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*State of New Mexico*  
**LEGISLATIVE FINANCE  
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August 25, 2021

Mr. James Kenney, Cabinet Secretary  
New Mexico Environment Department  
1190 St. Francis Drive, Suite N4050  
Santa Fe, NM 87505

RE: New Mexico Environment Department's Proposed Ozone Precursor Rule

In response to the governor's executive order on addressing climate change and energy waste prevention, the New Mexico Environment Department has proposed a new rule to reduce volatile organic compounds (VOCs) that will be presented to the Environmental Improvement Board (EIB) on September 20, 2021. The Legislative Finance Committee is concerned about the potential fiscal impact of the rule as written on the state's oil and gas industry, particularly on small and independent producers operating low-volume oil and gas wells in New Mexico.

An analysis conducted by John Dunham and Associates (JDA) – an economic research firm specializing in tax and regulatory policy – determined the proposed rule could affect roughly 97.3 percent of existing oil and natural gas wells in New Mexico. The study finds compliance with the proposed ozone precursor rule would cost operators \$3.2 billion in the first year and \$3.8 billion over the course of five years. The equipment and operational costs necessary for compliance with the rule are expected to be especially burdensome for mature wells that produce low volumes of oil and natural gas. In testimony submitted to the EIB, the New Mexico Oil and Gas Association and the Independent Petroleum Association of New Mexico reported the costs necessary to comply with the proposed rule would lead a large number of oil and gas wells in the state to become uneconomical and cease production. This would occur because the upfront cost of the required equipment and ongoing compliance costs exceed the expected operating profit of such low rate wells for so long that operators simply cannot justify the expense.

The JDA study estimates the proposed rule would cause as many as 37 percent of currently operating oil wells and 87 percent of operating natural gas wells to become uneconomical after accounting for increased regulatory costs. JDA finds the rule would lead to about a 12.9 percent oil production decline in the state and 22.8 percent decline in natural gas production. JDA also finds impact to producers could lead to a loss of as many as 3,217 jobs in the petroleum production industry in New Mexico.

Using the production impact analysis by JDA, the New Mexico Tax Research Institute (NMTRI) estimates the total annual cost impact of the proposed rule to the state and local governments would be \$730 million, of which \$569 million would be a loss in state revenue and \$160 million would be a loss to local government revenue. NMTRI's revenue impact analysis considers losses in severance taxes, federal and state royalties, and ad valorem taxes due to lost production, as well as losses in gross receipts and income taxes due to reduced economic activity and potential job losses.

Of the total estimated costs, NMTRI finds the potential reduction in oil and gas production in the state would cost \$482 million in lost production taxes and royalties alone, of which \$213 million would be losses to the general fund, with the remaining impact to the severance tax bonding fund, land grant permanent fund, oil and gas reclamation fund, and local governments. NMTRI also finds the direct, indirect, and induced impacts on state and local revenues -- including sales taxes, income taxes, and property taxes -- would be \$119 million and \$128 million, respectively.

Given the potential substantial impact of the proposed rule to state revenues, and therefore to the state budget, the Legislative Finance Committee is seeking clarification from the department on the following questions.

Did NMED conduct an evaluation of the economic and revenue impacts to state and local governments prior to developing the rule? If so, what were the results of the department's analysis?

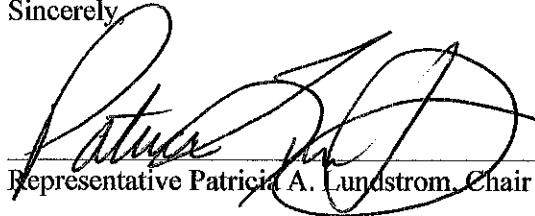
What is NMED's response to the JDA analysis on the potential oil and natural gas production impact of the proposed ozone precursor rule? How many oil and gas wells in the state does the department believe would become uneconomical if the rule is approved by the EIB in its current form, and what is the potential impact to the state's oil and natural gas production if those wells were to shut-in as a result of the rule's implementation?

How does NMED intend to address the concerns of New Mexico's oil and natural gas operators that a large number of the state's oil and natural gas wells will become uneconomical if the rule is implemented in its current form?


Our understanding is the current draft of the proposed rule contains an exemption for small businesses with no more than 10 employees and a gross annual revenue of less than \$250 thousand. However, the Independent Petroleum Association of New Mexico's testimony submitted to the EIB states that, as drafted, the "definition of 'small business facility' is so limiting that few, if any, oil and gas operators in New Mexico could qualify." What is NMED's response to this statement? What are other options NMED could consider that would address the intended goals of the proposed rule while providing regulatory relief to small oil and gas operators in the state, particularly those that operate wells with a low propensity for VOC emissions?

Please address these questions and any other issues NMED deems relevant to the proposed ozone precursor rule, as the potential economic and revenue impact to the state is a matter of great importance to the committee.

Sincerely,



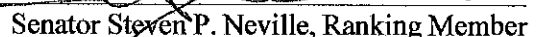
Representative Patricia A. Lundstrom, Chair



Senator George K. Munoz, Vice Chair



Representative Randal S. Crowder, Ranking Member



Senator Steven P. Neville, Ranking Member

Cc: Members, Legislative Finance Committee

Attachments: Memo from John Dunham and Associates; Memo from New Mexico Tax Research Institute



## MEMORANDUM

TO: New Mexico Oil & Gas Association  
FROM: John Dunham, Managing Partner  
DATE: June 13, 2021  
RE: Estimated Costs of Proposed Ozone Precursor Rule on Oil and Natural Gas Development in New Mexico

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The New Mexico Environment Department is proposing a regulation for adoption by the New Mexico Environmental Improvement Board that will impact the development of the petroleum industry in New Mexico, by requiring new standards and monitoring of certain production facilities in the state.<sup>1</sup>

The following is an updated examination of the potential cost of this new rule on oil and natural gas producers in New Mexico, along with an economic impact analysis of the effects of these costs.<sup>2</sup> The analysis is being done using a model developed for the Western Energy Alliance by John Dunham & Associates in 2018, updated to reflect current well counts and petroleum prices in the state of New Mexico.

### Summary

Based on data gathered from operators in New Mexico, the state and federal governments, and a model developed for the Western Energy Alliance in 2018, the proposed rule enacted in New Mexico would cost operators as much as \$3.2 billion to comply with in the first year, and a discounted \$3.8 billion over the course of 5 years.

**Table 1**  
**Summary of Costs to the Oil and Natural Gas Industry in New Mexico Resulting from Proposed Ozone Precursor Rule**

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	Proposed Rule
Administrative Costs	\$ 352,565
Operational Costs	\$ 3,248,759,403
Total Costs	\$ 3,249,111,968
<hr/>	
5-Year Costs	\$ 3,852,291,118
NPV 5-Year Costs	\$ 3,830,083,361

The increased costs would force operators to shut down marginal wells and forfeit the development of new plays in the state. This could lead to a loss of as many as 3,217 jobs in the petroleum production industry in New Mexico and cost the state's economy \$674.2 million annually. In addition, the state and its localities would receive almost \$22.9 million less in tax revenue from businesses and employees in the oil and gas industry. This does not include reduced royalty and severance tax revenues resulting from lower production.

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<sup>1</sup> *Environmental Protection, Air Quality (Statewide), Oil and Gas Sector – Ozone Precursor Pollutants, Proposed Rule, New Mexico Environmental Improvement Board, May 6, 2021.*

<sup>2</sup> An earlier analysis was conducted by John Dunham & Associates in September of 2020.

**Table 2**  
**Economic Cost of the Proposed Ozone Precursor Rule on New Mexico's Economy**

	Jobs	Wages	Economic Output
Direct	(1,207)	\$ (108,284,469)	\$ (358,590,607)
Supplier	(623)	\$ (39,377,218)	\$ (119,562,267)
Induced	(1,387)	\$ (62,141,272)	\$ (196,008,679)
Total	(3,217)	\$ (209,802,960)	\$ (674,159,553)
State and Local Business and Personal Taxes			\$ (22,862,830)

### The Model

In order to determine the economic impact of the new ozone precursor rule on the oil and natural gas industry in New Mexico, it is necessary to determine exactly how it would impact overall costs. As costs for developing projects rise, the number undertaken will fall. The key is to determine how the restrictions will impact:

1. Direct costs: For example, costs related to additional equipment;
2. Financial costs: Or those related to the cost of money resulting from increased delays;
3. Input prices: Higher costs for equipment and crews resulting from increased demand;
4. Revenues: Reduced revenues resulting from both wells not drilled and delays in well servicing.

These additional costs are run through the oil and natural gas well model developed for Western Energy Alliance by John Dunham & Associates (JDA) in 2018. The model was updated to reflect the current number of operating oil and natural gas wells in New Mexico,<sup>3</sup> as well as current average prices for oil at the wellhead in New Mexico, and the citygate price for natural gas in the state.<sup>4</sup>

These figures are linked to the economic impact model and from that an estimate of lost jobs, economic activity and taxes are developed.<sup>5</sup>

The Western Energy Alliance model is based on a wide range of data sources and assumptions, each of which impacts the final results. JDA has striven to ensure that the assumptions are as cautious as possible leading to what is likely a low estimate of the overall cost of the proposed rule. Each of these assumptions, along with the data used in the development of the models, is detailed below:

Average Drilling Costs are estimated based on data derived from the US Department of Commerce, Bureau of Economic Analysis by IMPLAN Inc. in 2016. These data come from the Input/Output accounts of the United States. These data present detailed figures on the input costs for oil and gas well drilling including wages, capital costs, leasing costs, and costs of various materials and services used in the drilling and completion of oil and gas wells. The data are from 2016. The figures used in this model are based on the average cost per dollar of output (basically sales) multiplied by the estimated sale of oil and natural gas in each state as of 2020. Annual

<sup>3</sup> *OCD Well Statistics*, State of New Mexico, Oil Conservation Division, January 28, 2021 at: <http://www.emnrd.state.nm.us/OCD/statistics.html>.

<sup>4</sup> Wellhead price data are not available.

<sup>5</sup> Western Oil & Natural Gas Employs America, John Dunham & Associates for Western Energy Alliance, 2018.

average prices and production volumes by state are gathered from the US Department of Energy.<sup>6</sup> Costs are divided between exploration/leasing/permitting, drilling and completion, with the distribution between these two processes based on the type of input and labor costs. About 52.4 percent of the drilling/completion cost is assumed to be for drilling and the rest for completion.<sup>7</sup>

Production Costs are estimated based on data derived from the US Department of Commerce, Bureau of Economic Analysis by in 2016. These data come from the Input/Output accounts of the United States. These data present detailed figures on the input costs for oil and gas production including wages, capital costs, leasing costs, and costs of various materials and services used in the exploration/leasing/permitting, production, infrastructure development and reclamation of oil and gas plays. The data are from 2016. The figures used in this model are based on the average cost per dollar of output (basically sales) multiplied by the estimated sale of oil and natural gas using the latest data available. Annual average prices and production volumes by state are gathered from the US Department of Energy.<sup>8</sup> Costs are divided between different activities based on the type of input and labor costs are divided based on input commodity and service costs.

Anticipated Revenues are based on data from the US Department of Energy. It is simply equal to the annualized price of either oil or natural gas at the wellhead (by state), multiplied by annual production.<sup>9</sup> Revenues per well cannot be derived simply by dividing this by the number of producing wells since oil and gas wells tend to have either a hyperbolic or an exponentially declining production trend. Based on discussions with industry principals, a well will generally not be drilled and put into production unless it can recoup at least the direct drilling costs in the first year after completion. Using this assumption and a simple declining exponential function, the model suggests that about 97 percent of the production occurs in the first 4 years after drilling. The four-year production total (multiplied by the current price of either oil or gas) was used to estimate total revenue per well. Operating costs were then multiplied by 4 to reflect the economic life of each well.

The Number of Wells To Be Drilled is estimated based on data from individual state permitting authorities. Each authority uses different methods to identify whether wells are gas or oil (or both) and the wells' stage in the production process. While complete standardization between the states is not possible, in general it is possible to label a well as oil or gas, or as being in some stage of pre-production.

The Number of Producing Wells is also estimated based on data from individual state permitting authorities. Again, each authority uses different methods to identify whether wells are gas or oil (or both) and the wells' stage of production. While complete standardization between the states is not possible, in general it is possible to label a well as oil or gas, and that it is in some stage of production. Water wells, disposal wells, capped wells, injection wells, and other operations not directly used to extract petroleum are not included.

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<sup>6</sup> See *Domestic Crude Oil First Purchase Prices by Area*, US Department of Energy, Energy Information Administration, at: [www.eia.gov/dnav/pet/pet\\_pri\\_dfp1\\_k\\_a.htm](http://www.eia.gov/dnav/pet/pet_pri_dfp1_k_a.htm)

<sup>7</sup> The model is based on average costs and revenues. These can vary greatly by play, product and individual well.

<sup>8</sup> Op cit. *Domestic Crude Oil First Purchase Prices by Area*

<sup>9</sup> Ibid.

Table 3 below outlines the number of oil and natural gas wells used in the model, as well as the estimated production and prices.

**Table 3**  
**Annual Production Statistics and Assumptions for New Mexico (2020 Data)**

	Oil	Natural Gas	Total
Number of Wells			
High Production	34	219	253
Medium Production	7,089	17,550	24,639
Low Production	26,170	33,185	59,355
Total Wells	33,293	50,954	84,247
Production	Barrels	Million (Cu Ft)	
High Production	12,825,551	227,148.7	
Medium Production	262,880,023	1,473,358.6	
Low Production	103,403,426	349,916.6	
Total Production	379,109,000	2,050,424.0	
Prices	\$56.14	\$2,856.67	
Revenue	\$21,281,915,563	\$5,857,377,893	\$27,139,293,457

On a per well basis, the data suggest (Table 4) that the vast majority of oil and natural gas wells generate very little in the way of revenue, and the potential costs of the rules under consideration would be so high as to encourage operators to simply cap the wells rather than continue to produce.<sup>10</sup>

**Table 4**  
**Average Estimated Production and Revenues by Well Type**

	Oil		Natural Gas	
Average Production Per Well	Barrels (Annual)	Barrels Per Day	Million Cu Ft (Annual)	MCF Per Day
High Production	377,931	1,035	1,035	2,835
Medium Production	37,081	102	84	230
Low Production	3,951	11	11	29
Average Revenue Per Well	Annual	Per Day	Annual	Per Day
High Production	\$21,215,767	\$58,125	\$2,956,499	\$8,100
Medium Production	\$2,081,590	\$5,703	\$239,818	\$657
Low Production	\$221,811	\$608	\$30,122	\$83

Note that this does not include condensate produced in what are essentially natural gas wells as this is a very low number in the natural gas plays in New Mexico

As the analysis below will show, as wells become uneconomical due to higher regulatory costs, production slows and jobs in the industry are eliminated. Based on a model developed for Western Energy Alliance in 2018, the oil and natural gas industry is a major part of the New Mexico economy, directly employing nearly 7,740 FTE people, and creating a total of almost

<sup>10</sup> Based on data originally developed for Western Energy Alliance, 2018. These data represent production figures across most of the western part of the country. A high production oil well is considered to be one producing over 400 barrel of oil equivalent (BOE) per day, a low production well is considered to be one producing between 1 and 15 BOE per day. Data taken from *Distribution and Production of Oil and Gas Wells by State*, EIA website: [http://www.eia.gov/pub/oil\\_gas/petroleum/petrosysog.html](http://www.eia.gov/pub/oil_gas/petroleum/petrosysog.html). Data retrieved 05/06/2014

25,820 FTE jobs.<sup>11</sup> All told, the industry generated almost \$6.9 billion in economic activity in the state in 2018, and firms and their employees paid state and local governments \$233.4 million in taxes.<sup>12</sup>

**Table 5**  
**Economic Impact of Oil and Natural Gas Industry in New Mexico (2018 Baseline)**

	Jobs		Wages		Economic Output
Direct	7,737	\$	751,669,030	\$	3,978,310,389
Supplier	6,917	\$	436,862,521	\$	1,326,459,201
Induced	11,165	\$	500,176,207	\$	1,577,661,247
Total	25,818	\$	1,688,707,759	\$	6,882,430,838
State and Local Business and Personal Taxes				\$	233,404,461

### Ozone Precursor Rule

The New Mexico Environmental Improvement Board is contemplating issuing rules restricting the emission of volatile organic compounds (VOCs) and nitrogen oxides (NOx) from sources located within counties that have areas with ambient ozone concentrations in excess of ninety-five percent of the national ambient air quality standard for ozone, including but not limited to Chaves, Eddy, Lea, Rio Arriba, Sandoval, and San Juan counties. Wells located in Bernalillo County, on Tribal Lands, and in other areas that are not within the Board's jurisdiction are expected to be excluded from the rules. These rules would impact roughly 97.3 percent of the existing oil and natural gas wells in New Mexico, with the remaining facilities operating in parts of the state that are excluded from the requirements.

Based on a reading of the rule's language, oil and natural gas producers would be impacted by a wide range of requirements. According to the language in the document, there would be a minimum of 35 new administrative requirements that will need to be adhered to, as many as 16 provisions that will require additional equipment to be installed and maintained, and 46 provisions that will lead to new operational costs.<sup>13</sup>

These rules would impact the operation and maintenance of about 81,975 oil and natural gas wells in New Mexico and would lead to a reduction of further development in the state.

### Costs Associated With The Proposed Rule

#### *Administrative Costs*

The proposed ozone precursor rule implies that oil and natural gas producers in the state will be required to abide by approximately 35 new administrative requirements. Each of these will require that operators dedicate staff time that could otherwise be directed toward more productive activities. In its Regulatory Impact Analysis of similar rules conducted in 2015, the US Environmental Protection Agency (EPA) stated that recordkeeping and reporting

<sup>11</sup> See: Western Oil & Natural Gas Employs America, prepared by John Dunham & Associates for Western Energy Alliance, 2018, <https://legacy.westernenergyalliance.org/employsamerica>

<sup>12</sup> Not including taxes and royalties on oil and natural gas production.

<sup>13</sup> *Environmental Protection, Air Quality (Statewide), Oil and Gas Sector – Ozone Precursor Pollutants*, Proposed Rule, New Mexico Environmental Improvement Board, May 6, 2021.



requirements would equate to 92,658 labor hours for 2,552 facility owners and operators.<sup>14</sup> There is no source for where these data came from. This works out to an average of 36.30 hours per company.

Since this rule would apply only to wells being operated in specific parts of the state, the requirement should be adjusted to account for those operations that are in other areas. Based on wells operating in New Mexico in 2020, 97.3 percent of the operations would be covered by the rule, reducing the administrative requirement to 35.30 hours per firm.<sup>15</sup>

While these estimates are based on similar rules regarding the release of certain waste gases, those proposed rules did not include all of the databases, and data management software that would be required by the New Mexico Environment Department. The systems being envisioned by the proposed rules do not even exist, making it nearly impossible to estimate their costs. As such, the administrative costs estimated here are likely millions of dollars too low. Considering that 194 individual firms will be required to develop, or purchase, a database system that not only maintains records, but allows for remote access, this might actually be the most expensive part of the rule.

#### Database Management Systems

Database Management Systems (DBMS) can be extremely expensive. Licenses for database software alone can range upwards of \$5,000 to \$10,000 per month, not including the custom software needed for data entry and reporting.

Off the shelf well management software can cost \$600 per year per well, so a company with 100 wells would be paying \$60,000 per year just for the software.

And these costs do not include the IT staff necessary to manage the system. In New Mexico, a database administrator has an annual average wage of \$78,270, not including benefits. So even a small company would be paying a minimum of about \$150,000 per year just to maintain the required databases. The cost for larger firms would be in the millions of dollars annually.

The analysis below uses wage rates from the Bureau of Labor Statistics for May of 2020.<sup>16</sup> A mathematical median wage per hour for the occupations identified below is used. The median wage is multiplied by 1.117 to account for social insurance taxes, benefits, unemployment insurance and other labor costs assumed by the employer.

**Table 6**  
**Wage Rates Used in Analysis of Administrative Expenses (Annual)**

Occupation	Median Wage	Adjusted All-in Median Wage
Accountants and Auditors	\$ 61,298	\$ 89,010
Engineers, All Other	\$ 121,950	\$ 177,084
Lawyers	\$ 90,293	\$ 131,114
Bookkeeping, Accounting, and Auditing Clerks	\$ 38,106	\$ 55,333
Information and Record Clerks, All Other	\$ 43,534	\$ 63,216
Legal Secretaries and Administrative Assistants	\$ 41,891	\$ 60,830
Average		\$ 96,098
Hourly		\$ 46.20

Annual wages have been calculated by multiplying the corresponding hourly wage by 2,080 hours.

<sup>14</sup> *Regulatory Impact Analysis of the Proposed Emission Standards for New and Modified Sources in the Oil and Natural Gas Sector*, U.S. Environmental Protection Agency, Office of Air and Radiation and Office of Air Quality Planning and Standards, August 2015.

<sup>15</sup> This would be the same calculation as reducing the number of firms by 2.5 percent.

<sup>16</sup> May 2020 State Occupational Employment and Wage Estimates: New Mexico. These are the latest data currently available.



According to data from the Bureau of Labor Statistics, there are 194 establishments involved in the production of oil and natural gas in New Mexico.<sup>17</sup> Assuming a similar administrative burden as the federal rule would mean that companies would spend over 6,852 hours to comply. At a wage rate of \$46.20, this equals \$316,565 in administrative costs per year.

### *Equipment and Operational Costs*

Using data from a survey of members conducted by the New Mexico Oil and Gas Association it is possible to calculate the equipment and operational costs that would be imposed by the new rule on a per well basis.<sup>18</sup> The new rule will place significant burdens on operators, both initially as wells are drilled and completed, and then over time, as operators are required to maintain systems and change their operational behaviors. The initial costs would be over \$3.2 billion and will consist mainly of new construction and equipment requirements as wells are drilled, and equipment requirements as old wells are retrofitted.

**Table 7**  
**Additional Operational Costs Associated With Proposed Ozone Precursor Rules**

	Per Natural Gas		Natural Gas		Total Costs
	Per Oil Well	Well	Oil Production Costs	Production Costs	
RFID Tag	\$ 281	\$ 281	\$ 9,102,739	\$ 13,931,759	\$ 23,034,498
Engines	\$ 1,336	\$ 1,336	\$ 43,265,576	\$ 66,218,047	\$ 109,483,624
Compressors	\$ 55	\$ 55	\$ 1,787,690	\$ 2,736,064	\$ 4,523,754
Open Flares	\$ 3,076	\$ 3,076	\$ 99,642,977	\$ 152,503,766	\$ 252,146,743
Enclosed Combustion Devices (ECD) and Thermal Oxidizers (TO)	\$ 9,681	\$ 9,681	\$ 313,612,225	\$ 479,984,109	\$ 793,596,334
Vapor Recovery Units	\$ 5,866	\$ 5,866	\$ 190,036,547	\$ 290,851,297	\$ 480,887,844
Gas Well Liquid Unloading	\$ -	\$ 2,813	\$ -	\$ 139,441,542	\$ 139,441,542
Glycol Dehydrators	\$ 9,681	\$ 9,681	\$ 313,612,225	\$ 479,984,109	\$ 793,596,334
Heaters	\$ 86	\$ 86	\$ 2,790,777	\$ 4,271,290	\$ 7,062,067
Hydrocarbon Liquid Transfers	\$ 2,813	\$ -	\$ 91,108,375	\$ -	\$ 91,108,375
Pipeline Pig Launching and Receiving	\$ 2,813	\$ 2,813	\$ 91,108,375	\$ 139,441,542	\$ 230,549,918
Pneumatic Controllers and Pumps	\$ 1,689	\$ 1,689	\$ 54,727,221	\$ 83,760,116	\$ 138,487,337
Storage Tanks	\$ 5,706	\$ -	\$ 184,841,033	\$ -	\$ 184,841,033
<b>Total</b>	<b>\$ 43,083</b>	<b>\$ 37,377</b>	<b>\$ 1,395,635,762</b>	<b>\$ 1,853,123,641</b>	<b>\$ 3,248,759,403</b>

In sum, the operational and administrative costs of the potential rules could equal as much as \$3.2 billion dollars in the first year, although they would fall significantly from then on.

### **NPV calculation**

The costs of the new rule will not be one-time effects but will continue year after year. The bulk of the continuing costs would be administrative, however, there will be additional operational costs as well. Based on discussions with operators in New Mexico, JDA estimates that about 15.2 percent of the costs will continue each year, declining over time as wells are naturally removed from service. Over a 5-year period, assuming 3 percent inflation, the costs will equate to about \$3.85 billion. Discounting this back to 2020 dollars using a discount rate of 3.23 percent,<sup>19</sup> the net present value of the stream of costs would be roughly \$3.83 billion. See Table 8 on the following page.)

<sup>17</sup> *Quarterly Census of Employment and Wages*, US Department of Labor, Bureau of Labor Statistics, at: <https://www.bls.gov/cew/data.htm>.

<sup>18</sup> Survey data represents reporting by 10 companies.

<sup>19</sup> *ICE BofA US High Yield Index Option-Adjusted Spread*, Ice Data Indices, LLC, retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/BAMLH0A0HYM2>, June 10, 2021.

**Table 8**  
**Net Present Value of Costs Associated With Proposed Rules**

	Proposed Rule
Administrative Costs	\$ 352,565
Operational Costs	\$ 3,248,759,403
Total Costs	\$ 3,249,111,968
5-Year Costs	\$ 3,852,291,118
NPV 5-Year Costs	\$ 3,830,083,361

### Economic Impact of Proposed Ozone Precursor Rule

Based on the Western Energy Model, if the costs outlined above are reflective of the entire industry in the state of New Mexico, the results could be devastating for the oil and natural gas sector of the economy. Were these costs to be incurred, it would be likely that 37.2 percent of the currently operating oil wells, and as many as 87.0 percent of the natural gas wells, would become unproductive in that they would lose money once the cost of the retrofits is put in place. These would predominately be the lower- and mid-range producing wells, so overall there would be a roughly 12.9 percent reduction in oil production and a 22.8 percent reduction in natural gas production.<sup>20</sup> Overall, there would be a 15.0 percent reduction in output of both oil and natural gas in terms of value.

As this impact passes through the economic system in New Mexico, it will surely lead to reductions in jobs. Looking at the baseline, there were about 25,820 jobs in the oil and natural gas industry in the state. The reduction would likely lead to 1,207 lost jobs directly in the oil and natural gas industry in the state, and a total of 3,217 lost jobs. The state economy would face a \$674.2 million loss, and state and local taxes would fall by nearly \$22.9 million (See Table 9 on the following page).

#### New Mexico Natural Gas Production

While it might seem as if the model is overestimating the impact of the proposed regulation on natural gas production in the state, it is important to remember that over 50 percent of the producing (primary) natural gas wells in New Mexico account for just under 10 percent of production. On average, these wells produce roughly 23.5 MCF per day of natural gas, generating about \$21,500 per year in revenues.

Based on the analysis, the average first year operational cost of complying with the proposed rule would be nearly \$37,300. This means that all of the revenue produced by one of these wells over a 21-month period would go toward just the operational costs of compliance. Under these conditions, operators would be forced to cease production.

These low production wells tend to be located in older fields in and around the San Juan basin, located in the counties of San Juan, Rio Arriba, McKinley and Sandoval.

### Changes From Prior Analysis

In September of 2020, John Dunham & Associates examined two regulations then being promulgated by the state of New Mexico. Those rules included one establishing emissions standards for volatile organic compounds and nitrogen oxides for oil and gas production and processing sources located in certain areas of the state, while the second would require the capture of up to 98 percent of all natural gas produced in the state. This second rule has been

<sup>20</sup> Note that with the current slump in natural gas prices many of the existing natural gas wells are barely productive already.

adopted with some changes by the Oil Conservation Commission,<sup>21</sup> while the first rule is substantially similar to the one being proposed by the Environmental Improvement Board.

**Table 9**

**Economic Cost From Proposed Ozone Precursor Rule on the Oil and Natural Gas Industry in New Mexico**

	Jobs	Wages	Economic Output
Direct	(1,207)	\$ (108,284,469)	\$ (358,590,607)
Supplier	(623)	\$ (39,377,218)	\$ (119,562,267)
Induced	(1,387)	\$ (82,141,272)	\$ (196,006,679)
Total	(3,217)	\$ (209,802,960)	\$ (674,159,553)
State and Local Business and Personal Taxes			\$ (22,862,830)

The earlier analysis was based on the same methodology and modeling as the examination presented in this paper; however, the number of active wells, production levels per well, and oil and natural gas prices were different than today. The new analysis includes more oil and natural gas wells (an increase of 2.1 percent), and significantly more production per well. In addition to this, prices are higher, meaning that each production facility lost due to higher costs will have a greater economic impact.

**Table 10**

**Change in Base Data from Prior Analysis**

	2020 Analysis			2021 Analysis			Pct Change		
	Oil	Natural Gas	Total	Oil	Natural Gas	Total	Oil	Natural Gas	Total
Number of Wells	31,584	50,955	82,539	33,293	50,955	84,248	5.4%	0.0%	2.1%
Total Production	330,901,700	1,819,534		379,109,000	2,050,424		14.6%	12.7%	
Prices	\$53.01	\$2.74		\$56.14	\$2.86		5.9%	4.3%	
Revenue	\$17,541,099,117	\$4,985,523,160	\$22,526,622,277	\$21,281,915,563	\$5,857,377,893	\$27,139,293,457	21.3%	17.5%	20.5%

In addition, the estimated administrative costs of the rule have risen based not only on higher wages in New Mexico, but also because the proposed rule imposes more administrative requirements. Overall, the Net Present Value over 5 years of the proposed ozone precursor rule is down by about 2.0 percent from the earlier analysis mainly because that analysis also included a waste gas rule which was subsequently implemented by the state Oil Conservation Commission. (See Table 11)

**Table 11**

**Change in Estimated Cost of the Proposed Rule from the Prior Proposed Rule**

	2020	2021	Pct Change
Administrative Costs	\$ 273,420	\$ 352,565	28.9%
Operational Costs	\$ 3,332,307,587	\$ 3,248,759,403	-2.5%
Total Costs	\$ 3,332,581,007	\$ 3,249,111,968	-2.5%
5-Year Costs	\$ 3,944,160,332	\$ 3,852,291,118	-2.3%
NPV 5-Year Costs	\$ 3,909,019,063	\$ 3,830,083,361	-2.0%

<sup>21</sup> *Natural Resources and Wildlife, Oil and Gas, Venting and Flaring of Natural Gas*, New Mexico Code, Title 19, Chapter 15, Part 27.

In the September 2020 model, it was estimated that 257 jobs would be lost versus 3,217 in this update. This is because a different modeling technique was used in this report that takes into account both losses of the number of facilities (wells) in the state, as well as the financial losses resulting from the proposed rule.

**Table 12**  
**Comparison of Economic Impact from 2020 to 2021 Analysis (Proposed VOC Rule Only)**

2021	Jobs	Wages	Economic Output	2020	Jobs	Wages	Economic Output
Direct	(1,207)	\$ (108,284,469)	\$ (358,590,607)	Direct	(93)	\$ (8,857,892)	\$ (29,186,594)
Supplier	(623)	\$ (39,377,218)	\$ (119,562,267)	Supplier	(51)	\$ (3,205,011)	\$ (9,731,474)
Induced	(1,387)	\$ (62,141,272)	\$ (196,006,679)	Induced	(113)	\$ (5,076,497)	\$ (16,012,343)
Total	(3,217)	\$ (209,802,960)	\$ (674,159,553)	Total	(257)	\$ (17,139,401)	\$ (54,930,410)
State and Local Business and Personal Taxes				State and Local Business and Personal Taxes			
\$ (22,862,830)				\$ (1,862,860)			

In sum, the estimates of the cost and economic losses resulting from the proposed emissions rule are much larger now than they were previously estimated to be. This is a result of continued development of the oil and natural gas sector in New Mexico since last year, and due to higher wellhead prices for both oil and natural gas.

#### **About John Dunham & Associates:**

John Dunham & Associates (JDA) is a leading New York City based economic consulting firm specializing in the economics of fast-moving issues. JDA is an expert at translating complex economic concepts into clear, easily understandable messages that can be transmitted to any audience. Our company's clients have included a wide variety of businesses and organizations, including some of the largest Fortune 500 companies in America, such as:

- Altria
- Diageo
- Feld Entertainment
- Forbes Media
- MillerCoors
- Verizon
- Wegmans Stores

John Dunham is a professional economist with over 30 years of experience. He holds a Master of Arts degree in Economics from the New School for Social Research as well as a Masters of Business Administration from Columbia University. He also has a professional certificate in Logistics from New York University. Mr. Dunham has worked as a manager and an analyst in both the public and private sectors. He has experience in conducting cost-benefit modeling, industry analysis, transportation analysis, economic research, and tax and fiscal analysis. As the Chief Domestic Economist for Philip Morris, he developed tax analysis programs, increased cost-center productivity, and created economic research operations. He has presented testimony on economic and technical issues in federal court and before federal and state agencies.

Prior to Phillip Morris John was an economist with the Port Authority of New York and New Jersey as well as for the City of New York.



## Potential State and Local Revenue Impacts of Proposed Ozone Precursor Rule on the Oil and Gas Industry

August 2021

### Summary:

Table 1 summarizes estimates of the potential State and Local revenue impacts of the proposed Ozone precursor rule (Rule) that has been submitted to the N.M. Environmental Improvement Board for approval.<sup>1</sup> Total annual impacts are estimated at \$730 million, \$569 million in State revenue and \$160 million in Local revenue. These estimates are based on the decrease in oil and gas production estimated by John Dunham & Associates (JDA).<sup>2</sup> The annual impact on the State General Fund would be \$327 million, on the State Bonding Funds \$108 million and on the Land Grant Permanent Fund \$133 million. Table 1 presents all of the Local revenue impacts in the General Fund, although some of the impacts would affect bonding programs at the Local level. Information is not currently published to enable separating these effects. The rest of this report provides detailed information on how estimates were derived.

**Table 1**  
**Potential Annual State & Local Revenue Impacts of Proposed Ozone Precursor Rule**  
Million Dollars

	<b>State</b>	<b>Local</b>	<b>Total</b>
Taxes	-\$324.0	-\$160.5	-\$484.6
Royalties	-\$245.0	\$0.0	-\$245.0
<b>Total</b>	<b>-\$569.1</b>	<b>-\$160.5</b>	<b>-\$729.6</b>
General Fund	-\$327.1	-\$160.5	-\$487.7
Bonding Funds	-\$108.4		-\$108.4
Land Grant Permanent Fund	-\$133.0		-\$133.0
Other funds	-\$0.6		-\$0.6
<b>Total</b>	<b>-\$569.1</b>	<b>-\$160.5</b>	<b>-\$729.6</b>

### Production Impacts:

Table 2 presents the estimated impacts on oil and gas production in the State due to the Rule. The estimates were derived by applying the estimated percentage reduction as estimated by JDA to the baseline forecast of total production in the State prepared by the Consensus Revenue Estimating Group (CREG) in February 2021.<sup>3</sup> Estimates are presented as full-year effects in FY23 under the simplifying assumption that the rule will take effect by the beginning of FY23. The timeline for implementation of

<sup>1</sup> Environmental Protection, Air Quality (Statewide), Oil and Gas Sector – Ozone Precursor Pollutants, Proposed Rule, N.M. Environmental Improvement Board, May 6, 2021.

<sup>2</sup> John Dunham & Associates, Memorandum on Estimated Costs of Proposed Ozone Precursor Rule on Oil and Natural Gas Development in New Mexico, June 13, 2021.

<sup>3</sup> Available at the website of the Legislative Finance Committee.

the rule is uncertain at this time, and it may take effect before or after the beginning of FY23. Thus, these may be thought of as the annualized impacts of the rule in the early years of its implementation.

**Table 2**  
**Production and Industry Revenue Impacts of Proposed Rule: FY23**

	<b>Oil</b>	<b>Gas</b>	<b>Total</b>
Baseline production volume<1>	370	1,830	NA
Percentage volume impact <2>	-12.9%	-22.8%	NA
Amount of volume impact	(47.73)	(417.24)	NA
Annual price average <1>	\$48.50	\$2.65	NA
<b>Industry revenue impact (Million \$)</b>	<b>-\$2,314.9</b>	<b>-\$1,105.7</b>	<b>-\$3,420.6</b>

<1> Consensus Group revenue forecast, February 2021.

<2> John Dunham Associates, Memorandum on Estimated Costs of Proposed Ozone Precursor Rule, June 13, 2021.

#### **Production-Related Revenues:**

Table 3 presents the potential impacts of the Rule on production-related taxes and royalties as well as the specific funds affected by each revenue. For each tax or royalty payment, an effective payment rate has been estimated. Specific assumptions for these rates are:

- **O&G Production Taxes:** Statutory rate is applied to estimated Taxable Revenue for each product. Taxable Revenue is calculated by applying the Net product price as estimated by the CREG after statutory deductions applying to each product.<sup>4</sup> This method applies to all but one of the taxes shown in Table 3. For the Ad Valorem taxes, Taxable Value is multiplied by the uniform assessment ratio and an average statewide property tax rate of 20 mills is assumed.
- **The Natural Gas Processors Tax** impacts were estimated by applying the percentage reduction in Natural gas production to the baseline revenue forecast.
- **State Land Office royalties:** The royalty rate assessed by the State Land Office (SLO) is multiplied by the share of total production of each product occurring on State Lands. In FY20, these percentages were 33 percent for oil and 22% for natural gas.
- **Federal Mineral Lease royalties:** The average royalty rate of 12.5 percent is multiplied by the share of production of each product on Federal Lands. In FY20 this percentage was 52 percent of oil and 60 percent of gas. The State's share of total Federal royalties is 48 percent under Federal policy.

<sup>4</sup> For an example, see Section 7-31-5 NMSA 1978.



**Table 3**  
**Change in Production-related revenues: FY23**

			<b>Oil:</b>		<b>Gas:</b>	<b>Combined:</b>
Percentage Volume Change			-12.9%		-22.8%	
Volume <1>			(48)		(417)	
Price <2>			\$48.50		\$2.65	
Gross revenue (\$MM)			-\$2,315		-\$1,106	-\$3,420.6
Net price			\$42.58		\$1.75	
Taxable revenue (\$MM)			-\$2,032		-\$730	-\$2,762.5
<b>Revenue by source: (\$MM)</b>	<b>Fund:</b>	<b>EPR &lt;3&gt;</b>		<b>EPR &lt;3&gt;</b>		
OG School Tax	GF	3.15%	-\$64.0	4.00%	-\$29.2	-\$93.2
OG Severance Tax	STBF	3.75%	-\$76.2	3.75%	-\$27.4	-\$103.6
OG Conservation Tax	GF	0.17%	-\$3.5	0.17%	-\$1.2	-\$4.7
OG Conservation Tax	Recl. Fd.	0.02%	-\$0.4	0.02%	-\$0.1	-\$0.6
N. Gas Processors Tax	GF				-\$2.6	-\$2.6
OG Ad Valorem Tax	LG	1.00%	-\$20.3	1.00%	-\$7.3	-\$27.6
Ad Val. Prod. Eqpt Tx	LG	0.18%	-\$3.7	0.18%	-\$1.3	-\$5.0
SLO Royalties	LGPF	5.28%	-\$107.3	3.52%	-\$25.7	-\$133.0
FML royalties	GF	3.12%	-\$72.2	3.60%	-\$39.8	-\$112.0
<b>Total</b>			<b>-\$347.6</b>		<b>-\$134.7</b>	<b>-\$482.4</b>
<b>Revenue by fund:</b>						
General Fund			-\$139.7		-\$72.9	-\$212.6
Sev. Tax Bonding Fund			-\$76.2		-\$27.4	-\$103.6
Land Grant Perm. Fund			-\$107.3		-\$25.7	-\$133.0
OG Reclamation Fd.			-\$0.4		-\$0.1	-\$0.6
Local Governments			-\$24.0		-\$8.6	-\$32.6
<b>Total</b>			<b>-\$347.6</b>		<b>-\$134.7</b>	<b>-\$482.4</b>

<1> Consensus group forecast February 2021. Oil in million barrels, Gas in Billion cubic feet.

<2> Consensus Group, Oil in dollars per barrel, Gas in dollars per thousand cubic feet.

<3> Effective tax or royalty rate. Calculated as described in the text.

### Additional Economic Impacts:

Table 4 presents estimates of the Direct, Indirect and Induced impacts on State and Local revenues of the proposed Rule.<sup>5</sup> These estimates were prepared using the IMPLAN modelling system. The starting point for the impacts was the estimated decline of \$3.4 billion in output of the Oil and Gas Extraction

<sup>5</sup> Per Wikipedia:

*Direct effects* are the results of the money initially spent in the study region by the business or organization being studied. This includes money spent to pay for salaries, supplies, raw materials, and operating expenses. *Indirect effects* are the results of business-to-business transactions indirectly caused by the direct effects. *Induced effects* are the results of increased personal income caused by the direct and indirect effects.

industry described in Table 2. The estimates of production-related revenue impacts described in Table 3 were subtracted from the IMPLAN estimates of Direct revenue impacts to avoid double counting.

**Table 4**  
**Direct, Indirect & Induced State & Local Tax Impacts Excluding Production Taxes**  
**Million Dollars**

	<b>Direct</b>	<b>Indirect</b>	<b>Induced</b>	<b>Total</b>
<b>State:</b>				
Sales Taxes	-\$52.2	-\$21.3	-\$11.6	-\$85.2
Income Taxes	-\$11.5	-\$2.9	-\$2.2	-\$16.6
Property Taxes	-\$4.2	-\$0.4	-\$0.2	-\$4.8
Other	-\$10.6	-\$1.7	-\$0.5	-\$12.8
<b>Total</b>	<b>-\$78.5</b>	<b>-\$26.2</b>	<b>-\$14.6</b>	<b>-\$119.3</b>
<b>Local:</b>				
Sales Taxes	-\$59.2	-\$5.0	-\$2.7	-\$66.9
Income Taxes	\$0.0	\$0.0	\$0.0	\$0.0
Property Taxes	-\$47.0	-\$6.7	-\$3.6	-\$57.3
Other	-\$3.3	-\$0.3	-\$0.2	-\$3.7
<b>Total</b>	<b>-\$109.5</b>	<b>-\$11.9</b>	<b>-\$6.5</b>	<b>-\$127.9</b>
<b>Total:</b>				
Sales Taxes	-\$111.5	-\$26.3	-\$14.3	-\$152.1
Income Taxes	-\$11.5	-\$2.9	-\$2.2	-\$16.6
Property Taxes	-\$51.2	-\$7.0	-\$3.8	-\$62.1
Other	-\$13.8	-\$2.0	-\$0.7	-\$16.5
<b>Total</b>	<b>-\$188.0</b>	<b>-\$38.2</b>	<b>-\$21.1</b>	<b>-\$247.3</b>

Source: IMPLAN modelling system analysis conducted by the authors.

#### **Potential sources of conservatism in the estimates:**

- Economic impacts of the decreased government spending due to decreased revenue are not included in these estimates.
- The Rule is likely to negatively impact the incentive to drill new wells in the state, increasing the impact on future production and revenues.
- Some revenues were not included, such as bonus payments on State and Federal lands due to lack of specific information.
- Over time the reduced royalty income on State lands will reduce the balance in the Land Grant Permanent Fund, which will result in lower distributions to all of the beneficiaries of that Fund.