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 26, 2021

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

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

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

A. Yes.

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

Q. HAVE YOU REVIEWED NMED'S PROPOSED REGULATIONS RELATED TO THE SCOPE OF THE REGULATIONS?

A. Yes.

Q. PLEASE SUMMARIZE NMED'S CURRENT PROPOSALS.

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

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

Q. DID YOU REVIEW NMED AIR QUALITY BUREAU'S REPORT ENTITLED "OZONE PATH FORWARD," ATTACHED TO THE DIRECT TESTIMONY OF MICHAEL BACA AS EXHIBIT 4?

A. Yes.

Q. PLEASE SUMMARIZE NMED'S "OZONE PATH FORWARD" REPORT.

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

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

"Cause" means a single source is solely responsible for a concentration in excess of 95 percent of NAAQS.

"Contribute" signifies that a single source or source group has impacts is in excess of the EPA significant concentration.

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

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

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

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

Emphasis added. Section 172 requires that:

(c) Nonattainment plan provisions

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

(1) In general

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

(2) RFP

Such plan provisions shall require reasonable further progress.

(3) Inventory

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

(4) Identification and quantification

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

> (5) Permits for new and modified major stationary sources
>
> Such plan provisions shall require permits for the construction and operation of new or modified major stationary sources anywhere in the nonattainment area, in accordance with section 7503 of this title.
>
> (6) Other measures
>
> Such plan provisions shall include enforceable emission limitations, and such other control measures, means or techniques (including economic incentives such as fees, marketable permits, and auctions of emission rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to provide for attainment of such standard in such area by the applicable attainment date specified in this part.
>
> (7) Compliance with section 7410(a)(2)
>
> Such plan provisions shall also meet the applicable provisions of section 7410(a)(2) of this title.
>
> (8) Equivalent techniques
>
> Upon application by any State, the Administrator may allow the use of equivalent modeling, emission inventory, and planning procedures, unless the Administrator determines that the proposed techniques are, in the aggregate, less effective than the methods specified by the Administrator.
>
> (9) Contingency measures
>
> Such plan shall provide for the implementation of specific measures to be undertaken if the area fails to make reasonable further progress, or to attain the national primary ambient air quality standard by the attainment date applicable under this part. Such measures shall be included in the plan revision as contingency measures to take effect in any such case without further action by the State or the Administrator.

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

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

Key Issues of the Statute

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

Current rulemaking is intended to assure that EPA will not need to designate further ozone non-attainment areas in New Mexico. The Report states, “Regulations developed under 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.

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

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

Modeling Results

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

My review of the Technical Support Document ("TSD") entitled, "NEW MEXICO OZONE ATTAINMENT INITIATIVE PHOTOCHEMICAL MODELING STUDY – DRAFT" indicates that critical information was lacking to completely evaluate the emission inventories used in the ozone modeling. See NMED Ex. 15. The emission inventories used to develop the 2014 base case and the 2028 future year base case were not available for review and were not included in the TSD, which precluded review of the emission calculations, as well as the assumptions used in the development of the inventory.

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

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

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

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

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

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

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

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

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

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

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 8-1. Observed ozone $DVC_{2012-2016}$ and projected 2028 ozone DVFs for the 2028 Base Case and 2028 O&G Control strategy and differences in the 2028 ozone DVFs ($DVF_{Cntl} - DVF_{Base}$).

AQS_ID	2012-16 DVC (ppb)	Projected 2028 DVF Base (ppb)	Projected 2028 DVF Cntl (ppb)	Cntl - Base	Site Name	State	County
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	Foothills	NM	Bernalillo
Southern New Mexico							
350130008	66.3	60.0	59.8	-0.2	La Union	NM	Doña Ana
350130017	67.0	61.9	61.8	-0.1	Sunland Park City Yard	NM	Doña Ana
350130020	67.0	62.3	62.2	-0.1	Chaparral	NM	Doña Ana
350130021	72.0	67.0	66.8	-0.2	Desert View	NM	Doña Ana
350130022	71.3	66.1	66.0	-0.1	Santa Teresa	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 Lentes)	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

1) 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

2) 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)

3) For the 2028 base case all modeled design values are below 66.5 ppb except at Desert View and Carlsbad monitors

4) At Desert View the 2028 base case design value 67 ppb and is 0.5 ppb above the threshold value

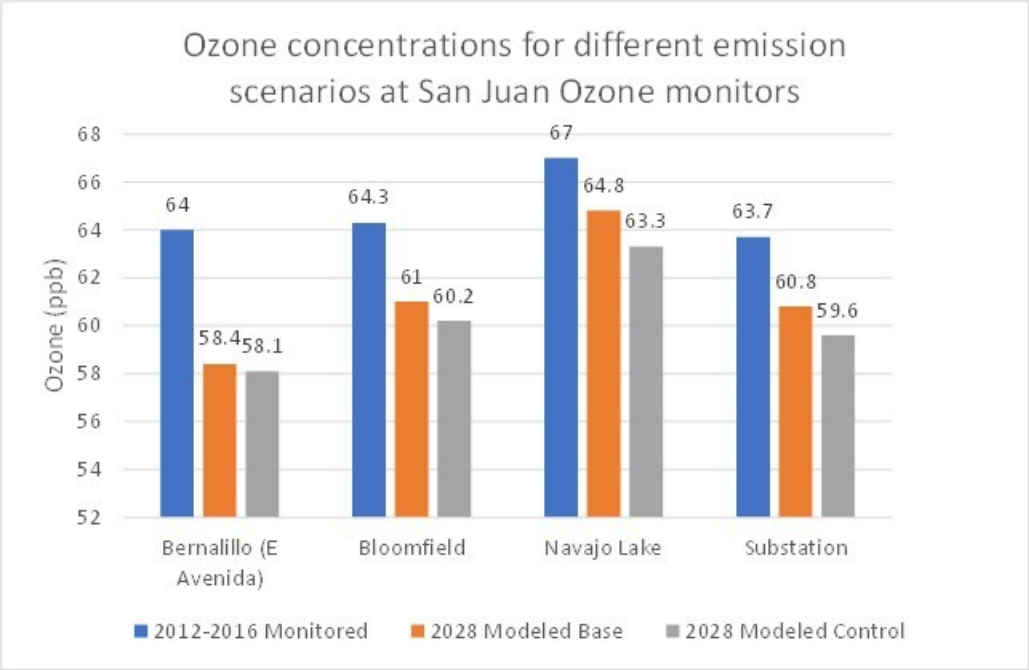
5) Additional Oil and Gas controls reduce impacts for the Desert View monitor 0.2 ppb (total O3 66.8 ppb which is still above the 66.5 ppb threshold)

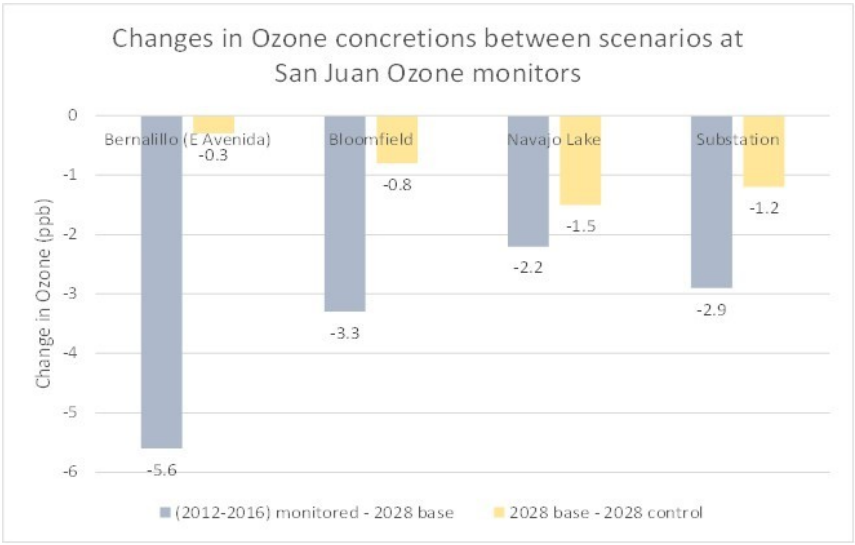
6) At the Carlsbad monitor the 2028 base case is 66.7 ppb (0.2 ppb above the 66.5 ppb threshold) and Oil and Gas controls reduce the design value by an additional 0.3 ppb (66.4 ppb)

6) Combined Oil and Gas controls are a very ineffective way to reduce impacts below 66.5 ppb

7) 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.





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

projected in the 2028 future year base case from additional controls on oil and gas are a small fraction and is an insignificant improvement beyond the 2028 future year base case. To achieve reductions in ambient ozone concentrations NMED must: 1) provide documentation regarding the 2028 base case inventory; 2) confirm that the emission reductions identified in the 2028 inventory will actually occur; and 3) the reductions outlined must become enforceable emission limits through regulation.

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

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

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

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

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

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

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

critical deficiency in the modeling since NOx 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.

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

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

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

A. No.

Q. PLEASE EXPLAIN.

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

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

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

The statute states if there are sources that **cause** or **contribute** to exceedances of the 95 percent threshold, then NMED must develop a plan to reduce ambient ozone impacts. The current modeling indicates oil and gas sources do not **cause** exceedances of the 0.070 ppm NAAQS nor the 95 percent threshold. A source **contributes** to an exceedance of the ozone NAAQS if individual impacts are above the significance level. EPA and NMED have indicated that the ozone significance level is 1.0 ppb (0.001 ppm)[3]

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

Q. HAVE YOU REVIEWED THE NATIONAL PARK SERVICE'SSUMMARY OF TECHNICAL TESTIMONY AND TECHNICAL COMMENTS REGARDING THE PROPOSED OZONE PRECURSOR RULE?

A. Yes

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

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

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

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

Rich-burn Engines

- NPS recommends that all *new* and *existing* rich-burn engines >500 HP to meet a limit of 0.2 g NOx/hp-hr

- **NMED proposal is 0.5 g NOx/hp-hr**

- NPS recommends that all *new* and *existing* rich-burn engines >100 HP and <500 HP to meet a limit of 0.25 g NOx/hp-hr

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

- NPS recommends that all *new* rich-burn engines <100 HP to meet a proposed limit of 1.0 g NOx/hp-hr

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

Lean-burn Engines

- NPS recommends that all *existing* lean-burn engines <100 HP to meet a proposed limit of 2.0 g NOx/hp-hr

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

- NPS recommends that all *existing* lean-burn engines >100 and <500 HP to meet a proposed limit of 1.0 g NOx/hp-hr

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

- NPS recommends that all *existing* lean-burn engines >500 HP to meet the proposed limit of 0.5 g NOx/hp-hr

- **NMED is proposing this limit for all existing engines greater than 1,000 HP**

- 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 ≥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 ≥ 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 ≥ 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 Statement[4]

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

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

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

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

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

- While the addition of NSCR in conjunction with AFRC controls to an existing engine may provide >98 percent 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).

Spirit confirmed this finding with Innio – Waukesha, a rich-burn engine vendor familiar with oil and gas operations using these types of compressors. 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 impossible. 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. This was confirmed in NPCA's own technical data, which indicated that a 90 percent reduction of nitrogen oxides is state of the art emission performance level for existing RICE fueled by natural gas, and that 95 percent control of NOx may be assumed when evaluating the cost-effectiveness of NSCR/AFRC controls, yielding a 0.75 g/hp-hr NOx emission level at best.

- NPCA included data that supports the inability to meet these 98 percent reductions on an ongoing basis. 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 percent 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 percent NOx reduction." However, based on NPCA's own assumptions regarding the g/hp-hr for uncontrolled engines, 95 to 96 percent will not achieve the necessary limits.

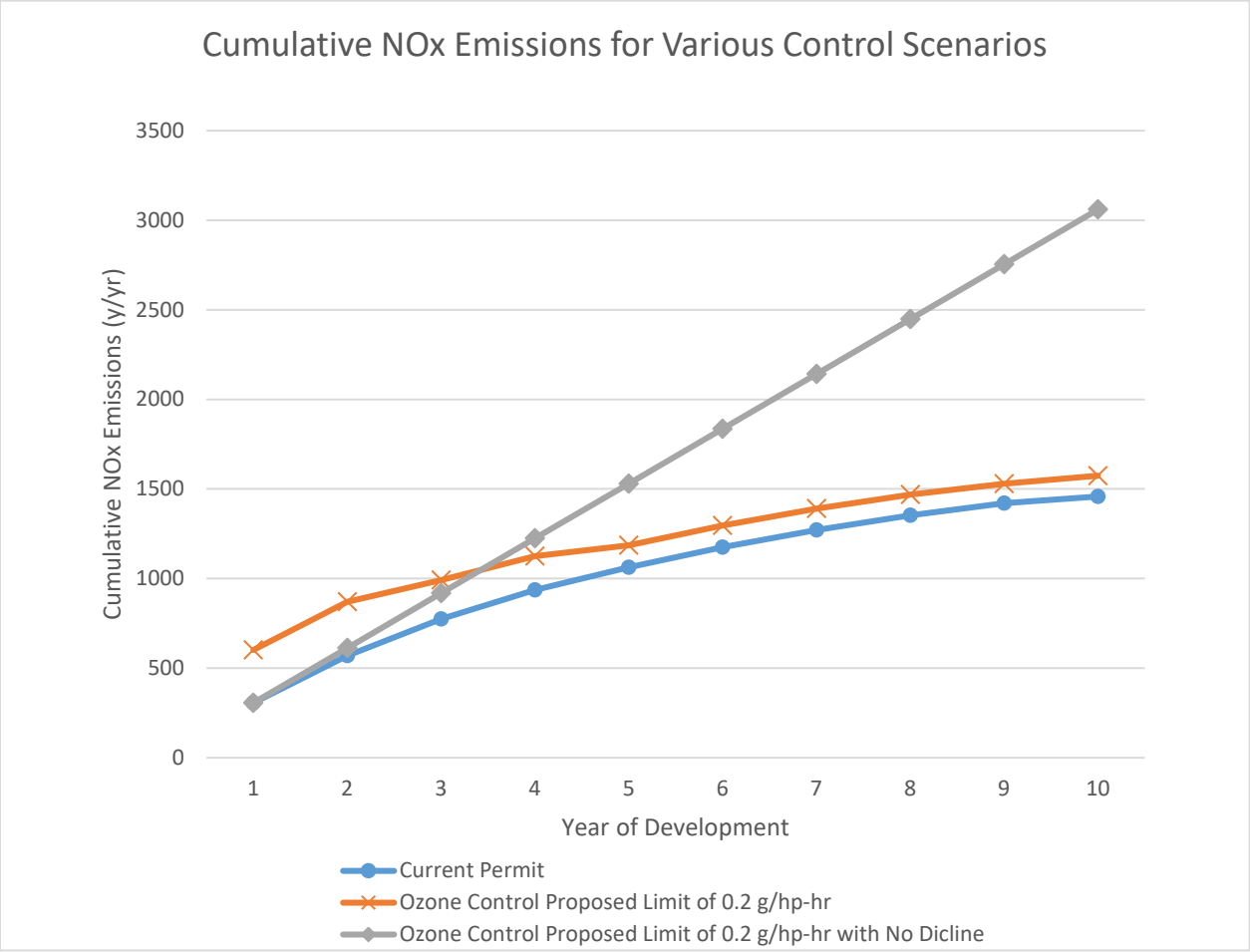
A more realistically achievable level of control using NSCR in conjunction with AFRC lies in the range of 90 percent-95 percent. For existing 4SRB engines to consistently meet a NOx emission level of 0.2 g/hp-hr, other significant equipment upgrades, in addition to an AFRC and/or NSCR installation, would need to be made. These engine upgrades were not accounted by NPCA. Engine upgrade kits may be used to replace several major components on an existing engine (e.g. pistons, heads, turbocharger, emission management system, flywheel etc.), and to work in conjunction with a traditional NSCR/AFRC system to further bolster the ability to achieve a 0.2 g/hp-hr NOx emission rate. 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.

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

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

We would encourage the NMED to review Spirit's analysis which was submitted to the CAQCC. Their report can be found at Exhibit 10.

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



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

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

Q. DID THE ANALYSIS PERFORMED BY NPS 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 NPS'S PROPOSAL?

A. No.

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

A. The suggested emission limits are not viable.[5,6,7]

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

A. No.

Q. PLEASE EXPLAIN.

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

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

A. The Board should reject this proposal.

V. DIRECT TESTIMONY OF JEREMY NICHOLS (WEG)

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

[5] 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.
[6] Solar Turbines Oil and Gas Sector - Ozone Precursor Pollutants Title 20 Chapter 2 Part 50.
[7] Testimony of John Smitherman, NMOGA.

A. Yes.

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

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

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

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

Q. DID THE TESTIMONY PROVIDED BY WEG 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 WEG'S PROPOSAL?

A. No.

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

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

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

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

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

The definition and determination of potential to emit is problematic for oil and gas production sites. The quantification from many NOx and VOC well sources is related to production rate. Until a well is completed, the actual production rate is unknown and hence emissions cannot be quantified. At the end of one year of production for wells in the San Juan Basin, production will be 85 percent of initial production and after 10 years production will be 10 percent of initial production. PTE is expressed as an emissions rate over an

annual period. Given the variation in production over time, emissions will also decrease over time and the initial determination of instantaneous PTE becomes irrelevant over time. Non-road engines are regulated by EPA through the application of control technology and do not require permits. The inclusion of drilling rig and fracking emissions in a PTE inventory is meaningless since these are temporary sources and the equipment is on site for a very limited amount of time (less than a year), are considered non road engines and have associated control limits under EPA regulations.

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

> Included as Wild Earth Guardians Exhibit 16 is a spreadsheet I prepared, based on air quality data reported by EPA at its AirData webpage, listing instances during which ozone concentrations in excess of 95 percent of the NAAQS have been recorded so far in 2021 at New Mexico monitoring sites. This exceedance data is sorted from highest 8-hour exceedance (0.089 parts per million, recorded in Dona Aña County on July 9, 2021) to the lowest (0.067 parts per million recorded at numerous monitoring sites in May, June, and July 2021) and it illustrates the severity of New Mexico's ozone problem and the likely consequences of inaction to curtail emissions. Of note:
> • The data shows that 34 ozone exceedances of the NAAQS have been recorded so far in New Mexico's oil and gas producing counties, including Eddy, Lea, Rio Arriba, San Juan, and Sandoval. In the attached spreadsheet, I highlight data recorded from monitors in these counties.
> • There have been 70 instances during which ozone concentrations have been higher than 95percent 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, NOx emissions were reported in the TSD as 232,766 tons per year and for the 2028 base case NOx emissions of 168,661 tons per year were computed. This is a reduction of 61,105 tons per year of NOx.

In 2014 VOC emissions were estimated to be 433,188 tons per year and were forecast to be 407,4088 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 NOx and VOC emissions contained in the 2028 base case inventory. The 2028 base case defines the “plan” required by the regulation. Adding additional oil and gas controls before reductions in the 2028 base case inventory will not result in improvement in ozone under the 95 percent threshold.

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

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

A. No.

Q. PLEASE EXPLAIN.

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

Q. WHAT IS YOUR RECOMMENDATION TO THE ENVIRONMENTAL IMPROVEMENT BOARD WITH RESPECT TO WEG'S PROPOSAL REGARDING 20.2.50.7 AND .12 NMAC?

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

V. DIRECT TESTIMONY OF TAMMY THOMPSON (EDF)

Q. HAVE YOU REVIEWED THE DIRECT TESTIMONY OF EDF WITNESS TAMMY THOMPSON?

A. Yes.

Q. HAVE YOU REVIEWED THE FINAL REPORT: HUMAN HEALTH RISK ASSESSMENT FOR OIL & GAS OPERATIONS IN COLORADO ("THE

COLORADO REPORT"), LISTED AS EXHIBIT II IN EDF'S NOTICE OF INTENT TO PRESENT DIRECT TESTIMONY?

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

This rulemaking is about controlling ozone and ozone precursors and not about potential human exposure from VOC compounds. VOC health risks are beyond the scope of this proceeding. If NMED believes that VOC emissions pose a significant health risk, NMED should conduct a study specifically tailored to New Mexico oil and gas operations along with stakeholder input. Depending on the results of such a study, rulemaking could follow. It is true that if VOC compounds are reduced, potential significant health risks would be reduced. The determination of VOC exposure from well operations based on a single paper is beyond the scope of this hearing.

Q. PLEASE SUMMARIZE EDF'S PROPOSALS AS THEY RELATE TO THE COLORADO REPORT.

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

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

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

First, the approach used to transform 3-minute emission rates to hourly emission rates using a log normal frequency distribution is not appropriate. The development of hourly

emission rates from a 3-minute average emission rate becomes an averaging time dispersion issue.

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

Q. DID THE TESTIMONY PROVIDED BY EDF 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 EDF'S PROPOSAL?

A. No.

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

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

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