

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

IN THE MATTER OF:

PROPOSED NEW REGULATION

20.2.50

No. EIB 21-27 (R)

Oil and Gas Sector – Ozone Precursor Pollutants

REBUTTAL TESTIMONY OF DENNIS MCNALLY

Q. PLEASE STATE YOUR NAME FOR THE RECORD.

A. Dennis McNally.

Q. ARE YOUR QUALIFICATIONS PROVIDED IN YOUR DIRECT TESTIMONY IN THIS MATTER?

A. Yes.

Q. IN WILD EARTH GUARDIANS EXHIBIT 4, WILD EARTH GUARDIANS PRESENTED AN EXHIBIT ABOUT THE INAPPROPRIATENESS OF “SYSTEMWIDE APPROACHES” UNDER COLORADO REGULATIONS 3 AND 7. DO YOU SHARE ANY SIMILAR CONCERNS FOR NEW MEXICO OR DOES NEW MEXICO HAVE ADEQUATE PROVISIONS TO ADDRESS CONCERNS FROM A SOURCE?

Wild Earth Guardians has included as Exhibit 4 their comments to the Colorado Air Quality Commission (CAQC) on Regulations Numbers 3 and 7. In Mr. Nicholl’s Direct Technical Testimony (Exhibit 3) the CAQC comments are referenced as “Exhibit 4 is an example of recent written testimony that Guardians, along with other organizations, presented to the Colorado Air Quality Control Commission on issues related to the regulation of air pollution from the oil and gas sector”. It is not clear if Wild Earth Guardians intends these comments to apply to this rule, or as an example of their qualifications to comment on this rule.

One of the comments relates to systemwide tank limits versus tank specific emission limits. The comment states: “With the systemwide approach, operators are free to pick and choose which tanks to control—or not control—even though operation of certain tanks may interfere with applicable requirements of the Clean Air Act or cause or contribute to exceedances of the NAAQS. The systemwide approach could allow the most polluting tanks to remain uncontrolled, potentially jeopardizing attainment of the ozone NAAQS in the Denver Metro/North Front Range nonattainment area or otherwise interfering with other Clean Air Act requirements”. This is not an accurate statement for tanks in New Mexico.

1 First, the proposed NMED tank provisions apply to each tank or group of tanks. Neither NMED
2 nor industry has proposed a “systemwide” approach to tanks.

3
4 Second, to the extent that Wild Earth Guardians submits this comment as possible opposition to
5 either an Alternative Compliance Plan for engines and turbines or the phase down of pneumatics,
6 the comment is inappropriate because the New Mexico and federal regulatory programs provide
7 adequate safeguards to prevent a NAAQS exceedance from this cause.

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9 The US EPA has prepared guidance for performing screening analyses of single sources of ozone
10 precursor emissions. EPA released the “Guidance on the Development of Modeled Emission
11 Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and PM_{2.5} under the
12 PSD Permitting Program”¹ to provide a detailed framework for permit applicants to estimate
13 single source impacts on secondary pollutants under the first tier (or Tier 1) approach put forth in
14 the 2017 final revisions to the EPA's Guideline on Air Quality Models². For Tier 1 assessments,
15 it is generally expected that PSD permit applicants would use existing empirical relationships
16 between precursors and secondary impacts (e.g., O₃ and PM_{2.5}). EPA has generated empirical
17 relationships between single sources and ozone impacts for hundreds of hypothetical sources that
18 vary in stack height, emission rate, and geographic location. The EPA modeling included a
19 number of sites in New Mexico, West Texas and Southern Colorado.

20
21 Table 4-1 of the MERPS Guidance present the lowest, median and highest NOx and VOC
22 emission rates that equal the EPA ozone Significant Impact Level (SIL). The lowest emission
23 level in the Southwest or Rockies/Plains climate zone for 8-hr ozone is 218 tons/year for NOx
24 and 1,067 tons/year for VOC.

25
26 For NOx, New Mexico requires an air quality permit for any source “which has a potential
27 emission rate greater than 10 pounds per hour or 25 tons per year of any regulated air
28 contaminant for which there is a National or New Mexico Ambient Air Quality Standard.”
29 20.2.72.200.A.(1) NMAC. Modifications are covered if the source exceeds the same threshold.
30 20.2.72.200.A.(2). New Mexico’s exemptions for reconfiguring sources only allows such
31 reconfigurations (without a permit) when the change “does not increase air emissions or the
32 ambient impacts of such emissions.” 20.2.72.202.B.(4). Part 72 provides that the NMED “shall
33 deny any application for a permit or permit revision if considering emissions after controls” if
34 “the construction, modification, or permit revision will cause or contribute to air contaminant
35 levels in excess of any National Ambient Air Quality Standard or New Mexico Ambient Air
36 Quality Standard....” 20.2.72.208.D. NMAC. As a result, any action involving an engine and
37 turbine alternative compliance plan would trigger a permit to review for NOx impacts at any
38 affected facility at 25 tons/year, a little more than 10% of the modeled impact rate.

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40 For VOC, New Mexico requires a Prevention of Significant Deterioration (“PSD”) permit for
41 any source which emits 250 tons/year of any regulated pollutant, including VOC. 20.2.74.7.AG
42 & 20.2.74.200.A NMAC. A PSD permit also requires protection of the NAAQS. 20.2.74.303.B
43 NMAC. As a result, any action involving an engine and turbine alternative compliance plan or

¹ https://www.epa.gov/sites/default/files/2020-09/documents/epa-454_r-19-003.pdf

² https://www.epa.gov/sites/default/files/2020-09/documents/appw_17.pdf

the pneumatics phase down would trigger a permit to review for FOV impacts at any affected facility at 250 tons/year, approximately one quarter of the modeled impact rate.

Finally, as an added measure of protection, in permitting NMED will group associated facilities in close proximity together to ensure that the group will not cause or contribute to a NAAQS exceedance. Based upon the reductions required by proposed Part 50 and the protections in the existing permitting programs, there is no material risk that the proposed rule or NMOGA alterations under consideration would cause a NAAQS violation.

Q. IN NMED EXHIBIT 106, MR. RALPH MORRIS MADE SOME PROJECTIONS FOR 2023 OZONE LEVELS BASED ON DATA FROM 2015-2017. ARE THOSE PROJECTIONS BASED ON THIS MODEL APPROPRIATE UNDER APPLICABLE GUIDANCE? WHY OR WHY NOT?

NMED presents as Exhibit 106 the Direct Testimony of Ralph Morris. Mr. Morris provided testimony on the ozone modeling that was performed to examine the ozone impacts of this rule. In Section X (NMED Exhibit 103 0046) of his testimony Mr. Morris presents 2023 ozone projections based on ozone observations from 2015-2019 which is counter to EPA modeling guidance and potentially misleading.

The EPA “Modeling Guidance for Demonstrating Air Quality Goals for Ozone, PM_{2.5}, and Regional Haze”³ (NMOGA Exhibit 2) lays out an approach where future ozone projections are based on observed ozone concentrations scaled by the base and future year ozone modeled concentrations. This approach is used since the model results can have both low or high concentration biases and using the model results in this relative sense accounts for the bias.

Section 4.1.1 of the EPA guidance presents the approach to developing the observed ozone concentrations. The guidance states: “For the modeled attainment tests for ozone and PM_{2.5}, we recommend using the average of the three design value periods, which include the base emissions inventory year. This average is expected to best represent the air quality resulting from base year emissions with consideration of meteorological and emissions variability.” Since the NMED model has a base year of 2014, the design values in the analysis should be from 2012-2016.

The ozone standard is based on the three-year average of the fourth highest ozone observation. The 2012-2016 average is the average of three, three-year averages. The average is illustrated in Table A, the shaded cells are the individual years that are included in each of the three-year averages. As is shown on the last row, 2014 is included three times. This is desirable since the meteorology that is used in the modeling is for 2014. This approach is followed in the majority of the NMED air impact analyses.

Table A: Years included in the 2012-2016 base design value.

	Year				
	2012	2013	2014	2015	2016

³ https://www3.epa.gov/ttn/scram/guidance/guide/O3-PM-RH-Modeling_Guidance-2018.pdf

2012-2014					
2013-2015					
2014-2016					
Years in Average	1	2	3	2	1

However, Section X of his testimony Mr. Morris presents 2023 ozone projections based on ozone observations from 2015-2019. This analysis never includes 2014, the year for which the meteorology was developed and the model was evaluated. If NMED wanted to use the 2015-2019 observations, they should have developed a 2017 base year modeling platform, instead of using the 2014 base year. It is inappropriate and potentially misleading to include this “alternative” ozone projection.

Q. IN EXHIBIT 106, MR. MORRIS TESTIFIED ABOUT THE EPISODE MAXIMUM DAILY MAXIMUM 8-HOUR AVERAGE CONCENTRATION, THE SO-CALLED MDA8. DOES THIS VALUE PROVIDE ANY MEANINGFUL INFORMATION?

NMED presents as Exhibit 106 the Direct Testimony of Ralph Morris. Mr. Morris provided testimony on the ozone modeling that was performed to examine the ozone impacts of this rule. In Section XI (NMED Exhibit 103 0049) Mr. Morris presents the CAMx 2028 Source Sector Ozone Source Apportionment Modeling. In Figure 19 he presents episode maximum MDA8 ozone contribution due to emissions from the New Mexico oil and gas emissions source sectors. This is an inappropriate and potentially misleading use of the modeling results.

Firstly, The EPA “Modeling Guidance for Demonstrating Air Quality Goals for Ozone, PM2.5, and Regional Haze”⁴ lays out an approach where future ozone projections are based on observed ozone concentrations scaled by the base and future year ozone modeled concentrations. This approach is used since the model results can have both low or high concentration biases and using the model results in this relative sense accounts for the bias. Looking at the episode maximum MDA8 contributions is using the modeling in an absolute sense, so is counter to this guidance.

Additionally, this analysis does not take into account the model estimated ozone levels. It is possible that the maximum source contribution could be occurring on a relatively low ozone day, which has lower regulatory or public health significance. It is inappropriate and potentially misleading to present the modeling results in this manner.

Q. DO YOU AGREE WITH HOW MR. MORRIS PRESENTED THE VOC AND NOX SENSITIVITY DATA IN FIGURES 20-22 OR DO YOU FIND THEM POTENTIALLY CONFUSING OR MISLEADING FOR A REVIEWER?

NMED presents as Exhibit 106 the Direct Testimony of Ralph Morris. Mr. Morris provided testimony on the ozone modeling that was performed to examine the ozone impacts of this rule.

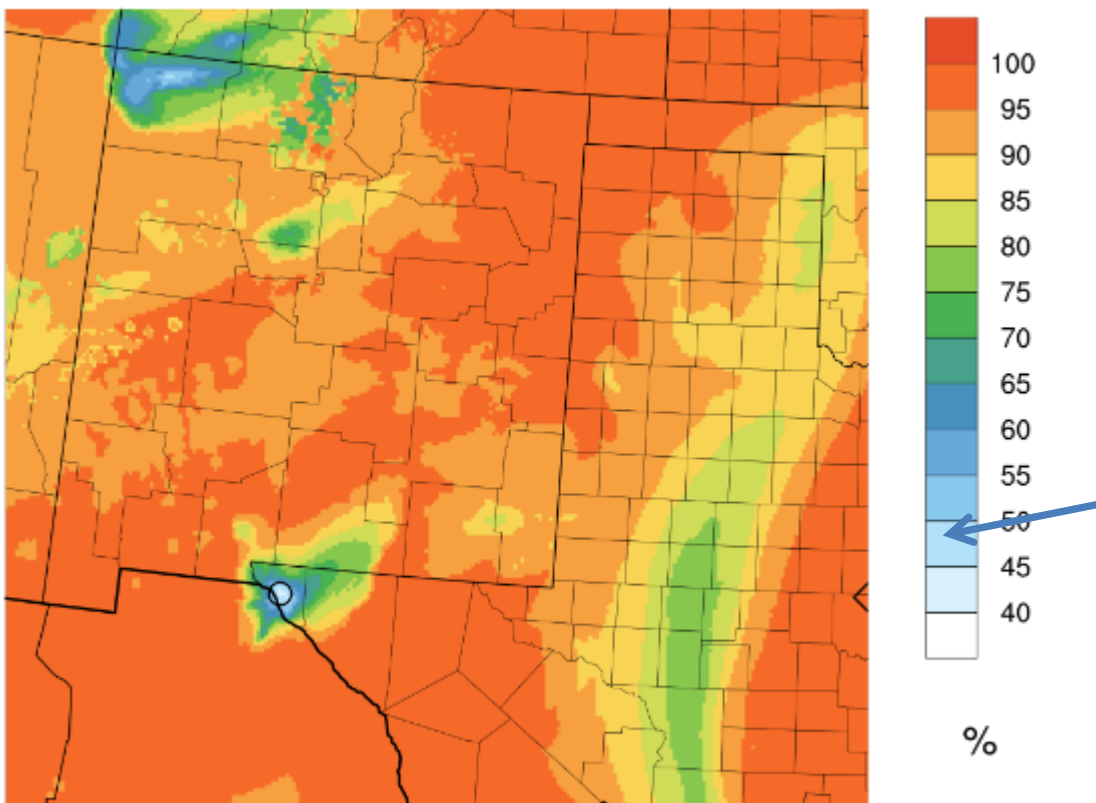
⁴ https://www3.epa.gov/ttn/scram/guidance/guide/O3-PM-RH-Modeling_Guidance-2018.pdf

In Section XII (NMED Exhibit 103 0057), Mr. Morris presents the CAMx 2028 VOC/NO_x sensitive ozone source apportionment modeling results. This analysis is useful for determining areas where more ozone formation is favored by NO_x or VOC emissions. The percent NO_x sensitive graphics presented in the right side of Figures 20-22 are potentially misleading.

In these figures the color scale is chosen to emphasize the degree of NO_x sensitivity, not whether the region is more NO_x or VOC sensitive. For this metric any value of 50 or greater is more NO_x than VOC sensitive, but the color scale is chosen so that only the white regions and the two lightest blue regions are more VOC than NO_x sensitivity. Without careful consideration of the color scale, it would be very easy to interpret the warmer half of the color scale (green through red) as more NO_x sensitive and the cooler colors (blues-white) as more VOC sensitive. The results show that the vast majority of the state is NO_x sensitive meaning that VOC controls will have small ozone air quality improvement.

Figure 20 (b) is reproduced below, the arrow shows the color scale where the region becomes more VOC than NO_x emissions sensitive. Only a small area in Texas and possibly in San Juan County are more VOC emission sensitive than NO_x sensitive.

Percent NO_x-limited Ozone formation 4km
2028cntl_osat_all_emis 20140605



◇ max(243, 60) = 98.3%
○ min(78, 61) = 43.9 %

Unfortunately with the limited information presented it is not readily possible to adjust the color scale to address this issue.

Q IN YOUR OPINION, DOES NMED ADEQUATELY JUSTIFY THE INCLUSION OF RIO ARriba AND CHAVES COUNTIES?

NMED Exhibit 1 presents the Direct Testimony of Michael Baca. In Section IV (NMED Exhibit 1 – 0005) Mr. Baca makes the statement: “Additionally, oil and gas sources located in Rio Arriba and Chaves Counties contribute to elevated ozone concentrations in the San Juan and Permian Basins, respectively.” I do not believe that NMED has justified the inclusion of Rio Arriba and Chaves Counties in this rule.

Based on the most recent finalized ozone observations, the 2018-2020 observed ozone design value for Rio Arriba County is 0.065 ppm⁵. This regulation is to apply to counties in excess of 95% of the ozone standard (in excess of 0.066 ppm for the 2015 0.070 ppm standard). Since Rio Arriba County is not in excess of 95% of the standard, and is modeled in the NMED analysis to remain below the 95% threshold in 2028, the county should not be included in this rule. Chaves County does not have an ozone monitor and hence does not have an EPA-recognized design value.

NMED justifies inclusion of these counties based on the contribution of oil and gas emissions. There is no technical justification for this statement. Before making this assertion, NMED should have performed an analysis on the county specific oil and gas emissions contributions.

Any source of precursor emissions contributes some ozone formation, although that contribution could be vanishingly small. The NMED should have done CAMx modeling to determine if the contribution is high enough to justify their inclusion in the rule.

Q. DO YOU HAVE ANY CONCERNS ABOUT HOW MR. BACA, IN NMED EXHIBIT 1, PORTRAYS THE IMPACT OF THE PROPOSED PART 50 RULE? PLEASE EXPLAIN.

NMED Exhibit 1, Direct Testimony of Michael Baca, makes reference to NMED Exhibit 4, Ozone Advance Path Forward. Table 3 (NMED Exhibit 4 – 0010) presents the differences in design values by site in Ozone Advance counties throughout New Mexico. The accompanying text states “The photochemical modeling shows a total of 60.3 ppb of ozone reduced in the Ozone Advance counties as a result of the Proposed Ozone Rule.” This statement has two significant faults.

First, it appears that this 60.3 ppb value was calculated by summing the impact at each station. This is not an appropriate analysis since it is dependent on the number of stations in the analysis. If a monitor composite metric is desired, it would be better to perhaps take an average of the station values. Presenting the sum is meaningless and potentially misleading by overstating the impact.

⁵ https://www.epa.gov/sites/default/files/2021-05/o3_designvalues_2018_2020_final_05_11_21.xlsx

Second, the stated impacts are *not* the impact of the rule, they are the changes in ozone concentration between the 2012-2016 observations and the projected 2028 base case concentrations (See NMED Exhibit 106 – 0034). This future year ozone simulation did not include the NMED estimates of the emissions changes from this rule. This change in ozone concentration is the result of emission changes from other state and federal rules. Stating that these emission differences are from the rule is incorrect. The NMED modeled impacts from the rule are much smaller.

The description of Table 3 in the NMED Ozone Advance Path Forward document is incorrect and should be updated.

Q. THE NATIONAL PARK SERVICE USED “ETHANE” AS A SURROGATE FOR OIL AND GAS VOLATILE ORGANIC COMPOUNDS. IS THAT APPROPRIATE? WHY OR WHY NOT?

The National Park Service presents the results of a series of air quality observation studies. In their testimony they present ethane concentrations as a surrogate for VOC concentrations. This is potentially misleading.

Since 1977 EPA has excluded the regulation of ethane emissions by including it on a list of “negligibly reactive” 40 C.F.R. § 51.100(s)(1) compounds. I agree that examination of ethane concentration is useful for attributing sources of VOC emissions (i.e. oil and gas, motor vehicles, biogenic, etc). However the National Park Service testimony uses ethane concentrations as a surrogate for the VOC concentrations which affect ozone formation. This substitution is potentially misleading. The National Park Service should also present total VOC concentrations since that metric is more relevant for ozone formation.

Q. DR. MCCABE URGES NMED TO REQUIRE A PARTICULAR INCREASE IN THE PERCENTAGE OF ZERO-EMISSIONS CONTROLLERS, AS OPPOSED TO REQUIRING THAT OPERATORS ACHIEVE A PARTICULAR PERCENTAGE. DR. MCCABE ALSO REQUESTS THAT THESE REDUCTIONS BE ACHIEVED ON A MORE ACCELERATED SCHEDULE. HAVE YOU REVIEWED THIS PROPOSAL?

Yes, I have reviewed this proposal.

Q. IN THE SUPPORT OF THIS PROPOSAL, DR. MCCABE TESTIFIES THAT “EACH ADDITIONAL YEAR OF DELAY MEANS THOUSANDS OF ADDITIONAL TONS OF VOCS AND TENS OF THOUSANDS OF ADDITIONAL TONS OF METHANE WILL BE EMITTED.” ASSUMING FOR THE SAKE OF YOUR RESPONSE THAT THIS IS TRUE, BASED ON YOUR UNDERSTANDING OF THE MODELING COMMISSIONED BY NMED, WOULD ACHIEVING VOC REDUCTIONS CONSISTENT WITH DR. MCCABE’S PROPOSAL HAVE A MEANINGFUL IMPACT ON OZONE CONCENTRATIONS?

As stated in the question, I have no basis for judging the accuracy of Dr. McCabe’s “thousands of additional tons of VOCs” statement, nor is it possible to quantify the ozone impact of such a broad statement. However, as I outline in my testimony, I was able to use the NMED modeling

to examine the ozone formed from NM oil and gas VOC emissions after the rule emission controls were applied. The monitor specific impact of 105,172 tpy of VOC emissions is shown in Table B. At the Coyote Ranger District monitor in Northern NM the contribution of NM oil and gas VOC emissions is 0.1 ppb, at the other monitors the VOC contribution is 0.3 to 0.5 ppb (0.4 to 0.0.7 percent of the standard). In Central NM the NM oil and gas VOC emissions contribute over 0.1 ppb (0.1% of the standard) at two monitors, less than 0.1 ppb at 5 monitors, with a peak of 0.1 ppb at the Santa Fe Airport. In Southern NM the NM oil and gas VOC emissions contribute 0.1 ppb at 4 monitors, and less than 0.1 ppb at the other 7 monitors.

Controls on oil and gas VOC emissions are not an effective means of controlling ambient ozone levels in New Mexico, except for possibly in a very limited area in northeastern San Juan County. I am presuming the “thousands of additional tons” is including many years of emissions, so the annual emissions would be much smaller. The earlier imposition of VOC controls would have little impact on ozone levels in NM.

Table B: New Mexico oil and gas VOC emissions contributions after the proposed emission reductions at regulatory monitors in NM.

Ozone Monitor ID	Station Name	County	NM O&G VOC Contrib. PPB
Northern New Mexico			
350390026	Coyote Ranger District	Rio Arriba	0.1
350450009	Bloomfield	San Juan	0.3
350450018	Navajo Lake	San Juan	0.5
350451005	Substation	San Juan	0.5
Central New Mexico			
350010023	Del Norte HS	Bernalillo	0.0
350010024	South East Heights	Bernalillo	0.0
350010029	South Valley	Bernalillo	0.0
350010032	Westside	Bernalillo	0.1
350011012	Foothills	Bernalillo	0.0
350431001	Bernalillo (E Avenida)	Sandoval	0.0
350490021	Santa Fe Airport	Santa Fe	0.1
Southern New Mexico			
350130008	La Union	Dona Ana	0.0
350130017	Sunland Park City Yard	Dona Ana	0.0
350130020	Chaparral	Dona Ana	0.0

Ozone Monitor ID	Station Name	County	NM O&G VOC Contrib.
			PPB
350130021	Desert View	Dona Ana	0.1
350130022	Santa Teresa	Dona Ana	0.1
350130023	Solano	Dona Ana	0.0
350151005	Carlsbad	Eddy	0.1
350171003	Chino Copper Smelter	Grant	0.0
350250008	Hobbs Jefferson	Lea	0.0
350290003	Deming Airport	Luna	0.0
350610008	Los Lunas (Los Lentes)	Valencia	0.1

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By: /s/ Dennis McNally
Dennis McNally