allison Park	PA
Gwen	DiPietro		Pittsburgh	PA
Vince	DiPillo		Glen Mills	PA
Boris	Dirnbach		Philadelphia	PA
Deborah	Diserens		Philadelphia	PA
Peg	Dissinger		Newtown	PA
Michel	Diviney		Pittsburgh	PA
Don	Dixon		Pittsburgh	PA
Aurora	Dizel		Havertown	PA
Colin	Dobell		Philadelphia	PA
Kathleen	Doctor		Kittanning	PA
Ryan	Dodson		Lancaster	PA
Allyson	Doig		Wayne	PA
Susan	Dolan		Lock Haven	PA
Christine	Dolle		Swarthmore	PA
Laura	Donahue		Swarthmore	PA
Darlyn	Donald		Chalfont	PA
Marilyn	Donis		East Norriton	PA
Robert	Donnan		McMurray	PA
Karen	Donofrio		Philadelphia	PA
Joyce	Donohue		Hallstead	PA
Pat	Donohue		Sellersville	PA
Edward	Doogan		Glenside	PA
Patrick	Dooling		Pittsburgh	PA
David	Doorn		West Chester	PA
Tasha	Doremus		Philadelphia	PA
Edmund	Dornheim		Glenside	PA
Kenneth	Doroski		Wayne	PA
Shane	Dorward		Lansdale	PA
Eric	Dougherty		Perkiomenville	PA
Frank	Dougherty		Newtown Square	PA
James	Dougherty		Pittsburgh	PA
Joan	Dougherty		Newtown Square	PA

First Name	Last Name	Affiliation	City	State
Holly	Dowling		Novato	CA
Ryan	Dowling		State College	PA
Alex	Downing		Allison Park	PA
Ellen	Doyle		Pittsburgh	PA
Jack	Doyle		Pittsburgh	PA
Timothy	Drager		Pottstown	PA
David	Drake		Easton	PA
Michael	Drake		Elkins Park	PA
Anna	Drallios		Carlisle	PA
Lisa	Dreano		Greensburg	PA
Karen	Drennen		South Park Township	PA
John	Drescher-Lehman		Green Lane	PA
Alan	Dresser		Denver	CO
Louis	Dreyer		Beaver Falls	PA
Jason	Driesbaugh		Philadelphia	PA
Edward	Drinkwater		Malvern	PA
Daniel	Drozd		Philadelphia	PA
Andrew	Druckenbrod		Pittsburgh	PA
Robert	Drummey		Portland	OR
Faith	Drummond		Lancaster	PA
Henry	D'Silva		Newtown	PA
Lauren	Duda		Seven Fields	PA
Sean	Duffin		Paoli	PA
Connor	Duffy		Washington	DC
Jerry	Duffy		Warminster	PA
John	Duffy		Hatboro	PA
Matthew	Duffy		Wyndmoor	PA
Michelle	Dugan		Upper Darby	PA
Jane	Dugdale		Phoenixville	PA
Gary	Dukart		Ambler	PA
John	Dulik		Philadelphia	PA
Evan	Dull		Wexford	PA
Jessie	Dull		Wexford	PA
Allison	Duncan		Malvern	PA
Carol	Duncan		Philadelphia	PA
Christopher	Dunham		Feasterville-trevose	PA
Joan	Dunham		Glenside	PA
Dr. W. Bruce	Dunkman		Radnor	PA
Dorothy	Dunlap		Pittsburgh	PA
Thomas	Dunlap		Latrobe	PA
Timothy	Dunleavy		State College	PA
Sandra	Dunlevy		Washington	PA
Curtis	Dunn		Ambler	PA
Eileen	Dunn		Bellefonte	PA
Mary	Dunn		Bryn Mawr	PA
Nicole	Dunn		Wyncote	PA
Loretta	Dunne		Philadelphia	PA

First Name	Last Name	Affiliation	City	State
Rebeca	Dunst		Chalfont	PA
Robert	DuPlessis		Philadelphia	PA
Anne Garcia	Dupont		Paoli	PA
Dr. Mary	Durando		Landenberg	PA
Faith	D'Urbano		Lancaster	PA
Joyce	Durkin		Mountville	PA
Marion	Durrwachter		Matamoras	PA
Gab	Duszak		Philadelphia	PA
Cindy	Dutka		Philadelphia	PA
Dr. Linda	Dwyer		Maple Glen	PA
Janet Petery	Dyszel		Schnecksville	PA
Dr. Anne	Dzamba		Westtown	PA
David Scott	Eaby		Ephrata	PA
Carissa	Eakin		Export	PA
Brian	Earley		Lancaster	PA
Philomena	Easley		Fairless Hills	PA
Karl	Ebert		Cranesville	PA
Karen	Eble		Huntingdon Valley	PA
Brian	Eckert		Bethel Park	PA
Sarah	Eckstein		Philadelphia	PA
William	Edelman		Philadelphia	PA
Sandra	Edmiston		Allentown	PA
Daryn	Edwards		Philadelphia	PA
Dr. Mary Dawn	Edwards		Pittsburgh	PA
Kathleen	Edwards		Glenside	PA
Katie	Edwards		Philadelphia	PA
Martha	Edwards		Glenmoore	PA
Mary	Edwards		Pittsburgh	PA
Robert	Edwards		Wilkes-Barre	PA
Sally	Edwards		West Bradford Township	PA
Paul	Egan		West Chester	PA
Wesley	Egli		Picture Rocks	PA
Margaret	Ehmann		Harrisburg	PA
Zoellen	Eichen		San Francisco	CA
Lindsey	Eischeid		Williamsport	PA
Nicholas	Eischeid		Williamsport	PA
Bonnie	Eisenfeld		Philadelphia	PA
Josh	Eisenfeld		Pittsburgh	PA
Robin	Eisman		Glenside	PA
Sylvan	Eisman		Philadelphia	PA
Bill	Elbert		Mountain Top	PA
Fayten	El-Dehaibi		Pittsburgh	PA
David	Eldredge		Haverford	PA
Arianne	Elinich		Coopersburg	PA
David	Elliott		Ardmore	PA
Russell	Elliott		Philadelphia	PA

First Name	Last Name	Affiliation	City	State
Shannon	Elliott		Bensalem	PA
Joyce	Ellis		Media	PA
Irma	Elo		Philadelphia	PA
Herbert	Elwell		Lawrenceville	PA
Kenneth	Ely		Brooklyn	PA
Justin	Emery		Allentown	PA
Hannah	Enderby	Evergreen Duquesne	Bethel Park	PA
Evan	Endres	The Nature Conservancy	Harrisburg	PA
Marie	Engberg		Pittsburgh	PA
Donna	Engle		Unityville	PA
Victoria	English		Villanova	PA
Daniel	Ennis		Glenside	PA
Elizabeth	Enright		Scottsdale	AZ
Jill	Epstein		Leesport	PA
Mark	Epstein		Allentown	PA
George	Erceg		Natrona Heights	PA
Joseph	Erdeljac		West Chester	PA
Mark	Erickson		Honey Brook	PA
Sheila	Erlbaum		Philadelphia	PA
Esther	Ermlick		Palmerton	PA
Bryan	Ernest		Pittsburgh	PA
Kathleen	Ernst		Abington	PA
Jeff	Erwin		Chalfont	PA
Kathleen	Espamer		Camp Hill	PA
Char	Esser		Villanova	PA
David	Estabrook		Philadelphia	PA
Brianna	Esteves	Ceres & ICCR	Boston	MA
Barbara	Estomin		Williamsport	PA
Joe	Evans		Lansdale	PA
Louise	Evans		Wynnewood	PA
Margaret	Evans		Collegeville	PA
Sherlene	Evans		Reading	PA
Kathy	Evans-Palmisano		Pittsburgh	PA
Frank	Evelhoch, II		Mechanicsburg	PA
Erich	Everbach		Wallingford	PA
William	Ewing		Philadelphia	PA
Richard	Eynon		Villanova	PA
Beth	Fabiani		Aliquippa	PA
Joan	Fabiani		Pittsburgh	PA
Amy	Faivre		Allentown	PA
Laura	Fake		Womelsdorf	PA
Ralph	Falbo		Pittsburgh	PA
Holton	Falk		Drexel Hill	PA
Mark	Fallon		Philadelphia	PA
Antonia	Fanaro		Collegeville	PA
Stephen	Fanicase		Easton	PA
Joan	Farb		Newtown	PA

First Name	Last Name	Affiliation	City	State
Brent	Farnum		Spring City	PA
Melissa	Farr		Lancaster	PA
Jeanine	Farrell		Philadelphia	PA
Ronald	Farrell		Philadelphia	PA
Melody	Farrin		Pittsburgh	PA
Ruth	Fauman-Fichman		Pittsburgh	PA
Caroline	Fedor		Clune	PA
Barbara	Feidt	American Petroleum Institute PA	Harrisburg	PA
David	Feingold		Philadelphia	PA
Amy Tecosky	Feldman		Narberth	PA
Jane	Fell		Philadelphia	PA
Len	Fennessy		Levittown	PA
Cindy	Ferguson		Bensalem	PA
Frank	Ferguson		Gibsonia	PA
Karen	Feridun	Berks Gas Truth	Kutztown	PA
Manny	Feris		Emmaus	PA
Anabel	Fernandez		Philadelphia	PA
Mary	Ferrigno		Philadelphia	PA
Al	Ferrucci		Pittsburgh	PA
Robert	Ferry		Media	PA
J. Allen	Feryok		Monessen	PA
Michele	Fetting*		Pittsburgh	PA
Deborah	Fexis		Nottingham	NH
Mark	Fichman		Pittsburgh	PA
Judith	Fickensberger		Easton	PA
David	Fiedler		Bensalem	PA
Byron	Fiegel		Oley	PA
Jaimie	Field		Gladwyne	PA
Sandy	Field		Lewisburg	PA
David	Fielder		Bensalem	PA
Rosemary	Fielding		Oil City	PA
Damon	Fields		Elizabethtown	PA
Dolores	Fifer		Pittsburgh	PA
Gaye	Fifer		Pittsburgh	PA
Janet	Filante		Philadelphia	PA
Jaime	Filipek		Pittsburgh	PA
Howard	Filtz		Pittsburgh	PA
Frank	Finan		Hop Bottom	PA
Kelly	Finan		Hop Bottom	PA
Jonathan	Fine		Boalsburg	PA
Susan	Fineman		Pittsburgh	PA
Janet	Finesilver		Prospect Park	PA
Beverly	Fink		York	PA
Brenda	Fink		Columbia	PA
Bruce	Fink De Beaufort		McKees Rocks	PA
Carl	Finkbeiner		Media	PA

First Name	Last Name	Affiliation	City	State
Wesley G.	Finkbeiner		Womelsdorf	PA
Rebecca	Finkel		Collingswood	NJ
Thomas	Finn-Cusick		Ridley Park	PA
Ambrose	Finnegan		Downingtown	PA
Janice	Fiore		Glenside	PA
Patricia	Fiorella		Philadelphia	PA
Elizabeth	Fiorentini		Carnegie	PA
Brandon	Fishbaum		Morganville	NJ
David	Fisher		Pittsburgh	PA
Jack	Fisher		Erie	PA
Keith	Fisher		Willow Grove	PA
Laura	Fisher		Elkins Park	PA
Mary	Fisher		Carnegie	PA
Rw	Fisher		Bryn Mawr	PA
Sandra	Fisher		Pittsburgh	PA
Shanlee	Fisher		Phoenixville	PA
Harris	Fishkin		Doylestown	PA
Michele	Fisk		Henryville	PA
Jeannie	Fissinger		Levittown	PA
Thom	Fistner		Bethlehem	PA
Dr. Silvio	Fittipaldi		Philadelphia	PA
Josephine	Fitts		Bryn Mawr	PA
Peter	Fitzpatrick		Franklin	PA
Peter	Fitzpatrick		Yardley	PA
Robert	Fladger		Port Orford	OR
A	Flagle		Newville	PA
Lori	Flanagan-Cato		Merion Station	PA
Connie	Fleeger		Butler	PA
James	Fleming		Newtown	PA
Robert	Flick		Elizabethtown	PA
Robert	Flipse		Malvern	PA
Jenna	Flohr		Pittsburgh	PA
Greg	Flood		Glenshaw	PA
Dr.	Flower		Pittsburgh	PA
John	Flynn		Millville	PA
Judith	Focareta		Pittsburgh	PA
Linda	Focht		Reading	PA
Danielle	Foderaro		Boothwyn	PA
Denise	Foehl		Royersford	PA
Sandra	Fochl		Philadelphia	PA
Marguerite	Foley		Philadelphia	PA
Susie	Folks		Pottstown	PA
Michael	Follman		Bethlehem	PA
Sandra	Folzer		Philadelphia	PA
Tom	Fonda		State College	PA
Dale	Foote		Philadelphia	PA
John	Ford		Stroudsburg	PA

First Name	Last Name	Affiliation	City	State
Matthew	Ford		Nazareth	PA
Roslyn	Foreman		Philadelphia	PA
Cathie	Forman		Southampton	PA
Valeri	Fornagiel		Wellsboro	PA
Karen	Fornari		Pittsburgh	PA
Alice	Forne		Wynnewood	PA
Anna	Forrester		Philadelphia	PA
Jean	Forsberg		Julian	PA
June	Fortunato		Philadelphia	PA
Dr. Kevin	Foskett		Ardmore	PA
Ida	Foster		Mountain Top	PA
T.	Foster		Hershey	PA
Travis	Foster		State College	PA
David	Fox		Warminster	PA
Kathy	Fox		Bethlehem	PA
Paula	Fox		Bethlehem	PA
Richard	Fox		Harrisburg	PA
Walter	Fox		Philadelphia	PA
Anne	Francis		Philadelphia	PA
Barbara	Franck		Philadelphia	PA
Heather	Franco		Fogelsville	PA
Gail	Francolini		Pittsburgh	PA
Henry	Frank		Philadelphia	PA
Rachel	Frankford		Philadelphia	PA
Razelle	Frankl		Gladwyne	PA
Elliott	Franklin		East Stroudsburg	PA
Leah	Franqui		Philadelphia	PA
Glenn	Frantz		Paoli	PA
Patricia	Franz		Pittsburgh	PA
Will	Fraser		Philadelphia	PA
Michael	Fratangelo		Pleasant Gap	PA
Jacquelynn	Freas		Philadelphia	PA
Glenn	Frederick		Gwynedd	PA
Heather	Frederick		Philadelphia	PA
Bryn	Frederickson		Landenberg	PA
Linda	Freed		Southampton	PA
Mark	Freed		Pittsburgh	PA
Allan	Freedman		Elkins Park	PA
Edward	Freeman		Philadelphia	PA
M.	Freiberg		Penn Valley	PA
Erich	Freimuth		Wayne	PA
Vicky	Frerotte		Ford City	PA
Jordan	Frey		Pittsburgh	PA
J	Fried		West Chester	PA
Lester	Friedlander		Wyalusing	PA
Lindsay	Friedman		Philadelphia	PA
Diane	Fries		Allentown	PA

First Name	Last Name	Affiliation	City	State
Jim	Fritch		Pennsburg	PA
Lani	Fritz		Beaver	PA
Marilyn	Fritz		Bethlehem	PA
shawn	frye		Downingtown	PA
Veryl	Frye		Lock Haven	PA
Sherri	Fryer		Clymer	PA
Ann	Fuchs		Chadds Ford	PA
Diane	Fuchs		Philadelphia	PA
Rosemary	Fuller		Media	PA
Tom	Fulmer		Lititz	PA
Fran	Fulton		Philadelphia	PA
Ashley	Funk*	Mountain Watershed Association	Champion	PA
Peter	Furcht		Philadelphia	PA
John	Furlong		Feasterville-trevose	PA
Park	Furlong		Feasterville	PA
Sharon	Furlong	Bucks Environmental Action	Feasterville	PA
Wendy	Futrick		Reading	PA
Tiffany	Gaal		Elkins Park	PA
Joan	Gabrie		Perkasie	PA
Ptah	Gabrie		Philadelphia	PA
Susan	Gage		Chalfont	PA
Rebecca	Gagliano		Philadelphia	PA
Pam	Gagne		Wyndmoor	PA
Ed	Gahres		Cleona	PA
Catherine	Galie		Langhorne	PA
Lisa	Gall		Philadelphia	PA
Adrienne	Gallagher		Sellersville	PA
George	Gallagher		Levittown	PA
Judith	Gallagher		Stahlstown	PA
Marie	Gallagher		Flourtown	PA
Kevin	Gallen		Yardley	PA
Joseph	Gallo		Coraopolis	PA
Joseph	Gammaitoni		Scranton	PA
Sakuna	Ganbari		Philadelphia	PA
Andrea	Gangloff		Royersford	PA
Nancy	Gansky		Springfield	PA
Diane	garcia		Narberth	PA
Enrique	Garcia		Philadelphia	PA
Constance	Garcia-Barrio		Philadelphia	PA
Cheryl	Gardner		Effort	PA
Debra	Gardner		Clearfield	PA
Will	Gardner		Swarthmore	PA
Rich	Garella		Philadelphia	PA
Mary	Garret		Annville	PA
Kathy	Garvey		Feasterville-trevose	PA
Brian	Garvin		Ambler	PA

First Name	Last Name	Affiliation	City	State
Timothy	Gaughan		Pittsburgh	PA
Larry	Gaugler		Emmaus	PA
Tom	Gauntt		Bensalem	PA
Knar	Gavin		Philadelphia	PA
Glenn	Gawinowicz		Oreland	PA
Peter	Gawron		Hershey	PA
Linda	Gazzola		Navarre	FL
Mavis	Gee		Pittsburgh	PA
Connie	Geesaman		Waynesboro	PA
Suzanne	Geffre		Newtown Square	PA
Justine	Geiger		Oil City	PA
Melinda	Geiger		Freedom	PA
Thomas	Geinzer		Irwin	PA
Caitlyn	Geist		Royersford	PA
anne	Gemmell		Philadelphia	PA
Mary	Gengenbach		Newtown Square	PA
Donna	Gensler		Pittsburgh	PA
Alyssa	Geoghan		Philadelphia	PA
Colin	George		Philadelphia	PA
John	George		Chester Springs	PA
Jim	Gergat		Bechtelsville	PA
Sandra	Gerhart		Reading	PA
Trudy	Gerlach		Wyalusing	PA
Joseph	German		Pittsburgh	PA
Carl	Gershenson		Philadelphia	PA
Victoria	Gershon		Philadelphia	PA
Jill	Gery		Perkasie	PA
Margaret	Ghiardi		Avonmore	PA
Indrani	Ghosh		Havertown	PA
Vincent	Giamartino		Ardmore	PA
Maria	Gianni		Pittsburgh	PA
Michael	Giansiracusa		Philadelphia	PA
Robert	Gibb		Homestead	PA
Frederica	Gibbon		Pittsburgh	PA
David	Gibson		Philadelphia	PA
Mia	Giglietti		Gibsonia	PA
Barry	Gilbert		Chester Springs	PA
Jeff	Gilbert		Bridgeville	PA
Gwen	Gilens		Adwyne	PA
Vincent	Gilhool		Wynnewood	PA
Derek	Gilliam		Pittsburgh	PA
Donna	Gilliam		Pittsburgh	PA
Keith	Gillogly		Pittsburgh	PA
Frances	Gilmore		Glenside	PA
Judith	Gilroy		Mechanicsburg	PA
Jennifer	Ginsberg		Philadelphia	PA
Louise	Giugliano		Narberth	PA

First Name	Last Name	Affiliation	City	State
Jennifer	Gladue		Media	PA
Ken	Glah		West Chester	PA
William	Gleason		Harrisburg	PA
Robert	Gleeson		Warren	PA
Lynn	Glielmi		Lancaster	PA
Marcia	Godich		Trafford	PA
Lynn	Godmilow		Philadelphia	PA
Ana	Goldenberg		Philadelphia	PA
David	Goldenberg		Bala Cynwyd	PA
Laura	Goldman		Merion Station	PA
Bernard	Goldstein		Pittsburgh	PA
Anne	Golub		Levittown	PA
William G.	Gonzalez		Suffern	NY
Elizabeth	Good		Hollsopple	PA
Chris	Goodacre		Gettysburg	PA
Kyle	Goodell		Mechanicsburg	PA
Michael	Goodhart		Pittsburgh	PA
Sara	Goodkind		Pittsburgh	PA
Margaret	Goodman		Glen Mills	PA
Hannah	Goodno		Philadelphia	PA
Nathaniel	Goodson, Jr.*		Upper Darby	PA
Luana	Goodwin		Philadelphia	PA
Sandra	Goodwin		Monroe	PA
Dr. Regina	Gordon		Wyncote	PA
Joan	Gordon		Pittsburgh	PA
Peggy	Gordon		Milford	PA
Richard	Gordon		Pittsburgh	PA
robert	gordon		Kennett Square	PA
Timothy	Gordon		Williamsport	PA
William	Gordon		Glenolden	PA
Kim	Goren		Penndel	PA
Barbara	Gorman		Maple Glen	PA
Diana	Goslin		Chicora	PA
Peter	Gottemoller		Glenside	PA
Susan	Gottfried		State College	PA
Laurie	Gottlieb		Philadelphia	PA
Dr. Jeffrey	Gould		Chalfont	PA
Amanda	Gower		South Abington Township	PA
Gillian	Graber	Protect PT (Penn-Trafford)	Harrison City	PA
Suzann	Graf		Philadelphia	PA
Doug	Grainge		Philadelphia	PA
Linda	Granato		Philadelphia	PA
William	Granche		Ridgway	PA
Alexander	Grande		Souderton	PA
Eveline	Grant		Pen Argyl	PA
Renee	Grant		Pen Argyl	PA

First Name	Last Name	Affiliation	City	State
Marilyn	Grasso		Erie	PA
Ralf	Graves		Wallingford	PA
Thomas	Graves		Holtwood	PA
Frank	Gray		Lancaster	PA
Penny	Gray		Fairless Hills	PA
Rosie	Grayburn		Springfield	PA
Brett	Green		State College	PA
Lawrence	Green		Swarthmore	PA
Kayla	Greenawalt		Pottsville	PA
Bernard	Greenberg	Pennsylvania Chapter - Sierra Club	West Chester	PA
David	Greene		North Huntingdon	PA
Donna	Greene		Pittsburgh	PA
Peggy	Greenfeld		Penn Valley	PA
Patricia	Greenlee		Morrisville	PA
Melissa	Greenley		Harleysville	PA
John	Greeno		Mt. Lebanon	PA
Wendy	Greenspan		Philadelphia	PA
Adams	Greenwood-Ericksen		Camp Hill	PA
Patricia	Greiss		Carlisle	PA
Trina	Gribble		Harrisburg	PA
Lillian	Grieco		Harrisburg	PA
Pat	Griffey		Clifton Heights	PA
Joseph	Griffin		Bellefonte	PA
David	Griffith		Wyncote	PA
P.	Griffith		Strafford	PA
Jacob	Griffith-Rosenberger		Pittsburgh	PA
Lois Ann	Griffiths		Harrisburg	PA
Sarah	Grill		Pittsburgh	PA
Kathy	Grim		Devon	PA
Louise	Grim		Wyomissing	PA
Judy	Grisel		Lewisburg	PA
Frank and Phoebe	Griswold		Philadelphia	PA
Brent	Groce		Philadelphia	PA
Susanne	Groenendaal		State College	PA
Nicole	Groff		Ambler	PA
Anna Marie & Richard	Grossman		Wayne	PA
Derek	Grossman		Pittsburgh	PA
Eric	Grote		West Chester	PA
Rex	Grubb		Quarryville	PA
Alexandra	Gruskos		Pittsburgh	PA
Linda	Grutzmacher		Philadelphia	PA
Ed	Gruver		Lancaster	PA
Tom	Gruver		Carlisle	PA
Eugene	Gualtieri		Philadelphia	PA
John	Guandolo		Freedom	PA

First Name	Last Name	Affiliation	City	State
Matthew	Guarno		Yardley	PA
Joe	Guest		Easton	PA
Veronica	Guevara		Bethlehem	PA
Susan	Guido		Gibsonia	PA
David	Guleke		Chester	PA
Katherine	Gulick		Philadelphia	PA
Ronald	Gulla		Canonsburg	PA
Jennifer	Gumbert		South Park	PA
Michael	Gumpert		Douglassville	PA
Edward.	Gundrum		Lebanon	PA
Herb	Gundy		New Alexandria	PA
Preeti	Gupta		Swarthmore	PA
Marta	Guttenberg		Philadelphia	PA
Ralph	Guttman		Bryn Mawr	PA
Perry	Gx		Tustin	CA
Randy	Gyory		Orwigsburg	PA
April	Gyure		Pottstown	PA
William	Haaf		Kennett Square	PA
Katelyn	Haas-Conrad		Pittsburgh	PA
Ben	Haaz		Philadelphia	PA
Sue	Habecker		Lebanon	PA
anne	Haddad		Berwyn	PA
William	Haegele		Philadelphia	PA
Paul	Hagedorn		Philadelphia	PA
Frances	Hager		Hughesville	PA
Dr. James	Haglund		Philadelphia	PA
Sy	Hakim		Philadelphia	PA
Don	Halbert		Ardmore	PA
Sara	Hale		Quakertown	PA
Marsha	Haley		Seven Fields	PA
Michael	Halick		Susquehanna	PA
John	Halko		Philadelphia	PA
Dianne	Hall		Franklin	PA
Margie	Hall		Lititz	PA
Suzanne	Hall		Mont Alto	PA
Barbara	Hamilton		White Oak	PA
Bonnie	Hamilton		Lewisberry	PA
Mary	Hamilton		Lafayette Hill	PA
Nina	Hamilton		Pittsburgh	PA
Bryn	Hammarstrom	Vice Pres, Pine Creek Headwaters Protection Group	Wellsboro	PA
Ronald	Hammill		Pittsburgh	PA
Richard	Han		Ann Arbor	MI
William	Hance		Drums	PA
Vikki	Hanchin		Pittsburgh	PA
Polly	Hancock		Newtown Square	PA
Warren	Hancock		Kintnersville	PA

First Name	Last Name	Affiliation	City	State
Edward	Hand		Broomall	PA
Matthew	Hanley	CNX	Canonsburg	PA
Mark	Hannah		Gibsonia	PA
Robert	Hansberry		York	PA
Linda	Hansell		Philadelphia	PA
Johanna	Hantel		Malvern	PA
L.	Hanusa		Pittsburgh	PA
Jaime	Harasym		Phoenixville	PA
Cecelia	Hard		Pittsburgh	PA
Susan	Hardin		West Chester	PA
Diana	Harding		Bryn Mawr	PA
Ellie	Harding		White Haven	PA
IHerman	Hardy		Pittsburgh	PA
Fran	Harkins		Munhall	PA
Nancy	Harkins		West Chester	PA
Miriam	Harlan		Philadelphia	PA
Micah	Harms		Mount Bethel	PA
Susan	Harnish		Landisville	PA
Brian	Harper		Wynnewood	PA
Marilynn	Harper		Media	PA
Grace	Harpole		Newtown	PA
Joseph	Harrick	JKLM Energy, LLC	Sewickley	PA
Bridget	Harris		Pittsburgh	PA
Dr. Dale	Harris		Lansdowne	PA
Shirlene	Harris		San Antonio	TX
Tom	Harris		Harrisburg	PA
Dr. Scott	Harrison		Elkins Park	PA
Dennis	Hartenstine		Birdsboro	PA
Patricia	Hartigan		Glenshaw	PA
Aaron	Hartman		Fleetwood	PA
Brenda	Hartman		Reading	PA
Brenda	Hartman		Reading	PA
Denise	Hartman		Ambler	PA
Justin	Hartman		Downingtown	PA
Kyoichi	Haruta		Bethlehem	PA
Kristin	Harvey		Philadelphia	PA
Marian	Harvey		Philadelphia	PA
Mark Judy	Harvey		Great Bend	PA
Breana	Hashman*		Philadelphia	PA
Susan	Haskins		Harrisburg	PA
Carol	Hassler		Levittown	PA
Deborah	Haste		Bethlehem	PA
Dorothea	Haug		Philadelphia	PA
Robert	Havrilla		Pittsburgh	PA
Don	Hawkins		North Braddock	PA
Joseph	Haydt		Philadelphia	PA
Chad	Hayes		Philadelphia	PA

First Name	Last Name	Affiliation	City	State
Erin	Hayes		Danville	PA
Randall	Hayes		Harrisburg	PA
Sharon	Hayes		Valparaiso	IN
Cami	Hays		Glenmoore	PA
Rachel	Hays		Aldan	PA
Verlyn	Hays		Mechanicsburg	PA
Richard	Headley		Pittsburgh	PA
Margaret	Healy		Bryn Mawr	PA
Michael	Heaney		Philadelphia	PA
Jeffrey	Hearn		Hatboro	PA
Nancy	Heastings	Justice Cmte. - East Liberty Presbyterian Church	Pittsburgh	PA
Peter	Hecht		Philadelphia	PA
Joe	Heefner		New Cumberland	PA
Barbara	Hegedus		Parkesburg	PA
Meredith	Hegg		Clifton Heights	PA
Louise	Heidecker		Pittsburgh	PA
Diane	Heil		Philadelphia	PA
Linda	Heindel		Easton	PA
Alison	Heiser		York	PA
Rob	Heist		Coatesville	PA
Jeanne	Held-Warmkessel		North Wales	PA
Marc	Helhowski		Rydal	PA
Michael	Heller		Philadelphia	PA
Dr. Bennett	Helm		Lancaster	PA
Barbara	Hemmendinger		Williamsport	PA
Judith	Henckel		Mount Bethel	PA
Laura	Henderson		Gibsonia	PA
Patrick	Henderson	Marcellus Shale Coalition	Harrisburg	PA
William	Hendricks		Pittsburgh	PA
Richard	Hengst		Furlong	PA
Grace	Henning		Pittsburgh	PA
Maryann	Henninger		Boyertown	PA
Amy	Henry		Northampton	MA
Dr. Marc	Henry		State College	PA
Jessica	Henry		Lancaster	PA
John	Henty		York	PA
Steven	Hepler		Schuylkill Haven	PA
Marcia	Hepps		West Chester	PA
Heather	Herczak		Oakdale	PA
Patrick	Herman		Reading	PA
Tim	Herman		Hershey	PA
Cristel	Hernández		Shippensburg	PA
Doug	Herren		Philadelphia	PA
Ann	Hershey		Chalfont	PA
Connie	Hershman		Philadelphia	PA
Tina	Herzog		Slatington	PA

First Name	Last Name	Affiliation	City	State
Will	Herzog		Malvern	PA
Rev. Mitchell	Hescox	Evangelical Environmental Network	New Freedom	PA
Heidi	Hess		Glenside	PA
Matthias	Hess		Lancaster	PA
Constance	Hester		Pittsburgh	PA
Jennifrr	Hetrick		Doylestown	PA
Susanne	Hewitt		Newtown	PA
Diane	Heyer		Kendall Park	NJ
Dr. Kevin	Hicks		Malvern	PA
RoseMary	Highman		Pittsburgh	PA
Enola	Hihi		Phoenixville	PA
Linda	Hilf		Cheswick	PA
Edward	Hill		Phoenixville	PA
Gregory	Hill		Stroudsburg	PA
James	Hill		Airville	PA
Mel	Hill		Bloomsburg	PA
Dr. Frank	Hillary		State College	PA
Sara	Hirschler		Philadelphia	PA
Mark	Hirschman		Lititz	PA
Robert	Hirsh		Philadelphia	PA
Natalie	Hirshorn		Philadelphia	PA
Hilary	Hirtle		Harrisburg	PA
Mary	Hoberg		Coraopolis	PA
Harry	Hochheiser		Pittsburgh	PA
Jason	Hochreiter		Pittsburgh	PA
Anne	Hodapp		Pitcairn	PA
Frances	Hoenigswald		Philadelphia	PA
Michelle	Hoff		Allentown	PA
Cindy	Hoffer		Kutztown	PA
David	Hoffman		Lebanon	PA
Donna	Hoffman		Pittsburgh	PA
Jason	Hoffman		Upper St. Clair	PA
Sharon	Hoffman		Pittsburgh	PA
Tom	Hoffman		Pittsburgh	PA
Bruce L	Hoffman, II		Thomasville	PA
Laurel	Hoffmann		Oreland	PA
Emmy	Hofmann		Telford	PA
Barbara	Hogan		Landenberg	PA
Gabriel	Hohag		Philadelphia	PA
Christina	Hoke		Carlisle	PA
K.	Holbrook		Birdsboro	PA
Kenneth	Holden		Philipsburg	PA
Curtis	Holgate		Lancaster	PA
Dianna	Holland		Philadelphia	PA
Fonda	Hollenbaugh		Pittsburgh	PA
Jill	Hollingshead		Gibsonia	PA

First Name	Last Name	Affiliation	City	State
Joanna	Hollis		Wyomissing	PA
Charles	Hollister		Columbia Cross Roads	PA
Daniel	Holmes		Doylestown	PA
Matthew	Holmes		Hummelstown	PA
Randi	Holt		Palatine	IL
Jayne	Holtman		Philadelphia	PA
Christine	Holzmueller		Glen Rock	PA
Barry L.	Homan		New Oxford	PA
Donna	Honigman		Lehighton	PA
Dr. Maryann	Hooker		Media	PA
Andy	Hooper		Swarthmore	PA
Amy	Hopf		Philadelphia	PA
Jeff	Hopkins		Sunbury	OH
Michael	Hopkins		Lewistown	PA
Olivia	Hopkins		Jenkintown	PA
Dennis	Hopple		Milton	PA
Deborah	Horan		Springfield	PA
Olivia	Horgan		Pittsburgh	PA
Lee	Horne		Mount Bethel	PA
Laura	Horowitz		Pittsburgh	PA
Robert	Hosier		Parkesburg	PA
Jennifer	Hotaling		Wayne	PA
Kathleen	Howe		Saylorsburg	PA
Karen	Howes		Trout Run	PA
Tim	Hoy		Halifax	PA
Reginald	Hoyt		Flourtown	PA
John	Hrabar		Pittsburgh	PA
Bruce	Hubbard		Yardley	PA
William	Huber		Tobyhanna	PA
Jerri	Huber-Gibson		Lansdale	PA
Roger	Hudak		Bethlehem	PA
Alexandra	Huddell		West Chester	PA
Margaret	Hudgings		West Chester	PA
Erich	Huff		Pittsburgh	PA
Bill	Hufford		Latrobe	PA
Mary	Hufford		Bala Cynwyd	PA
Judith	Hughes		Blue Bell	PA
Merritt	Hughes		Doylestown	PA
Ravi	Hughes		Pittsburgh	PA
Roger	Hughes		Robesonia	PA
Diana	Hulboy		Philadelphia	PA
Patrick Carl	Hume		Roslyn	PA
J.R.	Humphrey		Bellefonte	PA
Ashley	Hunsberger		Feasterville-trevose	PA
Kristine	Hunt		Pittsburgh	PA
Cricket	Hunter	Pennsylvania Interfaith Power & Light	State College	PA

First Name	Last Name	Affiliation	City	State
Patricia	Hunter		Greensburg	PA
Jacque	Hurley		Royersford	PA
Jeffrey	Hurwitz		San Francisco	CA
Ricki	Hurwitz		Harrisburg	PA
Julia	Hustad		Glenside	PA
Joan	Husted		Media	PA
Jamey	Hutchinson		Mohnton	PA
Steve	Hvozdovich	Clean Water Action	Pittsburgh	PA
Nancy	Iannuzzelli		Boothwyn	PA
Louis	Iatarola		Philadelphia	PA
Susan	Ice		Philadelphia	PA
Linda	Imbasciati		Willow Grove	PA
Donald	Imler		Duncansville	PA
Donna	Ingenito		Mount Joy	PA
Frank	Innes		Philadelphia	PA
Judith	Inskeep		Gwynedd	PA
J. William	Inslee		Coatesville	PA
Bridget	Irons		Philadelphia	PA
Bethany	Irwin		Pittsburgh	PA
Sheldon	Isaac		Philadelphia	PA
Steven	Iszauk		McDonald	PA
Tim	Ivers		Wexford	PA
Jo Ann	Jablon		Laverock	PA
Amy	Jackson		Morton	PA
Anne	Jackson		Birdsboro	PA
Christopher	Jackson		Morton	PA
Erica	Jackson		Pittsburgh	PA
Jennifer	Jackson		Yardley	PA
Suzanne	Jackson		Lancaster	PA
Dr. Heidi	Jacob		Swarthmore	PA
Joel	Jacobs		Carlisle	PA
Rebecca	Jacoby		Philadelphia	PA
John	Jakoby		Mountain Top	PA
Cathy	James		Drexel Hill	PA
Michael	James		Haverford	PA
Raymond	James		Lewisburg	PA
Peter	Jameson		Ligonier	PA
Dr. Elizabeth	Jamme		Chadds Ford	PA
Gloria	Janavitz		Pittsburgh	PA
Nathan	Janes		Ambler	PA
Robert	Janusko		Bethlehem	PA
Barb	Jarmoska*	Project CoffeeHouse	Montoursville	PA
Kristin	Jaros		Philadelphia	PA
Edward	Jasiewicz		Pittsburgh	PA
Robert	Jasper		York	PA
Celia	Jayne		Tionesta	PA
Skylar	Jeffries		Philadelphia	PA

First Name	Last Name	Affiliation	City	State
Robert	Jehn		Cochranton	PA
Daphne	Jenkins		Philadelphia	PA
Vicki	Jenkins		Philadelphia	PA
Dana	Jensen		Sewickley	PA
Pamela	Jensen		Wayne	PA
Jane	Jesteadt		Valencia	PA
Linda	Jeub		Pittsburgh	PA
Marian	Jew		Murrysville	PA
Justin	Jiunta		Philadelphia	PA
Shirley	Johannsen		York	PA
Suzanne St.	John		Wyncote	PA
Barbara	Johns		Harrisburg	PA
Gail	Johns		Royersford	PA
Andrew	Johnson		Gibsonia	PA
Charles	Johnson		Lansdale	PA
Emily	Johnson		Winfield	PA
Erin	Johnson		Swarthmore	PA
Gilda	Johnson		Philadelphia	PA
Jenifer	Johnson		Marietta	GA
Johnny	Johnson		Philadelphia	PA
K.	Johnson		Pittsburgh	PA
Kathleen	Johnson		Bloomsburg	PA
Michele	Johnson		Altoona	PA
Nora	Johnson	Beaver County Marcellus Awareness Community	Pittsburgh	PA
Patricia	Johnson		Philadelphia	PA
Patti	Johnson		Perkasie	PA
Richard	Johnson		Curwensville	PA
Shari	Johnson		Wyncote	PA
Sherwood	Johnson		Gibsonia	PA
Victoria	Johnson		Philadelphia	PA
Wesley	Johnson		Harrisburg	PA
William M.	Johnson		Narberth	PA
J.B.	Johnson-Allen		Danville	KY
Ryan	Johnson-Evers		Pittsburgh	PA
Jan	Johnston		Bethlehem	PA
Amy	Jones		Blue Bell	PA
Daneece	Jones		Scranton	PA
Gregory	Jones		Philadelphia	PA
Jacqueline	Jones		Bainbridge	PA
Jonesy G	Jones		Chambersburg	PA
Melody	Jones		Sinking Spring	PA
Racheal	Jones		Southampton	PA
John	Jonik		Philadelphia	PA
Pat	Jordan		Wayne	PA
Thomas	Josephi		Pittsburgh	PA
Ira	Josephs		Media	PA

First Name	Last Name	Affiliation	City	State
Karen	Joslin		Philadelphia	PA
Susan	Joslyn		Milford	PA
John and Ann Marie	Judson		Mechanicsburg	PA
Karol	Judy		Clinton	PA
Kasey	Jueds		Philadelphia	PA
Pamela	Jumet		Albrightsville	PA
Dan	Junttonen		King Of Prussia	PA
Melissa	K		South Heights	PA
M.	K.		Havertown	PA
S.	K.		Philadelphia	PA
Suzanne	Kafantaris		Pittsburgh	PA
F. Thomas	Kahler		Ephrata	PA
Sidney	Kahn		Wyncote	PA
Andrew	Kalan		Bryn Mawr	PA
Kristine	Kallinen		media	PA
Brian	Kaltreider		Spring Grove	PA
Alan	Kaminsky		Philadelphia	PA
Frank	Kaminsky		Stoystown	PA
Jean	Kammer		Hawley	PA
Shobhana	Kanal		Bala Cynwyd	PA
Katelyn	Kanavy		Philadelphia	PA
Judy	Kandel		Canonsburg	PA
Kimberly	Kane		Lititz	PA
Adam	Kapp		West Chester	PA
Robert	Kaprinski		Wynnewood	PA
Elizabeth	Karpinski		Norristown	PA
Julie	Kascal		Pittsburgh	PA
Suzanne	Kasenic		Philadelphia	PA
Melissa	Katterson		South Heights	PA
Demian	Katz		North Wales	PA
Debbie	Katzman		Camp Hill	PA
Maxwell	Kauffman		New Cumberland	PA
Tim	Kauffman		Lancaster	PA
Gerald	Kaufman		Philadelphia	PA
Leslie	Kaufman		Philadelphia	PA
Michael	Kaufman		Philadelphia	PA
Sandy	Kavoyianni		Athens	PA
Susan	Kawtoski		Center Valley	PA
Brigitte	Kay		Pine Ridge	PA
Myra	Kazanjian		Bethel Park	PA
Dee	Kearney		Philadelphia	PA
John	Kearney		Pittsburgh	PA
Kimberly	Keating		Warrington	PA
Richard	Keeler		Bensalem	PA
Nigel	Keen		Philadelphia	PA
James	Keenan		Lansdowne	PA

First Name	Last Name	Affiliation	City	State
Geoffrey	Keightly		Oreland	PA
Mary	Keil		Bloomsburg	PA
Barbara	Keiser		Stroudsburg	PA
Sam	Keiser		Kutztown	PA
Mary	Kelchak		Monroeville	PA
Joanne	Kellar		Springfield	PA
Marilyn	Kellar		Elverson	PA
Dennis	Keller		Middletown	PA
Lindsay	Keller		Ambler	PA
Rhonda	Keller		Lancaster	PA
Rudolph	Keller		Boyertown	PA
James	Kellett		West Windsor	NJ
William	Kellner		Lehighton	PA
David	Kelly		Selinsgrove	PA
Erin	Kelly		Philadelphia	PA
James	Kelly		Wayne	PA
Mary	Kelly		Exton	PA
Rachel	Kelly		Chadds Ford	PA
Sean	Kelly		Collingdale	PA
Sean	Kelly		Swarthmore	PA
Dean	Kendall		Leesport	PA
Quanita	Kendrick		Philadelphia	PA
Mary	Kennedy		State College	PA
Patricia	Kennedy		Harrisburg	PA
Dianne	Kenosky		Mount Pocono	PA
Joseph	Kenosky		Mount Pocono	PA
Michael	Kenosky		Mount Pocono	PA
Anna	Kent		Wyndmoor	PA
Gwen	Kerber		Newtown	PA
Brian	Kern		Lancaster	PA
David	Kerr		Pipersville	PA
Beth Rosenblum	Kessinger		Sunrise	FL
Sharon	Kessler		Rochester	PA
Marie	Kessler Kaminski	Fridays for Future Pittsburgh	Pittsburgh	PA
Heather	Kester		Berwick	PA
Rob	Kettell		Philadelphia	PA
Kathy	Kettlety		Downingtown	PA
Edward	Ketyer		Venetia	PA
Elizabeth	Ketz-Robinson		Alexandria	VA
Alice	Keyes		Cresco	PA
Brian	Keyes		New Hope	PA
Nina	Khorey		Pittsburgh	PA
Joe	Kiefner		Jenkintown	PA
Maria	Kiernan		Jenkintown	PA
Bruce	Kiesel		Southampton	PA
Steven	Killough		Lancaster	PA
Jee	Kim		Whitehall	PA

First Name	Last Name	Affiliation	City	State
Kenny	Kim		Philadelphia	PA
Charles	Kimber		Downingtown	PA
Tanya	Kinder		McDonald	PA
Kelly	King		Mt. Pleasant	PA
Linda	King		Daisytown	PA
Margaret	King		Pittsburgh	PA
Sarah	King		Royersford	PA
Douglas	Kingsbury		Philadelphia	PA
sarah	kinsella		Narberth	PA
Janis	Kinslow		Aston	PA
Michael	Kirchner		Harrisburg	PA
Karen	Kirk		Williamsport	PA
mary	kirsch		yardley	PA
Stephen	Kirsch		Emmaus	PA
Ralph	Kisberg	Responsible Drilling Alliance	Williamsport	PA
Allison	Kiser		Camp Hill	PA
Cynthia	Kishinchand		Philadelphia	PA
Linda	Kissel		East Stroudsburg	PA
Karen	Kite		Pennsylvania Furnace	PA
Tracey	Kleber		Reading	PA
Carol	Klein		West Chester	PA
Ellyn	Klein		Willow Grove	PA
Ian	klein		Cinnaminson	NJ
Kelyn	Klein		Elverson	PA
Mary	Kleinbach		Mertztown	PA
Robert	Kleinberg	Columbia University; Boston University	Cambridge	MA
Paul	Klepach		Akron	PA
Carolyn	Klepser		Philadelphia	PA
Norma	Kline		Meadville	PA
Paula	Kline		West Chester	PA
Tracey	Kline-Carey		Palmerton	PA
William And Nancy	Klink		Bloomsburg	PA
Sarah	Klockars-Clauser		Nether Providence Township	PA
Karey	Kluesner		Pittsburgh	PA
Mary	Knapp		Spring Mills	PA
Theresa	Knapp		Ulster	PA
Warren	Knapp		Towanda	PA
Marlene	Knight		Wyalusing	PA
Chris	Knipe		Philadelphia	PA
Heather	Knizhnik		Philadelphia	PA
Mark	Knobil		Pittsburgh	PA
Alyson	Knop		New Castle	PA
David	Knox		Gettysburg	PA
Van	Knox		Lititz	PA

First Name	Last Name	Affiliation	City	State
Judy	Knueven		Beaver Falls	PA
Karen	Knutson*		Allison Park	PA
James	Kobelak		Pittsburgh	PA
Ad	Koch		New Cumberland	PA
Joann	Koch		Lebanon	CT
Pamela	Koch		West Chester	PA
R.	Koch		Reading	PA
Elspeth	Koehle		Erie	PA
Scott	Koerber		Pittsburgh	PA
Karl	Koerner		Philadelphia	PA
Norman	Koerner		Philadelphia	PA
Matthew	Kohan		Gibsonia	PA
James	Kohler		Philadelphia	PA
Divya	Kohli		Cranberry township	PA
Frank	Kohn		Philadelphia	PA
Susan	Kohn		Phoenixville	PA
Donna	Kohut		Macungie	PA
Diane	Kokowski		Pittsburgh	PA
Michael F.	Kolassa		Brooklyn	NY
Lynda	Kolesar		Monroeville	PA
Joan	Kolessar		New Columbia	PA
Karen	Kolkka		Wyndmoor	PA
Pam	Komm		Chesterbrook	PA
Krista	Kontzamanys		Chester Springs	PA
Margee	Kooistra		Mechanicsburg	PA
Badger	Kopnitsky		Pittsburgh	PA
Neil	Korostoff		Spring Mills	PA
Pam	Kosty		Havertown	PA
Michael	Kovach	Pennsylvania Farmers Union	Stroudsburg	PA
Rosemarie	Kozdron		Rockton	PA
Jean	Kozel		Eagleville	PA
Emily & David	Krafjack		Mehoopany	PA
Jenny	Kraft		Philadelphia	PA
Norma	Kramer		Philadelphia	PA
Diane	Krassenstein		Philadelphia	PA
Peter	Kratz		Phoenixville	PA
Kelly	Kraus		Gibsonia	PA
Doug	Krause		Philadelphia	PA
Drew	Krause		Philadelphia	PA
Melissa	Krauss		Reading	PA
Darla	Kravetz		Lehighton	PA
Barbra	Kravitz		Philadelphia	PA
Fred	Kraybill		Pittsburgh	PA
Kathleen	Krebs		Pittsburgh	PA
Ruth	Krebs		Cornwall	PA
Joseph	Krenetsky		Factoryville	PA
Kelsey	Krepps	Sierra Club	Pittsburgh	PA

First Name	Last Name	Affiliation	City	State
Charles	Krimmel		Pittsburgh	PA
Melinda	Krokus		Scranton	PA
Jan	Kropczynski		North Versailles	PA
Jessica Bender	Krow		Philadelphia	PA
Julie	Krug		Philadelphia	PA
Tammy	Krumbhaar		Glenmoore	PA
Deborah	Krupp		Huntingdon Valley	PA
Maria	Kruszewski		Bellevue	PA
Natalie	Kubiak		Erie	PA
Lucia	Kubik		Philadelphia	PA
Patti	Kubli		Burgettstown	PA
Barbara	Kucan		Monroeville	PA
Peg	Kucek		Pottstown	PA
Leo	Kucewicz		Phoenixville	PA
Diana	Kudrich		Matamoras	PA
Sandi	Kuglics		Beaver	PA
Claudette	Kulkarni		Pittsburgh	PA
Jan	Kulp		Blue Bell	PA
Angela	Kump		East Stroudsburg	PA
Joanne	Kundrat		Philadelphia	PA
Steve	Kunz		Phoenixville	PA
Mary	Kupferschmid		Bethlehem	PA
Sandy	Kuritzky		Blue Bell	PA
M.	Kurland		Havertown	PA
Jason	Kurtz		Moon Township	PA
Mary Ann	Kusner		West Chester	PA
Edric	Kusuma		Pittsburgh	PA
Edward	Kuszajewski		Greensburg	PA
Annie	Kuter		Venice	FL
David	Kutish		Chalfont	PA
David	Kutner		Philadelphia	PA
Louis	Kyle		Philadelphia	PA
Elaine	Labalme	Environmental Defense Fund	Pittsburgh	PA
Jamison	Labov		Philadelphia	PA
Juluie	Lacinak		Shreveport	LA
John D	Lahr		Pequea	PA
Tom	Lalinsky		Red Hill	PA
William	Lallman		Corry	PA
Grace	Lambert		Nazareth	PA
Robert	Lambert		Philadelphia	PA
Taylor	Lamborn		Reading	PA
Kristina	Lamons		Houston	TX
Donald	Lancaster		Indiana	PA
Kenneth	Landis		Lewisburg	PA
Dr. Melissa	Lane		Lititz	PA
Laura	Lane		Philadelphia	PA
Sharon	Lane		Harrisburg	PA

First Name	Last Name	Affiliation	City	State
Todd	Lane		Philadelphia	PA
Liana	Lang		White Haven	PA
Suzanne	Lang		Philadelphia	PA
Barbara	Langan		Huntingdon	PA
Carolyn	Lange		Saylorsburg	PA
Eric	Langenmayr		Philadelphia	PA
Christopher	Lankenau		Philadelphia	PA
Amanda	Lapham		Philadelphia	PA
Dan	Lara		Philadelphia	PA
Joyce	Larry		Melrose Park	PA
Deborah	Larson		Pittsburgh	PA
Magali	Larson		Philadelphia	PA
Margaret	Laske		Pittsburgh	PA
Kim	Laskowsky		Marianna	PA
Dr. Roger	Latham		Rose Valley	PA
Roger	Latham		Nether Providence Township	PA
Bryan	Latkanich		fredricktown	PA
Clifford	Lau		Moon Township	PA
Jeffrey	Laubach		Greentown	PA
Victoria	Laubach		Pottstown	PA
Wayne	Laubscher		Lock Haven	PA
J M	Lavassaur		Norristown	PA
David	Laverne		Dickson City	PA
Dyan	Law		Plumsteadville	PA
Meya	Law		District Heights	MD
Kathleen	Lawless		Harleysville	PA
Kathy	Lawless		Harleysville	PA
Helen	Lawman		West Chester	PA
Michael	Lawrence		Harrison City	PA
John	Lawson		Penn Valley	PA
Barbara	Laxon		Bradford	PA
Chaim	Lazaros		Washington	DC
Lynette	Lazarus		Philadelphia	PA
Janet	Lazrow		Philadelphia	PA
Alicia	Lazur		Phoenixville	PA
Milton	Leake		York	PA
Tim	Leary		West Chester	PA
Diane	Leasure		Jeannette	PA
Lauren	Leavell		Philadelphia	PA
Carolyn	Leavitt		Bangor	PA
Sharon	Lebon		Pittsburgh	PA
Megan	LeCluyse		Philadelphia	PA
Brian	Lee		Pittsburgh	PA
Deborah	Lee		Philadelphia	PA
Judithann	Lee		Philadelphia	PA
MaryAnn	Lee		Carnegie	PA

First Name	Last Name	Affiliation	City	State
Noah	Lee		Philadelphia	PA
Yohan	Lee		Whitehall	PA
Lawrence	Leech		West Chester	PA
Michael	Leeling		Souderton	PA
Mark	Leeson		Orwigsburg	PA
Yvonne	LeFever		Prospect Park	PA
Shawn Mcgill	Legendre		Philadelphia	PA
Linda	Leghart		Jacobs Creek	PA
Louise	Legun		Blandon	PA
Loretta	Lehman		Duncannon	PA
Otto	Lehrbach		Alburtis	PA
Bruce	Leiby		Media	PA
Dorothea	Leicher		Columbia Crossroads	PA
Charles	Leiden		Altoona	PA
Sherry	Leinbach		Mertztown	PA
Mary Ann	Leitch		Philadelphia	PA
John	Leitel		Pittsburgh	PA
Arlene	Leiter		Langhorne	PA
Howard	Leiter		Langhorne	PA
Leann	Leiter	Earthworks	Canonsburg	PA
Olivia	Leleck		Pittsburgh	PA
Thomas	Leleck, II		Pittsburgh	PA
Lisa	Lendl-Lander		McKnight	PA
Deb	Lennon		Glenside	PA
Paul	Lerman		Wyncote	PA
Marielle	Lerner		Philadelphia	PA
Rebecca	Lesko		Tunkhannock	PA
M.	Leszczynski		Lapeer	MI
Sanford	Leuba		Pittsburgh	PA
Lori	Levan		Fountain Hill	PA
Angela	Leventis		Philipsburg	PA
Jon	Levin		Macungie	PA
Mark	Levin		Plymouth Meeting	PA
Nancy	Levine		Pittsburgh	PA
Serena	Levingston		Philadelphia	PA
Karen	Levy		Glenside	PA
Jeff	Lewin		Wallingford	PA
Felicia	Lewis		Philadelphia	PA
Gary	Lewis		Phoenixville	PA
Melanie	Lewis		Union Dale	PA
Shirley	Lewis		Factoryville	PA
Pat	Libbey		Philadelphia	PA
Patricia	Libbey		Philadelphia	PA
Patricia	Libengood		Erie	PA
Rebecca	Lieberman		Lansdale	PA
Veronica	Liebert		Drexel Hill	PA
Dr. Michael	Liebman		Kennett Square	PA

First Name	Last Name	Affiliation	City	State
Holly	Lightkep		Lansdale	PA
Andrea	Likovich		Aston	PA
Robert	Limouze		Coatesville	PA
Maggie	Lincoln		Pittsburgh	PA
Megan	Lindeman		South Park	PA
MaryAnn	Linehan		Saint Davids	PA
John	Linkes		Leechburg	PA
Joni	Lipson		Philadelphia	PA
Julie	Lipson		Philadelphia	PA
Sharon	Lipson		Drexel Hill	PA
Dr. David	Lischner		Allentown	PA
Karen	Liska		Kennett Square	PA
Barbara	Litt	Green Sanctuary Team, 1st Unitarian Church of PGH	Pittsburgh	PA
Robert	Little		Harrisburg	PA
Mark	Litwack		West Chester	PA
Bernard	Lizak		Northampton	PA
John	Lizak		Northampton	PA
Juan	Llarena		Erie	PA
Gina	LoBiondo		Havertown	PA
Jennifer	Loch		Factoryville	PA
Kathleen	Lockwood		Stroudsburg	PA
Cathy	Lodge		Bulger	PA
David	Loeb		Jenkintown	PA
Edward	Loeber		Hummelstown	PA
William	Loftus		Blakeslee	PA
Donna	Logan		Erie	PA
Hao-Li	Loh		Merion	PA
Gretchen	Lohse		Philadelphia	PA
Alex	Lola		Philadelphia	PA
Michael	Lombardi		Levittown	PA
Michael	Loncoski		Wilkes-Barre	PA
Matt	Loney		King Of Prussia	PA
Eugene	Long		Bryn Mawr	PA
Kevin	Long		Marysville	PA
Charlene	Longacre		East Greenville	PA
Robin	Longenbach		Danielsville	PA
Nancy	Lonsdale		Doylestown	PA
Kathryn	Lopez		Philadelphia	PA
Michael	Lord		Downingtown	PA
Frances	Lorie		Doylestown	PA
Dawn	Lorincy		Pittsburgh	PA
Elizabeth	Loser		Hanover	PA
Doris	Loud		Millertown	PA
Susan	Loughnane		Harrison City	PA
Mary Ann	Love	St. Paul's UMC Clean Air Group	Wexford	PA

First Name	Last Name	Affiliation	City	State
Cody	Low		Pittsburgh	PA
Mordecai-Mark Mac	Low		Philadelphia	PA
Melanie	Lowe		Carlisle	PA
Jeff	Lowry		Johnstown	PA
Dr. Peter	Luborsky		Phoenixville	PA
Brian	Lucas		Bethlehem	PA
Brian	Lucas		Yardley	PA
Kathleen	Lucas		Ellwood City	PA
Natalie	Lucas		Erie	PA
Patrice	Lucas		Wexford	PA
John	Lucci		Beaver	PA
Ray	Luncher		Pittsburgh	PA
Jennene	Lundy		Altoona	PA
Jamison	Lung		Philadelphia	PA
Sheila E.	Lunger		Unityville	PA
Pat	Lupo		Erie	PA
Laura	Lupovitz		Pittsburgh	PA
Al	Luque		Philadelphia	PA
Elizabeth	Lutes		Philadelphia	PA
Jonathan	Lutz	Associated Petroleum Industries of PA	Harrisburg	PA
David	Lutzker		Phoenixville	PA
Christine	Lutz-Walturz		Easton	PA
Dr.	Luxbacher		Pittsburgh	PA
Becca	Lynch		Philadelphia	PA
Elizabeth	Lynch		Fairfield	PA
Gail	Lynch		Philadelphia	PA
Mary Lynn	Lynch		Mechanicsburg	PA
Peter	Lynch		Berwyn	PA
Rita	Lynch		North East	PA
Vanessa	Lynch*	Moms Clean Air Force	Pittsburgh	PA
Deborah	Lyons		West Chester	PA
John	Lyons		Erie	PA
Jesse	Lytle	Haverford College	Haverford	PA
Jesse	Lytle		Narberth	PA
Ellen	M		West Chester	PA
Charles	MacDonald		Center Valley	PA
Pat	Mace		Hanover	PA
Ruth	MacIntosh		Ardmore	PA
Rhoda	Mack		Carlisle	PA
Joan	MacKenzie		Westtown Township	PA
Sandra	Mackie		Gettysburg	PA
John	Macphail		Ligonier	PA
Michelle	MacVeigh		Gibsonia	PA
Brian	MacWhinney		Pittsburgh	PA
Nicholas	Maddaloni		Annville	PA

First Name	Last Name	Affiliation	City	State
Char	Magaro		Enola	PA
Joseph	Magid		Wynnewood	PA
Pam	Magidson		Ardmore	PA
Diane	Maguire		Philadelphia	PA
Edward	Maguire		Folsom	PA
Margaret	Mahoney		Pittsburgh	PA
Jessica	Maia		South River	NJ
Andreas	Maihofer*		Cheswick	PA
Ben	Mainwaring		Philadelphia	PA
Russ	Mairs		Philadelphia	PA
Theresa	Maker		Butler	PA
Blair	Malcom		State College	PA
W. Andrew	Malcom		State College	PA
Rocco	Malerbo		Pittsburgh	PA
Jocelyn	Malik		Pittsburgh	PA
Mary	Malloy		Ardmore	PA
Nancy	Malone		Pittsburgh	PA
Ann	Malyon		Oakland	NJ
Dr. Yitzhak	Mandelbaum		Pittsburgh	PA
Randc	Mandelblatt		Philadelphia	PA
Risa	Mandell		Ambler	PA
Tracey	Mangus		Ford City	PA
Lynn	Manheim		Factoryville	PA
Yanni	Maniates		Morrisville	PA
Jaime	Maniatis		Morrisville	PA
Mary	Manly		Baden	PA
Robin	Mann*		Rosemont	PA
Laurie	Manney		Stevensville	PA
Alexa	Manning		Downingtown	PA
Megan	Manning		Philadelphia	PA
Steve	Manns		Monroeville	PA
Emily	Mansfield		Tafton	PA
V	Marasco		Pittsburgh	PA
Dr. Cindy	March		Dallas	PA
Deborah	Marchand		Gibsonia	PA
Kirby	Marchand		North Versailles	PA
Alana	Marchetti		Pittsburgh	PA
Marc	Marchioli		Pittsburgh	PA
Debra	Marge		Shamokin	PA
John	Margerum		Philadelphia	PA
Eugene	Mariani		Carnegie	PA
Louis	Mariani		Whitehall	PA
Dean	Marinelli		East Stroudsburg	PA
Laura	Markley		Kimberton	PA
Michael	Marks		Ardmore	PA
Stephen	Maroldo		Ambler	PA
Ray	Maroney		Lehighton	PA

First Name	Last Name	Affiliation	City	State
Ralph	Marothy		Philadelphia	PA
Victoria	Mars		Newtown Square	PA
Caroline	Marsh		Pittsburgh	PA
Lauren	Marsh		Pittsburgh	PA
Cindy	Marshall		Fairfield	PA
Dean	Marshall		Benton	PA
John	Marshall		Philadelphia	PA
Audrey	Martin		Pittsburgh	PA
George	Martin		Bensalem	PA
Julie	Martin		Blakely	PA
Rodney	Martin		Lititz	PA
Steven	Martin		Philadelphia	PA
Cody	Martini		Philadelphia	PA
Michelle	Martini		Palmyra	NY
Jennifer	Martorello		Media	PA
Barry	Martz		Mount Pleasant	PA
Valerie	Martz		Kintnersville	PA
Rory	Maruschak		Bethlehem	PA
Judith	Marvin		Lewisburg	PA
Mindy	Maslin		Philadelphia	PA
Mike	Massari		New Ringgold	PA
Thomas	Mastrilli		Harmony	PA
Lynn	Mather		Philadelphia	PA
Jack	Matisoff		Elkins Park	PA
Scott	Mato		State College	PA
Nicole	Matthesen		Philadelphia	PA
Carol	Matthews		Wayne	PA
John	Matthews		Chester Springs	PA
William	Matthews		Bethlehem	PA
Priscilla	Mattison		Bryn Mawr	PA
Linda	Maule		Easton	PA
Dorothy	Maurer		Blue Bell	PA
Marilyn	Maurer		Wynnewood	PA
Anita	Maximo		New Hope	PA
Norman	May		Pittsburgh	PA
Paige	May		Dallas	PA
Ken	Mayer		Mohnton	PA
Corinne	Mayland		Lansdale	PA
Ryan	McAllister		Philadelphia	PA
Dennis	McAndrew		Elizabeth	PA
James	McBride		Hermitage	PA
Elaine	McCabe		Wyoming	PA
Jay	McCahill		Lansdowne	PA
Annie	McCann		Bensalem	PA
Sean	McCarson		Malvern	PA
Susan	McCartan		Irwin	PA
Andrea	McCarthy		Jenkintown	PA

First Name	Last Name	Affiliation	City	State
Anne	McCarthy		Erie	PA
Thomas	McCartney		Pittsburgh	PA
Aiesha	McCastle		Willow Grove	PA
Joe	McCay		Houston	PA
Brien	Mcchesney		Bellefonte	PA
Rob	McClimon		Pottstown	PA
Mike	McClurkin		Mechanicsburg	PA
Dave	McCollough		York	PA
Ed	McConnell		West Chester	PA
Ruth	McCord		Lewisburg	PA
Richard	Mccorkle		State College	PA
Anne	McCormick		Philadelphia	PA
Sean	McCormick		Wallingford	PA
Margaret	McCourt		Philadelphia	PA
Elizabeth	McCue		Yardley	PA
Joe	McCullough		Woodlyn	PA
Karen	McCunney		Springfield	PA
Darlin	McDaniel		Fayetteville	PA
Patricia	McDaniel		Cochranton	PA
John	McDermott		State College	PA
Judy	McDougall		Pittsburgh	PA
Jennifer	McDowell*		Pittsburgh	PA
sydney	mcelwee		Philadelphia	PA
Robin	Mcfall		Hermitage	PA
Mary Lou	McFarland		Ambler	PA
Carol	McFerren		Bushkill	PA
Olga	McGarrity		Philadelphia	PA
Aizya	McGee		Austin	TX
Bonnie	McGill		Conneaut Lake	PA
Daniel	McGinnis		Ambler	PA
Diana	McGlory		Pittsburgh	PA
Karen	Mcgovern		Philadelphia	PA
Maureen	McGranaghan		Pittsburgh	PA
Joan	Mcgrane		Drexel hill	PA
Bridget	McGrath		Norristown	PA
Carol	McGrath		Narvon	PA
Jim	McGraw		Malvern	PA
Ellie	McGuire		Bethlehem	PA
Arlen	Mchale		Dalton	PA
Maureen	McHugh		Chambersburg	PA
Cathy	McIlvain		Sellersville	PA
Eve	McIntosh		Broomall	PA
Doris	McKay		Doylestown	PA
Donna	McKee		Lederach	PA
Timothy	McKee		Lederach	PA
Mary	McKenna		Philadelphia	PA
Ann Elise	McLaughlin		Rose Valley	PA

First Name	Last Name	Affiliation	City	State
William	McLaughlin		Philadelphia	PA
Mary	McMahon		Philadelphia	PA
Andrew	McManus		Glen Mills	PA
Bruce	McMichael		Media	PA
Max	McMinn		Phoenixville	PA
Vickie	McMurray		Clearfield	PA
Linda	McNair		Pittsburgh	PA
Karla	McNamara		Baden	PA
Margaret	Mcnamera		Glenside	PA
Lisa	McNany		Butler	PA
Kelsey	McNaul		Pittsburgh	PA
Sandra	McNeal		Aston	PA
Sherry	McNeil		Butler	PA
B	McNutt		Levittown	PA
Richard	McNutt		Pipersville	PA
Marlene	McPherson		Elliottsburg	PA
Lisa	McQuarrie		Pittsburgh	PA
Michael	McQuown		Philadelphia	PA
Mari	McShane		Pittsburgh	PA
Melissa	McSwigan		Pittsburgh	PA
Jennifer	McTiernan		West Chester	PA
Harry	McVey		Mount Joy	PA
Millie	McWhorter		McDonald	PA
Robert	MD		Philadelphia	PA
David	Meade		Apollo	PA
Laurel Person	Mecca		Pittsburgh	PA
Mark	Mechling		Pittsburgh	PA
Larisa	Mednis		Pittsburgh	PA
Kevin	Meehan		Newtown Square	PA
Lawrence	Meehan		Philadelphia	PA
Tekku	Meep		Erie	PA
Marilyn	Mehalick		Wayne	PA
Matthew	Mehalik	Breathe Project	Pittsburgh	PA
Michael	Mehrazar		Harrisburg	PA
Sagar	Mehta		Erie	PA
Mary	Meininger		Buckingham	PA
Lisa	Mell		Philadelphia	PA
Chris	Melograna		Collegeville	PA
Nancy	Melograna		Collegeville	PA
Marion	Menapace		Asheville	NC
Mark	Mendenhall		Philadelphia	PA
Marsha	Menendez		Berwyn	PA
Toni	Menninger		Philadelphia	PA
Marcy	Meritz		Philadelphia	PA
Lou Ann	Merkle		Plymouth Meeting	PA
Wesley	Merkle		Philadelphia	PA
Gail	Mershon		Philadelphia	PA

First Name	Last Name	Affiliation	City	State
Jodie	Messner		Oakdale	PA
Nathaniel	Metz		Paoli	PA
Rich	Metz		Erdenheim	PA
Debra	Metzger		Irwin	PA
Doug	Metzler		Turtle Creek	PA
Jonathan	Meyer		Chambersburg	PA
Mary	Meyer		Philadelphia	PA
Melva	Meyer		Beach Lake	PA
Peter	Meyer		New Hope	PA
Rachel	Meyer		Aliquippa	PA
Sydney	Meyer		Philadelphia	PA
Harold Adolph	Meyer Jr		Washington Depot	CT
Donna	Meyers		Stowe	PA
Michele	Meyrowitz		Blue Bell	PA
Eve	Miari		Media	PA
Laura	Micco		Pittsburgh	PA
Susan	Michael		Aliquippa	PA
Karen	Michalczyk		Philadelphia	PA
Mollie	Michel	Moms Clean Air Force	Philadelphia	PA
Sara	Michelsen		Merion Station	PA
Andrew	Middleton		Laporte	PA
Marian	Mientus		Mount Pleasant	PA
Matthew	Mier		Sewickley	PA
Nick	Milam		Pittsburgh	PA
Carol	Milano		Richlandtown	PA
Kathleen	Milano		Erie	PA
Pamela	Milavec		Windber	PA
Dr. Gregory	Milbourne		Swarthmore	PA
Farah	Mili		Doylestown	PA
Regina	Milione		Plymouth Meeting	PA
Ada	Miller		Sellersville	PA
Barbara	Miller		Glen Mills	PA
Bonnie	Miller		Laceyville	PA
Christina	Miller		Media	PA
Eugene	Miller		Fort Washington	PA
Fred	Miller		Mechanicsburg	PA
James S.	Miller		Erie	PA
Jean	Miller		Devon	PA
Jessica	Miller		Carlisle	PA
Kathleen	Miller		Wilkes-Barre	PA
Lee	Miller		Schwenksville	PA
Lisa	Miller		Pittsburgh	PA
Maureen	Miller		Glenside	PA
Naomi	Miller		Philadelphia	PA
Nicole	Miller		Mechanicsburg	PA
Patricia	Miller		Manchester	PA
Phyllis	Miller		Reading	PA

First Name	Last Name	Affiliation	City	State
Susan	Miller		White Haven	PA
Thomas	Miller		Dillsburg	PA
Thomas	Miller		Harrisburg	PA
Tim	Miller		Philadelphia	PA
Michael	Miller Jr.		Philadelphia	PA
Donald	Milliman		Pottstown	PA
Andrew	Mills		Ambler	PA
Janis	Millu		Franklin	PA
Dr. Svetlana	Milutinovic		Philadelphia	PA
Joe	Mimott		Philadelphia	PA
Barbara	Mina		Media	PA
David	Mindel		Horsham	PA
Daniel	Mink		Lancaster	PA
Alex	Minkoff		Philadelphia	PA
Julio Paz y	Mino		Havertown	PA
Leandra	Mira		Pittsburgh	PA
Philip	Mirabelli		Factoryville	PA
Julia	Mirek		Pittsburgh	PA
Leslie	Mitchell		Pittsburgh	PA
Lillian	Mittleman		Havertown	PA
Maurice	Mitts		Philadelphia	PA
Jennifer	Mizak		Allentown	PA
Corinne	Moeller		Bakerstown	PA
Tish	Molloy		Glenmoore	PA
Brian	Moloney		Oreland	PA
Valerie	Monick		Dallas	PA
Barbara	Montabana		Aldan	PA
Paul	Montell		Baden	PA
Andrew	Montemayor		Philadelphia	PA
Karen	Montgomery		Bethlehem	PA
William	Montgomery		Pottstown	PA
John	Monti		Meadville	PA
Kevin	Moody	PIOGA	Harrisburg	PA
Lauri	Moon		Williamsport	PA
Dianne	Moore		Narberth	PA
William	Moore		Wyncote	PA
William	Moore		Media	PA
Michael	Moppin		Lemoyne	PA
Renee	Moran		Harrisburg	PA
Tina	Mordan		Sunbury	PA
Mary	More		Flourtown	PA
Adrienne	Morgado		Newtown	PA
Ang	Morgan		Wexford	PA
David	Morgan		Ambler	PA
Judy	Morgan		Philadelphia	PA
Robert	Morgan		Dallas	PA
Chrys	Morris		Wampum	PA

First Name	Last Name	Affiliation	City	State
Jason	Morris		Pittsburgh	PA
Linda	Morris		Williamsport	PA
Margaret	Morris		Johnstown	PA
Paulette	Morris		McKeesport	PA
Susan	Morris		Philadelphia	PA
James	Morrison		Willow Grove	PA
Mary	Morrison		Williamsport	PA
Yvette	Morrison		Philadelphia	PA
James	Morrow		State College	PA
Kathryn	Morrow		State College	PA
Roy	Morsch		Starlight	PA
Donna	Morse		Trafford	PA
Nicole	Morton		Pittsburgh	PA
Stephanie	Mory		Clarks Summit	PA
Christopher	Moscony		Philadelphia	PA
Tom	Moser		Murrsyville	PA
Wiliam	Moses		Norristown	PA
George	Mostoller		Philadelphia	PA
Mary	Motz		Sewickley	PA
Julia	Mount		Pittsburgh	PA
Magdalen	Mowery		Lancaster	PA
Bruce	Moyer		Harleysville	PA
Glenn	Moyer		Souderton	PA
Stephen	Moyer		Pottsville	PA
Thomas	Moyer		Harleysville	PA
Deb	Moyers		Lititz	PA
Andrew	Mramor		Philadelphia	PA
Susan	Mucha		Crafton	PA
Judith	Mueller		York	PA
Mary	Mulholland		Bryn Mawr	PA
Virginia	Mulky		Pittsburgh	PA
Barbara	Mullen		Pittsburgh	PA
Kathleen	Mullen		Pittsburgh	PA
Jennifer	MullenHaa		Flourtown	PA
Lisa	Muller		Pottstown	PA
Eric	Munck		Carlisle	PA
JoEllen	Muntz		Chadds Ford	PA
Jami	Murdoch		Milton	PA
Laura	Murillo		Glenside	PA
Barbara	Murock		Pittsburgh	PA
Claire	Murphy		Ridley Park	PA
Jacqueline	Murphy		Wellsboro	PA
Jim	Murphy		Havertown	PA
Tammy	Murphy		Philadelphia	PA
Tim	Murphy		Harrisburg	PA
Al	Mushlin		Easton	PA
Rosanna	Mutzabaugh		State College	PA

First Name	Last Name	Affiliation	City	State
Janice L	Myers		Etters	PA
Jeanne	Myers		Philadelphia	PA
Karena	Myers		Milford	PA
Linda	Myers		Petersburg	PA
Sara	Myers		Runnemede	NJ
Stephanie	Myers		York	PA
Hayley	Myron		Port Huron	MI
Jon	Nadle		Pittsburgh	PA
Danika	Nadzan		Ambler	PA
Gratia	Nagle		Dover	PA
John	Nagle		Pittsburgh	PA
Al	Nagy		Lititz	PA
Kayleigh	Nance		Austin	TX
Alexandra	Napoleon		Morrisville	PA
James	Napolitana		Altoona	PA
Bethany	Narajka		Pittsburgh	PA
Sharon	Narushoff		Hanover	PA
Nora	Nash	Sisters of St Francis of Philadelphia	Aston	PA
Samantha	Nathan		Wynnewood	PA
Daniel	Natt		Towanda	PA
Greg	Navarro		Drexel Hill	PA
Jeannelle	Navas		Gouldsboro	PA
Dr. Dolores	Needleman		Doylestown	PA
Taylor	Neel		Philadelphia	PA
Jim	Neely		Perkasie	PA
Sophia	Neiblum		West Chester	PA
Sophia	Nekoranik		Yardley	PA
Nora	Nelle		Collegeville	PA
Frank	Nelson		Philadelphia	PA
Heather	Nelson		Douglassville	PA
Sydney	Nelson		Haddon Township	NJ
Thomas	Nelson		Lansdowne	PA
Michael	Nese		Havertown	PA
Robert	Neuhauser		Lancaster	PA
Gail	Neustadt		Presto	PA
Ben	Nevin		Blossburg	PA
Doreen	Newby		Glenmoore	PA
Crystal	Newcomer		Enola	PA
Sharon	Newman		West Chester	PA
Rick	Newsome		Horsham	PA
Heather	Neylon		Penn Hills	PA
Kathleen	Nicholas		Pittsburgh	PA
William	Nichols		Philadelphia	PA
Nathan	Nicholson		Wallingford	PA
John	Nickey		Hanover	PA
Nicola	Nicolai		Chester Springs	PA

First Name	Last Name	Affiliation	City	State
John	Nicolella		Chester	PA
Jeanne	Niedelman		Pittsburgh	PA
Susan	Nierenberg		Teaneck	NJ
Douglas	Nightengale		King Of Prussia	PA
Barbara	Nigriini		Shillington	PA
Joan	Nikelsky		Upper Darby	PA
Dr. Paul	Nisly		Grantham	PA
Diane	Nissen		Haverford	PA
Jennica	Nobre		Huntingdon Valley	PA
Elliot	Nolter		Bethlehem	PA
Marie	Norman		Pittsburgh	PA
Thomas	Norpel		Blue Bell	PA
Tamar	Norquist		Landsdowne	PA
Brenda	Norris		Brookhaven	PA
Glenavie	Norton		Philadelphia	PA
Nick	Notte		Sewickley	PA
Nancy	Novak		Media	PA
Elaine	Novinger		Halifax	PA
Betsy	Noyce		Lewisburg	PA
Regal	Noye		Havertown	PA
P.	Nunez		Summerfield	FL
Judy	Nussbaum		Newtown	PA
Christine	Nye		Fredericksburg	PA
Leslie	Nyiri		Glenside	PA
Warren	Nystrom		Pittsburgh	PA
Chuck	Oatman		Drumore	PA
William	Obenour		Sewickley	PA
Daniel	OBrien		Milton	NY
Bill	O'Brien		Beaverton	OR
Mary	Obringer		Harrison City	PA
Anne	O'Callaghan		Media	PA
Evelyn	Och		Pittsburgh	PA
Kathleen	O'Connell		Willow Grove	PA
Dewey	Odhner		Horsham	PA
Deanne	O'Donnell		Derry	PA
DeDe	O'Donnell		Derry	PA
Kathleen	O'Donnell		Philadelphia	PA
Kim	O'Donnell		Pittsburgh	PA
Terry	OHara		Pittsburgh	PA
Sandra (Bili)	O'Hara		Murrysville	PA
Nina	O'Hella		Allison Park	PA
Max	Ojserkis		Philadelphia	PA
Lois	Oleksa		Durham	PA
Ed	Oles		Ligonier	PA
Jean	Olivett		Emporium	PA
Ignacio	Olivieri		Saylorsburg	PA
Steve	Olshevski		Philadelphia	PA

First Name	Last Name	Affiliation	City	State
Elaine	Olson		Manheim	PA
Wayne	Olson		Manheim	PA
Watson	Olszewski		East Norriton	PA
Lisa	O'Mahony		Swarthmore	PA
Laura	OMalley		Cresco	PA
Bernadette	Ondus		Danville	PA
Carol	O'Neill		Warriors Mark	PA
Jeffrey	Onink		Corry	PA
Evan	Opas		Lansdale	PA
David	Oppenheim		Wynnewood	PA
Debra	Orben		Riegelsville	PA
Susan	Orenstein		Pittsburgh	PA
Daniel	Orfe		Harleysville	PA
Jim	Orley		East Stroudsburg	PA
Bev	Ornik		Villanova	PA
Eileen	O'Rourke		Flourtown	PA
Olivia	Ortiz		Philadelphia	PA
Lisa	Osachy		Pittsburgh	PA
Diane	Osgood		Hollidaysburg	PA
Emily	O'Shell		Pittsburgh	PA
Christine	Ostopoff		Philadelphia	PA
Wayne	Ott		Orbisonia	PA
Chris	Ozbun		Wynnewood	PA
Barbara	Pace		Pittsburgh	PA
Robert	Pace		Eagleville	PA
William	Paci		Philadelphia	PA
Katherine	Packer		Philadelphia	PA
Rose	Paddison		Philadelphia	PA
Patrick	Pagano	Protect Allegheny County	Sewickley	PA
Chris	Pager		Monaca	PA
Eleanor	Pages		Glen Mills	PA
E	Pajak		Canonsburg	PA
Patricia	Palenik		Milford	PA
Paul	Palla		Greencastle	PA
John	Palmer		Athens	PA
Joseph	Palmer		Holland	PA
William	Palmer		Spring Mills	PA
Sylvia	Palms		Philadelphia	PA
Tina	Paloskey		Julian	PA
Zsuzca	Palotas		Warrington	PA
Paul	Paluba		Newtown Square	PA
Walter	Pankoe		Dublin	PA
Daniel	Papa		Philadelphia	PA
Robin	Pappas		Pocono Manor	PA
John	Parana		Johnsonburg	PA
Elizabeth	Paranhos		Boulder	CO
Donald	Park		Newtown Square	PA

First Name	Last Name	Affiliation	City	State
Barbara	Parker		Sarver	PA
Hillary	Parker		Ambler	PA
Judith	Parker		Philadelphia	PA
Laurin	Parker		Allentown	PA
Stephanie	Parker		Freedom	PA
Karen	Parker-Masarone		West Chester	PA
Nancy	Parks		Aaronsburg	PA
Stephen	Parks		Hollidaysburg	PA
Janet	Parlett		Coatesville	PA
Joshua	Parmarter		Linesville	PA
Antoine	Parmentier		Upper Black Eddy	PA
Carol	Parowski		Richfield	PA
Brian	Parrish		Hollidaysburg	PA
Christy	Parry		Wayne	PA
Gene	Parsons		Sewickley	PA
Judy	Parsons		Philadelphia	PA
Susan	Parsons		Freedom	PA
Linda	Partridge		Fleetwood	PA
Eric	Pash		Indiana	PA
Joe	Pasqualetti		Pittsburgh	PA
Mary Ann	Pastore		Levittown	PA
Chirag	Patel		Philadelphia	PA
Sagar	Patel		Westborough	MA
Leslie	Patrick		Mifflinburg	PA
Christopher	Patterson		Berwyn	PA
Susan	Patterson		Philadelphia	PA
William V.	Patterson		New Oxford	PA
Avis	Pattishall		Hershey	PA
Peter	Patton		Havertown	PA
Susanne	Paulovic		Doylestown	PA
Paz	Paulsen-Sacks		Norristown	PA
Robin	Paur		Center Valley	PA
Eric	Pavlak		Oaks	PA
Stephen	Pavlick		Port Carbon	PA
Lex	Pavlo		West Chester	PA
Sister	Pawlicki		Pittsburgh	PA
Lee	Paxton		Coraopolis	PA
Kim	Paymaster		Philadelphia	PA
Mike	Peale		Aston	PA
Tim	Pearce		Pittsburgh	PA
Ray	Pearson		Easton	PA
Janice	Pechan		Greensburg	PA
Leslie	Peckerman		Trenton	NJ
Chrissa	Pedersen		Philadelphia	PA
Erica	Peiffer		Natrona Heights	PA
Janice	Peischl		Allison Park	PA
Joan	Pelc		Newtown Square	PA

First Name	Last Name	Affiliation	City	State
Cass	Peluso		Williamsport	PA
Shannon	Pendleton		Bryn Athyn	PA
Erin	Pennabecker	Seneca Resources Company, LLC	Pittsburgh	PA
Christina	Penrose		Philadelphia	PA
Dan	Pepin		Cranberry Township	PA
Dan	Pepin		Cranberry Twp	PA
Billy	Pepmeyer		Glenshaw	PA
Kyle	Perella		Morrisville	PA
Olivia	Perfetti		Pittsburgh	PA
Aggie	Perilli		Lancaster	PA
Jeffrey	Perkins	Friends Fiduciary Corporation	Philadelphia	PA
Laura	Perkins		Pittsburgh	PA
Phyllis	Permar		McMurray	PA
Judith	Perreault		Downingtown	PA
Doreen	Perry		Pittsburgh	PA
Rita	Pesini		North Wales	PA
Ann	Peters		Philadelphia	PA
Alan	Peterson		Willow Street	PA
Mark	Peterson		Glenside	PA
Megan	Peterson		Solebury	PA
Patricia	Petko		West Chester	PA
Saundra	Petrella		Beaver	PA
Saundra	Petrella		Beaver	PA
Emily	Petrucci		Media	PA
Marian	Pflaumer		West Chester	PA
Thomas	Pfleger		Upper Chichester	PA
Madeline	Phillips		Pittsburgh	PA
Martin	Phillips		Philadelphia	PA
tamara	phillips		Pittsburgh	PA
Virginia	Phillips		Pittsburgh	PA
James	Phipps		Collegeville	PA
Eva	Piatek		Philadelphia	PA
Daniel	Pickens		Wyndmoor	PA
James	Piech		Wapwallopen	PA
Dr. Jon	Piersol		Wexford	PA
Bonnie	Piestrak		Yardley	PA
Anthony	Pietranton		Oakdale	PA
Dale	Pincus		Flourtown	PA
Anne	Pinkerton		Phoenixville	PA
Juliann	Pinto		Philadelphia	PA
Beth	Pirolli		Bristol	PA
Jeremy	Pitcairn		Jenkintown	PA
Emily	Pitner		Washington	PA
Mary	Pivarnik		New Castle	PA
Carryl	Platt		Bryn Mawr	PA

First Name	Last Name	Affiliation	City	State
David	Platt		Halifax	PA
Jim and Judy	Platt		Derry	PA
Rodney	Platt		Phoenixville	PA
Donna	Plummer		Harrisburg	PA
George	Plummer		Downingtown	PA
Liz	Plummer		West Chester	PA
Laura	Plunkett		Mars	PA
Jill M	Podczaski		Oil City	PA
Kari	Pohl	Sisters of St. Joseph of Baden, PA	Aliquippa	PA
ML	Polak		Philadelphia	PA
Joseph	Polansky		Scranton	PA
Carol	Poleno		New Castle	PA
Linda	Polinski		Pittsburgh	PA
Linda	Polishuk		West Chester	PA
Deborah	Polk		Pittsburgh	PA
Robert	Pollitto		Colts Neck	NJ
Ted	Pomerantz		Philadelphia	PA
John	Ponis		Philadelphia	PA
Nancy	Pontone		Philadelphia	PA
Kristen	Poole		Philadelphia	PA
Paul	Popiel		Norwood	PA
Jane	Popko		Palmyra	PA
Eileen	Poroszok		Richboro	PA
Linda	Porter		Bristol	PA
Susan	Porter		Hawley	PA
Susan	Porter		Avondale	PA
Thomas	Posey		Yardley	PA
Rebecca	Posner		Philadelphia	PA
Arthur	Post		Wayne	PA
Danielle	Post		Philadelphia	PA
Paul	Pottenger		Bristol	PA
Eric	Potter		West Chester	PA
Christophe	Pouchot		Chester Springs	PA
Colleen	Powers		South Orange	NJ
Janet	Powers		Gettysburg	PA
Catherine	Poynton		Havertown	PA
Kathryn	Pradel		Wilkes-Barre	PA
Emily	Pratt		Philadelphia	PA
Marly	Pred		Philadelphia	PA
John	Prellwitz		Greenburg	PA
Laura	Prewitt		Philadelphia	PA
Charles	Price		Philadelphia	PA
Laurie	Prince		Ambler	PA
Ruth	Prince		New Hope	PA
Allen	Prindle		Swarthmore	PA
Susan	Proietta		Philadelphia	PA

First Name	Last Name	Affiliation	City	State
Madison	Provorny		Princeton	NJ
Dan	Prpin		Cranberry Twp	PA
Vincent	Prudente		Philadelphia	PA
Laura	Prushinski		Larksville	PA
Hazel	Puchalsky		Philadelphia	PA
Andrew	Pudzianowski		Yardley	PA
J. Morgan	Puett		Beach Lake	PA
James	Pugliese		Glen Mills	PA
Hope	Punnett		Philadelphia	PA
Joann	Puskarcik		Starlight	PA
Kathleen	Putt		York	PA
Trisha	Qualio		Pittsburgh	PA
Jennifer	Quick		Hummelstown	PA
E.	R.		Broomall	PA
Lutz	R.		Pittsburgh	PA
Frances	Raab		Quakertown	PA
Shelden	Radin		Bethlehem	PA
Beverly	Rae		Hellertown	PA
Janet	Rafferty		New Cumberland	PA
Suzan	Ragan		Pittsburgh	PA
Tif	Ragan		Pittsburgh	PA
Dorothy	Raizman		Ligonier	PA
Kirk	Ramble		York	PA
John	Ramirez		Pottstown	PA
Candace	Ranck		Marietta	PA
Michael	Rancurello		Pittsburgh	PA
Deborah	Randall		State College	PA
Stephanie	Randall		Gray	PA
Jean	Randolph		Stroudsburg	PA
Paul	Ranello		Hawley	PA
Nancy	Ranieri		Collegeville	PA
Jennifer	Rankin		Perkasie	PA
Kira	Raquet		Ypsilanti	MI
Jason	Rash		Wallingford	PA
William	Rastetter		Philadelphia	PA
Joseph	Rattman		Stroudsburg	PA
Daniel	Rauscher		Ambler	PA
Christopher	Ravenscroft		Ambler	PA
Arvind	Ravikumar		Philadelphia	PA
Jill Van	Rawley		Wynnewood	PA
Catherine	Raymond		Penn Valley	PA
Shawna	Raymond		Harrisburg	PA
Beth	Razin		Philadelphia	PA
Christine	Razler		Yardley	PA
Brad	Rea		Pittsburgh	PA
Janet	Rea		Damascus	PA
Shannon	Rea		Lafayette Hill	PA

First Name	Last Name	Affiliation	City	State
Mel	Reader		York	PA
Reid	Reading		Pittsburgh	PA
Ahren	Ream		Kutztown	PA
Sara	Ream		Conestoga	PA
Louise	Reardon		Lancaster	PA
John	Rech		Wyncote	PA
Brian	Reed		Pittsburgh	PA
David	Reed		Murrysville	PA
Mary Ellen	Reed		Doylestown	PA
Theodore	Reed		Philadelphia	PA
Stacy	Reedy		Reading	PA
Phoebe	Reese		Pittsburgh	PA
Karen	Reever		Doylestown	PA
Diane	Reeves-Pak		Quakertown	PA
Maddie	Reid		Philadelphia	PA
Mykie	Reidy		Pittsburgh	PA
Jeff	Reiferson		Emmaus	PA
Kathleen	Reifke		Pottstown	PA
Kay	Reinfried		Lititz	PA
Margaret	Reiter		Saylorsburg	PA
Leo	Reitmeyer		South Park Township	PA
Lissa	Renner		Coatesville	PA
Bryan	Resch		Glenside	PA
Christine	Resch		Fullerton	PA
Joey	Resciniti		Gibsonia	PA
Brian	Resh		Pequea	PA
Cory	Reyman		Philadelphia	PA
Nicholas	Reynolds		Newtown	PA
Ronda	Reynolds		Aliquippa	PA
Sandy	Rhein		Metairie	LA
Victoria	Rhoades-Carraro		Pittsburgh	PA
Robert	Rhodes		Mercersburg	PA
Roberta	Riccio		Swarthmore	PA
Brittney	Rice		Philadelphia	PA
Carolyn	Rice		Womelsdorf	PA
Lawrence	Rice		Womelsdorf	PA
Micheline	Rice-Maximin		Swarthmore	PA
Dr. Janet	Rich		Paoli	PA
Susan	Richard		Lewistown	PA
Alexandria	Richards		Levittown	PA
Marin	Richeson		Ardmore	PA
Ron	Richter		Bethlehem	PA
Simon	Richter		Wyndmoor	PA
Jeffrey	Ridge		Saint Clair	PA
William	Ridgeway		Scranton	PA
Kathi	Ridgway		Canal Winchester	OH
Amanda	Riess		Philadelphia	PA

First Name	Last Name	Affiliation	City	State
Martha	Riggle		Mercersburg	PA
Jerri	Rigo		Somerset	PA
Carol	Rigond		Pittsburgh	PA
Joanne	Rile		Jenkintown	PA
Kelly	Riley		Hatfield	PA
Charles	Rinehart		New Freedom	PA
Dave	Ringle		Macungie	PA
Kathleen	Riordan		Philadelphia	PA
Luz	Rios		East Stroudsburg	PA
Mary	Rippel		Newtown Square	PA
Candice	Ritchey		Pittsburgh	PA
F Anne	Ritchings		Philadelphia	PA
Charles	Ritson		Dingmans Ferry	PA
Barbara	Ritzheimer		Pine Grove	PA
Lis	Rivera		Mountville	PA
Miguel	Rivera		Philadelphia	PA
Virginia	Rivers		Bryn Mawr	PA
Julia	Rix		Elkins Park	PA
Jeanine	Rizzo		Pittsburgh	PA
Robert	Roach		Pittsburgh	PA
Robert	Robbins		Newtown Square	PA
Valerie	Robbins-Rice		Calvin	PA
Suzanne E Webster	Roberson		Downingtown	PA
Douglas	Roberts		Philadelphia	PA
Gary	Roberts		Mount Wolf	PA
Jack	Roberts		Lancaster	PA
Jan	Roberts		Philadelphia	PA
Joe	Roberts		Wayne	PA
Judith	Roberts		State College	PA
Roberta	Roberts		Kennett Square	PA
Ruth	Roberts		Irwin	PA
Don	Robertson		York	PA
Joanna	Robinson		Newville	PA
Lewis	Robinson		Forkston	PA
Liz	Robinson		Philadelphia	PA
Patrick	Robinson		Penndel	PA
Dr. Allen	Robinson*		Pittsburgh	PA
Natalie	Robiou		Kennett Square	PA
Ryan	Robison		Philadelphia	PA
Jessica	Rocco		Greensburg	PA
Sadie	Rock		Clarks Summit	PA
Cindy	Roehrig		Chesterbrook	PA
Mary	Rogers		Langhorne	PA
Tyreece	Rogers		Philadelphia	PA
Kara	Roggenkamp		Pittsburgh	PA
Kathlene	Rohm		Bloomsburg	PA

First Name	Last Name	Affiliation	City	State
John	Rohrer		Goldsboro	PA
Gabriel	Romano		Philadelphia	PA
Melisa	Romano		Havertown	PA
Steve	Rominger		Blue Bell	PA
Mike	Roome		Thompson	PA
Christina	Rosan		Philadelphia	PA
Gianna	Rosati		Philadelphia	PA
B.	Rose		New Straitsville	OH
Carol	Rose		Pittsburgh	PA
Kenneth	Rose		Elizabethtown	PA
Michael	Rose		Ardmore	PA
Helene	Rosen		Ivyland	PA
Phyllis	Rosenbaum		Warwick	PA
Anne	Rosenberg		Bala Cynwyd	PA
Ernest	Rosenberg		Exton	PA
Pauline	Rosenberg		Philadelphia	PA
Sondra	Rosenberg		Philadelphia	PA
Donald	Rosenberger		Three Springs	PA
Deborah	Rosene		Whitehall	PA
Berte	Rosin		Garnet Valley	PA
Doug	Ross		Bryn Mawr	PA
Elliot	Ross		Union Dale	PA
James	Ross		Mechanicsburg	PA
Steve	Ross		Philadelphia	PA
Susan	Ross		King Of Prussia	PA
Robert	Rossachacj		Glenolden	PA
John	Rossey	Collingswood Cuts	Harrisburg	PA
Patricia	Rossi		Levittown	PA
Ben	Roterv		Ottsville	PA
James	Roth		Yardley	PA
Jason	Roth		Pittsburgh	PA
Carol	Rothman		Philadelphia	PA
Lynn	Rothman		Bethlehem	PA
Mitchell	Rothman		Merion Station	PA
Robin	Rothstein		Philadelphia	PA
Mary Ann	Rotondo		Schwenksville	PA
Valerie	Rousse		Media	PA
Erin	Roussel		Pittsburgh	PA
Robert	Routh	Clean Air Council	Philadelphia	PA
maureen	rowan		Philadelphia	PA
Jeromy	Rowe		Marysville	PA
Stephen	Rowland		Allentown	PA
Katherine	Rubel		Glenshaw	PA
Lionel	Ruberg		Newtown	PA
Victoria	Rubietta		Bradenton	FL
Allan	Rubin		Philadelphia	PA
Judy	Rubin		Philadelphia	PA

First Name	Last Name	Affiliation	City	State
Steven	Ruby		Haverford	PA
Katy	Ruckdeschel		Merion Station	PA
Karen	Rudy		New Cumberland	PA
Kathleen	Rueppel		McKees Rocks	PA
Mary Ann	Runco		Glenshaw	PA
Alison	Rupert		Hughesville	PA
Diane	Rusch		Canonsburg	PA
Charlene	Rush		Allison Park	PA
Joanna	Russell		Stroudsburg	PA
Joan	Russo		Hawley	PA
Edward	Ruszkowski		Pittsburgh	PA
Margery	Rutbell		New Hope	PA
Gary	Ryan		Doylestown	PA
John	Ryan		Newtown	PA
Tony	Ryan		Pottstown	PA
Bill	S		Pittsburgh	PA
Irene	S		Port Matilda	PA
Steve	S.		Washington	DC
Frank	Sabatini		Exeter	PA
Pouné	Saberi		Philadelphia	PA
Emma	Sabin		Philadelphia	PA
Dr. Jillan	Sackett		Bala Cynwyd	PA
David	Sacks		Reading	PA
Dr. Daniel	Safer		Philadelphia	PA
Heather	Sage		Pittsburgh	PA
R.	Sagely		Blairsville	PA
Todd	Sagin		Glenside	PA
Claudia	Saitz		Pittsburgh	PA
Joanna	Sakala		McConnellsburg	PA
Daniel	Salmen		Pittsburgh	PA
Susan	Saltzman		Philadelphia	PA
Hannah	Salvatore		Robesonia	PA
Trisha	Salvia	Chesapeake Bay Foundation	Harrisburg	PA
Maurice M.	Sampson, II*		Philadelphia	PA
Mary	Samsonoff		East Stroudsburg	PA
Maurice	Samuels		Pittsburgh	PA
William	Sanders		Birdsboro	PA
Jason	Sandman		Philadelphia	PA
Jim	Sandoe		Ephrata	PA
Meryl	Sands		Philadelphia	PA
Carol	Sandt		Willow Street	PA
Mario	Sangillo		Harrisburg	PA
Genevieve	Santalucia		Philadelphia	PA
Lais	Santoro*	Zero Hour	Chester Springs	PA
Zachary	Sapienza		Saint Thomas	PA
Graciela	Sarabia		Pittsburgh	PA
Ann	Sardineer		Trafford	PA

First Name	Last Name	Affiliation	City	State
Anya	Saretzky		Philadelphia	PA
Ec	Sartori		Allentown	PA
Robert	Sasser		Pittsburgh	PA
Tricia	Satifka		Washington	PA
Andrea	Saunders		Bethlehem	PA
Atara	Saunders		Elkins Park	PA
Merle	Savedow		Philadelphia	PA
Joan	Saverino		Philadelphia	PA
CW	Savitzky		Ambler	PA
Jamie	Sawich		Canonsburg	PA
Martha	Sawyer		State College	PA
Masoud	Sayles		Pittsburgh	PA
John	Scanlon		Pittsburgh	PA
John	Schad		Bensalem	PA
Dennis	Schaef		Meadville	PA
Jacqueline	Schaefer		Philadelphia	PA
Jan	Schaefer		Leola	PA
Mary	Schallenberger		Bridgeville	PA
Monica	Schallenberger		Bridgeville	PA
Julie	Schampel		McKeesport	PA
Michele	Schasberger		Kingston	PA
Robin	Schaufler		Swarthmore	PA
Ed	Scheid		Pittsburgh	PA
Edna	Scheifele		Emmaus	PA
Carolin	Schellhorn		Ardmore	PA
Nicholas	Scheman		Pittsburgh	PA
Peter	Schempf		Centre Hall	PA
Hilary	Schenker		Pittsburgh	PA
Lisa	Scherer		Marianna	PA
Liz	schiavone		Bethlehem	PA
Barbara	Schick		Merion Station	PA
Amanda	Schlegel		Columbia	PA
Kathryn	Schlesinger		Pittsburgh	PA
Glenn	Schlippert		Goldsboro	PA
David	Schmid		Pittsburgh	PA
Kris	Schmidt		Roslyn	PA
Krista	Schmidt		Philadelphia	PA
Linda	Schmidt		Gibsonia	PA
Peg	Schmidt		Pittsburgh	PA
Michael	Schmotzer		York	PA
Dan	Schneck		Bethlehem	PA
Alan	Schneider		Wexford	PA
Carl	Schneider		Philadelphia	PA
Robin	Schnitzer		Philadelphia	PA
Fred	Schober		Ephrata	PA
Bill	Schoell		Oxford	PA
Arline	Schoenberger		Glen Mills	PA

First Name	Last Name	Affiliation	City	State
Robert	Schoenholtz		Hawley	PA
George J	Schofield, III		Bryn Mawr	PA
David	Schogel		Philadelphia	PA
Daniel	Scholnick		Philadelphia	PA
David	scholnick		Philadelphia	PA
Lauren	Scholtz		Glenshaw	PA
Jack	Schonewolf		Philadelphia	PA
Elizabeth	Schongar		Pittsburgh	PA
Brandon	Schooley		Cheswick	PA
Steven	Schrayer		Allentown	PA
Jerene	Schroeder		Philadelphia	PA
Michael	Schroeder*	Quittapahilla Creek Garbage Museum	Annville	PA
Gregory	Schubert		Gibsonia	PA
Linda	Schubert		New Kensington	PA
Edward	Schultz		Elkins Park	PA
Kaylene	Schultz		Phoenixville	PA
Loree	Schuster		Philadelphia	PA
Ann	Schwartz		Langhorne	PA
Ari	Schwartz		Teaneck	NJ
Dan	Schwartz		Bath	PA
Dr. Matt	Schwartz		Philadelphia	PA
Marissa	Schwartz		Philadelphia	PA
Michele	Schwartz		Morgantown	PA
Dean	Schwartzman		Dresher	PA
Madilyn	Schwer		Glenshaw	PA
Amanda	Schwinn		Wynnewood	PA
Wm	Scott		Mansfield	PA
Judy	Scriptunas		Chambersburg	PA
Vera	Scroggins	Citizens for Clean Water	Brackney	PA
Patricia	Seabrook	Miller/Howard Investments, Inc.	Woodstock	NY
Steve	Sears		Hatboro	PA
Monika	Seegler		New Kensington	PA
Ruth	Seeley		Philadelphia	PA
Kimberly	Seger		Kittanning	PA
George	Segon		Freeland	PA
Erika	Seibel		Eighty Four	PA
Anne	Seidman		Philadelphia	PA
Marci	Seidman		Philadelphia	PA
Lois	Seipp		Levittown	PA
Deborah	Seitz		Bala Cynwyd	PA
Kristen	Selleck		Glenside	PA
Meg	Sellers		Kintnersville	PA
Geoffrey	Selling		Philadelphia	PA
Adrian	Seltzer		Wynnewood	PA
Elizabeth	Seltzer		Brookhaven	PA

First Name	Last Name	Affiliation	City	State
Eric	Selvage		Philadelphia	PA
Malina	Sem		Philadelphia	PA
Kathy	Semic		Middletown	PA
Frank	Senatore		West Chester	PA
Josie	Sepel		Elkins Park	PA
Kathleen	Serrano		Havertown	PA
Bradley	Sevin		Haverford	PA
Kelly	Seward		Sewickley	PA
Shannon	Sexton		Philadelphia	PA
Larry	Seymour		Factoryville	PA
Larry	Seymour		Factoryville	PA
Terri	Shadle		Harrisburg	PA
Carolyn	Shaffer		Erie	PA
Diane	Shaffer		Lancaster	PA
Jesse	Shaffer		Pittsburgh	PA
Suzanne	Shaffer		Spring Grove	PA
Paula	Shafransky		Sedro Woolley	WA
Keri	Shannon		West Chester	PA
Adina	Shapiro		Philadelphia	PA
Julie	Shapiro		Philadelphia	PA
Mary	Sharp		Altoona	PA
Phoebe	Sharp		Pittsburgh	PA
James	Sharpe		Radnor	PA
Kathleen	Sharpe		Radnor	PA
Eddie	Shaw		Pittsburgh	PA
Joe	Shaw		Quakertown	PA
Barb	Sheads-Smith		Gettysburg	PA
Melvin	Sheets		New Brighton	PA
Ruth	Sheets		Brookhaven	PA
Cynthia	Sheikh		West Chester	PA
Mark	Shellenberger		Ambler	PA
Sally	Sheppard		Ambler	PA
Dena	Sher		Philadelphia	PA
Michelle	Sheridan		Allentown	PA
Howard	Sherman		Lansdowne	PA
Kate	Sherman		Pittsburgh	PA
Daniel	Shertzer		Lancaster	PA
Marillyn	Shertzer		Mount Joy	PA
Jennifer	Sherwood		Jenkintown	PA
Ann	Shields		State College	PA
Jamie	Shields		Portland	OR
Warren	Shimer		Philadelphia	PA
Melinda	Shirk		Hanover	PA
Daniel	Shively		Greensburg	PA
Elizabeth	Shober		Lafayette Hill	PA
David	Shoemaker		Gulph Mills	PA
Herbert	Short		West Homestead	PA

First Name	Last Name	Affiliation	City	State
Paul	Shrivastava		State College	PA
Jeffrey	Shuben		Philadelphia	PA
Eileen	Shultz		Red Lion	PA
Heather	Shultz		Philadelphia	PA
Eileen	Shupak		Philadelphia	PA
James	Shuta		Dickson City	PA
Faez	Siddiqi		Philadelphia	PA
Janet	Sidewater		Coatesville	PA
Linda	Sieber		Shermans Dale	PA
Sheila	Siegel		Philadelphia	PA
Cathy	Siegl		Ardmore	PA
Frank	Signorello		Philadelphia	PA
Barbara	Silbert		Glenside	PA
Barbara	Silfies		Bethlehem	PA
Monique	Silva		King of Prussia	PA
Wesley	Silva		Marianna	PA
Genie	Silver		Wynnewood	PA
Suzie	Silver		Pittsburgh	PA
Elise	Silvestri		Pittsburgh	PA
Bruce	Simmeth		Buffalo	NY
Bruce	Simmeth		Monaca	PA
Barry	Simon		Warren	PA
Erica	Simon		Abington	PA
Marcy	Simon		Abington	PA
Natalie	Simon		Wyncote	PA
Sam	Simon		Philadelphia	PA
Judy	Simonson		Wynnewood	PA
Nora	Simpson		Pittsburgh	PA
Robert	Sims		Yardley	PA
Manav	Singh		Huntingdon Valley	PA
Diane	Sipe	Better Path Coalition		PA
Shirley	Sipos-Sassani		Riverside	PA
Jutta von	Sivers		Minersville	PA
Pam	Sivertsen		Drexel Hill	PA
Eileen	Sizer		Chadds Ford	PA
Patricia Anne Hisler	Skabla		Bensalem	PA
Alison	Skaluba		Old Forge	PA
Steve	Skarupa		Mc Donald	PA
David	Skellie		Erie	PA
Mark	Skevofilax		Dallas	PA
Phyllis	Skok		Camp Hill	PA
Gregory	Skutches		Bethlehem	PA
Dan	Slack		Wayne	PA
Dallas	Slagle		Richeyville	PA
Carol	Slomski		Pittsburgh	PA
Roslyn	Small		Pittsburgh	PA

First Name	Last Name	Affiliation	City	State
Vince	Small		Wynnewood	PA
Beverly	Smalley		Feasterville Trevose	PA
Holly	Smallwood		Aliquippa	PA
Ken	Smeltzer		Boalsburg	PA
Christine	Smerker		Wexford	PA
Patricia	Smialkowski		Yardley	PA
Dennis	Smiddle	FANS 4 HELP (nonprofit)	Canonsburg	PA
Marian	Smit		Baden	PA
Anne Marie	Smith		Rose Valley	PA
Catherine	Smith		Media	PA
Christopher	Smith		Birdsboro	PA
Daniel	Smith		Pottstown	PA
Donna	Smith		Havertown	PA
Ellen	Smith		Naples	FL
Fran	Smith		Meadville	PA
Gabriel	Smith		Philadelphia	PA
Jean	Smith		Equinunk	PA
JT	Smith		Sellersville	PA
Karen	Smith		Elkins Park	PA
Katie	Smith		Glenshaw	PA
Kelly	Smith		Derry	PA
Kevin	Smith		Havertown	PA
Lynn	Smith		Lancaster	PA
Mary	Smith		Rochester	NY
Melanie	Smith		Pittsburgh	PA
Robert	Smith		York	PA
Scott	Smith		Pittsburgh	PA
Shannon	Smith		Millvale	PA
Stacey	Smith		Perkasie	PA
Stephen	Smith		Bethlehem	PA
Timmie	Smith		Erie	PA
Vincent	Smith		Jenkintown	PA
B. David	Smith*		Lititz	PA
James W.	Smith, Sr.*		York	PA
Colleen	Smithyman		Wexford	PA
James and Joanne	Smoker		York	PA
Noel	Smyth		Havertown	PA
Kathie	Snavely		Wrightsville	PA
Marie	Snavely		Harrisonberg	VA
Ric	Snead		Phoenixville	PA
Dave	Sniderman		Pittsburgh	PA
Thomas	Snow		Oakmont	PA
Andre	Snyder		Muncy	PA
Brian	Snyder		Bridgeville	PA
Desiree	Snyder		Minersville	PA
Elisia	Snyder		Castle Shannon	PA
Pamela	Snyder		Harrisburg	PA

First Name	Last Name	Affiliation	City	State
Stephanie	Snyder		Lititz	PA
Tracy	Snyder		Chambersburg	PA
Arthur	Soifer		Glenside	PA
Bernard	Solomon		Narberth	PA
Sharyn	Solomon		Philadelphia	PA
B	Soltis		Downingtown	PA
Naomi	Somerville		Mechanicsburg	PA
Jeff	Sommers		Doylestown	PA
Barbara	Sonies		Narberth	PA
Gloria	Sonnie		Philadelphia	PA
Thomas	Soper		Philadelphia	PA
JoAnn	Sorrell		Collegeville	PA
John	Sorrrentino		Glenside	PA
Dr. Carole	Soskis		Bala Cynwyd	PA
Merian	Soto		Philadelphia	PA
Irene	Souder-Coyle		Lansdale	PA
Stephen	Sowa		Wexford	PA
David	Spangenberg		Philadelphia	PA
Dana	Spano		Pittsburgh	PA
Karen Guarino	Spanton		Philadelphia	PA
Jayne	Spector		Philadelphia	PA
Kayla	Speedy		Philadelphia	PA
Libba	Spiegel		Pittsburgh	PA
Mark	Spiller		Philadelphia	PA
Chester	Spohn	JKLM Energy LLC	Butler	PA
Bernard	Spraker-Gomez		Morton	PA
Wilson	Sproehnle		Philadelphia	PA
Chris	Squire		Pittsburgh	PA
Roberta	Sramac		Pittsburgh	PA
Rae K Du	Ssollae		Ben Avon	PA
Thomas	St. Hilaire*	Center for Methane Emissions Solutions	Camp Hill	PA
Barbara	Staats		Doylestown	PA
Karen	Stabenow		Philadelphia	PA
Lea	Stabinski		Eagleville	PA
Gwen	Stadler		Nazareth	PA
Steve	Stales		Philadelphia	PA
Rebecca	Stallings		Pittsburgh	PA
Joanne	Stamm		Kutztown	PA
Jenna	Stanislaw*		Pittsburgh	PA
Lee	Stanley		Bethlehem	PA
Carol	Stanton		Pittsburgh	PA
Chris	Stanton		Morton	PA
Mark	Starheim		Hermitage	PA
Rodney	Stark		Pocono Lake	PA
Shirley and Rick	Stark		Lemoyne	PA
Stephen	Starr		Ambler	PA

First Name	Last Name	Affiliation	City	State
James	Staszewski		Pittsburgh	PA
Gary	Stauffer		Harrisburg	PA
Randy	Stauffer		Lehighton	PA
Susan	Staugaard		Ardmore	PA
Kathleen	Stayton		Northumberland	PA
Eileen	Steding		Mc Donald	PA
Susan	Stedman, PhD		Paoli	PA
Alison	Steele	SW Pennsylvania Environmental Health Project	McMurray	PA
Dr. Ann	Steele		Pittsburgh	PA
John	Steely		Wayne	PA
Rose Marie	Stef		Erie	PA
Heidi	Steffy		Erie	PA
David	Steger		Media	PA
Alice	Stehle		Butler	PA
Laura	Stein		Philadelphia	PA
Mark	Stein		Haverford	PA
Renee	Stein		Lansdale	PA
Gary	Steinbauer	Pennsylvania Grade Crude Oil Coalition	Pittsburgh	PA
Barbara	Steinberg		Avalon	PA
MaryAnne	Steinert		Northampton	PA
Bob	Steininger		Phoenixville	PA
Richard	Steinman		Pittsburgh	PA
Ralph	Stenerson		Doylestown	PA
Rebecca	Stephens		Allentown	PA
Jessica	Stephenson		Pittsburgh	PA
Janet Ries	Stern		Philadelphia	PA
Stephanie	Stern		Narberth	PA
Mae	Sterrett		Kennett Square	PA
Lydia	Stettler		Mount Bethel	PA
Sari	Steuber		Springfield	PA
Sheila	Stevens		Fort Washington	PA
Robert	Stevenson		Lebanon	PA
George	Stewart		Pittsburgh	PA
Kevin	Stewart	American Lung Association in Pennsylvania	Camp Hill	PA
Leonard	Steyn		Newtown	PA
Joy	Steyne		Doylestown	PA
Donald	Stichick		Erie	PA
Bonnie	Stoeckl		Pequea	PA
John	Stofko		Allentown	PA
Sophia	Stokes		Pittsburgh	PA
Judith	Stoltzfus		Parkesburg	PA
John	Stolz		Glenshaw	PA
Julia	Stone		Philadelphia	PA
Margery	Stone		Shelocta	PA

First Name	Last Name	Affiliation	City	State
Meredith	Stone		Philadelphia	PA
James	Stoner		Monroeville	PA
Jim	Stoner		Monroeville	PA
Ethan	Story*	Center for Coalfield Justice	Washington	PA
Barry	Stover		Souderton	PA
W. Andrew	Stover		Chambersburg	PA
George	Stradtman		Elkins Park	PA
Stephen	Strahs		Philadelphia	PA
Darren	Strain		Brookhaven	PA
Liam	Strain		Philadelphia	PA
Kathleen	Strattan		Narvon	PA
Rev. Sandra L.	Strauss	Pennsylvania Council of Churches	Harrisburg	PA
Chris	Striegel		Philadelphia	PA
Laurie	Strine		Kennett Square	PA
Jan	Strouse		Bala Cynwyd	PA
M.	Struble		Philadelphia	PA
Dorothee	Stuber		Ogden	PA
Rebecca	Studer		Pittsburgh	PA
Jason	Stump		Philadelphia	PA
Steven	Styers		Mifflinburg	PA
David	Sucato		Pittsburgh	PA
Dorothy	Sucato		Pittsburgh	PA
Daisy	Sudparid		Havertown	PA
Fred	Suffian		Warrington	PA
Kent	Suhrvier		Pittsburgh	PA
Edward	Sullivan		Verona	PA
Marilyn	Sullivan		Freedom	PA
Robert	Sullivan		Pittsburgh	PA
Barrie	Summers		Doylestown	PA
Kevin	Sunday	PA Chamber of Business and Industry	Harrisburg	PA
Betty	Surbeck		Wayne	PA
Rich	Surdyk		Pittsburgh	PA
Paul	Surovchak		Belle Vernon	PA
	Susang-Talamo Family		Export	PA
Susan	Sussman		Harrisburg	PA
Annie	Sutton		Pittsburgh	PA
Daniel	Sutton		Wynnewood	PA
Robin	Sutton		Phoenixville	PA
Karen	Swam		Lancaster	PA
Rita	Swancy		Uniontown	PA
Carrie	Swank		Sinking Spring	PA
Daniel	Swartz	Coalition on the Environment and Jewish Life	Clarks Summit	PA
Jordan	Swartz		Pittsburgh	PA

First Name	Last Name	Affiliation	City	State
Lily	Swartz		New Hope	PA
J.	Sweeney		Ardmore	PA
Shawn	Sweeney		Philadelphia	PA
Ruth	Sweger		Zion Grove	PA
James	Swenson		State College	PA
Charles	Swigart		Fayetteville	PA
Thomas	Swimley		Knoxville	PA
Kimberly	Swing		Downingtown	PA
A.	Sybrandy		Philadelphia	PA
Helen	Syen		Philadelphia	PA
Edward	Sykes		Camp Hill	PA
Sheila	Sykes-Gatz		West Chester	PA
Barbara	Symons		Monroeville	PA
Peter	Syre		Abington	PA
Charlie	Sywulak-Herr		Elkins Park	PA
Robert	Szafranski		Philadelphia	PA
Daniel	Szyld		Philadelphia	PA
Sr. Lyn	Szymkiewicz		Baden	PA
Peter	Tafuri		Fleetville	PA
Helen	Tai		New Hope	PA
Kathie	Takush		Reading	PA
Dr. Evelyn	Talbott*		Pittsburgh	PA
Katie	Tandon		Phoenixville	PA
Anna	Tangi		Philadelphia	PA
Donald	Tannenbaum		Gettysburg	PA
Nicola	Tannenbaum		Fountain Hill	PA
Anthony	Taranto		Ross Township	PA
William	Tarbox		Emmaus	PA
Jay	Tarler		Philadelphia	PA
Garry	Taroli		Dallas	PA
Mary	Tasillo		Philadelphia	PA
Mary Ann	Tatara		Camp Hill	PA
Nancy	Tate		Riegelsville	PA
Agnes	Tavani		Lebanon	PA
Jessica	Tawney		Windsor	PA
Arlene	Taylor		Harrisburg	PA
John	Taylor		Pittsburgh	PA
Sharon	Taylor		Pittsburgh	PA
Domenic	Tedesco		Pittsburgh	PA
Jordan	Tegtmeyer		Morrisville	PA
Tracy	Tellep		Union Dale	PA
Joan	Tempesta		Havertown	PA
Randall	Tenor		Mechanicsburg	PA
Carol	Teodori		McMurray	PA
Alex	Teplyakov		Phoenixville	PA
Cassandra	Tereschak		Scranton	PA
Cheryl	Terry		Philadelphia	PA

First Name	Last Name	Affiliation	City	State
Phyllis	Terwilliger		York	PA
Katherine	Terzi		Lansdowne	PA
Francesca	Testa		Lancaster	PA
Linda	Theophilus		Pittsburgh	PA
Martha	Thomae		Eagle	PA
Diane	Thomas		Williamsport	PA
Barbara	Thomas-Kruse		Peoria	AZ
Carol	Thompson		South Park	PA
Garrett	Thompson		Harleysville	PA
James	Thompson		Knox	PA
Scott	Thompson		State College	PA
Susan	Thompson		Audubon	PA
Edward	Thornton		Swarthmore	PA
William	Thorp		Orcland	PA
Edward	Threlfall		Everson	PA
Dr. Susanna	Throop		Collegeville	PA
Amanda	Thum		Philadelphia	PA
Alice	Thurau		Clarion	PA
Judy	Tiberi		Butler	PA
Dale	Tiberie		Scenery Hill	PA
Barbara	Tiffany		Point Pleasnt	PA
Carol	Tileston		Philadelphia	PA
Joyce	Tilli		West Chester	PA
Christopher	Tobias		Pittsburgh	PA
Jennifer	Tobin		Philadelphia	PA
Maryanne	Tobin		Philadelphia	PA
Anthony	Tolomeo		Wallingford	PA
June	Tolomeo		Wallingford	PA
Patrice	Tomcik*		Gibsonia	PA
Linda	Tomei		Folcroft	PA
Stanley	Tomkiel		Bushkill	PA
Alex	Toner		Philadelphia	PA
John	Tooker		Mechanicsburg	PA
Debra	Topf		Wellsboro	PA
Katrina	Toporcer		Nanticoke	PA
Debra	Torok		Pomeroy	PA
Ray	Torres		Philadelphia	PA
Stephanie	Torres		Mohnton	PA
Karen	Tortorella		Holicong	PA
Kristin	Toscano		Narberth	PA
Charles	Tossi		Media	PA
Coreen	Tossona		Collegeville	PA
Ibrook	Tower		York	PA
Shawn	Towey		Phoenixville	PA
Elizabeth	Towner		Philadelphia	PA
Marlene	Trambley		Erie	PA
Meghan	Tranauskas		Philadelphia	PA

First Name	Last Name	Affiliation	City	State
Jay	Treat		King Of Prussia	PA
Scott	Trees		Aliquippa	PA
Richard	Tregidgo		Holtwood	PA
Tamara	Trella		Newtown Square	PA
Jill	Tressel		Newtown	PA
Deanna	Trevethan		York	PA
MaryMichael	Tribone		Pittsburgh	PA
Alex	Trimble		West Chester	PA
Donna	Troll		Johnstown	PA
Dr. John	Trout		West Chester	PA
Larry	Trout		Havertown	PA
Linda	Trout		Etters	PA
Melissa	Troutman*		Coudersport	PA
Brad	Trutt		White Haven	PA
Mandy	Tshibangu		Devon	PA
Dr. Walter	Tsou		Philadelphia	PA
Jeff	Tucker		New Hope	PA
Kimberly	Tucker		Dillsburg	PA
Susan	Tucker		Warren	PA
Elizabeth	Tuminski		Langhorne	PA
Cheryl Graff	Tumola		Wayne	PA
Jill	Turco		Philadelphia	PA
Leann	Turley		West Decatur	PA
David	Turner		West Chester	PA
Kathy	Turner		Clearfield	PA
Margaret	Turner		Shohola	PA
Phoebe	Turner		Kennett Square	PA
Carol	Tyler		Wyndmoor	PA
Brenda	Uhler		Landisburg	PA
Christina	Uhlir		Mountain Top	PA
Jane	Uhr		Havertown	PA
Margaret	Ullman		Newtown	PA
Stephanie	Ulmer		Pittsburgh	PA
Kim	Ulrich		Newville	PA
Ece	Ulus		Pittsburgh	PA
Jennifer	Unger		York	PA
Sandy	Unger		Newtown	PA
Jennifer	Unterberger		Wayne	PA
Katherine	Urbaniak		Philadelphia	PA
Kathryn	Urbanowicz		Jenkintown	PA
Rajani	Vaidyanathan		Pittsburgh	PA
Meghan	Valentich		Pittsburgh	PA
Brion	Vallone		Hellertown	PA
Richard	Van Aken		Churchville	PA
Juli	Van Brown		Philadelphia	PA
Peter	Van Ekelenburg		Lansdale	PA
Nathan	Van Velson		Lancaster	PA

First Name	Last Name	Affiliation	City	State
Robert	Van Wyk		Bedford	PA
Jon	Vandegrift		Langhorne	PA
Peg	Vanderlin		Erie	PA
Susan	Vandervort		Monroeville	PA
Damian	VanHart		Bristol	PA
Barbara	VanHorn		Duncannon	PA
Mark	Vargo		Derry	PA
Terri	Vasko		Slippery Rock	PA
Jennifer	Vastardis		Wayne	PA
Alex	Vazquez		Philadelphia	PA
Claire	Vebele		Havertown	PA
Micah	Veilleux		Philadelphia	PA
Richard	Veleta		Media	PA
Cindy	Veloric		Gladwyne	PA
Meera	Velu		Pittsburgh	PA
Brian	Venable		Seattle	WA
Caitlin	Venezel		Bellevue	PA
Mark	Vendel		Conneautville	PA
Matthew	Vento		Plum	PA
Lois	Ventura		Ohiopyle	PA
Thomas	Vernon		Philadelphia	PA
Keilah	Vidal		Pittsburgh	PA
Nick	Viggiano		Aston	PA
Edward	Vilkauskas		Bethel Park	PA
Tracy	Viola		Wayne	PA
Patrick	Vogelsong		Harrisburg	PA
Katherine	Volin		Philadelphia	PA
Dan	Volpatti		Pittsburgh	PA
Jason	Volpe		Philadelphia	PA
Joan	Vondra		Pittsburgh	PA
Samuel	Vrooman		Philadelphia	PA
Thao	Vu		Upper Darby	PA
Dr. Anne	W.		State College	PA
Devin	Wachs		Ardmore	PA
Nuiko	Wadden		Pittsburgh	PA
Joan	Wagman		Pittsburgh	PA
Glenn	Wagner		Richboro	PA
Mark	Wagner		Bechtelsville	PA
Melanie	Wagner		Parkesburg	PA
Denise	Waite		Berwyn	PA
Jessica	Walcott		Langhorne	PA
R.	Waleski		Philadelphia	PA
David	Walker		Avondale	AZ
Jay	Walker		Pittsburgh	PA
Matthew	Walker		Lafayette Hill	PA
Natalie	Walker		Philadelphia	PA
Jere	Walkow		Pittsburgh	PA

First Name	Last Name	Affiliation	City	State
Carol	Wall		Hopewell Jct.	NY
Pamela	Wallace		Conneautville	PA
Irene	Wallaert		Indiana	PA
John	Walliser*	Pennsylvania Environmental Council	Pittsburgh	PA
Diana	Walls		Nesquehoning	PA
Gerald	Walsh		Claysville	PA
Daniel	Walters		Harleysville	PA
Kevin	Wang		Pittsburgh	PA
Diane	Ward		Wysox	PA
Sheila	Ward		San Juan	PR
Layla	Ware		Wynnewood	PA
Elizabeth	Warner		Equinunk	PA
Lawrence	Warner		Zelienople	PA
Sally	Warren		Kennett Square	PA
Mike	Washil		Irwin	PA
Robert	Wasilewski		Wilkes-Barre	PA
Garrett	Wassermann		Coraopolis	PA
Sue	Watchko		Sewickley	PA
Ann	Waters		Pomeroy	PA
Hugh	Watkins		Pittsburgh	PA
Lisa	Watson		West Mifflin	PA
Yvonne	Watson		Philadelphia	PA
Mark	Watt		Reynoldsville	PA
Craig	Way		Pottstown	PA
David	Way		Pottstown	PA
Lynne	Waymon		Newtown	PA
Todd	Waymon		Newtown	PA
Shanna	Weagle		Pittsburgh	PA
Jill	Weathington		Pittsburgh	PA
Susan	Weaver		Allentown	PA
Thomas	Weaver		Pittsburgh	PA
Gretchen	Webb		West Chester	PA
Aerie	Webb-Anderson		Glenside	PA
Jeanne	Weber		Phoenixville	PA
Mary Anne	Webster		Pottstown	PA
Diane	Weeks		Roulette	PA
Ruby	Weeks		Carlisle	PA
Maria	Weick		Huntingdon	PA
Stephanie	Wein		Philadelphia	PA
Gudrun	Weinberg		Swarthmore	PA
S.	Weinberg		Philadelphia	PA
Arlene	Weiner		Pittsburgh	PA
Robert	Weiner		Pittsburgh	PA
Rafael	Weinstein		Philadelphia	PA
Harriett	Weis		Pittsburgh	PA
Ransome	Weis		Doylestown	PA

First Name	Last Name	Affiliation	City	State
Eleanor	Weisman		Meadville	PA
Alicia	Weiss		Lansdale	PA
Barry	Weiss		Philadelphia	PA
Dylan	Weiss		Presto	PA
Elissa	Weiss		Glenshaw	PA
Gabrielle	Weiss		Wayne	PA
Michael	Weiss		West Chester	PA
Norman	Weiss		Philadelphia	PA
Richard	Weiss		Emmaus	PA
Ronni	Weiss		Pittsburgh	PA
Katalin	Weisz		Pittsburgh	PA
Sean	Welch*		Elkins Park	PA
Logan	Welde		Philadelphia	PA
Erica	Wells		Pittsburgh	PA
Susan	Welsford		Norton Shores	MI
Jim	Welty	Marcellus Shale Coalition	Harrisburg	PA
Robert	Wendelgass		Philadelphia	PA
Patricia	Wendell		Jeannette	PA
David	Wenger		Harrisburg	PA
Rebecca	Wenhold		Allentown	PA
Tanya	Wenrich		Selinsgrove	PA
Joseph	Wenzel		Lake Elmo	MN
Nancy	Werner		East Greenville	PA
Sara	Wersinger		Buda	TX
Patricia	Wertz		Havertown	PA
Joseph	Werzinski		New Hope	PA
John	Wesner		Pittsburgh	PA
Michelle	Wessant		Pittsburgh	PA
Barbara	West		Fredericksburg	TX
Kathryn	Westman		Gibsonia	PA
Carol	Weston-Young		New Britain	PA
Ron	Wexler		North Wales	PA
Richard	Wheland		Allison Park	PA
Barbara	White		Pittsburgh	PA
Robert	White		Philadelphia	PA
Bert	Whitehair		Lake City	PA
Tom	Whiteman		Fullerton	PA
Megan	White-Marley		Havertown	PA
Judi	Whitesell		My. Holly Springs	PA
Tracy	Whitman		Wayne	PA
Cheryl	Whittaker		Kennett Square	PA
Dr. Janet	Whittaker		Southampton	PA
Jean	Wiant		Glenolden	PA
Aaron	Wiedemer		State College	PA
Loren	Wieland		Pembroke Pines	FL
Beth	Wierman		Sewickley	PA
Barbara	Wiggin		Mechanicsburg	PA

First Name	Last Name	Affiliation	City	State
Kevin	Wiker		Phoenixville	PA
Jonathan	Wilbur		Montrose	PA
Katherine	Wilde		Lafayette Hill	PA
Lois	Wildrick		Easton	PA
Dana	Wiley		Ardmore	PA
David	Wiley		Philadelphia	PA
Diane	Wiley		Newtown	PA
L. L.	Wilkinson		Taos	NM
Gene	Willard		West Chester	PA
David	Williams		Washington	PA
Inge	Williams	Lutheran Advocacy Ministry in Pennsylvania	Shoemakersville	PA
Jesse	Williams		Cincinnati	OH
JoAnn	Williams		Media	PA
Karen	Williams		Harrisburg	PA
Laurie	Williams		East Pittsburgh	PA
Linda	Williams		Bethel Park	PA
Mikki	Williams		Boiling Springs	PA
Sally	Williams		Wallingford	PA
Sarah	Williams		Philadelphia	PA
Tammy	Williams		McMurray	PA
William	Williams		Pittsburgh	PA
Thomas	Willis		Warminster	PA
Will	Willis		Mercersburg	PA
Walter	Wills		West Chester	PA
Peter	Wilmerding		Haverford	PA
Alfred	Wilson		State College	PA
Anatole	Wilson		Pittsburgh	PA
Andrew M.	Wilson		Philadelphia	PA
Calvin	Wilson		West Deer	PA
Cindy	Wilson		Pittsburgh	PA
Donald	Wilson		Philadelphia	PA
Jon	Wilson		Swissvale	PA
Karen	Wilson		Newtown Square	PA
Marisa	Wilson		Philadelphia	PA
Nancy	Wilson		Paoli	PA
Paul	Wilson		Breinigsville	PA
Richard	Wilson		Narberth	PA
Elsa	Winch		Lock Haven	PA
Linda	Winchester		Norristown	PA
Kim	Winck		Bellefonte	PA
K.	Winder		Wallingford	PA
Yolanda	Winfield		Philadelphia	PA
Dennis	Wingle		Shoemakersville	PA
Lauren	Winkler		Pittsburgh	PA
Nancy	Winkler		Narberth	PA

First Name	Last Name	Affiliation	City	State
Charles	Winschuh	Breathe Easy Susquehanna County	Springville	PA
David	Winston		Riegelsville	PA
Bonnie	Winter		Shrewsbury	PA
Deborah	Winter		Havertown	PA
Mark	Winter		Shrewsbury	PA
Natalir	Winter		Chambersburg	PA
Dawn	Winters		Bellevue	PA
Linda	Winters		Allentown	PA
Jonathan	Wirtz		Glenshaw	PA
Karen	Wisniewski		Philadelphia	PA
Michael	Wisniewski		Marlton	NJ
Ronald	Wisniewski		Erie	PA
Richard	wisor		Homer City	PA
Andrea	Withers		Landenberg	PA
Danielle	Witmer		Pittsburgh	PA
Stacy	Woeppel		Newfoundland	PA
Mary	Woestman		Montrose	PA
Sabrina	Wojnaroski		Pittsburgh	PA
David	Wolf		Philadelphia	PA
Laurence	Wolf		Wynnewood	PA
Mark	Wolfe		Pittsburgh	PA
Megan	Wolfe		Dalton	PA
George	Wolff		Lemoyne	PA
Pat	Wolff		Arcadia	CA
Kenneth	Wolfgang		Philadelphia	PA
Debra	Wontor		Hawley	PA
Glenn	Wood		Moon Township	PA
Nancy	Wood		Baden	PA
Connie	Woodring		Center Valley	PA
Brooke	Woodside		Muncy	PA
Curt	Woolford		Havertown	PA
Peter	Wray	350 Pittsburgh	Pittsburgh	PA
Edward	Wrenn		Pittsburgh	PA
Dorothy	Wright		Ardmore	PA
Carol	Wukits		McKees Rocks	PA
Anna	Wulick		Philadelphia	PA
Sharon	Wushensky		Kennett Square	PA
Allan	Wysocki		Glen Rock	PA
Dr. Youping	Xiao		Doylestown	PA
Julie	Yaeger		Phoenixville	PA
Ari	Yamaguchi		Media	PA
Lynda	Yankaskas		Allentown	PA
Trista	Yatsko		Pittsburgh	PA
C.	Yee		Sacramento	CA
Mary	Yee		Philadelphia	PA
Rosanne	Yesenosky		Carmichaels	PA

First Name	Last Name	Affiliation	City	State
Laura	Yim		Wayne	PA
Ana	Yoder		Philadelphia	PA
Kathleen	Yoder		Doylestown	PA
Kathy	Yorkievitz		Camp Hill	PA
Andre	Young		Muncy	PA
Andrea	Young		Muncy	PA
Anne	Young		Revere	PA
Jennifer	Young		Easton	PA
Kevin	Young		West Chester	PA
Cloda	Yusko		Saltsburg	PA
A	Z		Willow Grove	PA
Harry	Zabetakis		Pittsburgh	PA
David	Zabriskie		Hawley	PA
Stefan	Zajic		Philadelphia	PA
Jeanine	Zang		Sewickley	PA
Hilary	Zankel		Philadelphia	PA
Alexander	Zbinden		Yardley	PA
Florence	Zeller		Haverford	PA
Sharon	Zemel		Pittsburgh	PA
Alysha	Zerbe		Hatboro	PA
Russell	Zerbo		Philadelphia	PA
Martin	Zichy		Whitehall	PA
David	Ziegler		Hatboro	PA
Nora	Ziegler		West Chester	PA
Edyta	Zielinska		Philadelphia	PA
Elayne	Zielinski		Allentown	PA
Mark	Ziff		New Hope	PA
Dennis	Zilinski		Lykens	PA
Perry	Zimmerman		New Hope	PA
Steven	Zimmerman		Pine Grove	PA
Matthew	Zipin		Philadelphia	PA
Patricia	Zlatkin		Fairless Hills	PA
Maria	Zmurkewycz		Elkins Park	PA
Beatrice	Zovich		Philadelphia	PA
Deborah	Zubow		Philadelphia	PA
Michael	Zuckerman		Philadelphia	PA
Jody	Zwick		Coatesville	PA

Commentators Requesting a Copy of the Final-Form Rulemaking:

Control of VOC Emissions from Oil and Natural Gas Sources (#7-544)

Kevin J. Moody, Esquire
Pennsylvania Independent Oil & Gas Association
212 Locust Street, Suite 300
Harrisburg, PA 17101-1510

George Busse
8511 Harper Drive
Waynesboro, PA 17268

Jenna Flohr
4302 Haldane Street
Pittsburgh, PA 15207

Jordan Swartz
6939 Willard Street
Pittsburgh, PA 15208

Rebecca Studer
157 Fairfax Road
Pittsburgh, PA 15221

Robert Little
4621 Tarryton Road
Harrisburg, PA 17109

Luther Barber
6220 Hocker Drive
Harrisburg, PA 17111

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

March 15, 2022

David Sumner
Executive Director
Independent Regulatory Review Commission
333 Market Street, 14th Floor
Harrisburg, PA 17120

Re: Final Rulemaking: Control of VOC Emissions from Oil and Natural Gas Sources (#7-544 / IRRC # 3256)

Dear Mr. Sumner:

Pursuant to Section 5.1(a) of the Regulatory Review Act (RRA), please find enclosed the Control of VOC Emissions from Oil and Natural Gas Sources final-form rulemaking for review by the Independent Regulatory Review Commission (IRRC). The Environmental Quality Board (Board) adopted this rulemaking on March 15, 2022.

The Board adopted the proposed rulemaking at its meeting on December 17, 2019. On May 23, 2020, the proposed rulemaking was published in the *Pennsylvania Bulletin* at 50 Pa.B. 2633, for a 66-day public comment period, during which the Board held three public hearings on June 23, June 24, and June 25, 2020. The public comment period closed on July 27, 2020. The Department received 4,510 written comments. The Board provided the Environmental Resources and Energy Committees and IRRC with copies of all comments received in compliance with Section 5(c) of the RRA.

The Department will provide assistance as necessary to facilitate IRRC's review of the enclosed rulemaking under Section 5.1(e) of the Regulatory Review Act.

Please contact me by e-mail at laurgriffi@pa.gov or by telephone at 717.772.3277 if you have any questions or need additional information.

Sincerely,

Laura G. Griffin
Regulatory Coordinator

Enclosures

0120-FM-PO0011 6/2015

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
POLICY OFFICE

TRANSMITTAL SHEET FOR REGULATIONS SUBJECT TO THE REGULATORY REVIEW ACT

I.D. NUMBER: 7-544

SUBJECT: Control of VOC Emissions from Oil and Natural Gas Sources

AGENCY: DEPARTMENT OF ENVIRONMENTAL PROTECTION, Environmental Quality Board

TYPE OF REGULATION

- ☐ Proposed Regulation
- ☒ Final Regulation
- ☐ Final Regulation with Notice of Proposed Rulemaking Omitted
- ☐ 120-day Emergency Certification of the Attorney General
- ☐ 120-day Emergency Certification of the Governor
- ☐ Delivery of Tolled Regulation
  - a. ☐ With Revisions
  - b. ☐ Without Revisions

RECEIVED
MAR 15 2022
Independent Regulatory Review Commission

FILING OF REGULATION

DATE	SIGNATURE	DESIGNATION
3/15/2022	Pamela Mingl	Majority Chair, HOUSE COMMITTEE ON ENVIRONMENTAL RESOURCES & ENERGY Representative Daryl Metcalfe
3/15/2022		Minority Chair, HOUSE COMMITTEE ON ENVIRONMENTAL RESOURCES & ENERGY Representative Greg Vitali
3/15/2022	M.	Majority Chair, SENATE COMMITTEE ON ENVIRONMENTAL RESOURCES & ENERGY Senator Gene Yaw
3.15.2022	Emily	
3/15/2022		Minority Chair, SENATE COMMITTEE ON ENVIRONMENTAL RESOURCES & ENERGY Senator Carolyn Comitta
3/15/22	Kathy Cooper	INDEPENDENT REGULATORY REVIEW COMMISSION David Sumner
		ATTORNEY GENERAL (for Final Omitted only)
		LEGISLATIVE REFERENCE BUREAU (for Proposed only)