Notes & Comments

Flames, Fixes, and the Road Forward: The Waste Prevention Rule and BLM Authority to Regulate Natural Gas Flaring and Venting

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INTRODUCTION

The Bureau of Land Management ("BLM") finalized its Waste Prevention, Production Subject to Royalties, and Resource Conservation Rule ("Waste Prevention Rule" "BLM Methane Rule," or "Rule") in November 2016. The stated purpose of the Rule is "to implement and carry out the purposes of statutes relating to prevention of waste from Federal and Indian (other than Osage Tribe) leases, conservation of surface resources, and management of the public lands for multiple use and sustained yield."[1] The Waste Prevention Rule aims to achieve these goals by limiting the flaring and venting of natural gas[2] by imposing certain prohibitions, as well as capture and royalty requirements on avoidably lost

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[1] Waste Prevention and Resource Conservation, 43 C.F.R. § 3179.1 (2017).

[2] The terms "natural gas" and "gas" are treated synonymously in this Note and used predominantly to refer to associated gas, discussed in Section I.C, infra.

gas, with limited exceptions.[3] The Rule went into effect on January 17, 2017, only three days before Donald Trump's inauguration.[4]

The Waste Prevention Rule generated a significant amount of attention in both the legal and political arenas. Only hours after the Rule was announced, a lawsuit was filed which resulted in multi-state litigation challenging the BLM's authority to act.[5] The Rule drew political challenge when the Republican House of Representatives voted in favor of using the Congressional Review Act ("CRA") to rescind the Rule, less than three weeks after it had gone into effect.[6] Many anticipated that the Senate would follow the House's lead and make the rescission final, and, per the CRA, prohibit the BLM from enacting any rule or regulation that is "substantially the same."[7] However, a closely divided Senate refused to overturn the Rule using the CRA.[8] Still, the Rule's future is uncertain. Shortly after the Senate failed to rescind the Waste Prevention Rule pursuant to the CRA, President Trump signed an Executive Order specifically targeting the Rule, among other late-term Obama regulations.[9] The Order called for a review of the Waste Prevention Rule, and "if appropriate," its suspension, revision, or rescission.[10] The Department of the Interior ("Interior") responded less than three months later by postponing the Rule's compliance dates indefinitely, "in light of the

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3 See 43 C.F.R. Subpt. 3179 (2017).

4 43 C.F.R. § 3179.1 (2017).

5 See Wyoming v. U. S. Dept. of the Interior, No. 2:16-CV-0280-SWS, 2017 WL 161428 (D. Wyo. Jan. 16, 2017).

6 Sarah G. Vilms & Mallory A. Richardson, Resolution Repealing BLM's Planning 2.0 Rule Sent to President; Vote on Rescinding Methane Rule Put on Hold, THE NAT. L. REV. (March 13, 2017), http://www.natlawreview.com/article/resolution-repealing-blm-s-plan ning-20-rule-sent-to-president-vote-rescinding.

7 5 U.S.C. § 801(b)(2) (2012); Vilms & Richardson, supra note 6.

8 Alan Septoff, Senate Votes to Keep BLM Methane Rule Intact to Protect Taxpayers and Public Health, EARTHWORKS (May 10, 2017), https://www.earthworksaction.org /media/detail/senate_votes_to_keep_blm_methane_rule_intact_to_protect_taxpayers_and _publi#.WTbBJhPytn4. The Republican-controlled Senate vote was 51-49, in favor of the Waste Prevention Rule. Id.

9 See Presidential Executive Order on Promoting Energy Independence and Economic Growth, The White House (Mar. 28, 2017), https://www.whitehouse.gov/the-press-office/2017/03/28/presidential-executive-order-promoting-energy-independence-and-economi-1 [hereinafter Trump Climate E.O.].

10 Id. The executive order purports to target "regulations that potentially burden the development or use of domestically produced energy resources . . ." Id.

regulatory uncertainty created by the pending litigation and the ongoing administrative review."[11]

Interior's decision to postpone the Rule was then challenged in court by California, New Mexico, and a number of conservation groups.[12] These challengers alleged that Interior, in issuing the postponement order, violated the Administrative Procedure Act ("APA") by postponing a rule that had already gone into effect.[13] Because Interior failed to commence a new rulemaking prior to postponing the Rule, and also failed to provide for a notice-and-comment period before issuing the postponement order, the United States District Court for the Northern District of California held for the challengers on summary judgment.[14] This decision effectively revived the Waste Prevention Rule by vacating Interior's postponement order.[15] In addition, the ruling mandated the BLM and Interior to either implement the Rule, or to follow the APA's procedures before postponing or otherwise altering the Rule.[16] Following the Waste Prevention Rule's revival, reports immediately emerged that President Trump's Interior Department was in the process of working on a new rulemaking proposal to weaken or otherwise delay key provisions of the Rule.[17]

The purpose of this Note is to analyze the Waste Prevention Rule generally, its necessity, and the BLM's authority to regulate natural gas flaring and venting as waste. This Note begins with a brief discussion of the basics of natural gas and its production in Part I, before turning to the factors, which lead to gas flaring and venting, discussed in Part II. Part III analyzes the BLM's previous regulatory approach in this area. Part IV then details the key provisions of the Waste Prevention Rule, and discusses relevant federal law authorizing the BLM's regulatory authority over natural gas waste. Principles of waste and their potential application to natural gas flaring and venting are also analyzed in Part IV. Part V explores state regulatory schemes for flaring and venting, as well as the

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11 82 Fed. Reg. 27,430, 27,430-31. (June 15, 2017) [hereinafter postponement order].

12 See California v. U. S. Bureau of Land Mgmt., No. 17-CV-03804-EDL, 2017 WL 4416409, at *1 (N.D. Cal. Oct. 4, 2017) (order granting plaintiffs' motions for summary judgment).

13 Id.

14 Id. at *14.

15 Id.

16 Id.

17 See Nicholas Iovino, Methane Ruling Faces Uphill Battle at Interior Dep't, COURTHOUSE NEWS (Oct 5, 2017), https://www.courthousenews.com/interior-department-likely-trump-courts-methane-ruling/ (discussing the Trump administration's plan to publish a new proposed rule which would postpone the Waste Prevention Rule until further notice).

Waste Prevention Rule's challenges. Finally, Part VI analyzes and discusses the necessity of the Rule as a regulatory mechanism for preventing the unreasonable waste of natural gas.

I. NATURAL GAS BASICS

A. What Is Natural Gas?

In order to understand the market forces contributing to natural gas flaring and venting, a brief discussion of oil and gas production is necessary. Natural gas is principally methane (CH4), with some ethane (C2H6) and propane (C3H8), and impurities such as carbon dioxide (CO2), hydrogen sulfide (H2S), and nitrogen (N2).[18] Natural gas is odorless and colorless, and the smell that we associate with the burning gas of a stovetop, is due to an odorization process for safety and leak detection purposes.[19] As a fossil fuel, natural gas forms from the decaying remains of pre-historic plant and animal life, deep beneath the earth's surface over millions of years.[20] Although the rise in commercial use of natural gas is relatively recent, there has been knowledge of naturally occurring gas since ancient times. Around 500 B.C., the Chinese began using crude bamboo pipelines to transport gas that seeped to the surface, using it to boil sea water to make the water potable.[21] Today, natural gas is a vital component of the nation's energy supply.[22]

Of the available fossil fuels used today for electric power generation—coal, oil, and natural gas—natural gas emits the lowest amount of CO2 when combusted.[23] For decades, coal, which produces roughly double the CO2 per unit of energy produced,[24] dominated and served as the primary resource for electric generation in the United

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18 Natural Gas, AMERICAN CHEMICAL SOC'Y, http://www.ems.psu.edu/~pisupati/ACSOutreach/Natural_Gas.html (last visited Mar. 18, 2017).

19 Id.

20 Id.

21 A Brief History of Natural Gas, AMERICAN PUB. GAS ASS'N, http://www.apga.org/apgamainsite/aboutus/facts/history-of-natural-gas (last visited Mar. 18, 2017).

22 Id.

23 EIA, How Much Carbon Dioxide Is Produced when Different Fuels Are Burned?, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/tools/faqs/faq.php?id=73&t=11 (last visited Mar. 18, 2017).

24 Id.

States.[25] Data from the U.S. Energy Information Administration ("EIA") projected 2016 as the first year in history where natural gas exceeded coal as an electric generation resource, as natural gas now powers a third of the country's total electricity.[26] This growth was mainly a market-driven response.[27] Coal has traditionally been available at a lower cost than natural gas; however, advances in directional drilling and hydraulic fracturing have increased the production of natural gas from shale formations.[28] Those advances have eliminated the traditional price gap between coal and gas, and resulted in a growing market share for natural gas-fired electric generation.[29]

Natural gas has other diverse uses and offers many benefits to society. Among the advantages of natural gas include its domestic availability, a relatively established distribution network, improved emissions, and energy security.[30] Today, gas is the primary fuel heating more than half of America's households.[31] This resource can also fuel vehicles and stovetops, heat water, and help power industrial appliances.[32] As a vehicle fuel, the potential of natural gas is high. The traditional barriers to the growth of natural gas as a vehicle fuel have been limited options for vehicles and a shortage of refueling locations.[33] Still, potential remains in this area. Since about half of all households in the United States are supplied with natural gas, in-home refueling options could vastly increase the number of NGVs on the road.[34] The recent growth of natural gas is largely a result of the shale revolution.

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[25] EIA, Natural Gas Expected to Surpass Coal in Mix of Fuel used for U.S. Power Generation in 2016, U.S. ENERGY INFO. ADMIN. (Mar. 16, 2016), https://www.eia.gov/todayinenergy/detail.php?id=25392.

[26] Id.

[27] Id.

[28] Id.

[29] Id.

[30] Natural Gas Benefits and Considerations, U.S. DEPT. OF ENERGY, http://www.afdc.energy.gov/fuels/natural_gas_benefits.html (last visited Mar. 18, 2017).

[31] Uses of Natural Gas, GEOLOGY.COM, http://geology.com/articles/natural-gas-uses/ (last visited Mar. 18, 2017).

[32] Id.

[33] Id.

[34] Natural Gas: A Fuel and a Raw Material, GEOLOGY, http://geology.com/articles/natural-gas-uses/ (last visited Mar. 18, 2017).; see also Natural Gas Vehicles, U.S. DEPT. OF ENERGY, http://www.afdc.energy.gov/vehicles/natural_gas.html (last visited Mar. 18, 2017).

B. The ShaleRevolution

The rise of natural gas is part of a larger resurgence of petroleum production, mainly driven by technological improvements.[35] In the past, the oil and gas industry considered resources locked in tight, impermeable, or "unconventional" formations such as shale, uneconomical to produce.[36] Conventional oil and natural gas deposits occur in permeable sandstone and carbonate reservoirs, which are susceptible to flow through pressure exerted by water.[37] By contrast, unconventional formations are fine-grained sedimentary rocks, usually shale and similar rocks, which are both the source of and the reservoir for the oil and gas.[38] These resources are also called "tight oil formations."[39] The largest and most well-known tight oil formations include the Bakken Formation in North Dakota and Montana, the Eagle Ford Formation in Texas, and the Marcellus Shale Region underlying West Virginia, Pennsylvania, Southern New York and extending into other Eastern states.[40] The recent combination of hydraulic fracturing and horizontal drilling, particularly in tight oil formations, has enabled the United States to significantly increase its domestic production of oil and natural gas.[41] As a result of these improved technologies, tight oil production in North Dakota's Bakken Formation and Texas' Eagle Ford Formation has risen from 0.2 million barrels a day in 2007 to around 3.1 million barrels a day in 2015.[42] Some commentators have deemed this growth "the shale revolution."[43] Aside from an increase in production capacity, the shale revolution has also resulted in economic growth and thousands of new oil and gas industry jobs.[44]

Horizontal drilling and hydraulic fracturing were industry techniques that existed before the shale revolution; it is their application to

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35 MICHAEL RATNER & MARY TIEMANN, CONG. RESEARCH SERV., R43148, AN OVERVIEW OF UNCONVENTIONAL OIL AND NATURAL GAS: RESOURCES AND FEDERAL ACTIONS 4 (2015).

36 Id. at 1.

37 Id. at 2.

38 Id.

39 Id.

40 Id. at 5, 9 n.15.

41 Strauss Center, The U.S. Shale Revolution, UNIV. OF TEXAS AT AUSTIN, https://www.strausscenter.org/energy-and-security/the-u-s-shale-revolution.html (last visited Mar. 18, 2017).

42 CARBON LIMITS AS, IMPROVING UTILIZATION OF ASSOCIATED GAS IN US TIGHT OIL FIELDS 2 (2015) [hereinafter CARBON LIMITS].

43 See Strauss Center, supra note 41.

44 Id.

unconventional shale gas formations that is relatively new.[45] These technologies were first applied to shale gas formations in the mid-2000s.[46] Advances in directional drilling and improvements in hydraulic fracturing techniques both contributed to making shale gas production profitable.[47] Increased oil and gas production as a result of the shale revolution has helped the United States become a net-exporter of natural gas.[48] The United States now produces more dry natural gas than any other country in the world.[49] This increase in production has reduced our dependence on foreign oil imports, and as a result the nation is a significant step closer to energy independence.[50] As recently as 2005, the United States imported 65 percent of its daily oil demand.[51] By 2015, that figure dropped to 28 percent, as domestic oil production reached its highest mark in over 40 years.[52]

C. Associated Natural Gas

This analysis focuses on the flaring and venting of associated natural gas by operators on BLM-administered leases.[53] Associated gas is natural gas that is produced in the process of, or in association with, oil

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45 RATNER & TIEMANN, supra note 35, at 3.

46 Id.

47 Id.

48 Strauss Center, supra note 41.

49 Id.; "dry" gas has a high methane content, such that a higher methane percentage translates into drier gas. Dry gas also refers to what remains after the purification process which removes liquid and nonhydrocarbon impurities. Most of the discussion around natural gas today refers to dry gas, which is used in heating and cooling systems, for electric generation, and as a vehicle fuel. By contrast, "wet" gas generally contains less than 85 percent methane and higher percentages of liquid natural gasses such as butane. These "wet" impurities can be removed during the production process and sold as individual compounds. When burned, both dry and wet gas produce fewer emissions than coal or oil. Natural Gas: Dry vs. Wet, U.S. ENERGY DEV. CORP., http://www.usenergydevcorp.com/media_downloads/Natural%20Gas%20Dry%20Vs%20Wet_050913.pdf (last visited Mar. 27, 2017).

50 Strauss Center, supra note 41.

51 Matt Egan, U.S. energy independence looks 'tantalizingly close', CNN MONEY (Aug. 9, 2016, 12:41 PM), http://money.cnn.com/2016/08/09/investing/us-energy-independence-oil-opec/.

52 Id.

53 Operators operating under a mineral lease agreement with the BLM are referred periodically throughout this analysis as "jurisdictional operators."

production.[54] While many areas where the shale revolution has occurred have wells that are drilled to produce oil, significant amounts of associated natural gases are also produced.[55] During oil production, hydrocarbons are brought to the surface of a well pad and associated gas is separated from the oil and other elements.[56] Compared to the processed natural gas distributed to end-users, associated gas at the point of collection typically contains higher amounts of natural gas liquids.[57] Captured associated gas, however, can be sold and later processed as a commercial product, often resulting in revenues for those who produce and process the gas.[58]

Nonetheless, the promise of this new revenue stream has failed to drastically alter the behavior of wellhead operators.[59] Natural economic incentives tend to work against gas capture, as the value of oil production continues to outpace that of natural gas.[60] When compared to oil, associated gas has lower energy density and value, and is more challenging to store and transport.[61] Traditionally, operators have increasingly focused their efforts on finding the more valuable commodity—oil.[62] In any case, in the process of developing unconventional shale oil, operators have increased the levels of domestic natural gas production beyond the levels seen by drilling for conventional gas alone.[63]

The organic composition of associated gas tends to vary over time and space due to variable operating conditions.[64] Wellhead conditions can also vary throughout the day, as intraday associated gas volumes and

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54 EIA, Definitions, Sources and Explanatory Notes, Natural Gas, U.S. ENERGY INFO. ADMIN, https://www.eia.gov/dnav/ng/TblDefs/ng_enr_nprod_tbldef2.asp (last visited Mar. 18, 2017).

55 CARBON LIMITS, supra note 42, at 6.

56 Id.

57 CARBON LIMITS, supra note 42, at 8.; In other words, gas gathered at a well pad tends to be more "wet" than the gas which exists after processing for pipeline transportation. See U.S. ENERGY DEV. CORP., supra note 49.

58 CARBON LIMITS, supra note 42, at 6.; This means that even associated gas which is "wet" at the point of collection can still be profitable after its processing and removal of natural gas liquids. See U.S. ENERGY DEV. CORP., supra note 49.

59 See Jim Magill, With US focus on shale, associated gas makes up smaller share of total production, S&P GLOBAL PLATTS (Oct. 25, 2013, 5:09 PM EDT/2109), http://www.platts.com/latest-news/natural-gas/houston/with-us-focus-on-shale-associated-gas-makes-up-21738746.

60 Id.

61 CARBON LIMITS, supra note 42, at 8.

62 Magill, supra note 59.

63 Id.

64 CARBON LIMITS, supra note 42, at 16.

pressures can have substantial ranges.[65] These differing associated gas streams can result in a large variation in the composition of captured gas across geographical areas, as the presence of impurities from one well to another may require different levels of treatment in order to create a market-ready product.[66] These factors represent major operational challenges in the effort to reduce flaring and venting with uniform federal standards.

II. NATURAL GAS FLARING AND VENTING

One of the main purposes of the Waste Prevention Rule is to reduce the amount of flaring and venting that occurs on jurisdictional leases. When promulgating the Rule, the BLM noted that available data suggested that natural gas losses were increasing as a result of flaring and venting.[67] The reported volume of flared oil-well associated gas increased over 300 percent from 2009 through 2015.[68] During that time, the BLM received an ever-increasing number of applications to flare or vent associated gas, free of royalty obligations.[69] The following Sections discuss natural gas flaring and venting, their contributing factors, environmental impacts, alternative practices, and the extent to which these practices have occurred on federal and tribal lands.

A. Introduction to Flaring and Venting

Oil and gas production involves several stages, including initial well drilling, wellbore cleaning, production from the well, separation of gathered oil, gas and other liquids, transfer of oil and gas to storage units, and distribution to processing plants.[70] Throughout these processes, operators may flare or vent natural gas for a number of reasons. Flaring is the controlled combustion of organic compounds, often associated gas, by a process in which the gas is piped to and burned in an open flame in open

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65 Id. at 17.

66 Id. at 16.

67 81 Fed. Reg. 83,015 (Nov. 18, 2016).

68 Id. at 83,009.

69 Id. at 83,015.

70 U.S. GOV'T ACCOUNTABILITY OFF., GAO-11-34, FEDERAL OIL AND GAS LEASES 5 (2010) [hereinafter GAO-11-34).

air.[71] The controlled burning of gas through a flare system is a common practice in oil and gas exploration and production operations, both in the United States and abroad.[72] Common flare systems consist of a flare stack and pipes that feed gas to the flare stack.[73] These systems use specially designed burners that are usually elevated, and produce both noise and heat.[74] In elevated systems, gas is fed through a stack anywhere from 30 to over 300 feet tall and combusted at the top of the stack.[75] The flame of a flare stack is exposed to atmospheric conditions such as wind and rain.[76] Efficient combustion—which converts methane and other gas elements into less harmful carbon dioxide—may depend on these atmospheric conditions, but a well-designed flare stack can produce combustion efficiencies in the high 90 percent range.[77] This means that the combustion process of flaring results in less harmful carbon dioxide emissions when compared to the methane emissions caused by venting.

Venting is the controlled release of unburned gases directly into the atmosphere.[78] Operational venting may include releases of gas from pneumatic devices[79] and other equipment controlling gas flow, temperature, and pressure.[80] A related issue is that of "fugitive" emissions—leaks that are totally unaccounted for—that may occur throughout the production, storage, and transportation of natural gas.[81] Although not officially classified as vented gas by the Interior Department, gas lost through fugitive emissions has the same environmental impact as

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71 INT'L ASS'N OF OIL AND GAS PRODUCERS, FLARING & VENTING IN THE OIL & GAS EXPLORATION & PRODUCTION INDUSTRY 1 (2000).

72 See Ohio EPA, Understanding the Basics of Gas Flaring, DIVISION OF AIR POLLUTION CONTROL FACT SHEET, 1 (Nov. 2014), http://www.epa.state.oh.us/Portals/27/oil%20and%20gas/Basics%20of%20Gas%20Flaring.pdf.

73 Id.

74 See EPA AIR POLLUTION CONTROL COST MANUAL, FLARES, EPA/452/B-02-001 Chapter 1 Flares 1–3 (6th ed. 2002), https://www3.epa.gov/ttncatc1/dir1/c_allchs.pdf.

75 EPA, AP-42, Chapter 13.5, at 13.5-1, https://www3.epa.gov/ttn/chief/ap42/ch13/final/C13S05_12-13-16.pdf.

76 Id. at 13.5-1.

77 INT'L ASS'N OF OIL AND GAS PRODUCERS, supra note 71, at 1.

78 Id. at 2.

79 See UNIV. OF TEXAS AT AUSTIN, Methane Emissions from Process Equipment at Natural Gas Production Sites in the United States: Pneumatic Controllers, http://dept.ceer.utexas.edu/methane2/study/docs/UT%20Study%20Pneumatics%20FAQ%20to%20SC.pdf. Pneumatic devises or "controllers" use gas pressure to operate mechanical equipment like valves.

80 GAO-11-34, supra note 70, at 5.

81 Id.

vented gas.[82] Accordingly, for the purposes of this analysis, the discussion of venting includes references to leaks and fugitive emissions, which are addressed by the Waste Prevention Rule.[83]

The industry practices of flaring and venting have been in use for decades.[84] The practices are common during maintenance, well testing, and safety situations, as well as where natural gas cannot be stored, transported, or put to other economic use.[85] As discussed above, oil reserves naturally occur with some amount of associated natural gas. Ideally, that associated gas would be sold to a consumer as a fuel or, alternatively, as a commercial petrochemical.[86] However, natural gas, unlike oil, is not a fuel that is easily transportable.[87] Nevertheless, a significant amount of flaring has historically occurred at well sites that are already connected to gas gathering plants and other downstream infrastructure.[88] Factors contributing to gas flaring at wells connected to downstream infrastructure include pressure imbalances in gas gathering systems, as well as temporary and long-term limitations on gas processing and gathering capacities.[89]

The shale revolution brought extraordinary growth to areas that previously had low pipeline capacity, such as North Dakota's Bakken Formation.[90] Some commentators have argued that, in order to reduce flaring and venting rates effectively, significant new pipeline infrastructure will be needed. Infrastructure projects often depend on obtaining Rights of Way ("ROW") to lay pipelines across multiple properties.[91] The BLM is charged with processing ROW applications when federal or tribal land is involved, and flaring is a common occurrence

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82 See id. at 5 n.14.

83 While gas losses through leaks and fugitive emissions are not technically considered as vented gas by the BLM, those emissions are nonetheless addressed by the Waste Prevention Rule. See id.; 43 C.F.R. § 3179.3 (2017).

84 See INT'L ASS'N OF OIL AND GAS PRODUCERS, supra note 71, at 3.

85 See id.

86 Id. at 2.

87 Id.

88 CARBON LIMITS, supra note 42, at 8.

89 Id. at 8–9.

90 Brydon Ross, Natural Gas Flaring Highlights Infrastructure Needs, Potential Regulatory Gaps, THE COUNCIL OF STATE GOVERNMENTS (Nov. 28, 2012, 5:24 PM), http://knowledgecenter.csg.org/kc/content/natural-gas-flaring-highlights-infrastructure-needs-potential-regulatory-gaps.

91 Flaring, WESTERN ENERGY ALLIANCE, https://www.westernenergyalliance.org/knowledge-center/air/flaring (last visited Mar. 19, 2017).

in the interim while ROW applications are under review.[92] Because many areas lacked sufficient infrastructure to collect and transport natural gas, roughly 35 percent of North Dakota's total natural gas production was flared rather than marketed in 2011.[93]

Venting may be employed by operators as an alternative to flaring, and is also used as a distinct technique for different operational purposes. These purposes include liquid unloading and well purging,[94] maintaining pressure in storage tanks, and operating pneumatic valves—as gas may "bleed" from those valves each time they are turned on or off.[95] Less advanced pneumatic systems, or "high-bleed" systems, may vent gas continuously through these valves.[96] Leaks alone account for the second largest source of vented gas from federal and tribal leases.[97]

Flaring and venting are also employed as safety measures because they can allow for the controlled disposal of excess associated gases during emergencies, power failures, or other interruptions in processing and production.[98] At the wellhead, flaring can be used as a method for disposing of associated gas, and is also common for well testing purposes to determine the types of fluids a well can produce.[99] Flaring is also common at natural gas processing plants, where gases are separated to produce a market-ready product.[100] Alternative practices are available, but they are not always technically, geographically, or economically feasible for operators.[101] Historically, in situations where operators had quantities of associated gas that could not be commercialized, they faced three options: flare the gas, vent the gas, or reinject the gas into an underground storage reservoir.[102] Reinjection is highly dependent on well infrastructure technologies and the geological nature of the formation where the

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92 Id.; see 43 C.F.R. §§ 2800–2809 (2016).

93 Over one-third of natural gas produced in North Dakota is flared or otherwise not marketed, U.S. ENERGY INFO. ADMIN, https://www.eia.gov/todayinenergy/detail.php?id=4030 (last visited Mar. 18, 2017).

94 Well purging refers to a process where venting is used to eject liquids which collect inside the well and slow the flow of oil and gas. GAO-11-34, supra note 70, at 9.

95 See id.

96 Id. at 8–9.

97 81 Fed. Reg. 83,011 (Nov. 18, 2016).

98 What is Flaring, CALIBER PLANNING, https://rfn.caliberplanning.com/index.php?content=faq&section=flaring (last visited Mar. 19, 2017).

99 Id.

100 Id.

101 INT'L ASS'N OF OIL AND GAS PRODUCERS, supra note 71, at ii.

102 Id. at 2.

production occurs.[103] In the absence of a regulatory framework that prohibits flaring and venting, operators arguably still have incentives to devote their capital to oil production, which continues to have higher economic returns.[104]

B. Environmental Impacts

The occasional flaring and venting of natural gas may be a necessary byproduct of the production process, however, the wasted gas has both economic and environmental implications.[105] The oil and gas industry accounts for a substantial amount of the nation's air pollution, and is the nation's largest source of methane pollution.[106] Flaring emits carbon dioxide, while venting releases methane, both of which are greenhouse gases that contribute to climate change.[107] Methane, however, is at least 25 times more potent than carbon dioxide.[108] These greenhouse gases are widely acknowledged to have negative impacts on the environment.[109] Flared and vented gas may also harm local and regional air quality by increasing ground-level ozone levels and contributing to haze and smog.[110] Data collected by the BLM suggests that methane emissions have increased in recent years as a result of venting.[111] The number of operators seeking to flare or vent gas has also increased—from just 50 applications

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103 Id.

104 See Magill, supra note 59.

105 GAO-11-34, supra note 70, at 6.

106 Reducing Methane Pollution on Public Lands: BLM/EPA Waste Rules, WESTERN ENVT'L L. CTR., https://westernlaw.org/safeguarding-climate/reforming-oil-gas-operations/reducing-methane-pollution-public-lands-blm-epa-waste-rules/ (last updated Jan. 17, 2017).

107 GAO-11-34, supra note 70, at 1-2.

108 Press Release, Kimberly Brubeck, Interior Department Announces Final Rule to Reduce Methane Emissions & Wasted Gas on Public, Tribal Lands, BLM (Nov. 15, 2016).

109 See 74 Fed. Reg. 66,496-97 (2009). EPA Greenhouse Gas Endangerment Finding) (declaring that carbon dioxide, methane, and other greenhouse gases in the atmosphere "may reasonably be anticipated to both endanger public health and to endanger public welfare" based on a "body of scientific evidence compellingly support[ing] this finding").

110 CARBON LIMITS, supra note 42, at 2.

111 DEP'T. OF INTERIOR: BUREAU OF LAND MGMT., DOI-BLM-WO-WO2100-2017-0001-EA, ENVIRONMENTAL ASSESSMENT, WASTE PREVENTION, PRODUCTION SUBJECT TO ROYALTIES, AND RESOURCE CONSERVATION, at 5 (Nov. 10, 2016).

in 2005, to 1,248 applications in 2014.[112] A majority of those applications were for flaring in New Mexico, Montana, the Dakotas, and Wyoming.[113]

Flaring and venting have other local and regional impacts. At the community-level, gas flaring and venting can increase health risks including respiratory illnesses and premature death from prolonged exposure to pollutants.[114] Noise and light pollution from flaring has adverse impacts on local residents, who have described flare stacks as sounding like "a jet engine."[115] Noise and light pollution also affect the recreational value of the natural environment.[116] These impacts can affect wildlife species and lead them away from areas where flaring is common, weakening local biodiversity.[117] Environmental Impact Statements filed with the BLM have at times highlighted these wildlife impacts, specifically pointing to modified sage-grouse behavior and habitat-use patterns.[118] Since flaring may occur in a single region for years, these impacts have the potential to persist for extended periods of time.[119]

A recent study of emissions in the Bakken Formation area, conducted by the National Oceanic and Atmospheric Administration ("NOAA"), highlights some of the environmental impacts of flaring and venting. The study featured a specially instrumented plane that gathered regional air quality data, and concluded that Bakken operators were leaking some 275,000 tons of methane per year.[120] After a number of years, methane decays into carbon dioxide in the atmosphere, which then can last for centuries.[121] New data such as the NOAA study have only recently shown

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112 Id.

113 Id.

114 O. Saheed Ismail & G. Ezaina Umukoro, Global Impact of Gas Flaring, 4 ENERGY AND POWER ENGINEERING 290, 292 (2012).

115 DEP'T. OF INTERIOR: BUREAU OF LAND MGMT., supra note 111, at 33.

116 Id. at 34.

117 See id. at 34–35.

118 Id.

119 Id. at 30.

120 John Fialka, Scientists Perfect a Way to Sense Airborne Methane, SCIENTIFIC AMERICAN (Oct. 5, 2016), https://www.scientificamerican.com/article/scientists-perfect-a-way-to-sense-airborne-methane/. The study found "in the skies over the Bakken . . . the equivalent of 1 to 3 percent of the world's estimated emissions of ethane floating over a relatively tiny place." Those emissions have the about the same annual impact as 1.45 million automobiles. Id.

121 Id.

that methane emissions from oil and gas development sources are significantly higher than was previously understood.[122]

A recent California natural gas leak is also illustrative of the environmental impact gas venting can cause. In October 2015, a massive leak was discovered at a natural gas storage facility at Aliso Canyon in California.[123] The leak emitted an estimated 109,000 tons of methane—equivalent to almost ten million tons of carbon dioxide—and vented gas for months before being contained in February 2016.[124] This "mega-leak," which was the largest in United States history, wasted over twenty million dollars' worth of natural gas.[125] Some researchers have concluded that the leak's environmental impacts will be greater than those caused by the 2010 Deepwater Horizon disaster in the Gulf of Mexico.[126] The amount of methane that entered the atmosphere as a result of the Aliso Canyon leak highlights that incidents such as these may negate the clean energy benefits of natural gas when viewed against traditional coal and oil resources. Because leaks have traditionally occurred during the production, processing, and transportation of natural gas, some climate scientists have gone so far as to project that total equivalent carbon dioxide emissions from natural gas may actually surpass those from coal, which is traditionally viewed as the top climate polluting resource.[127] Although this analysis focuses on flaring and venting on federal and tribal lands, it is worth noting that opportunities also exist to modernize the natural gas infrastructure used during processing, transmission, and storage in an effort to reduce overall natural gas system methane emissions.[128]

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122 News Releases, EPA Releases First-Ever Standards to Cut Methane Emissions from the Oil and Gas Sector, EPA (May 12, 2016), https://www.epa.gov/newsreleases/epa-releases-first-ever-standards-cut-methane-emissions-oil-and-gas-sector.

123 California Methane Progress, ENVT'L DEF. FUND, https://www.edf.org/climate/aliso-canyon-leak-sheds-light-national-problem (last visited Mar. 19, 2017).

124 Id.

125 Id.

126 Matt McGrath, California methane leak 'largest in US history', BBC NEWS (Feb. 26, 2016), http://www.bbc.com/news/science-environment-35659947.

127 Bobby Magill, Natural Gas Emissions to Surpass Those of Coal in 2016, CLIMATE CENTRAL (Aug. 30, 2016), http://www.climatecentral.org/news/natural-gas-emissions-surpass-coal-2016-20650.

128 See id.

C. Flaring and Venting Alternatives

While much of the natural gas that is flared and vented is considered unavoidably lost, technologies and practices to capture at least some of this gas do exist and can be economically employed during the production process.[129] Industrial operators have maintained that it is in their interest to minimize the amount of gas flared and vented in order to realize as much value as possible from all hydrocarbons being produced.[130] The goal of minimizing flaring and venting can be achieved through a variety of mechanisms, ranging from marketing initiatives to maintenance strategies and new technologies.[131] There are, however, many challenges to achieving reduced flaring and venting levels. These challenges include large distances to bring associated gas to market, high capital costs to do so, technical concerns, and the fact that there is no federal cost penalty for methane or carbon emissions.[132] Nonetheless, the productive utilization of associated natural gas that is otherwise wasted would reduce adverse environmental impacts, and make more domestic energy resources available for current and future use.[133]

Associated gas flaring and venting takes place at both isolated well sites and those connected to pipeline infrastructure.[134] Accordingly, on-site alternatives can be employed in either situation to help minimize the need to flare or vent gas.[135] To effectively reduce flaring and venting rates, operators must either have access to necessary pipeline or other infrastructure or make use of an on-site utilization technology.[136] The following alternative technologies for utilizing associated gas were identified in a recent report commissioned by Carbon Limits,[137] and have been demonstrated commercially in tight oil formations where large

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129 GAO-11-34, supra note 70, at 19.

130 INT'L ASS'N OF OIL AND GAS PRODUCERS, supra note 71, at ii.

131 Id. at 2.

132 Id. at ii.

133 See CARBON LIMITS, supra note 42.

134 Id. at 8–9.

135 Id. at 29.

136 Id. at 11.

137 Press Release, As Federal Agencies Consider Flaring Restrictions, New Report Highlights Four Affordable, Proven, Scalable Gas Capture Solutions, Clean Air Task Force (Apr. 23, 2015) [hereinafter CATF], http://www.catf.us/newsroom/releases/2015/20150423-CATF_Alternatives_to_Flaring_press_release_FINAL.pdf. Carbon Limits is an international consulting company aimed at reducing emissions in the oil and gas industry.

amounts of flaring occur.[138] These are mature technologies, indicating a process used commercially numerous times, with a procurement time that typically allows for commercial delivery within weeks or months.[139]

Carbon Limits analyzed multiple potential waste reduction and capture technologies and determined that four proven alternatives are the most appropriate to meaningfully reduce flaring and venting levels.[140] These include natural gas liquid ("NGL") recovery, compressed natural gas trucking, gas-to-power at well-sites or other local uses, and gas-to-power for grid usage.[141] Carbon Limits found that these technologies can be utilized at a reasonable cost at a wide range of production sites.[142] It is important to keep in mind that each well site produces different levels of associated gas, and each gas capture and utilization alternative comes with differing levels of capital investment, operating expense, expected revenue, and risk.[143] Regional markets for natural gas and access to infrastructure will also affect these considerations.[144] The technical and economic feasibility of these alternatives may vary and will often depend on the characteristics of the production site.[145] Where feasible, gas reinjection remains an alternative to flaring and can be used to increase pressure within underground oil reservoirs in order to increase production of oil from the reservoir.[146] In any case, implementation of the alternatives noted above would reduce the amount of gas which is lost through flaring and venting, increase the nation's energy independence, create jobs, and promote a cleaner environment.

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138 CARBON LIMITS, supra note 42, at 3.

139 Id.

140 CATF, supra note 137.

141 See id. NGL recovery allows well operators to capture the various gases present in associated gas, which can then be separated and transported as liquids to processing plants for commercial refinement. CNG trucking allows for associated gas, after its capture and compression, to be trucked to processing plants where it can later be moved into pipeline systems for traditional use. Gas-to-power for well-site or local use allows for associated gas to act as power sources for pumps and other operational equipment as an alternate to traditional power sources. The final alternative, gas-to-power for grid use, allows well operators to install a large gas generator on site which can process and wire pipeline quality gas into the local electric grid or to other electric utilities for usage. Id.

142 CARBON LIMITS, supra note 42, at 3.

143 Id. at 18.

144 Id.

145 GAO-11-34, supra note 70, at 7.

146 Aregbe, A.G., Natural Gas Flaring—Alternative Solutions, 5 WORLD J. OF ENGINEERING & TECH. 139, 139–53 (2017), http://file.scirp.org/pdf/WJET_20170228141 81642.pdf.

D. Flaring and Venting Practices on Federal and Tribal Lands

Oil and gas development on federal lands is both a vital part of the nation's energy production and a significant source of revenue for the federal government.[147] Federal revenues from oil and gas production account for one of the largest nontax sources of federal funds.[148] Domestic oil and gas production from nearly 100,000 federal onshore oil and gas leases administered by the BLM accounts for eleven percent of the nation's natural gas supply and five percent of its oil.[149] Estimates as to the exact amount of flaring and venting that has occurred on BLM jurisdictional leases in recent years vary substantially by source. Nonetheless, all sources show that a considerable amount of natural gas is lost during production.[150]

The flaring and venting of natural gas represents the loss of a valuable public resource. Federal and tribal onshore operators reported to the Office of Natural Resources Revenue that they vented 462 billion cubic feet (Bcf) of natural gas between 2009 and 2015, enough gas to serve over 6 million households for a year.[151] In 2014, oil and gas producers on jurisdictional leases (i.e., leases on BLM land) vented around 30 Bcf and flared, at a minimum, 81 Bcf of natural gas.[152] These totals amount to over four percent of the total gas production from BLM leases for 2014.[153] Flaring totals on public lands increased again in 2015, as the BLM estimated that producers flared a minimum of 85 Bcf, an increase in over 100 percent from 2009 levels.[154] Nearly all of the flared gas in these years was associated natural gas from oil wells.[155] Notably, most flaring was routine at wells developing and producing oil, not limited to situations involving exploration, well testing, or emergencies.[156] One report estimated the total volume of flared and vented gas on federal and tribal lands in 2015 at 307 Bcf, representing hundreds of millions of dollars in lost royalties and

147 GAO-11-34, supra note 70, at 1.

148 Id.

149 Waste Prevention, Production Subject to Royalties, and Resource Conservation, 81 Fed. Reg. 83,008, 83,014 (Nov. 18, 2016).

150 Id. at 83,010.

151 Id. at 83,009.

152 Id. at 83,010.

153 Id.

154 Id. at 83,011.

155 Id.

156 Id.

economic value.[157] Some estimates put the total value of flared and vented gas in the United States—including federal, tribal and private lands—at over a billion dollars annually.[158] In terms of their environmental impact, these losses account for around 12 percent of the nation's total methane emissions, stemming solely from federal and tribal lands.[159]

In the context of venting, natural gas waste on jurisdictional leases is also significant. Venting losses from liquid unloading practices in 2014 totaled around 3.2 Bcf on Federal and Indian lands, according to the BLM.[160] The BLM further estimated that about 15 Bcf of natural gas gathered by jurisdictional operators was lost through pneumatic devices in 2014, while nearly 3 Bcf was lost from storage tank venting.[161] The Government Accountability Office ("GAO") found in a 2010 report that roughly forty percent of the natural gas flared or vented by jurisdictional operators could be captured economically with the currently available control technologies discussed above.[162] In sum, routine natural gas flaring and venting are costly practices both environmentally and economically.

III. OTHER APPLICABLE FEDERAL REGULATORY APPROACHES

A. The NTL-4A

i. NTL-4A's Regulatory Approach

The Waste Prevention Rule is not the BLM's first regulatory approach to natural gas flaring and venting. That being said, prior to promulgating the Rule, the BLM had not updated its approach to flaring or venting, or the royalty determinations applicable thereto, for over three decades.[163] Flaring, venting, and other royalty-free uses of gas on federal

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157 ICF Int'l, Onshore Petroleum and Natural Gas Operations on Federal and Tribal Lands in the United States: Analysis of Emissions and Abatement Opportunities (Sept. 16, 2015).

158 CATF, supra note 137, at 1.

159 EDF, Substantial loss of natural gas on public lands, ENVT'L DEF. FUND (Sept. 2015), https://www.edf.org/energy/substantial-loss-natural-gas-public-lands.

160 81 Fed. Reg. 83,012 (Nov. 18, 2016).

161 Id.

162 GAO-11-34, supra note 70, at 19.

163 81 Fed. Reg. 83,009 (Nov. 18, 2016).

and tribal lands were previously governed by guidance titled "Notice to Lessees and Operators of Onshore Federal and Indian Oil and Gas Leases" ("NTL-4A" or "Notice").[164] The NTL-4A was issued by the United States Geological Survey in 1979, and later adopted by the BLM when the agency assumed oversight duties for onshore oil and gas development.[165] The NTL-4A generally prohibited flaring and venting at both gas-wells and oil-wells, unless approval was granted by the BLM.[166] The Notice contained numerous exceptions to the prohibition, and allowed royalty-free flaring and venting in a number of circumstances.[167] Flaring and venting were permitted on a short-term basis, with no royalty liability during well purging, evaluation tests, initial production tests, and routine well tests.[168] Emergency flaring was to be temporary, as operators could flare or vent gas royalty-free for 24 hours per incident, and were limited to 144 cumulative hours of emergency flaring or venting during any calendar month.[169] Under the NTL-4A, there was no limit on the volume of gas an operator could flare or vent, so long as that operator had obtained approval from the BLM.[170]

Under the NTL-4A, area field office supervisors had discretion to determine whether gas losses were "unavoidabl[e]," and royalty-free, or "avoidabl[e]," and subject to royalties.[171] Unavoidably lost gas was defined as gas vapor released from storage tanks or other production vessels, as well as losses from equipment failures, production tests, and emergencies.[172] By contrast, avoidably lost gas was defined as gas lost without prior BLM authorization, as a result of negligence on the part of the lessee, the failure of the lessee to take reasonable measures to prevent

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164 U.S. GOV'T ACCOUNTABILITY OFF., GAO-16-607, NATURAL GAS EMISSIONS ON FEDERAL LANDS 9 (2016) [hereinafter GAO-16-607). The NTL-4A was published by the United States Geological Survey (USGS) in the Federal Register at 44 Fed. Reg. 76,600 (Dec. 27, 1979) [hereinafter NTL-4A]. An electronic version of the NTL-4A can be found on the BLM's webpage, https://www.ntc.blm.gov/krc/uploads/172/NTL-4A%20Royalty%20or%20Compensation%20for%20Oil%20and%20Gas%20Lost.pdf (last visited Mar. 20, 2017).

165 GAO-16-607, supra note 164.

166 Id.

167 Id.

168 NTL-4A, supra note 164, at § III.A-D.

169 Id. § III. A.

170 Id. § IV. B.

171 Id. § IV. B.-C.

172 Id. § II. C.

or control the loss, and the failure of the lessee to comply with applicable lease terms and regulations.[173]

Pursuant to the NTL-4A, operators were required to submit flaring and venting requests to their local field office supervisor in advance to obtain approval for the practices.[174] Approval was based either on a determination that gas losses were unavoidable, or alternatively in the supervisor's discretion, where it appeared that a beneficial use was not economical.[175] Approval was not required during the initial production period of 30 days, or for certain well testing, so long as those losses did not occur over 24 consecutive hours.[176] The NTL-4A also provided that no royalty obligation was incurred where operators made an on-site use of gas, rather than wasting it.[177] Finally, the NTL-4A contained reporting requirements as lessees were required to disclose the total volume of gas they produced, and whether it was sold, avoidably or unavoidably lost, flared or vented, or used on-site.[178]

ii. Implementation Problems

In a 2016 report, the GAO concluded that Interior and the BLM, in applying the NTL-4A's requirements, did not have consistent accounting methods or the necessary information to reasonably ensure that the agencies were minimizing waste by jurisdictional operators.[179] Among other findings, the GAO reported that BLM field offices had approved flaring and venting requests which lacked the requisite documentation under the NTL-4A.[180] The GAO reviewed a random sample of 100 flaring or venting requests made in 2014 and found that roughly ninety percent of those requests lacked documentation required by BLM guidance.[181] The GAO reported that seventy percent of those requests were approved by BLM field offices, and that nearly half of those approvals allowed operators to flare or vent gas royalty-free.[182] The BLM's inconsistencies in applying the NTL-4A went further, as the GAO concluded that BLM

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173 Id. § II. A.

174 Id. § IV. B.

175 Id. § II. B.-C.

176 Id. § III. B.-C.

177 Id. § II. B.

178 Id. § V.

179 GAO-16-607, supra note 164, at 14.

180 Id. at 18.

181 Id. at 5, 21–22.

182 Id. at 23.

field offices were routinely applying different standards in reviewing applications to flare or vent gas.[183] BLM officials in two field offices said that they used their authority under the NTL-4A to charge royalties on flared gas, whereas a third office was considering such action.[184] Three other field offices that the GAO reviewed interpreted BLM guidance as to allow all flared or vented gas in their regions to go royalty-free.[185] In the three decades that have passed since the NTL-4A was issued, oil and gas drilling technologies have improved considerably, leading to an increase in oil and gas production.[186] Numerous production technologies—including hydraulic fracturing and directional drilling, gas capture, and leak detection—have improved dramatically since 1979.[187] However, the American public has not realized the full extent of these technological advances due to the continued prominence of flaring and venting and inconsistencies in applying the NTL-4A's requirements. These findings sent a clear signal to Interior and the BLM that the agencies needed to update regulations in order to clarify the management of flaring and venting.

B. EPA Efforts

The EPA has taken its own steps to limit methane and other emissions from oil and gas sources.[188] The EPA issued subpart OOOO ("quad O") in 2012, a regulation aimed at controlling VOC and other emissions, aside from methane, from new, reconstructed, or modified oil and natural gas sources.[189] In 2016, the agency took additional action to limit oil and gas source emissions.[190] The 2016 regulation—quad Oa—built on quad O by adding requirements to cover additional production equipment and activities.[191] The EPA's stated goal in issuing quad Oa was to cut methane pollution by more than 40 percent in an effort to improve public health and

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183 Id. at 24–26.

184 Id. at 24.

185 Id. at 26.

186 Id. at 2.

187 See id.

188 See 40 C.F.R. § 60.5360 (2016).

189 Id.

190 40 C.F.R. § 60.5360a (2016).

191 ENVTL. PROTECTION AGENCY, EPA'S ACTIONS TO REDUCE METHANE EMISSIONS FROM THE OIL AND NATURAL GAS INDUSTRY: FINAL RULES AND DRAFT INFORMATION COLLECTION REQUEST 1 (2016).

reduce air pollution.[192] However, Trump's EPA has been hostile to the implementation of quad Oa, which has resulted in litigation and uncertainty regarding the rule's future.[193]

Although the BLM conceded that the Waste Prevention Rule is similar to quad Oa, Interior and the BLM worked with the EPA throughout the rulemaking effort for the Waste Prevention Rule in order to ensure that there were no conflicting requirements as between the agencies.[194] It is important to note that the EPA's efforts in this area—now the subject of extensive litigation themselves—affect only new, modified, or reconstructed sources, and not existing operations.[195] Accordingly, quad Oa's capture requirements and leak detection provisions do not apply to existing operators who are not otherwise modifying their equipment.[196] The agencies' actions are also supported by different statutory authorities; the EPA's invoked the Clean Air Act,[197] whereas the BLM's authority to act in the area is under the Mineral Leasing Act.[198]

IV. THE WASTE PREVENTION RULE

A. The Rule's Regulatory Approach

In an effort to clarify regulatory uncertainties regarding implementation of the NTL-4A and reduce the prominence of flaring and venting on federal and tribal lands, the BLM issued the Waste Prevention Rule.[199] The following Sections highlight the key provisions of that Rule, and the challenges that have arisen as a result of its promulgation. The Rule aims to reduce the waste of natural gas from BLM jurisdictional operators, and supersedes the previously-existing regulatory framework

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192 Id.

193 Clean Air Council v. Pruitt, 862 F.3d 1, 4 (D.C. Cir. 2017); see also Travis Hunt & Blake X. Longoria, D.C. Circuit Strikes Down EPA Stay on Key Parts of Quad OA — the 2016 Methane NSPS Rule for the Oil and Gas Industry, LEXOLOGY (Aug. 7, 2017), https://www.lexology.com/library/detail.aspx?g=0fa724ee-dc69-4bdc-a1be-ad055aa38647 (explaining complex procedural history of the quad Oa litigation).

194 Bureau of Land Management, 81 Fed. Reg. 83,027, 83,037 (Nov. 18, 2016); Environmental Protection Agency, 81 Fed. Reg. 35,825 (June 3, 2016).

195 81 Fed. Reg. 83,018 (Nov. 18, 2016).

196 Id.

197 See 42 U.S.C. § 7411 (2012).

198 See 30 U.S.C. § 225 (2012).

199 Waste Prevention and Resource Conservation, 43 C.F.R. § 3179.1 (2017).

under the NTL-4A.[200] The Waste Prevention Rule applies to all federal and tribal (other than Osage Tribe) onshore oil and gas leases.[201] The Rule requires operators to take various steps to reduce natural gas losses, and establishes updated criteria for determining whether flared or vented gas is wasted, and thus subject to royalty payments.[202] The Rule seeks to limit avoidable natural gas waste by requiring operators to capture gas which would otherwise be flared or vented.[203] The Waste Prevention Rule purports to "implement and carry out the purposes of statutes relating to prevention of waste from [jurisdictional] leases, conservation of surface resources, and management of the public lands for multiple use and sustainable yield."[204]

i. Determining Avoidably Versus Unavoidably Lost Gas

In an effort to provide additional guidance to both field offices and operators, the Waste Prevention Rule updated NTL-4A's royalty provisions to more clearly define when gas losses are considered unavoidable and royalty-free, or avoidable and subject to royalties.[205] While retaining the avoidable/unavoidable distinction for gas losses, the Rule eliminates a large amount of discretion by BLM field office supervisors to make case-by-case loss determinations.[206] Gas is considered unavoidably lost only where an operator has taken prudent steps to avoid waste, has complied with other applicable laws, and meets one of 12 explicit exceptions.[207] These exceptions include emergencies; well drilling, completions, and tests; operation of pneumatic and storage devices; liquid unloading; leaks (only when the operator complies with leak detection and repair requirements); and equipment maintenance operations which require pressure changes.[208] The Rule preserves some BLM discretion, as the agency is permitted to make case-by-case determinations where an operator flares gas from a well that is not

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200 Id.

201 For the exact jurisdictional scope of the Waste Prevention Rule, see 43 C.F.R. § 3179.2 (2017).

202 43 C.F.R. §§ 3179.1, 3179.6, 3179.7 (2017).

203 43 C.F.R. § 3179.7 (2017).

204 Id. § 3179.1.

205 Id. §§ 3179.4, 3179.5.

206 43 C.F.R. § 3179.5 (2017); see also Wyoming v. U.S. Dep't of the Interior, No. 2:16–CV–0285–SWS, No. 2:16–CV–0280–SWS, 2017 WL 161428 *1, *3 (D. Wyo. Jan. 16, 2017).

207 See 43 C.F.R. § 3179.4 (2017).

208 Id.

connected to a pipeline.[209] Gas losses which otherwise fail to meet an unavoidable exception, as well as gas flared or vented in violation of capture targets—discussed below—are deemed avoidable and thus subject to royalties.[210] These bright-line distinctions were meant to clarify the NTL-4A's uncertainties and reduce the number of requests for royalty-free flaring which BLM field offices must process.[211]

ii. Routine Flaring Capture Targets

The Waste Prevention Rule adopted capture requirements over volumetric flaring limits, which the BLM described as "two sides of the same coin."[212] According to the agency, increasing the capture of associated natural gas was a primary goal in order to effectively limit waste.[213] The BLM was inspired in part by the research of Carbon Limits on flaring and venting capture alternatives, discussed above.[214] Additionally, capture targets were adopted over fixed flaring limits to better account for the "geographically varying volumes of associated gas."[215] The Rule's capture targets were modeled in part on North Dakota's approach, and adjust over time in an effort to make compliance more feasible and less costly.[216] As promulgated, the Rule provides for a one year grace period before requiring jurisdictional operators to capture at least 85 percent of their total adjusted volume of gas produced monthly, increasing to 90 percent in 2020, 95 percent in 2023, and 98 percent in 2026.[217] The BLM calculates total adjusted volume based on "the quantity of high pressure gas produced from the operator's development oil wells that are in production, adjusted to exempt a specified volume of gas per

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209 Id. § 3179.4(a)(2).

210 Id. § 3179.4(b).

211 81 Fed. Reg. 83,013 (Nov. 18, 2016). See also GAO-16-607, supra note 164, at 25-26 (discussing the processing burdens associated with flaring and venting requests; illustrative is the Dickinson, N.D. BLM Field Office, which faced a backlog of over 2000 flaring requests by the end of August 2015).

212 81 Fed. Reg. 83,011 (Nov. 18, 2016).

213 Id.

214 Id. at 83,029.

215 Id. at 83,025.

216 43 C.F.R. § 3179.7 (2017).

217 The capture requirements were set to begin on January 17, 2018, one year from the original effective date of the Rule. Id. However, because Interior later postponed the Rule's compliance dates, these timeframes may change in the future. See 43 C.F.R. § 3179.7 (2017).

well, which declines over time."[218] As the Rule's gas capture requirements increase with time, this allowable gas exemption decreases.[219] The Rule permits operators to meet capture targets on a lease-by-lease basis, or on an average basis over all their federal or tribal operations.[220] This approach was meant to accommodate operators by giving them different methods for demonstrating compliance with capture requirements. Additionally, the Rule allows the BLM to relax an operator's capture target where the operator demonstrates that meeting the original target would be so costly that the operator would have to cease production.[221] The BLM estimated that these capture targets would reduce flaring by up to 49 percent when compared to 2015 levels.[222]

iii. Venting Prohibition

Venting is prohibited under the Waste Prevention Rule, except in certain express circumstances.[223] Under the Rule, venting is permissible only where flaring is technically infeasible, or where gas is not combustible; when the gas is vented during operation of a gas-activated pneumatic device; when the gas is vented from a storage vessel; during liquid unloading; in emergency situations;[224] and through leaks so long as the operator is complying with the Rule's leak detection and repair ("LDAR") requirements, discussed below.[225] Venting is also permitted during situations of non-routine facility or pipeline maintenance.[226] Several provisions of the Rule require operators to flare gas—rather than vent it—where that gas cannot be captured for a beneficial use.[227]

The Rule also specifies requirements applicable to pneumatic devices in an effort to limit routine operational losses from those sources.[228] These requirements as originally promulgated demanded that operators replace high-bleed pneumatic valves with low-bleed or no-bleed valves within one

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218 43 C.F.R. § 3179.7(c)(i)-(vii); see also 81 Fed. Reg. 83,011 (Nov. 18, 2016).

219 43 C.F.R. § 3179.7(b)-(c).

220 43 C.F.R. § 3179.8.

221 Id. § 3179.8(a).

222 81 Fed. Reg. 83,011 (Nov. 18, 2016).

223 See 43 C.F.R. § 3179.6 (2017).

224 "Emergencies" are situations in which the loss of gas is "uncontrollable" and thus flaring or venting is "necessary to avoid risk of an immediate and substantial adverse impact on safety, public health, or the environment." 43 C.F.R. § 3179.105(a).

225 43 C.F.R. §§ 3179.4, 3179.6 (2017).

226 Id. § 3179.4(xi).

227 See 43 C.F.R. §§ 3179.6, 3179.105; 81 Fed. Reg. 83,037 (Nov. 18, 2016).

228 43 C.F.R. § 3179.201.

year.[229] Gas vented in violation of these requirements is deemed avoidably lost, and is subject to royalty obligations pursuant to the Rule.[230]

iv. Leak Detection and Repair

The BLM viewed LDAR programs as a cost-effective mechanism to achieve venting reductions.[231] The Waste Prevention Rule requires operators to inspect their well sites and "all equipment associated with it," and comply with specified standards for leak detection.[232] The Rule requires operators to use an instrument-based approach and conduct semi-annual inspections for leaks at well sites.[233] Operators seeking to use an alternate instrument for leak detection must obtain advance approval from the BLM.[234] Where leaks are detected, they must be repaired and verified as fixed within 30 days, unless the operator can show with good cause that more time is needed.[235] The Rule requires operators to keep and submit records documenting the maintenance and repair of leaks, including results of inspections, repairs, and follow-ups.[236] Operators are not required to inspect equipment components that are not accessible.[237]

The Waste Prevention Rule provides only some amount of specificity on what constitutes a "leak." The Rule defines that term as "a release of natural gas from a component that is not associated with normal operation of the component."[238] Releases occurring from the normal operation of equipment intended to vent as part of normal operations are not considered leaks, unless "the releases exceed the quantities and frequencies expected during normal operations."[239] Releases due to operator error and equipment malfunction are considered leaks.[240] The Rule also integrated compliance with the EPA's regulatory requirements for leaks, such that an

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229 Id. § 3179.201 (2017); see also 81 Fed. Reg. 83,012 (Nov. 18. 2016).

230 43 C.F.R. § 3179.5.

231 81 Fed. Reg. 83,011 (Nov. 18, 2016).

232 43 C.F.R. § 3179.301(a); see §§ 3179.301-.305.

233 Id. §§ 3179.303(a), 3179.301(a).

234 Id. § 3179.303(b).

235 Id. § 3179.304(a).

236 Id. § 3179.305(a).

237 Id. § 3179.301(d).

238 Id. § 3179.3.

239 Id.

240 Id.

operator complying with the EPA's regulations would automatically be deemed in compliance with the BLM's LDAR requirements.[241]

v. Waste Minimization Plan

The Waste Prevention Rule requires operators to submit a Waste Minimization Plan ("WMP") along with their application for a permit to develop an oil well.[242] The WMP requirement was adopted to ensure that operators consider and plan for how they will capture associated gas before they begin to drill a well.[243] Although an operator's WMP is not legally enforceable against them, plan submission is mandatory and must include a number of specific details.[244] Failure to submit an adequate WMP could be grounds for denial of an application for a permit to drill.[245]

vi. Variances

In an effort to streamline the administration of new regulatory requirements contained in the Waste Prevention Rule, the BLM considered and accounted for regulatory overlaps.[246] The BLM sought to align the requirements contained in the Rule with similar requirements adopted by the EPA, tribes, or states.[247] The Rule provides a variance process from any particular provisions "if a petitioner State or tribe can show that a State, local, or tribal requirement is at least as effective as the corresponding provision of this rule."[248] The Rule further identifies what a state or tribe must include in a request for a variance, including a requirement that the petitioner identify the specific provision from which a variance is requested, why the variance is needed, and a demonstration that the petitioner's regulatory approach is equally as effective.[249]

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241 Id. §§ 3179.301(j)-(k), 3179.102. For a discussion on the compliance alternatives between the two regulatory approaches, see 81 Fed. Reg. 83,037 (Nov. 18, 2016).

242 43 C.F.R. § 3162.3–1(j) (2017).

243 81 Fed. Reg. 83,011 (Nov. 18, 2016).

244 See 43 C.F.R. § 3162.3–1(j) (2017).

245 Id.

246 43 C.F.R. § 3179.401 (2017); 81 Fed. Reg. 83,017 (Nov. 18, 2016).

247 43 C.F.R. § 3179.401 (2017).

248 See id. § 3179.401(2).

249 Id. §§ 3179.401(2)(i)-(iv).

B. Applicable Federal Law

"It is axiomatic that an administrative agency's power to promulgate legislative regulations is limited to the authority delegated by Congress."[250] Interior and BLM authority to manage federal and tribal oil and gas leasing was delegated and reaffirmed in multiple federal statutes.[251] More specifically, the BLM's authority to regulate waste stems directly from the Mineral Leasing Act, the Federal Oil and Gas Royalty Management Act, the Federal Land Policy and Management Act of 1976, the Indian Mineral Leasing Act of 1938, and the Indian Mineral Development Act of 1982.[252]

The Mineral Leasing Act ("MLA") created a system for leasing deposits of coal, oil, oil shale, and gas located on federal lands.[253] The law mandates that jurisdictional operators extracting minerals "use all reasonable precautions to prevent waste of oil or gas developed in the land."[254] Further, all leases issued by the BLM must be operated with "reasonable diligence, skill, and care" and operators must abide by rules prescribed "for the prevention of undue waste."[255] The MLA directs the Secretary of Interior to "determine reclamation and other actions as required in the interest of conservation of surface resources" and authorizes the Secretary to suspend a lease permit "in the interest of conservation of natural resources."[256]

The overriding purpose of the MLA was "to promote the orderly development of the oil and gas deposits in publicly owned lands of the United States through private enterprise."[257] The MLA, however, also rests on the foundational principle that the American public should benefit from the minerals found and produced on public lands.[258] This public-benefit purpose of the statute was enunciated in California Co. v. Udall, where the D.C. Circuit stated that the statute was "intended to promote wise development of . . . natural resources, and to obtain for the public a

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250 Bowen v. Georgetown Univ. Hosp., 488 U.S. 204, 207 (1988).

251 81 Fed. Reg. 83,019 (Nov. 18, 2016).

252 Id.

253 30 U.S.C. § 181 (2012).

254 Id. § 225.

255 Id. § 187.

256 30 U.S.C. §§ 226(g), 209.

257 Harvey v. Udall, 384 F.2d 883, 885 (10th Cir. 1967) (citing The Investigation of Oil and Gas Lease Practices, Before the Senate Subcomm. of the Comm. on Interior and Insular Aff., 84th Cong., 2nd Sess. 2 (1957)).

258 California Co. v. Udall, 296 F.2d 384, 388 (D.C. Cir. 1961).

reasonable financial return on assets that 'belong' to the public."[259] Congress recognized the need for conservation measures in the MLA by adding provisions on waste prevention.[260] The MLA, when it was passed, was viewed as a major piece of conservation legislation.[261]

The Federal Oil and Gas Royalty Management Act ("FOGRMA") created the modern system for managing federal mineral royalties.[262] The statute reinforces Congress' concern about wasted oil and gas by declaring that

> any lessee is liable for royalty payments on oil or gas lost or wasted from a lease site when such loss or waste is due to negligence on the part of the operator of the lease, or due to the failure to comply with any rule or regulation, order or citation issued under this chapter or any mineral leasing law.[263]

An overriding purpose behind the FOGRMA was to "ensure the prompt and proper collection and disbursement of oil and gas revenues owed to the United States and Indian lessors and those inuring to the benefit of States."[264] The statute calls on the Secretary of Interior to "aggressively" carry out the trust responsibilities which arise from the administration of tribal oil and gas reserves.[265] The FOGRMA reaffirms the authority of the Secretary, first established in the MLA, to collect royalty payments and establish royalty liabilities under the mineral leasing laws.[266] The FOGRMA, like the MLA, contains a broad delegation of rulemaking authority in order to fulfill its statutory objectives.[267] The MLA and FOGRMA together "make [it] clear that Congress intended the Secretary, through the BLM, to exercise its rulemaking authority to prevent the waste of federal and Indian mineral resources and to ensure the proper payment of royalties to federal, state, and tribal governments."[268]

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259 Id.

260 David W. Miller, The Historical Development of the Oil and Gas Laws of the United States, 51 CAL. L. REV. 506, 517 (1963) (discussing history of the Mineral Leasing Act).

261 Id. at 518.

262 See 30 U.S.C. § 1701(a)-(b) (2012).

263 Id. § 1756 (emphasis added).

264 Id. § 1701(b)(3).

265 Id. § 1701(a)(4).

266 Id. § 1712(a); Interior's Office of Natural Resources Revenue collects these royalties, which totaled nearly $2.2 billion in 2015. GAO-16-607, supra note 164, at 1.

267 30 U.S.C. § 1751 (2012).

268 Wyoming v. U.S. Dep't of the Interior, 2017 WL 161428, at *6.

The Federal Land Policy and Management Act ("FLPMA") mandates that the BLM manage the public lands under multiple use and sustained yield principles.[269] The statute also admonishes the BLM to "regulate, through . . . published rules . . . the use, occupancy, and development of the public lands."[270] Multiple use is defined by FLPMA to mean, inter alia:

> Management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources . . . that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including . . . minerals.[271]

Importantly for the purposes of the Waste Prevention Rule, the statute directs consideration of the relative values of all resources, not just "the combination of uses that will give the greatest economic return or the greatest unit output."[272]

Each of these statutes gives Interior or the BLM regulatory authority which extends to the development of tribal (other than Osage) oil and gas interests.[273] Interior delegated its federal onshore minerals management authority to the BLM in 1983.[274] Additionally, Interior has delegated regulatory jurisdiction over oil and gas operations on tribal lands to the BLM.[275] In the context of tribal oil and gas development, "we must keep in mind that the Secretary and his delegates act as the Indians' fiduciary and thus represent the Indians' best interests."[276] The BLM's authority to manage tribal mineral interests carries with it an obligation to act as a trustee for the benefit of the tribal landowners.[277] The BLM discharges this duty by adopting regulatory plans that are in the best interest of tribes and individual tribal mineral owners. The best interest of the tribe and

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269 43 U.S.C. § 1732(a) (2012).

270 Id. § 1732(b).

271 Id. § 1702(c).

272 Id. (emphasis added).

273 43 C.F.R. § 3170.1 (2017).

274 See Transfer of Minerals Management Functions, 48 Fed. Reg. 8,983 (Mar. 2, 1983).

275 43 C.F.R. § 3170.1 (2017).

276 Woods Petroleum Corp. v. U.S. Dep't of the Interior, 47 F.3d 1032, 1038 (10th Cir. 1995) (citing Cheyenne-Arapaho Tribes of Oklahoma v. United States, 966 F.2d 583, 588-89 (10th Cir. 1992)).

277 Id.

individual owners is determined by considering a number of factors, including economic, marketability, environmental, and cultural affects.[278]

These statutes make it clear that the BLM has regulatory authority in the context of waste prevention. The agency's authority to regulate air quality, however, is significantly more cabined.[279] Congress has delegated authority to the EPA and the states to "protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare."[280] The Clean Air Act ("CAA") establishes that states have primary responsibility for assuring air quality within their boundaries.[281] The CAA's scheme for regulating air quality is that of a "cooperative federalism" approach, where the EPA develops baseline standards that the states then implement and enforce.[282] Accordingly, protection of air quality, unlike the prevention of waste, is expressly within the substantive field of the EPA and the states pursuant to the CAA.[283] The trouble in this context arises because the regulation of flaring and venting for waste prevention purposes necessarily reduces air pollution and other externalities related to carbon dioxide and methane emissions.

Where the statutory obligations of two separate agencies overlap, those agencies must work together to administer their obligations while avoiding inconsistency and conflict.[284] The BLM themselves have conceded that their regulatory authority over air quality is limited to developing land use plans and assuring compliance with federal and state pollution control laws.[285] The structure of the CAA leaves the Waste Prevention Rule susceptible to challenge where the BLM points to its air quality benefits as a justification for the Rule.[286] Accordingly, the Waste Prevention Rule must stand or fall on the BLM's authority to regulate for waste prevention.[287] Thus, the question of whether the BLM has authority to regulate these practices largely comes down to whether the BLM's classification of flaring and venting as "waste" was a reasonable one.

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278 25 C.F.R. § 211.3 (2016).

279 Wyoming v. U.S. Dep't of the Interior, 2017 WL 161428, at *9.

280 42 U.S.C. § 7401(b)(1) (2012).

281 Id. § 7407(a).

282 See Oklahoma v. EPA, 723 F.3d 1201, 1204 (10th Cir. 2009).

283 Wyoming v. U.S. Dep't of the Interior, 2017 WL 161428, at *6.

284 Massachusetts v. EPA 549 U.S. 497, 532 (2007).

285 U.S. DEP'T OF AGRIC., U.S. DEP'T OF THE INTERIOR, AND E.P.A., MEMORANDUM OF UNDERSTANDING REGARDING AIR QUALITY ANALYSES AND MITIGATION FOR FEDERAL OIL AND GAS DECISIONS THROUGH THE NAT'L ENVT'L POLICY ACT PROCESS (2011).

286 Wyoming v. U.S. Dep't of the Interior, 2017 WL 161428, at *9.

287 Id.

C. Flaring and Venting as Waste

i. What Is Waste?

The first step in statutory interpretation is an analysis of the language itself.[288] Waste is a term that has different meanings in different contexts. Waste is defined in dictionaries as, "[i]n the popular sense, the failure to conserve."[289] Waste is "a bad use of something valuable that you have only a limited amount of."[290] Waste may also refer to "unwanted matter . . . of any type."[291] To waste is to use "without care or thought"[292] or "to consume . . . or employ uselessly or without adequate return; to squander."[293]

Many states have defined waste, in the context of oil and gas production and management, by statute. A primary purpose behind these statutes is to prevent the unnecessary destruction of natural resources.[294] A North Dakota statute on oil and gas defines waste to include, inter alia, "the inefficient, excessive, or improper use of, or the unnecessary dissipation of reservoir energy" and "[the] operating . . . of any oil or gas well or wells in a manner which causes, or tends to cause, reduction in the quantity of oil or gas ultimately recoverable."[295] A Colorado statute defines waste "as applied to gas" to include "the escape, blowing, or releasing, directly or indirectly, into the open air . . . in quantities or in such manner as . . . unreasonably diminishes the quantity of oil or gas that ultimately may be produced."[296] A Wyoming statute explicitly states that flaring is a waste of gas, unless necessary for well drilling, completing, or testing.[297]

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288 City of Chicago v. Envtl. Def. Fund, 511 U.S. 328, 335–36 (1994).

289 See, e.g., Waste, Def. 1, Ballentine's Law Dictionary (3d ed. 1969).

290 Waste, Def. 1, Cambridge Dictionary, http://dictionary.cambridge.org/us/dictionary/english/waste (last visited Mar. 20, 2017).

291 Id., Def. 2.

292 Id., Def. 1.

293 Waste, Def. 1, http://www.dictionary.com/browse/waste (last visited Mar. 20, 2017).

294 Vogel v. Marathon Oil, 879 N.W.2d 471, 480 (N.D. 2016); see also Barker v. Campbell-Ratcliff Land Co., 167 P. 468, 469 (Okla. 1917).

295 N.D. CENT. CODE § 38-08-02 (2015).

296 C.R.S. § 34-60-103 (2012).

297 WYO. STAT. ANN. § 30-5-101(a)(i)(G) (2015).

ii. Waste in the Law of Property

The complete analysis of a statutory term often calls for more than a resort to the "ordinary, everyday meaning of the specific language at hand."[298] In a more technical sense, waste is defined in the legal realm as "[p]ermanent harm to real property committed by a tenant . . . to the prejudice of the heir, the reversioner, or the remainderman."[299] The law of waste is one of the common law's ancient writs, and it applies when two or more persons have an interest in property, but at least one person is not in possession.[300] Waste doctrines govern the changes that tenants can lawfully make to the estates they occupy, and the legal actions that can be pursued by absentee owners to prevent tenants from injuring the absent owner's interest.[301]

An action alleging waste can be brought in three distinct forms: permissive, voluntary, and ameliorative.[302] Permissive waste presumes an act of nonfeasance, such that a tenant is aware of damage to the property and does nothing to prevent or correct the situation.[303] Affirmative waste is a form of misfeasance, such that a tenant voluntary damages the absent owner's interest or the property's future value.[304] Ameliorative waste, the final variety and least common, may occur where a tenant changes the property's underlying character, even if the change increases the value of the property.[305] Whether a particular act constitutes waste at common law depends on the circumstances of each particular case.[306] To the extent that contracting parties who hold interests in a property contemplate a particular use of the property by the tenant, waste law generally assumes that they, by implication, contemplate all the ordinary incidents of that use.[307] Accordingly, flaring and venting fit comfortably into the everyday understanding of waste, as well as the legal definition of waste where the

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298 American Mining Congress v. EPA, 824 F.2d 1177, 1185 (D.C. Cir. 1987).

299 Waste, Def. 1, BLACK'S LAW DICTIONARY (3rd pocket ed. 2006).

300 Thomas W. Merrill, Melms v. Pabst Brewing Co. and the Doctrine of Waste in American Property Law, 94 MARQ. L. REV. 1055, 1056 (2011).

301 See, e.g., Jedidiah Purdy, The American Transformation of Waste Doctrine: A Pluralist Interpretation, 91 CORNELL L. REV. 653, 654, 658 (2006).

302 Merrill, supra note 300, at 1057.

303 Id.

304 Id.

305 Id.

306 Chosar Corp. v. Owens, 370 S.E.2d 305, 307 (Va. 1988).

307 Purdy, supra note 301, at 659.

practices are avoidable. A look to state regulation in this area further helps to highlight these issues.

V. STATE REGULATION AND THE RULE'S CHALLENGES

A. Federalism: State Regulatory Schemes

Several states have either legislation or regulations regarding flaring and venting for waste prevention purposes. In formulating the Waste Prevention Rule, the BLM looked primarily to the approaches of Colorado, North Dakota, and Wyoming.[308] However, there is a considerable amount of variance in oil and gas producing states as to the extent of control exercised over industrial operators for the prevention of waste.[309] This Section focuses on the oil and gas rules of six Western states, which host a majority of oil and gas activity on federal public lands: Colorado, Montana, New Mexico, North Dakota, Utah, and Wyoming.[310] This Section will identify statutes and regulations adopted in those states relating to gas flaring and venting, without addressing the effectiveness of their implementation.

Colorado and Wyoming are known for having stringent air pollution control requirements relating to oil and gas operations.[311] Both states have comprehensive LDAR programs.[312] In a comment during promulgation of the Waste Prevention Rule, Colorado stated that it would seek a variance from the Rule's LDAR requirements because the state's regulation "as a whole, generates greater emissions benefits than [the Waste Prevention Rule]—benefits that are uniquely tailored to the Colorado airshed."[313] While some in industry challenged Colorado's methane emission and LDAR rules, three of the largest oil and gas producers in the state

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308 81 Fed. Reg. 83,012, 83,019 (Nov. 18, 2016).

309 NANCY SAINT-PETERS, SUMMERS OIL AND GAS 4:19 (3d ed.) (2016).

310 W. ENVTL. L. CTR. & W. ORG. OF RES. COUNCILS, FALLING SHORT 2 (2016), http://westernlaw.org/sites/default/files/2016StateMethaneWasteReport.pdf.

311 Jana B. Milford, Out in Front: State and Federal Regulation of Air Pollution Emissions from Oil and Gas Production Activities in the Western United States, 55 NAT. RES. J. 1, 2 (2015).

312 Id. at 45.

313 Andrew Casper, Comments of the Colorado Oil & Gas Association on the Bureau of Land Management's Proposed Rules Concerning Waste Prevention, Production Subject to Royalties, and Resource Conservation, COGA 6, 10-11 (April 22, 2016).

supported the measure, and even helped to write the rules alongside the Environmental Defense Fund.[314] Colorado prohibits "unnecessary or excessive venting or flaring" in order to "limit waste of resources."[315] The regulatory approach in Colorado contains many common flaring and venting exceptions, including emergency conditions, well maintenance, well purging, and productivity tests.[316]

Wyoming's regulatory requirements for flaring and venting are similar to those in Colorado. Flaring and venting are permitted on a limited basis, as well as during emergencies, well purging, and production tests.[317] Wyoming encourages operators "to employ practical technologies that minimize the venting and flaring of gas."[318] Although flaring is considered waste by statute where avoidable,[319] a state commission retains discretion to classify certain gases as "low rate [associated] gas" which presumptively does not qualify as waste.[320] Wyoming permits routine venting, so long as it occurs at rates below 20 million cubic feet of gas per day.[321]

Routine flaring is permitted in Montana, up to a daily production limit.[322] An operator seeking to flare "or otherwise waste the associated gas" must submit results from production tests and statements justifying the need for the waste.[323] The state requires operators to flare gas—rather than vent it—if operators dispose of associated gases at rates exceeding 20 million-cubic-feet per day for a period in excess of 72 hours.[324] Montana has no enforceable gas capture requirements but does require basic LDAR obligations.[325]

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314 Cassy Carswell, Colorado's Successful Methane Emissions Program is a Gas to Congress, NEWSWEEK (Feb. 8, 2017, 10:10 AM), http://www.newsweek.com/methane-emissions-rules-congress-colorado-environmental-policy-553912.

315 2 COLO. CODE REGS. § 404-1:912(a) (2016).

316 Id. § 404:1-912(b).

317 Wyo. Oil and Gas Conservation Comm'n Rules and Regulations, Ch. 3, § 39 (Authorization for Flaring and Venting of Gas) (2016) [hereinafter Wyoming Oil and Gas Rules].

318 Id. § 39(a).

319 WYO. STAT. ANN. § 30-5-101(a)(i)(G) (2017).

320 Wyoming Oil and Gas Rules, supra note 317, at § 39(b)(iv).

321 Id. § 39(b)(iv)(C).

322 MONT. ADMIN. R. 36.22.1220(2) (1978).

323 Id. (emphasis added).

324 Id. 36.22.1221(1).

325 Id. 17.8.1712.

New Mexico is the locale of a substantial amount of flaring, despite prohibiting flaring and venting effective 60 days after a well's completion.[326] Operators may apply for exemptions, and they may flare the gas—rather than vent it—if they are not connected to gas-gathering infrastructure. Additionally, they must report estimated volumes to a state management division.[327] Operators are prohibited from allowing gas to leak or escape from tanks, containers, pipes, or other conduits.[328] However, the state has no enforceable LDAR requirements.[329] In April 2016, the state management division issued a notice to operators (NTO) regarding gas capture.[330] The NTO established a requirement that operators finalize gas capture plans with the "ultimate goal to reduce natural gas emission."[331]

North Dakota, home to large parts of the Bakken Shale Formation, has significantly expanded oil and gas production in the last decade as a result of the shale revolution.[332] From 2012 until mid-2016, North Dakota flared the highest volume of natural gas in the United States.[333] Since 2016, North Dakota has taken steps to reduce this waste.[334] Today, the state's approach to flaring and venting is relatively straightforward, has been effective, and can serve as a model for regulators in other jurisdictions.

In North Dakota, gas produced in association with crude oil at an oil well may be flared for one year starting once the well begins production, consistent with the rules of the State Industrial Commission.[335] After that, flaring "must cease" and the well is required to be either capped or equipped with a system that captures at least 75 percent of the gas for a beneficial use.[336] Operators are liable for royalty payments to royalty

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326 N.M. CODE R. § 19.15.18.12(A) (2008).

327 Id. § 19.15.18.12(B), (F).

328 Id. § 19.15.2.8(B).

329 W. ENVTL. L. CTR. & W. ORG. OF RES. COUNCILS, supra note 310, at 6.

330 N.M. ENERGY, MIN., AND NAT. RESOURCES DEP'T, NOTICE TO OPERATORS (2016).

331 Id.

332 See Bakken News, BAKKEN SHALE, https://bakkenshale.com/ (last visited Mar. 21, 2017).

333 Natural Gas Flaring in North Dakota has Declined Sharply since 2014, U.S. ENERGY INFO. ADMIN. (June 13, 2014), https://www.eia.gov/todayinenergy/detail.php?id=26632.

334 Id.

335 N.D. CENT. CODE § 38-08-06.4.1 (2013).

336 Id. § 38-08-06.4.2.

owners for the value of any gas flared in violation of these requirements.[337] Operators can obtain exemptions from the Industrial Commission upon a satisfactory showing that "connection . . . to a gas gathering line is economically infeasible at the time of the application or in the foreseeable future or that a market is not available and that equipping the well with an electrical generator is economically infeasible."[338]

Additionally, the North Dakota Industrial Commission established gas capture goals in 2014, with limited exceptions.[339] The approach allows operators to accumulate credits for gas captured in volumes exceeding the capture goal, but limits the banking of those credits to three months, and the usage of those credits to "extenuating circumstances."[340] North Dakota's requirements are slightly more stringent through 2020 than those contained in the Waste Prevention Rule, such that an operator complying with North Dakota's capture rule will always be in compliance with the BLM's Rule.[341] After 2020, the BLM's Rule continues to require increasing gas capture percentages, up to 98 percent by 2026, while North Dakota's capture percentage stops increasing after 2020's ninety-one percent capture rate.[342]

Utah allows flaring and venting, without approval, so long as operators stay within monthly limits.[343] Operators can also flare or vent relatively large volumes of gas, without approval, during production tests.[344] Once an oil well is completed, operators are allowed to vent gas from storage tanks and other production vessels, unless a state management division "determines that . . . recovery . . . is warranted."[345] Operators who wish to flare or vent gas in excess of the volumes defined by regulation must submit a statement justifying that need.[346] Utah has no specific LDAR requirements, but the state requires operators to "maintain

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337 Id. § 38-08-06.4.4.

338 Id. § 38-08-06.6.

339 N.D. Indus. Comm'n., Order 24665 (2013), https://www.dmr.nd.gov/oilgas/GuidancePolicyNorthDakotaIndustrialCommissionorder24665.pdf.

340 Id.

341 Compare N.D. Indus. Comm'n., Order 24665 (2013), with 43 C.F.R. § 3179.7 (2017).

342 43 C.F.R. § 3179.7 (2017); N.D. Indus. Comm'n., Order 24665 (2013).

343 UTAH ADMIN. CODE. r.649-3-20.1.1 (2016).

344 Id. 1.2.

345 Id. 4.1.

346 Id. 5, 5.1.

tanks in a workmanlike manner" so as to "preclude leakage."[347] To date, Utah has no requirements regarding gas capture planning.[348]

B. Legal Challenge: Wyoming v. Interior

The Waste Prevention Rule was challenged almost immediately after it was announced as a final rule.[349] Wyoming, Montana, North Dakota, and industry groups challenged the Rule in the United States District Court for the District of Wyoming, alleging that the BLM lacked authority to act and alternatively that the Rule was arbitrary and capricious.[350] The challengers sought a preliminary injunction before the Rule originally took effect and were opposed by New Mexico and California, who intervened as respondents.[351] The challengers argued that the Rule constituted an attempt by the BLM to regulate air pollution, which undermined efforts by other agencies tasked by Congress to regulate air quality.[352] New Mexico, arguing in defense of the Rule, acknowledged the unique circumstance by stating that "the [waste] product is also the pollutant."[353] The court was persuaded by BLM's authority to regulate for waste prevention under the MLA and FOGRMA. However, the court was more skeptical on the arbitrary and capricious question, finding that the BLM, under the guise of waste prevention, seemed to be "propping up" the benefits of the Rule in air quality terms.[354] The court also questioned BLM's calculation of the "social cost of methane" as an appropriate resource conservation factor pursuant to the MLA, but concluded that it could not find the Rule to be arbitrary or capricious at such an early stage in the litigation.[355] At the time of this writing, the parties to this suit are preparing briefs for these issues of dispute.

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347 UTAH ADMIN. CODE. r.649-3-15.1.2.4 (2016).

348 W. ENVTL. L. CTR. & W. ORG. OF RES. COUNCILS, supra note 310, at 7.

349 See Wyoming v. U.S. Dep't of the Interior, 2017 WL 161428 (D. Wyo. 2017).

350 Id. at. *1.

351 Id. at *3.

352 Id.

353 Id.

354 Id. at *6, *9.

355 Id. at *9-10.

C. BLM's Cost-Benefit Analysis

The process by which an administrative agency reaches a final decision must be rational, such that the result reflects "a consideration of the relevant factors."[356] Executive Order 12,866 requires administrative agencies to engage in regulatory cost-benefit analysis and submit a report of that analysis to the Office of Management and Budget for review of significant regulatory actions.[357] The BLM determined that, using certain assumptions, the benefits provided by the Waste Prevention Rule would significantly outweigh its costs."[358] Total annual costs were estimated to range from $114 to $279 million per year, or $110 to $275 million, depending on the discount rate applied.[359] In the Rule's Regulatory Impact Analysis, the BLM estimated that small operators—those with fewer than 1,250 employees—would incur increased compliance costs at an average amount of $55,200.[360] Over 1,800 small operators will likely be impacted by the Rule's regulatory requirements.[361]

The BLM measured as benefits "the cost savings that the industry would receive from the recovery and sale of natural gas and the [associated] environmental benefits"[362] The agency estimated that the Waste Prevention Rule will result in monetized benefits of $209 to $403 million per year, based on models accounting for a "social cost of methane."[363] The Rule is estimated to reduce up to thirty-five percent of

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356 Michigan v. EPA, 135 S. Ct. 2699, 2706 (2015) (citing Motor Vehicle Mfrs. Ass'n. v. State Farm Mut. Auto. Ins. Co., 463 U.S. 29, 43 (1983)).

357 Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (Sept. 30, 1993) (Regulatory Planning and Review).

358 81 Fed. Reg. 83,013–83,014, 83,069 (Nov. 18, 2016).

359 81 Fed. Reg. 83,013, 83,068 (Nov. 18, 2016); One industrial representative opposing the Rule, however, estimated the overall costs at a total exceeding one billion dollars. See Memorandum from Mike Stojsavljevich to Kathleen Sgamma, VP of Gov't and Pub. Aff., Western Energy Alliance (Apr. 12, 2016).

360 81 Fed. Reg. 83,013-14 (Nov. 18, 2106).

361 Philip Rossetti, Costs and Benefits of the BLM Methane Rule, AM. ACTION F. (Mar. 6, 2017).

362 81 Fed. Reg. 83,014 (Nov. 18, 2016).

363 Id.; the "social cost" of greenhouse gases have been used by federal agencies "to value the climate impacts of rulemakings." See The Social Cost of Carbon, E.P.A. (Jan. 19, 2017), https://19january2017snapshot.epa.gov/climatechange/social-cost-carbon_.html. The Trump administration has taken steps to curtail this practice, including disbanding the Interagency Working Group on the Social Cost of GHGs and asking federal agencies to limit the monetization of the social costs of GHGs in policymaking. See Trump Climate EO, supra note 9.

venting and forty-nine percent of flaring, and produce additional royalties valued up to $14 million.[364] Roughly half of the monetary benefits accounted for by the BLM are a result of reductions in methane emissions; in other words, the value derived from reducing the social cost of methane.[365] The BLM's cost-benefit analysis also assumed that operators would recoup some of their costs through the recovery and eventual sale of natural gas.[366] Accordingly, on a cost savings basis—not accounting for the social cost of methane—the Waste Prevention Rule is not net beneficial.[367] As a result, the court in Wyoming v. Interior appeared skeptical of the BLM's use of a methane cost factor in promulgating the Rule under its MLA waste prevention authority.[368] The reasonableness of the BLM's cost-benefit analysis is likely to turn on one's view of whether the "social cost of methane" is a proper valuation in these contexts.

VI. WHY WE NEED THE WASTE PREVENTION RULE

The Waste Prevention Rule should be phased in as planned because the Rule is a reasonable exercise of BLM authority to prevent waste, is consistent with the purposes of the MLA, and represents a much needed modern regulatory scheme to the limit waste of a resource owned by all Americans. In the context of the BLM's authority to act, the question is not whether Congress has delegated the BLM authority to regulate flaring and venting specifically, but rather whether Congress has granted the authority to regulate for the prevention of waste.[369] The BLM undoubtedly has that authority, which was delegated and reaffirmed in a number of federal statutes.[370]

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364 81 Fed. Reg. 83,014 (Nov. 18, 2016).

365 Id. The BLM estimated the "social benefit" of the Rule to constitute $189-247 million of the total $209-403 million in estimated benefits.

366 Id.; BP installed venting controls on its wells in the Four Corners' San Juan Basin area and reported a 99 percent emissions reduction, which resulted in increased natural gas production and total profits. GAO-11-34, supra note 70, at 23.

367 Rossetti, supra note 361.

368 Wyoming v. U.S. Dep't of the Interior, 2017 WL 161428, at *10 (D. Wyo. 2017).

369 See City of Arlington v. F.C.C., 569 U.S. 290, 306 (2013) (noting in the context of promulgating regulations, "the whole includes all of its parts." Thus, courts need not try to discern "whether the particular issue was committed to agency discretion.") (emphasis in original).

370 See Section IV.B. Even the states and industry groups challenging the Rule "[did] not challenge BLM's authority to regulate waste and promulgate rules governing royalty payments." Wyoming v. Interior, 2017 WL 161428 at *6 n.6. If the Waste Prevention Rule

It is a longstanding principle at common law and under the MLA that an operator commits waste if economically recoverable natural gas is flared or vented.[371] The flaring of associated gas has been seen as a wasteful practice by regulators as early as the 1950s.[372] According to one report, flaring and venting on BLM-administered lands wastes at least $330 million in natural gas annually, a resource owned by all Americans.[373] Other commentators estimated that the American public could lose out on around $800 million over the next ten years if flaring and venting are not effectively reduced.[374] Moreover, Interior and the BLM have regulated flaring and venting pursuant to waste prevention principles for many decades.[375] Since the NTL-4A was issued, oil and gas production on jurisdictional leases has increased dramatically.[376] Oversight reviews by the GAO found that many operators are not using reasonably available capture or on-site use technologies to economically reduce the need to flare and vent gas.[377] The BLM's implementation of the NTL-4A has failed to keep pace with the development of modern gas capture technologies.[378]

A review of state action on flaring and venting makes clear that there are indeed regulatory gaps for the BLM to fill in these areas. States with large amounts of BLM-administered production have not universally taken steps to safeguard the public interest in these public resources, or to ensure against their routine waste.[379] While many rules are in place at the state level, many of them are weak or otherwise leave unaddressed the problem of routine flaring, even at relatively low volumes.[380] In a report

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is to fail, it should fail for reasons other than being in excess of the BLM's statutory authority to regulate waste specifically.

371 Letter from Richard Ranger, Am. Petroleum Inst., to Steven Wells, Div. Chief, BLM, at 2 (May 30, 2014) [hereinafter API Letter] (on file with American Petroleum Institute).

372 Railroad Comm'n of Tex. v. Rowan Oil Co., 259 S.W.2d 173, 175 (Tex. 1953) (declaring, in flaring case, "[t]he prevention of waste of gas is a well-established public policy . . ."); Border Farm Trust v. SM Energy Co., 2014 WL 11016398, at *12 (D. N.D. 2014) (stating that "[f]laring is without question a wasteful . . . practice").

373 See EDF, supra note 159.

374 WESTERN VALUES PROJECT, UP IN FLAMES: TAXPAYERS LEFT OUT IN THE COLD AS PUBLICLY OWNED NATURAL GAS IS CARELESSLY WASTED 2 (May 2014).

375 See e.g. NTL-4A, supra note 164.

376 Wyoming v. U.S. Dep't of the Interior, 2017 WL 161428, at *2 (D. Wyo. 2017).

377 GAO-11-34, supra note 70, at 32.

378 Id.

379 W. ENVTL. L. CTR. & W. ORG. OF RES. COUNCILS, supra note 310, at 8–9.

380 Id.; see infra Section V.A.

analyzing state regulation and its effectiveness to control associated gas waste, the Western Environmental Law Center concluded that "[s]tate rules . . . are simply not adequate to prevent methane waste on federally owned lands."[381] As the BLM recounted, action at the state level addresses only some aspects of the waste problem.[382] "Indeed, no State or tribe has requirements covering all the sources of waste addressed by [the Waste Prevention Rule]."[383] State regulations on flaring and venting are also subject to change, and the BLM should not have to rely on state standards to prevent the waste of a resource owned by all Americans.[384] Another factor that frustrates the effectiveness of state regulatory action in these areas is the fact that those actions generally do not apply to BLM-administered leases on tribal lands.[385] Moreover, the BLM has independent statutory responsibilities to prevent the waste of resources held in trust for the American people.[386] In sum, state regulatory schemes often do not fully or adequately cover all facets of the flaring and venting waste problem. Because the BLM has independent statutory authority to regulate waste on jurisdictional leases, and because it may issue variances for equally effective regulatory approaches at the state and tribal levels, a sufficient and pressing need exists for uniform waste reduction standards at the federal level.

The Waste Prevention Rule is supported by the history and purposes of the MLA. Squandering a potentially valuable resource which could be put to a beneficial use with reasonably available capture technologies is certainly waste within the ordinary meaning of that term.[387] This reading is reinforced by the fact that many states have legislation, which clearly implies—and in some cases explicitly suggests—that flaring and venting constitute waste where those practices are avoidable.[388] Agencies generally remain free to reinterpret statutory language, particularly in light of new evidence, so long as the resulting regulation is clear and definite so that affected parties have adequate notice concerning the agency's

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381 W. ENVTL. L. CTR. & W. ORG. OF RES. COUNCILS, supra note 310, at 8.

382 81 Fed. Reg. 83,018 (Nov. 18, 2016).

383 Id.

384 Id. at 83,019.

385 Id.

386 Id.

387 See Waste, supra note 290.

388 N.D. CENT. CODE § 38-08-02 (2015); WYO. STAT. ANN. § 30-5-101(a)(i)(G) (2015).

understanding and application of the law.[389] Unexplained inconsistency may be reason to find agency action arbitrary and capricious under the APA,[390] but the BLM's actions in this area are far from unexplained. The agency acted after studying these issues for a number of years, and after the GAO found an urgent need for regulatory reform.[391] A new application of the statutory term "waste" is not itself a sufficient reason to refuse deference to the BLM's expertise in these areas.[392] The MLA rests in part on strong conservation principles, and the BLM acted prudently by promulgating the Waste Prevention Rule rather than continuing to let operators "reap the greatest profit possible before the Government [chose to] enforce its rights."[393]

In response to the debate on the "social cost of methane," it is important to remember that flaring and venting reductions will produce a number of ancillary benefits, which are often difficult to quantify. These benefits include less regional haze and smog, less noise and light pollution, and fewer negative environmental consequences.[394] The Waste Prevention Rule should not be deemed arbitrary or capricious simply by virtue of its ancillary benefits that are difficult to quantify, because in this case the waste product is the pollutant.[395] Moreover, when the Rule was finalized, it was common practice for federal regulatory agencies to account for the social cost of greenhouse gases "in estimating benefits associated with . . . reductions."[396] The social cost of greenhouse gas emissions was used to assess benefits in a number of Obama-era regulations, including rules by the Department of Energy, the National Highway and Traffic Safety Administration, and the EPA.[397] Harmful emissions aside, flaring and venting represent the "wasteful loss of a finite and valuable resource" that

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389 Nat'l Cable & Telecomm. Ass'n v. Brand X Internet Servs., 545 U.S. 967, 981 (2005).

390 See 5 U.S.C. § 706(2)(a) (2012).

391 See GAO-11-34, supra note 70, at i, 4 ; see also GAO-16-607, supra note 164, at 17–18.

392 See Talk America, Inc. v. Mich. Bell Tel. Co., 564 U.S. 50, 57 (2011) (declaring that "novelty alone is not a reason to refuse deference").

393 Miller, supra note 260, at 513 (quoting ATT'Y GEN. ANN. REP. SUPP., UPON THE LITIGATION OVER WITHDRAWN OIL LANDS OF THE UNITED STATES 10 (1915)).

394 For a discussion of these externalities, see Section III.B.

395 Wyoming v. U.S. Dep't of the Interior, 2017 WL 161428, at *3 (D. Wyo. 2017) (emphasis added).

396 Alex L. Marten & Stephen C. Newbold, Estimating the Social Cost of Non-CO2 Emissions: Methane and Nitrous Oxide, NAT. CENT. FOR ENVT'L ECON 2 (Jan. 2011).

397 Id.

the BLM must manage for the benefit of all Americans.[398] It is largely settled that the BLM has authority to regulate for waste prevention purposes, and the fact that the agency attached a social cost factor to that determination should not by itself abrogate the agency's authority to require the reasonable management of America's resources.[399] Even conceding that the Rule is burdensome for some operators and is not net beneficial absent the social cost factor, the BLM nonetheless retains authority to require operators to take reasonable steps to prevent waste. Additionally, the Rule's capture requirements are feasible for a large percentage of jurisdictional operators.[400]

The Waste Prevention Rule is a flexible, yet firm approach to solving the flaring and venting waste problem. The Rule includes an important exception for operators who can show that capture targets are economically infeasible as applied to them.[401] Nothing in the Waste Prevention Rule unduly interferes with the authority of the EPA or the states to regulate air quality through specific standards.[402] Just as important, neither the EPA nor the states have the authority to infringe on the BLM's mandate to prevent the waste of public resources, and the CAA does not supersede or displace the BLM's Congressionally delegated authority to prevent waste and other environmental impacts arising from the use of public lands.[403] In this context, the BLM's valuation of the social cost of methane is not so unreasonable as to make an otherwise valid regulation arbitrary or capricious.

The Waste Prevention Rule preserves state sovereignty and is not a redundant regulation. Despite its largely bright-line approach, the Rule does leave to the BLM a degree of discretion in determining whether operators have taken prudent steps to avoid waste, and it also allows for case-by-case application in situations where an operator is not connected to regional infrastructure.[404] The Rule not only updates the NTL-4A, it also represents "an important element of BLM's larger effort to ensure that

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398 Dan Grossman, Big Oil and Gas Emissions out West – New Report Sizes Up Methane Problem on Federal and Tribal Lands, ENVT'L DEF. FUND (June 23, 2015), http://blogs.edf.org/energyexchange/2015/06/23/big-oil-and-gas-emissions-out-west-new-report-sizes-methane-problem-on-federal-and-tribal-lands/; see also California Co. v. Udall, 296 F.2d 384, 387 (D.C. Cir. 1962) (describing public purposes behind the MLA).

399 Grossman, supra note 398; see also California Co. v. Udall, 296 F.2d at 388.

400 See CARBON LIMITS, supra note 42, at 3.

401 See 43 C.F.R. § 3179.8 (2017).

402 81 Fed. Reg. 83,038 (Nov. 18, 2016).

403 Id.

404 43 C.F.R. § 3179.4(1)-(2) (2017).

its oil and gas regulations are effective, transparent, and easy to understand and administer, and that the provisions of those regulations adequately account for significant recent technological advances in the industry."[405]

Additionally, concerns about right-of-way permitting, while legitimate, are often overblown. According to the BLM, right-of-way processing time is not the primary cause of the large volume of gas waste that presently occurs.[406] For example, the BLM field office in Dickinson, North Dakota received over 1,700 requests to flare or vent gas in 2015, yet that office had just four ROW applications pending at the time of the Rule's promulgation.[407] It is also significant that the Waste Prevention Rule contains numerous provisions that are completely absent from the NTL-4A, such as gas capture targets, LDAR, and waste minimization planning.[408] Operators producing public resources on public lands should be held to the highest standards, which include minimizing waste, maximizing royalty returns to taxpayers, and safeguarding the public health and environment.[409] The Waste Prevention Rule offers a meaningful opportunity for the BLM to lead by example in these areas.

In 1949, the Texas Supreme Court affirmed a flaring ban using language that is equally applicable today:

> [i]t clearly appears . . . that the [agency] is trying to carry out the mandate of the Legislature and prevent the waste of a very valuable and important natural resource, and in doing so . . . it will not willfully act in a tyrannical or arbitrary manner. [The agency] show[s] an inclination to cooperate with the operators in preventing waste, and if a bona fide effort is made to comply . . . the [agency] will not be unreasonable, and will make exceptions to prevent unnecessary damage or loss to the operators. If this gas, which is an important natural resource, is to be conserved, some action is necessary to prevent its further unnecessary waste. It will be too late to speculate on what to do when the gas is exhausted through waste.[410]

For these reasons, the Waste Prevention Rule was narrowly tailored to remedy particularized issues arising on jurisdictional leases, which

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405 81 Fed. Reg. 83,018 (Nov. 18, 2016).

406 Id. at 83,039-40.

407 Id.

408 Compare NTL-4A, supra note 164, with 43 C.F.R. §§ 3179.7, 3179.301, 3162.3–1(j) (2017).

409 Grossman, supra note 398.

410 See R.R. Comm'n v. Sterling Oil & Refining Co., 218 S.W.2d 415, 421 (Tex. 1949) (emphasis added).

often lead to the waste of America's energy resources. Accordingly, the BLM made a reasonable determination that uniform national waste prevention standards were needed for oil and gas operators on public and tribal lands across the country.[411]

CONCLUSION

Principles of waste prevention have been reaffirmed in a number of statutes administered by Interior and the BLM. Moving forward, those agencies should refrain from altering the Waste Prevention Rule, and they should phase the Rule in as planned because it constitutes a reasonable exercise of agency discretion. The NTL-4A could not keep pace with the growing flaring and venting problem, and a new approach was well overdue. In an effort to minimize a national problem affecting all Americans, the Rule borrows from successful regulatory approaches in a few states to fill substantial gaps left by numerous other states with sizeable BLM production. Federal regulation is needed in this area. No matter what Colorado or North Dakota do to limit natural gas flaring and venting, their efforts do not affect how other states safeguard a resource that belongs to all Americans.

In sum, the Waste Prevention Rule is consistent with the public interest in protecting domestic resources that are crucial for a clean energy future. Regardless of its value relative to oil, natural gas will be the leading fossil fuel of the future. Associated natural gas, which could serve millions of people each year, is often wasted on BLM-administered leases because of flaring and venting. The BLM has statutory duties to require reasonable efforts to prevent this waste, and to accurately account for the volumes and

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411 81 Fed. Reg. 83,019 (Nov. 18, 2016). An argument can be made that the BLM should use other means to limit flaring and venting. The question of waste has long been regarded by the BLM and accepted by regulated entities as a factual economic test turning on "actual economic conditions relating to an oil and gas operation on a case-by-case basis." See API Letter, supra note 371, at 2. The Rule's bright-line distinctions tread heavily on previously well-established notions of waste. The meaning of "waste" in these contexts has for decades taken into account the development of technologies, infrastructure, and markets for the product. Id. at 3. The MLA by its terms does not contemplate that operators would be required to capture all of their potential gas losses. That statute requires jurisdictional leases to "use all reasonable precautions to prevent waste of oil or gas developed in the land." 30 U.S.C. § 225 (2012) (emphasis added). The total prevention of associated gas losses will undoubtedly be economically infeasible for at least some operators. See API Letter, supra note 371, at 3. Accordingly, the BLM should exercise careful discretion in applying and enforcing the Waste Prevention Rule's bright-line distinctions.

royalties associated with the production of all natural gas. The Rule's requirements are feasible for most operators using currently available and mature technology. Variances and individual exemptions are available for operators who can show that particular provisions of the Rule are unduly burdensome as applied to them. The Rule provides both environmental and economic benefits to the American public by safeguarding a clean energy resource and maximizing royalty receipts. These royalty revenues could then be used to help fund energy infrastructure projects at the state and federal levels.

Moving forward, the Waste Prevention Rule should be phased in as planned because natural gas is simply too valuable a resource to waste through flaring and venting. If Interior fails to implement or enforce the Waste Prevention Rule, flaring and venting will likely continue at present levels, and the American public will continue to lose millions of dollars each year in economic return.