

**STATE OF NEW MEXICO
BEFORE THE ENVIRONMENTAL IMPROVEMENT BOARD**

IN THE MATTER OF:

**PROPOSED NEW REGULATION,
20.2.50 NMAC – OIL AND GAS
SECTOR –OZONE PRECURSOR POLLUTANTS**

No. EIB 21-27 (R)

**REBUTTAL TESTIMONY OF JEFFREY “RYAN” DAVIS
ON BEHALF OF THE INDEPENDENT PETROLEUM
ASSOCIATION OF NEW MEXICO**

September 7, 2021

IPANM EXHIBIT 10

**Rebuttal Testimony of Ryan Davis
No. EIB 21-27 (R)**

I. WITNESS BACKGROUND AND QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Jeffrey Ryan Davis. My business address is 610 Reilly Ave., Farmington, New Mexico 87401.

Q. ON WHOSE BEHALF ARE YOU SUBMITTING REBUTTAL TESTIMONY?

A. The Independent Petroleum Association of New Mexico (“IPANM”). I am currently the President of IPANM.

Q. HAVE YOU PROVIDED PREVIOUS TESTIMONY IN THIS CASE?

A. Yes, I provided direct testimony, which includes: (i) a summary of my qualifications and experience; (ii) a discussion of IPANM’s evaluation of and proposed changes to the regulations proposed by the New Mexico Environment Department (“NMED”), Oil and Gas Sector—Ozone Precursor Pollutants, 20.2.50 NMAC; and (iii) the technical bases for certain related modifications to the regulations proposed in IPANM’s Notice of Intent to Present Technical Testimony (“IPANM’s Notice of Intent”). My direct testimony was submitted with IPANM’s Notice of Intent, filed on July 28, 2021.

II. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my rebuttal testimony is to respond to the direct testimony of NMED and other parties to this proceeding relating to the following proposed amendments to 20.2.50 NMAC:

- 20.2.50.2 NMAC – Scope;

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- 1 • 20.2.50.7 NMAC – Definitions of “Pneumatic controller” and “Small business
- 2 facility”;
- 3 • 20.2.50.111 NMAC – Applicability;
- 4 • 20.2.50.117 NMAC – Natural Gas Liquid Unloading;
- 5 • 20.2.50.122 NMAC – Pneumatic Controllers and Pumps;
- 6 • 20.2.50.124 NMAC – Well Workovers, and;
- 7 • 20.2.50.125 NMAC – Small Business Facilities.

8 **Q. HAVE YOU REVIEWED THE NOTICE OF INTENT TO PRESENT TECHNICAL**
9 **TESTIMONY (“NOI”) AND EXHIBITS FILED BY NMED, THE NEW MEXICO**
10 **OIL & GAS ASSOCIATION (“NMOGA”), CLEAN AIR ADVOCATES (“CAA”),**
11 **THE ENVIRONMENTAL DEFENSE FUND (“EDF”), AND THE GAS**
12 **COMPRESSOR ASSOCIATION (“GCA”) RELATED TO THE AMENDMENTS**
13 **ADDRESSED IN YOUR DIRECT AND REBUTTAL TESTIMONY?**

14 A. Yes.

15 **III. NMED PROPOSALS RELATED TO DEFINITIONS OF “PNEUMATIC**
16 **CONTROLLER” AND “SMALL BUSINESS FACILITY”**
17

18 **Q. HAVE YOU REVIEWED NMED’S PROPOSED DEFINITIONS OF**
19 **“PNEUMATIC CONTROLLER” AND “SMALL BUSINESS FACILITY”?**

20 A. Yes.

21 **Q. PLEASE SUMMARIZE NMED’S CURRENT PROPOSALS.**

22 A. The definition of “Pneumatic controller” in 20.2.500.7(EF) NMAC provides a general
23 description of what a pneumatic controller is and the device’s function. My understanding
24 is that the definition was derived in part from the Colorado Reg. 7.

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1 The definition of “Small business facility” in 20.2.500.7(OO) NMAC outlines the criteria
2 for applicability of 20.2.5.125 NMAC. The proposed definition states that a “small
3 business facility” is a source that is independently owned or operated by a company this is
4 not a subsidiary or a division of another business with less than 10 employees and less than
5 \$250,000 in gross revenue.

6 **Q. BASED ON YOUR REVIEW OF KUEHN & PALMER’S AND DAY & KUEHN’S**
7 **TESTIMONY, RESPECTIVELY, WHAT DO YOU UNDERSTAND TO BE THE**
8 **BASIS FOR NMED’S PROPOSAL FOR THE DEFINITIONS OF “PNEUMATIC**
9 **CONTROLLER” AND “SMALL BUSINESS FACILITY”?**

10 A. The Pneumatic controller definition is necessary for the provisions proposed in 20.2.5.122
11 NMAC regarding the regulation of natural gas-driven pneumatic controllers and pumps.
12 The definition of small business facilities is necessary for the applicability of 20.2.50.125
13 NMAC.

14 **Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY**
15 **NMED WITNESSES KUEHN & PALMER AND DAY & KUEHN CAUSE YOU TO**
16 **RECONSIDER THE STATEMENTS AND PROPOSED REVISIONS TO**
17 **20.2.50.7(EF) AND (OO) NMAC CONTAINED IN YOUR DIRECT TESTIMONY?**

18 A. On the small business definition, the direct testimony helped me to understand the
19 extensive effort that the NMED went through to evaluate and propose the threshold for the
20 regulations’ applicability to small businesses. While the current threshold of \$250,000 in
21 gross revenue and 10 employees may provide some relief for the very small operators in
22 the state, I do not believe that it addresses the potential economic impact completely on

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1 most small businesses. The fact remains that there will be many wells and operators
2 significantly impacted by the proposed regulation. The first concern is the lack of
3 regulatory certainty for operators with the fluctuation of commodity prices. An operator
4 could find itself qualifying as a "Small Business Facility" one year, and then not the next,
5 if commodity prices increase. The second issue that I see is that the NMED analysis for the
6 "Small Business Facility" threshold only considered operators with wells that overall, on
7 average, could not support the cost of compliance. While this helps ensure those select few
8 operators do not become insolvent, there are a few things to address with the analysis.

9 First, NMED's analysis doesn't include the cost of compliance for pneumatics, which is a
10 provision that IPANM has significant concerns about the feasibility both economically and
11 technically. I took the well count and production data used in the NMED analysis and ran
12 gross revenue calculations. The main takeaway from the analysis is the higher percentage
13 of stripper wells, the higher the percentage of gross revenue for the cost of compliance. It
14 was difficult to determine the appropriate threshold in terms of gross revenue. As
15 previously stated, gross revenue is dependent on commodity price and is not a good
16 measure of an operator's profitability. I believe that a well's production and potential to
17 emit (PTE) are better measures to assure the necessary relief. The production and PTE are
18 independent of commodity prices.

19 **Q. BASED ON YOUR REVIEW OF NMED'S PROPOSALS AND SUPPORTING**
20 **DIRECT TESTIMONIES, ARE YOU CHANGING YOUR POSITION ON**
21 **RECOMMENDED PROPOSED REVISIONS TO 20.2.50.7(E) AND (O) NMAC**
22 **THAT WERE STATED IN YOUR DIRECT TESTIMONY?**

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1 A. No.

2 **Q. PLEASE EXPLAIN.**

3 A. IPANM believes that it is necessary to refine the definition of the pneumatic controller to
4 provide more clarity when referenced in 20.2.50.122 NMAC.

5 Regarding the Small business facility definition, IPANM still believes that the original
6 stripper well and low PTE proposal made by the NMED in the pre-proposal draft provided
7 the necessary and appropriate relief for operators with marginal production in the state.

8 **Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THE DEFINITIONS**
9 **OF “PNEUMATIC CONTROLLER” AND “SMALL BUSINESS FACILITY”?**

10 A. Yes, NMOGA proposed modifications to both.

11 **Q. PLEASE SUMMARIZE THOSE PROPOSED CHANGES.**

12 A. On the pneumatic controller definition, NMOGA proposed similar changes to the base
13 definition as IPANM and added additional detail on the different types/configuration of
14 pneumatic controllers.

15 For the small business facility definition, NMOGA proposed deleting the definition and
16 the associated 20.2.50.125 NMAC Small Business Facilities section due to the lack of relief
17 provided.

18 **Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL**
19 **IMPROVEMENT BOARD WITH RESPECT TO THE DEFINITIONS OF**
20 **“PNEUMATIC CONTROLLER” AND “SMALL BUSINESS FACILITY”?**

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1 A. IPANM recommends that the Environmental Improvement Board consider the proposed
2 changes from IPANM and NMOGA, which includes the additional detail on the types and
3 configurations of pneumatic controllers.

4 IPANM recommends that the Environmental Improvement board carefully consider the
5 necessary relief for small business with the potential impacts of the proposed regulations.
6 Regarding the definition of a small business facility, IPANM has expressed concerns with
7 the current proposal of \$250,000 gross revenue and less than 10 employees. IPANM
8 recommends that the Environmental Improvement Board consider the following provisions
9 of the Small Business Regulatory Relief Act:

10 E. "small business" means a business entity, including its
11 affiliates, that is independently owned and operated and employs fifty or
12 fewer full-time employees.

13
14 NMSA 1978 § 14-4A-3.

15
16 D. The legislature finds that: when adopting rules to protect the
17 health, safety and economic welfare of the state, agencies should seek to
18 achieve statutory goals as effectively and efficiently as possible without
19 imposing unnecessary burdens on small businesses;

20
21
22 NMSA 1978 § 14-4A-2.

23
24 It is apparent that the Legislature found it important to protect businesses that employ 50
25 or fewer employees.

26 **IV. NMED PROPOSALS RELATED TO THE APPLICABILITY SECTION**
27 **(20.2.50.111 NMAC)**

28
29 **Q. HAVE YOU REVIEWED NMED'S PROPOSED REGULATIONS RELATED TO**
30 **THE APPLICABILITY SECTION?**

31 A. Yes.

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Q. PLEASE SUMMARIZE NMED'S CURRENT PROPOSALS.

A. As drafted, 20.2.50.111 NMAC states that the regulations apply "to crude oil and natural gas production and processing equipment and operations that extract, collect, separate, dehydrate, store, process, transport, transmit, or handle hydrocarbon liquid or produced water in the areas specified in 20.2.50.2 NMAC and are located at wellhead sites, tank batteries, gathering and boosting sites, natural gas processing plants, and transmission compressor stations, up to the point of the local distribution company custody transfer station." Additionally, the section requires that sources subject to the rules, "calculate the Potential to Emit (PTE) of such sources" and have the calculations "certified by a qualified professional engineer." The rule requires the calculation be kept on file for at least 5 years and be provided to NMED "upon request."

Q. BASED ON YOUR REVIEW OF KUEHN & PALMER'S TESTIMONY, WHAT DO YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL REGARDING THE APPLICABILITY SECTION?

A. It is my understanding that the NMED's primary purpose in the applicability section is to ensure the accurate and representative calculation of a source's PTE, which would determine whether a source is subject to Part 50 of the proposed regulation.

Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASES FOR NMED'S PROPOSED CHANGES?

A. Yes, as stated in my direct testimony IPANM has concerns with the requirement that certification of the PTE calculations be by a qualified professional engineer.

Q. WHAT IS YOUR ANALYSIS OF NMED'S BASES FOR ITS POSITIONS?

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1 A. The requirement of having a qualified professional engineer certification is not necessary
2 and creates an unnecessary burden to operators. In-house engineers are not required to be
3 licensed as a professional engineer. New Mexico Board of Licensure for Professional
4 Engineers and Professional Surveyors states that "An engineer employed by a business
5 entity who performs only the engineering services involved in the operation of the business
6 entity's business shall be exempt from the provisions of the Engineering and Surveying
7 Practice Act; provided that neither the employee nor the business entity offers engineering
8 services to the public" (Section 61-23-22 of the NM Engineering and Survey Practice Act).

9 **Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY**
10 **NMED WITNESSES KUEHN & PALMER CAUSE YOU TO RECONSIDER THE**
11 **STATEMENTS AND PROPOSED REVISIONS TO 20.2.50.111 NMAC**
12 **CONTAINED IN YOUR DIRECT TESTIMONY?**

13 A. No

14 **Q. BASED ON YOUR REVIEW OF NMED'S PROPOSALS AND SUPPORTING**
15 **DIRECT TESTIMONIES, ARE YOU CHANGING YOUR POSITION ON**
16 **RECOMMENDED PROPOSED REVISIONS TO 20.2.50.111 NMAC THAT WERE**
17 **STATED IN YOUR DIRECT TESTIMONY?**

18 A. No

19 **Q. PLEASE EXPLAIN.**

20 A. As I stated previously, the requirement of having certification by a qualified professional
21 engineer is not appropriate and creates an unnecessary burden to operators. In-house
22 engineers are not required to be licensed as professional engineers and can produce

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1 accurate and representative PTE calculations. In addition, there may be other qualified
2 individuals, that are not engineers, employed by the company that would be capable of
3 producing accurate and representative PTE calculations.

4 **Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THE**
5 **APPLICABILITY SECTION?**

6 A. Yes. NMOGA.

7 **Q. PLEASE SUMMARIZE THOSE PROPOSED CHANGES.**

8 A. NMOGA proposed striking the need for a professional engineer certification of the PTE
9 calculations. John Smitherman testified, based on his experience, why it is not necessary
10 to have a professional engineer certify PTE calculations.

11 **Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL**
12 **IMPROVEMENT BOARD WITH RESPECT TO THE APPLICABILITY**
13 **SECTION?**

14 A. IPANM recommends that the environmental improvement board consider removing the
15 professional engineer certification requirement as it is not necessary to ensure accurate
16 and representative PTE calculations. This requirement would create unnecessary delay,
17 additional cost, and burden to the operator without any benefit.

18 **V. NMED'S PROPOSAL RELATED TO NATURAL GAS LIQUID UNLOADING**
19 **SECTION (20.2.50.117 NMAC)**
20

21 **Q. HAVE YOU REVIEWED NMED'S PROPOSED REGULATIONS RELATED TO**
22 **THE NATURAL GAS LIQUIDS UNLOADING SECTION?**

23 A. Yes.

24 **Q. PLEASE SUMMARIZE NMED'S CURRENT PROPOSALS.**

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1 A. The intent of this section is to reduce VOC emissions associated with manual liquids
2 unloading events using best management practices during the life of the well and during
3 the manual liquids unloading activities.

4 **Q. BASED ON YOUR REVIEW OF KUEHN & PALMER'S TESTIMONY, WHAT DO**
5 **YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL**
6 **REGARDING THE NATURAL GAS LIQUID UNLOADING SECTION?**

7 A. Based on the review of Kuehn & Palmer's testimony, the proposal of using best
8 management practices to reduce VOC emissions associated with the liquids unloading is
9 based on the requirements outlined in Colorado Reg. 7, Pennsylvania GP-5 and GP-5A,
10 and the Wyoming Permitting Guidance. It is also based on the estimate 13,020 tpy of VOC
11 inventory number used in the ozone modeling conducted as part of the rulemaking. The
12 NMED referenced the EPA Greenhouse Gas Reporting Program data that indicated that
13 97% of gas wells in the Permian and San Juan that require manual liquids unloading
14 employ plunger lift. The NMED noted that the installation of plunger lift on the remaining
15 2.9% of the gas wells requiring manual liquids unloading would result in 4,272 tpy of VOC
16 reductions or 36% of the baseline.

17 **Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASES FOR NMED'S**
18 **PROPOSED CHANGES?**

19 A. Yes.

20 **Q. WHAT IS YOUR ANALYSIS OF NMED'S BASIS FOR ITS POSITIONS?**

21 A. The use of best management practices is a widely accepted method for reducing emission
22 from manual liquids unloading activities. The prescription of artificial lift as a method to

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1 reduce VOC emissions is inappropriate. The proposed regulation includes a requirement
2 for the operator to use best management practices during the life of the well to avoid the
3 need to perform manual liquids unloading. These best management practices would include
4 using the appropriate artificial lift over the entire production life cycle of the well. The
5 NMED is indicating through the proposal that the use of plunger lift or other artificial lift
6 is a method to control VOC emissions from manual liquids unloading. I do not believe that
7 artificial lift, including plunger lift, should be considered a control technology. If the
8 appropriate artificial lift method is employed on a well, it can reduce the need to manual
9 liquids unloading events, but as shown on the EPA GHGRP data, the majority of manual
10 liquids unloading events occur on wells that have plunger lift installed. The intent of this
11 section is to reduce the VOC emissions from manual liquids unloading events and I believe
12 that is cover by the best management practices that are proposed in paragraphs 1 and 2
13 under subsection B of 20.2.50.117. There is no need for the NMED to prescribe the use of
14 artificial lift under paragraph 3. In my experience, most manual liquids unloading events
15 occur due to an upset conditions that is usually beyond the control of the operator. This is
16 supported by the fact that the EPA GHGRP data indicated that 97% of the wells in the San
17 Juan and Permian that require manual liquids unloading have plunger lift utilized.

18 **Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY**
19 **NMED WITNESSES KUEHN & PALMER CAUSE YOU TO RECONSIDER THE**
20 **STATEMENTS AND PROPOSED REVISIONS TO 20.2.50.117 NMAC**
21 **CONTAINED IN YOUR DIRECT TESTIMONY?**

22 **A. No.**

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1 **Q. BASED ON YOUR REVIEW OF NMED’S PROPOSALS AND SUPPORTING**
2 **DIRECT TESTIMONIES, ARE YOU CHANGING YOUR POSITION ON**
3 **RECOMMENDED PROPOSED REVISIONS TO 20.2.50.117 NMAC THAT WERE**
4 **STATED IN YOUR DIRECT TESTIMONY?**

5 A. No.

6 **Q. PLEASE EXPLAIN.**

7 A. IPANM is supportive of using best management practices to reduce VOC emissions
8 associated with manual liquids unloading. However, IPANM has significant concerns with
9 the requirement to install and use artificial lift. The application of artificial lift is an
10 engineered solution based on individual well parameters and site configurations. As
11 illustrated by the EPA GHGRP data contained in the NMED testimony, plunger lift does
12 not eliminate the need for manual liquid unloading. The installation and use of artificial lift
13 should be a decision made by the operator who has the information and experience to
14 employ the appropriate artificial lift method for each well.

15 **Q. HAVE YOU REVIEWED NMOGA’S PROPOSED MODIFICATIONS RELATED**
16 **TO THE NATURAL GAS LIQUID UNLOADING SECTION?**

17 A. Yes.

18 **Q. PLEASE SUMMARIZE THOSE PROPOSED CHANGES.**

19 A. NMOGA highlighted that operators are in the business of selling gas, not venting it to the
20 atmosphere. In most cases, manual liquids unloading is a last resort effort to restore
21 production from a gas well. The testimony of John Smitherman also pointed to revisions
22 proposed that clarify that the proposed regulations should apply to the events that result in

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1 venting to the atmosphere. Lastly, NMOGA pointed to the need to have an additional
2 management practice of utilizing an automated control system.

3 **Q. IS IPANM SUPPORTIVE OF NMOGA'S PROPOSED MODIFICATIONS?**
4 **PLEASE EXPLAIN.**

5 A. Yes, IPANM is supportive of the modification that limits the applicability of the proposed
6 regulation to the activities that result in venting natural gas to the atmosphere and believes
7 the use of an automated control system can reduce the need for manual liquid unloading.
8 The use of an automated control system would fall under the best management practices
9 utilized over the life of a well.

10 **Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL**
11 **IMPROVEMENT BOARD WITH RESPECT TO THE NATURAL GAS LIQUID**
12 **UNLOADING SECTION?**

13 A. IPANM recommends the changes outlined in the proposed redline changes submitted with
14 direct testimony. IPANM has provided clarifying language for the applicability to cover
15 the manual liquids unloading events that result in the venting of natural gas. IPANM also
16 proposed changes to eliminate Paragraph 3 under subsection B of 20.2.50.117 NMAC.
17 IPANM does not believe that the regulations should prescribe artificial lift, including
18 plunger lift, as this is a complex engineered application dependent on the individual well
19 parameters and site characteristics. The use of a control device is not technically feasible
20 for manual liquids unloading. Manual liquids unloading aims to maximize the differential
21 pressure to remove the liquids from the well. The venting is directed to a storage tank on-
22 site to capture the liquids during the manual liquids unloading event. These storage tanks

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1 have a very small operating pressure range (ounces of pressure). Any attempt to capture
2 the emissions from these tanks during the manual liquids unloading event would cause an
3 unsafe condition on location. The use of artificial lift (plunger lift, foamers, automated
4 control systems, compression, velocity strings, rod pumps, progressive cavity pumps
5 (PCPs), electrical submersible pumps (ESPs), etc.) are covered under Paragraph 1 of
6 Subsection B of 20.2.50.117 NMAC, which states "The owner or operator of a natural gas
7 well shall use best management practices during the life of the well to avoid the need for
8 manual liquids unloading". The best management practices listed in Paragraph 2 of
9 Subsection B cover the best management practices employed to minimize the emissions
10 during the manual liquids unloading events. The installation and use of plunger lift and
11 artificial lift are not methods employed during the unloading event; they are methods that
12 an operator implements over the life of the well. IPANM also believes that the being too
13 prescriptive could unintentionally curtail innovation of best management practices in the
14 future.

15 **VI. NMED PROPOSALS RELATED TO PNEUMATIC CONTROLLERS AND**
16 **PUMPS (20.2.50.122 NMAC)**
17

18 **Q. HAVE YOU REVIEWED NMED'S PROPOSED REGULATIONS RELATED TO**
19 **THE PNEUMATIC CONTROLLERS AND PUMPS SECTION?**

20 A. Yes.

21 **Q. PLEASE SUMMARIZE NMED'S CURRENT PROPOSALS.**

22 A. It is my understanding that NMED intends to secure VOC emission reductions from natural
23 gas-driven pneumatic controllers and diaphragm pumps. The reduction in VOC emissions
24 from pneumatic controllers is accomplished by setting natural gas-driven pneumatic

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1 emission rates of zero for new pneumatic controllers and existing pneumatic controllers
2 with access to commercial line power while transitioning a percentage of existing gas-
3 driven pneumatics to non-emitting over time based on a schedule set forth within the tables
4 in the proposed regulation. A similar approach is proposed with natural gas-driven
5 pneumatic diaphragm pumps by setting natural gas emissions rates of zero for natural gas-
6 driven pneumatic diaphragm pumps at natural gas processing plants and wellhead sites,
7 tank batteries, gathering and boosting sites, or transmission compressor stations with access
8 to commercial line power. The existing natural gas-driven pneumatic diaphragm pumps
9 located at wellhead sites, tank batteries, gathering and boosting sites, or transmission
10 compressor stations without access to commercial line power must reduce VOC emissions
11 by 95% by routing emissions to a control device, fuel cell, or process.

12 **Q. BASED ON YOUR REVIEW OF KUEHN & PALMER'S TESTIMONY, WHAT DO**
13 **YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL**
14 **REGARDING THE PNEUMATIC CONTROLLERS AND PUMPS SECTION?**

15 A. The proposal for pneumatic controller and pumps is based on the Colorado Reg. 7 Sections
16 I.K, III.C, and IID. The zero-emission rate for new pneumatic controllers is based on
17 Colorado Reg. 7, Section III.C.1-3 and is more stringent as it requires all new pneumatic
18 controllers to have a bleed rate of zero. The NMED proposal does include the necessary
19 exceptions for pneumatic controllers needed for safety and process requirements. The
20 regulations for requiring all existing pneumatic controllers with access to line power to be
21 non-emitting are based on Colorado Reg. 7, Section III.C.3.a.(i). The regulations requiring
22 existing pneumatic controllers to be replaced with non-emitting controllers overtime are

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1 based on Colorado Reg. 7, Section III.C.4. The NMED chose to phase-out on a percentage
2 of controller basis versus the percentage of liquid approach in Colorado Reg. 7 with the
3 basis that it provides operators the flexibility to retrofit in a manner they deem most cost-
4 effective.

5 **Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASES FOR NMED'S**
6 **PROPOSAL?**

7 A. Yes.

8 **Q. WHAT IS YOUR ANALYSIS OF NMED'S BASES FOR ITS POSITIONS?**

9 A. The NMED based the proposed regulation of pneumatics controllers on Colorado Reg. 7,
10 but the Colorado approach on pneumatics has been a phased-in approach over close to a
11 decade. Colorado Reg. 7 started with the phase-out of high-bleed rate pneumatic
12 controllers. The zero-bleed rate standard started with sites with access to line power was
13 the next phase that occurred over a seven-year period. There was also a technical and
14 economic feasibility consideration. The most recent update of Reg. 7 that outlined the
15 phase-out of gas-driven pneumatics is based on the percentage of liquid production and has
16 an average statewide 15 barrels of oil equivalent or less per day per well exemption. Also,
17 current Colorado Reg. 7 updates, with the non-emitting controller requirements on existing
18 controllers without access to line power, were adopted earlier this year, and we have not
19 yet seen how the actual implementation will go. It might look good on paper, but could be
20 a very different story during the actual implementation. While the NMED based the general
21 approach of phasing out gas-driven pneumatics on Reg. 7, the proposed regulation is

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1 missing many essential relief provisions in Reg. 7 that prevent the overburdening of smaller
2 operators and operators of stripper wells.

3 **Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY**
4 **NMED WITNESSES KUEHN & PALMER CAUSE YOU TO RECONSIDER THE**
5 **STATEMENTS AND PROPOSED REVISIONS TO 20.2.50.122 NMAC**
6 **CONTAINED IN YOUR DIRECT TESTIMONY?**

7 A. No.

8 **Q. BASED ON YOUR REVIEW OF NMED'S PROPOSALS AND SUPPORTING**
9 **DIRECT TESTIMONIES, ARE YOU CHANGING YOUR POSITION ON**
10 **RECOMMENDED PROPOSED REVISIONS TO 20.2.50.122 NMAC THAT WERE**
11 **STATED IN YOUR DIRECT TESTIMONY?**

12 A. No.

13 **Q. PLEASE EXPLAIN.**

14 A. There are significant challenges with utilizing the two control methods that NMED
15 evaluated in its pneumatics reductions and cost analysis. Instrument air installations require
16 line power for reliable performance. The vast majority of well sites and facilities in New
17 Mexico do not have access to line power. The utility providers in San Juan and Permian
18 operate in a just-in-time development manner, being that they do not have excess capacity
19 or infrastructure deployed. The build-out of infrastructure is expensive and, in most cases,
20 cost-prohibitive. The average cost of a line drop can be in the \$200-300 thousand range,
21 including the transformer bank and disconnect switches. Depending on terrain and power
22 requirements, the distribution network build-out can run in the \$325 thousand per mile

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1 range. Overall the terrain is the most significant factor in the cost of installing the line
2 power. There are also issues with securing the right of way (ROW) necessary to install the
3 line. In the San Juan basin, we have challenging terrain and a checkboard situation in terms
4 of surface ownership in some areas of the basin. It can require securing ROWs from several
5 entities, including the Bureau of Land Management (BLM), State Land Office (SLO),
6 tribes, and private landowners.

7
8 The use of solar electric also has it unique challenges. First off, it is not necessarily scalable
9 for sites with multiple wells and more pneumatic controllers. In the direct testimony, the
10 NMED witness states that "ERG assumed that intermittent bleed, low bleed, and high-
11 bleed pneumatics could be powered with solar electric systems" (NMED Exhibit 32 page
12 137 lines 3-4). The testimony also stated that this assumption was supported by the EPA
13 GHGRP data, which indicated that natural gas processing plants with access to electric
14 power have 100% non-emitting controllers and pumps and that commercial line electrical
15 power is equivalent to solar electric power. There are a few things I think are worth noting.
16 First, when talking about solar electric systems, it was stated earlier in the testimony that
17 solar electric systems included installing solar panels, batteries, and system controllers and
18 replacing the pneumatic controllers with electric powered controllers. While high-bleed,
19 low-bleed and intermittent bleed controllers can be replaced, it depends on the function
20 that the device needs for the given process control. As an example, let's look at a liquid
21 level controller and dump valve. The liquid level controller senses the liquid level in the
22 process vessel and actuates the dump valve to move liquid out of the vessel to the storage

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1 tank. From my experience, two types of electric actuators that can be used for this
2 application. The rotary electric device is a little more affordable option. It consumes less
3 power than the linear actuators, which has quicker positioning capability at the expense of
4 power consumption and increased cost. The electric replacement must be a linear actuator
5 in higher pressure gas separation applications, where snap action control is necessary. Our
6 local supply vendor told me that these linear actuators consume a significant amount of
7 power and that no one is running them without access to line power in the San Juan Basin.
8 I highlight this primarily to illustrate that going solar electric is more complicated than just
9 installing solar panels, batteries and replacing the pneumatic controllers with electric
10 powered controllers. The power requirement for the solar system will depend on the
11 number of actuations, the number of devices, and the type of devices. The second point is
12 the equivalency of solar electric power to line power. You can design a solar system to
13 provide the equivalent instantaneous power of line power, but there are challenges
14 associated with solar when there is a lack of solar recharge. These challenges can be
15 addressed with battery storage, but can be expensive. From IPANM's perspective,
16 emissions from pneumatic controllers are over estimated since NMED based the emissions
17 on an outdated and overstated EPA emission factors (IPANM Exhibit 2 at 16: 1-7) and the
18 cost associated with going to non-emitting controls could be underestimated when you
19 consider power requirements for sites without line power (solar and line power
20 installations). There are a lot of variables when it comes to phasing out gas-driven
21 pneumatics.

**Rebuttal Testimony of Ryan Davis
No. EIB 21-27 (R)**

Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THE PNEUMATIC CONTROLLERS AND PUMPS SECTION?

A. Yes. EDF proposed modifications addressed with direct testimony of David Lyon and Thomas Alexander. Clean Air Advocates proposed modifications included in the direct testimony of David McCabe. The direct testimony of Raymond Carr covers the proposed changes by Gas Compressor Association. NMOGA also address modifications of the Pneumatic Controller and Pumps Section with the direct testimony of John Smitherman.

Q. PLEASE SUMMARIZE THOSE PROPOSED CHANGES.

A. On a high-level EDF and Clean Air Advocates both proposed similar changes to the Pneumatic Controllers and Pumps Section that include a move to fixed percentage change on the phase-out of natural gas driven pneumatics and an accelerated schedule. The Gas Compressor Association proposed changes to the Pneumatic Controllers and Pumps Section to encourage the use of intermittent pneumatic controllers. NMOGA proposed changes to the Pneumatic Controllers and Pumps section that would base the phase-out of non-essential natural gas-driven pneumatic controllers on a percentage of liquid production basis.

Q. IS IPANM SUPPORTIVE OF GCA'S AND NMOGA'S PROPOSED MODIFICATIONS? PLEASE EXPLAIN.

A. Yes. First, IPANM is supportive of GCA's proposed changes that would encourage the use of intermittent pneumatic controllers. IPANM believes that intermittent pneumatic controllers provide a cost-effective method for operators to reduce the emissions associated with pneumatic controllers. IPANM also supports the modifications proposed by NMOGA.

Rebuttal Testimony of Ryan Davis
No. EIB 21-27 (R)

1 The phase-out of gas-driven pneumatic controllers based on liquid production gives
2 operators the ability to prioritize the retrofitting where it is most cost-effective and
3 technically feasible.

4 **Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL**
5 **IMPROVEMENT BOARD WITH RESPECT TO THE PNEUMATIC**
6 **CONTROLLERS AND PUMPS SECTION?**

7 A. IPANM recommends that the EIB consider phasing out non-essential gas-driven
8 pneumatic controllers based on a percentage of liquid production, while encouraging the
9 use of intermittent bleed pneumatic controllers as a cost-effective method to reduce VOC
10 emissions from gas-driven pneumatic controllers. It is also critical to include the
11 necessary flexibility where it is not technically or economically feasible. IPANM has
12 incorporated these recommendations in the proposed changes submitted in IPANM
13 Exhibit 1 starting on page 7.

14 **VII. NMED PROPOSALS RELATED TO WELL WORKOVERS (20.2.50.124 NMAC)**

15 **Q. HAVE YOU REVIEWED NMED'S PROPOSED REGULATIONS RELATED TO**
16 **THE WELL WORKOVERS SECTION?**

17 A. Yes.

18 **Q. PLEASE SUMMARIZE NMED'S CURRENT PROPOSALS.**

19 A. My understanding is that the NMED intends to secure VOC reductions associated with
20 well workovers. The proposed regulation accomplishes this using best management
21 practices while depressurizing or blowing down wellbores for downhole maintenance or
22 repairs. These best management practices include reducing the wellhead pressure prior to

Rebuttal Testimony of Ryan Davis
No. EIB 21-27 (R)

1 blowdown, monitoring the blowdown, and routing to sales if possible. NMED also has a
2 provision in the current proposal to notify by certified mail all residents within a quarter
3 mile at least three days prior to the workover.

4 **Q. BASED ON YOUR REVIEW OF KUEHN & PALMER'S TESTIMONY, WHAT DO**
5 **YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL**
6 **REGARDING THE WELL WORKOVERS SECTION?**

7 A. The NMED workover provisions were based on Colorado Reg. 7 requirements and
8 Wyoming's Permitting Guidance. Colorado Reg. 7, Section II.G requires operators to use
9 best management practices to minimize emissions associated with well workovers, liquids
10 unloading, and well plugging. Wyoming's Permitting Guidance requires minimizing
11 emissions to the extent practicable. In addition, both Reg. 7 and Wyoming Permitting
12 Guidance require that personnel remain on site to minimize gas venting.

13 **Q. DID YOUR DIRECT TESTIMONY ADDRESS NMED'S PROPOSAL ON WELL**
14 **WORKOVERS?**

15 A. Yes.

16 **Q. WHAT IS YOUR ANALYSIS OF NMED'S BASIS FOR ITS POSITIONS?**

17 A. IPANM is supportive of the use of best management practices to minimize the VOC
18 emissions from well workover activities but did not see any ozone-related basis for the
19 requirement to notify offset residents via certified mail three days prior.

20 **Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY**
21 **NMED WITNESSES KUEHN & PALMER CAUSE YOU TO RECONSIDER THE**

Rebuttal Testimony of Ryan Davis
No. EIB 21-27 (R)

**STATEMENTS AND PROPOSED REVISIONS TO 20.2.50.124 NMAC
CONTAINED IN YOUR DIRECT TESTIMONY?**

A. No.

**Q. BASED ON YOUR REVIEW OF NMED'S PROPOSALS AND SUPPORTING
DIRECT TESTIMONIES, ARE YOU CHANGING YOUR POSITION ON
RECOMMENDED PROPOSED REVISIONS TO 20.2.50.124 NMAC THAT WERE
STATED IN YOUR DIRECT TESTIMONY?**

A. No.

Q. PLEASE EXPLAIN.

A. As mentioned previously, IPANM supports the use of best management practices to minimize the VOC emissions from well workover activities. The NMED did not provide an estimate of the emission reductions associated with well workovers, but the cost and administrative burden associated with employing best management practices are minimal. IPANM does not see how the requirement to notify offset residents would reduce VOC emissions but has significant burdens. As outlined in my direct testimony, there are concerns about the impact on the logistics of well workovers. The three-day certified mail notification has the potential to delay a downhole repair and the associated production restoration while not resulting in any reductions in VOC emissions.

**Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THE WELL
WORKOVERS SECTION?**

A. Yes, NMOGA proposed modifications.

Q. PLEASE SUMMARIZE THOSE PROPOSED CHANGES.

Rebuttal Testimony of Ryan Davis
No. EIB 21-27 (R)

1 A. NMOGA highlighted the fact that there are two different categories of workovers. There
2 are planned workovers, such as recompletions, and there are routine downhole repair
3 workovers. NMOGA recommends that the three-day certified mail notification not apply
4 to the routine workovers but instead a non-prescriptive notification given 24 hours prior.
5 IPANM agrees that there is not the same potential for delaying planned workovers with the
6 three-day certified notification as these activities require prior regulatory approvals and are
7 planned well in advance. IPANM does not see how the notification process would result in
8 any VOC emissions reductions.

9 **Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL**
10 **IMPROVEMENT BOARD WITH RESPECT TO THE WELL WORKOVERS**
11 **SECTION?**

12 A. IPANM recommends that the regulation of well workovers be based on the use of best
13 management practices to reduce VOC emissions associated with well workovers, but not
14 include the notification process since it will not result in any VOC emission reductions
15 and has the potential to cause an unnecessary burden to industry by delaying well repairs
16 and creating inefficiencies when moving workover rigs in the field.

17 **VIII. NMED PROPOSALS RELATED TO SMALL BUSINESS FACILITIES**
18 **(20.2.50.125 NMAC)**
19

20 **Q. HAVE YOU REVIEWED NMED'S PROPOSED REGULATIONS RELATED TO**
21 **THE SMALL BUSINESS FACILITIES SECTION?**

22 A. Yes.

23 **Q. PLEASE SUMMARIZE NMED'S CURRENT PROPOSALS.**

Rebuttal Testimony of Ryan Davis
No. EIB 21-27 (R)

1 A. The NMED has proposed provisions in 20.2.50.125 NMAC to establish emission
2 reduction, monitoring, and operational requirements for small business facilities. These
3 requirements include operating equipment based on manufacturer specifications,
4 calculating, and maintaining a company-wide database of VOC and NOx emissions. Small
5 business facilities are also subject to the reporting requirements of 20.2.50.112 NMAC and
6 the fugitive leak monitoring requirements of 20.2.50.116 NMAC. The small business
7 facility operator must file an annual certification of meeting the small business facility
8 definition requirements. The provision includes an onramp for the remaining sections of
9 20.2.50 NMAC if the operator does not fully comply with the requirements of 20.2.50.125
10 NMAC.

11 **Q. BASED ON YOUR REVIEW OF DAY & KUEHN'S TESTIMONY, WHAT DO**
12 **YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL**
13 **REGARDING THE SMALL BUSINESS FACILITIES SECTION?**

14 A. The proposal for the small business facilities section is based on the recognition that the
15 cost of complying with the requirements of the entire proposed rule could
16 disproportionately impact the smallest companies and may result in the early abandonment
17 of small business-owned wells. The NMED stated that this could result in increased
18 uncontrolled emission from the abandoned wells.

19 **Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASIS FOR NMED'S**
20 **PROPOSED CHANGES?**

21 A. Yes.

22 **Q. WHAT IS YOUR ANALYSIS OF NMED'S BASES FOR ITS POSITIONS?**

Rebuttal Testimony of Ryan Davis
No. EIB 21-27 (R)

1 A. IPANM supports reducing the requirements applicable to small businesses and appreciates
2 the Department's consideration of the regulations' impacts on small businesses. The
3 requirements in 20.2.50.125 NMAC are not a complete exemption of the wells subject to
4 the provision. The wells are subject to emission reductions by requiring proper equipment
5 operation and maintenance, and the wells must comply with the equipment leaks and
6 fugitive emissions requirements of 20.2.50.116 NMAC. In addition, the operator has
7 requirements to calculate and maintain a company-wide database of VOC and NOx
8 emissions, while being subject to the reporting requirements of 20.2.50.112 NMAC. It is
9 evident the NMED recognized the potential financial burden that the proposed rule could
10 have on small businesses and wanted to provide the necessary relief to prevent premature
11 abandonment of wells in the state while not creating a regulation loophole.

12 **Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY**
13 **NMED WITNESSES DAY & KUEHN CAUSE YOU TO RECONSIDER THE**
14 **STATEMENTS AND PROPOSED REVISIONS TO 20.2.50.125 NMAC**
15 **CONTAINED IN YOUR DIRECT TESTIMONY?**

16 A. Yes.

17 **Q. BASED ON YOUR REVIEW OF NMED'S PROPOSALS AND SUPPORTING**
18 **DIRECT TESTIMONIES, ARE YOU CHANGING YOUR POSITION ON**
19 **RECOMMENDED PROPOSED REVISIONS TO 20.2.50.125 NMAC THAT WERE**
20 **STATED IN YOUR DIRECT TESTIMONY?**

21 A. Yes.

22 **Q. PLEASE EXPLAIN.**

Rebuttal Testimony of Ryan Davis
No. EIB 21-27 (R)

1 A. IPANM originally proposed that the small business facility provisions not be adopted since
2 it didn't accomplish the objective of reducing requirements applicable to small businesses.
3 While I am still concerned that it is too limiting with the qualification of less than 10
4 employee and \$250,000 of gross revenue, I recognize the Department's efforts to provide
5 appropriate relief for small business and prevent the premature abandonment of marginal
6 wells. I believe that there is a balance to strike here to alleviate IPANM's concerns and
7 accomplish the NMED's goal of providing relief, all while not exempting a large number
8 of wells from regulation under the proposed 20.2.50 NMAC.

9 **Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THE SMALL**
10 **BUSINESS FACILITIES SECTION?**

11 A. Yes, NMOGA proposed modifications to this section.

12 **Q. PLEASE SUMMARIZE THOSE PROPOSED CHANGES.**

13 A. NMOGA expressed concerns regarding the devastating impact the rule could have on small
14 businesses. NMOGA estimated that the operators of 87% of all gas wells in the state would
15 not be able to absorb the cost of compliance associated with the entire rule. The testimony
16 from NMOGA highlights that the NMOCD Waste Rule recently adopted contains
17 requirements that apply to all wells in the state, effectively reducing VOC emissions.
18 NMOGA proposed that the Small Business Facility section not be adopted because it did
19 not provide the necessary relief that was intended. IPANM agrees with the concerns outline
20 in the NMOGA testimony and agrees that the gas capture requirements of the NMOCD
21 Waste Rule apply to every well in New Mexico, which will result in a reduction of ozone
22 precursor emissions across the board. IPANM also agrees with NMOGA that the oil and

Rebuttal Testimony of Ryan Davis
No. EIB 21-27 (R)

1 gas industry is very important to the state. We urge the EIB to adopt a balanced approach
2 to secure emission reductions in this sector with a reasonable burden.

3 **Q. IS IPANM SUPPORTIVE OF NMOGA'S PROPOSED MODIFICATIONS?**
4 **PLEASE EXPLAIN.**

5 A. IPANM agrees with NMOGA's modifications based on the current small business facility
6 provision structure and definition. The gross revenue of an oil and gas producer is tied to
7 commodity prices, which ebb and flow with market conditions. Moreover, gross revenue
8 is not a good measure of an operator's profitability and does not consider the upfront capital
9 costs of drilling and completing a well or the infrastructure needed to operate.

10 **Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL**
11 **IMPROVEMENT BOARD WITH RESPECT TO THE SMALL BUSINESS**
12 **FACILITIES SECTION?**

13 A. IPANM recommends that the EIB recognize that the cost of compliance with this
14 proposed rule will disproportionately impact small business and lead to the premature
15 abandonment of wells in the state of New Mexico. It is vital that the rule provide the
16 appropriate relief to ensure the continued operation of a very important production base
17 that comes from moderate to low producing wells in the state and the small businesses
18 that operate these wells. Therefore, IPANM recommends that the EIB adopt an approach
19 that balances the preproposal draft structure with the intent of the current proposal from
20 NMED. Moving back to the stripper well and low PTE structure of the pre-proposal draft,
21 while including the applicability of LDAR and the other requirements ensures that all
22 wells are subject to a baseline set of requirements while not overburdening the stripper

1 wells in the state. This approach provides the appropriate relief for small business and
2 prevents the premature abandonment of stripper wells.

4 **Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?**

5 A. Yes.

**STATE OF NEW MEXICO
BEFORE THE ENVIRONMENTAL IMPROVEMENT BOARD**

IN THE MATTER OF:

**PROPOSED NEW REGULATION,
20.2.50 NMAC – OIL AND GAS
SECTOR –OZONE PRECURSOR POLLUTANTS**

No. EIB 21-27 (R)

**REBUTTAL TESTIMONY OF DAVID R. BROWN,
DJR OPERATING, LLC, ON BEHALF OF THE INDEPENDENT PETROLEUM
ASSOCIATION OF NEW MEXICO**

September 7, 2021

IPANM EXHIBIT 11

Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)

I. WITNESS BACKGROUND AND QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. David R. Brown. My business address is DJR Operating, LLC, 1 Road 3263, Aztec, New Mexico 87410.

Q. ON WHOSE BEHALF ARE YOU SUBMITTING REBUTTAL TESTIMONY?

A. The Independent Petroleum Association of New Mexico (“IPANM”).

Q. HAVE YOU PROVIDED PREVIOUS TESTIMONY IN THIS CASE?

A. Yes, I provided direct testimony, which includes: (i) a summary of my qualifications and experience; (ii) a discussion of IPANM’s evaluation of and proposed changes to the regulations proposed by the New Mexico Environment Department (“NMED”), Oil and Gas Sector—Ozone Precursor Pollutants, 20.2.50 NMAC (the “Regulations”); and (iii) the technical bases for certain related changes to the Regulations proposed in IPANM’s Notice of Intent to Present Technical Testimony (“IPANM’s Notice of Intent”). My direct testimony was submitted with IPANM’s Notice of Intent, filed on July 28, 2021.

II. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my rebuttal testimony is to respond to the direct testimony of NMED and other parties to this proceeding relating to the following proposed amendments to 20.2.50 NMAC:

- 20.2.50.112 NMAC –General Provisions.
- 20.2.50.113 NMAC –Engines and Turbines;
- 20.2.50.114 NMAC –Compressor Seals;
- 20.2.50.115 NMAC –Control Devices;

Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)

- 20.2.50.117 NMAC –Natural Gas Well Liquid Unloading;
- 20.2.50.122 NMAC –Pneumatic Controllers and Pumps, and;
- 20.2.50.123 NMAC –Storage Vessels

More specifically, the purpose of my rebuttal testimony is to re-affirm IPANM’s position in opposition to NMED’s proposed requirement in 20.2.50.112(A)(2)-(10) and (B)(3) NMAC mandating that owners or operators of sources subject to the proposed requirements for Equipment Monitoring Tag (“EMT”) to physically tag each unit and specify the format of each tag. My testimony also relates to EMT requirements throughout the proposed Part 50, including the following Sections: 20.2.50.113(B)(9), (C)(7), (D)(1)(a), and (D)(2)(a); 20.2.50.114(B)(5); 20.2.50.115(B)(3)-(4), (C)(2)(d), (D)(2)(c), and (E)(2)(b); 20.2.50.117(B)(4) and (C)(3); 20.2.50.118(B)(3)(d); 20.2.50.119(B)(4) and (C)(4); 20.2.50.122(B)(6), (C)(4), and (D)(6)-(7), and; 20.2.50.123(B)(8) and (C)(4), to require the compliance database report in 20.250.112.A.(6) and(7) NMAC and to require an operator to retain a third party to verify data retained by an operator (audit).

Q. HAVE YOU REVIEWED THE NOTICE OF INTENT TO PRESENT TECHNICAL TESTIMONY (“NOI”) AND EXHIBITS FILED BY NMED, THE COMMERCIAL DISPOSAL GROUP (“CDG”), THE GAS COMPRESSOR ASSOCIATION (“GCA”), OXY USA, INC., THE NEW MEXICO OIL AND GAS ASSOCIATION (“NMOGA”), AND WILDEARTH GUARDIANS (“WEG”) RELATED TO THE AMENDMENTS ADDRESSED IN YOUR DIRECT AND REBUTTAL TESTIMONY?

A. Yes.

**Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)**

**III. NMED PROPOSALS RELATED TO GENERAL PROVISIONS SECTION
(20.2.50.112 NMAC)**

**Q. HAVE YOU REVIEWED NMED'S PROPOSED REGULATIONS RELATED TO
THE GENERAL PROVISIONS SECTION?**

A. Yes.

**Q. PLEASE SUMMARIZE NMED'S CURRENT PROPOSALS AS IT RELATES TO
REQUIREMENTS FOR EQUIPMENT MONITORING TAG.**

A. The NMED's direct testimony provides an overall summary of the proposed rule as written.

**Q. BASED ON YOUR REVIEW OF KUEHN'S & PALMER'S TESTIMONY, WHAT
DO YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL TO
REQUIRE OWNERS OR OPERATORS OF SOURCES SUBJECT TO THE
PROPOSED REGULATIONS TO PHYSICALLY TAG EACH UNIT WITH AN
EQUIPMENT MONITORING TAG ("EMT")?**

A. According to direct testimony of their witnesses, NMED believes EMT requirements will significantly improve the Department's ability to receive, review and analyze compliance monitoring for subject sources. In addition, NMED believes that these requirements will help improve and increase the public's confidence that required compliance monitoring is occurring as required because contemporaneous scanning and recordkeeping during the monitoring and testing events ensures that owners and operators are fulfilling the monitoring requirements of the rule (Page 26, lines 10-15).

**Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASIS FOR NMED'S
PROPOSED CHANGES?**

A. Yes.

Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)

Q. WHAT IS YOUR ANALYSIS OF NMED'S BASIS FOR ITS POSITIONS?

A. It is unknown whether the EMT will accomplish what the NMED anticipates regarding regulatory compliance. If EMT remains part of the final rule, it will come at a significant cost and a complex logistical regime for owner/operators to implement and maintain. In addition, there is no evidence presented that implementing EMT will have any effect on reducing NOx and VOC emissions which form ozone.

Q. BASED ON YOUR REVIEW OF NMED'S PROPOSALS AND SUPPORTING DIRECT TESTIMONIES, ARE YOU CHANGING YOUR POSITION ON RECOMMENDED PROPOSED REVISIONS TO 20.2.50.112 NMAC THAT WERE STATED IN YOUR DIRECT TESTIMONY?

A. No.

Q. PLEASE EXPLAIN.

A. As previously stated, my direct testimony dealt with the high costs to comply with Section 20.2.50.112.A, Paragraphs (3) through (9) and paragraph (10). The NMED witnesses provided no information on the costs for owner and operators to comply with these provisions, nor was there any information provided regarding how EMT reduces precursors of ozone.

Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THE PROPOSED EMT REQUIREMENT?

A. Yes.

Q. PLEASE SUMMARIZE THOSE PROPOSED CHANGES.

Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)

1 A. The testimony of Ms. Marquez expressed serious concerns with the EMT requirement and
2 recommended deletion of Section 20.2.50.112.A(3)-(10) which includes the EMT
3 requirement. Mr. Copeland cited the extremely expensive implementation without any
4 emissions benefit and requested the EMT requirements be stricken from the proposed rule.
5 Mr. Holderman suggested that the EMT rule allow for alternative methods of monitoring
6 instead of requiring operators to scan every piece of equipment. Mr. Smitherman
7 mentioned the complexity and that the new requirement would be staggering with no
8 achievable emission reductions. The testimony of Mr. Nichols did not mention or suggest
9 any changes to the EMT requirement.

10 **Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL**
11 **IMPROVEMENT BOARD WITH RESPECT TO THE EMT REQUIREMENTS**
12 **FOUND AT 20.2.50.112.A(6) & (7).**

13 A. I recommend that EMT requirement be rejected and that all references to EMT in the
14 proposal be deleted from the final rule.

15 **Q. PLEASE SUMMARIZE NMED'S CURRENT PROPOSALS AS IT RELATES TO**
16 **REQUIREMENTS FOR THE COMPLIANCE DATABASE REPORT.**

17 A. The NMED's direct testimony provides an overall summary of the proposed rule as written,
18 which allows the Department to contemporaneously track compliance event for each
19 subject source and requirements for timely uploads of monitoring or testing event data and
20 maintaining those records for 5 years.

21 **Q. BASED ON YOUR REVIEW OF KUEHN & PALMER'S TESTIMONY, WHAT DO**
22 **YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL TO**

Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)

1 REQUIRE OWNERS OR OPERATORS OF SOURCES SUBJECT TO THE
2 PROPOSED REGULATIONS TO REQUIRE OWNERS OR OPERATORS
3 RETAIN A THIRD PARTY AT THE OWN EXPENSE TO VERIFY DATA OR
4 INFORMATION COLLECTED, REPORTED OR RECORDED REQUIRED BY
5 THIS PART?

6 A. The witnesses mention generating a compliance database report from the owner or operator
7 in a format determined by the Department. According to direct testimony of their
8 witnesses, NMED believes that the EMT requirements, which apparently include the
9 compliance database report (CDR), strengthens the overall rule; saves limited staffing
10 resources; improves the public's confidence in compliance with the rule; will result in
11 overall better compliance; and provides owners and operators with targeted
12 recommendations on how to improve any compliance issues identified in the report.

13 **Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASIS FOR NMED'S**
14 **PROPOSED CHANGES?**

15 A. Yes.

16 **Q. WHAT IS YOUR ANALYSIS OF NMED'S BASIS FOR ITS POSITIONS?**

17 A. As noted in my direct testimony, the costs to implement a computer-based record system
18 to compile the information will be cost prohibitive for small operators or owners. Based
19 upon our inquiries to company to develop the system necessary to achieve what the
20 proposed rule requires is between \$95,000 and \$145,000 plus another \$10,000 to annually
21 maintain the system. In addition, after the system is developed the owner and operator
22 must populate it with the data required to be input into the system. This will likely require

Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)

1 contractors since most small companies do not have in-house staff capable of developing
2 a data base system. While companies could merely populate the CDR without the use of
3 an automated system, the amount of staff time could rival that of an automated system
4 depending upon what constitutes the CDR. Either option will present a formidable task for
5 small companies, in terms of costs, logistics and the time of employees.

6 **Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THE PROPOSED**
7 **CDR REQUIREMENT?**

8 A. Yes.

9 **Q. PLEASE SUMMARIZE THOSE PROPOSED CHANGES.**

10 A. The testimony of Ms. Marquez and Mr. Copeland suggested elimination of the EMT
11 requirement. Mr. Holderman expressed concerns about the EMT and CDR requirements
12 but suggested the rule be modified to allow the use of any data base that can produce a
13 report providing NMED reasonable compliance assurance. Mr. Smitherman expressed
14 concerns as well and noted that careful planning is needed in developing what is needed
15 for the system which should include input from the regulated community. The testimony
16 of Mr. Nichols did not mention or suggest any changes to the EMT requirement.

17 **Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL**
18 **IMPROVEMENT BOARD WITH RESPECT TO THE CDR REQUIREMENT?**

19 A. The CDR requirement should be eliminated from the final rule.

20 **Q. PLEASE SUMMARIZE NMED'S CURRENT PROPOSALS AS IT RELATES TO**
21 **REQUIREMENTS FOR THIRD PARTY AUDIT IN 20.2.50.112.A(10) NMAC.**

Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)

1 A. The proposed rule allows the Department to request an owner or operator retain a third
2 party, at the owner and operator's expense, to verify information collected, reported, or
3 recorded as required in this rule. The third party would be required to make
4 recommendations to correct or improve the collocation of data or information. The owner
5 or operators then must submit a report of the verification and recommendations made by
6 the third party to the department.

7 **Q. BASED ON YOUR REVIEW OF KUEHN & PALMER'S TESTIMONY, WHAT DO**
8 **YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL TO**
9 **REQUIRE OWNERS OR OPERATORS OF SOURCES SUBJECT TO THE**
10 **PROPOSED REGULATIONS TO REQUIRE OWNERS OR OPERATORS**
11 **RETAIN A THIRD PARTY AT THE OWN EXPENSE TO VERIFY DATA OR**
12 **INFORMATION COLLECTED, REPORTED OR RECORDED REQUIRED BY**
13 **THIS PART?**

14 A. NMED's direct testimony provides an overall summary of the proposed rule as written.
15 According to direct testimony of their witnesses, they believe including the third-party
16 audits, are part of an effort that strengthens the overall rule; saves limited staffing
17 resources; improves the public's confidence in compliance with the rule; will result in
18 overall better compliance; and provides owners and operators with targeted
19 recommendations on how to improve any compliance issues identified in the report.

20 **Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASIS FOR NMED'S**
21 **PROPOSED CHANGES?**

22 A. Yes.

Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)

Q. WHAT IS YOUR ANALYSIS OF NMED'S BASIS FOR ITS POSITIONS?

A. As noted in my direct testimony, the cost to conduct a third-party audit is another cost which must be incurred by owners or operators, including small businesses, to comply with the proposed rule. The cost of audits is not limited to the costs of the third party; companies must devote a significant amount of staff time to arrange and accompany the third party for field tours to inspect sites and equipment, provide files and make copies, answer questions, and respond to findings. These audits are very resource intensive, both for costs and logistics. What is not known is whether NMED could request these be done for an entire company's assets in New Mexico or would be on a site-by site or permit-by-permit basis. We provided costs of applying the requirement on a site-by-site basis; \$5000 for a single vertical well and \$7,600 for a multiple well horizontal pad. Instead of a third-party contractor, the alternative should be to simply request the operator provide required records of concern to the NMED staff as requested. The additional costs of a third-party audit are costly and is difficult to demonstrate reductions in emissions of ozone precursors.

Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THE PROPOSED THIRD-PARTY AUDIT?

A. Yes.

Q. PLEASE SUMMARIZE THOSE PROPOSED CHANGES.

A. Ms. Marquez and Mr. Copeland requested deletion of Section 20.2.50.112.A(3)-(10). Mr. Copeland stated these provisions are unclear, extremely onerous, and extremely expensive to implement which includes the third-party audit. Mr. Smitherman of NMOGA expressed concerns with the third-party audit and recommended a process whereby an operator could

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1 challenge the findings and recommendations thus providing for fair protection for all
2 parties. Mr. Holderman expressed concerns about the third-party audit and recommended
3 it be modified to limit the number of times NMED can require an operator to retain a third
4 party to verify data to once a year. The testimony of Mr. Nichols did not mention the third-
5 party audit provision.

6 **Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL**
7 **IMPROVEMENT BOARD WITH RESPECT TO THE THIRD-PARTY AUDIT**
8 **REQUIREMENTS?**

9 A. The third-party audit provision should be eliminated.

10 **IV. NMED'S PROPOSED EMT REQUIREMENT VIS-À-VIS ENGINES AND**
11 **TURBINES SECTION (20.2.50.113 NMAC)**
12

13 **Q. HAVE YOU REVIEWED NMED'S PROPOSED REGULATIONS RELATED TO**
14 **THE ENGINES AND TURBINES SECTION?**

15 A. Yes.

16 **Q. PLEASE SUMMARIZE NMED'S PROPOSED REGULATIONS FOR THE**
17 **ENGINES AND TURBINES SECTION AS THEY RELATE TO THE EMT**
18 **REQUIREMENT.**

19 A. The testimony indicates that EMT will be required for engines and turbines.

20 **Q. BASED ON YOUR REVIEW OF KUEHN & PALMER'S TESTIMONY, WHAT DO**
21 **YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL TO THE**
22 **ENGINE AND TURBINES SECTION AS IT RELATES TO THE EMT**
23 **REQUIREMENT?**

24 A. No basis is provided other than stating "install EMT on all units subject to this subpart."

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1 **Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASIS FOR NMED’S**
2 **PROPOSED CHANGES?**

3 A. Yes.

4 **Q. WHAT IS YOUR ANALYSIS OF NMED’S BASIS FOR ITS POSITIONS?**

5 A. While NMED justified EMT as being advantageous to the Department, it did not address
6 costs or logistic implications to owners and operators, nor was there any information
7 provided regarding how EMT reduces precursors of ozone.

8 **Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY**
9 **NMED WITNESSES KUEHN & PALMER CAUSE YOU TO RECONSIDER THE**
10 **STATEMENTS AND PROPOSED REVISIONS TO 20.2.50.113 NMAC**
11 **CONTAINED IN YOUR DIRECT TESTIMONY?**

12 A. No.

13 **Q. BASED ON YOUR REVIEW OF NMED’S PROPOSALS AND SUPPORTING**
14 **DIRECT TESTIMONIES, ARE YOU CHANGING YOUR POSITION ON**
15 **RECOMMENDED PROPOSED REVISIONS TO 20.2.50.113 NMAC THAT WERE**
16 **STATED IN YOUR DIRECT TESTIMONY?**

17 A. No.

18 **Q. PLEASE EXPLAIN.**

19 A. Since the NMED testimony did not include any cost data relative to the regulated
20 community, the need to change my testimony is not warranted.

21 **Q. PLEASE SUMMARIZE NMED’S CURRENT PROPOSALS AS IT RELATES TO**
22 **REQUIREMENTS FOR EQUIPMENT MONITORING TAG.**

Rebuttal Testimony of David R. Brown
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1 A. The NMED's direct testimony provides an overall summary of the proposed rule as
2 written.

3 **Q. BASED ON YOUR REVIEW OF KUEHN & PALMER'S TESTIMONY, WHAT DO**
4 **YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL TO**
5 **REQUIRE OWNERS OR OPERATORS OF SOURCES SUBJECT TO THE**
6 **PROPOSED REGULATIONS TO PHYSICALLY TAG EACH UNIT WITH AN**
7 **EQUIPMENT MONITORING TAG ("EMT")?**

8 A. According to their direct testimony, they believe EMT requirements will significantly
9 improve the Department's ability to receive, review and analyze compliance monitoring
10 for subject sources. In addition, they believe that these requirements will help improve and
11 increase the public's confidence that required compliance monitoring, is in fact occurring
12 as required because contemporaneous scanning and recordkeeping during the monitoring
13 and testing events ensures that owners and operators are fulfilling the monitoring
14 requirements of the rule (Page 26, lines 10-15).

15 **Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASIS FOR NMED'S**
16 **PROPOSED CHANGES?**

17 A. Yes.

18 **Q. WHAT IS YOUR ANALYSIS OF NMED'S BASIS FOR ITS POSITIONS?**

19 A. It is unclear to me that the EMT will accomplish what the NMED anticipates regarding
20 regulatory compliance. If EMT remains part of the final rule, it will come at a significant
21 cost and a complex logistical regime for owner/operators to implement and maintain. In

Rebuttal Testimony of David R. Brown
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1 addition, there is no evidence presented that implementing EMT will have any effect on
2 reducing the emissions of precursors which form ozone.

3 **Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY**
4 **NMED WITNESSES KUEHN & PALMER CAUSE YOU TO RECONSIDER THE**
5 **STATEMENTS AND PROPOSED REVISIONS TO 20.2.50.113 NMAC**
6 **CONTAINED IN YOUR DIRECT TESTIMONY?**

7 A. No.

8 **Q. BASED ON YOUR REVIEW OF NMED'S PROPOSALS AND SUPPORTING**
9 **DIRECT TESTIMONIES, ARE YOU CHANGING YOUR POSITION ON**
10 **RECOMMENDED PROPOSED REVISIONS TO 20.2.50.113 NMAC THAT WERE**
11 **STATED IN YOUR DIRECT TESTIMONY?**

12 A. No.

13 **Q. PLEASE EXPLAIN.**

14 A. As previously stated, my testimony dealt with the high costs to comply with 20.2.50.112,
15 Paragraphs (3) through (9) and paragraph (10). The NMED witnesses provided no
16 information on the costs for owner and operators to comply with these provisions, nor was
17 there any information provided regarding how EMT reduces precursors of ozone.

18 **Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THE PROPOSED**
19 **EMT REQUIREMENT?**

20 A. Yes.

21 **Q. PLEASE SUMMARIZE THOSE PROPOSED CHANGES.**

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1 A. The testimony of Ms. Marquez, Mr. Copeland, Mr. Holderman, and Mr. Smitherman all
2 expressed concerns and opposition to the proposed EMT requirements. The testimony of
3 Mr. Nichols only addressed monitoring, but there were no specific references to EMT.

4 **Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL**
5 **IMPROVEMENT BOARD WITH RESPECT TO THE EMT REQUIREMENTS?**

6 A. I recommend that all references to the EMT requirement in the proposal be deleted from
7 the final rule.

8 **V. NMED'S PROPOSED EMT REQUIREMENT VIS-À-VIS COMPRESSOR SEALS**
9 **SECTION (20.2.50.114 NMAC)**

10
11 **Q. HAVE YOU REVIEWED NMED'S PROPOSED REGULATIONS RELATED TO**
12 **THE COMPRESSOR SEALS SECTION?**

13 A. Yes.

14 **Q. PLEASE SUMMARIZE NMED'S PROPOSED REGULATIONS FOR THE**
15 **COMPRESSOR AND SEALS SECTION AS THEY RELATE TO THE EMT**
16 **REQUIREMENT.**

17 A. Section 20.2.50.114(B)(5) requires that the owner or operator of a centrifugal or
18 reciprocating compressor "install an EMT on the compressor in accordance with
19 20.2.50.112."

20 **Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY**
21 **NMED WITNESSES KUEHN & PALMER CAUSE YOU TO RECONSIDER THE**
22 **STATEMENTS AND PROPOSED REVISIONS TO 20.2.50.114 NMAC**
23 **CONTAINED IN YOUR DIRECT TESTIMONY?**

24 A. No.

Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)

1 **Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASIS FOR NMED'S**
2 **PROPOSED CHANGES?**

3 A. Yes, the basic premise of the regulation was discussed.

4 **Q. WHAT IS YOUR ANALYSIS OF NMED'S BASIS FOR ITS POSITIONS?**

5 A. The Department did not consider the costs to industry to comply with the requirements in
6 20.2.50.114, nor was there any information provided regarding how EMT reduces
7 precursors of ozone.

8 **Q. BASED ON YOUR REVIEW OF KUEHN & PALMER'S TESTIMONY, WHAT DO**
9 **YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL TO THE**
10 **COMPRESSOR SEALS SECTION AS IT RELATES TO THE EMT**
11 **REQUIREMENT?**

12 A. That compressor seals is a component which can be an emission source and should be
13 included as part of the EMT program.

14 **Q. BASED ON YOUR REVIEW OF NMED'S PROPOSALS AND SUPPORTING**
15 **DIRECT TESTIMONIES, ARE YOU CHANGING YOUR POSITION ON**
16 **RECOMMENDED PROPOSED REVISIONS TO 20.2.50.114 NMAC THAT WERE**
17 **STATED IN YOUR DIRECT TESTIMONY?**

18 A. No.

19 **Q. PLEASE EXPLAIN.**

20 A. As discussed earlier, I believe that the cost to meet the EMT requirements is substantial
21 and is not warranted. The NMED witnesses did not provide any cost information related
22 to the cost to industry to comply with EMT.

**Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)**

1 **Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THE**
2 **COMPRESSOR SEALS SECTION ON THE BASIS OF THE EMT**
3 **REQUIREMENT IN 20.2.50.114 NMAC?**

4 A. Yes.

5 **Q. PLEASE SUMMARIZE THOSE PROPOSED CHANGES.**

6 A. Kinder Morgan, Gas Compressor Association, the Commercial Disposal Group and the
7 New Mexico Oil and Gas Association all proposed removal of the requirement from the
8 proposed rule.

9 **Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL**
10 **IMPROVEMENT BOARD WITH RESPECT TO THE COMPRESSOR SEALS**
11 **SECTION AS IT RELATES TO THE EMT REQUIREMENT?**

12 A. I recommend that all references to the EMT requirement in the proposal should be deleted
13 from the final rule.

14 **VI. NMED'S PROPOSED EMT REQUIREMENT VIS-À-VIS CONTROL DEVICES**
15 **SECTION (20.2.50.115 NMAC)**
16

17 **Q. HAVE YOU REVIEWED NMED'S PROPOSED REGULATIONS RELATED TO**
18 **THE CONTROL DEVICES SECTION?**

19 A. Yes.

20 **Q. PLEASE SUMMARIZE NMED'S PROPOSED REGULATIONS FOR THE**
21 **CONTROL DEVICES SECTION AS THEY RELATE TO THE EMT**
22 **REQUIREMENT.**

23 A. NMED's proposal extends the EMT requirements to enclosed combustion devices and
24 thermal oxidizers (20.2.50.115(D)) and Vapor Recovery Units (20.2.50.115(E)).

**Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)**

Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY NMED WITNESSES KUEHN & PALMER CAUSE YOU TO RECONSIDER THE STATEMENTS AND PROPOSED REVISIONS TO 20.2.50.115 NMAC CONTAINED IN YOUR DIRECT TESTIMONY?

A. No.

Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASIS FOR NMED'S PROPOSED CHANGES?

A. Yes.

Q. WHAT IS YOUR ANALYSIS OF NMED'S BASIS FOR ITS POSITIONS?

A. The cost of compliance does not warrant the application of EMT to this equipment.

Q. BASED ON YOUR REVIEW OF KUEHN & PALMER'S TESTIMONY, WHAT DO YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL TO THE CONTROL DEVICES SECTION AS IT RELATES TO THE EMT REQUIREMENT?

A. NMED is proposing the requirement to reduce its cost of enforcing compliance with the regulation.

Q. BASED ON YOUR REVIEW OF NMED'S PROPOSALS AND SUPPORTING DIRECT TESTIMONIES, ARE YOU CHANGING YOUR POSITION ON RECOMMENDED PROPOSED REVISIONS TO 20.2.50.115 NMAC THAT WERE STATED IN YOUR DIRECT TESTIMONY?

A. No.

Q. PLEASE EXPLAIN.

Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)

1 A. The NMED witnesses did not provide an analysis on the cost to industry to comply with
2 EMT and did not provide any information regarding how requiring EMT results in a
3 reduction of ozone precursors.

4 **Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THE CONTROL**
5 **DEVICES SECTION ON THE BASIS OF THE EMT REQUIREMENT IN**
6 **20.2.50.115 NMAC?**

7 A. Yes.

8 **Q. PLEASE SUMMARIZE THOSE PROPOSED CHANGES.**

9 A. Yes. Kinder Morgan, Gas Compressor Association, the Commercial Disposal Group and
10 the New Mexico Oil and Gas Association all requested removal of the requirement from
11 the proposed rule.

12 **Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL**
13 **IMPROVEMENT BOARD WITH RESPECT TO THE COMPRESSOR SEALS**
14 **SECTION AS IT RELATES TO THE EMT REQUIREMENT?**

15 A. All references to the EMT requirement in the proposal should be deleted from the final
16 rule.

17 **VII. NMED'S PROPOSED EMT REQUIREMENT VIS-À-VIS NATURAL GAS WELL**
18 **LIQUID UNLOADING SECTION (20.2.50.117 NMAC)**

19
20 **Q. HAVE YOU REVIEWED NMED'S PROPOSED REGULATIONS RELATED TO**
21 **THE NATURAL GAS WELL LIQUID UNLOADING SECTION?**

22 A. Yes.

Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)

Q. PLEASE SUMMARIZE NMED'S PROPOSED REGULATIONS FOR THE NATURAL GAS WELL LIQUID UNLOADING SECTION AS THEY RELATE TO THE EMT REQUIREMENT.

A. The proposed rule requires EMT to be installed on natural gas well liquid unloading equipment.

Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY NMED WITNESSES KUEHN & PALMER CAUSE YOU TO RECONSIDER THE STATEMENTS AND PROPOSED REVISIONS TO 20.2.50.117 NMAC CONTAINED IN YOUR DIRECT TESTIMONY?

A. No.

Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASIS FOR NMED'S PROPOSED CHANGES?

A. Yes.

Q. WHAT IS YOUR ANALYSIS OF NMED'S BASIS FOR ITS POSITIONS?

A. While NMED proposed the application of EMT to liquids unloading equipment to reduce its costs to monitor compliance, the direct testimony did not explain how NMED considered the costs for owners or operators to install EMT or demonstrate that implementation of EMT will reduce the emissions or precursors that contribute to form ozone.

Q. BASED ON YOUR REVIEW OF KUEHN & PALMER'S TESTIMONY, WHAT DO YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL TO THE

**Rebuttal Testimony of David R. Brown
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**LIQUID UNLOADING SECTION AS IT RELATES TO THE EMT
REQUIREMENT?**

A. NMED's basis for the proposal is to assure that monitoring data related to liquids unloading will be retained and available for review.

**Q. BASED ON YOUR REVIEW OF NMED'S PROPOSALS AND SUPPORTING
DIRECT TESTIMONIES, ARE YOU CHANGING YOUR POSITION ON
RECOMMENDED PROPOSED REVISIONS TO 20.2.50.117 NMAC THAT WERE
STATED IN YOUR DIRECT TESTIMONY?**

A. No.

Q. PLEASE EXPLAIN.

A. The NMED witnesses did not provide evidence on the cost to industry to comply with EMT nor or explain how the EMT requirement reduces precursors of ozone.

**Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THE NATURAL
GAS WELL LIQUID UNLOADING SECTION ON THE BASIS OF THE EMT
REQUIREMENT IN 20.2.50.117 NMAC?**

A. Yes.

Q. PLEASE SUMMARIZE THOSE PROPOSED CHANGES.

A. Yes. Kinder Morgan, Gas Compressor Association, the Commercial Disposal Group and the New Mexico Oil and Gas Association all requested removal of the requirement from the proposed rule.

**Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL
IMPROVEMENT BOARD WITH RESPECT TO THE NATURAL GAS WELL**

**Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)**

**LIQUID UNLOADING SECTION AS IT RELATES TO THE EMT
REQUIREMENT?**

A. I recommend that all references to the EMT requirement in the proposal be deleted from the final rule.

**VIII. NMED'S PROPOSED EMT REQUIREMENT VIS-À-VIS HEATERS SECTION
(20.2.50.119 NMAC)**

**Q. HAVE YOU REVIEWED NMED'S PROPOSED REGULATIONS RELATED TO
THE HEATERS SECTION?**

A. Yes.

**Q. PLEASE SUMMARIZE NMED'S PROPOSED REGULATIONS FOR THE
HEATERS SECTION AS THEY RELATE TO THE EMT REQUIREMENT.**

A. EMT is required to be install on heaters greater than 10 MMBtu/hr.

**Q. BASED ON YOUR REVIEW OF KUEHN & PALMER'S TESTIMONY, WHAT DO
YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL TO THE
HEATERS SECTION AS IT RELATES TO THE EMT REQUIREMENT?**

A. Heaters greater in size than 10 MMBtu/hr are an emission source that should be subject to EMT.

**Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASES FOR NMED'S
PROPOSED CHANGES?**

A. Yes.

Q. WHAT IS YOUR ANALYSIS OF NMED'S BASIS FOR ITS POSITIONS?

A. Larger size rated heaters are subject to EMT, but it is not clear what monitoring requirements the NMED is requiring be included with EMT.

Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)

1 **Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY**
2 **NMED WITNESSES KUEHN & PALMER CAUSE YOU TO RECONSIDER THE**
3 **STATEMENTS AND PROPOSED REVISIONS TO 20.2.50.119 NMAC**
4 **CONTAINED IN YOUR DIRECT TESTIMONY?**

5 A. No.

6 **Q. BASED ON YOUR REVIEW OF NMED'S PROPOSALS AND SUPPORTING**
7 **DIRECT TESTIMONIES, ARE YOU CHANGING YOUR POSITION ON**
8 **RECOMMENDED PROPOSED REVISIONS TO 20.2.50.119 NMAC THAT WERE**
9 **STATED IN YOUR DIRECT TESTIMONY?**

10 A. No.

11 **Q. PLEASE EXPLAIN.**

12 A. The NMED did not address the costs to install EMT, which will be significant for
13 owner/operator or demonstrate that requiring EMT will reduce the emissions of ozone
14 precursors that contribute to form ozone.

15 **Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THE HEATERS**
16 **SECTION ON THE BASIS OF THE EMT REQUIREMENT IN 20.2.50.111 NMAC?**

17 A. Yes.

18 **Q. PLEASE SUMMARIZE THOSE PROPOSED CHANGES.**

19 A. Yes. Kinder Morgan, Gas Compressor Association, the Commercial Disposal Group and
20 the New Mexico Oil and Gas Association all requested removal of the requirement from
21 the proposed rule.

Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)

1 **Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL**
2 **IMPROVEMENT BOARD WITH RESPECT TO THE HEATERS SECTION AS IT**
3 **RELATES TO THE EMT REQUIREMENT?**

4 **A. I recommend that all references to the EMT requirement in the proposal be deleted from**
5 **the final rule.**

6 **IX. NMED’S PROPOSED EMT REQUIREMENT VIS-À-VIS PNEUMATIC**
7 **CONTROLLERS AND PUMPS SECTION (20.2.50.122 NMAC)**
8

9 **Q. HAVE YOU REVIEWED NMED’S PROPOSED REGULATIONS RELATED TO**
10 **THE PNEUMATIC CONTROLLERS AND PUMP SECTION?**

11 **A. Yes.**

12 **Q. PLEASE SUMMARIZE NMED’S PROPOSED REGULATIONS FOR THE**
13 **PNEUMATIC CONTROLLERS AND PUMP SECTION AS THEY RELATE TO**
14 **THE EMT REQUIREMENT.**

15 **A. The proposal requires that an EMT be affixed to equipment subject to this rule and that the**
16 **owner or operator “scan the EMT” prior to a monitoring, inspection, maintenance, or repair**
17 **event.**

18 **Q. BASED ON YOUR REVIEW OF KUEHN & PALMER’S TESTIMONY, WHAT DO**
19 **YOU UNDERSTAND TO BE THE BASIS FOR NMED’S PROPOSAL TO THE**
20 **PNEUMATIC CONTROLLERS AND PUMPS SECTION AS IT RELATES TO**
21 **THE EMT REQUIREMENT?**

22 **A. NMED’s basis for the EMT requirement is to assure operational data, control device data**
23 **and any records involving certification that control emissions is infeasible, are properly**
24 **recorded and maintained.**

Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)

1 **Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASIS FOR NMED'S**
2 **PROPOSED CHANGES?**

3 A. Yes.

4 **Q. WHAT IS YOUR ANALYSIS OF NMED'S BASIS FOR ITS POSITIONS?**

5 A. The NMED EMT requirement for pneumatic controllers is not cost effective and will not
6 result in lower emissions of the precursors of ozone.

7 **Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY**
8 **NMED WITNESSES KUEHN & PALMER CAUSE YOU TO RECONSIDER THE**
9 **STATEMENTS AND PROPOSED REVISIONS TO 20.2.50.119 NMAC**
10 **CONTAINED IN YOUR DIRECT TESTIMONY?**

11 A. No.

12 **Q. BASED ON YOUR REVIEW OF NMED'S PROPOSALS AND SUPPORTING**
13 **DIRECT TESTIMONIES, ARE YOU CHANGING YOUR POSITION ON**
14 **RECOMMENDED PROPOSED REVISIONS TO 20.2.50.119 NMAC THAT WERE**
15 **STATED IN YOUR DIRECT TESTIMONY?**

16 A. No.

17 **Q. PLEASE EXPLAIN.**

18 A. The NMED witnesses did not provide any information on the cost to industry to comply
19 with EMT or demonstrate that EMT will reduce the emissions of precursors that contribute
20 to form ozone.

**Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)**

**1 Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THE PNEUMATIC
2 CONTROLLERS AND PUMPS SECTION ON THE BASIS OF THE EMT
3 REQUIREMENT IN 20.2.50.119 NMAC?**

4 A. Yes.

5 Q. PLEASE SUMMARIZE THOSE PROPOSED CHANGES.

6 A. Yes. Kinder Morgan, Gas Compressor Association, the Commercial Disposal Group and
7 the New Mexico Oil and Gas Association all requested removal of the requirement from
8 the proposed rule.

**9 Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL
10 IMPROVEMENT BOARD WITH RESPECT TO THE PNEUMATIC
11 CONTROLLERS AND PUMPS SECTION AS IT RELATES TO THE EMT
12 REQUIREMENT?**

13 A. I recommend that all references to the EMT requirement in the proposal be deleted from
14 the final rule.

**15 X. NMED'S PROPOSED EMT REQUIREMENT VIS-À-VIS STORAGE VESSELS
16 SECTION (20.2.50.123 NMAC)**

**17
18 Q. HAVE YOU REVIEWED NMED'S PROPOSED REGULATIONS RELATED TO
19 THE STORAGE VESSELS SECTION?**

20 A. Yes,

**21 Q. PLEASE SUMMARIZE NMED'S PROPOSED REGULATIONS FOR THE
22 STORAGE VESSELS SECTION AS THEY RELATE TO THE EMT
23 REQUIREMENT.**

24 A. The owner or operator of a new or existing storage vessel is required to install EMT.

**Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)**

Q. BASED ON YOUR REVIEW OF KUEHN & PALMER'S TESTIMONY, WHAT DO YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL TO THE STORAGE VESSELS SECTION AS IT RELATES TO THE EMT REQUIREMENT?

A. The EMT requirement will allow NMED to better address emissions from storage vessels.

Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASES FOR NMED'S PROPOSED CHANGES?

A. Yes.

Q. WHAT IS YOUR ANALYSIS OF NMED'S BASIS FOR ITS POSITIONS?

A. I believe that requiring EMT is not cost effective and has not been demonstrated to lower precursors of ozone.

Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY NMED WITNESSES KUEHN & PALMER CAUSE YOU TO RECONSIDER THE STATEMENTS AND PROPOSED REVISIONS TO 20.2.50.123 NMAC CONTAINED IN YOUR DIRECT TESTIMONY?

A. No.

Q. BASED ON YOUR REVIEW OF NMED'S PROPOSALS AND SUPPORTING DIRECT TESTIMONIES, ARE YOU CHANGING YOUR POSITION ON RECOMMENDED PROPOSED REVISIONS TO 20.2.50.123 NMAC THAT WERE STATED IN YOUR DIRECT TESTIMONY?

A. No.

Q. PLEASE EXPLAIN.

Rebuttal Testimony of David R. Brown
No. EIB 21-27 (R)

1 A. The NMED witnesses did not provide information on the cost to industry to comply with
2 EMT or how EMT reduces precursors of ozone.

3 **Q. DID ANY OTHER PARTY PROPOSE MODIFICATIONS TO THE STORAGE**
4 **AND VESSELS SECTION ON THE BASIS OF THE EMT REQUIREMENT IN**
5 **20.2.50.123 NMAC?**

6 A. Yes.

7 **Q. PLEASE SUMMARIZE THOSE PROPOSED CHANGES.**

8 A. Yes. Kinder Morgan, Gas Compressor Association, the Commercial Disposal Group and
9 the New Mexico Oil and Gas Association all requested removal of the requirement from
10 the proposed rule.

11 **Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL**
12 **IMPROVEMENT BOARD WITH RESPECT TO THE STORAGE VESSELS**
13 **SECTION AS IT RELATES TO THE EMT REQUIREMENT?**

14 A. I recommend that all references to the EMT requirement in the proposal should be
15 deleted from the final rule.

16

XI. CONCLUSION

17 Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

18 A. Yes.

**STATE OF NEW MEXICO
BEFORE THE ENVIRONMENTAL IMPROVEMENT BOARD**

IN THE MATTER OF:

**PROPOSED NEW REGULATION,
20.2.50 NMAC – OIL AND GAS
SECTOR –OZONE PRECURSOR POLLUTANTS**

No. EIB 21-27 (R)

**REBUTTAL TESTIMONY OF DOUG N. BLEWITT, CCM
AIR QUALITY RESOURCE MANAGEMENT,
ON BEHALF OF THE INDEPENDENT PETROLEUM
ASSOCIATION OF NEW MEXICO**

September 7, 2021

IPANM EXHIBIT 12

**Rebuttal Testimony of Doug N. Blewitt
No. EIB 21-27 (R)**

I. WITNESS BACKGROUND AND QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. Doug N. Blewitt. My business address is 6077 Highwood Park Court, Naples, Florida 34110.

Q. ON WHOSE BEHALF ARE YOU SUBMITTING REBUTTAL TESTIMONY?

A. The Independent Petroleum Association of New Mexico (“IPANM”).

Q. HAVE YOU PROVIDED PREVIOUS TESTIMONY IN THIS CASE?

A. Yes, I provided written direct testimony, which included: (i) a summary of my qualifications and experience; (ii) a discussion of IPANM’s evaluation of and proposed changes to the regulations proposed by the New Mexico Environment Department (“NMED”), Oil and Gas Sector—Ozone Precursor Pollutants, 20.2.50 NMAC; and (iii) the technical bases for certain related modifications to the regulations proposed in IPANM’s Notice of Intent to Present Technical Testimony (“IPANM’s Notice of Intent”). My written direct testimony was submitted with IPANM’s Notice of Intent, filed on July 28, 2021.

II. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my rebuttal testimony is to respond to (1) the direct testimony of NMED and other parties to this proceeding relating to NMED’s proposed scope of Part 50 in 20.2.50.2 NMAC, (2) the adequacy of NMED’s “plan [NMED Exhibit 4], including rules, to control emissions of oxides of nitrogen and volatile organic compounds to provide for attainment and maintenance of the [National Ambient Air Quality] standard” for addressing concentrations in excess of 95 percent of the ozone NAAQS, as required by the

**Rebuttal Testimony of Doug N. Blewitt
No. EIB 21-27 (R)**

1 New Mexico Air Quality Control Act, NMSA 1978, § 74-2-5.C (2021), and (3) the
2 modeling conducted by Ramboll Environment and Health (“Ramboll”), including the
3 source apportionment analyses to determine which sources or categories of sources causes
4 or contributes to ambient Ozone concentrations in those areas that exceed 95 percent of the
5 ozone NAAQS.

6 **Q. HAVE YOU REVIEWED THE NOTICE OF INTENT TO PRESENT TECHNICAL**
7 **TESTIMONY (“NOI”) AND EXHIBITS FILED BY NMED, THE NATIONAL**
8 **PARK SERVICE (“NPS”), THE NEW MEXICO OIL & GAS ASSOCIATION**
9 **(“NMOGA”), SOLAR TURBINES, INC. (“ST”), KINDER MORGAN, INC.**
10 **(“KM”), WILDEARTH GUARDIANS (“WEG”), AND THE ENVIRONMENTAL**
11 **DEFENSE FUND (“EDF”) RELATED TO THE ISSUES ADDRESSED IN YOUR**
12 **DIRECT AND REBUTTAL TESTIMONY?**

13 A. Yes.

14 **III. NMED PROPOSALS RELATED TO SCOPE SECTION (20.2.50.2 NMAC)**
15

16 **Q. HAVE YOU REVIEWED NMED’S PROPOSED REGULATIONS RELATED TO**
17 **THE SCOPE OF THE REGULATIONS?**

18 A. Yes.

19 **Q. PLEASE SUMMARIZE NMED’S CURRENT PROPOSALS.**

20 A. The NMED proposal sets emission limitations, operational requirements, monitoring,
21 recordkeeping and reporting requirements for NOx and VOC emissions from oil and gas
22 sources “located within areas of the state under the [EIB’s] jurisdiction that . . . are causing
23 or contributing to ambient ozone concentrations that exceed [95 percent] of the national

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1 ambient air quality standard for ozone, as measured by a design value calculated and based
2 on data from one or more [NMED] monitors.”

3 **Q. DID YOU REVIEW NMED AIR QUALITY BUREAU’S REPORT ENTITLED**
4 **“OZONE PATH FORWARD,” ATTACHED TO THE DIRECT TESTIMONY OF**
5 **MICHAEL BACA AS EXHIBIT 4?**

6 A. Yes.

7 **Q. PLEASE SUMMARIZE NMED’S “OZONE PATH FORWARD” REPORT.**

8 A. NMED’s Ozone Advance Path Forward Report (the “Report”) states that the Ozone
9 Attainment Initiative (“OAI”) was undertaken pursuant to the Air Quality Control Act,
10 Section 74-2-5(C), which states: “If the environmental improvement board or the local
11 board determines that emissions from sources within the environmental improvement
12 board's jurisdiction . . . cause or contribute to ozone concentrations in excess of ninety-five
13 percent of the primary national ambient air quality standard for ozone promulgated
14 pursuant to the federal act, the environmental improvement board . . shall adopt a plan,
15 including rules, to control emissions of oxides of nitrogen and volatile organic compounds
16 to provide for attainment and maintenance of the standard. Rules adopted pursuant to this
17 subsection shall be limited to sources of emissions within the area of the state where the
18 ozone concentrations exceed ninety-five percent of the primary national ambient air quality
19 standard.” *See also* NMED Ex. 4 at 11.

20 A “plan” is required if a source “causes” or “contributes” to concentrations in excess of
21 95percent of ozone NAAQS.

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1 “Cause” means a single source is solely responsible for a concentration in excess of 95
2 percent of NAAQS.

3 “Contribute” signifies that a single source or source group has impacts is in excess of the
4 EPA significant concentration.

5 Both EPA and NMED have defined an ozone concentration less than 1 ppb (0.001 ppm) to
6 be insignificant. Source impact can only be determined through air quality modeling. Thus,
7 if emissions from a single source or similar group of sources have impacts which are less
8 than the significant level (1 ppb), then it does not contribute to ambient ozone
9 concentrations.

10 The New Mexico Air Quality Control Act does not specify what needs to be in a “plan” for
11 areas in excess of 95 percent of the NAAQS. In my opinion, the most appropriate methods
12 are the plans required under Section 110 the federal Clean Air Act, 42 USC §7410 to assure
13 that areas achieve or maintain the primary NAAQS and Section 172 of the federal Clean
14 Air Act, 42 USC §7502. Section 110(a) requires that:

15 (1) Each State shall, after reasonable notice and public hearings, adopt
16 and submit to the Administrator, within 3 years (or such shorter period as
17 the Administrator may prescribe) after the promulgation of a national
18 primary ambient air quality standard (or any revision thereof) under [section](#)
19 [7409](#) of this title for any air pollutant, ***a plan which provides for***
20 ***implementation, maintenance, and enforcement of such primary standard***
21 ***in each air quality control region (or portion thereof) within such State.***
22 In addition, such State shall adopt and submit to the Administrator (either
23 as a part of a plan submitted under the preceding sentence or separately)
24 within 3 years (or such shorter period as the Administrator may prescribe)
25 after the promulgation of a national ambient air quality secondary standard
26 (or revision thereof), a plan which provides for implementation,
27 maintenance, and enforcement of such secondary standard in each air
28 quality control region (or portion thereof) within such State. Unless a
29 separate public hearing is provided, each State shall consider its plan

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1 implementing such secondary standard at the hearing required by the first
2 sentence of this paragraph.

3
4 Emphasis added. Section 172 requires that:

5 (c) Nonattainment plan provisions

6
7 The plan provisions (including plan items) required to be submitted under
8 this part shall comply with each of the following:

9
10 (1) In general

11
12 ***Such plan provisions shall provide for the implementation of all***
13 ***reasonably available control measures as expeditiously as practicable***
14 ***(including such reductions in emissions from existing sources in the area***
15 ***as may be obtained through the adoption, at a minimum, of reasonably***
16 ***available control technology)*** and shall provide for attainment of the
17 national primary ambient air quality standards.

18
19 (2) RFP

20
21 Such plan provisions shall require reasonable further progress.

22
23 (3) Inventory

24
25 Such plan provisions shall include a comprehensive, accurate, current
26 inventory of actual emissions from all sources of the relevant pollutant or
27 pollutants in such area, including such periodic revisions as the
28 Administrator may determine necessary to assure that the requirements of
29 this part are met.

30
31 (4) Identification and quantification

32
33 Such plan provisions shall expressly identify and quantify the emissions, if
34 any, of any such pollutant or pollutants which will be allowed, in
35 accordance with section 7503(a)(1)(B) of this title, from the construction
36 and operation of major new or modified stationary sources in each such
37 area. The plan shall demonstrate to the satisfaction of the Administrator that
38 the emissions quantified for this purpose will be consistent with the
39 achievement of reasonable further progress and will not interfere with
40 attainment of the applicable national ambient air quality standard by the
41 applicable attainment date.

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1 (5) Permits for new and modified major stationary sources
2

3 Such plan provisions shall require permits for the construction and
4 operation of new or modified major stationary sources anywhere in the
5 nonattainment area, in accordance with section 7503 of this title.
6

7 (6) Other measures
8

9 Such plan provisions shall include enforceable emission limitations, and
10 such other control measures, means or techniques (including economic
11 incentives such as fees, marketable permits, and auctions of emission
12 rights), as well as schedules and timetables for compliance, as may be
13 necessary or appropriate to provide for attainment of such standard in such
14 area by the applicable attainment date specified in this part.
15

16 (7) Compliance with section 7410(a)(2)
17

18 Such plan provisions shall also meet the applicable provisions of section
19 7410(a)(2) of this title.
20

21 (8) Equivalent techniques
22

23 Upon application by any State, the Administrator may allow the use of
24 equivalent modeling, emission inventory, and planning procedures, unless
25 the Administrator determines that the proposed techniques are, in the
26 aggregate, less effective than the methods specified by the Administrator.
27

28 (9) Contingency measures
29

30 Such plan shall provide for the implementation of specific measures to be
31 undertaken if the area fails to make reasonable further progress, or to attain
32 the national primary ambient air quality standard by the attainment date
33 applicable under this part. Such measures shall be included in the plan
34 revision as contingency measures to take effect in any such case without
35 further action by the State or the Administrator.
36

37 Emphasis added. The EPA has defined “reasonably available control technology” or RACT
38 as the lowest emission limit that a source is capable of meeting by the application of control

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1 technology that is reasonably availability considering technological and economic
2 feasibility. It requires RACT for ozone nonattainment areas that are moderate or higher.¹
3 For the requirements of the plan, NMED developed a 2028 base case modeling inventory
4 and conducted ozone modeling. The 2028 base case modeling showed significant
5 reductions in emissions and ambient concentrations of ozone compared to current
6 conditions. When oil and gas emission reductions were implemented on top of the 2028
7 base case, insignificant further reductions in ozone were observed. The TSD does not
8 contain any documentation on the specifics of the 2028 inventory, nor is any information
9 provided if the emission reductions are federally enforceable. The changes in emissions
10 for the 2028 base case are a predicate for attainment of the standard and need to be part of
11 the overall ozone plan. It is incorrect to bypass the reductions in emissions between 2014
12 and 2028 as part of formal rulemaking and skip ahead to rulemaking on sources that result
13 in insignificant ambient ozone concentrations.

14 Key Issues of the Statute

15
16 Because 2028 future year modeling indicates that ozone design values will be below 95
17 percent of the ozone NAAQS (except at Desert View Monitor [67 ppb equal to the 95
18 percent threshold] and already designated as a non-attainment area), a plan is not required
19 to comply with the statute except in Dona Ana County.

20 Current rulemaking is intended to assure that EPA will not need to designate further ozone
21 non-attainment areas in New Mexico. The Report states, “Regulations developed under
22 the OAI to reduce emissions of ozone precursor pollutants will have the co-benefit of

¹ EPA defines moderate nonattainment areas having a design value above 81 ppb up to 93 ppb.

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1 reducing methane emissions because methane is released along with volatile organic
2 compounds in oil and gas operations. Thus, the Department worked in close coordination
3 with EMNRD in developing 20.2.50 NMAC, and the agencies endeavored to align their
4 respective regulatory regimes as much as possible to avoid duplicative or conflicting
5 requirements.”

6 Methane is typically emitted along with VOCs, but the technical analysis conducted
7 through modeling **assumed** that VOC reductions will result in ozone reductions. Given
8 that ozone formation in the region is NO_x limited and that the modeling combined NO_x
9 and VOC emissions from oil and gas with respect to source apportionment, it is not possible
10 to test that assumption. The modeling needs to be revised to separate NO_x and VOC source
11 culpability for oil and gas sources to evaluate the role of NO_x emissions versus VOC
12 emissions in ozone formation in New Mexico.

13 Modeling Results

14 Ozone modeling conducted by RAMBOLL is germane to the Report and I have included
15 comments on the modeling report and results.

16 My review of the Technical Support Document (“TSD”) entitled, “New Mexico Ozone
17 Attainment Initiative Photochemical Modeling Study – Draft” indicates that critical
18 information was lacking to completely evaluate the emission inventories used in the ozone
19 modeling. See NMED Ex. 15. The emission inventories used to develop the 2014 base
20 case and the 2028 future year base case were not available for review and were not included
21 in the TSD, which precluded review of the emission calculations, as well as the
22 assumptions used in the development of the inventory.

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1 The basis for the 2014 inventory was the National Emission Inventory (NEI) for the year
2 2014. The 2028 future year base case inventory was based on projected changes in NOx
3 and VOC emissions from the 2014 base case inventory. Changes in the 2028 base
4 inventory likely include: 1) new “on the book regulations” that will affect NOx and VOC
5 emissions for different source categories; 2) plant shutdowns; 3) other enforceable
6 regulatory actions affecting NOx and VOC emissions; and 4) approved growth (i.e.,
7 approved oil and gas NEPA projects). No specific details were provided on the
8 development of the 2028 base case future year inventory.

9 Review of Oil and Gas emission inventories is critical, especially in terms of future year
10 emission estimates, because of the unique nature of oil and gas operations and related
11 emissions. As stated in my direct testimony, oil and gas production for a single new well
12 will decline over time. Some emission sources located on a well pad will have emissions
13 directly related to production (i.e., well head compressors, dehydration units, tank
14 emissions, etc.). Thus, as production declines, emissions from those sources will also
15 decline. Other well equipment such as fugitives and pneumatic controllers have emissions
16 independent of production and emissions will scale by the number of units.

17 A single well in operation in 2014 will have substantially lower emissions in 2028. The
18 cumulative effect on emissions must address the rate of decline for cumulative existing
19 wells, coupled with the emissions from new wells, which will subsequently decline.

20 Because of decline, it is not appropriate to assume that oil and gas emissions are constant
21 and emissions from initial production of new wells are simply added to the baseline
22 emissions.

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1 The TSD indicates that production decline was listed in estimates of produced volumes of
2 oil and gas. No data was provided regarding decline versus new production. How decline
3 was used to calculate future year emissions for NO_x and VOCs was not presented. This is
4 a critical omission in the inventory development. Review of the emission inventory for the
5 Mancos EIS found that production decline was not incorporated into the future year
6 emission inventory for that project². When emissions were recalculated using decline, a
7 reduction of over 1,000 tons per year of both NO_x and VOC emissions were identified over
8 the previous emission estimates. The Mancos EIS was a precursor of the current NMED
9 ozone initiative (both projects started from the same basic inventories).

10 Compressor stations and gas plant emissions over time need to be evaluated for total field
11 production to evaluate changes in emissions.

12 The lack of documentation for the calculation of future year emissions makes it impossible
13 to confirm that accurate oil and gas emission inventories were used in the modeling.
14 Accurate emission inventories are a necessary component of accurate modeling.

15 The future year modeling indicates that the 2028 future year emission inventory resulted
16 in a substantial reduction in ozone concentrations at the New Mexico monitors. This is
17 illustrated in the following table (from RAMBOLL report).

18 The table indicates that for the 2028 future year base case all monitors except Desert View
19 are below the 95 percent threshold of 0.067 ppm. The Desert view design value dropped
20 from 0.072 ppm in 2014 to 0.067 ppm (equal to the 95 percent threshold) in the 2028 future
21 year base case.

² Farmington MANCOS-Gallup Draft Resource Management Plan Amendment and Environmental Impact Statement.

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The largest reduction between the 2014 base case and the 2028 base case was 6.3 at the La Union monitor and the smallest reduction was at the Hobbs monitor (2.0 ppb)

Summary of changes in O3 from the 2028 future year base case using 2012 – 2016 data (time period follows EPA guidance)

Table S-1. Observed ozone DV ₂₀₁₂₋₂₀₁₆ and projected 2028 ozone DVFs for the 2028 Base Case and 2028 O&G Control strategy and differences in the 2028 ozone DVFs (DV _{Fut} - DV _{Base}).							
AQIS_ID	2012-16		Projected 2028 DV _F		Site Name	State	County
	DVC (ppb)	Base (ppb)	Cell (ppb)	Cell - Base			
Northern New Mexico							
350390026	64.0	60.8	60.0	-0.8	Coyote Ranger District	NM	Rio Arriba
350431001	64.0	58.4	58.1	-0.3	Bernalillo (E Avenida)	NM	Sandoval
350450009	64.3	61.0	60.2	-0.8	Bloomfield	NM	San Juan
350450018	67.0	64.8	63.3	-1.5	Navajo Lake	NM	San Juan
350451005	63.7	60.8	59.6	-1.2	Substation	NM	San Juan
350490021	64.3	60.6	60.4	-0.2	Santa Fe Airport	NM	Santa Fe
Bernalillo County							
350010023	66.3	60.9	60.7	-0.2	Del Norte HS	NM	Bernalillo
350010024	68.0	62.3	62.0	-0.3	South East Heights	NM	Bernalillo
350010029	66.0	61.0	60.5	-0.5	South Valley	NM	Bernalillo
350010032	67.0	62.6	62.1	-0.5	Westside	NM	Bernalillo
350011012	65.0	59.1	58.8	-0.3	Footfalls	NM	Bernalillo
Southern New Mexico							
350130008	66.3	60.0	59.8	-0.2	La Union	NM	Doña Ana
350130017	67.0	61.9	61.6	-0.3	Sunland Park City Yard	NM	Doña Ana
350130020	67.0	62.3	62.2	-0.1	Chaparral	NM	Doña Ana
350130023	65.0	60.3	60.2	-0.1	Solano	NM	Doña Ana
350151005	69.0	66.7	66.4	-0.3	Carlsbad	NM	Eddy
350171003	62.0	59.0	58.9	-0.1	Chino Copper Smelter	NM	Grant
350250008	66.0	64.0	63.3	-0.7	Hobbs Jefferson	NM	Lea
350290003	66.0	62.7	62.5	-0.2	Deming Airport	NM	Luna
350610008	66.3	62.2	62.0	-0.2	Los Lunas (Los Lunas)	NM	Valencia

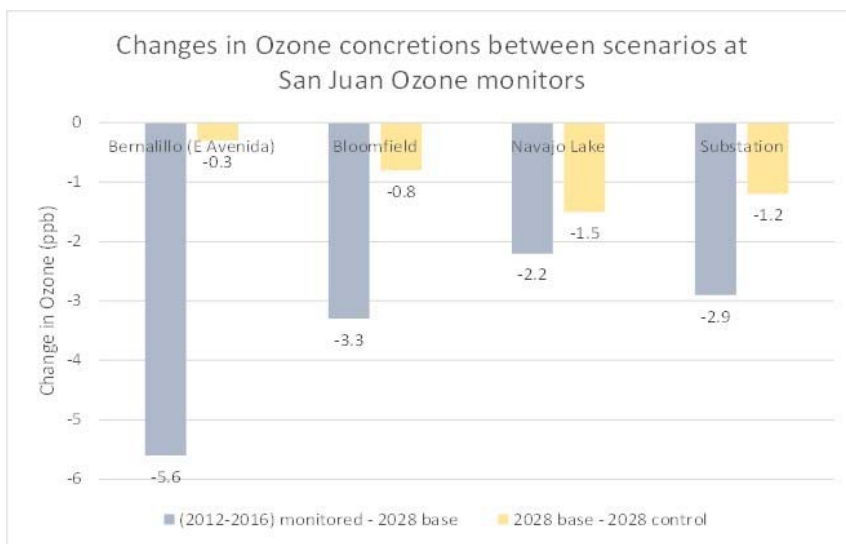
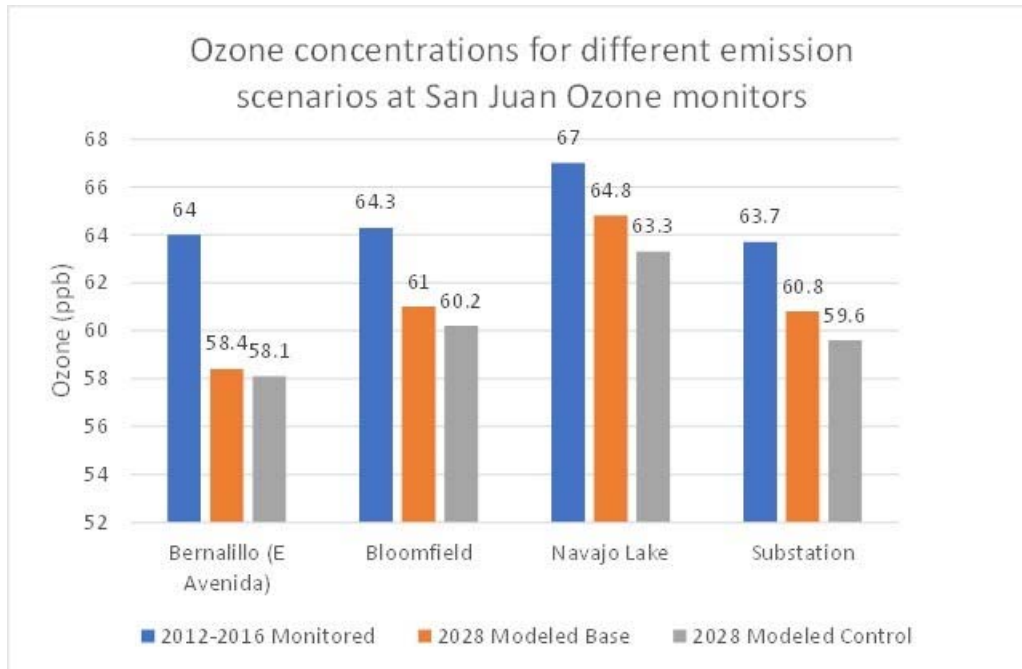
Legend: Red highlight 2012-2016 design value is above O3 NAAQS of 70 ppb
Yellow highlight 2012 -2016 design value is above 95% of O3 NAAQS or 66.5 ppb

Conclusions

- For the 2012 -2016 time frame the only monitors that have a design value above the NAAQS are Desert View and Santa Teresa 72.0 and 71.3 ppb respectively
- The Navajo Lake, Carlsbad, South East Heights, Westside, Sunland Park City Yard, and Carlsbad monitors have design values for the 2012 -2016 base case above 66.5 (95 % of the 70 ppb NAAQS)
- For the 2028 base case all modeled design values are below 66.5 ppb except at Desert View and Carlsbad monitors
- At Desert View the 2028 base case design value 67 ppb and is 0.5 ppb above the threshold value
- Additional Oil and Gas controls reduce impacts for the Desert View monitor 0.2 ppb (total O3 66.8 ppb which is still above the 66.5 ppb threshold)
- At the Carlsbad monitor the 2028 base case is 66.7 ppb (0.2 ppb above the 66.5 ppb threshold) and Oil and Gas controls reduce the design value by an additional 0.3 ppb (66.4 ppb)
- Combined Oil and Gas controls are a very ineffective way to reduce impacts below 66.5 ppb
- If different years are used for the dv, slightly different conclusions are found. According to the TSD the use of the 2012 -2016 baseline follows EPA guidance

The following two figures present the change in design value between the three cases considered (2014 base, 2028 future year base, and 2028 future year with additional oil and gas controls added at the San Juan monitors). Both figures indicate the large reduction in ozone between 2014 base and 2028 future year base cases. The change between 2028 future year base case base and 2028 future year base case with oil and gas controls added is generally less than 1 ppb, and therefore, oil and gas does not contribute to any ozone exceedance.

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Note that the total 2028 base ozone was 64.8 ppm at the Navajo Lake Monitor and 60.4 at the Substation monitor. The dramatic reduction in ambient ozone concentrations predicted for the 2028 future year base case is a result of the estimated emission reductions in the NOx emission inventory between 2014 and 2028. The further air quality improvement

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1 projected in the 2028 future year base case from additional controls on oil and gas are a
2 small fraction and is an insignificant improvement beyond the 2028 future year base case.

3 To achieve reductions in ambient ozone concentrations NMED must: 1) provide
4 documentation regarding the 2028 base case inventory; 2) confirm that the emission
5 reductions identified in the 2028 inventory will actually occur; and 3) the reductions
6 outlined must become enforceable emission limits through regulation.

7 It is technically and procedurally incorrect to bypass the reductions in emissions between
8 2014 and 2028 as part of formal rulemaking and skip ahead to rule on oil and gas sources
9 that result in insignificant decreases in ambient ozone concentrations.

10 **Q. BASED ON YOUR REVIEW OF NMED WITNESS RALPH MORRIS'S**
11 **TESTIMONY AND EXHIBITS ATTACHED TO HIS TESTIMONY, WHAT DO**
12 **YOU UNDERSTAND TO BE THE BASIS FOR NMED'S PROPOSAL**
13 **REGARDING THE SCOPE OF PART 50 IN 20.2.50.2 NMAC?**

14 A. Ralph Morris's testimony attempts to justify additional controls on oil and gas sources to
15 achieve design values of ozone less than 95 percent of the ozone standard. However,
16 because of deficiencies in the modeling, the conclusion of additional controls on oil and
17 gas sources is not supported.

18 **Q. DO YOU AGREE WITH THE MODELING PROVIDED BY RAMBOLL**
19 **ENVIRONMENT & HEALTH IN SUPPORT OF NMED'S PROPOSALS? IF NOT,**
20 **PLEASE EXPLAIN.**

21 A. No. Air quality modeling is comprised of many components that provide estimates of
22 ozone concentrations and are used to forecast future year conditions for air quality

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1 planning. The primary components of modeling are: 1) determination of emissions within
2 the modeling domain; 2) meteorological data that are used to describe transport and
3 diffusion of pollutants; and 3) the mathematical model that transforms emissions into
4 ambient concentrations, including chemical transformation of primary pollutants into
5 secondary ozone. In order for the modeling results to be accurate, all components must be
6 accurate. In the case of the current modeling for NMED, the meteorological modeling and
7 photochemical modeling represent current modeling practices. Unfortunately, the
8 development of emission inventories is not properly documented and uncertainties in the
9 inventory place large uncertainties on the modeling results.

10 The photochemical ozone modeling for oil and gas sources combined NO_x and VOC
11 impacts for oil and gas sources. The modeling has demonstrated that the majority of the
12 region is NO_x limited (meaning NO_x directly affects ozone formation) and because of
13 ambient emissions (ambient concentrations) of VOCs, control of VOCs provides little
14 reduction in ambient ozone. The modeling needs to separate NO_x and VOC emissions to
15 better understand the role of VOCs in ozone formation in the region. Morris indicates in
16 his testimony that ozone concentrations in New Mexico are NO_x limited. This means that
17 raising or lowering NO_x emissions will result in changes in ozone concentrations, while
18 changes in VOC emissions will not result in changes in ozone levels. He further indicated
19 that there were a limited number of grid cells where ozone was VOC limited.
20 Unfortunately, no details are provided for review. The identification of VOC limited
21 conditions is important for policy considerations. A further issue with the modeling is that
22 oil and gas source apportionment results combined NO_x and VOC impacts. This is a

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critical deficiency in the modeling since NO_x and VOC evaluation of controls by pollutant cannot be determined.

Q. DID THE ANALYSIS IN PRE-FILED DIRECT TESTIMONY PROVIDED BY THE NMED WITNESSES LISTED ABOVE CAUSE YOU TO RECONSIDER THE STATEMENTS AND PROPOSED REVISIONS TO 20.2.50.2 NMAC CONTAINED IN YOUR DIRECT TESTIMONY?

A. No.

Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASES FOR NMED'S PROPOSED CHANGES?

A. No.

Q. WHAT IS YOUR ANALYSIS OF NMED'S BASES FOR ITS POSITIONS?

A. The purpose of this regulatory process is to develop a plan to assure that ambient ozone concentrations remain below the ozone NAAQS, not to reduce methane emissions from oil and gas operations.

Methane emissions are not strongly involved in ozone formation, which is why methane is excluded in the definition of VOC by EPA.

First, for NMED to reduce ambient ozone, it must include regulatory actions associated with reducing the Dona Ana County marginal non-attainment area below the 0.070 ppm NAAQS. Regulatory action must include emission reductions to bring the area into compliance with the NAAQS and codify the emission reductions into enforceable permit limits.

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1 Second, the source-specific emission reductions associated with the future year base case
2 that result in large reductions in ozone must be identified and verified, and then codified
3 into enforceable permit limits.

4 Unless these two steps are taken before addressing additional emission controls on oil and
5 gas, the large reductions in ambient ozone concentrations predicted from the 2028 future
6 year base case will not be achieved and the result will be rather insignificant ozone
7 reductions related to changes in oil and gas operations.

8 **Q. BASED ON YOUR REVIEW OF NMED'S PROPOSALS AND SUPPORTING**
9 **DIRECT TESTIMONIES, ARE YOU CHANGING YOUR POSITION ON**
10 **RECOMMENDED PROPOSED REVISIONS TO 20.2.50.2 NMAC THAT WERE**
11 **STATED IN YOUR DIRECT TESTIMONY?**

12 A. No.

13 **Q. PLEASE EXPLAIN.**

14 A. My direct testimony indicated that the vast majority of reductions in ambient ozone are
15 related to changes in emissions of the 2028 future year base case.

16 **Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL**
17 **IMPROVEMENT BOARD WITH RESPECT TO THE SCOPE SECTION?**

18 A. The stated goal of this regulatory action is to develop a "plan" to ensure that no new areas
19 of New Mexico exceed the 0.070 ppm standard and, as a result, become designated non-
20 attainment. The 95 percent threshold of 0.070 ppm NAAQS is a tool to prevent any further
21 non-attainment designations. This is a reasonable policy approach for the Board to take.

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1 The statute states if there are sources that **cause** or **contribute** to exceedances of the 95
2 percent threshold, then NMED must develop a plan to reduce ambient ozone impacts.

3 The current modeling indicates oil and gas sources do not **cause** exceedances of the 0.070
4 ppm NAAQS nor the 95 percent threshold. A source **contributes** to an exceedance of the
5 ozone NAAQS if individual impacts are above the significance level. EPA and NMED
6 have indicated that the ozone significance level is 1.0 ppb (0.001 ppm)³

7 **IV. NPS'S SUMMARY OF TECHNICAL TESTIMONY REGARDING THE**
8 **PROPOSED OZONE PRECURSOR RULE AND TECHNICAL COMMENTS**
9

10 **Q. HAVE YOU REVIEWED THE NATIONAL PARK SERVICE'S SUMMARY OF**
11 **TECHNICAL TESTIMONY AND TECHNICAL COMMENTS REGARDING THE**
12 **PROPOSED OZONE PRECURSOR RULE?**

13 **A.** Yes

14 **Q. PLEASE SUMMARIZE NPS'S PROPOSAL REGARDING THE PROPOSED**
15 **OZONE PRECURSOR RULE.**

16 **A.** The following table presents recommended NOx engine emission limits suggested
17 by the National Park Service (NPS) and are based on Pennsylvania's regulations. I
18 determined from a review of current engineering data for engines that the NPS suggested
19 emission limits are not practicable or achievable and are not cost-effective. IPAMS
20 contracted with Spirt Environmental to review the feasibility of achieving such limits. A
21 portion of the engineering study examining the feasibility of achieving very stringent

³ EPA, 2018, Guidance on Significant Impact Levels for Ozone and Fine Particulates in the Prevention of Significant Deterioration Permitting Program.

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1 emission limits for engines is presented and was submitted in a prehearing statement to the
2 Board.

3 NPS's recommendations are outlined below accompanied with a comparison to NMED's
4 proposals:

5 **Rich-burn Engines**

- 6
- 7 • NPS recommends that all *new* and *existing* rich-burn engines >500 HP to meet a
8 limit of 0.2 g NOx/hp-hr
- 9
- 10 • **NMED proposal is 0.5 g NOx/hp-hr**
- 11
- 12 • NPS recommends that all *new* and *existing* rich-burn engines >100 HP and <500
13 HP to meet a limit of 0.25 g NOx/hp-hr
- 14
- 15 • **NMED is not proposing limits for this class size**
- 16
- 17 • NPS recommends that all *new* rich-burn engines <100 HP to meet a proposed limit
18 of 1.0 g NOx/hp-hr
- 19
- 20 • **NMED is not proposing limits for this class size**
- 21

22 **Lean-burn Engines**

- 23
- 24 • NPS recommends that all *existing* lean-burn engines <100 HP to meet a proposed
25 limit of 2.0 g NOx/hp-hr
- 26
- 27 • **NMED is not proposing limits for this size class**
- 28
- 29 • NPS recommends that all *existing* lean-burn engines >100 and <500 HP to meet a
30 proposed limit of 1.0 g NOx/hp-hr
- 31
- 32 • **NMED is not proposing limits for this size class**
- 33
- 34 • NPS recommends that all *existing* lean-burn engines >500 HP to meet the proposed
35 limit of 0.5 g NOx/hp-hr
- 36
- 37 • **NMED is proposing this limit for all existing engines greater than 1,000 HP**
- 38

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- NPS recommends that all *new* lean-burn engines < 500 HP to meet a proposed limit of 1.0 g NOx/hp-hr

- **NMED is not proposing limits for this size class**

Existing Turbines

- NPS recommends that all *existing* turbines $\geq 1,000$ and <5,000 HP to meet a NOx limit of 25 ppmvd @15 percent O₂

- **NMED is proposing a limit of 50 ppmvd @15 percent O₂ for all turbine size classes**

- Require all *existing* turbines $\geq 5,000$ HP and < 60,000 HP to meet a NOx limit of 15 ppmvd @15percent O₂

- **NMED is proposing a limit of 50 ppmvd @15 percent O₂ for all turbine size classes**

- Require all *existing* turbines $\geq 60,000$ HP to meet a NOx limit of 9 ppmvd @15percent O₂

- **NMED is proposing a limit of 50 ppmvd @15 percent O₂ for all turbine size classes**

IPANM Prehearing Statement⁴

IPANM believes that there are significant factors that make it challenging to apply Pennsylvania's overly restrictive GP-5 engine emissions standards in New Mexico. One of the primary concerns is the field fuel heating value, which in New Mexico can vary from an ideal value of 1000 btu/scf to upwards of 1,400 btu/scf. The higher end of the heating value range can have significant impacts on achieving the restrictive limits for NOx and VOC proposed in the rule. The other primary concern is the cost of compliance in terms of

⁴ Letter to Sandra Ely, Director, Environmental Protection Division, and Secretary James Kenney, New Mexico Environment Department, dated September 16, 2020

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1 upgrading, replacing and performing maintenance for the necessary control systems to
2 achieve the limits set forth in Table 1.

3 IPANM has looked at a similar situation in the neighboring state of Colorado. Table 1 in
4 the draft rule contains two headings regarding applicability for existing engines constructed
5 or reconstructed and installed after the effective date, meeting certain emission factors. Of
6 particular concern are the emission standards for rich burn engines which proposes that
7 rich burn engines $\geq 100 - \leq 500$ bhp meet 0.25 g/bhp-h (grams per brake horsepower-hour)
8 for NOx and 0.30 g/bhp-h for CO. In addition, the proposal would impose an even lower
9 emission threshold for rich burn engines ≥ 500 of 0.20 g/bhp-hr for NOx and a similar 0.30
10 g/bhp-h for CO. We do not believe these emission factors can be sustained based upon
11 expert technical information reviewed by IPANM for a similar proposal made in Colorado.
12 The originator of this similar proposal to the Colorado Air Quality Control Commission
13 was the National Parks Conservation Association (NPCA), a non-governmental
14 organization. In response, Spirit Environmental (Spirit), an air quality consulting firm in
15 Denver, performed an exhaustive review of the proposal by NPCA. While Spirit's report
16 focused on engines greater than 1,000 hp, smaller rich burn units such as those in the 100
17 hp-500 hp range have a similar starting point for emissions prior to controls being installed;
18 therefore, similar conclusions regardless of the size of the engine are warranted. Their
19 findings clearly outline the fallacy of NPCA's proposal, which is more fully explained
20 below:

21 • NPCA assumed to achieve a 0.2 g/hp-hr NOx emission rate was the addition
22 of an air-fuel ratio controller ("AFRC") and non-selective catalytic reduction ("NSCR").

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1 This is also what NPCA's cost estimates were exclusively based on when they made their
2 proposal. If this is true, NOx emission control would have to achieve greater than 98
3 percent control based upon data compiled by Spirit which, as explained below, is not
4 realistic with extended use of a compressor engine.

5 • While the addition of NSCR in conjunction with AFRC controls to an
6 existing engine may provide >98 percent control with brand new catalyst elements and
7 under ideal conditions, that level of control cannot be reliably maintained as catalytic
8 elements age, and engine settings drift (within acceptable levels).

9 Spirit confirmed this finding with Innio – Waukesha, a rich-burn engine vendor familiar
10 with oil and gas operations using these types of compressors. Innio – Waukesha agreed
11 that while a 4SRB engine equipped with NSCR and AFRC may be able to temporarily
12 meet a 0.2 g/hp-hr NOx emission rate, maintaining it at those levels for ongoing
13 compliance would be near impossible. In fact, catalyst manufacturers and vendors
14 contacted by Spirit (Miratech, Johnson Matthey, and RJ Mann) confirmed that they would
15 only guarantee catalyst performance for, at most, 1 to 3 years because the catalyst elements
16 and engine management systems must be in almost new condition to attempt to meet such
17 a low standard and high control efficiency. This was confirmed in NPCA's own technical
18 data, which indicated that a 90 percent reduction of nitrogen oxides is state of the art
19 emission performance level for existing RICE fueled by natural gas, and that 95 percent
20 control of NOx may be assumed when evaluating the cost-effectiveness of NSCR/AFRC
21 controls, yielding a 0.75 g/hp-hr NOx emission level at best.

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1 • NPCA included data that supports the inability to meet these 98 percent
2 reductions on an ongoing basis. NPCA's experts note the following: "For example, retrofit
3 installations of NSCR on five Caterpillar rich burn engines in Texas achieved a NOx
4 reduction of 96 percent or greater on all of the engines. On two of those engines, testing
5 conducted after more than 4,000 hours of operation with NSCR indicated the NSCR
6 controls were still achieving a 95 percent NOx reduction." However, based on NPCA's
7 own assumptions regarding the g/hp-hr for uncontrolled engines, 95 to 96 percent will not
8 achieve the necessary limits.

9 A more realistically achievable level of control using NSCR in conjunction with AFRC
10 lies in the range of 90 percent-95 percent. For existing 4SRB engines to consistently meet
11 a NOx emission level of 0.2 g/hp-hr, other significant equipment upgrades, in addition to
12 an AFRC and/or NSCR installation, would need to be made. These engine upgrades were
13 not accounted by NPCA. Engine upgrade kits may be used to replace several major
14 components on an existing engine (e.g. pistons, heads, turbocharger, emission management
15 system, flywheel etc.), and to work in conjunction with a traditional NSCR/AFRC system
16 to further bolster the ability to achieve a 0.2 g/hp-hr NOx emission rate. Such costs could
17 be in the hundreds of thousands of dollars for engines that are low emitting – representing
18 an extensive and expensive total cost to operators and potentially high cost-per-ton
19 reduced. This is a significant cost to the oil and natural gas industry where operators are
20 largely already controlling engines and is a significant additional cost to achieve the
21 minimal additional reductions that would result.

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1 IPANM also surveyed a local engine vendor in the San Juan Basin, and they categorically
2 stated these emission thresholds, particularly for engines 100 hp-500 hp, cannot be met.
3 The amount of catalyst needed to meet these standards would cause serious back pressure
4 on the operation of the engine causing a loss of power and result in overheating. This would
5 lead to engine blocks having to be replaced frequently, with associated increased costs to
6 companies either buying or renting these units.

7 IPANM consulted a compression service provider in the Permian Basin and have included
8 their feedback as an attachment to this comment letter. In summary, they found the
9 proposed Rule as drafted would result in unachievable emission standards, very
10 burdensome costs of retrofitting compressors, and maintenance and testing practices that
11 are simply not viable.

12 We would encourage the NMED to review Spirit's analysis which was submitted to the
13 CAQCC. Their report can be found at IPANM Exhibit 13.

14 Furthermore, IPANM has concerns around lower horsepower limits. For example, the draft
15 limits would certainly have different applications in different basins. With such limits as
16 written, the costs of compression, especially in the San Juan Basin, would escalate to the
17 point of rendering a marginal well uneconomic."

18 An analysis was conducted to evaluate the cumulative effect of NOx emissions from well
19 head compressor engines regarding the proposed 0.2 g/hp-hr emission limit on engines
20 greater than 500 hp but less than 1000 hp. The analysis utilized a typical three well pad
21 gas lift technology that is currently used on some wells in the San Juan Basin. The
22 equipment used at such a well site represents an upper bound of well head compression

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and most new development will utilize engines smaller than those used in this example.

Thus, the magnitude of the NOx emission reduction will be less than presented in this example.

For a well with gas lift technology, higher horsepower and more engines are needed at the onset of production. As production declines over time, engines will be removed or derated. This results in decreasing emissions over time as related to production decline.

The following Table presents changes in engine size and operation that will occur over the life of the well.

Summary of Compression Equipment and Associated Emissions Mancos Oil Well Using Gas Lift Technology

Year	Gas Lift Engines	Capacity Engine 1 and 2 (hp)	Well Pad Compressor NOx Emissions (t/yr)	VRU Engines	NOx Emissions Other Sources	Total NOx Emissions per 3 Well Pad	NOx Emissions per Well (t/yr)
1	2 Engines Max Capacity	1093	4.2	2 Engines Max Capacity	0.9	5.1	1.7
2	Interpolate Emissions		3.5	2 Engines Max Capacity	0.9	4.4	1.47
3	Interpolate Emissions		2.8	1 Engine Max Capacity	0.6	3.4	1.13
4	Reduce Capacity to 1 Engine	546	2.10	1 Engine Max Capacity	0.6	2.7	0.90
5	Interpolate Emissions		1.85	1 Engine Max Capacity	0.3	2.1	0.70
6	Interpolate Emissions		1.60	Remove VRU	0.3	1.9	0.62
7	Interpolate Emissions		1.35		0.3	1.6	0.54
8	Interpolate Emissions		1.11		0.3	1.4	0.46
9	Interpolate Emissions		0.86		0.3	1.1	0.37

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10	Reduce Engine Size	100*	0.36		0.3	0.6	0.21
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*Dependent upon pipeline pressures. Actual pressure could vary by site.

Annual emissions from a single well over a 10-year production window were calculated for the following cases: 1) Based on an emission profile presented above and correlated to production; 2) Using the compressor and emission profile presented but controlling emissions for engines greater than 500 hp but less than 1000 hp at a level of 0.2 g/hp-hr; and 3) Calculating emissions based on a constant rate of production.

Cumulative emissions were computed on a development rate of 200 new wells per year as outlined in the Mancos EIS⁵.

Emissions for the current permit case were based on a NOx emission limit of 2.0 g/hp-hr and 100 percent load. After the first year the production, volume was reduced based on a typical decline curve.

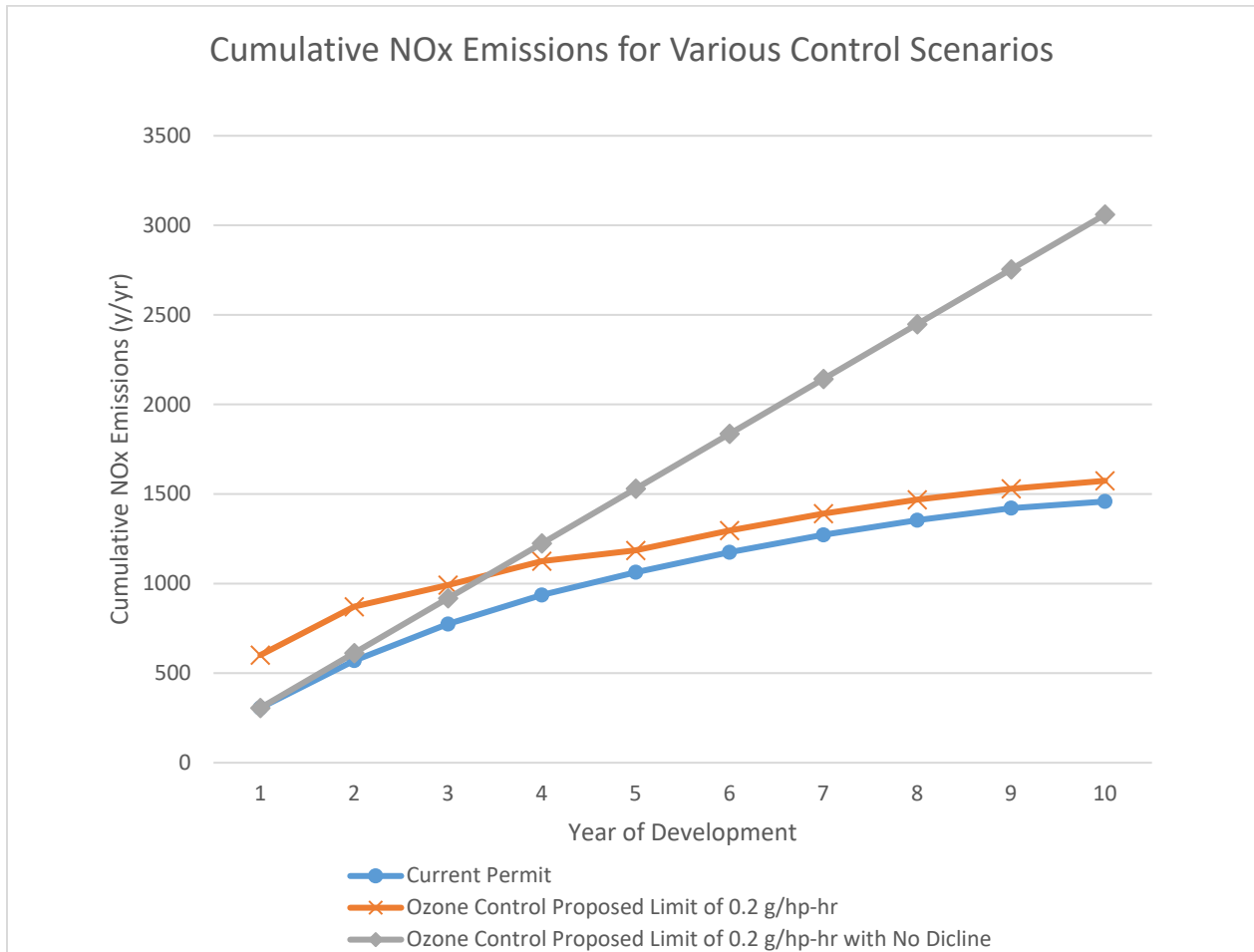
For the ozone control limit case, an emission limit of 0.2 g/hp-hr was used at 100 percent load. Future year production was treated the same as in the current permit case.

The third case assumed there was no production decline and subsequent year NOx emissions would be additive.

The following Figure presents a summary of emission profiles over a 10-year period.

⁵ Farmington MANCOS-Gallup Draft Resource Management Plan Amendment and Environmental Impact Statement.

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During the first year of development (200 wells drilled) there was a cumulative 295 ton increase of NOx emissions from new wells drilled for the current permit conditions compared to the proposed ozone regulation case. This translates to a reduction of approximately a 1.5 tons per year reduction per source by the implementation of the proposed regulation. After 5-years the difference between the current case and the proposed case is only 122 tons per year or 0.61 tons per year per well.

Over the 10-year production window, total cumulative NOx emissions (summed over the 10-year period) for the current practice case were 12,034 tons/10-year period and for the ozone control case total emissions were 10,329 tons/10-year period. The change in

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1 emissions between these two cases over this time was a reduction of 1,700 tons over a 10-
2 year period (approximately a 16 percent reduction).

3 After 4 years with additional controls the no decline case emissions are greater than the
4 current permit case and after 10 years the no decline case is 1,500 tons per year greater
5 than the current permit case.

6 If the proposed ozone control limit is used without decline, there is approximately an
7 increase of 4,800 tons over a 10-year period (approximately a 40 percent increase)
8 compared to current emission limits. This example demonstrates that computing
9 compressor emissions without decline is not representative of actual compressor emissions.

10 Although data are not available to confirm the modeling emission calculations, it is
11 believed that this is the approach that was used in developing the modeling emission
12 inventory.

13 This analysis is based on a load factor of 100 percent which is a very conservative
14 assumption. Actual load is likely to be in the range of 50 to 75 percent and actual emissions
15 will be lower than outlined in this example and the level of emission reduction will be
16 smaller.

17 Given the relatively small magnitude of control between the current practice case and the
18 proposed additional controls on engines to control ozone, the implementation of a 0.2 g/hp-
19 hr level of control would not be considered a cost-effective control.

20 As previously stated, this analysis is very conservative since it assumed that all new wells
21 would have similar engines installed. Many new wells would require smaller engines and
22 the overall NOx benefit would be much smaller.

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1 The effect of the proposed regulation on existing engines was not analyzed because data
2 on the number of existing engines was not available.

3 This analysis did not consider THC emissions. Ozone formation is NOx limited and
4 therefore hydrocarbon controls would have little effect on ozone formation.

5 One other aspect to be considered regarding hydrocarbon controls is that such controls will
6 oxidize any unburned hydrocarbons from the engine into increased CO2 emissions. This
7 conversion will be performed on a molar volume basis.

8 In conclusion, the proposed emission factor for engines in the 500 to 1000 hp range
9 provides a small reduction in cumulative NOx emissions when appropriate production
10 profiles are incorporated into emission calculations. Analysis of emission benefits for other
11 size engines was not conducted, but for actual production sites, well head engines are likely
12 to be smaller than those used in this example so the benefits will be less.

13 The emission reductions presented in this analysis are extremely conservative (overstate
14 the likely NOx emission reductions). Further, the magnitude of the very conservative
15 emission reductions is a small percentage of the 2028 future year base case inventory
16 (approximately 169,000 tons per year) and ambient ozone impacts are likely to be
17 insignificant as a result of implementing the proposed new controls.

18 **Q. BASED ON YOUR REVIEW OF NPS'S TESTIMONY, WHAT DO YOU**
19 **UNDERSTAND TO BE THE BASIS FOR NPS'S PROPOSAL REGARDING THE**
20 **OZONE PRECURSOR RULE?**

21 **A.** The regulation should be modified to reduce emissions for NOx from RICE engines and
22 turbines.

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**1 Q. DID THE ANALYSIS PERFORMED BY NPS CAUSE YOU TO RECONSIDER
2 THE STATEMENTS AND PROPOSED REVISIONS TO 20.2.50.2 NMAC
3 CONTAINED IN YOUR DIRECT TESTIMONY?**

4 A. No.

**5 Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASES FOR NPS'S
6 PROPOSAL?**

7 A. No.

8 Q. WHAT IS YOUR ANALYSIS OF NPS'S BASES FOR ITS POSITIONS?

9 A. The suggested emission limits are not viable.^{6,7,8}

**10 Q. BASED ON YOUR REVIEW OF NPS'S PROPOSAL RELATING TO THE OZONE
11 PRECURSOR RULE, ARE YOU CHANGING YOUR POSITION ON
12 RECOMMENDED PROPOSED REVISIONS TO 20.2.50.2 NMAC THAT WERE
13 STATED IN YOUR DIRECT TESTIMONY?**

14 A. No.

15 Q. PLEASE EXPLAIN.

**16 A. Engineering data demonstrates that these emission limits cannot be achieved on a
17 continuous basis.**

**18 Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL
19 IMPROVEMENT BOARD WITH RESPECT TO NPS'S PROPOSAL
20 REGARDING THE OZONE PRECURSOR RULE?**

⁶ Pre-Filed Non-Technical Statement of Kinder Morgan, Inc. and its Subsidiaries and Affiliates, El Paso Natural Gas Company, LLC, Transcolorado Gas Transmission Co., LLC, And Natural Gas Pipeline Company of America, LLC.

⁷ Solar Turbines Oil and Gas Sector - Ozone Precursor Pollutants Title 20 Chapter 2 Part 50.

⁸ Testimony of John Smitherman, NMOGA.

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1 A. The Board should reject this proposal.

2

3 **V. DIRECT TESTIMONY OF JEREMY NICHOLS (WEG)**

4

5 **Q. HAVE YOU REVIEWED THE DIRECT TECHNICAL TESTIMONY OF WEG**
6 **WITNESS JEREMY NICHOLS?**

7 A. Yes.

8 **Q. PLEASE SUMMARIZE WEG'S PROPOSALS REGARDING THE PROPOSED**
9 **20.2.50.7 AND .12 NMAC.**

10 A. Oil and gas emissions are directly and solely responsible for increased ozone levels in New
11 Mexico.

12 **Q. BASED ON YOUR REVIEW OF NICHOLS'S TESTIMONY, WHAT DO YOU**
13 **UNDERSTAND TO BE THE BASIS FOR WEG'S PROPOSALS REGARDING**
14 **20.2.50.7 AND .12 NMAC?**

15 A. WEG claims that oil and gas emissions are directly and solely responsible for increased
16 ozone exceedances in New Mexico and other areas where oil and gas development has
17 occurred.

18 **Q. DID THE TESTIMONY PROVIDED BY WEG CAUSE YOU TO RECONSIDER**
19 **THE STATEMENTS AND PROPOSED REVISIONS TO 20.2.50.2 NMAC**
20 **CONTAINED IN YOUR DIRECT TESTIMONY?**

21 A. No.

22 **Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASES FOR WEG'S**
23 **PROPOSAL?**

24 A. No.

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Q. WHAT IS YOUR ANALYSIS OF WEG'S BASES FOR ITS POSITIONS?

A. Wild Earth Guardians testimony regarding oil and gas impacts to ozone formation is quoted in the following:

To begin with, it is important to highlight the longstanding understanding that the oil and gas industry's ozone precursor emissions can have significant impacts on regional ozone formation and cause or contribute to exceedances and even violation of the NAAQS, particularly in the western United States. Studies and firsthand experience have confirmed the myriad sources of VOC and NOx emissions associated with oil and gas extraction can produce large amounts of ozone-forming pollution and contribute to exceedances and/or violations of the NAAQS."

"In response to the oil and gas industry's unchecked emissions, Colorado, Utah, and Wyoming have all adopted oil and gas industry-specific regulations to curtail emissions.

There are two specific and unique instances where oil and gas emissions resulted in a measured exceedance of the ozone NAAQS. One occurred in the Uinta Basin in Utah and the other occurred in the Greater Green Basin in Wyoming. In both cases the exceedances occurred during the winter season under specific and unique metrological conditions: 1) fresh snow cover, 2) a very low inversion that capped emissions within the boundary layer, 3) strong solar radiation, 4) terrain that formed a slight bowl that further inhibited advection of pollutants and 5) very stable atmospheric conditions. Under these conditions, emissions were trapped within a confined area and the low inversion reduced vertical mixing. Emissions were concentrated within a confined volume and when exposed to high solar radiation, photochemical reactions occurred and resulted in the formation of elevated ozone concentrations.

I participated in research programs that studied these events and I am very familiar with these specific episodes. I have also been involved in numerous regional air quality studies

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1 in the inter-mountain West and those regional studies do not suggest that oil and gas
2 emissions are solely responsible for exceedances of the NAAQS.

3 There is no specific data to suggest that the meteorological conditions that resulted in
4 winter ozone exceedances in Utah and Wyoming will occur in New Mexico.

5 Wild Earth Guardians testimony regarding the determination of the potential to emit for oil
6 and gas sources and suggested regulatory modification of the definition of potential to emit
7 is summarized below:

8 Unfortunately, there are signs that in the context of the oil and gas
9 production sector in New Mexico, ‘potential to emit’ may at times, not be
10 fully and accurately calculated in practice. In particular, I am concerned that
11 pre-production stationary source emissions at wellhead facilities, including,
12 but not limited to, non-mobile source emissions related to drilling, hydraulic
13 fracturing, and well completion, often may not be accounted for in the
14 assessment of a facility’s potential to emit.

15
16 The proposed 20.2.50.7 NMAC defines “potential to emit” as “the maximum capacity of a
17 stationary source to emit an air contaminant under its physical and operational design. The
18 physical or operational limitation on the capacity of a source to emit an air pollutant,
19 including air pollution control equipment and a restriction on the hours of operation or on
20 the type or amount of material combusted, stored or processed, shall be treated as part of
21 its design if the limitation is federally enforceable. The PTE for nitrogen dioxide shall be
22 based on total oxides of nitrogen. For wellhead sites, calculation of PTE shall include non-
23 mobile source emissions that may occur prior to commencement of operation.”

24 The definition and determination of potential to emit is problematic for oil and gas
25 production sites. The quantification from many NOx and VOC well sources is related to
26 production rate. Until a well is completed, the actual production rate is unknown and hence

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1 emissions cannot be quantified. At the end of one year of production for wells in the San
2 Juan Basin, production will be 85 percent of initial production and after 10 years production
3 will be 10 percent of initial production. PTE is expressed as an emissions rate over an
4 annual period. Given the variation in production over time, emissions will also decrease
5 over time and the initial determination of instantaneous PTE becomes irrelevant over time.
6 Non-road engines are regulated by EPA through the application of control technology and
7 do not require permits. The inclusion of drilling rig and fracking emissions in a PTE
8 inventory is meaningless since these are temporary sources and the equipment is on site for
9 a very limited amount of time (less than a year), are considered non road engines and have
10 associated control limits under EPA regulations.

11 It is important to note that emissions from these temporary sources are not ignored in terms
12 of ozone impact analyses. Regional modeling studies do include such sources in modeled
13 inventories. WEG asserts that ozone in portions of New Mexico is degrading as illustrated
14 in the following.

15 Included as Wild Earth Guardians Exhibit 16 is a spreadsheet I prepared,
16 based on air quality data reported by EPA at its AirData webpage, listing
17 instances during which ozone concentrations in excess of 95 percent of the
18 NAAQS have been recorded so far in 2021 at New Mexico monitoring sites.
19 This exceedance data is sorted from highest 8-hour exceedance (0.089 parts
20 per million, recorded in Dona Aña County on July 9, 2021) to the lowest
21 (0.067 parts per million recorded at numerous monitoring sites in May,
22 June, and July 2021) and it illustrates the severity of New Mexico's ozone
23 problem and the likely consequences of inaction to curtail emissions. Of
24 note:

25 • The data shows that 34 ozone exceedances of the NAAQS have been
26 recorded so far in New Mexico's oil and gas producing counties, including
27 Eddy, Lea, Rio Arriba, San Juan, and Sandoval. In the attached spreadsheet,
28 I highlight data recorded from monitors in these counties.

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- There have been 70 instances during which ozone concentrations have been higher than 95 percent of the NAAQS, particularly at monitors in the San Juan and Permian Basins.

The above information presented by WEG does not present a complete picture regarding ambient ozone concentrations.

1) The source apportionment modeling performed for NMED by RAMBOL indicates that oil and gas source contributions to ozone exceedances at the Dona Ana monitors are approximately 0.0005 ppm and by EPA definition of significant (0.001 ppm) do not contribute to exceedances of the ozone standard. Placing controls on oil and gas will not result in any improvement of ozone in this region.

2) As part of the modeling, RAMBOL emission inventories in New Mexico for 2014 and the 2028 base case were developed. In 2014, NO_x emissions were reported in the TSD as 232,766 tons per year and for the 2028 base case NO_x emissions of 168,661 tons per year were computed. This is a reduction of 61,105 tons per year of NO_x.

In 2014 VOC emissions were estimated to be 433,188 tons per year and were forecast to be 407,408 tons per year in 2028 (a reduction of 25,700 tons per year).

The magnitude of these reductions in emissions resulted in modeled baseline conditions less than 95 percent of the NAAQS at all monitors except Desert View which was 0.067 ppm (equivalent to the 95 percent of the NAAQS). Unfortunately, documentation of the emission reductions is lacking. The additional controls on oil and gas as outlined in the proposed regulation are also not included in the 2028 base case inventory.

The most effective approach method of reducing ozone in New Mexico is to formalize into regulation the changes in NO_x and VOC emissions contained in the 2028 base case

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1 inventory. The 2028 base case defines the “plan” required by the regulation. Adding
2 additional oil and gas controls before reductions in the 2028 base case inventory will not
3 result in improvement in ozone under the 95 percent threshold.

4 Comparison of the NOx and VOC changes in emissions indicate that NOx emissions were
5 reduced by 28 percent and VOC emissions were reduced by 6 percent. There is a strong
6 indication that the large reduction in ozone concentrations is a result of NOx control, not
7 VOC control, because ozone formation is NOx limited and changes in VOC emissions do
8 not result in appreciable changes in ambient ozone concentrations.

9 **Q. BASED ON YOUR REVIEW OF NICHOLS’S TESTIMONY, ARE YOU**
10 **CHANGING YOUR POSITION ON RECOMMENDED PROPOSED REVISIONS**
11 **TO 20.2.50.2 NMAC THAT WERE STATED IN YOUR DIRECT TESTIMONY?**

12 A. No.

13 **Q. PLEASE EXPLAIN.**

14 A. The claims regarding exclusive oil and gas contributions to ozone violations in New
15 Mexico are not supported by scientific studies.

16 **Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL**
17 **IMPROVEMENT BOARD WITH RESPECT TO WEG’S PROPOSAL**
18 **REGARDING 20.2.50.7 AND .12 NMAC?**

19 A. I recommend that the Board not adopt WEG’s recommended changes.

20 **V. DIRECT TESTIMONY OF TAMMY THOMPSON (EDF)**

21 **Q. HAVE YOU REVIEWED THE DIRECT TESTIMONY OF EDF WITNESS**
22 **TAMMY THOMPSON?**
23

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1 A. Yes.

2 **Q. HAVE YOU REVIEWED THE FINAL REPORT: HUMAN HEALTH RISK**
3 **ASSESSMENT FOR OIL & GAS OPERATIONS IN COLORADO (“THE**
4 **COLORADO REPORT”), LISTED AS EXHIBIT II IN EDF’S NOTICE OF**
5 **INTENT TO PRESENT DIRECT TESTIMONY?**

6 A. I have reviewed the ICF report entitled Human Health Risk Assessment for Oil & Gas
7 Operations in Colorado. My comments are as follows:

8 This rulemaking is about controlling ozone and ozone precursors and not about potential
9 human exposure from VOC compounds. VOC health risks are beyond the scope of this
10 proceeding. If NMED believes that VOC emissions pose a significant health risk, NMED
11 should conduct a study specifically tailored to New Mexico oil and gas operations along
12 with stakeholder input. Depending on the results of such a study, rulemaking could follow.

13 It is true that if VOC compounds are reduced, potential significant health risks would be
14 reduced. The determination of VOC exposure from well operations based on a single paper
15 is beyond the scope of this hearing.

16 **Q. PLEASE SUMMARIZE EDF’S PROPOSALS AS THEY RELATE TO THE**
17 **COLORADO REPORT.**

18 A. EDF has taken the position that reductions in specific VOC compounds will reduce human
19 exposure for people living adjacent to wells.

20 **Q. BASED ON YOUR REVIEW OF THOMPSON’S TESTIMONY AND THE**
21 **COLORADO REPORT, WHAT DO YOU UNDERSTAND TO BE THE BASIS FOR**
22 **EDF’S PROPOSAL?**

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1 A. I have technical issues with at least two aspects of the modeling.

2 First, the approach used to transform 3-minute emission rates to hourly emission rates using
3 a log normal frequency distribution is not appropriate. The development of hourly
4 emission rates from a 3-minute average emission rate becomes an averaging time
5 dispersion issue.

6 Second, modeling impacts in AERMOD using a single volume source the size of the well
7 pad exaggerates the concentrations near the source. Emission description in the modeling
8 should incorporate specific emission points associated with adjacent structures.

9 **Q. DID THE TESTIMONY PROVIDED BY EDF CAUSE YOU TO RECONSIDER**
10 **THE STATEMENTS AND PROPOSED REVISIONS TO 20.2.50.2 NMAC**
11 **CONTAINED IN YOUR DIRECT TESTIMONY?**

12 A. No.

13 **Q. DID YOUR DIRECT TESTIMONY ADDRESS THE BASES FOR EDF'S**
14 **PROPOSAL?**

15 A. No.

16 **Q. WHAT IS YOUR ANALYSIS OF EDF'S BASES FOR ITS POSITIONS?**

17 A. Health impacts from VOC emissions are beyond the scope this rulemaking. Based on the
18 Air Quality Control Act and NMED's direct testimony, the purpose of these rules is to
19 assure that ambient air concentrations of Ozone do not exceed the NAAQS. The rules do
20 not address alleged impacts of VOCs alone or Ozone concentrations below the NAAQS.

21 **Q. BASED ON YOUR REVIEW OF THOMPSON'S TESTIMONY AND THE**
22 **COLORADO REPORT, ARE YOU CHANGING YOUR POSITION ON**

**Rebuttal Testimony of Doug N. Blewitt
No. EIB 21-27 (R)**

**RECOMMENDED PROPOSED REVISIONS TO 20.2.50.2 NMAC THAT WERE
STATED IN YOUR DIRECT TESTIMONY?**

A. No.

Q. PLEASE EXPLAIN.

A. As explained, the potential health effects from VOC emissions are beyond the scope of this rulemaking.

Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL IMPROVEMENT BOARD WITH RESPECT TO EDF'S PROPOSAL?

A. They are beyond the scope of this rulemaking and should be rejected.

XII. CONCLUSION

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.



August 25, 2020

Ms. Christy Woodward

Senior Director of Regulatory Affairs
Colorado Oil & Gas Association
1800 Glenarm Place, Suite 1100
Denver, CO 80202

Via Email: christy.woodward@coga.org

RE: Engine Rulemaking Rebuttal and Technical Analysis

Dear Christy,

Spirit Environmental, LLC ("Spirit") was engaged to carefully review and respond to the expert testimony and alternate proposal presented by the National Parks Conservation Association ("NPCA") in their prehearing statement. The data and technical analyses that follow are being provided to the Colorado Oil & Gas Association ("COGA") and outside counsel representing numerous oil and natural gas operators in Colorado.

Summary of NPCA alternate proposal

NPCA submitted an alternate proposal that requests that the Air Quality Control Commission ("AQCC") adopt stricter standards for all engines by requiring that units be electrified where feasible, and that the horsepower ("hp") applicability threshold for four-stroke rich-burn engines ("4SRB") be lowered to 100 hp and greater. Spirit understands that the AQCC has directed that engines below 1000 HP are out of scope for the current rulemaking. As such, Spirit attempts, where possible, to address only those portions of NPCA's proposal related to engines equal to or greater than 1000 HP. In some instances, Spirit's responses implicate engines below 1000 HP because NPCA integrated its analysis of engines both above and below 1000 HP.

NPCA proposed the following language revisions to Regulation 7:

"I.D.5.b.(iii)(a). The owner or operator of any stationary natural gas fired reciprocating internal combustion engine shall electrify the engine unless the owner or operator shows that electrification is infeasible. The Division shall determine whether an owner or operator has demonstrated that electrification is infeasible based on information and data provided by the owner or operator, and any other information reasonably available to the Division (as applicable). In making the determination, the Division shall consider whether there is no reasonable access or opportunity to create access to the power grid, or whether the cost per ton of NOx reduction

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IPANM EXHIBIT 13

IPANM_0300

would be substantially more than alternative pollution control measures that achieve the same or greater pollution control identified in Table 2. The burden shall be on the owner or operator to demonstrate that electrification of an engine is infeasible based on this standard. (b) If an owner or operator shows, to the Division's satisfaction, that electrification is infeasible, the following emission standards shall apply:

- All 4SRB engine between 100 hp - 500 hp
 - Comply with a 0.25 g/hp-hr NO_x limit, OR
 - Install and operate NSCR and AFRC on units.
- All 4SRB engines >500 hp
 - Establish a 0.2 g/hp-hr NO_x limit for all units."

The intent of this document is to carefully review NPCA's proposal, and the technical and economic feasibility issues created by such a proposal for engines that would be subject to the Division's draft rule as modified by NPCA's alternate proposal.

Our approach in reviewing NPCA's alternate proposal has been to determine whether the assumptions and claims in its supporting economic impact analysis ("EIA") are accurate, and whether an objective third-party review of control costs and feasibility would yield the same results.

Spirit reached out to several Colorado based control system vendors, engine manufacturers, oil and natural gas operators, and other industry experts to gather costs and other data that are relevant to this discussion. What follows is a summary of our findings and conclusions for the electrification of all subject engines, and the feasibility of lowering the 4SRB emission limit to 0.2 g/hp-hr for engines >1,000hp (as noted in NPCA's proposal).

Electrification

NPCA has requested that the Division alter the proposal to "require owners and operators of engines subject to Regulation Number 7, Part E, Section I.D.5 to electrify their engines unless an operator demonstrates that electrification is infeasible," (NPCA Final Economic Impact Analysis). The cost and challenges presented in electrifying all engines for not only the operator, but the public, are high. The NPCA proposal also inappropriately places the responsibility of determining infeasibility on the operators as opposed to determining this at the time of rulemaking. The Division does not have the capacity or resources to review and address all these individual infeasibility claims on an engine by engine basis. The Division should deem the NPCA alternative proposal technically and economically infeasible as the costs and challenges outweigh any potential benefit electrification of natural gas fired engines equal to or greater than 1,000 hp could provide.

A. Cost Effectiveness and Feasibility

The NPCA claims to adopt the Division's estimates for cost of electrification of engines. NPCA included a Division document as Exhibit 2 – *NOx Emission 4-Factor Analysis for Reasonable Progress*. This document cites a cost of \$103 to \$4,743 per ton of NOx reduced. Spirit finds this estimate to be far too low and as acknowledged by the Division in the document itself, does not account for a significant number of considerations and costs associated with electrification – particularly for larger engines. Upon review, this estimate was taken from a 2007 document prepared by the Western Regional Air Partnership ("WRAP") titled *Area Source Emissions Inventory Protection and Control Strategy Evaluation – Phase II*. Spirit reviewed the basis for this cost analysis and found that the WRAP did not include many of the significant costs that would be associated with replacing a large natural gas fired engine with an electric motor. Their analysis appears to only include a small cost estimate for the electric motor itself, but no other capital expenditures or ongoing operating and maintenance costs. And notably, the CARB materials do not even address engines above 1000 HP. See Table CE-8-1 below¹.

Table CE-8-1. Capital, O&M and annualized costs by engine horsepower. (CARB, 2001b)

Horse Power Range	Capital Cost	O&M	Annualized Cost
50 - 150	14,000	unknown	\$4,492
151 - 300	24,000	unknown	\$8,023
301 - 500	40,000	unknown	\$12,839
501 - 1000	90,000	unknown	\$28,855

Cost Effectiveness: \$103/ton-NOx – \$4,743/ton-NOx

For example, the WRAP has a stated \$90,000 for the cost to purchase an electric motor for a stated horsepower range of 501 to 1,000. Cost estimates from oil and gas operators indicate a cost for the electric motor, labor, and equipment modifications to be at least \$500,000, not including other significant capital expenditures or ongoing operation and maintenance expenses. The disparity in costs between these figures is startling. Because the numbers provided by NPCA are not representative of the actual costs, it is inappropriate for NPCA to use this limited information to broadly claim that electrification is cost effective for the oil and natural gas industry.

NPCA also cites a recent study by SW Energy Efficiency Project ("SWEEP") in its Final Economic Impact Analysis. In this study, the author claims that if electricity is available at the site that the replacement of natural gas fired engines with electric motors will result in reduced annual

¹ Bar-Ilan, Amnon, Ron Friesen, Alison Pollack, and Abigail Hoats (2007), *WRAP Area Source Emissions Inventory Protection and Control Strategy Evaluation – Phase II*, Western Governors Association, Denver, CO. Chapter 4

operating costs and improved energy efficiency. They also claim that this change would significantly reduce methane and CO₂ emissions compared with natural gas fired engines. In our opinion these claims are not accurate and sufficient data was not included in the SWEEP document to support these claims. While utility provided electricity may be available at many sites, this does not mean the power is sufficient enough to run large electric compressors at the location. Many of the sites would still need to make significant power upgrades and pay high costs to support such a change. As we will discuss in greater detail below, there are many factors that impact the costs of upgrading electric power at facilities, all of which can have a significant impact on cost.

The SWEEP study also claims that replacement of natural gas fired engines with electric motors is cost-effective and that the reduced maintenance costs associated with electric motors will more than offset the slight increase in annual electricity costs. SWEEP does not provide any actual cost data to support this claim, instead they cite a personal communication email with an engine vendor, who may not have experience with electricity costs for large electric motors. If this statement were correct then clearly oil and natural gas operators would already be electrifying their engines. In fact, data collected from oil and natural gas operators shows that the electricity costs alone are substantially more than routine natural gas fired engine maintenance. One operator shared their electricity costs from their fully electrified facility and noted electricity costs of \$800,000 per month to run their station.. Similar to the WRAP study above, this cost analysis appears to leave out key cost parameters that significantly affect the overall cost-effectiveness of electrification of large natural gas fired engines.

Additionally, NPCA cites a California Air Resources Board (“CARB”) document as Exhibit-8, which they claim supports their position that electrification of large engines, >1,000 hp, is feasible and cost-effective. We have reviewed this document and find that this is untrue, and that CARB also agrees that this is not the case for larger natural gas fired engines. *“The cost estimates shown in Table V-1 are a mixture of quotes and extrapolations of cost from information provided by industry sources, associations, local governments, and the U. S. EPA. It also includes an estimated cost for replacing engines in various horsepower ranges with an electric motor. Electrification may be a consideration as an alternative for internal combustion engines from 50 to 500 horsepower. Beyond that range, modification and installation costs may become so extensive that this approach may not be cost effective. The costs for electrification assume the units will be located relatively close to a power grid.”*²

It is unclear to Spirit why NPCA did not acknowledge or address CARB’s statement that electrification may not be cost effective for larger engines. And nowhere does NPCA acknowledge that CARB provided no estimates for engines greater than 1000 HP. In general, we

² California Air Resources Board – *Determination of Reasonably Available Control Technology and Best Available Retrofit Control Technology for Stationary Spark-ignited Internal Combustion Engines.* <https://ww3.arb.ca.gov/ractbarc/rb-icemain.pdf>

find that NPCA did not actually conduct a cost analysis of any engines >1,000 hp and is simply extrapolating data for much smaller 50 hp to 500 hp engines using incomplete data to support their claims.

There are several aspects of NPCA's cost-analysis that need to be addressed. First, for electrification of engines to occur, the natural gas fired engine must be replaced with a new electric motor. It is highly unlikely that the horsepower of the compressor and electric motor will match, therefore leading to the need for additional equipment, and potentially a new compressor. Our review found that while it may be possible to couple the existing compressor to the new electric motors, a significant overhaul would also be required and the equipment and labor costs may be so extensive that it could be more cost effective to purchase a new electric motor and compressor as a packaged set. These determinations would need to be made on a case by case basis. Estimates from engine vendors and oil and natural gas operators range from \$500,000 to \$980,000 per unit to replace a natural gas fired engine greater than 1,000 hp with an electric powered natural gas compressor package depending on size and needs. This cost alone is significant, and not addressed in NPCA's cost analysis. This cost also assumes that sufficient electric power already exists at the site and does not account for any other capital costs or other significant operation and maintenance expenditures related to converting the site.

NPCA's alternate proposal also contains no evaluation of cumulative costs as they relate to this proposal. It relies on the Division's economic impact analysis ("EIA") and concludes "the proposed electrification requirement will not cost owners and operators substantially more than the cumulative costs associated with the NOx pollution limits for engines," (Ex. 2 NPCA EIA at 3). We find this statement to be wholly unsupported.

Spirit received cost analyses from several oil and natural gas operators, and the data indicate a very substantially higher cost in dollars per ton-removed ("\$/ton removed") from replacing existing RICE equal to or greater than 1,000 hp with electrically driven motors. Spirit and the oil and natural gas operators used concepts from EPA's BACT/RACT based approach to evaluate the economic impact of replacing natural gas fired engines greater than or equal to 1,000 hp with electric motors. We used a conservative interest rate of 5.5% (which does not include typical opportunity cost) and equipment life of 20 years. The cost that we reviewed, (excluding lost value of existing assets) results in a range of up-front capital costs from about \$50,000,000 to upwards of \$260,000,000. The company-wide increase in operation and maintenance cost resulting from natural gas to electric conversion ranged from \$15,000,000 a year for a small operator, to upwards of \$70,000,000 a year for a larger operator. Using assumptions specific to their own fleets, the operators reported a cost-effectiveness range of \$40,000 to \$350,000 per ton of NOx removed over the life of a replacement electric motor, far in excess of the \$103 to \$4,743 per ton cost-effectiveness that NPCA cites.

As mentioned above, NPCA's review did not evaluate the numerous costs and factors that impact an operator's ability to electrify a facility. We find that a true cost-effectiveness exercise for the

replacement of natural gas fired engines equal to or greater than 1,000 hp with electric motors should carefully review the following:

- Electric motor costs
- Compressor retrofit or new compressor package if not possible
- Potential expansion of facility to accommodate new equipment
- Intra-facility electrical upgrades (e.g. MCC, transformers, facility substation, wiring, buildings)
- Transmission line expansion to facility
- Electrical substation (utility company)
- Right-of-Way ("ROW") costs and acquisition
- Permitting timeframes and lost revenue from long-lead items
- Construction, engineering, and labor costs
- Electric motor maintenance costs
- Electric power costs (\$/kWh)
- The NOx emissions from the power plant supplying power to the facility
- The fuel savings and additional natural gas sales resulting from electrification
- The cost from lost production during equipment replacement and downtime

B. Power Availability and Access

Another component to installing electric engines to replace existing natural gas fired engines is the increased electric power requirements for the facility. For sites where connecting to electric power is possible, the additional costs of infrastructure needed to connect to the utility grid falls on the operator. Both transmission lines that carry power at high voltages for long distances, as well as distribution lines that carry power shorter distances to the source, would need to be constructed and run to the facility. A conservative estimate from a utility provider reveals an upfront cost of roughly \$2 million for the first mile of transmission line, and an additional \$1 million for each mile thereafter. It is also around \$3 million per additional substation, plus the cost of additional feeder lines at \$40,000 per mile and \$38,000 per facility for transformers. In addition to these utility infrastructure costs, data from oil and natural gas operators indicates that the cost of acquiring right-of-way ("ROW") to run the utility lines to the facilities would likely cost an additional \$26,000 to \$72,000 per mile.

One of the most significant ongoing costs, which was not evaluated in NPCA's proposal, is the annual electricity costs that oil and natural gas operators would incur from the local utility provider. Based on the data we have reviewed, the monthly utility bill to the operators could increase by as much as \$30,000 to 60,000 per electric driven compressor per month, based on a 1,380 hp

equivalent electric motor³. Spirit received information from one operator that noted their fully electric-driven natural gas processing plant costs around \$800,000 per month in electricity costs from the utility provider. Annualized, this is \$9,600,000 per year in electricity costs.

The Division itself also cites that if all statewide RICE engines above 500 hp were converted to electric, “a minimum of 600 MW of extra generating capacity would be required.”⁴ Currently, the CDPHE engine inventory indicates that about 1.6 million horsepower of natural gas fired engines greater than 1,000 hp exist in Colorado. The equivalent power from these engines alone is equal to about 1,240 MW of power⁵. Assuming they all operate 8,760 hours per year means they consume up to 11.4 terawatt-hours (“tWh”) of power. Within Colorado alone, only about 50 tWh of electric power is generated, meaning an additional 20% of power would need to be produced to meet this demand⁶. In discussions with one of the major electric utility providers, we do not believe it is possible to meet this demand in the next 5-10 years to support this proposal.

NPCA also suggests that the increased electric power demands could be offset by clean renewable energy sources (e.g. solar). Assuming half of the 20% increased power demand statewide could be supplied by solar energy, or about 5.0 tWh, about 15,500 acres of solar panels would need to be installed⁷. Solar power also has the disadvantage that it only produces peak power in full sun exposure, meaning no power is produced at night, and less power is produced during the winter months, making solar infeasible for power production to support this proposal. This renders clean energy that is currently available insufficient for this replacement, and instead points to the expansion of existing coal and natural gas fired power plants across the state in order to reach the increased energy demand from electric engines. Given the rural location of many facilities, coal fired power plants in the area are more common, thus meaning potential benefit from running an electric compressor may be offset in part due to increased NOx emissions from the coal fired electric power source.

Electric power delivery and efficiency is also an issue that is not addressed through NPCA's proposal. Converting a natural gas fired engine to electric motor may seem to provide immediate emission reduction benefits, however, burning one BTU of gas on site to operate a compressor versus burning a BTU of gas at a power plant hundreds of miles away is ultimately less efficient and could result in additional emissions just to supply electricity to the electric compressor due to losses down the electric transmission lines.

C. Timing

³ Assumes \$0.03-\$0.08 cents per kWh

⁴ CDPHE – RICE Four-factor Analysis

⁵ Standard conversion of 1hp = 0.746kw. [1,661,806 hp X 0.746 kw/1hp = 1,239.23 MW]

⁶ https://www.energy.gov/sites/prod/files/2016/09/f33/CO_Energy%20Sector%20Risk%20Profile.pdf (US Dept of Energy – State of Colorado Energy Sector Risk Profile)

⁷ NREL - *Land Use Requirements for Solar Power Plants in the United States*. Table ES-1. 3.1 acres of solar for 1 gWh of power. <https://www.nrel.gov/docs/fy13osti/56290.pdf>

Time constraints to provide electric power to oil and natural gas facilities prove to be another challenge that is not properly addressed by NPCA's proposal. The additional substations, transmission lines, and equipment that would need to be built to provide the increased power needed for electrification could take as much as 3 years. To request additional distribution (< 10 MW) can take at least a year from start to finish, while requesting additional transmission (> 10 MW) would take in excess of three years from start to finish. In addition, residential applications take precedence over industrial projects when it comes to utility companies providing service. This means that a natural gas site awaiting additional transmission would be surpassed by a newly built residence in the area, potentially pushing these timelines further out into the future. Such uncertainty is incompatible with regulations mandating compliance deadlines.

NPCA has oversimplified this process and does not address the significant time constraints and permitting process that supplying electrical power to oil and natural gas facilities creates. While we have not quantified the potential lost revenue from these delays, there would inevitably be business delays and potential lost revenue by delaying projects by 1 to 3 years while waiting for electric power connectivity to the sites.

D. Risk and Reliability

There are also reliability concerns surrounding use of the public power grid. Should a storm or equipment failure take out power in the area, unforeseen additional emissions at upstream facilities or compressor stations due to flaring, blow downs, and other shut down and startup operations would occur. These conditions are not unlikely. According to data gathered from Xcel Energy on an example set of 15 randomly selected oil and natural gas sites, an estimated 158 outages occurred between 2018 to 2020. Even a short outage likely requires the entire facility to restart, which may result in the flaring of natural gas onsite and the associated unaccounted-for emissions. Eastern Colorado also sees frequent afternoon thunderstorms due to prevailing wind patterns over the Rockies and the existence of the Denver Convergence Vorticity Zone. These storms are capable of damaging winds, lightning, and hail, that can take out power lines. Colorado ranks 19th in the nation for number of cloud-to-ground lightning flashes and the Colorado National Weather Service offices collectively issued over 220 high wind warnings across the state from 2010 to 2019 alone (weather.gov). This doesn't include the 530 winter storm warnings that also contain damaging winds and ice that impede reliable electric power delivery to customers.

Lost power due to natural phenomena or utility failures means the electric compressors depending on said power could not operate. Operators could be forced to flare extra gas, resulting in unintended additional emissions.

Overall Spirit finds the broad electrification of natural gas fired engines requirement infeasible. The increased strain on the public power grid burdens the public, while the cost per ton of NOx removed to oil and natural gas operators resulting from additional equipment, power costs, and utility bills is well above what is considered cost-effective.

4SRB Alternative Proposal

NPCA's alternate proposal requests a significant change to the rule applicability by lowering the horsepower threshold from 1,000 hp and greater, to 100 hp and greater for 4SRB engines. However, as noted above, the AQCC rejected engines below 1000 HP as outside of the scope of the rulemaking. In addition, the NPCA's alternate proposal mandates NO_x emission limits of 0.2 g/hp-hr for engines greater than 500 hp (or as authorized for consideration by the AQCC, equal to or greater than 1000 HP), much lower than the Division's proposal of 0.8 g/hp-hr for existing 4SRB engines equal to or greater than 1,000 hp and 0.5 g/hp-hr for new 4SRB engines equal to or greater than 1,000.

Throughout its EIA and supporting exhibits, NPCA assumes that the only controls needed to achieve a 0.2 g/hp-hr NO_x emission rate are the addition of an air-fuel ratio controller ("AFRC") and non-selective catalytic reduction ("NSCR"). This is also what NPCA's cost estimates are exclusively based on.

Table 1 presents controlled and uncontrolled NO_x emission factor values for a range of control device efficiencies representative of 4SRB engines commonly found at oil and gas facilities. Table 1 demonstrates that the NO_x emission limits proposed by NPCA are only achievable with control devices providing greater than 98% control of NO_x.

Table 1 – Controlled and uncontrolled 4SRB engines NOx emission factors for a range of NSCR/AFRC control efficiencies.

NOx Unc. EF (g/hp-hr) Control Device Efficiency	12.00	13.00	14.00	15.00	16.00
90.0%	1.20	1.30	1.40	1.50	1.60
90.3%	1.16	1.26	1.35	1.45	1.55
90.7%	1.12	1.21	1.31	1.40	1.49
91.0%	1.08	1.17	1.26	1.35	1.44
91.3%	1.04	1.13	1.21	1.30	1.39
91.7%	1.00	1.08	1.17	1.25	1.33
92.0%	0.96	1.04	1.12	1.20	1.28
92.3%	0.92	1.00	1.07	1.15	1.23
92.7%	0.88	0.95	1.03	1.10	1.17
93.0%	0.84	0.91	0.98	1.05	1.12
93.3%	0.80	0.87	0.93	1.00	1.07
93.7%	0.76	0.82	0.89	0.95	1.01
94.0%	0.72	0.78	0.84	0.90	0.96
94.3%	0.68	0.74	0.79	0.85	0.91
94.7%	0.64	0.69	0.75	0.80	0.85
95.0%	0.60	0.65	0.70	0.75	0.80
95.3%	0.56	0.61	0.65	0.70	0.75
95.7%	0.52	0.56	0.61	0.65	0.69
96.0%	0.48	0.52	0.56	0.60	0.64
96.3%	0.44	0.48	0.51	0.55	0.59
96.7%	0.40	0.43	0.47	0.50	0.53
97.0%	0.36	0.39	0.42	0.45	0.48
97.3%	0.32	0.35	0.37	0.40	0.43
97.7%	0.28	0.30	0.33	0.35	0.37
98.0%	0.24	0.26	0.28	0.30	0.32
98.3%	0.20	0.22	0.23	0.25	0.27
98.7%	0.16	0.17	0.19	0.20	0.21
99.0%	0.12	0.13	0.14	0.15	0.16

	Meets Division's proposed 0.8 g/hp-hr NOx emission limit (>1,000 hp existing engines)
	Meets Division's proposed 0.5 g/hp-hr NOx emission limit (>1,000 hp new engines)
	Meets NPCA's proposed 0.25 g/hp-hr NOx emission limit (all 100-500 hp engines)
	Meets NPCA's proposed 0.2 g/hp-hr NOx emission limit (all >500 hp engines)

While the addition of NSCR in conjunction with AFRC controls to an existing engine may provide >98% control with brand new catalyst elements and under ideal conditions, that level of control cannot be reliably maintained as catalytic elements age, and engine settings drift (within acceptable levels). This was confirmed by Innio – Waukesha, a rich-burn engine vendor familiar with Colorado oil and gas operations. Innio – Waukesha agreed that while a 4SRB engine equipped with NSCR and AFRC may be able to temporarily meet a 0.2 g/hp-hr NOx emission rate, maintaining it at those levels for ongoing compliance would be near impossible⁸. In fact, catalyst manufacturers and vendors contacted by Spirit (Miratech, Johnson Matthey, and RJ Mann) confirmed that they would only guarantee catalyst performance for at most 1 to 3 years because the catalyst elements and engine management systems must be in almost new condition to attempt to meet such a low standard and high control efficiency.

NPCA included data that supports the inability to meet these 98% reductions on an ongoing basis in Exhibit 1 – *Oil and Gas Sector Reasonable Progress Four-Factor Analysis of Controls for Five Source Categories*. Within Exhibit 1 NPCA's experts note the following: "For example, retrofit installations of NSCR on five Caterpillar rich burn engines in Texas achieved a NOx reduction of 96% or greater on all of the engines. On two of those engines, testing conducted after more than 4,000 hours of operation with NSCR indicated the NSCR controls were still achieving a 95% NOx reduction." However, as shown by Table 1 and based on NPCA's own assumptions regarding the g/hp-hr for uncontrolled engines, 95 to 96 percent will not achieve the necessary limits. In NPCA's Exhibit 3 - *Initial Economic Impact Analysis (EIA) for A Proposal To Regulate NOx Emissions from Natural Gas Fired Rich-Burn Natural Gas Reciprocating Internal Combustion Engines (RICE) Greater Than 100 Horsepower*, Dr. Sahu recognizes that 4SRB engines pre-control emissions generally range from 15 to 16 g/hp-hr and claims that the proposed 0.2 g/hp-hr NOx emission limits are achievable for all 4SRB engines. Yet the references cited by Dr. Sahu to support this claim indicate that a 90% reduction of nitrogen oxides is state of the art emission performance level for existing RICE fueled by natural gas⁹ and that 95% control of NOx may be assumed when evaluating the cost-effectiveness of NSCR/AFRC controls¹⁰, yielding a 0.75 g/hp-hr NOx emission level at best.

A more realistically achievable level of control using NSCR in conjunction with AFRC lies in the range of 90%-95%¹¹. Table 1 above demonstrates that, unlike NPCA's proposed limit, the

⁸ Verbal conversation with Innio/Waukesha dated 08/11/2020.

⁹ NJ DEP State of the Art (SOTA) Manual for Reciprocating Internal Combustion Engines (2003), at 4-5.

¹⁰ Commonwealth of Pennsylvania, Final Technical Support Document (June 2018) for the General Plan Approval and/or General Operating Permit for Unconventional Natural Gas Well Site Operations and Remote Pigging Stations (BAQ-GPA/GP-5A, 2700-PM-BAQ0268); and the Revisions to the General Plan Approval and/or General Operating Permit for Natural Gas Compressor Stations, Processing Plants, and Transmission Stations (BAQ-GPA/GP-5, 2700- PM-BAQ0267), at 34.

¹¹ Stationary Reciprocating Internal Combustion Engines - Updated Information on NOx Emissions and Control Techniques, EPA-457/R-00-001, September 2000.

Division's proposed 0.8 g/hp-hr NO_x limit for existing engines equal to or greater than 1,000 hp can be achieved using NSCR and AFRC. Spirit also agrees that these two controls are readily available and reasonable to install on new and existing 4SRB engines to reduce NO_x emissions. For new 4SRB engines >1,000 hp, the Division's proposed 0.5 g/hp-hr NO_x limit is achievable through the use of NSCR/AFRC in conjunction with engine combustion improvements that have become common as part of the design of a new engine from the outset.

For existing 4SRB engines to consistently meet a NO_x emission level of 0.2 g/hp-hr, other significant equipment upgrades, in addition to an AFRC and/or NSCR installation, would need to be made. These engine upgrades were not accounted for in the NPCA's EIA. Engine upgrade kits may be used to replace several major components on the existing engine (e.g. pistons, heads, turbocharger, emission management system, flywheel etc.), and work in conjunction with a traditional NSCR/AFRC system to further bolster the ability to achieve a 0.2 g/hp-hr NO_x emission rate. However, even those NPCA's proposal does not even consider these costs, or attempt to determine the range of such costs. Such costs could be in the hundreds of thousands of dollars for engines that are low emitting – representing an extensive and expensive total cost to operators and potentially high cost-per-ton reduced. This is a significant cost to the oil and natural gas industry where operators are largely already controlling engines and is a significant additional cost to achieve the minimal additional reductions that would result.

Additionally, the cost analyses prepared by NPCA's experts or cited throughout their exhibits were overwhelmingly based on an annualized NSCR/AFRC cost estimate from a memo by E^C/R Incorporated. For this memo, E^C/R Incorporated collected capital cost data for retrofitting NSCR/AFRC on existing 4SRB engines from industry groups, vendors, and manufacturers of RICE control technology for engines in the 50 to 3,000 horsepower range. However, in actuality, the direct and indirect annual cost data in this memo was obtained from an INGAA/API Technical Report¹² based on a dataset which was limited to engines less than 500 hp. These direct and indirect annual costs for engines in the 300-500 hp range from the INGAA/API Technical Report were applied by E^C/R Incorporated to any engine above 300 hp, including up to 3,000 hp. This is inappropriate, because direct and indirect annual costs increase with the engine horsepower, and the use of this data results in a gross underestimation of direct and indirect annual costs for engines equal to or greater than 1,000 hp, which are the main focus of our review.

Finally, NPCA's calculated cost is based on an underestimate of the total number of engines that will require retrofit in order to meet their alternate proposal. First, NPCA excluded from their cost estimate engines that, based on Division's APEN data, appeared to not be operating. Such engines are usually present at existing facilities to provide redundancy or backup capacity. Though they may not operate in certain given years, such engines would still need to be available

¹² Emission Control Cost Analysis Background for "Above the Floor" Emission Controls for Natural Gas-Fired RICE, Attachment D. Available at: https://downloads.regulations.gov/EPA-HQ-OAR-2008-0708-0279/attachment_1.pdf.

for use on an as-needed basis, and under NPCA's proposal would need to be retrofitted to meet proposed emission standards. The cost of these retrofits needs to be included in NPCA's analysis, regardless of the fact that associated actual emission reductions may be minimal. Second, NPCA also excluded from their cost estimate engines that, based on Division's APEN data, appeared to already meet NPCA's proposed standard. However, the Division's data was based on reported actual NOx emissions from APEN forms. The annual NOx actual emissions were then divided by an *assumed 8,760 hours of operation* and the engine horsepower rating to calculate the resulting NOx emission factor, in g/hp-hr. This leads to an underestimate of the actual NOx emission factor for engines that do not operate all year (not uncommon in oil and gas operations) and therefore an underestimate of the number of engines requiring retrofit. Based on NPCA's data presented in Table 1 of their EIA, this adds up to excluding 47 engines from their cost calculation, or up to 22% of the 4SRB engines that would potentially be subject to their alternate proposal. This is particularly misleading as retrofits on such engines would be just as costly as for any other engine but would lead to minimal emission reductions.

After careful review of all NPCA's documents, Spirit asserts that the 0.2 g/hp-hr NOx emission limit proposed by NPCA for 4SRB engines greater than or equal to 1000 HP is not appropriately supported. We disagree with NPCA, and their experts, and do not believe that this alternate proposal is feasible. Many of their data sources and assessments make broad leaps and assumptions by underestimating costs, overestimating potential NOx emission reductions, underestimating the number of engines affected, and underestimating the overall economic impact on the oil and natural gas industry.

Closing

Spirit appreciates the opportunity to support COGA and the oil and gas operators with this technical rebuttal support. If you have any questions, please do not hesitate to contact us.

Spirit Environmental, LLC