UNITED STATES DISTRICT COURT
DISTRICT OF WYOMING

STATE OF WYOMING, et al., Petitioners, v. UNITED STATES DEPARTMENT OF THE INTERIOR, et al., Respondents, and WYOMING OUTDOOR COUNCIL, CENTER FOR BIOLOGICAL DIVERSITY, CITIZENS FOR A HEALTHY COMMUNITY, DINÉ CITIZENS AGAINST RUINING OUR ENVIRONMENT, ENVIRONMENTAL DEFENSE FUND, ENVIRONMENTAL LAW AND POLICY CENTER, MONTANA ENVIRONMENTAL INFORMATION CENTER, NATIONAL WILDLIFE FEDERATION, NATURAL RESOURCES DEFENSE COUNCIL, SAN JUAN CITIZENS ALLIANCE, SIERRA CLUB, THE WILDERNESS SOCIETY, WESTERN ORGANIZATION OF RESOURCE COUNCILS, WILDERNESS WORKSHOP, AND WILDEARTH GUARDIANS, Respondent-Intervenors.	)	Civil Case No. 2:16-cv-00285-SWS [Lead] [Consolidated With 2:16-cv-00280-SWS] Assigned: Hon. Scott W. Skavdahl

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF WYOMING

DECLARATION OF EVAN HJERPE AND PETE MORTON, CONSERVATION ECONOMICS INSTITUTE
Submitted In Support of Respondent-Intervenors' Response to Motions for Preliminary Injunction

Evan Hjerpe and Pete Morton declare as follows:

I, Evan Hjerpe, am the Director of the Conservation Economics Institute (CEI). I have over a decade of professional experience as a natural resource economist. I received a Ph.D. in Forest and Resource Economics from Northern Arizona University. I have a broad background in conducting resource economics research, with a specific focus in oil and gas economics. I have authored numerous peer-reviewed journal articles, book chapters, technical reports, and co-edited a graduate text book.

I, Pete Morton, Senior Economist with the Conservation Economics Institute (CEI), earned my Ph.D in Natural Resource Economics from Colorado State University. I have 20 years of experience working as an applied economist in the private, academic, and non-profit sectors. I have extensive experience conducting research in oil and gas economics. I have presented the results of my research in testimony before the United States Congress and in Federal Court.

We have evaluated claims of economic harm presented in petitions and supporting affidavits seeking preliminary injunctions of the Bureau of Land Management's Waste Prevention Rule. Below we provide a summary of critical flaws in those claims that undermine their rigor and credibility. We then include more detailed analyses of our findings with respect to six of these claims.

Executive Summary

1. BLM's analysis—which shows very modest compliance costs and no significant distributional impacts—is economically rigorous and well supported by available data. ¶¶ 7-18.
2. There are several cross-cutting flaws in Petitioners' analyses that undermine their rigor and credibility:
    - Petitioners' analyses fail to account for the phase-in of compliance times for BLM requirements—many of which will take effect in January of 2018—undermining their claims that the Rule will have imminent compliance costs impacts. ¶¶ 3-5.
    - Petitioners generally do not substantiate their claims with data or analysis, nor are they transparent with their methodologies or assumptions. ¶¶ 19-24.
    - Where Petitioners do make assumptions, they are neither credible, nor rigorous. For instance, the gas price assumptions at the heart of

Petitioners' analyses are below current or projected prices, inaccurately overstating the alleged adverse impacts of the Rule. ¶¶ 29-43. Likewise, Petitioners' assumptions about the impacts the Rule will have on permitting delays and oil and gas production are, at best, speculative. ¶¶ 52-67.

- Without support, Petitioners mistakenly attribute distributional impacts—including claims of reduced drilling, production, and jobs—to the compliance costs of the Rule. In fact, when fully phased-in, compliance costs are extremely small and larger macroeconomic variables like resource prices are the main drivers of changes in drilling, production, and jobs. ¶¶ 44-51.

I. PHASE IN OF REQUIRED COMPLIANCE TIMELINES MAKES IT UNLIKELY THAT OPERATORS WILL EXPERIENCE MEANINGFUL COMPLIANCE COSTS DURING THE PENDENCY OF THE LITIGATION

3. Despite industry petitioners' claim that they will need to make "immediate" capital expenditures when the Rule takes effect,[1] the structure of the Rule's requirements make it unlikely that oil and gas producers will incur meaningful compliance costs during the pendency of the litigation. The standards are phased in over time, with most of the Rule's requirements not necessitating

[1] Indus. Memo. 49.

compliance until January of 2018, limiting the need for immediate capital expenditure.

4. For example, the Rule requirements for storage vessels, pneumatic controllers, and leak detection and repair ("LDAR") all allow operators up to one year from when the Rule becomes effective on January 17, 2017 to implement new standards. For storage vessels, operators must determine potential for emissions after the Rule becomes effective, but then have until January 17, 2018 to expend capital to bring covered vessels into compliance, or even longer (until January 17, 2020) if the storage vessel is scheduled for replacement.[2] With respect to pneumatic controllers, operators have until January 17, 2018 to replace faulty devices, and the Rule effectively exempts wells or facilities with a remaining productive life of three years or less from the requirement.[3] Similarly, the LDAR provisions give operators until January 17, 2018 to begin making inspections for leaks for sites that have begun production before January 17, 2017, and give operators 60 days to begin inspections for sites newly producing after the Rule's effective date.[4]
5. In addition to these phased compliance timeframes, the Rule contains provisions allowing operators to obtain exemptions when the Rule's requirements would force operators to cease production. BLM can adjust

[2] 81 Fed. Reg. at 83,061.
[3] 81 Fed. Reg. at 83,057.
[4] 81 Fed. Reg. at 83,026.

capture target requirements if the "operator on an existing lease [] demonstrates to the BLM that meeting the target would impose such costs as to cause the operator to cease production and abandon significant recoverable oil reserves under the lease."[5] BLM may also provide an exemption from many of the other equipment standards in the rule if the operator demonstrates that replacement of equipment "would impose such costs as to cause the operator to cease production and abandon significant recoverable oil reserves under the lease."[6]

II. COMPLIANCE COSTS CALCULATED BY BLM ARE REASONABLE.

6. Industry and State petitioners claim that compliance costs associated with the Rule will cause economic harm to operators. Petitioners assert that the compliance costs of the Rule are higher than estimated by BLM in the regulatory impact analysis ("RIA") and that additional regulatory compliance costs will significantly slow the pace and scale of oil and gas development. As the BLM's estimates of costs and benefits are a key component of most of the Petitioners' claims of economic harm, we address the rigor of BLM's compliance cost assessment.

7. The data and methods used by BLM to determine compliance costs and compare them to benefits are transparent and sound. BLM properly assigned dynamic market prices that were greater than zero to calculate the value of the

[5] 81 Fed. Reg. at 83,011.
[6] 81 Fed. Reg. at 83,012.

methane captured due to the Rule. After including societal benefits, BLM correctly concluded that the benefits of the Rule exceed compliance costs.

8. As part of the RIA, BLM conducts a cost/benefit analysis as a measure of the Rule's economic efficiency. The economic efficiency analysis provides an economy-wide perspective of the overall benefits of complying with the Rule in comparison to the costs of compliance. BLM conducts a very thorough cost/benefit analysis in the RIA. The RIA is transparent with the data, assumptions, and methods used to derive BLM's results.[7] Based on our review of the data, assumptions, and methods in the RIA, we conclude that BLM properly valued the revenue from capturing methane as a result of implementing the Rule based on projections of market prices over time.[8]

9. BLM's analysis of compliance costs is likewise reasonable, and BLM rightly found that these compliance costs are very modest. Furthermore, given the relatively small scale of these compliance costs, it is unlikely they are driving operator decisions to shut-in wells. For example, the RIA specifically examined the compliance cost of the rule on small entities by performing a screening analysis for impacts on a representative sample of 26 small companies and analyzing the potential impact on profit margins.[9] BLM estimated the Rule's projected compliance costs would reduce the small

[7] *See, e.g.*, RIA 38-40.
[8] *See id.*
[9] RIA 8, 129-30.

entities' profit margin, on average, by 0.15 percentage points.[10] Based on this information, BLM reasonably concluded that the Rule would not have a significant impact on a substantial number of small entities.

10. The results of the RIA—both with respect to the small magnitude of compliance costs and their effects on covered entities—are consistent with the recent oil and gas rulemaking in Colorado, which has comparable requirements. Colorado regulators estimated the net cost to the oil and gas industry to implement the new rules would be $42.4 million per year, representing approximately 0.4% of industry's annual revenues.[11] The Commission concluded: "Given this small percentage, the Division's proposal is unlikely to have any appreciable impact on the economic competitiveness of the industry as a whole. This conclusion is bolstered by the fact that several of the largest oil and gas companies in the state (Anadarko Petroleum Corp., Noble Energy, Inc., Encana Oil and Gas USA, and DCP Midstream) fully support the Division's proposed revisions."[12]

11. Moreover, compliance costs are expected to decrease over time. Evidence from Encana in the Jonah field of Wyoming shows declining inspection costs as methods are improved, underscoring the potential benefits from technological

[10] 81 Fed. Reg. at 83,013-14.
[11] Colorado Air Quality Control Commission, Cost-Benefit Analysis for Proposed Revisions to AQCC Regulations No. 3 and 7 (February 11, 2014).
[12] Colorado Air Quality Control Commission, Cost-Benefit Analysis for Proposed Revisions to AQCC Regulations No. 3 and 7at 21 (February 11, 2014).

gains in leak detection.[13] As these detection costs decrease over time, operators will benefit from efficiency gains and higher net present values (NPV) will be associated with compliance with the Rule.

12. BLM's Waste Prevention Rule is an improvement in economic efficiency at both the national and regional levels. We agree with BLM's methodology for estimating benefits of the Rule and note that the data and methods are transparent and scientifically rigorous. Beyond the benefit of additional revenue from newly captured and sold natural gas, there are number of societal benefits that BLM has properly considered.

13. BLM's RIA indicates that societal benefits of the Rule will exceed costs by as much as $200 million annually.[14] This is likely an underestimate of the total net societal benefits of the Rule. While the BLM utilized many possible benefits when completing the benefit cost analysis (BCA), the agency did not monetize many of the co-benefits generated by implementing the Rule.[15] These co-benefits occur because the gas capture requirements in the Rule also reduce air pollution from volatile organic chemicals (VOC), fine particulate matter (PM) and other hazardous air pollutants (HAP), resulting in significant benefits to public health. If all of the co-benefits to public health had been monetized and

[13] Encana, *Enhanced Directed Maintenance and Inspection, Jonah Field* (2014); *see also* RIA 87.
[14] RIA 5-6.
[15] 81 Fed. Reg. at 83,014.

included in the BCA, the net benefits from the Rule would be significantly greater.[16]

14. An examination of the regulatory compliance literature also supports BLM's finding that the Rule provides benefits for both the environment and for industry and state revenues. The results in the RIA are consistent with the peer-reviewed literature analyzing regulatory compliance costs.

15. BLM's analysis indicated that the cost of complying with the Rule is small. These results are consistent with our review of the economic literature, which indicates that regulatory compliance is typically not a large economic burden.[17] The reasons for this include: 1) regulatory compliance costs are small relative to total business costs; 2) comparable regulations exist across state lines and from country to country; 3) other economic factors like drilling and labor costs play a more significant role in location decisions; and 4) technological change stimulates innovation and increases productivity, which offsets the costs of regulation. Additionally, the rule contains several provisions that let operators

[16] *See* P. Morton and E. Hjerpe, *A Review of the Economic Factors Surrounding the Capture of Methane from Oil and Natural Gas Development on Federal Public Land*, Conservation Economics Institute (April 22, 2016).

[17] Porter, M.E. and C. van der Linde, *Toward a New Conception of the Environment-Competitiveness Relationship*, 9 JOURNAL OF ECONOMIC PERSPECTIVES 97 (1995); Jaffe, A.B. and Palmer, K., *Environmental Regulation and Innovation: A Panel Data Study*, 79 THE REVIEW OF ECONOMICS AND STATISTICS 610 (1997); Ambec, S et al., Resources for the Future Discussion Paper, *The Porter Hypothesis at 20: Can environmental regulation enhance innovation and competitiveness?*, (Jan. 2011).

propose alternative compliance mechanisms that would drive innovation and further reduce costs.[18]

16. The treatment of technological change is increasingly recognized as an important variable when estimating the benefits and costs of environmental regulations. We find the Rule's requirements for capturing methane to be well designed to spur continued technological innovation in the oil and gas industry. Furthermore, capturing more methane will lead to increasing productivity.

17. These results are consistent with research indicating that environmental regulations provide firms with an incentive to innovate and develop more cost-effective methods of achieving regulatory compliance.[19] Regulations that are designed to spur technological innovation and increase productivity will help offset compliance costs and can lead to increased profits. With technological change, the near-term costs of regulation can be offset in part or in full if in the long-term environmental regulations stimulate innovation and increase productivity.[20]

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[18] *See, e.g.*, 81 Fed. Reg. at 83,057 (§3179.201(b) ("including but not limited to")); 81 Fed. Reg. at 83,074 (§3179.204(c) ("the operator must consider other methods")); and 81 Fed. Reg. at 83,087 (§3179.302(a)(3) ("A leak detection device not listed in this section")).

[19] Porter, M., *America's Green Strategy*, SCIENTIFIC AMERICAN (1991); Porter, M. and C. van der Linde, *Green and competitive*, HARVARD BUSINESS REVIEW 121 (Sep.-Oct. 1995); Porter, M.E. and C. van der Linde, *Toward a New Conception of the Environment-Competitiveness Relationship*, 9 JOURNAL OF ECONOMIC PERSPECTIVES 97 (1995).

[20] Ambec, S et al., Resources for the Future Discussion Paper, *The Porter Hypothesis at 20: Can environmental regulation enhance innovation and competitiveness?,* (Jan. 2011).

18. Peer-reviewed studies of the oil and gas industry indicate that regulation can help induce innovation and lead to increased producer productivity and efficiency.[21] For example, a peer-reviewed study of environmental regulations and oil refineries, found that in meeting more stringent environmental standards, oil refineries in the Los Angeles air basin actually increased their productivity and efficiency.[22] The increase in productivity was a result of "a careful redesign of production processes induced by the need to comply with environmental regulations." A second study using data from offshore oil and natural gas production in the Gulf of Mexico found that environmental regulation induced technological change in the oil and gas industry.[23] A review of the economic literature provides evidence that the oil and natural gas industry can potentially become more profitable by meeting and perhaps exceeding the BLM Rule's requirements.

III. ECONOMIC ANALYSIS RELIED ON BY INDUSTRY IS FUNDAMENTALLY FLAWED.

[21] *See, e.g.*, Berman, E. and L.T. Bui, *Environmental regulation and productivity: Evidence from oil refineries*, 83 REV. ECON. AND STATS. 498, 508 (Aug. 2001); Managi, S., et al., *Environmental regulations and technological change in the offshore oil and gas industry*, 81 LAND ECONOMICS 303 (May 2005); Ford, J., et al., *How environmental regulations affect innovation in the Australian oil and gas industry: Going beyond the Porter Hypothesis*, JOURNAL OF CLEANER PRODUCTION (December 2014).

[22] Berman, E. and L.T. Bui, *Environmental regulation and productivity: Evidence from oil refineries*, 83 REV. ECON. AND STATS. 498, 508 (Aug. 2001).

[23] Managi, S., et al., *Environmental regulations and technological change in the offshore oil and gas industry*, 81 LAND ECONOMICS 303 (May 2005).

19. The motion filed by the Western Energy Alliance and the Independent Petroleum Association of America does not directly incorporate economic analysis, but instead cites to the declaration of Kathleen Sgamma of the Western Energy Alliance, which in turn, uses a supporting memo from John Dunham and Associates (JDA Memo)[24] as the primary basis for claiming that Rule compliance costs were underestimated.

20. The JDA Memo claims that the BLM did not include potential market impacts into their compliance cost calculations. Without providing any supporting analysis, economic rational, or citations to data, the JDA memo asserts that approximately 112 million barrels of oil will not be produced due to the compliance costs of the Rule. This assumed lost production is then translated into the alleged economic impacts of lost jobs, income, and output. Finally, the JDA memo uses this estimated lost output and associated state and federal taxes, including estimated indirect and induced effects, as the basis for claiming $1.26 billion in compliance costs compared to the BLM's estimate of $117-$174 million in compliance costs. Notably, the JDA memo ignores revenue generated from captured gas due to complying with the Rule, assigning captured gas a market price of $0.

[24] *Cost-Benefit Analysis of the Impact of Onshore Oil and Gas Leasing (43 CFR 3100), Onshore Oil and Gas Operations (43 CFR 3600), Royalty-Free Use of Lease Production (43 CFR 3178), and Waste Prevention and Resource Conservation (43 CFR 3179)*, John Dunham and Associates (April 12, 2016), *available at* www.regulations.gov, Docket ID No. BLM-2016-0001, Comment No. BLM-2016-0001-8313.

21. The JDA Memo is fundamentally flawed because its analysis cannot be checked or replicated—JDA did not cite to any dataset, detail any of the assumptions for its economic model, or provide its methodology. Furthermore, JDA overstates compliance costs because the memo: 1) ignores the revenue produced from capturing methane; and 2) misleadingly includes distributional impacts with compliance costs. Inaccurate and contradictory assumptions render the JDA memo critically flawed and unable to stand up to economic scrutiny.

22. The JDA memo ignored revenue generated by the Rule by erroneously assuming a price of zero for captured natural gas. A key assumption in the JDA memo is that the natural gas market is so flooded with excess supply that any methane captured as a result of the Rule has zero economic value, and hence will not produce any revenue to cover the compliance costs. This is simply not true—natural gas sold, whether produced by a well or captured by fixing leaks, will have a marginal value equal to the market price for natural gas.

23. We question how JDA can assume on the one hand that undeveloped oil and gas in the ground can generate so much revenue as to spur almost a $1 billion of output; but on the other hand that natural gas captured due to Rule compliance is assumed to have a price of $0 and would not generate any output. A meaningful portion of the estimated 111 Bcf of annual gas vented and flared on

Federal and Indian leases[25] is likely to be captured and brought to market under the Rule. This marketed new gas will generate significant revenue, or cost savings, for operators, which can spur substantial positive economic impacts in jobs and output.

24. Importantly, the JDA Memo has also erroneously conflated economic impacts with costs and benefits calculated in economic efficiency analysis. This is a critical flaw and an incorrect economic representation of reality. Economic impacts are the changes in market indicators associated with employment, income, output, and taxes. Costs and benefits in economic efficiency analysis, on the other hand, are economic values associated with the compliance costs and revenue generated, along with subsequent societal costs and benefits from implementing the rule. Therefore, the alleged lost output in oil and gas sectors by JDA should not be confused with compliance costs and benefits. Following standard economic theory, BLM separately evaluated market impacts as distributional effects in the RIA. To illustrate the breakdown of the conflated JDA claims of economic harm we summarize these cost claims in Table 1.

Table 1: Breakdown of JDA Alleged Rule "Costs" of $1.26 Billion

JDA Estimated Cost	Amount ($million)	Actual Economic Description	Comments
Output (Direct	$539	Economic Impact	Excludes increased output

[25] RIA 3.

Effect)			from captured gas and new leak detection jobs
Output (Indirect and Induced Effects)	$438	Secondary Economic Impact	Excludes increased secondary output from captured gas and new leak detection jobs
Taxes	$114	Economic Impact	Excludes new taxes from increased gas sales.
Compliance Costs to Operators	$174	Cost in Cost/Benefit Analysis	Same as high end BLM estimate.

25. In addition to conflating economic impacts and economic efficiency analysis, the suggested economic impact losses by the JDA memo are poorly evaluated and inaccurate. The basis for their conclusions is the unsupported claim that 112 million barrels of oil will not be developed if the Rule is implemented. While the JDA Memo states that based on "JDA's dynamic model of the oil and natural gas industry, it is likely that as many as 4,700 fewer oil wells would be undertaken as a result of the rules," supporting evidence for this assumption is completely missing. Furthermore, as discussed above, there is no accounting of the increased gas revenue and output from captured methane that would counteract any lost output from oil not developed.

26. From this dubious claim, the JDA memo then goes on to assume that all of the associated jobs and output taken to produce 112 million barrels of oil will also be lost to the industry. These associated economic impacts were first presented as direct effects, with the associated amount of annual output from not

developing 112 million barrels of oil claimed to be $540 million. But JDA's estimate of lost output is approximately $980 million, almost double their claimed direct effect. Without any basis, JDA assumes that the indirect and induced effects of lost oil output will also be lost. Essentially, JDA claims that the associated output needed to supply the oil and gas industry, and the induced wages of oil and gas workers will also be lost. This series of logical leaps, untethered to clear assumptions or methodology, opaquely produces JDA's claim of almost $1 billion in industry output losses.

27. Additional critical economic flaws and assumptions in the JDA memo include ignoring the jobs created by greater monitoring and waste prevention efforts. We fail to see how an objective analysis of economic impacts of the Rule could not also include the jobs and output that will be generated in the industry conducting leak monitoring and repair, adding gas capture infrastructure, and perhaps most importantly, the positive economic impacts that stem from increased capture of currently leaked, vented, or flared gas. It is important to present and understand *net* economic effects, as opposed to isolating one or two speculative effects on which to base an entire claim.

28. As discussed, changes in economic output are not "costs" or "benefits" in cost/benefit analysis—they represent distributional changes. Even looking at JDA's claimed economic impacts in isolation, however, the JDA memo claims

of over $1 billion in lost output and taxes are extremely unlikely and devoid of any supporting economic theory.

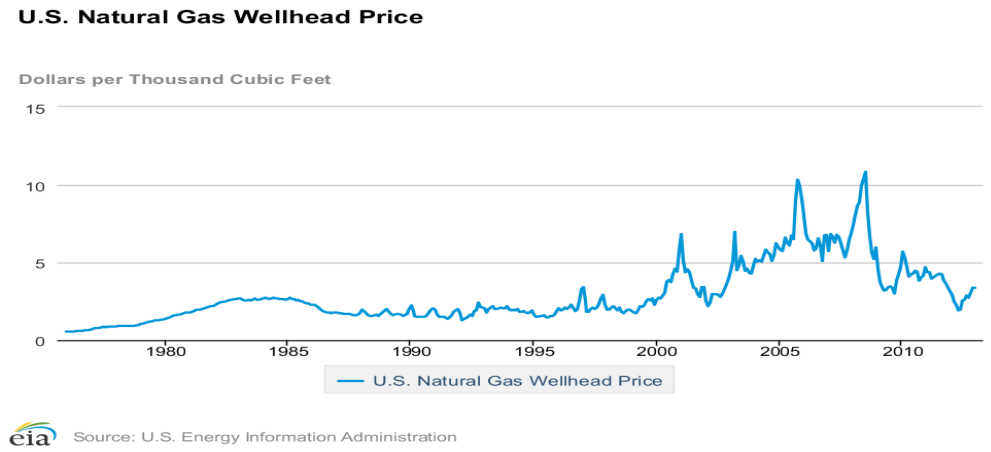
IV. BLM PROPERLY USED A RANGE OF COMMODITY PRICES REFLECTIVE OF CURRENT AND HISTORIC PRICES TO CALCULATE COSTS AND BENEFITS IN THE RIA.

29. The JDA Memo claims that BLM's estimate of gas prices was "inflated," resulting in overstated benefits and understated costs. WEA and IPAA also make claims of inflated commodity prices being used by the BLM to determine cost savings and subsequent benefits.

30. The claims that BLM's benefits were inflated by using higher commodity prices than existed a year ago are fundamentally flawed and incorrect. The BLM used a range of prices over time to account for market volatility when determining benefits. However, even in examining the Rule under the lowest market prices modeled in isolation, or depressed market years, we believe the benefits still outweigh the overall costs.

31. Although peer reviewing the JDA memo is not possible—due to the lack of transparency in data, methods and assumptions —it appears that the authors did not model change in prices over time, unlike BLM's analysis. Instead, JDA overstates the potential costs of the rule as they assumed a static, permanently flooded natural gas market in which record low prices would persist for the foreseeable future.

32. Conversely, in both the draft and final RIA, the BLM modelled a dynamic natural gas market by allowing price to change based on forecasts from the Energy Information Administration. Markets are dynamic, not static. The following graph shows the volatile and dynamic nature of natural gas prices over the last 40 years. Consistent with rigorous economic analysis, BLM used a range of resource values based on projections of oil and gas prices over time in its cost/benefit analysis.[26]



33. Moreover, in response to industry comments on the Draft RIA, the BLM took a conservative approach, downwardly adjusted forecasted market prices to account for a lower price received by upstream producers for unprocessed gas/oil. From the Final RIA:

> Using ONRR data for 2015, we determined that it is reasonable to assume that an operator might receive prices for natural gas and

[26] Morton, P., C. Weller, J. Thomson, M. Haefele, and N. Culver, *Drilling in the Rockies: How much and what cost?*, Special Energy Session of the 69th North American Wildlife and Natural Resources Conference, Wildlife Management Institute (2004).

> crude oil that are about 75% and 98%, respectively, of the published index prices…Given additional feedback that the price received for natural gas could be even lower, we determined it was appropriate to assume a natural gas price that was 75% of the EIA's projections. Table 7-5 shows the projected commodity prices used in this analysis.[27]

34. Table 2, reproduced from the Final BLM RIA Table 7-5, shows the natural gas prices used in the analysis. Of note, current Henry Hub forward prices for natural gas are greater than EIA forecasted prices for 2017.[28]

Table 2: Crude Oil and Natural Gas Price Forecasts, 2017 – 2026

Year	EIA Forecast – Crude Oil – West Texas Intermediate Spot ($/bbl)	Crude Oil Price Used in this Analysis ($/bbl)	EIA Forecast – Natural Gas – Spot Price at Henry Hub ($/Mcf)	Natural Gas Price Used in this Analysis ($/Mcf)
2017	48.08	47.12	3.19	2.39
2018	51.53	50.50	3.73	2.80
2019	64.24	62.96	4.14	3.11
2020	71.12	69.70	4.58	3.43
2021	75.37	73.86	4.47	3.35
2022	78.71	77.14	4.49	3.37
2023	81.06	79.44	4.89	3.67
2024	82.93	81.27	5.16	3.87
2025	85.41	83.70	5.29	3.97
2026	88.40	86.63	5.15	3.86
2027	92.96	91.10	4.95	3.83
2028	95.33	93.42	5.00	3.87
2029	97.06	95.12	5.05	3.91
2030	100.28	98.28	5.06	3.91
2031	103.50	101.43	5.01	3.88
2032	106.81	104.68	5.03	3.90
2033	110.31	108.11	4.98	3.85
2034	112.45	110.20	4.96	3.84
2035	116.14	113.81	4.91	3.80
2036	118.35	115.98	4.90	3.79

[27] RIA 39.

[28] RIA at 40; WRTG Economics, *Natural Gas Spot Henry Hub*, http://wtrg.com/daily/ngspot.gif.

2037	122.09	119.64	4.84	3.74
2038	124.95	122.45	4.78	3.70
2039	129.11	126.52	4.85	3.75
2040	92.96	91.10	4.86	3.76

35. These future price scenarios are consistent with historical prices and represent the price environment that operators will likely experience in future years when compliance requirements actually take effect.

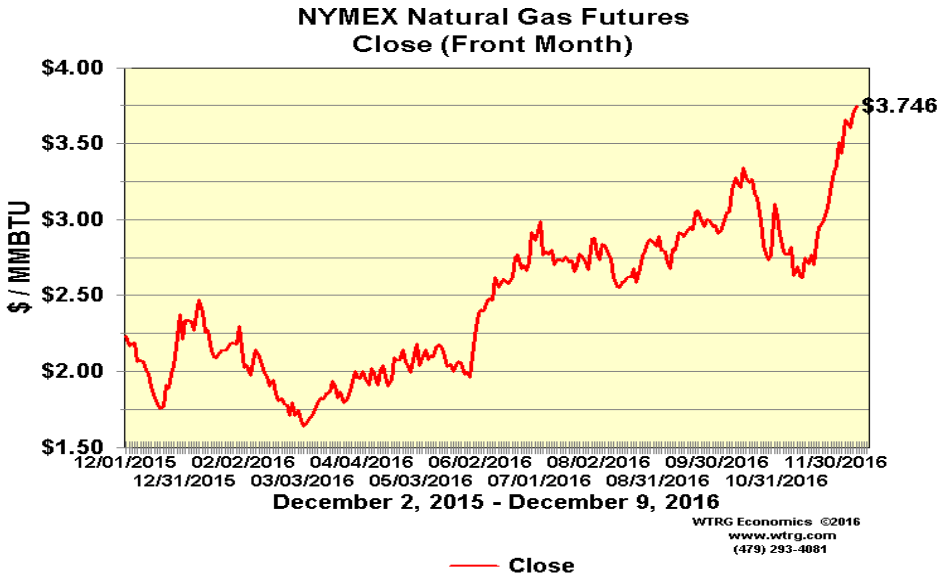
36. WEA and IPAA forward similar critiques,[29] claiming that the BLM used $4/Mcf to estimate costs savings generated by selling newly captured gas, which are allocated as overall benefits of the Rule. However, these claims incorrectly use an example value used for an illustration by the BLM[30] and claim this value is used for all the cost/benefit analysis. This is incorrect. As is apparent from a review of the natural gas prices in the Table 2, the BLM did not use a price of $4 per Mcf to calculate the estimated cost savings (or benefits) from the Rule and no such "fatal flaw" exists in the RIA.

37. In the past 9 months since the JDA memo was released, the "flooded" natural gas market has started to clear and natural gas prices have more than doubled. As a result of this erroneous static market assumption—and the reliance on record low prices—the JDA memo overestimates the potential economic costs from the BLM Rule.

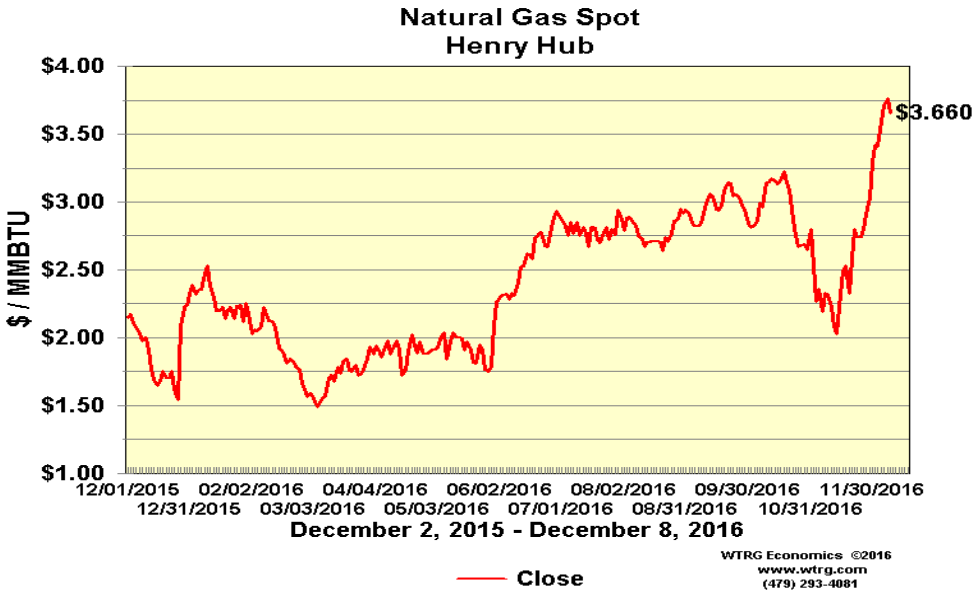
[29] Indus. Memo. 45.
[30] RIA 3.

38. Natural gas prices have risen to over $3.50/Mcf—more than twice the $1.40/Mcf cited in the JDA memo—and in line with both BLM's assumptions in the RIA and historical and projected prices. The increase in natural gas prices illustrates that the markets are not static, as assumed by JDA. The recent price increase further undercuts the previously discussed assumption by JDA that any methane captured due to low prices will have zero value in the market place.

39. The following graph illustrates the recovery in natural gas prices since the Dunham memo was released.[31]



[31] WRTG Economics, *NYMEX Natural Gas Futures Close*, http://wtrg.com/daily/gasprice.html; WRTG Economics, *Natural Gas Spot Henry Hub*, http://wtrg.com/daily/ngspot.gif.



40. The results from the JDA memo are based on natural gas prices that are much lower than current and projected prices. As a result of these inaccuracies, JDA's assessments of costs and distributional impacts, i.e. the well closures, job and revenue lost, are fundamentally flawed because they rely on depressed and inaccurate natural gas prices. All declarations that reference the results from the JDA Memo therefore also overstate net economic costs.

41. The recent short term forecast from EIA states: "Growing domestic natural gas consumption, along with higher pipeline exports to Mexico and liquefied natural gas exports, contribute to the Henry Hub natural gas spot price rising from an average of $2.49 per million British thermal units (MMBtu) in 2016 to $3.27/MMBtu in 2017." [32]

[32] U.S. Energy Information Administration, *Short Term Energy Outlook*, http://www.eia.gov/outlooks/steo/.

42. Rising gas prices reveal the fundamental errors in the gas price critique—that it is based on a limited, historical snapshot that is inconsistent with current and future projected prices. These inaccurate assumptions, along with the other flaws in the analyses, dramatically overstate any possible compliance costs of the Rule and their potential impacts.

43. Finally, if the Rule is examined under the lowest projected market prices modeled in isolation, the benefits will likely still outweigh the overall costs, since the Rule has significant monetized benefits that are not tied to the sale of captured gas.[33]

V. THE RULE IS UNLIKELY TO CAUSE LOSSES IN OIL AND GAS EMPLOYMENT, TAXES, OR ROYALTIES.

44. Petitioners also claim that the Rule will have adverse effects on oil production, royalties and jobs. Each of these claims depends upon Petitioners' assumptions concerning reduced or deferred production.

45. All claims that the Rule will lead to adverse effects on industry employment, taxes, and royalties are speculative and without economic merit. Based on transparent data and methods used by the BLM, we believe the Rule will likely have a neutral or positive effect on employment and a positive effect on taxes, and royalties.

[33] *See* RIA 5-6.

46. Petitioners' claims are flawed on several levels. First, as with their compliance cost and price critiques, they offer no support for their claims nor any transparent assessment of the analysis or methodologies used to establish their conclusions. This is especially problematic with respect to their assessment of jobs, taxes, and royalties—distributional impacts that rely on layers of assumptions that are neither available nor readily identifiable based on petitioners filings.

47. For instance, the North Dakota supporting memo references a North Dakota employment study that has not been attached nor is it available. The only referenced study that is available and has examined potential economic effects of the Rule are the API comments. The API comments suggest that the BLM has underestimated compliance costs (as discussed above, BLM properly estimated compliance costs) and that the based on the market price for oil from spring of 2016, more leases may be at risk of being uneconomical than the number of at-risk leases assumed in the BLM's analysis. Both of these claims suffer from the same deficiencies identified in our above compliance-cost analysis.

48. Second, BLM has included express exemptions in the final rule aimed at mitigating the distributional impacts claimed by Petitioners. As discussed above, provisions in the rule include exemptions to allow operators to avoid

compliance if doing so would otherwise result in loss of substantial amounts of recoverable oil, or in some cases, are "unduly costly."[34] As the Final Rule states, the "final rule requires an operator to make a demonstration that each requirement for which the operator is requesting an exemption would itself cause the operator to cease production and abandon significant recoverable reserves on the lease."[35] Thus, if any operators would otherwise be forced to shut-in wells, abandon significant recoverable reserves, or face undue costs, these operators could seek exemption from the Rule and the claimed economic loss or deferral of production would not occur.

49. Finally, even absent these compliance provisions, as discussed above the minimal compliance costs are unlikely to affect overall industry production and are phased in over a number of years. Coupled with fact that compliance costs will be counteracted by increased revenue coming from newly marketed gas, and the far more prominent role resource prices have in affecting development decisions, we agree with BLM's findings of minimal effects on overall production.

50. Petitioners' claim of lost jobs and royalties are derived from their claims about foregone production suffer from the same flaws discussed above. In addition, however, Petitioners' jobs analyses fail to account for the fact that compliance

[34] 81 Fed. Reg. at 83,012.
[35] 81 Fed. Reg. at 83,041.

with the rule will generate additional revenues due to increased capture, and likewise will likely generate employment in areas needed to demonstrate compliance with the rule, including new engineering, consulting, and gas gathering jobs.

51. Claims of economic harm in terms of lost state and federal taxes and royalties are also very unlikely to occur. As described above, it is unlikely that the BLM Rule will have a negative effect on oil and gas production. When accounting for the output and jobs that will be spurred by the Rule, in terms of equipment installation and increased marketable production, both state and federal taxes and royalties are likely to increase and not decline. In cases of deferred production, royalties and taxes will be generated at the time production resumes. On the other hand, waste of oil and gas represents a permanent loss of royalties. It is important to note that any claims of lost royalties from deferred production should consider the future economic impact of these deferred royalties.

VI. THE RULE WILL NOT RESULT IN LOST REVENUES DUE TO PERMITTING DELAYS.

52. Based primarily on the Helms declaration,[36] Petitioners claim that the Rule will cause delays in permitting, which they assert will result in lost royalty revenue

[36] Declaration of Lynn D. Helms in Support of State of North Dakota's Motion for Preliminary Injunction (December 5, 2016)(ECF 40-2).

and taxes. Helms asserts that the Rule will result in a 50 percent decline in oil and gas production in North Dakota.[37] Helms claims that the assumed decline in production will result in lost royalties and taxes of $150 million in FY 2017, $550 million over the next two years, and $18 billion over the next 30 years.

53. To derive these estimates, Helms assumes (without any quantitative basis other than his experience) that the Rule, and in particular the requirement to submit a waste minimization plan along with the rule, will double the time it takes the BLM to approve a drilling permit. Helms further assumes, once again without reference to any factual basis, that the rate of oil and gas production and the associated revenues for the state of North Dakota will be reduced by 50%.

54. Helms's methods for estimating the potential decline in production and lost royalties and taxes are unreliable. He offers no basis to support his assertion that the Rule will increase permitting times by 6 months. Furthermore, permit approval times are generally not the predominant factor determining drilling rates—which, as discussed above, is largely driven by the market price of oil and gas. Helms's estimates of lost royalties and taxes cannot be reconciled with the other information he provided in his testimony. Finally, the lack of approved drilling permits is not a binding constraint on oil and gas production from federal lands. Industry has a ready supply of already approved drilling

[37] Helms Decl. ¶ 30.

permits available, which undercuts Petitioners' arguments about delay-based harms in the short term.

55. Helms offers no basis for his assumption that the BLM Waste Minimization Rule will increase all Application for Permit to Drill (APD) approval times by six months. In his declaration, Helms claims permitting delays are attributable to the need for operators to file waste minimization plans (WMPs) "on more than 900 wells already permitted by the NDIC and on an additional 100 to 250 wells per month over the next 10 to 12 years."[38] The declaration does not provide support for why the WMP—a required submission, the terms of which are unenforceable against the operator—would result in such delays.

56. Furthermore, a change in APD approval time alone is an incomplete and poor proxy for estimating the change in future production and revenue. The level of drilling and production is influenced by both the pace at which drilling permits are approved and the scale of permits submitted and the number of active rigs. Future production cannot be predicted based solely on the change in permit approval time. Additionally, there is no basis for the assumption that production would decrease in direct proportion to an assumed increase in approval time.

[38] Helms Decl. ¶ 28.

57. In addition to geologic considerations, two key variables for estimating the rate of future drilling and production are pace and scale.[39] Pace indicates the speed with which an area is developed – in many instances a large number of wells are drilled in a very short time. Scale indicates the geographic or spatial extent of development – the recent drilling boom has spread across a large geographic area. Scale of development is largely driven by commodity prices and the cost of extraction.

58. For purposes of our analysis, the time it takes to approve a drilling permit will serve as a proxy for pace, while the number of drilling permit applications and active rigs are proxies for scale. The future level of drilling and production is positively correlated with the number of active rigs and scale of permits submitted for approval, which are influenced by market price. While the pace of drilling in the form of permitting approval time has some influence, the scale of drilling, and hence production, is more a function of market price.[40] While BLM or States can control the pace at which APDs are approved, neither the agency, the states, nor local communities can control the market price for oil and gas.

[39] Haefele, M., and Morton, P., *The Influence of the Pace and Scale of Energy Development on Communities: Lessons from the Natural Gas Drilling Boom in the Rocky Mountains*, Western Economics Forum Vol. VIII, No. 2 (2009).
[40] Haefele, M., and Morton, P., *The Influence of the Pace and Scale of Energy Development on Communities: Lessons from the Natural Gas Drilling Boom in the Rocky Mountains*, Western Economics Forum Vol. VIII, No. 2 (2009).

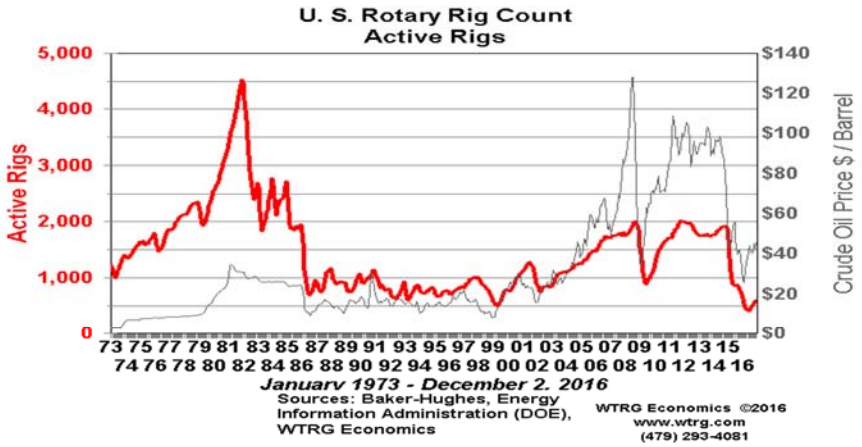
59. Helms in his declaration estimates, based on his professional judgement, that the Rule will add 6 months to the time it takes to process a drilling permit. It is not clear how he arrives at this conclusion. Based on this assumption, Helms estimate the BLM permitting time will double from 6 months to 12 months.

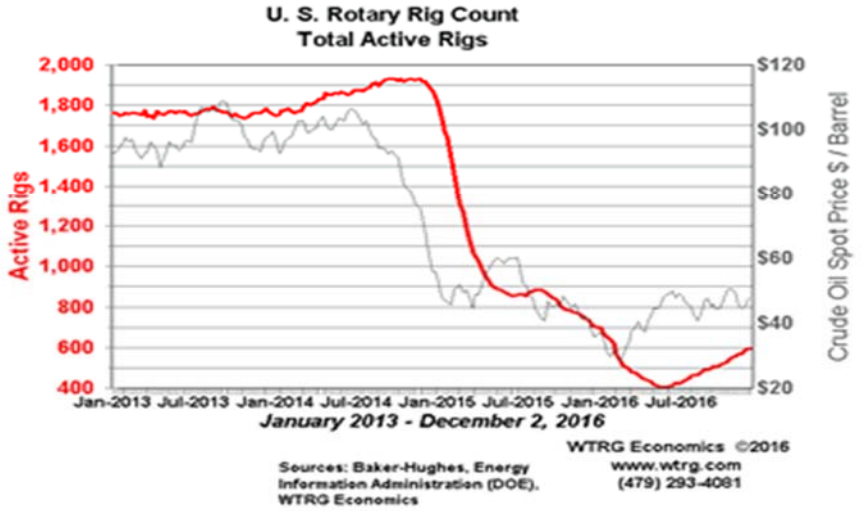
60. Helms further assumes that since time needed to get a drilling permit will double, that the rate of oil and gas production and the associated revenues for the state of North Dakota will be reduced by 50%.

61. We respectfully disagree with Helms's assumption. We do not believe, nor have we found literature supporting the proposition that there is a direct correlation between the change in APD approval time and the rate of production. Helms provides no quantitative analysis to support such an assumption. Without any supporting quantitative analysis, it's a major leap of logic to assume that a doubling of permitting time will automatically lead to oil and gas production being cut in half.

62. The rate of production from new wells is determined by a number of things including the number of drilling rigs active, which is a primarily a function of the price of oil or natural gas. The graphs below show the positive relationship between active drilling rigs and the price of oil.[41]

[41] WRTG Economics, Rotary Rig Count, http://wtrg.com/rotaryrigs.html.





63. For example, high oil prices can increase the number of active rigs, permit applications, and hence future production, even if permitting time has doubled. Conversely, if the BLM cuts the APD permit time in half, production is very unlikely to double – especially if prices are too low to spur investment in new wells. Permitting time is not a binding constraint on oil production. Therefore, reducing permitting time will not directly lead to an increase in production.

64. Consider the following example to highlight Helms's assumption. To start, we will assume a BLM drilling permit approval time of 6 months and a production

level of 1 million barrels. Using the Helms assumption of correlation, the BLM can double oil and gas production to 2 million barrels by simply reducing approval time to 3 months. Production can then be doubled again to 4 million barrels by dropping approval time to 90 days. With further streamlining of the permitting process to reduce approval time to 45 days, oil production is assumed to increase to 8 million barrels of oil. And when the BLM gets its approval time down to 22.5 days – production increases to 16 barrels of oil. We seriously doubt anyone could believe that oil production in a state can increase 16-fold simply by reducing the time it takes to approve a drilling permit from 6 months to 22.5 days.

65. The costs of extraction and the price of oil play a critical role that is ignored when relying solely on permit approval time to predict oil and gas production levels. Overall, APD permitting time is an incomplete and poor proxy for estimating production levels or economic efficiency.

66. Finally, because industry has a supply of approved APDs, the lack of approved drilling permits is not a binding constraint on oil and gas production from federal land. Based on data from the BLM, the oil and gas industry currently has a ready supply of over 7,500 already-approved drilling permits that will

enable operators to increase production if market conditions warrant it.[42] These approved AAPDs last for up to 4 years, expiring after 2 years with one extension of an additional 2 years.

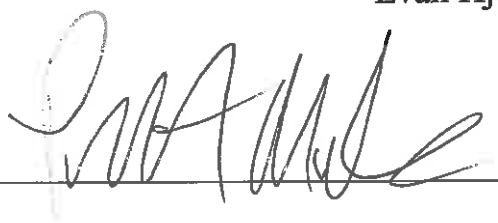
67. The availability of AAPDs undercuts industry arguments about harm associated with approval delays in the short term. If operators plan to increase production in the next year, there are a significant number of available AAPDs to draw upon.

[42] BLM, Approved Applications for Permit to Drill - Not Drilled (September 30, 2015), *available at* https://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/statistics.html.

I declare under penalty of perjury that the foregoing is true and correct.

Evan Hjerpe

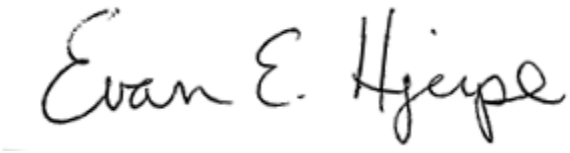
Dated December __, 2016



Pete Morton

Dated December 15 2016

I declare under penalty of perjury that the foregoing is true and correct.



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Visiting Assistant Professor for the School of Forestry at Northern Arizona University: January--June 2007;

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- Identified and evaluated socio-economic impacts to river users and surrounding communities
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Recent Publications:

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