



THE
STATE
OF
METHANE



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Introduction

In 2016, the Bureau of Land Management (BLM) finalized common-sense standards to reign in the excessive waste of natural gas from oil and gas development on public lands. By curbing unnecessary venting, flaring and leaks at oil and gas facilities, the BLM's Waste Prevention Rule would have helped to protect public health, reduce potent greenhouse gas (GHG) emissions, and recoup millions of dollars in revenue owed to American taxpayers.

Despite the rule's broad support and numerous benefits, the Department of the Interior under Secretary Ryan Zinke has rolled back its most important protections. Under the agency's replacement to the 2016 rule, the BLM will now, in many cases, rely on existing state requirements to regulate publicly owned oil and gas production. Unfortunately, policies to reduce natural gas waste vary significantly by state. This patchwork approach to federal energy management will lead to inconsistent requirements across states and ultimately result in increased pollution, degraded air quality, and millions of dollars in lost royalty revenue for state and federal taxpayers.



Energy Development on Public Lands and the Problem of Natural Gas Waste

The BLM is responsible for oil and gas leasing on approximately 700 million acres of onshore BLM, national forest and other federal lands, as well as private lands where the federal government has retained the mineral rights.¹ As of 2017, private companies held over 38 thousand oil and gas leases covering almost 26 million acres of federal land.² Combined, federal lands and waters accounted for 24% of total US oil production and 13% of US natural gas production in 2017.³

The development of these energy resources results in significant greenhouse gas (GHG) emissions and natural gas waste. The waste has serious climate implications because of its scale and composition, and material fiscal consequences because of the revenue not generated from its capture and sale.

Methane is the primary component of natural gas, making up between 87 to 97% of natural gas by volume. While carbon dioxide (CO₂) may be the most familiar GHG, methane (CH₄) poses a more serious near-term threat. Methane is approximately 87 times more potent than carbon dioxide as a climate pollutant over the short-term.⁴ Despite its heat trapping potential, its short atmospheric life (about 10 years on average) means that reducing methane emissions can have real near-term climate benefits.⁵ Yet methane emissions from federal lands have only proliferated in recent years.

Between 2009 and 2015, oil and gas operators on public lands wasted 462 billion cubic feet (Bcf) of natural gas – enough to serve 6.2 million households for a year.⁶ The rate at which that gas was lost over the seven-year span, however, was not consistent; it increased dramatically. By the BLM's admission,⁷ gas waste is under-reported by operators, and yet the reported total more than doubled between 2009 and 2015. The growing problem of wasting publicly owned resources is amplified by the gas's value and the resulting loss of royalty revenue for taxpayers. At the average price of gas sold from federal lands in the 2009-2015 period – \$3.65 per thousand cubic feet (Mcf) – the 462 Bcf was worth an estimated \$1.7 billion. Instead of collecting royalties on the full value of the gas, the Office of Natural Resources Revenue reports collecting just \$17 million from operators for lost gas between 2009 and 2015.

There are also a number of ancillary public health issues that arise from the waste of natural gas. The flaring of gas results in increased noise and light pollution while vented gas can contribute to regional and global air pollution problems of smog, and exposure to particulate matter and other toxics like benzene, a known carcinogen.

1 <https://fas.org/sgp/crs/misc/R42346.pdf>

2 <https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/oil-and-gas-statistics>

3 <https://revenue.data.doi.gov/explore>

4 <https://www.epa.gov/ghgemissions/understanding-global-warming-potentials>

5 <https://www.epa.gov/climateleadership/atmospheric-lifetime-and-global-warming-potential-defined>

6 Waste Prevention, Production Subject to Royalties, and Resource Conservation, Final Rule, 81, Fed. Reg. 83,008, 83009 (Nov. 18, 2016).

7 Bureau of Land Management (BLM), Regulatory Impact Analysis for the 2018 proposed rule, BLM-2018-0001-0002, p. 20

Addressing Gas Waste on Public Lands (The 2016 BLM Waste Prevention Rule)

The BLM has a statutory duty to prevent the waste of publicly owned resources pursuant to the Federal Land Policy and Management Act (FLPMA) and the Mineral Leasing Act (MLA). However, as many independent reports have documented, and the recent proliferation of waste demonstrates, the agency has failed to meet these obligations. That failure was due in large part to the outdated framework governing oil and gas production on federal lands.

Notice to Lessee 4A (NTL-4A) was written in 1979 and did little to incentivize the reduction of gas waste. To address the shortcomings of NTL-4A and reduce gas waste from leaks, venting, and flaring on public lands, the BLM finalized the Waste Prevention Rule in 2016 after years of working with industry experts and other stakeholders.

The final 2016 methane waste prevention rule included comprehensive leak detection and repair (LDAR) requirements, methane capture standards for various field equipment and common drilling practices and established volumetric and percentage-based venting and flaring limits.

If fully implemented, the rule would have incentivized operators to capture and sell previously wasted gas, reducing methane emissions by over 35%⁸ and producing millions of dollars in royalty revenue for taxpayers over the next decade.

See page 6 for a more detailed description of the 2016 rule.

Rolling Back Public Protections for Private Gains

In early 2017, despite the urgent need to address the problem of methane waste, the BLM began efforts to repeal the 2016 rule. A draft of BLM's new rule was released in February and finalized in September 2018. The new rule substantially revised the 2016 rule by eliminating its most significant requirements.

According to the agency's own estimates, the new rule will result in lost royalty payments of up to \$80 million, the loss of 299 Bcf of natural gas production, lost cost savings from gas that would have been captured and sold under the 2016 rule of \$735 million and forgone methane emission reductions valued conservatively at \$259 million.



THE NEW RULE

- Removes all leak detection and repair (LDAR), inspection and reporting requirements.
- Eliminates methane capture requirements for: drilling operations, well completions, pneumatic pumps and controllers, storage vessels, and well unloading.
- No longer requires operators to submit plans identifying how they intend to limit waste prior to receiving approval to drill.
- Eliminates the gas capture targets and flaring limits, as well as weaken the limitations on venting. These provisions explicitly required operators to reduce venting and flaring and accounted for most of the waste reduction benefits. Instead, the new rule relies on existing state requirements to limit the venting, flaring and waste of natural gas on public lands.

⁸ Ibid.

How the States Stack Up:

Companies developing oil and gas resources on federal lands are required to meet the standards set by the BLM, those set by the state in which they are operating, or whichever are more stringent. To reduce the extensive waste of natural gas on federal lands, the BLM's 2016 rule set standards that were often more stringent than existing state rules. In doing so, the 2016 rule provided more consistent guidance for companies operating in different states and ensured all federal oil and gas operations were held to the same minimum standards.

Under the newly finalized rule, companies will be required to meet the state standards only. That is, the new rule relies on existing state rules to limit natural gas losses on federal lands and to determine when operators will be charged royalties for wasting gas. However, several western states

have inadequate or nonexistent natural gas waste and methane reduction regulations. As a result, the impact of the new rule will vary by state.

The following eight states were selected based on the amount of federal oil and gas leasing and production occurring in each. These are the states that will be most impacted by the repeal of the 2016 BLM rule.

The table below illustrates how individual state's requirements compare to nine significant components of the 2016 BLM rule. It highlights where states have met or exceeded the BLM standard as well as those instances where the repeal of the rule may leave emission sources unaddressed. It also allows for comparisons between state regulatory regimes.

State Requirements Compared to Components of the 2016 BLM Rule

- 0** No comparable requirement
- 1** State requirement that may lead to marginal emission reductions
- 2** Explicit requirement that applies at some but not all facilities (i.e. requirement only applies to either new facilities or in a portion of the state)
- 3** State requirement meets or exceeds the BLM standard

	Colorado	California	Wyoming	North Dakota	Utah	Alaska	Montana	New Mexico
Venting prohibition	2	3	0	3	0	0	1	0
Gas capture targets/Flaring limits	1	0	2	2	2	2	2	1
Measurement of vented and flared gas	3	2	2	2	2	3	0	2
Emission reductions from well drilling and completion activities	3	1	2	0	0	1	1	0
Emission reductions from pneumatic pumps and controllers	3	3	2	2	3	0	0	0
Emission reductions from liquids unloading	2	3	0	0	1	0	1	0
Emission reductions from storage vessels	3	3	3	2	2	1	2	1
Leak Detection and Repair (LDAR)	3	3	2	0	2	0	2	0
Waste minimization plans	0	0	2	2	0	3	0	2
TOTAL	20/27 (74%)	18/27 (67%)	15/27 (55%)	13/27 (48%)	12/27 (44%)	10/27 (37%)	9/27 (33%)	6/27 (22%)

Conclusion

States have taken wildly different approaches to minimizing natural gas waste. Some have established requirements that meet or even exceed the 2016 BLM standard while others have left significant sources completely unregulated. Relying on this patchwork approach will lead to inconsistent standards across our public lands and more importantly will result in pollution and the continued waste of taxpayer owned resources.

We need consistency and continuity in the way we regulate the oil and gas industry on federal lands to minimize waste, improve public health and protect the environment. The 2016 final rule provided a common-sense and cost-effective framework for achieving these goals.

Requirements of the 2016 BLM Methane Rule

The 2016 final rule aimed to curb methane emissions and natural gas waste on public lands by establishing standards for operators that reduced or eliminated venting, flaring and leaks. Had it been fully implemented, it was projected to reduce methane emissions by 180,000 tons per year (tpy) (estimated to be worth up to \$247 million).⁹ Moreover, the capture of previously wasted natural gas would lead to increased production of over 41Bcf per year, helping to generate additional royalty revenues of up to \$14 million annually.¹⁰ Altogether, the 2016 final rule would reduce venting by about 35%, reduce flaring by 49% and reduce total methane emissions by 35%.¹¹

For comparative purposes the requirements of the 2016 final rule are summarized below:

Venting Prohibition: Venting is the act of intentionally releasing uncombusted natural gas to the atmosphere. Some venting is unavoidable and necessary for safety reasons. However, operators often vent gas in instances where it could be easily captured and sold or safely combusted. Under the 2016 rule, the venting of natural gas was prohibited in all but a few specific circumstances.¹²

Gas Capture Targets/Flaring Limits: The rule set targets for the percent of associated gas from development oil wells that an operator must capture in a given month. The capture percentage increased over time, starting at 85% and growing to 98%. The rule also established allowable flaring limits which specified the volume of gas an operator could flare without it counting towards the capture percentage. The volume limits declined annually. Over time, as capture percentages increased, and allowable flared volumes decreased the amount of gas operators could flare decreased dramatically. Additionally, the rule also stated that any gas flared or vented in excess of these requirements would be subject to royalties.¹³

Measurement and Reporting: Operators must measure or estimate the volume of all gas vented, flared or used on site.¹⁴ The BLM needs this information to evaluate compliance with the gas capture targets and flaring limits established under the rule, and to ensure the agency is properly assessing royalties. More generally, the public has a right to know how much of its gas is being wasted and this requirement goes a long way towards increasing transparency.

Drilling and Completions: To bring a new well into production it first has to be drilled, then completed. During those operations and before the well is connected to permanent production equipment, gas will escape from the wellbore. Often this gas is vented directly to the atmosphere. However, there are a number of best practices that can be used to reduce or eliminate the need to vent gas during these events. Under the 2016 rule, operators were required to flare, capture and sell, use on site, or reinject gas produced during drilling operations and well completions.¹⁵

Pneumatics: Pneumatic controllers and pumps are automated instruments used for maintaining a process condition, such as liquid level, pressure, and temperature or for circulating fluids. Many pneumatic devices are often powered by pressurized natural gas. When pressurized gas is used, many pneumatic devices release or vent some amount of that gas. According to BLM's own analysis, pneumatic pumps and controllers accounted for 36% of all vented federal gas in 2013.¹⁶ The 2016 rule required reductions in venting from pneumatic controllers and pumps. Specifically, it required devices with high bleed rates (leakage rates) to be replaced with low or no bleed devices or to route emissions to a combustion device.¹⁷

Storage Vessels: Enclosed tanks are often used to store oil, condensate, other hydrocarbon liquids, and produced water. While in the tanks, these liquids release hydrocarbons and other gases. Tanks can be pressurized and controlled to reduce the amount of gas that escapes. The 2016 rule required operators to reduce emissions from storage vessels by routing emissions to a combustion device, continuous flare or sales line.¹⁸

Liquids Unloading: Over time, liquids and solids accumulate in a wellbore, restricting the flow of gas and reducing the productivity of a well. Liquids unloading is the act of removing an accumulation of liquid hydrocarbons or water from the wellbore of a completed gas well in order to allow the gas to once again flow freely. Often the process of removing these liquids results in the release of large volumes of gas. The 2016 rule allowed venting (i.e. purging) and required operators to "consider" other methods of liquids unloading but required operators to submit justification for the use of purging and required the use of best management practices to minimize loss of gas if purging techniques were being used. The 2016 rule also required operators to report the volume of gas vented or flared from liquids unloading.¹⁹

LDAR: Under the 2016 rule, leak detection and repair (LDAR) inspections were required for all well production facilities, compressors and produced water facilities located on a federal lease. Inspections were to be conducted semi-annually for all well production facilities and quarterly for all compressors, using optical gas imaging technology or a portable analyzer. Any leaks greater than 500 parts per million (ppm) were to be repaired within 30 days. Operators were also required to submit an annual report to BLM describing their LDAR activities.²⁰

Waste Minimization Plans: Operators were required to submit plans detailing how they would comply with the methane venting, flaring and leak requirements of the rule and how they planned to capture associated gas once a well began producing, with every Application for Permit to Drill (APD). BLM had the authority to delay the approval of an APD until a plan was submitted.²¹

9 81 Fed. Reg. 223 (November 18, 2016) at 83069

10 Id. at 83014

11 Id. at 83069

12 Id. at 83082

13 Ibid.

14 Id. at 83083

15 Id. at 83084

16 Bureau of Land Management (BLM), Regulatory Impact Analysis for the 2016 proposed rule, p. 3.

17 Id. at 83085

18 Id. at 83086

19 Id. at 83086

20 Id. at 83087 - 83089

21 Id. at 83078



Alaska

Percent of 2017 federal onshore production:

Oil: <1% Gas: <1%²²

Population within ½ mile of active oil & gas facilities:

16,460 people

Federal Gas Wasted (2008-2017):

640,138 Mcf²³

The amount of natural gas wasted from federal lands in Alaska over the past decade is roughly equal to the amount of natural gas required to meet the consumption needs of 4,412 average Alaskan households for an entire year.²⁴

Value of Wasted Gas (2008-2017):

\$2.8 million

Alaska is an important energy-producing state and ranks seventh and eighth in federal onshore gas and oil production, respectively. The state's relatively high rates of production coupled with severely inadequate waste and methane emission reduction requirements and enforcement result in significant loss of natural gas. Alaska's industrial sector emissions – which are almost entirely related to oil and gas production, transportation, and processing – produce 57% of gross greenhouse gas emissions in Alaska on an annual basis, with fugitive methane accounting for 19% of that.²⁵

National Petroleum Reserve – Alaska, overseen by BLM, is undergoing rapid oil production growth, with recent oil discoveries likely resulting in significant new production within a few years. Additionally, the proposed Alaska Gasline Development Corporation's proposed 800-mile natural gas pipeline from Alaska's North Slope to a proposed Liquefied Natural Gas export terminal on Cook Inlet would mean gas production on the North Slope likely will increase dramatically within a decade.²⁶

The benefits of capturing methane are important for a state seeing some of the most dramatic impacts of climate change, with climate change-related warming occurring more than twice

as fast in the Arctic as the global average. Sea level rise, coastal erosion from storms, thawing permafrost, shifting seasons, changes in precipitation patterns and intensity, and many other impacts have all been reported in Alaska. The near-term climate benefits from reducing methane emissions could prove crucial for the state.

Alaska's leaders understand the need for real action, calling to “reduce oil, gas, and mining industry greenhouse gas emissions in Alaska by 30% (over 2005 levels) by 2030...” in the recently released Climate Change Action Plan.²⁷ Such actions would help to curb these threats and ultimately reduce future expenditures on adaptation and mitigation needs.

Current State Requirements:

Venting Prohibition: There is no prohibition on venting gas.

Gas Capture Targets/Flaring Limits: Gas that is flared, vented or otherwise escapes into the air is considered waste. However, operators are permitted to vent or flare for up to one hour for emergencies or planned releases authorized for safety. De minimis venting of gas incidental to normal oil field operations is also authorized.²⁸ For any venting or flaring exceeding these limits, operators must submit a written supplement describing why the gas was vented or flared and what actions will be taken to minimize future releases.²⁹

Measurement and Reporting: Operators must measure and report the volume of gas vented, flared, reinjected, sold, and used on site monthly.³⁰

Drilling and Completions: Alaska has no explicit requirements to minimize waste during drilling and completion operations although venting and flaring limits may result in reduced emissions from these operations.

Pneumatics: Alaska has no state requirements to minimize fugitive emissions from pneumatic pumps or controllers.

Storage Vessels: Alaska has no state requirement to minimize emissions from onshore storage vessels located at well production facilities. It does require storage tanks located at the Port of Anchorage to minimize emissions.³¹

Liquids Unloading: Alaska has no state requirement to minimize emissions during liquids unloading.

LDAR: Alaska has no LDAR inspection or reporting requirements for wells and compressor stations.

Waste Minimization Plans: Before commencement of regular production from an oil or gas pool, the operator must submit to a “plan of reservoir development and operation.” The plan must address how the operator intends to prevent waste,³² though it's unclear if this provision has ever been used to reduce gas waste.

22 Federal production figures are self-reported to ONRR by producers. Percentages were calculated by comparing federal onshore production by state to total federal onshore production. Raw data can be found here: <https://revenue.data.doi.gov/downloads/federal-production>

23 Wasted gas figures are for federal leases only, it does not include gas lost from tribal, Native corporation, or state leases. The data is self-reported to ONRR by operators as “lost gas”. Reliance on self-reported data has a number of obvious weaknesses and the totals reported here should be viewed as highly conservative. A review of ONRR data has often revealed implausibly low reported volumes in many states, and inexplicable swings in reported volumes from one year to the next.

24 Figures were calculated by comparing the total volume of federal wasted gas from 2008-2017 to average residential consumption of natural gas by household for each state. Based on data from EIA: https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm; AGA: <https://www.aga.org/research/data/energy-consumption> and the US Census Bureau: <https://www.census.gov/quickfacts/geo/chart/US/PSTo45217>

25 State of Alaska. Office of Governor Bill Walker, Climate Action for Alaska Leadership Team. (2018). Alaska: Climate Change Action Plan Recommendations to the Governor. Available at: http://climatechange.gov.alaska.gov/wp-content/uploads/sites/11/2018/09/Ak_Climate_Action_Plan_brochure_final_web.pdf

26 See <https://agdc.us>

27 Ibid.

28 20 AAC 25.235(d)

29 20 AAC 25.235(b-c)

30 20 AAC 25.235(a)

31 18AAC 50.085

32 20 AAC 25.517



California

Percent of 2017 federal onshore production:

Oil: 4.8% Gas: < 1%³³

Population within ½ mile of active oil & gas facilities:

1.1 million people

Federal Gas Wasted (2008-2017):

3,238,359 Mcf³⁴

The amount of natural gas wasted from federal lands in California over the past decade is roughly equal to the amount of natural gas required to meet the consumption needs of 81,223 average California households for an entire year.³⁵

Value of Wasted Gas (2008-2017):

\$7,653,929

In California, BLM is responsible for managing one of the most productive individual onshore leases in the lower 48 states, and four of the nation's top seven producing oil fields. However, a significant amount of the associated gas produced in those oil fields is wasted. In fact, the amount of natural gas wasted on public lands in 2013 had the same climate impact as the annual energy usage of 31,000 homes.³⁶ Moreover, this development is occurring near large population centers, with more than 1.1 million people living in close proximity to oil and gas development.

California has been proactive in addressing natural gas waste and methane pollution. In fact, the state is considered a national leader in air quality and emissions regulations; and in March of 2017, finalized some of the strictest methane standards in the country.³⁷

Despite these existing requirements, the repeal of the 2016 BLM rule would leave some oil and gas emission sources underregulated.

Current State Requirements:

Venting Prohibition: The blowing, release or escape of gas into the air is prohibited and considered waste.³⁸

Gas Capture Targets/Flaring Limits: California does not place limits on the flaring of associated gas.

Measurement and Reporting: Operators must use direct measurement to measure the flow rate of vented casinghead gas. There is no requirement to measure or report volumes of gas flared.

Drilling and Completions: California has no emission reduction requirements for drilling but does require operators to reduce emissions associated with well stimulation treatments.³⁹

Pneumatics: Continuous bleed pneumatic controllers and pumps are prohibited from venting beginning in 2019. Intermittent bleed controllers and pumps must comply with LDAR inspection requirements.⁴⁰

Storage Vessels: New and existing storage tanks that receive over 50 barrels per day of crude oil or condensate or 200 barrels of water and have an annual methane emission rate greater than 10 metric tons must control emissions using a vapor recovery system.⁴¹

Liquids Unloading: During liquids unloading operators must use a vapor collection system; measure vented gas using direct measurement; or calculate the volume of gas AND record and report the volume vented.⁴²

LDAR: Audio, visual and olfactory inspections will be conducted at least once a year and up to once a day. Inspections utilizing an optical gas imaging camera must be conducted quarterly as a screening mechanism, but must be measured using Method 21. Leaks larger than 50,000ppm must be repaired within 5 days while smaller leaks must be repaired within 14. Significantly more stringent repair timelines go into effect in 2020.⁴³

Waste Minimization Plans: There are no waste minimization plan requirements.

33 Federal production figures are self-reported to ONRR by producers. Percentages were calculated by comparing federal onshore production by state to total federal onshore production. Raw data can be found here: <https://revenuedata.doi.gov/downloads/federal-production>

34 Wasted gas figures are for federal leases only, it does not include gas lost from tribal leases. The data is self-reported to ONRR by operators as "lost gas". Reliance on self-reported data has a number of obvious weaknesses and the totals reported here should be viewed as highly conservative. A review of ONRR data has often revealed implausibly low reported volumes in many states, and inexplicable swings in reported volumes from one year to the next.

35 Figures were calculated by comparing the total volume of federal wasted gas from 2008-2017 to average residential consumption of natural gas by household for each state. Based on data from EIA: https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm; AGA: <https://www.aga.org/research/data/energy-consumption> and the US Census Bureau: <https://www.census.gov/quickfacts/geo/chart/US/PST045217>

36 <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

37 <https://www.arb.ca.gov/regact/2016/oilandgas2016/ogfro.pdf>

38 California Public Resources Code, Title 17, Division 3, Chapter 1, Article 5, Section 3300.

39 California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 10, Climate Change, Article 4. Available at: <https://www.arb.ca.gov/regact/2016/oilandgas2016/ogfro.pdf>

40 17 CCR, Division 3, Article 4

41 17 CCR, Division 3, Article 4

42 17 CCR, Division 3, Article 4

43 17 CCR, Division 3, Article 4

Colorado

Percent of 2017 federal onshore production:

Oil: 2.7% **Gas: 20.3%**⁴⁴

Population within ½ mile of active oil & gas facilities:

247,000 people

Federal Gas Wasted (2008-2017):

3,888,841 Mcf⁴⁵

The amount of natural gas wasted from federal lands in Colorado over the past decade is roughly equal to the amount of natural gas required to meet the consumption needs of 51,346 average Colorado households for an entire year.⁴⁶

Value of Wasted Gas (2008-2017):

\$14,839,637

Colorado set the standard for reducing gas waste when it finalized first-in-the-nation methane capture requirements in 2014. The state has shown that there are easy and cost-effective ways to address methane pollution. In fact, when Colorado passed new requirements in 2014, the number of active wells and overall natural gas production actually increased. The state's natural gas production increased about 3%⁴⁷, oil production rose 37%⁴⁸, and the number of active oil and gas wells increased by 4% between 2014 and 2017.⁴⁹ Moreover, Colorado has seen a 75% reduction in reported leaks and a recent survey of oil and gas production companies found that most operators believe that the state's rule is cost-effective.⁵⁰⁻⁵¹

While Colorado has been a leader in addressing methane waste, 186,815 Mcf of natural gas from public lands was lost in 2017, and state regulations fail to address a number of issues that otherwise would have been resolved under full implementation of the BLM's 2016 rule.

44 Federal production figures are self-reported to ONRR by producers. Percentages were calculated by comparing federal onshore production by state to total federal onshore production. Raw data

45 Wasted gas figures are for federal leases only, it does not include gas lost from tribal leases. The data is self-reported to ONRR by operators as "lost gas". Reliance on self-reported data has a number of obvious weaknesses and the totals reported here should be viewed as highly conservative. A review of ONRR data has often revealed implausibly low reported volumes in many states, and inexplicable swings in reported volumes from one year to the next.

46 Figures were calculated by comparing the total volume of federal wasted gas from 2008-2017 to average residential consumption of natural gas by household for each state. Based on data from EIA: https://www.eia.gov/dnav/ng/ng_cons_sum_dcunus_a.htm; AGA: <https://www.aga.org/research/data/energy-consumption/> and the US Census Bureau: <https://www.census.gov/quickfacts/geo/chart/US/PST045217>

47 <https://www.eia.gov/dnav/ng/hist/n901oco2m.htm>

48 <https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MCRFPCO1&f=M>

49 http://cogcc.state.co.us/documents/library/Staff_Reports/2016/201601_StaffReport.pdf

50 <http://www.eenews.net/climatewire/2017/01/30/stories/1060049171>

51 <http://keatingresearch.com/wp-content/uploads/2016/04/Colorado-Methane-Regulation-7-Survey-Research-Memo-4-10-2016-Final-Version.pdf>

Current State Requirements:

Venting Prohibition: As of August 2014, all associated gas from a new oil or gas well must either be routed to a gas gathering line or controlled from the date of first production by air pollution control equipment that achieves an average control efficiency of 95%.⁵²

Gas Capture Targets/Flaring Limits: There are no explicit limits on flaring, but the unnecessary or excessive venting or flaring of natural gas produced from a well is prohibited, and an operator must obtain prior approval for any venting or flaring.⁵³

Measurement and Reporting: The volume of gas vented, flared or used on site must be estimated and reported on a monthly basis.⁵⁴

Drilling and Completions: Green completions are required for all oil and gas wells.⁵⁵

Pneumatics: Colorado rules require low-bleed pneumatic controllers to be used unless a site has access to electricity, in which case no-bleed controllers must be used.⁵⁶ More stringent inspection requirements for pneumatic controllers apply within the Front Range Ozone Non-Attainment Area. Operators of natural gas-driven pneumatic pumps located at a well production facility must reduce VOC emissions by 95% and conduct annual visual inspections and repair defects or leaks.⁵⁷

Storage Vessels: Depending on the volume of emissions, Colorado requires methane emissions from both new and existing storage vessels to be controlled by 95% to 98%.⁵⁸

Liquids Unloading: Venting is permitted during liquids unloading only if other best management practices to eliminate emissions are unsuccessful. Someone must be present on site throughout the duration of the unloading event.⁵⁹

LDAR: LDAR is required for new and existing well production facilities and compressor stations. Inspection frequency varies based on actual emissions and is conducted no less than quarterly for compressor stations and as infrequently as once over the lifespan of a well production facility. The requirements include a 50ppm repair threshold and a first attempt at repairs must be made within five days.⁶⁰

Waste Minimization Plans: Operators are not required to submit plans identifying how they intend to limit waste prior to receiving approval to drill.

52 Colorado Air Quality Control Commission (AQCC), Regulation No. 7, XVII.G

53 Colorado Oil and Gas Conservation Commission (COGCC) Rule 912.

54 COGCC Rule 912.

55 COGCC Rule 805

56 AQCC Reg. 7.XVIII

57 AQCC Reg. 7.XII.K

58 AQCC Reg. 7, XVII.G; See also Reg. 7, XII.L

59 AQCC, Reg. 7, XVII.H

60 AQCC, Reg. 7, XVII.F



Montana

Percent of 2017 federal onshore production:

Oil: 1.5% Gas: < 1%⁶¹

Population within ½ mile of active oil & gas facilities:

11,000 people

Federal Gas Wasted (2008-2017):

21,048,878 Mcf⁶²

*The amount of natural gas wasted from federal lands in Montana over the past decade is roughly equal to the amount of natural gas required to meet the consumption needs of all of Montana households for an entire year.*⁶³

Value of Wasted Gas (2008-2017):

\$111,572,692

Montana has some of the weakest natural gas waste and methane regulations in the country. Paired with increased federal leasing - almost 100 new leases were issued in 2017 compared to only 6 in 2016 - and the repeal of the BLM rule, natural gas waste is likely to continue. For Montanans this means less royalty revenue and increased pollution. At this time, state regulations in Montana are insufficient to meet the BLM's statutory obligations to the public.

Current State Requirements:

Venting Prohibition: There is no prohibition on venting. Operators may vent up to 20 Mcf per day of gas for 72 hours, after which excess gas must be burned unless authorized by the state.⁶⁴

Gas Capture Targets/Flaring Limits: For the first 60 days following production testing operators may flare associated gas in unlimited quantities. Following the 60-day test period, operators are allowed to flare up to 100 Mcf/day/well but can seek a variance from this limit.⁶⁵

Measurement and Reporting: Montana does not require operators to measure and report the volume of associated gas vented and flared.

Drilling and Completions: There are no emission reduction requirements for drilling or completion activities.

Pneumatics: There are no waste minimization requirements for pneumatic pumps and controllers.

Storage Vessels: Storage tanks greater than 65,000 gallons must have a control device. VOC vapors greater than 500 british thermal units per standard cubic foot from oil and condensate storage tanks with the potential to emit 15 tpy of VOCs or more must be captured and routed to a gas pipeline, captured and routed to emissions minimizing technology, or to a flare.⁶⁶

Liquids Unloading: There are no explicit limits on venting during liquids unloading. Emissions may be limited by more general venting restrictions.⁶⁷

LDAR: Leak detection and repair inspections using sight, sound or smell must be conducted monthly at oil and gas well facilities. There is no requirement to use optical gas imaging and there is no repair threshold identified.⁶⁸

Waste Minimization Plans: Operators are not required to submit plans identifying how they intend to limit waste prior to receiving approval to drill.

⁶¹ Federal production figures are self-reported to ONRR by producers. Percentages were calculated by comparing federal onshore production by state to total federal onshore production. Raw data can be found here: <https://revenuedata.doi.gov/downloads/federal-production>

⁶² Wasted gas figures are for federal leases only, it does not include gas lost from tribal leases. The data is self-reported to ONRR by operators as "lost gas". Reliance on self-reported data has a number of obvious weaknesses and the totals reported here should be viewed as highly conservative. A review of ONRR data has often revealed implausibly low reported volumes in many states, and inexplicable swings in reported volumes from one year to the next.

⁶³ Figures were calculated by comparing the total volume of federal wasted gas from 2008-2017 to average residential consumption of natural gas by household for each state. Based on data from EIA: https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm; AGA: <https://www.aga.org/research/data/energy-consumption> and the US Census Bureau: <https://www.census.gov/quickfacts/geo/chart/US/PST045217>

⁶⁴ Montana Administrative Rules (MAR) 36.22.1221

⁶⁵ MAR 36.22.1220

⁶⁶ MAR 17.8.324 see also MAR 17.8.1603

⁶⁷ MAR 36.22.1219 and 1221

⁶⁸ MAR 17.8.1604

New Mexico

Percent of 2017 federal onshore production:

Oil: 46% Gas: 25%⁶⁹

Population within ½ mile of active oil & gas facilities:

138,000 people

Federal Gas Wasted (2008-2017):

86,619,392 Mcf⁷⁰

The total amount of natural gas wasted from federal lands in New Mexico over the past decade is more than the amount of natural gas consumed by the entire New Mexico residential sector for over 2-1/2 years.⁷¹

Value of Wasted Gas (2008-2017):

\$322,453,063

More methane is wasted from oil and gas production on federal and tribal lands in New Mexico - 570,000 tons annually - than any other state.⁷² In fact, between \$182 and \$244 million worth of natural gas is wasted each year, causing taxpayers to lose out on as much as \$27 million in tax and royalty revenues annually.⁷³ This is enough natural gas to meet the annual heating and cooking needs of every home in the state.

Moreover, this waste is likely to continue or even increase as the Permian oil and gas basin (located in the southeast portion of the state) has become one of the fastest growing oil plays in the country. From 2009 to 2013 flared volumes rose a staggering 2,255%.⁷⁴ Meanwhile, federal producing acreage in the state has continued to grow, increasing by almost 1 million acres since 2011.

The rampant waste of federal gas in New Mexico is indicative of a high producing state with inadequate waste prevention standards. Given the lack of state protections and the high rates of production, the repeal of the BLM rule will disproportionately impact New Mexicans, causing them to lose out on important royalty revenues. It also illustrates the serious need for statewide action.

69 Federal production figures are self-reported to ONRR by producers. Percentages were calculated by comparing federal onshore production by state to total federal onshore production. Raw data can be found here: <https://revenue.data.doi.gov/downloads/federal-production>

70 Wasted gas figures are for federal leases only, it does not include gas lost from tribal leases. The data is self-reported to ONRR by operators as "lost gas". Reliance on self-reported data has a number of obvious weaknesses and the totals reported here should be viewed as highly conservative. A review of ONRR data has often revealed implausibly low reported volumes in many states, and inexplicable swings in reported volumes from one year to the next.

71 Figures were calculated by comparing the total volume of federal wasted gas from 2008-2017 to average residential consumption of natural gas by household for each state. Based on data from EIA: https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm; AGA: <https://www.aga.org/research/data/energy-consumption> and the US Census Bureau: <https://www.census.gov/quickfacts/geo/chart/US/PST045217>

72 McVay, Renee and Hull, Hillary. "Oil and Gas Methane Emissions in New Mexico" (2017). Available at: <https://www.edf.org/sites/default/files/new-mexico-methane-analysis.pdf>

73 Ibid

74 U.S. Bureau of Land Management. (2016). Regulatory Impact Analysis for: Revisions to 43 CFR 3100 (Onshore Oil and Gas Leasing) and 43 CFR 3600 (Onshore Oil and Gas Operations) Additions of 43 CFR 3178 (Royalty-Free Use of Lease Production) and 43 CFR 3179 (Waste Prevention and Resource Conservation). p.202

Current State Requirements:

Venting Prohibition: Operators are not prohibited from venting gas.

Gas Capture Targets/Flaring Limits: The state has no gas capture targets. Flaring is permitted in unlimited quantities for the first 60 days following completion. Exceptions to flare and vent beyond 60 days may be granted by the Oil Conservation Division.⁷⁵

Measurement and Reporting: New Mexico only requires operators to meter and report casinghead gas produced and sold, gas that is used on site may be estimated.⁷⁶ Regulations explicitly state that flared gas does not need to be measured except for that gas which is flared prior to connection to a gathering line. Recently, Senate Memorial 102 established a pilot program requiring operators to report the volume of flared, vented and leaked gas. However, these requirements have not been formally adopted by the state or made permanent in any way.

Drilling and Completions: There are no emission reduction requirements for drilling or completion activities.

Pneumatics: New Mexico has no state requirement to minimize emissions from pneumatic pumps or controllers.

Storage Vessels: Some operators are required to equip storage tanks with a method or device to minimize hydrocarbon loss to the atmosphere. The requirements are dictated by throughput, the presence of hydrogen sulfide and the facility's proximity to a municipality.⁷⁷

Liquids Unloading: There are no explicit emission reduction requirements for liquids unloading.

LDAR: New Mexico has no LDAR requirements for oil and gas production facilities or compressor stations.

Waste Minimization Plans: While not a formal regulation, the state has created a Notice to Operators requiring gas capture plans to be submitted with all APDs.⁷⁸

75 NMAC 19.15.18.12

76 New Mexico Administrative Code (NMAC) 19.15.18.11

77 NMAC 20.2.38

78 NM OCD Notice to Operators April 8, 2016

North Dakota

Percent of 2017 federal onshore production:

Oil: 18% **Gas: 2%**⁷⁹

Population within ½ mile of active oil & gas facilities:

11,300 people

Federal Gas Wasted (2008-2017):

55,559,195 Mcf⁸⁰

*The total amount of natural gas wasted from federal lands in North Dakota over the past decade is more than the amount of natural gas consumed by the entire North Dakota residential sector over 5 years.*⁸¹

Value of Wasted Gas (2008-2017):

\$257,913,769

North Dakota ranks second only to New Mexico in natural gas waste from public lands and accounts for 25% of total reported gas lost from federal lands between 2007 and 2016.⁸² While the BLM modeled its flaring reduction targets off of North Dakota's rules, those restrictions do not apply statewide and North Dakota still has a number of regulatory gaps when it comes to addressing methane waste.

Current State Requirements:

Venting Prohibition: All associated oil well gas must be flared.⁸³

Gas Capture Targets/Flaring Limits: Operators may flare associated gas for the first year with no restrictions and are only required to limit flaring by 60%, however exemptions can be granted.⁸⁴ Those operating in the Bakken Pool may vent or flare for up to 90 days, after which operators must meet stringent gas capture percentage goals.⁸⁵

Measurement and Reporting: The estimated amount of associated oil well gas flared must be reported monthly.⁸⁶

Drilling and Completions: There are no venting or flaring restrictions during drilling and completion activities.

Pneumatics: Pneumatic pumps located at production facilities in the Bakken must be controlled.⁸⁷ North Dakota has no requirements for pneumatic controllers.

Storage Vessels: North Dakota imposes routine inspection and maintenance requirements for storage vessels outside of the Bakken.⁸⁸ For those storage vessels located at production facilities in the Bakken Pool operators must control emissions by 90%-98% depending on throughput.⁸⁹

Liquids Unloading: There are no emission control requirements for liquids unloading.

LDAR: There are no LDAR requirements for well production facilities.

Waste Minimization Plans: Gas capture plans required with applications for permits to drill in the Bakken only.⁹⁰

⁷⁹ Federal production figures are self-reported to ONRR by producers. Percentages were calculated by comparing federal onshore production by state to total federal onshore production. Raw data can be found here: <https://revenue.data.doi.gov/downloads/federal-production>

⁸⁰ Wasted gas figures are for federal leases only, it does not include gas lost from tribal leases. The data is self-reported to ONRR by operators as "lost gas". Reliance on self-reported data has a number of obvious weaknesses and the totals reported here should be viewed as highly conservative. A review of ONRR data has often revealed implausibly low reported volumes in many states, and inexplicable swings in reported volumes from one year to the next.

⁸¹ Figures were calculated by comparing the total volume of federal wasted gas from 2008-2017 to average residential consumption of natural gas by household for each state. Based on data from EIA: https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm; AGA: <https://www.aga.org/research/data/energy-consumption> and the US Census Bureau: <https://www.census.gov/quickfacts/geo/chart/US/PST045217>

⁸² Ibid. See also: Taxpayers for Common Sense. "Gas Giveaways: Methane Losses are a Bad Deal for Taxpayers" (2018). Available at: <https://www.taxpayer.net/wp-content/uploads/2018/04/TCS-Report-Gas-Giveaways-April-2018.pdf>

⁸³ North Dakota Administrative Code (NDAC) 43-02-03-45

⁸⁴ North Dakota Century Code (NDCC) 38-08-06.4

⁸⁵ North Dakota Industrial Commission Order 24665 Policy/Guidance Version 102215; Available at: <https://www.dmr.nd.gov/oilgas/GuidancePolicyNorthDakotaIndustrialCommissionorder24665.pdf>

⁸⁶ NDAC 43-02-03-45

⁸⁷ North Dakota Department of Health – Division of Air Quality, "Air Pollution Control Permitting and Compliance Guidance for Bakken Pool Oil and Gas Production Facilities" Available at: https://deq.nd.gov/publications/AQ/policy/PC/20110502-OilGas_Permitting_Guidance.pdf

⁸⁸ NDCC 33-15-20-04

⁸⁹ North Dakota Department of Health – Division of Air Quality, "Air Pollution Control Permitting and Compliance Guidance for Bakken Pool Oil and Gas Production Facilities" Appendix D.

⁹⁰ North Dakota Industrial Commission Order 24665 Policy/Guidance Version 102215

Utah

Percent of 2017 federal onshore production:

Oil: 4.7% **Gas: 5.9%**⁹¹

Population within ½ mile of active oil & gas facilities:

14,800 people

Federal Gas Wasted (2008-2017):

6,414,572 Mcf⁹²

The amount of natural gas wasted from federal lands in Utah over the past decade is roughly equal to the amount of natural gas required to meet the consumption needs of 86,976 average Utah households for an entire year.⁹³

Value of Wasted Gas (2008-2017):

\$25,311,531

Utah faces growing air quality concerns. High ozone levels, largely attributable to increased emissions from the oil and gas and transportation sectors, continue to plague the Salt Lake City metropolitan area and the northeast corner of the state more generally. Poor natural gas waste and methane emission standards have exacerbated these issues at the same time the urban centers in the state are seeing rapid population growth. Without the BLM rule, waste will continue at existing federal oil and gas facilities impairing air quality and threatening the state's residents.

Current State Requirements:

Venting Prohibition: Utah has no prohibition on the venting of associated oil well gas. However, a venting prohibition has been proposed by the Department of Air Quality (DAQ).

Gas Capture Targets/Flaring Limits: Up to 1,800 MCF of oil well gas may be vented or flared from an individual well on a monthly basis at any time without approval. Operators may vent and flare oil well gas in excess of these limits with the approval of the Board of Oil, Gas and Mining. Unlimited, short-term or unavoidable venting and flaring of oil well gas and gas well gas is permitted once a well has been completed in emergency situations.⁹⁴

Measurement and Reporting: Operators must report the volume of gas produced and any unauthorized venting, flaring or waste of gas in excess of 50Mcf when it is considered a "reportable event".⁹⁵

Drilling and Completions: There is no prohibition of venting or flaring during well drilling or completions and no requirement to use reduced-emission (or green) completions. Operators may vent or flare as much oil well gas or gas well gas as necessary during production testing and up to 3,000 MCF per well in the month following testing.⁹⁶

Pneumatics: Utah requires the use of low-bleed pneumatic controllers for both new and existing facilities unless gas vented from new controllers is routed to a process unit or flare.⁹⁷ Emissions from pneumatic pumps must be routed to a process unit or flare.⁹⁸

Storage Vessels: Emissions from a storage vessel located at a well site must be routed to a process unit or control device if throughput exceeds 8,000 barrels/year of oil or 2,000 barrels/year of condensate. Storage vessels with VOC emissions less than 4tpy are exempt.⁹⁹ Storage tanks at new wells with VOC emissions of at least 4tpy must control emissions by 95%.

Liquids Unloading: Gas may be vented or flared from a well during well unloading for 24 hours or a maximum of 144 hours per month.¹⁰⁰

LDAR: LDAR is required only at new facilities with high rates of production and the frequency of inspections vary based on past performance (which we know to be a poor indicator of future leak potential, but must be conducted semi-annually at a minimum.)¹⁰¹

Waste Minimization Plans: Operators are not required to submit plans identifying how they intend to limit waste prior to receiving approval to drill.

⁹¹ Federal production figures are self-reported to ONRR by producers. Percentages were calculated by comparing federal onshore production by state to total federal onshore production. Raw data can be found here: <https://revenue.data.doi.gov/downloads/federal-production>

⁹² Wasted gas figures are for federal leases only, it does not include gas lost from tribal leases. The data is self-reported to ONRR by operators as "lost gas". Reliance on self-reported data has a number of obvious weaknesses and the totals reported here should be viewed as highly conservative. A review of ONRR data has often revealed implausibly low reported volumes in many states, and inexplicable swings in reported volumes from one year to the next.

⁹³ Figures were calculated by comparing the total volume of federal wasted gas from 2008-2017 to average residential consumption of natural gas by household for each state. Based on data from EIA: https://www.eia.gov/dnav/ng/ng_cons_sum_dcunus_a.htm; AGA: <https://www.aga.org/research/data/energy-consumption> and the US Census Bureau: <https://www.census.gov/quickfacts/geo/chart/US/PST045217>

⁹⁴ Utah Administrative Code (UAC) R649-3-20

⁹⁵ R649-3-32

⁹⁶ R649-3-20

⁹⁷ R307-502; See also Utah General Approval Order (GAO) for a Crude Oil and Natural Gas Well Site and/or Tank Battery, Issued June 5, 2014. Available at: <https://daq.utah.gov/legacy/permits/general-approval-orders/docs/2014/6June/DAQE-AN149250001-14.pdf>

⁹⁸ Utah General Approval Order (GAO) for a Crude Oil and Natural Gas Well Site and/or Tank Battery, Issued June 5, 2014.

⁹⁹ R307-506

¹⁰⁰ R649-3-20

¹⁰¹ R307-509

Wyoming

Percent of 2017 federal onshore production:

Oil: 20.3% **Gas: 43%**¹⁰²

Population within ½ mile of active oil & gas facilities:

18,000 people

1,700 students¹⁰³

Federal Gas Wasted (2008-2017):

17,682,337 Mcf¹⁰⁴

The amount of natural gas wasted from federal lands in Wyoming over the past decade is enough to cover the natural gas use of all of Wyoming households for just under 1.5 years.¹⁰⁵

Value of Wasted Gas (2008-2017):

\$65,418,927

Wyoming is the largest producer of federal natural gas and the second largest producer of federal oil. While the state has made strides to address natural gas waste, it still ranks third in total wasted gas from public lands.¹⁰⁶ Despite the state's efforts, many of the most stringent standards only apply to facilities located in the Upper Green River Basin (UGRB) including LDAR requirements and requirements to limit emissions from pneumatic controllers, pumps and storage vessels. This has resulted in a significant loss of taxpayer revenue but also means that any statewide efforts to reign in emissions will have an outsized impact compared to other states. Without the 2016 rule, a large number of facilities would be regulated under comparatively lax standards.

¹⁰² Federal production figures are self-reported to ONRR by producers. Percentages were calculated by comparing federal onshore production by state to total federal onshore production. Raw data can be found here: <https://revenue.data.doi.gov/downloads/federal-production>

¹⁰³ Population figures are based on data compiled in the "Oil and Gas Threat Map". For a description of the methodology employed please see: <https://oilandgasthreatmap.com/about/data>

¹⁰⁴ Wasted gas figures are for federal leases only, it does not include gas lost from tribal leases. The data is self-reported to ONRR by operators as "lost gas". Reliance on self-reported data has a number of obvious weaknesses and the totals reported here should be viewed as highly conservative. A review of ONRR data has often revealed implausibly low reported volumes in many states, and inexplicable swings in reported volumes from one year to the next.

¹⁰⁵ Figures were calculated by comparing the total volume of federal wasted gas from 2008-2017 to average residential consumption of natural gas by household for each state. Based on data from EIA: https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm; AGA: <https://www.aga.org/research/data/energy-consumption> and the US Census Bureau: <https://www.census.gov/quickfacts/geo/chart/US/PST045217>

¹⁰⁶ "Natural Gas Waste Map" The Wilderness Society. Available at: <https://wilderness.org/natural-gas-waste-map>

Current State Requirements:

Venting Prohibition: There is no prohibition on venting gas.

Gas Capture Targets/Flaring Limits: Operators may flare up to 60Mcf and vent up to 20Mcf of oil well gas per day, per well. The state may grant authorization for an operator to flare up to 250Mcf/day (or up to 45Mmcf total) for up to 180 days following production testing. Oil and Gas Conservation Commission approval is required for authorization to flare in excess of 45 MMCF or 180 days.¹⁰⁷

Measurement and Reporting: Duration and estimate volumes of gas vented or flared must be reported monthly.¹⁰⁸

Drilling and Completions: Venting and flaring is permitted during all drilling and well testing. Reduced-emission or "green completions" are required for all oil and gas wells.

Pneumatics: In the UGRB pneumatic controllers must be low-bleed, no-bleed, or gas must be routed to a closed loop system or flare capable of reducing emission by 98%. Pneumatic controllers must be routed to a closed loop system or flare capable of reducing emission by 98%.¹⁰⁹ Statewide requirements to control emissions from pneumatic pumps and controllers only apply to new and modified facilities.¹¹⁰

Storage Vessels: All new and existing storage tanks located in the UGRB with VOC emissions greater than 4tpy must reduce emissions by 98%.¹¹¹ Statewide, new and modified storage tanks with VOC emission greater than 6tpy must reduce emissions by 98% (no requirements for existing storage tanks).¹¹²

Liquids Unloading: Personnel must be on site during all unloading events. However, unlimited quantities of gas may be vented or flared during liquids unloading.¹¹³

LDAR: LDAR is required for production facilities and compressor stations with VOC emissions greater than 4tpy located in the UGRB. Inspections must be conducted quarterly but there is no repair threshold.¹¹⁴ Importantly, the state is now likely to expand these requirements statewide. This is a significant opportunity for the state to reign in natural gas waste.

Waste Minimization Plans: Operators must submit a gas capture plan along with any application to flare. Applications to flare are only required if operators are requesting to flare in excess of the established limits.¹¹⁵

¹⁰⁷ Wyoming Oil and Gas Conservation Commission Rules, Chapter 3, Section 39

¹⁰⁸ Wyoming Oil and Gas Conservation Commission Rules, Chapter 3, Section 39

¹⁰⁹ Wyoming Department of Environmental Quality Rules, Chapter 8, Section 6.e-f

¹¹⁰ Wyoming Department of Environmental Quality, Oil and Gas Facilities, Chapter 6, Section 2, Permitting Guidance (May 2016). Available at: <http://deq.wyoming.gov/media/attachments/Air%20Quality/New%20Source%20Review/Guidance%20Documents/5-12-2016%20Oil%20and%20Gas%20Guidance.pdf>

¹¹¹ Wyoming Department of Environmental Quality Rules, Chapter 8, Section 6.c

¹¹² Wyoming Department of Environmental Quality, Oil and Gas Facilities, Chapter 6, Section 2, Permitting Guidance.

¹¹³ Wyoming Oil and Gas Conservation Commission Rules, Chapter 3, Section 39

¹¹⁴ Wyoming Department of Environmental Quality Rules, Chapter 8, Section 6.g

¹¹⁵ Wyoming Oil and Gas Conservation Commission Rules, Chapter 3, Section 39