EDF ENVIRONMENTAL DEFENSE FUND™

Finding the ways that work

Clean Air Institute

LEADING REGULATORY PRACTICES TO ABATE OIL AND GAS METHANE EMISSIONS

Lessons Learned for Mexico

August 7th, 2018

Overview

On July 30, 2018, Mexico officially released comprehensive regulations to reduce oil and natural gas methane emissions, as part of the country's efforts to implement international climate commitments and support industry efficiency. These draft regulations aim to ensure that Mexico substantially reduces emissions of methane, even as the oil and gas sector grows due to the energy reform. By doing so, Mexico both protects the environment and reaps the full economic benefit from this energy resource.

The draft regulations to reduce oil and gas methane emissions are now open for public consultation. They are in line with international best practices to regulate methane and if the final regulations track closely to the proposal, Mexico will be well on its way to meeting its national commitment to reduce country's methane emissions by 40-45% by 2025.[1] The nation will also be able to claim its place as a world leader in implementing rigorous clean air measures for the oil and gas industry.

Why **Methane?**

Methane is a potent greenhouse gas with more than 80 times the climate warming impact of carbon dioxide over a 20-year timespan. Methane is responsible for approximately 25% of the warming we feel today.[2] These facts make near-term methane reductions a necessary element of international efforts to battle climate change.

Methane is also the primary constituent of natural gas—a valuable product. Actions that eliminate or reduce methane losses to the atmosphere therefore are highly cost effective as fewer methane emissions translates to more product in the pipeline. The International Energy Agency says globally the oil and gas industry can cost-effectively reduce up to 75% of its emissions, and 50% of global methane reductions can be realized at zero net cost. This level of reduction delivers the same long-term climate benefit as immediately closing all the coal plants in China. [3] That's a huge win for both the climate and the economy.

Reducing methane emissions can also have significant air quality benefits. Actions that release methane emissions, such as unintentional leaking and intentional venting and flaring, also emit harmful air toxics and smog-forming volatile organic compounds (VOCs) . Therefore, actions to reduce methane emissions, such as frequent inspections to find and repair leaks, also lead to improved public health protection as a co-benefit. Reduced flaring can also reduce black carbon emissions to achieve simultaneous air quality and climate mitigation objectives.

The potential benefits to the climate, economy, and public health make reducing methane an opportunity Mexico cannot afford to miss.

[1] *https://pm.gc.ca/eng/news/2016/06/29/leaders-statement-north-american-climate-clean-energy-and-environment-partnership*
[2] *Data is from IPCC AR5 WGI 2013 Chapter 8 SM, Table 8.SM.6'*
[3] *https://www.iea.org/newsroom/news/2017/october/commentary-the-environmental-case-for-natural-gas.html*

Why **Mexico?**

Mexico is the world's fifth largest emitter of oil and gas methane pollution.[4] As a result of the historic energy reform, Mexico's oil and gas industry is poised for major modernization and expansion. While increased production would have positive social and economic benefits, all of this could be undermined by Mexico's existing methane emissions problem, which will only get worse if unaddressed.

Fortunately, Mexico has been a visible and strong leader on climate change, and taking action on methane presents an opportunity to solidify this global leadership. In concert with Canada and the U.S., Mexico committed to reduce methane emissions by 40-45% by 2025. Achieving this goal would meet 10% of Mexico's overall Paris commitment. An analysis on cost-effectiveness of reducing oil and gas methane in Mexico shows that Mexico can achieve this reduction at no net cost. [5]

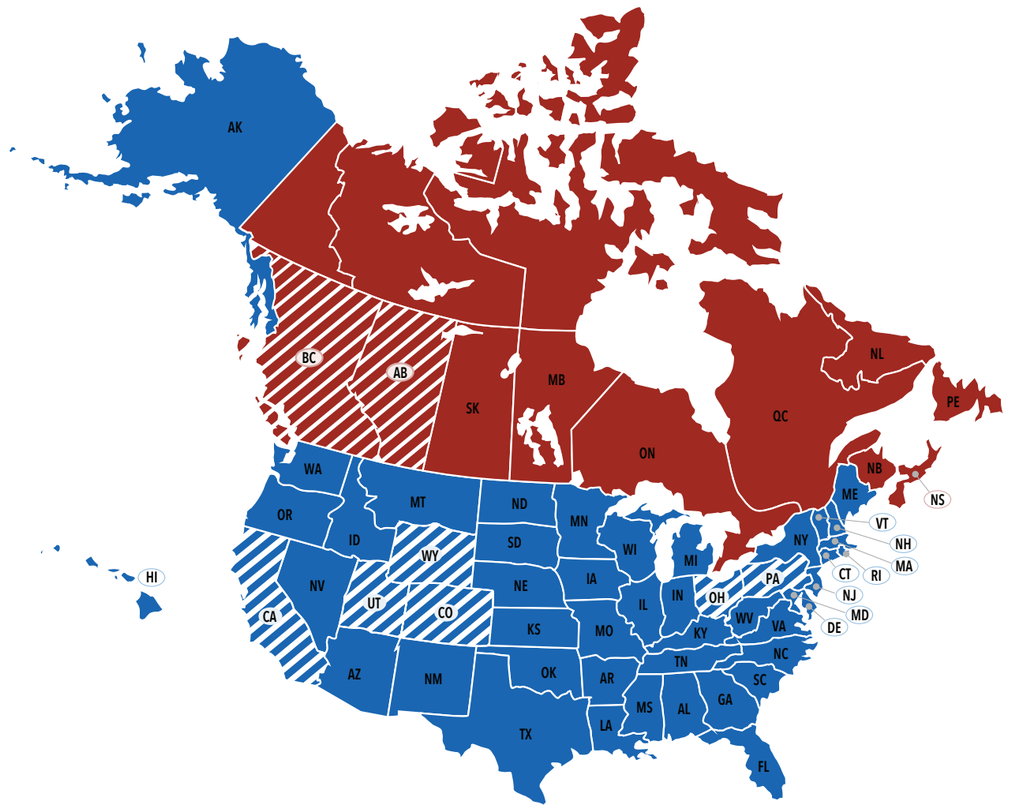
Mexico agreed to develop and implement regulations to ensure its national methane emissions reduction goal by 2025 is met and the regulations published on July 30th are the first step towards finalizing the regulations later in 2018. Avoiding methane emission is consistent with an agenda of investment in improving PEMEX and decreasing foreign energy purchases, key priorities for Mexico's incoming Administration. Moreover, since methane is the major component of natural gas, abating these emissions is also key for avoiding waste of a precious resource, preserving Mexico's wealth and increasing the country's potential for alleviating poverty.

This document provides an overview of what other jurisdictions are doing on oil and gas methane emissions, as well as a checklist of key issues Mexican regulations should address.

[4] *https://rhg.com/research/untapped-potential-reducing-global-methane-emissions-from-oil-and-natural-gas-systems/*
[5] *https://www.edf.org/energy/mexicos-opportunity-cut-oil-and-gas-methane*

Mapping **Methane Action**

Companies and countries representing over 40% of global oil and gas production have agreed to limit their methane emissions in some capacity. National and sub-national jurisdictions across the US and Canada have all issued regulations, or committed to do so in order to meet methane reduction goals. While US federal regulations are in limbo, other sub-national jurisdictions are moving forward. Even if the US federal regulations are removed, action in the US states is significant. The US states with regulations that reduce oil and gas methane produce more oil and gas than Mexico.



US National Methane Standards (US EPA and Bureau of Land Management).

Canada's National Methane Standards (Environment and Climate Change Canada).

US states with additional standards or permits.

Provinces that have proposed or intend to propose additional standards.

Notes:

1. Some of these rules apply to methane while others apply to emissions of VOCs, which also reduce methane as a co-benefit.
2. Alberta has proposed draft regulations that are not credible. While it is highlighted in this map, its regulations do not match international best practices from other jurisdictions.

Best **Practices Emerge**

The strength of regulations varies from one jurisdiction to the next. Some regulate methane emissions directly, while others address VOCs, which reduces methane as a co-benefit. Some key best practices have emerged from the regulatory actions taken thus far. Those best practices are:

1. Achieves ambitious methane emission reductions across multiple segments of the oil and gas sector and from all significant emission sources, new and existing
2. Reduces Designed and Unintentional Equipment Venting
3. Reduces Venting of Associated Gas from Oil wells
4. Requires regular Leak Detection and Repair

Appendix 1 provides more details on these various actions.

How Does **Mexico Measure Up?**

In designing proposed regulations, the Mexican Agency for Safety, Energy and Environment (ASEA by its acronym in Spanish) has made a tremendous effort to review and incorporate best international practices to reduce oil and gas methane emissions, including technical inputs and advice from both national and international experts.

Swift implementation will be key to achieve targeted emission reduction goals.

As Mexico finalizes its regulations, the check list in the table below provides a guide to ensure its approach is robust and alligned with the regulatory best practices of other jurisdictions. Additionally, these leading practices provide civil society with international standards by which they can judge the robustness of Mexico's regulations. Mexico must finalize the strongest regulations possible to ensure emission reduction goals are met, and the full climate, economic, and public health benefits are realized.

Best Practice	Concrete Actions	Actions Included in the Published Draft	Observations from EDF+CAI	Improvement Opportunity
1. Achieves ambitious methane emission reductions across multiple segments of the oil and gas sector and from all significant emission sources, new and existing	**1.1** Applies to the following segments: • exploration and production • crude oil condensate and produced water separation and storage • natural gas storage • natural gas gathering and boosting stations • natural gas processing plants • natural gas transmission compressor stations • crude oil, condensate and natural gas pipelines	Draft Regulations apply to similar segments.	✓	
	1.2 Mandatory, performance-based standards	Draft Regulations include Mandatory, Performance based goals and Performance-based best practices.	◎	Clarify that the requirements of Title III are mandatory, even though the rule provides a phase-in compliance schedule for operators of existing sources.
	1.3 Targets largest emissions sources	Draft Regulations target largest emission sources.	✓	
	1.4 Limited, and clearly circumscribed	Art. 2 & T. III	✓	
	1.5 Exceptions	Compliance is mandatory and draft regulations include exceptions.	✓	

✓ Good ◎ Good, but need clarification 🔧 Needs improvement

Best Practice	Concrete Actions	Actions Included in the Published Draft	Observations from EDF+CAI	Improvement Opportunity
2. Reducing Designed and Unintentional Equipment Venting	2.1 Engineer and design new equipment to be zero or near zero emitting (e.g., use electricity or instrument air in lieu of natural gas as power source)	These elements are addressed at different extents in Art. 24, 27, 33.	✓	
	2.2 Retrofit existing equipment to be zero or near zero emitting (e.g., replace high-bleed pneumatic devices with low or zero-bleeds)		✓	
	2.3 Reduces all intentional venting across sources (e.g., tanks, pneumatic devices, compressors, dehydrators, pipeline maintenance)		✓	
	2.4 Flaring is minimized and is only allowed where capture is infeasible		✓	
	2.5 Ensure all flaring that is allowed is conducted with efficient flares		🔧	We recommend ASEA update its CNH venting and flaring rule to require a 98% destruction and reduction efficiency of exploration and production flares, rather than change anything in this rule.

✓ Good ◎ Good, but need clarification 🔧 Needs improvement

Best Practice	Concrete Actions	Actions Included in the Published Draft	Observations from EDF+CAI	Improvement Opportunity
3. Reduce Venting of Associated Gas from Oil wells	3.1. Prohibit venting of associated gas from oil wells	ASEA reports this regulation complements existing venting controls established in different regulations (CNH: Associated Gas Utilization and ASEA: Exploration and Extraction of Conventional and Unconventionals). Venting is prohibited except for emergencies and operational safety. Art. 26 Art 64. Chapter X	🔧	As appropriate, incorporate cross references to other relevant regulations and revise CNH rule to narrowly define emergency venting in order to ensure venting is limited to very few exceptions.
	3.2. Limit flaring of associated gas; only allow where capture is infeasible		🔧	In the CNH rule, require operators capture associated gas; flaring is only permitted when capture is infeasible.
	3.3. Ensure all flaring that is allowed is conducted with efficient flares		🔧	We recommend ASEA update its CNH venting and flaring rule to require a 98% destruction removal efficiency of exploration and production flares, rather than change anything in this rule.

✓ Good ◎ Good, but need clarification 🔧 Needs improvement

Best Practice	Concrete Actions	Actions Included in the Published Draft	Observations from EDF+CAI	Improvement Opportunity
4. Regular Leak Detection and Repair	4.1. Quarterly inspections of well sites, gas processing plants, compressor stations, tank batteries	Draft regulations include these actions	✓	
	4.2. Comprehensive inspections that apply to all sources with the potential to leak, unintentionally vent or abnormally operate		✓	
	4.3. Include robust alternative compliance pathway that allows for the use of emerging technologies that are as effective in reducing emissions as allowable instruments and that is subject to public input and regulatory review		🔧	Include the requirement of providing documentation (e.g., field or test data, modeling) adequate to demonstrate the proposed alternative monitoring method or program is capable of achieving emission reductions that are at least as effective as the emission reductions achieved by Optical Gas Imaging or Method 21.

✓ Good ◎ Good, but need clarification 🔧 Needs improvement

Appendix

The following appendix represents a compendium of the best U.S. state and federal requirements to limit methane emissions from new and existing onshore oil and gas activities and equipment. We have not attempted to address every source of methane emissions, but rather have focused on upstream and midstream stationary sources that historically have been the subject of state and federal air pollution regulation. Sources not addressed include flaring of associated gas from oil wells, abandoned and orphaned wells, the integrity of underground natural gas storage facilities, and pipelines, among others. Rather than suggesting regulatory language, this memo highlights the solutions to regulated sources and points to the U.S. regulation(s) that serve as an example of today's leading practices. Footnotes provide citations to the relevant regulatory language.

The requirements apply to:

- *new and existing activities or sources, unless otherwise noted*
- *activities and equipment in the onshore crude oil and natural gas production and natural gas processing, storage and transmission segments.*

"New" activities or sources are those which begin or are constructed after the effective date of the regulation or requirement.

The appendix lists recommended policies by source.

I. Combustion devices

a. Operational requirements

i. If a flare or other combustion device[6] is used to control emissions of hydrocarbons, it shall be enclosed, be equipped with and operate an auto-igniter, have no visible emissions during normal operations, and be designed so than that an observer can, by means of visual observation from the outside of the enclosed flare or combustion device, determine whether it is operating properly.[7]

b. Monitoring requirements

i. Operation of a combustion device used to control emissions shall be continually monitored using any device that sense and record a parameter that indicates whether the combustion device is functioning to achieve the 98% control requirement.[8]

II. Continuous Bleed Pneumatic Controllers

a. Control requirement

i. New controllers: Shall not vent to the atmosphere.[9] Operators can meet this requirement by either using no-bleed devices at facilities with access to grid or renewable energy[10] or routing emissions to a vapor collection system[11] that captures the emissions.[12] If it is not feasible to capture the emissions, operators may use a flare.[13]

[6] *A combustion device means an enclosed device with a design destruction efficiency of at least 98% for hydrocarbons and equipped with an auto-igniter. Colorado Regulation Number 7, 5 C.C.R. 1001-9, §§ XVII.B.2.b, XVII.B.2d, XVII.D.3, available at https://www.colorado.gov/pacific/sites/default/files/5-CCR-1001-9_0.pdf.*

ii. Existing controllers at production facilities: Require retrofits of existing continuous bleed controllers such that emissions from all controllers are no-bleed (zero emissions) or must be limited to 6 standard cubic feet per hour ("low-bleed" levels).[14] If it is not feasible to route the discharge to a vapor collection system operators may route the discharge to a combustion device.[15]

iii. Existing controllers at gas processing plants and compressor stations. Utilize zero bleed.[16]

b. Monitoring

i. Inspect pneumatic devices and vapor recovery system or control device as part of LDAR. [17]

ii. Test low-bleed devices using a direct measurement method to ensure they are not venting gas at a rate greater than six (6) standard cubic feet per hour (SCFH).[18]

c. Recordkeeping

i. Documentation of the natural gas bleed rate or, if bleed rate is zero, documentation of the type of pneumatic controller. [19]

d. Reporting

i. Annual report demonstrating compliance and recording any deviations accompanied by certification of the truth, accuracy and veracity of the report signed by a responsible official.[20]

[7] Id. at § XVII.B.2.b.

[8] See Environmental Protection Agency, Final Rule, Oil and Natural Gas Sector: Emission Standards for New and Modified Sources, 81 Fed. Reg. 35824 (June 3, 2016), 40 C.F.R. § 60.5417a, ("EPA OOOOa).

[9] California Final Regulation Order, March 25, 2016 ("CARB"), 17 C.C.R. § 95668(e)(2),(5) available at https://www.arb.ca.gov/regact/2016/oilandgas2016/oilgasfro.pdf.

[10] See Id. at § 95668(e)(5)(A); see also 5 C.C.R. 1001-9, § XVIII.C.2.a (requiring the use of no-bleed controllers wherever "on-site electrical grid power is being used and use of a no-bleed pneumatic controller is economically and technically feasible.").

[11] A vapor collection system means equipment and components installed on pressure vessels, separators, tanks, or sumps including piping, connections, and flow-inducing devices used to collect and route emissions to a processing, sales gas, or fuel gas system; to an underground injection well. CARB, 17 C.C.R. § 95667(a)(62) "Vapor collection system" means equipment and components installed on pressure vessels, separators, tanks, or sumps including piping, connections, and flow-inducing devices used to collect and route emission vapors to a processing, sales gas, or fuel gas system; to a gas disposal well; or to a vapor control device.

[12] Wyo. Dep't of Envtl. Quality, Oil and Gas Production Facilities: Chapter 6 Section 2 Permitting Guidance (June 1997, Revised May, 2016) ("WY Permitting Guidance"), 11, available at http://deq.wyoming.gov/media/attachments/Air%20Quality/New%20Source%20Review/Guidance%20Documents/5-12-2016%20Oil%20and%20Gas%20Guidance.pdf; see also CARB § 95668(e)(5).

[13] Id.

[14] EPA Control Techniques Guidelines for the Oil and Natural Gas Industry ("CTGs"), Oct. 20, 2016, § 6.4, available at https://www.epa.gov/sites/production/files/2016-10/documents/2016-ctg-oil-and-gas.pdf; Bureau of Land Management, Final Rule, Waste Prevention, Production Subject to Royalties, and Resource Conservation ("BLM"), 81 FR 83008, Nov. 18, 2016, 43 C.F.R. § 3179.201(a)(1), available at file:///Users/Bessie/Downloads/BLM-2016-0001-9126%20(1).pdf; Wyo. Dep't of Envtl. Quality, Air Quality Division, Chapter 8, Nonattainment Area Regulations, Section 6(f), ("Wyoming Nonattainment Area Regulations") available at http://soswy.state.wy.us/Rules/default.aspx; CARB, § 95668(e)(2)(A)(1).

[15] CARB § 95668(e)(5)(a); Wyoming Nonattainment Area Regulations, Section 6(f).

[16] Environment & Climate Change Canada, Proposed Regulations Respecting Reduction in the Release of Methane and Certain Volatile Organic Compounds (Upstream Oil and Gas Sector) (May 27, 2017), available at http://www.gazette.gc.ca/rp-pr/p1/2017/2017-05-27/html/reg1-eng.php.

[17] CARB § 95668(e)(2); see also Colorado Reg. 7, §XVIII.F.

[18] CARB § 95668(e)(2).

[19] See 40 C.F.R. § 60.5390a.

[20] See e.g., Wyoming Permitting Guidance (compliance requirements for well blowdown BMP requirements); 40 C.F.R. § 60.5420(c)(1) (EPA requirements for gas well completions); see also Colorado Reg. 7, § XVII.F.9.f.

III. Intermittent Vent Pneumatic Controllers

a. Control requirement

i. Controllers shall not vent natural gas when idle (not actuating) determined by testing the device when not actuating in accordance with leak detection and repair requirements; [21] and

b. Monitoring

i. Inspect pneumatic devices when not actuating as part of LDAR.[22]

c. Recordkeeping

i. Documentation that the device is not venting when idle and not actuating.[23]

d. Reporting

i. Annual report demonstrating compliance and recording any deviations accompanied by certification of the truth, accuracy and veracity of the report signed by a responsible official.[24]

IV. Liquids Unloading

a. Control requirement

i. New and Existing wells: Require existing wells to use any means of creating differential pressure to unload the liquids from a well without venting.[25] If these methods are not successful in unloading the liquids from the well, the well may be vented to the atmosphere. Operators must remain on-site during any liquids un loading events to ensure that any venting to the atmosphere is limited to no more than what is practically necessary.[26]

b. Recordkeeping

i. Operators must retain records of the cause, date, time, duration and estimated volume of each venting event.[27]

c. Reporting

i. Annual report demonstrating compliance and recording any deviations accompanied by certification of the truth, accuracy and veracity of the report signed by a responsible official.[28]

[21] CARB, § 95668(e)(3); Ohio General Permit 18.1.C.1.d.2.b., available at http://epa.ohio.gov/dapc/genpermit/ngcs/GP_181.aspx; see also Colorado Reg. 7, §XVIII.F..

[22] CARB § 95668(e)(3); Ohio General Permit 18.1.C.1.d.2.b., available at http://epa.ohio.gov/dapc/genpermit/ngcs/GP_181.aspx; see also proposed Colorado Reg. 7, §XVIII.F. (October 18, 2017).

[23] 40 C.F.R. §§ 60.5390(c)(1), 5420(b)(5)(i).

[24] Wyoming Oil and Gas Production Facilities Ch. 6, Sec. 2 Permitting Guidance (Nov. 2013) (compliance requirements for well blowdown BMP requirements); 40 C.F.R. § 60.5420(c)(1) (EPA requirements for gas well completions); see also CO Reg. 7, § XVII.F.9.f.

[25] Colorado Reg. 7, § XVII.H.1.a; see also BLM, 43 C.F.R. § 3179.204.

[26] Id.

[27] CO Reg. 7, § XVII.H.1.c; 43 C.F.R. § 3179.204(c)(2).

[28] See e.g., Wyoming Permitting Guidance (Nov. 2013) (compliance requirements for well blowdown BMP requirements); 40 C.F.R. § 60.5420(c)(1) (EPA requirements for gas well completions); see also Colorado Reg. 7, § XVII.F.9.f.

V. Equipment leaks

a. Applicable to wells, well sites, compressor stations, tank batteries and gas processing plants.

b. Control requirement

i. Immediate inspection after startup, at least within 30 days. [29]

ii. Quarterly inspections[30] of components using an optical gas imaging device or alter native approved device that is equally or more effective at detecting leaks.[31]

1. Components means any component that has the potential to emit fugitive emissions of methane including but not limited to a valve, fitting, flange, threaded-connection, process drain, stuffing box, pressure-vacuum, valve, pipe, seal fluid system, diaphragm, hatch, sight-glass, meter, open-ended line, continuous bleed and intermittent-vent natural gas powered pneumatic device, natural gas powered pneumatic pump, centrifugal compressor wet seal, or reciprocating compressor rod packing or seal, combustion devices and vapor recovery systems. [32]

2. Rule includes robust compliance pathway for evaluating and approving of alternative monitoring technologies such as emerging continuous methane monitors. [33]

iii. Daily audio, visual, or olfactory inspections at manned facilities and weekly audio, visual, or olfactory inspections at unmanned facilities. [34]

iv. Repair or replace all "fugitive emissions" within 5 working days of discovery, unless the component is a critical component or unsafe to monitor. [35] If a critical or unsafe to monitor component, operators shall minimize the leak within one day of detection and repair the leak by the end of the next process shutdown or within 12 months, whichever is sooner. [36]

1. Fugitive emissions means any visible emission from a fugitive emissions component observed using optical gas imaging. [37]

2. Fugitive emissions means any concentration of hydrocarbon above 500 ppm for any monitoring using approved quantitative instrument based monitor ing. [38]

v. Re-monitoring

1. Each repaired or replaced component must be resurveyed as soon as practicable to ensure there is no leak, but no later than 15 days of the leak discovery. [39]

c. Recordkeeping

i. Must retain records documenting results of inspections, including identification of number of leaks by component, date of inspection and date of repairs, date of re-monitoring to verify repair, list of unsafe to monitor and critical components on delayed repair list, and plan for monitoring such components. [40]

d. Reporting

i. Must submit annual report including total number of facilities inspected, total number of inspections, total number of leaks identified, by component, total number of leaks repaired, total number of leaks on delayed repair list. Accompanied by cer tification of the truth, accuracy and veracity of the report signed by a responsible official. [41]

VI. Glycol Dehydrators

a. Control requirement

i. Operators shall control emissions from new and existing glycol dehydrators by 98%. [42]

b. Monitoring

i. Inspect glycol dehydrator and vapor recovery system or control device as part of LDAR. [43]

c. Reporting

i. Annual report demonstrating compliance and recording any deviations accompanied by certification of the truth, accuracy and veracity of the report signed by a responsible official.[44]

VII. Centrifugal compressor seals

a. Control requirement

i. New and Existing: Require operators to route emissions either to a vapor collection system or combustion device. Alternatively, operators can design the compressor using dry seals.[45]

b. Monitoring

i. Inspect compressor, wet seals, isolation valves, vapor recovery system or control device as part of LDAR [46]

[29] Colorado Reg. 7, § XVII.F.4.a; 40 C.F.R. 60.5397a(f)(1).

[30] 40 C.F.R. § 60.5397a(g); Colorado Reg. 7, § XVII.F.4.a; CARB § 95669(g); Pa. Dep't of Envtl. Prot., Proposed General Plan Approval And/Or General Operating Permit BAQ-GPA/GP5, Section K ("Pennsylvania General Permit 5"), available at http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-116053/2700-PM-BAQ0267_GP-5%20.pdf; Ohio Envtl. Prot. Agency, General Permit 12.1(C)(5)(c)(2), 12.2(C)(5)(c)(2), available at http://epa.ohio.gov/Portals/27/oil%20and%20gas/GP12.1_PTIOA20140403final.pdf; WY Permitting Guidance at 22; Wyoming Nonattainment Area Regulation §(6)(g)(1)(a); Utah Department of Environmental Quality, Division of Air Quality, Approval Order: General Approval Order for a Crude Oil and Natural Gas Well Site and/or Tank Battery, II.B.10 (June 5, 2014), available at http://www.deq.utah.gov/Permits/GAOs/oilgas/oilgasgao.htm.

[31] 43 C.F.R. § 3179.302(a); 40 C.F.R. § 50.5397a(a)

[32] CARB § 95667(a)(9); Ohio General Permit 18.1.C.1.d.2.b.; see also 40 C.F.R. § 60.5430a.

[33] CO Reg. 7. § XII.L.8.a(ii)(I); CDPHE, Alternative AIMM Guidance and Procedures, p. 1 (May 31, 2018) (accessible at https://drive.google.com/file/d/1reFIFX_DVI_Wcu82853NNekmhjOtljui/view).

[34] CARB §95669(e).

[35] CO Reg. 7, § XVII.F.7.a.

[36] CO Reg. 7, § XVII.F.7.a § XVII.F.5.b; § CARB §§ 95669(h)(3). Critical component means component that would require the shutdown of a process unit if component was shut down or disabled. Unsafe to monitor means it is not possible to monitor without exposing operator to immediate danger as a result of monitoring.

[37] 40 C.F.R. § 60.5397a(a); see also CO Reg. 7, § XVII.F.4.

[38] CO Reg. 7, § XVII.F.6(a).

[39] 40 C.F.R. § 60.5397a(j)(2).

[40] CO Reg. 7, § XVII.F.4.

[41] CO Reg. 7, § XVII.F.9.f.

[42] WY Permitting Guidance, 25 (requiring all new dehydrators to control emissions by 98%); Wyoming Nonattainment Area Regulations, Section 6(d)(1)(A); CO Reg. 7, § XVII.D.3. Some states set a control threshold below which operators are not required to install controls. This threshold varies, and is dependent on a number of factors including whether or not a control device is already present at the site, the cost of installing a new device, and the emissions potential from the dehydrators.

[43] See e.g., CARB § 95668(c),(d) (components on driver engines and compressors are subject to LDAR).

[44] See e.g., Wyoming Permitting Guidance (compliance requirements for well blowdown BMP requirements); 40 C.F.R. § 60.5420(c)(1) (EPA requirements for gas well completions); see also CO Reg. 7, § XVII.F.9.f.

[45] CARB § 95668(e)(5); 40 C.F.R. §§ 5380(a)(1)-(2); 5380a(a)(1)-(2).

[46] CARB § 95668(d)(3).

c. Reporting
   i. Annual report demonstrating compliance and recording any deviations accompanied by certification of the truth, accuracy and veracity of the report signed by a responsible official. [47]

VIII. Reciprocating compressor rod-packing

a. Control requirement
   i. New and Existing: Route emissions from compressor vent stacks used to vent rod packing or seal emissions to a vapor recovery system, or if not feasible, to a combustion device. [48]
b. Monitoring
   i. Inspect compressor, compressor seals, rod-packing and vapor recovery system or control device part of LDAR. [49]
c. Reporting
   i. Annual report demonstrating compliance and recording any deviations accompanied by certification of the truth, accuracy and veracity of the report signed by a responsible official. [50]

IX. Storage Tanks

a. Control requirements
   i. Construct tankless facilities.[51]
   ii. Require operators to capture and conserve emissions using a vapor collection system. [52]
   iii. Prohibit venting of hydrocarbon emissions from access points on tanks during normal operation [53]
   iv. Require operators of controlled tanks to evaluate their systems for controlling tank emissions and certify that each system is designed to meet the no venting prohibition.[54]
b. Monitoring
   i. Require at least monthly visual and AVO inspections of tanks and control devices to ensure emissions are being routed to control units and flares are operating as designed. [55]
   ii. Monitor storage vessels, access points and vapor collection system or combuster as part of LDAR.[56]

[47] See e.g., Wyoming Permitting Guidance (Nov. 2013) (compliance requirements for well blowdown BMP requirements); 40 C.F.R. § 60.5420(c)(1) (EPA requirements for gas well completions); see also CO Reg. 7, § XVII.F.9.f.
[48] CARB § 95668(d)(3)(A),(B); Ohio Envtl. Prot. Agency, General Permit 17.1 Template, available at http://epa.ohio.gov/dapc/genpermit/permitsec.aspx; See CARB § 95668(d); See also 79 Fed. Reg. 41752 (July 17, 2014) and 40 C.F.R. § 60.5420(c).
[49] See CARB § 95668(c).
[50] See e.g., Wyoming Permitting Guidance (Nov. 2013) (compliance requirements for well blowdown BMP requirements); 40 C.F.R. § 60.5420(c)(1) (EPA requirements for gas well completions); see also CO Reg. 7, § XVII.F.9.f.
[51] See Boulder County Oil and Gas Regulations, Article 12-701.A.1.e., available at https://assets.bouldercounty.org/wp-content/uploads/2017/02/land-use-code-article-12.pdf (Providing that the County may require the construction of tankless facilities).
[52] CARB, 95668(a)(6). Some states set a control threshold below which operators are not required to install controls. This threshold varies, and is dependent on a number of factors including whether or not a control device is already present at the site, the cost of installing a new device, and the emissions potential from the storage tanks.
[53] Other potential language could include "hatches shall be closed at all times except during sampling, adding of process material through the hatch, or attended maintenance operations." Ventura County R. 74.10.C.1.

c. Recordkeeping
   i. Retain records of monthly visual and AVO inspections.[57]
d. Recordkeeping
   i. Annual report demonstrating compliance and recording any deviations accompanied by certification of the truth, accuracy and veracity of the report signed by a responsible official.[58]

X. Pneumatic Pumps

a. Control requirement
   i. New and existing: Use zero bleed pump or route emissions to vapor collection system. [59]
b. Monitoring
   i. Monitor pump, vapor collection system and combuster as part of LDAR.
c. Reporting
   i. Annual report demonstrating compliance and recording any deviations accompanied by certification of the truth, accuracy and veracity of the report signed by a responsible official. [60]

XI. Open ended lines and valves and sampling connection system

a. Control requirements
   i. Require each valve or line be equipped with a cap, blind flange, plug or second valve. Alternatively, operators can treat as fugitive components and include in LDAR program. [61]
   ii. Require each sampling connection system to be equipped with a closed-loop, vent or purge system. [62]

XII. Compressor venting

a. Control requirements
   i. New: The compressor shall be designed so that no gas from compressor blowdown vents is emitted into the atmosphere. This requirement can be met by a design that captures 100% of the gasses from these sources, and routes them to vapor recovery system, or if not feasible, to a combustion device. The above design requirements shall be met at all times that pressure is present at the inlet or discharge isolation valve, including periods of either intermittent or prolonged shutdown of the compressor. [63]

[54] CO AQCC Reg. 7 § XVII.C.2.
[55] Id. at § C.1.
[56] Id. at § C.2.b.
[57] Id. at §§ XVII.C.4, XVII.F.
[58] See e.g., Wyoming Permitting Guidance (Nov. 2013) (compliance requirements for well blowdown BMP requirements); 40 C.F.R. § 60.5420(c)(1) (EPA requirements for gas well completions); see also CO Reg. 7 § XVII.F.9.f.
[59] 43 C.F.R. 3179.202(b); CARB § 95668(e)(4); Wyoming Nonattainment Area Regulation §6(e).
[60] See e.g., Wyoming Permitting Guidance (Nov. 2013) (compliance requirements for well blowdown BMP requirements); 40 C.F.R. § 60.5420(c)(1) (EPA requirements for gas well completions); see also CO Reg. 7, § XVII.F.9.f.
[61] CO Reg. 7, § XVII.B.3.a.
[62] Ohio Envtl. Prot. Agency, General Permit 12.1.C.5.d.3.b, available at http://epa.ohio.gov/Portals/27/oil%20and%20gas/GP12.1_PTIOA20140403final.pdf
[63] See Ohio Envtl. Prot. Agency, General Permit 17.1.C.3, available at http://epa.ohio.gov/dapc/genpermit/ngcs/GP_171.aspx

b. Monitoring
   i. Monitor compressor, vapor collection system and combuster as part of LDAR.
c. Recordkeeping
   i. Maintain records of the number of blowdown events, volume of gas emitted from all compressor blowdown events for each month, in scf; mole fraction of each CH4 component in the gas stream using a representative analysis; and the rolling, 12-month summation of the volume of gas emitted from all compressor blowdown events, in scf. [64]
d. Reporting
   i. Annual report demonstrating compliance and recording any deviations accompanied by certification of the truth, accuracy and veracity of the report signed by a responsible official. [65]

XIII. Pigging

a. Control requirements
   i. During pigging activities operator must limit methane emissions by using a vapor recovery system, or if not feasible, a combustion device. [66]
b. Recordkeeping
   i. Date and time of venting,[67] and amounts of venting.[68]
c. Reporting
   i. Annual report demonstrating compliance and recording any deviations accompanied by certification of the truth, accuracy and veracity of the report signed by a responsible official. [69]

[64] See Ohio Envtl. Prot. Agency General Permit 17.1.C.1.d.2, available at http://epa.ohio.gov/dapc/genpermit/ngcs/GP_171.aspx
[65] See e.g., Wyoming Permitting Guidance (Nov. 2013) (compliance requirements for well blowdown BMP requirements); 40 C.F.R. § 60.5420(c)(1) (EPA requirements for gas well completions); see also CO Reg. 7, § XVII.F.9.f.
[66] See Ohio Envtl. Prot. Agency General Permit 21.1.C.1.b., available at http://epa.ohio.gov/dapc/genpermit/ngcs/GP_171.aspx;- See also Pennsylvania DEP General Permit 5A.K., available at http://www.depgreenport.state.pa.us/elibrary/GetDocument?docId=19615&DocName=02%20GP-5A%20UNCONVENTIONAL%20NATURAL%20GAS%20WELL%20SITE%20OPERATIONS%20AND%20REMOTE%20PIGGING%20STATIONS%20GENERAL%20PLAN%20APPROVAL%20AND/OR%20GENERAL%20OPERATING%20PERMIT.PDF%20%20%3Cspan%20style%3D%22color:blue%3b%22%3E%28NEW%29%3C/span%3E
[67] Id.
[68] Wyoming Permitting Guidance (Nov. 2013) (compliance requirements for well blowdown BMP requirements)
[69] See e.g., Wyoming Permitting Guidance (Nov. 2013) (compliance requirements for well blowdown BMP requirements); 40 C.F.R. § 60.5420(c)(1) (EPA requirements for gas well completions); see also CO Reg. 7, § XVII.F.9.f.

XIV. Oil and Gas well completions and recompletions

a. Control requirements
   i. During the initial flowback stage, the owner or operator of a gas well shall route the flowback into one or more well completion vessels or storage tanks and commence operation of a separator;
   ii. During the separation flowback stage, the owner or operator of a gas well shall route all recovered liquids from the separator to one or more well completion ves sels or storage tanks, re-inject the liquids into the well or another well or route the recovered liquids to a collection system. The owner or operator of a gas well shall route the recovered gas from the separator into a gas flow line or collection system, use the recovered gas as an on-site fuel source, or use the recovered gas for another purpose that a purchased fuel or raw material would serve;
   iii. The owner or operator of a gas well shall route all recovered gas to the gas flow line as soon as practicable or shut in and conserved. In cases where recovered gas can not be directed to the flow line, the owner or operator of a gas well shall capture and direct recovered gas to a combustion device, except in conditions that may re sult in a fire hazard or explosion, or where high heat emissions from a combustion device may negatively impact waterways;
   iv. The owner or operator of a gas well has a general duty to safely maximize resource recovery and minimize releases to the atmosphere during flowback and subsequent "recovery". [70]
   v. Notify [insert appropriate regulator] no later than two (2) days prior to the commencement of each well completion operation and provide location of the well and planned date of completion activity. [71]
b. Notification
   i. The owner or operator of an affected gas well subject to this section shall submit a notification to the Department no later than two (2) days prior to the commence ment of each well completion operation that provides the anticipated date of the well completion, well number and location, owner or operator contact number, and planned date of the beginning of flowback. [72]
c. Recordkeeping
   i. A log for each well completion operation at each affected gas well with hydraulic fracturing operations specifying the following location, date, time and duration of completion, duration of combustion and venting, if any and specific reasons for venting in lieu of capture or combustion. [73]
d. Reporting
   i. Annual report demonstrating compliance and recording any deviations accompanied by certification of the truth, accuracy and veracity of the report signed by a responsible official. [74]

[70] 40 C.F.R. §§ 60.5375(a)(1)-(4); 60.5375a(a)(1)-(4).
[71] Id. at §§ 60.5410; 60.5410a
[72] Id. at §§60.5420(a)(2); 60.5420a(a)(2);
[73] Id. at §§60.5375(b); 60.5375a(b).
[74] Id. at §§ 60.5420(c)(1), 60.5420a(c)(1),