Clean Air Council Comments on NYSDEC's Stakeholder Regulation Outline for Oil & Natural Gas Sector Emissions in New York

Introduction

Clean Air Council (the Council) submits the following comments on New York State Department of Environmental Conservation's (NYSDEC) Regulation Outline for Oil and Natural Gas Sector Emissions in New York. The Council received notification about this opportunity from its members, has previously commented on compressor stations and pipelines in the region, and is a stakeholder in this rulemaking process.

The Council is a non-profit environmental health advocacy organization headquartered at 135 South 19th Street, Suite 300, Philadelphia, Pennsylvania, 19103. The Council has been working to protect everyone's right to a healthy environment for over 50 years. The Council has members across Pennsylvania and the surrounding region, including New York, New Jersey, and Delaware.

The Council presents the following information to NYSDEC to enable the agency to most effectively control and limit emissions from natural gas infrastructure in New York. Many of these recommendations are reflected in the U.S. Environmental Protection Agency's (EPA) Natural Gas STAR program, are codified in state regulations across the country, or go above and beyond existing voluntary programs or regulations. Natural Gas STAR is a voluntary program based on cooperation with the natural gas industry; these technologies have been put into practice throughout the country, pay for themselves over time, and reduce emissions. The Council strongly recommends these measures be considered for adoption in new regulations. Thank you for the opportunity to present these comments.

Should the proposed requirements for oil and gas production apply to economically marginal and low producing oil and gas wells?

In developing the 2016 NSPS for the Oil and Natural Gas Sector, the EPA had initially considered an exemption for low-producing wells, which it defined as wells producing less than 15 barrel of oil equivalent per well per day (BOED) on average. After reviewing public comment and analysis on this proposed exemption, the EPA ultimately rejected the approach and eliminated the exemption for low-producing wells from the final rule based on its determination that emissions from low-producing wells could be equivalent to those from higher-producing wells. To put this in context, roughly 70-80% of total wells that would be subject to EPA's 2016 Control Techniques Guidelines (CTG) would meet the criteria of "low-producing" using a production exemption of 15 BOED.[1] Last year, Pennsylvania's Department of Environmental Protection (DEP) similarly rejected an exemption for low-producing wells in finalizing its general permits, GP-5 and GP-5A, for new and modified unconventional natural gas facilities. The Council believes that NYSDEC should also reject exempting low-producing wells.

Studies have shown that leaks can occur randomly and are not well correlated with well pad characteristics such as age, production type, or well count.[2] These low-producing wells are similar in complexity to larger wells. If low-producing wells are exempted, it will result in underregulation of methane leakage throughout the state.[3]

Storage Vessels

On feasibility and cost of tank retrofit and emission capture

Internal floating roof (IFR) tanks offer the lowest volatile organic compound (VOC) fugitive emission rates of all tanking options for products that do not require spherical tanks. As such, all newly constructed tankage for applicable products should be IFR. Additionally, Vapor Recovery Units (VRUs) are often used to collect any vapors that do escape the internal floating roof and collect on the internal surface of the fixed roof of the tank, as well as to recover fugitive emissions often associated with loading and off-loading operations. The cost-effectiveness of VRU usage depends upon the volume of product flow through the facility.

The Council strongly recommends that NYSDEC require the use of VRUs where it is determined that they are technically and economically feasible.

Brine and produced water applicability

Brine and produced water from oil and gas extraction is a known source of methane and VOC emissions and a significant byproduct of extraction.[4] [5] Greater than 5 barrels of water are

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[1] EDF's 2016 supplemental comments provide very thorough background on low-producing wells in the context of EPA's Final NSPS OOOOa TSD and the potential downfalls of exempting these wells from regulation. *(See http://blogs.edf.org/energyexchange/files/2016/09/Low-Producing-Well-Supplemental-Comments_9.13.pdf)*

[2] Id.
[3] Id.
[4] https://www.tceq.texas.gov/assets/public/permitting/air/NewSourceReview/oilgas/produced-water.pdf
[5] https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1153&context=chem_facpres

produced per barrel of oil and 182 barrels of water are produced per Mmcf of natural gas.[6] The large volumes of water produced during extraction, and subsequent potential for large uncontrolled emissions, if limits are not set, necessitates tank emission limits. The Texas Commission on Environmental Quality (TCEQ) has developed guidance on methods of produced water tank emissions, which demonstrates that setting limits is practicable. TCEQ's guidance may assist NYSDEC in setting and enforcing tank emission limits. Given the significant potential for emissions and practicability of measuring and setting limits, the Council supports the application of any proposed tank requirements to brine and produced water tanks.

Potential Methane Emissions and PTE Threshold

The Council has provided possible methodologies for setting PTE thresholds as well as methods and costs used by other states for regulating methane emissions from tanks. This is covered in greater detail in the "Methane from storage vessels and possibility of methane threshold" section of this document.

Pneumatic controllers

Cost-effective technologies are available to eliminate emissions from continuous-bleed and intermittent-bleed pneumatic controllers and pneumatic pumps. Federal rules and guidelines have required zero-bleed controllers at natural gas processing plants for several years and, while those same guidelines recommend only that pneumatic controllers at well sites have a bleed rate under 6 scf/hour (low-bleed controllers),, this technology is not new and is generally considered to be the industry standard. The Council recommends that NYSDEC exercise its discretion to require installation of newer, zero-bleed technology at all facilities.

An August 2016 study by Carbon Limits shows that cost-effective zero-bleed options exist for both new and existing pneumatic devices, even where grid power is not being used at the site. These zero-bleed options have been proven to work robustly in upstream oil and gas operations.[7] Specifically, Carbon Limits performed a comprehensive literature review and conducted 17 in-depth interviews with technology providers, as well as small and large oil and gas companies. Carbon Limits gathered up-to-date information on field experience with the implementation of zero-emission technologies, their applicability, and their costs. The zero-emission options Carbon Limits examined included:

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[6] Id. at 4

[7] Carbon Limits, Fact Sheet, Fixing the Leaks: What would it cost to clean up natural gas leaks?, available at
http://www.catf.us/resources/factsheets/files/LDAR_Fact_Sheet.pdf. Full report available at http://www.catf.us/resources/publications/files/Carbon_Limits_LDAR.pdf.

- Using compressed "instrument air" instead of natural gas to drive pneumatic controllers.
- Using electronic control systems and electric valve actuators instead of pneumatic controllers and valve actuators for valve automation. This approach can be used both at sites where electricity is already available and at sites without grid power by installing solar-powered systems.
- Pneumatic controllers that do not release gas to the atmosphere, but rather release gas to a pressurized gas line. These are typically referred to as "bleed-to-pressure" or "integral" controllers.
- Capturing gas released from pneumatic controllers using vapor recovery units, or routing gas that would otherwise have been emitted to fuel lines on site.

Carbon Limits found that well established, reliable, and low-cost technologies are available in almost all situations to replace venting pneumatic equipment. The Carbon Limits study demonstrates that for almost any configuration of oil and gas facilities, at least one of these technologies is an available, feasible, and low-cost means of methane abatement as compared to unmitigated natural gas-driven pneumatic controllers. In particular, both solar- and grid-powered electronic controllers and instrument air technology are in wide use today and readily available in the market. Carbon Limits accordingly concluded that "[o]verall . . . zero-emission solutions are available today and are cost-effective to implement in nearly every situation."

The Carbon Limits study includes a detailed analysis of the economics of electronic controllers and instrument air. Carbon Limits used the capital and operating costs of these systems and traditional pneumatic controllers, highly conservative estimates of emissions from gas-driven pneumatic controllers, and other parameters to calculate the net cost of these systems per metric ton of avoided methane pollution using a net present value formulation. The study considers the full cost of these systems. For example, for electric controllers at sites without electricity available, the costs considered by the study include solar panels, batteries, and control panels, in addition to installation costs and other expenditures. Notably, the conservative emissions factors used in the Carbon Limits model are likely too low in many cases, given the previously noted pattern of substantial emissions from improperly operating controllers.

An operator using either electronic controllers or instrument air to replace traditional gas-driven pneumatic controllers will generally replace all controllers (both continuous-bleed and intermittent bleed) and pneumatic pumps at a site, since all new controllers will use certain common equipment (such as solar panels and batteries for off-grid electronic controllers, or air compressors and tanks for instrument air-driven controllers). Typically, the cost of the common equipment is a large portion of total system cost, so the cost-effectiveness of the system will vary with the number of controllers (and pumps) at a site, in addition to other parameters.

Carbon Limits found that using instrument air and/or electric controllers as opposed to using gas-driven pneumatic equipment is cost-effective for the vast majority of site configurations. In these cases, the costs were lower than the social cost of methane and the costs that other states have considered appropriate for methane abatement.

To illustrate the cost-effectiveness of these non-emitting technologies, Carbon Limits created a spreadsheet tool that calculates the costs at a site with parameters entered by the user (see Exhibit 1. The user-controlled parameters include:

- The number of controllers of various types at each site
- Emissions factors for those controllers
- Whether the site:
  - Is new or has existing gas-driven controllers being considered for retrofit
  - Has electric power available already, and
  - Has dry gas or wet gas;
- The value of the gas conserved by switching from gas-driven pneumatics to zero-emitting options to the operator
- Costs of various types of equipment
- Essentially all other parameters, from discount rate to the number of days of energy storage required for solar systems

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Based on the availability of cost-effective means to eliminate or reduce emissions from intermittent-bleed controllers, the Council urges NYSDEC to consider the following options:

NYSDEC should require that all new controllers utilize zero-emitting approaches, such as electric controllers, instrument air, or the other options discussed above. These technologies and options are cost-effective, and as described above, there are a number of zero-emitting options to suit the varying needs of individual operators. Even when a site is not connected to the grid, electronic controllers are cost-effective because it is inexpensive to generate electricity on-site with technologies like solar panels, particularly when the costs of electricity generation are spread across a large number of controllers at a single site. As described above, unconventional wells drilled today are on large pads with multiple wells and a number of pneumatic controllers, making this approach very cost-effective.

Some exceptional circumstances may exist. Operators who have an unusual circumstance that makes every zero-emitting option infeasible or extraordinarily expensive always have the option of obtaining a site-specific permit.

However, the rare exceptional circumstance should not be used to justify allowing broad use of an outdated technology which, in the vast majority of cases, can be replaced with a non-emitting technology at very low cost.

At a minimum, NYSDEC must ensure that emissions from new controllers and existing controllers at modified sites are minimized in the following common-sense, low-cost ways:

- NYSDEC should include standards for emissions from intermittent-bleed pneumatic controllers that are similar to standards adopted by Wyoming.[8] [9]
- All pneumatic controllers should be subject to LDAR requirements to ensure that intermittent-bleed devices do not emit continuously, that continuous-bleed devices do not vent excessively, and that all controllers do not leak from other points on the controller aside from the vent port. The controllers should be inspected at any facility already subject to LDAR. Although this option will only capture the portion of emissions caused by improperly functioning devices, it will significantly reduce emissions.
- NYSDEC should require that no gas-driven pneumatic controller (whether intermittent or continuous) is used at any new site with power available, whether the power is from the grid or generated on site. Electric controllers and newer, smaller air compressors require smaller amounts of electricity and are generally appropriate for facilities that already have sources of power on-site (for lighting, SCADA systems or control systems for emissions control devices, etc.).

Pneumatic Pumps

The Council supports the inclusion of standards for pneumatic pumps in the regulation outline. However, NYSDEC should go further. At sites with electricity available, including electricity generated on-site, and at sites with pneumatic controllers, emissions from pneumatic pumps can be eliminated with the same strategies as used for pneumatic controllers: routing emissions to capture, process, or control; substitution with an electric pump; or (in most cases) conversion of the pump to instrument air (the final option is not feasible for pneumatic glycol assist pumps used on dehydrators). Including conversion of pneumatic pumps to these options makes it more cost-effective to eliminate emissions from pneumatic equipment at a site.

NYSDEC should require that operators install non-emitting options instead of vented pneumatic pumps at all sites where electricity is available and whenever electric or instrument air controllers are appropriate. It is not unreasonable to require a higher control efficiency than 95%. States such as Colorado and Wyoming require 98% and, where applicable, zero-emission solutions are favorable.

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[8] Wyo. Dep't of Envtl. Qual., Oil and Gas Production Facilities: Permitting Guidance at Ch. 6, § 2 (2010) (WDEQ Permitting Guidance) (stating that gas operated "pneumatic controllers shall be low [under 6 scfh] or no-bleed controllers or the controller discharge streams shall be routed into a closed loop system."). Wyoming applies these provisions to both continuous-bleed and intermittent-bleed pneumatic controllers.
[9] Wyo. Code R. Envtl. Air Qual. Ch. 8 § 6(f); see also Wyo. Dep't of Envtl. Qual., Comment Response Concerning the Proposed Wyoming Air Quality Standards and Regulations, Chapter 8, Section 6, Nonattainment Area Regulations at 10 (May 14, 2015) ("The regulation does not limit operators from using intermittent or continuous bleed controllers as long as the bleed rate is below the 6 standard cubic feet per hour (scfh) threshold.").

LDAR (Well Sites, Compressor Stations, Storage, and M&R Stations)

Quarterly OGI monitoring for all fugitive components is not adequate. Continuous OGI should be required where possible, and where it is not possible, monthly inspections should be required.

OGI is a simple, non-invasive, qualitative process that consists of surveying a facility with a specialized infrared camera that makes gas leaks instantly visible on a screen. The ease of this testing method means that it is not unreasonable to conduct testing more frequently than once per quarter. In contrast, EPA's Method 21 is a long, intensive, quantitative method of leak detection that requires readings to be taken by hand with a sensitive gas sniffer probe. Method 21 is a long process performed by hand and can be more susceptible to human error.

The Council recommends that NYSDEC require continuous OGI at larger facilities and bi-monthly handheld OGI inspections at smaller facilities, triggering a handheld OGI or Method 21 inspection in the event that a leak is detected. For assurance, handheld OGI or Method 21 inspections should additionally be required quarterly.

Generally, methane leaks can also be used to target VOC leaks, although some sources may have high or almost exclusive VOC emissions. Continuous monitoring for VOCs can be used in concert with methane monitoring or as early leak detection when continuous optical methods are not available.

Continuous monitoring for VOCs in the oil and gas industry is not a new or novel concept. Many of the current monitoring techniques occur at large refineries. The Petroleum Refinery Sector Rule is an example of the largest continuous monitoring requirement for VOCs in the United States .[10] Most other monitoring methods in the oil and gas industry are in use due to consent decrees enacted in the previous decade, but open-path monitoring systems were required for all refineries in certain districts of California in 2016. California, in its Refinery Monitoring Assessment Report, stated the following:

> State and air district requirements for real-time (fixed point systems) or near real-time (open path systems) fenceline monitoring around refineries are warranted and should be implemented. Site-specific modeling should be considered in siting fenceline monitors. Fenceline monitoring data should be posted to a publicly available website and clearly identified as preliminary data.[11]

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10 https://www.epa.gov/stationary-sources-air-pollution/petroleum-refinery-sector-rule-risk-and-technology-review-and-new

11 https://www.arb.ca.gov/fuels/carefinery/crseam/o2reamarmainfinal.pdf pg. 44

An EDF summary of monitoring techniques (sourced from the same report) around refineries in California as of December 2017 is outlined in Table 1.

Table 1: Continuous Air Monitoring Conducted by Refineries in California

Continuous air monitoring currently conducted by refineries in California

Refinery name	City	Monitor type	Pollutants
Alon Refinery	Bakersfield	4 ground-level monitors on site	Total hydrocarbons (VOCs), H_2S and NH_3 only
Chevron Richmond Refinery	Richmond	3 community-based semi-permanent monitors	Benzene and several others
		4 ground-level monitors on site	SO_2 and H_2S only
		6-part laser-based fenceline system	Ozone SO_2, H_2S and NH_3 only
Phillips 66 Bay Area	Rodeo	9-part laser-based fenceline system	Total hydrobarbons (VOCs), methane, benzene, SO_2 and H_2S, and several others
		4 ground-level monitors on site	SO_2 and H_2S only
Shell Martinez	Martinez	1-part fixed fenceline system	SO_2 only
		4 ground-level monitors on site	H_2S only
Tesoro	Martinez	4 ground-level monitors on site	SO_2 and H_2S only
Valero	Benicia	3 ground-level monitors on site	SO_2 and H_2S only

Source: CARB, Refinery Air Monitoring Assessment Report

While it is clear that a compressor station is not a refinery and emissions will be different, it is up to regulatory agencies like NYSDEC to determine what level of VOC control is available for a source. Many of the methods used in the refinery sector are also technically available for the natural gas sector. The question of availability then becomes a matter of cost-effectiveness. An EDF table outlining the cost of monitoring systems as of 2017 is detailed in Table 2. For a larger version of Table 2, see Exhibit 2.

Table 2: Fenceline Monitoring Technology and Cost-Effectiveness Analysis

Sensor category	Monitoring technologies	Compound classes	Sampling rate	Simultaneous detection of multiple compounds?	General limit of detection	Remote capability	Cost range in US$	Degree of market penetration
Sample collection	Active sampling	Methane, benzene, non-methane organic compounds (NMOC)	Discrete, time-weighted average	Yes	Methane: < 1 ppm Benzene: < 10 ppb NMOC: < 50 ppb	Yes	Under $1,000 each	Widespread use
	Passive sampling	Methane, benzene, NMOC	Discrete, time-weighted average	Yes	Methane: < 1 ppm Benzene: < 10 ppb NMOC: < 50 ppb	Yes	Under $1,000 each	Widespread use
Open Path Optical/Laser Absorption Spectroscopy	Differential Optical Absorption Spectroscopy (UV-DOAS)	Benzene, NMOC (monocyclic aromatic hydrocarbons)	Continuous	Yes	Benzene: < 10 ppb NMOC (monocyclic aromatic hydrocarbons): < 50 ppb	Yes	$60,000–200,000	Commercially available, limited availability
	Differential Absorption Lidar (DIAL)	Methane, benzene, NMOC	Continuous	No	Methane: < 1 ppm Benzene: < 10 ppb NMOC: < 50 ppb	Mobile-capable but requires an attendant to move the instrument's location	$295,000–445,000	Commercially available, limited availability
	Fourier Transform Infrared Spectroscopy (FTIR)	Methane, benzene, NMOC	Continuous	Yes	Methane: 15–60 ppb Benzene: 30–100 ppb NMOC: 1–100 ppb	Yes	$75,000–120,000	Commercially available
	Tunable Diode Laser (TDL) Spectroscopy	Methane, benzene	Continuous	No	Methane: 0.5–1 ppm Benzene: 10–30 ppb	Yes	$15,000–65,000	Commercially available
	Infrared camera	Methane, benzene, NMOC	Continuous	No	Qualitative detection only, add-on devices allow for emission rate quantification	Yes	$50,000–75,000	Commercially available
	Solar occultation flux	Methane, benzene, NMOC	Continuous	Yes	0.5 kg/hr from 50 m downwind or 0.3 mg/m^2 across a plane	Mobile-capable but requires an attendant to move the instrument's location	New unit is – $1,000,000, one-month study is $200,000	None in U.S., only in Sweden

Sensor category	Monitoring technologies	Compound classes	Sampling rate	Simultaneous detection of multiple compounds?	General limit of detection	Remote capability	Cost range in US$	Degree of market penetration
Extractive (non-open path) optical/ laser absorption spectroscopy	Fourier Transform Infrared Spectroscopy (FTIR)	Methane, benzene, NMOC	Continuous	Yes	Methane: 15–60 ppb Benzene: 30–100 ppb NMOC: 1–100 ppb	Yes	$20,000–50,000	Commercially available
	Non-Dispersive Infrared Sensor (NDIR)	Methane, NMOC	Continuous	No	Methane: 1–500 ppm NMOC: 500–1,000 ppm	Yes	$1,000–10,000	Commercially available
	Tunable Diode Laser (TDL) spectroscopy	Methane, benzene	Continuous	No	Methane: 1–10 ppb Benzene: 10–30 ppb	Yes	$15,000–50,000	Commercially available
	Cavity-enhanced spectroscopy	Methane, benzene	Continuous or semi-continuous	Yes	Methane: 1–10 ppb Benzene: 0.1–30 ppb	Yes	$40,000–150,000	Commercially available
Chromatography	Mass spectrometry	Methane, benzene, NMOC	Semi-continuous	Yes	Methane: < 1 ppm Benzene: < 10 ppb NMOC: < 50 ppb	Yes, if carrier gas included. Handheld units may have higher detection limits than bench-top units	$20,000–60,000	Commercially available
Ionization	Photoionization Detector (PID)	Benzene	Continuous	Yes	Benzene: 2–100 ppb NMOC: 0.05–200 ppm	Yes	$1,000–10,000	Widespread use
	Flame Ionization Detector (FID)	Methane, benzene, NMOC	Continuous	Yes	Methane: 1–10 ppm Benzene: 10–100 ppb NMOC: 50–500 ppb	Yes	$5,000–50,000	Widespread use
Reactive	Pellistor	Methane	Continuous	No	Methane: 100–1,000 ppm	Yes	Under $1,000	Commercially available
	Electrochemical	Methane, total VOC	Continuous	No	Methane: – 100 ppm Total VOC: 100–1,000 ppb	Yes	Under $1,000	Commercially available
	Metal oxide semiconductor	Methane, total VOC	Continuous	No	Methane: 10–100 ppm Total VOC: 1–10 ppm	Yes	Under $1,000	Commercially available

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Cost	Under $1,000	$1,000–$50,000	Over $50,000
Degree of market penetration	Available for purchase in larger quantities multiple vendors	Available but limited quantities/ limited vendors/prototype	Not commercially available, only used in research
Precision/resolution			
Methane	<1 ppm	1–10 ppm	> 10 ppm
BTEX	<10 ppb	10–100 ppb	> 100 ppb
Ozone-precursors	<50 ppb	50–500 ppb	> 500 ppb

If regulating agencies require operators to identify and detect leaks within hours or days instead of monthly or quarterly, the difference in emissions will equal the amount of emissions reduction (and cost reduction). Cost savings and emissions savings will depend on the severity of the leak and how long it occurred. When performing an evaluation to determine if a control technology is cost-effective, NYSDEC should use the average leak rate from equipment at a facility to evaluate cost in this way.

Repair within 5-30 days of discovery unless a critical component and 15 day resurvey

Repairs should be completed as expeditiously as feasible in situations where leaks are emitting directly to the atmosphere. Pennsylvania's GP-5 and GP-5A require that repairs take place "as expeditiously as practicable" after detection, with a first attempt at repair within 5 calendar days. Both permits require the repair to be completed within 15 calendar days. The Council urges NYSDEC to adopt those same timelines in its rulemaking. The only reasonable allowance for delays in repairs would be in situations where replacement parts need to be specially acquired. In such instances, as in Pennsylvania, repair should be required within 10 days of receiving the part. To alleviate such potential delays, NYSDEC should include a provision requiring the operator to maintain an inventory of back-up components where economically feasible.

Furthermore, It would benefit Operators to repair leaks as expeditiously as is safe since equipment leaks represent a discrete and quantifiable loss in product, and thus profit. The Council supports a resurvey of leaking equipment within 15 days of replacement, as stated in NYSDEC's proposed requirements.

Innovative technology/alternative compliance pathway

The Council commends NYSDEC for including a provision in the draft general permits that allow operators to use approved leak detection technologies other than OGI or Method 21. The Council strongly urges NYSDEC to adopt a robust alternative compliance pathway that allow for the use of appropriately qualified and demonstrated methane selective and/or multiple hydrocarbon detecting approaches and that allows for public participation in the approval of such alternative approaches.

The leak detection technology landscape is highly dynamic and innovation is happening in real time. For example, ARPA-E's MONITOR project and EDFs Methane Detectors Challenge project demonstrate the speed at which businesses are developing new technologies.[12] [13] It is crucial for state rules to allow for the adoption of innovative technologies, which may be able to deliver improved environmental performance at reduced cost. Colorado recently 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 (https://www.colorado.gov/pacific/sites/default/files/AP-BusIndGuidance-AIMMprocessmemo.pdf). The Council urges NYSDEC 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. Such an approach will help catalyze a race to the top in technology, control costs for the regulated community, and boost environmental outcomes.

M&R Stations Now Require LDAR

NYSDEC's proposal to require M&R stations to have LDAR plans is a positive and reasonable improvement. Despite the small size of these stations, there is no reason operators should not be required to check for and expeditiously repair leaks. OGI makes performing inspections of small facilities, such as M&R stations, easy and cost-effective.

Methane from storage vessels and possibility of methane threshold

The Council created a simple spreadsheet to calculate the cost-effectiveness of capturing methane from a storage vessel at various applicability thresholds (attached as Exhibit 3). The Council encourages NYSDEC to use the spreadsheet to explore the implications of various parameters (discount rate and equipment lifetime, price of gas, and methane content of gas) on the abatement cost.

EPA and other states have found methane abatement costs of these magnitudes to be

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[12] https://arpa-e.energy.gov/?q=arpa-e-programs/monitor
[13] https://www.edf.org/methane-detectors-challenge

reasonable. Colorado's 2014 rules for oil and gas included controls for the mixture of methane and ethane with abatement costs of over $1,000 per short ton. Meanwhile, the California Air Resources Board (CARB) estimated that its entire rule would have a methane abatement cost of over $1,200 per short ton of methane, and that LDAR provisions of its rule would have methane abatement costs of over $1,500 per short ton of methane. Both the social cost of methane, which is based on peer-reviewed studies assessing the damage to human society from climate change, and precedent from other jurisdictions demonstrate that abatement costs in this range are reasonable.

The Council urges NYSDEC to adopt CARB's threshold requiring control of tanks, dehydrators, and pigging operations that emit greater than 10 metric tons per year of methane, as CARB found control at this level to be cost-effective even using conservative cost estimates.

Centrifugal Compressors

The Council supports replacing wet seals with dry seals, which is a Natural Gas STAR recommendation. However, when replacing wet seals with dry seals is not technologically feasible, the reduction of methane emissions should still be required. In such instances, NYSDEC should explicitly state that methane reduction shall be accomplished by using wet seal degassing recovery systems (also a Natural Gas STAR recommendation). As with most reduction percentages mentioned by NYSDEC, greater than 95% reduction is feasible and has been implemented in other states (such as Colorado and Wyoming).

The Council recommends that recovery using wet seal degassing recovery systems be specified as the method of control and that the control efficiency be raised to 98%.

Reciprocating Compressors

Replace rod packing after 26,000 hours or 36 months

This requirement offers a reasonable timeline for the replacement of rod packing, however, NYSDEC should require compressor rod packing to be replaced at any point before the 26,000 hour or 36-month mark if it were to begin leaking at a rate greater than would be expected at that point in its life-cycle gas. NYSDEC should require operators to address this in the LDAR plan for the facility.

Alternatively, route emissions to a negative pressure closed vent system w/ 95% reduction

As stated in previous comments, the Council believes that a 98% level of reduction/control is available and achievable and should be implemented as it has been in Wyoming and Colorado.

Compressors designed so that no gas from compressor blowdown vents are emitted directly to the atmosphere. This may be achieved by routing the gas to a recovery system, combustion device, or other technology

The Council fully supports this provision, with a strong preference for recovery and re-routing over combustion. If combustion is necessary due to safety concerns and/or emergency conditions, the combustion efficiency should be measured and recorded and, as in Wyoming and Colorado, exceed 98% destruction efficiency.

Pipeline or Compressor Blowdown

Use lowest possible pressure

The Council supports the use of the lowest possible pressure based on compressor requirements, though the Council strongly believes that this amount should be clarified or elaborated upon in the rulemaking. In the very least, the amount should equal the lowest operating pressure as specified by the manufacturer and engineering practices. However, full capture and other emission reduction methods that NYSDEC is also considering is preferred. These methods, including, but not limited to, pigging with inert gas, downstream capture and re-route, or low-pressure line re-route or flaring should be considered instead of low-pressure operation requirements. Low pressure should be a bare minimum standard when all available methods fail or are impossible given the proper technical justification by the operator and approval by NYSDEC.

Notification and Reporting

Notification and reporting requirements for blowdown activities are important for blowdown mitigation, recordkeeping, and providing community notification for health and safety purposes. The Council supports 48-hour pre-notification for planned blowdowns and 30-minute post-notification for unplanned blowdowns as reasonable and achievable timeframes.

NYSDEC has requested feedback on responsible officials who should also be notified regarding blowdown activity. The Council recommends requiring operators to notify relevant NYSDEC officials, residents within 2500 feet of the facility, relevant local and state officials and appropriate local emergency management officials, depending on the severity of the incident. Notification is especially important for protecting the health and wellbeing of nearby community members who may be impacted by planned blowdowns or unplanned emergency blowdowns.

Community members should be notified directly when to plan for a blowdown event, especially so they can prepare to limit pollutant exposure to sensitive populations such as children, the elderly, or those with pre-existing health conditions. As blowdowns can be noisy for adjacent communities, planned blowdowns should be limited to daytime hours that are not during the pick-up or drop-off times for the local school district.

NYSDEC should retain the authority to reject the timing of a planned blowdown. This authority should be exercised with input from local officials after notification. This is not intended to prevent a necessary blowdown from ever happening, but input will avoid unnecessary community nuisance and exposure. A planned blowdown can be rescheduled and approved with this input in mind in order to reduce the overall impact of the event.

Consideration of requiring full capture with no venting to the atmosphere

The Council strongly supports a full capture requirement for pipeline blowdown gas with no venting to the atmosphere. Of the options listed, all are preferable to uncontrolled release, NYSDEC however should require that operators use inert gas and re-capture of blowdown gas while pigging rather than flaring.

Cost, case studies, and feasibility analysis of many of the options mentioned by NYSDEC are already available in EPA's Natural Gas STAR program here and here.

Pigging using VRU or other technology to eliminate atmospheric venting

The Council supports the proposed requirement to eliminate atmospheric venting of natural gas while pigging. VRUs should be used when other methods like pigging using inert gas are not available due to site specific issues or other concerns. If these concerns are present, operators should provide an explanation to NYSDEC as to why a specific method was technically infeasible. Gas recovery and using inert gas are Natural Gas STAR recommendations, and a brief cost, case study, and feasibility analysis can be found here for recovery here for inert gas.

Payback periods for gas recovery are relatively short, according to Natural Gas STAR, which makes a recovery system not only economical as a control technology, but capable of saving hundreds of thousands of dollars in the long term.[14] After one year, a recovery unit will save $68,300 when gas is priced at $3.00/Mcf (according to EIA, in 2017 gas per Mcf was priced at $3.54 on average [exports price]).[15] The initial cost of a unit on average is $24,000 with annual

[14] https://www.epa.gov/sites/production/files/2016-06/documents/pigging.pdf
[15] https://www.eia.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm

operation and maintenance cost of $1,000 per year. Given an annual savings of 21,400 Mcf of gas, the payback period on such a unit would be 5 months.[16]

Using inert gas to perform pipeline purges while pigging saves about 90 Mcf per 2 miles of 10-inch line. This has no capital cost and results in an annual savings of $670, with the only costs being worker time.[17] Safety is also an important reason to use pigs and inert gas to purge lines, as pigs can control the flow of gas and inert gasses are inert.[18]

General Items for Consideration

Technical Feasibility and Safety

Exemptions to rule requirements that are based on determinations of technical infeasibility and/or safety concerns (using an engineering evaluation and certification) must clarify that such evaluations should be conducted by an impartial third party selected by the owner/operator and approved by NYSDEC. This evaluation and certification should be subject to NYSDEC's approval prior to any owner/operator's deviation from rule requirements. The evaluation should be kept on record for periodic review and re-evaluation as circumstances and the regulatory landscape change (e.g. re-review exemptions every two years to determine if another evaluation should be conducted).

Information Request

The Council supports the collection of any and all data in this regulation to facilitate understanding and transparency in regulation. This data, provided that it is not confidential or a trade secret, should be made available on the NYSDEC website.

Conclusion

According to the recent report from the Intergovernmental Panel on Climate Change, the world only has 11 years to cut greenhouse gas emissions by 45% to avoid catastrophic climate change. Bold actions must be taken immediately, and NYSDEC's proposed rulemaking presents a great opportunity to effectively reduce methane, a very potent greenhouse gas.

In addition to developing this rule, the DEC should work with other applicable agencies to quickly develop rules to apply to all segments of the production, transportation, and distribution chain, including those beyond the "city gate." The DEC should also update regulations to cover combustion sources, as these are also significant sources of methane and VOCs.

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[16] Id.
[17] https://www.epa.gov/sites/production/files/2016-06/documents/useinertgases.pdf
[18] Id.

Thank you for the opportunity to provide comments and for your consideration. The Council urges DEC to use its clear legal authority to go above and beyond the federal requirements for reducing oil and gas pollution - specifically methane - as part of its proposed rulemaking.

Sincerely,

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