STATE OF NEW MEXICO
BEFORE THE ENVIRONMENTAL IMPROVEMENT BOARD

IN THE MATTER OF:

PROPOSED NEW REGULATION,
20.2.50 NMAC – OIL AND GAS **No. EIB 21-27(R)**
SECTOR –OZONE PRECURSOR POLLUTANTS

DIRECT TESTIMONY OF DOUG N. BLEWITT, AIR QUALITY RESOURCE MANAGMENET ON BEHALF OF THE INDEPENDENT PETROLEUM ASSOCIATION OF NEW MEXICO

July 28, 2021

IPANM EXHIBIT 6

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

I. INTRODUCTION

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 DIRECT TESTIMONY?

A. The Independent Petroleum Association of New Mexico

Q. BY WHOM ARE YOU EMPLOYED AND WHAT IS YOUR POSITION?

A. I am a Certified Consulting Meteorologist (379). Since 1999, I have been employed by Air Quality Resource Management.

Q. PLEASE DESCRIBE YOUR PAST EMPLOYMENT HISTORY.

A. From 1980 to 1999, I was employed by Amoco/BP and provided in-house air quality expertise to all Amoco operating companies (refining, chemical, production, and minerals). In addition, during my time at Amoco/BP, I was instrumental in obtaining many PSD and minor source air permits, participated in air quality research programs and control technology evaluation.

In 1999, I was appointed by the Governor of Colorado to the Colorado Air Quality Control Commission, where I served as Technical Secretary. I served in that capacity until 2005.

Q. WHAT ARE YOUR RESPONSIBILITIES AS A CERTIFIED CONSULTING METEROLOGIST?

A. In general, I develop technical solutions for industry when it encounters challenging air quality and process safety problems. The items listed below are representative of typical projects that I have undertaken as a Certified Consulting Meteorologist:

- Advocacy support regarding EPA National Ambient Air Quality Standards which illustrated technical issues for the ozone NAAQS determinations from stratospheric intrusion in elevated terrain which could result in exceedance of the NAAQS for ozone
- As part of that analysis it was found that the down welling algorithms in regional models overstated downward mixing.
- Detailed analyses were developed and communicated that outlined technical deficiencies in the proposed NOx and SOx secondary standard or an urban visibility standard
- Co-authored peer review papers on background ozone.
- Developed a screening methodology concept for NO2 modeling that has been adopted by EPA
- Developed a hazard response system for accidental releases from Oil and Gas operations
- Directed a scientific field program for release of HF at the Nevada Test Site
    - Results aided in the development of air quality models for accidental releases at an actual facility
    - Directed a research program to assist in the design of HF mitigation systems for oil refineries and a chemical plant
- Conducted regional air quality analyses for Oil and Gas operation EISs utilizing photochemical modeling for AQRVs (deposition and visibility) and NAAQS including ozone.
- Submitted detailed technical comments on FLAG and Regional Haze Rule

- Participated in the development and implementation of the WRAP WestJump Project to build regional modeling databases for agencies and EIS analyses
- Provided air quality impact analyses for the BP Gulf of Mexico oil spill.
- Designed a WRAP field program for evaluating accuracy of NO2 modeling for drilling rigs
- Participated in the evaluation and understanding of Wyoming winter ozone phenomena
- Participated in air quality technical expert review panels
- Participated and helped direct the Four Corners Regional Air Quality Study

Q. PLEASE DESCRIBE YOUR EXPERIENCE WITH THE OZONE PRECURSOR POLLUTANTS OF THE OIL AND GAS SECTOR PROPOSED FOR REGULATION UNDER 20.2.50 NMAC.

A. I have been involved in western air quality since 1995, both from an air quality perspective (both modeling and monitoring), as well as the evaluation and implementation of controls for oil and gas sources. I helped develop the presumptive BACT approach by the state of Wyoming. That work included the developed of an approach for evaluating presumptive BACT for sources with variable emission rates, as a result of production decline.

I have also been involved in research to address the accuracy of the quantification of methane emissions using ambient monitoring and inverse modeling.

Q. PLEASE SUMMARIZE YOUR EDUCATIONAL EXPERIENCE.

A. In 1969, I obtained a Bachelor of Arts degree in chemistry and physics from Milton College. From 1969 to 1970, I completed graduate coursework in the Department of Water Chemistry at the University of Wisconsin. A copy of my resume is attached as **IPANM Exhibit 7.**

Q. HAVE YOU PREVIOUSLY TESTIFIED IN STATE OR FEDERAL REGULATORY PROCEEDINGS ON OZONE PRECURSOR POLLUTANTS?

A. I have testified in EPA Clean Air Scientific Advisory Committee (CASAC) hearings for NAAQS rule making revisions. I have testified and commented many times to EPA regarding air quality modeling scientific issues, methodology and policy issues.

II. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to provide IPANM's position on NMED's proposed scope of Part 50 in 20.2.50.2 NMAC.

III. IPANM'S EVALUATION OF NMED'S PROPOSED REGULATIONS

Q. PLEASE IDENTIFY THE REGULATIONS PROPOSED BY NMED THAT YOU ARE ADDRESSING IN THIS TESTIMONY.

A. I will be addressing the following section:

- 20.2.50.2 NMAC—Scope

Q. HAVE YOU REVIEWED NMED'S STATEMENT OF REASONS FOR THESE PROPOSED REGULATIONS, FILED AS ATTACHMENT 3 TO NMED'S ORIGINAL PETITION [PDF 37-48]?

A. Yes.

1. NMED'S PROPOSED REGULATIONS TO SCOPE SECTION (20.2.50.2 NMAC)

Q. PLEASE SUMMARIZE YOUR UNDERSTANDING OF NMED'S PROPOSAL OF 20.2.50.2 NMAC.

A. NMED's proposal applies to sources located within areas of the state under the Board's jurisdiction that, as of the effective date of the proposed rule or anytime thereafter, are

causing or contributing to ambient ozone concentrations that exceed ninety-five 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 department monitors as specified in the EPA ozone NAAQS. The rule further states that once a source becomes subject to the rule, the requirements of the rule are irrevocably effective, unless the source obtains a federally enforceable air permit limiting the potential to emit to below such applicability thresholds established in Part 50.

Q. WHAT IS YOUR POSITION ON NMED'S PROPOSAL OF 20.2.50.2 NMAC?

A. I believe it is premature to regulate NOx and VOC emissions from oil and gas facilities until NMED addresses the many technical issues and uncertainties associated with the modeling, baseline emission inventories associated with base case, and providing documentation regarding future year inventories that were used to predict future year impacts. Further, the way that the modeling was conducted, it is not possible to identify ozone benefits from NOx control compared to VOC controls. Combining results for NOx and VOC emissions precludes identification control benefits for NOx and VOCs resulting from non-linear ozone chemistry. If reductions in ozone are deemed necessary, control strategies should be developed on a regional basis (by county) to ensure that focused regional emissions will produce meaningful ozone reductions. Many of the ozone monitors have design values below the threshold level specified in the draft regulation and should be exempt from the installation of new controls.

Q. ARE YOU RECOMMENDING CHANGES TO NMED'S PROPOSAL?

A. Yes. Based on my analysis of (a) relative source contribution to monitored ozone impacts, (b) emission inventory uncertainties, and (c) proposed emission reductions for oil and gas

operations, IPANM generally opposes additional proposed oil and gas controls because they result in an insignificant improvement in ambient ozone concentrations.

Q. PLEASE EXPLAIN THE BASIS FOR THIS PROPOSED CHANGE.

A. My analysis of the impacts from NMED's proposed rules that are the subject of this hearing are included in my PowerPoint Presentation, **IPANM Exhibit 8.**

(a) Relative Source Contribution to Monitored Ozone Impacts

I computed the ozone design value for the following: (a) Bloomfield, Navajo Lake, and Sub-Station Monitors and determined the ozone-source contribution to San Juan Monitors; (b) Dona Ana Monitors (La Union, Sunland Park, Chaparral, Desert View, Santa Teresa, Solano), and (c) Carlsbad City Monitor.

I reviewed the NMED ozone monitoring data and modeling. The contribution to ozone design values from New Mexico sources: for: (a) Navajo Lake, Bloomfield, and the Substation is 5.6 ppb, 4.8 ppb and 6.4 ppb, respectively; (b) Dona Ana Monitors is 3.4 ppb, and; (c) Carlsbad City Monitor is 1.9 ppb. The remainder of ozone impacts derive from sources outside the State of New Mexico.

IPANM Exhibit 8, slide 7 contains a bar diagram of predicted ozone contributions that derive impacts from sources outside the borders of the State of New Mexico. For all monitors, New Mexico source impacts are a small fraction of total ozone. In fact, sources beyond New Mexico are responsible for the majority of ozone. The Desert View monitor reported the largest measured ozone design value. The largest predicted source category ozone impacts (0.9 ppb) are from electric generating unit emissions. The combined predicted total Oil and Gas ozone impacts are only 0.5 ppb. Reported Oil and Gas ozone contributions are from combined NOx and VOC emissions. Because of ozone formation

non-linear chemistry, Oil and Gas ozone impacts, and ozone impacts from NOx emissions, must be separated from VOC impacts.

As a result of this analysis, I have concluded that the majority of ozone detected within New Mexico is transported from sources located outside of the boundaries of the state. The State of New Mexico has no regulatory authority to regulate ozone reductions beyond its borders. New Mexico is not the only state facing this issue, as other states have similar ozone-compliance issues with the NAAQS. As control strategies for those areas and regions are developed, ozone transport into New Mexico will be reduced.

I have also used the modeling results to calculate current ozone design values and projected zone concentrations for future cases. The monitored ozone design values from the 2012 to 2016 period (period used in the Technical Support Document, "TSD") were compared to design values in the case for year 2028. The 2028 year case considered growth in emissions and future controls. A controlled 2028 case was developed with additional controls applied on Oil and Gas sources for both NOx and VOC emissions. The controlled 2028 case results indicate the design value, as well as the change in monitored and predicted ozone. The predicted Oil and Gas results combine both monitoring and modeling. This combination is appropriate considering the analyses conducted.

I computed and analyzed ozone concentrations for different emission scenarios at the San Juan ozone monitors. At the Navajo Lake monitor (dv=67 ppb), the 2028 future year base case predicted impacts are 64.8 ppb and a reduction of 2.2 ppb (no additional controls on Oil and Gas). If additional Oil and Gas controls are implemented, the 2028 design value is reduced to 63.3 ppb (a decrease of 1.5 ppb). Results indicate future case

compliance with the 70 ppb NAAQS and the 66.5 ppb safety factor threshold. Compliance is therefore demonstrated without the implementation of additional Oil and Gas controls.

I also examined the modeled and analyzed changes in ozone concentrations for different emission scenarios at the Dona Ana ozone monitors. At the Desert View monitor (dv=72 ppb), the 2028 future year base case predicted impacts are 67 ppb and a reduction of 5 ppb (no additional controls on Oil and Gas). If additional Oil and Gas controls are implemented, the 2028 design value is reduced to 66.7 ppb (a decrease of 0.3 ppb). These results demonstrate future case compliance with the 70 ppb NAAQS. Compliance with the 66.5 ppb safety factor threshold is demonstrated. The results indicate future case compliance with the 70 ppb NAAQS and the 66.5 ppb safety factor threshold. Most significantly, compliance is therefore demonstrated without the implementation of additional Oil and Gas controls. Implementing the Oil and Gas control strategy results in an insignificant improvement in ozone (decrease of 0.3 ppb).

From my study of ozone from the 2028 future year base case using the 2012-2016 data, I have concluded the following: (a) for the 2012-2016 timeframe, the only monitors that have a design value above the NAAQS are Desert View and Santa Teresa 72.0 and 71.3 ppb, respectively; (b) the Carlsbad monitors are the only monitors with design values above 66.5 ppb (95 % of the 70 ppb NAAQS); (c) for the 2028 base case, all modeled design values are below 66 ppb, which suggests that the 2028 base case ambient ozone levels are in compliance with the threshold of 95 % of the NAAQS, and (d) if different years are used for the design value, slightly different conclusions are found. According to the TSD, the use of the 2012-2016 baseline follows EPA guidance.

From my study of ozone from the 2028 future year base case using the 2012-2016 data, I have made the following conclusions. First, for the 2015-2019 timeframe, the Chaparral, Desert View, Santa Teresa, Carlsbad and Carlsbad Cavern monitors have a design value above the 70 ppb NAAQS. Second, for the 2015-2019 time frame, the Foot Hills (located in Albuquerque), La Union, Solano, and Navajo Lake monitors have a design value in excess of 66.5 ppb (95 % of the 70 ppb NAAQ) threshold.

Third, for the 2028 base case, all monitors are below the 70 ppb ozone NAAQS except Carlsbad. The 2028 control base case reduces the design value from 73.7 ppb to 71.2 ppb (reduction of 2.5 ppb). The implementation of the Oil and Gas control strategy (NOx and VOC combined) reduces the design value to 70.9 ppb (a reduction of 0.3 ppb). The modeling demonstrates that the Oil and Gas control strategy is ineffective in reducing ozone at this monitor.

Fourth and finally, for the 2028 base case, only the Desert View and Santa Teresa monitors have concentrations above 66.5 ppb (95% of the 70 ppb NAAQS). The implementation of the Oil and Gas control strategy (NOx and VOC combined) reduces the design value by a maximum of 0.2 ppb. Thus, it follows that controls on Oil and Gas sources is a largely inefficient method and means of reducing ozone at this critical monitor.

(b) Emission Inventory Uncertainties

The NMED TSD does not contain data regarding the derivation of the base case emission inventory, and results in insufficient data to verify the base case modeling. The 2028 future year base case provides no documentation for emission calculations, emission growth (by source category), as well as assumptions regarding emission reductions that

will be implemented as a result of new control requirements that are required by the proposed promulgated regulation or other programs, including regional haze.

Growth assumptions for Oil and Gas sources are critical because growth for many sources is contingent on production levels, as well as rate of drilling for new wells. A review of the Mancos Farmington Mancos Gallup Draft Resource Management Plan Amendment and Environmental Impact Statement identified numerous issues with the Mancos modeling inventories. The Mancos analysis is directly related to the New Mexico O3 Attainment Initiative Photochemical Modeling Study.

Electric generating units ("EGU") represent a large power-plant emission source in New Mexico, and large EGU sources exist beyond NM borders that impact New Mexico ozone levels. The TSD developed provides limited documentation on EGU sources included in the inventory, as well as information supporting the 2028 emission reductions. The Technical Support Document presents the following NOx emission data for EGUs: (a) EGU 2014 base case NOx emissions 43,071 t/yr; (b) EGU 2028 future year case NOx emissions 13,389 t/yr; (c) Difference -29,682 t/yr; (d) EGU 2014 EIA NOx emissions are listed as 60,158 t/yr; (e) difference between NOx modeling and EIA inventories is approximately 17,000 t/yr; (f) no documentation is provided regarding how the 2014 EGU modeling inventory was developed and why it is vastly different than the 2014 EIA inventory, and (g) several EGU facilities have announced closure of coal-fired plants and the only statement made in the TSD is that Units 4 and 5 will continue to operate at the Four Corners Power Plant in 2028.

For Oil and Gas emission inventories, documentation is lacking on the underlying assumptions used to formulate Oil and Gas emissions for the 2014 base, 2028 growth, and

2028 Oil and Gas control cases. For NOx emissions, there is approximately a 34 % increase in emissions between the 2014 base case and the 2028 growth case, while, for VOCs, the difference between the 2014 base case and the 2028 growth base case indicates a 42% decrease. It does not seem reasonable that there is substantial growth in NOx sources while there is a simultaneous reduction in VOC emissions from the same sources. Assumptions used in developing the NOx and VOC inventories do not appear to be consistent. The production decline will result in emission reductions for some NOx and VOC emissions.

All production from Oil and Gas wells will exponentially decrease over time. Production decline is offset by drilling new wells, which slows the rate of overall decline. As well production declines, some Oil and Gas emissions from selected sources will be reduced (e.g., compressors (NOx), dehydrators (NOx and VOCs) and tanks (VOCs). The reduction in emissions from decline occurs for both NOx and VOCs. In most Oil and Gas inventories for existing wells, decline is not accounted for. Typically, in future year inventories, new well emissions at initial production are added to existing wells at initial production and result in substantially overstating actual emissions. The lack of documentation regarding Oil and Gas inventories prevents confirmation of values used in the modeling.

As an example of production decline, new wells are drilled in a basin to replace declining production in existing wells. Emissions from sources which are dependent on production rate will be reduced as production declines (compressors, dehydrators, tank emissions, liquid unloading etc.). *See* IPANM Exhibit 8, slide 21. In addition, IPANM Exhibit 8, slide 22 shows examples of changes over time in well head equipment and emissions. IPANM Exhibit 8, slide 23 highlights the importance of decline in wellhead

compressor emissions. The example is based on the high rate of development case from Mancos RMP over a 10-year drilling program, which indicates a 500 t/yr reduction in projected emissions over a ten year period.

For the changes in NOx emissions in the Mancos maximum development case, the total reduction in NOx over a non-decline case shows gas reductions in gas and oil and for 1,075 t/yr and 1,447 t/ty. Table 2-10 on IPANM Exhibit 8, slide 25 shows the changes in Mancos VOC emissions for Maximum Development Case by incorporating decline. Figure 2.8 on IPANM Exhibit 8, slide 26 charts the comparison of VOC flashing emissions from draft and actual well design being implemented in Mancos for BLM wells. Figure 2.9 on IPANM Exhibit 8, slide 27 plots produced VOC emissions from BLM wells with and without production decline.

(c) Proposed Emission Reductions for Oil and Gas

Under the procedure for heaters, the San Juan basin application of the proposed rule to existing sources for heaters would affect only five sources and reduce NOx emissions by 19 t/yr. Retrofitting heaters for NOx controls in the San Juan basin will have an insignificant effect on local ozone concentrations. Furthermore, the installation of low NOx burners for a 10 MMBtu/hr heater will result in the following: (a) Assume 50% control; (b) 30 ppm emission standard based on CARB BACT, and; (c) for new 10 MMBtu/hr heaters, the proposed regulation using low NOx burners at 100% load would reduce emissions from 4.4 t/yr to 2.2 t/yr.

First, in my summary of emission reductions and control cost effectiveness for a new 10 MMBtu/hr heating under the proposed regulations, the application of NOx controls for heaters with a threshold of 10 MMBtu/hr is not cost effective (90 % load control costs

are estimated to be $9,185/ton). Second, actual load may be closer to 50% and control costs are approaching $16,533/ton. Third, the emission standard of 30 ppm is based on CA BACT analysis (equivalent to LAER in the rest of US). Fourth, it is recommended that NMED consider a capacity threshold of 50 MMBtu/hr. Fifth and finally, the use of the CARB cost effective control based on CARB BACT (LAER other portions of US) at $2,200/ton is a reasonable cost effective threshold. However, NMED should consider establishing an emission threshold resulting in a reduction in ozone. A reduction of 19 t/yr on heaters in the San Juan basin is not a meaningful NOx reduction to reduce ozone.

In comparing ozone reductions from NOx and VOC controls, controls for NOx and VOCs do not have the same effect on reducing ozone concentrations. Typically, a reduction in NOx emissions will be more effective than a reduction in VOC emissions (most areas are NOx limited). The ozone analysis combines NOx and VOC emission reductions for Oil and Gas; consequently, it is not possible to determine the effectiveness of VOC control in a NOx limited region. The NOx and VOC source impacts must be separated to evaluate the effectiveness of NOx versus VOC controls. The modeling displayed on Exhibit B-32 indicates that ozone formation is dominated by NOx emissions (NOx limited), which means that NOx controls are more efficient in controlling ozone concentrations, as opposed to VOC controls.

Thus, I conclude that monitoring and modeling analyses presented in the TSD do not support the need for additional controls on Oil and Gas sources. The emission inventories used in the modeling lack documentation for verification. The emission inventories for Oil and Gas do not include production decline, and likely overstate actual emissions (this will likely affect cost effective control evaluations). The modeling strongly

indicates that ozone formation is NOx limited; however, the modeling cannot separate the effectiveness of NOx versus VOC controls.

IV. CONCLUSION

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.