

NED LEIBA
305 North El Dorado Street
Stockton, California 95202
(209) 948-9119

January 18, 2019

California Air Resources Board
1001 I Street
Sacramento, California, 95814
via email: <http://www.arb.ca.gov/lispub/comm/bclist.php>

RE: 2018 PM2.5 State Implementation Plan
San Joaquin Valley (the Valley)

Dear Board:

Your Board will consider the 2018 PM2.5 State Implementation Plan for the San Joaquin Valley (the Plan) at your meeting scheduled for January 24. I urge the Board to include the following two elements of the final Plan.

Recommendation 1:

As part of the implementation plan, there should be an updated scientific evaluation of the health risks and costs from exposure to ambient PM2.5 in the San Joaquin Valley. There has been a dramatic decrease in exposure to PM2.5 over the last twenty years. Accordingly, there should be proper studies that show the health effects, costs and benefits of the control programs implemented over the last twenty years and the likely benefits and costs of programs to further reduce ambient PM2.5 in the Valley.

Recommendation 2:

The San Joaquin Valley Air Pollution Control District (SJVAPCD or the District) and Board should implement the incentive elements of the PM2.5 Plan, but delay implementation of the enhanced regulatory measures pending the results of further studies.

The development and submission of the Plan will not be significantly delayed by incorporating these important recommendations. I explain my recommendations in more detail below. References and quotes are to the District's plan document unless otherwise noted.

RECOMMENDATION 1:
UPDATE SCIENTIFIC STUDIES.

The District and the Board have achieved remarkable success since implementing air quality rules in 1992. The District alone has adopted 650 rules as part of its "aggressive control strategy" to reduce emissions in the Valley.

The District has been able to achieve a significant reduction in PM2.5 and other emissions by implementation of "the nation's toughest air pollution emission controls...."

Emissions from stationary sources have been reduced by 85%, cancer risk from exposure to air pollutants has been reduced by 95%, population exposure to elevated PM2.5 levels have been reduced by 85%, and population exposure to elevated ozone levels have been reduced by 90%. (page 1-1)

Emissions are at historic lows and the number of good air quality days are at historic highs through out the Valley. In my home city, Stockton, the air quality index (AQI) days in 2017 were 72% good days, 23% moderate days and only 5% unhealthy days for sensitive groups. (Page A-53).

There has been so much progress, it will be difficult and costly to reduce PM2.5 much further from the existing levels of about 18 micrograms per cubic meter, down to the federal 2012 standard of 12 micrograms.

Given the significant emissions reductions already achieved through stationary and area source regulatory strategies and the significant investment necessary to achieve emissions reductions, the Valley is at the point of diminishing returns from new regulatory controls on stationary and area sources. (Page C-5)

Because of the dramatic improvement in emissions, air quality, and the substantial costs of moving to compliance with the 12 µg federal standards, we need to very carefully understand through proper research the actual change in health outcomes as a result of this significant improvement in air quality, and assess the costs and benefits looking at the past as a basis for evaluating future costs and benefits.

Letter to California Air Resources Board
January 18, 2019
Page 3

The remarkable successes of the past came at a cost of perhaps \$2 billion in direct subsidies and partner matching costs. I do not see where there has been an estimate of the cost of compliance borne by other Valley residents, businesses, and governmental agencies. In the future, the incentive program cost to achieve perhaps another 6 µg improvement in ambient PM2.5 levels could reach \$5 billion. We should have estimates of the economic burdens to be faced by individual Valley businesses, farms, and other parties beyond the \$5 billion in incentives.

The change in health outcomes cannot just be assumed or inferred by the use of "surrogates" as seems to be the case in most of the studies included in Plan Chapter 3 Health Impacts. The District has the resources to undertake cogent studies of actual health outcomes, especially mortality, and the costs and benefits of the major, individual programs implemented over the period from 1992 through 2018.

The District explains that it "tracks and sponsors health and PM2.5 research" in original studies. The District has stated that the Plan was "based on strong scientific foundation and extensive air quality modeling." It relied on studies sponsored by its San Joaquin Valley Study Agency Research. The research had a cost of \$60 million and it was aimed at developing methods to identify the "most efficient and cost-effective control strategies." The District should use its research funds to undertake the studies urged in the recommendation.

The design of such studies is very important. Let me offer some of my observations about the goals and design of District sponsored studies.

In 2012 the EPA regional administrator stated:

Four times more people die in the San Joaquin Valley from air pollution than they do from traffic fatalities. (See attached letter and email.)

These deaths were attributable to PM2.5. As you can see from my 2012 correspondence with the EPA and my email with the recently retired executive director of the District Seyed Sadredin, the EPA did not seem to have cogent epidemiological studies at hand to support their mortality claims. Mr. Sadredin stated that he

did not agree with the statistic attributable to the EPA. He further stated that premature deaths attributable to air pollution by some studies cannot be compared with traffic fatalities as suggested by the EPA. That statement by the District's recently retired executive director is significant for three reasons.

First, it reflects some uncertainty concerning EPA mortality claims attributable to exposure to PM2.5. Thus District sponsored research should look squarely at the link between mortality and PM2.5 in the Valley.

Second, this exchange shows that we should strive for studies with sufficient precision as to measure premature deaths from pollution exposure as we do from vehicle accidents. For example, vehicle accidents may be related to a number of factors including vehicle miles traveled (VMT), conditions of the road, and conditions of the human beings who are involved in such accidents. The conclusions of death from vehicle accidents are based on death certificates that have a physician's determination of a cause, lab and pathology reports, etc. There is a very high degree of reliability in the determination of deaths from vehicle accidents. Our studies should attempt to achieve a high degree of reliability in the determination of deaths from exposure to air pollution.

Third, there is a well developed literature on the costs and benefits of different vehicle accident mitigation policies. Such methods may serve as a guide, or at least a standard, in designing studies to determine appropriate costs and benefits as we consider PM2.5 exposure.

Chapter 3 of the Plan contains extensive explanations of the science that supports a link between exposure to PM2.5 and mortality and morbidity. But there are several noteworthy issues and unknowns that could be resolved with an updated, properly designed scientific study of health risks, costs and benefits.

Some large constituents of PM2.5 mass are not toxic yet standards are based on exposures to these constituents.

Chapter 3 contains a laudable analysis of the ammonium sulfate component of PM2.5. What must have been an extraordinary human subject experiment, 20 non-smoking subjects were exposed to PM2.5 constituent ammonium sulfate at levels of 500 µg per meter cubed, which is about 100 times greater than ambient levels of this

Letter to California Air Resources Board
January 18, 2019
Page 5

PM2.5. There was no significant change in pulmonary function or subject health. It seems clear that toxicity of ammonium sulfate is very low, and yet it is counted in the PM2.5 measurements.

Ammonium nitrate may comprise about 40% of the Valley's annual PM2.5 exposure, but it has a relatively low toxicity. The LD 50, (lethal dose that would kill 50 subjects) was reported to be two thirds of that of table salt. Again, this is a major part of ambient PM2.5, and yet it clearly is not toxic.

Per the Plan documents and the Weight of Evidence appendix, these two components, ammonium sulfate and ammonium nitrate, constitute between 45% to 55% of PM2.5 emissions. They do not appear to be toxic and accordingly, efforts and costs to reduce these emissions or their precursors are not justified by health concerns.

Where are the LD 50's for the likely toxic constituents of PM2.5, such as organic carbon and elemental carbon? Perhaps they are buried in some reports, but I did not see studies that referred to the LD 50s. You can see from my 2012 letter to the EPA, I asked about LD determinations as being a part of a proper epidemiological study to support the claim of high mortality from exposure to PM2.5. Updated scientific studies should contain the LD 50 information for the chemicals in PM2.5.

The studies should contain conventional pathology and etiologic results and analyses. A major claim of Professor Enstrom from his submitted scientific article is that there is not a well demonstrated PM2.5 disease mechanism.

The EPA claim that PM2.5 causes premature deaths is implausible because no etiologic mechanism has ever been established and because it involves a lifetime inhalation of only about 5 g of particulates that are less than 2.5 μm in diameter. (March 2017 Dose Response article)

See Enstrom's September 14, 2018 submission provided to the CAC and Board:

<https://www.arb.ca.gov/lists/com-attach/2-sjvsipsupplement-VTBROQR2UnUCdlU6.pdf>

Letter to California Air Resources Board
January 18, 2019
Page 6

Enstrom raises a number of questions about the claim of a link between exposure to PM2.5 and premature deaths. He claims that on average, over an 80 year life, an average adult inhales between 1 gram and 5 grams of PM2.5. This compares to a 1 gram dose delivered by smoking 20 cigarettes in a short period of time. If these statements are true, it does challenge belief in the existence of the fundamental biological mechanism linking PM2.5 exposure to premature death.

Enstrom provided a list of eight peer-reviewed empirical studies that found no connection between exposure to PM2.5 and premature deaths in the United States, and six additional studies specifically showing no mortality effect in California. The District should undertake studies that consider the claims raised by Enstrom and others cited.

Leaving aside the debate about the etiology and cogency of past empirical studies, the key goal of future District sponsor studies should be to investigate the relationship between the dramatic reduction in emissions and the expected improvement in actual health outcomes in the Valley. The design of such studies should be open to review and comment by well-qualified outside experts. As recited above, the District has sponsored scientific studies so the call for updated scientific studies is consistent with their existing policies and practices. Actual health outcomes have been a special focus of the District since at least 2013 when it adopted its Health Risk Reduction Strategy (HRRS).

As Chapter 3 explains, the District understands that the health risks arise from exposure to certain chemicals found in PM2.5. Further, the risk probably relates to exposure to the smallest, ultrafine particles, specifically PM0.1. Indeed, as the District stated:

Elevated exposure to freshly emitted PM0.1 is a critical health risk factor that often does not correspond to ambient PM2.5 concentrations at local monitors. (Page 3-18)

Updated studies should concentrate on the ultrafine particles and the specific chemicals that are suspected of having adverse health risks. Thus the focus on PM2.5 measurements may be too blunt and perhaps off the mark if we are concerned about health risks.

There have been well documented spikes in PM2.5 readings because of natural events such as wildfires, high winds and droughts. These spikes have led to application of the "Exceptional Events Rule" to exclude these readings from attainment determinations (e.g. pages 55-75 Weight of Evidence). These natural events dramatically increase the outdoor recorded PM2.5 measurements in the Valley, with effects that seem to last for years. Given climate change, there may be many such spiking natural events in the future. While the District can exclude these events for attainment determination, if we are concerned about human health, all PM2.5 exposure should be studied. Updated studies should try to distinguish emissions that are anthropogenic vs. natural. Updated studies should determine the actual human exposure (e.g., outdoor vs. indoor), and the best, cost effective methods to address demonstrated health risks.

The District in 2013 established its HRRS program in order to maximize the public health benefits of the various measures undertaken to address air pollution, and to look more closely at the actual agents that might affect health. As the Plan recites:

Rather than ignore this growing body of scientific knowledge, the District's HRRS seeks to embrace it to the extent possible within the current CAA to maximize public health benefits. In practice, this knowledge provides the District with the necessary scientific foundation for justifying and prioritizing the pollution control measures that are necessary for demonstrating attainment of federal standards. The outcome is stronger, more health-protective plans that reflect the current trajectory of scientific knowledge toward a more complete understanding of population risk from PM2.5 particles. (Page 3-7)

The District is playing an active role in funding "leading edge" health research focusing on the Valley population. That research had a cost of \$60 million. The District should continue its commitment to original research with a focus on the most fundamentally important studies that speak to health outcomes in the Valley.

Finally, while it is true the District and the Board must work within certain federal standards such as the Clean Air Act and the National Ambient Air Quality Standards (NAAQS), it is clear the District can and does undertake independent scientific

research and evaluation. It participates in an intellectually honest effort to evaluate health risks and benefits. Read Chapter 3, and you will appreciate the District's commitment to evaluating the science. The call to update the science is core to the mission and purpose of the District and the Board.

RECOMMENDATION 2:
THE DISTRICT SHOULD IMPLEMENT INCENTIVE MEASURES BEFORE
REGULATORY MEASURES.

The District provided an estimate of the cost of its incentive programs. For established incentive programs, the cost was estimated at \$2 billion. For new incentive programs part of the Plan, the cost was estimated at over \$5 billion. The funding sources for the \$5 billion in incentive plans have not been identified.

I was not able to find any estimate of costs of regulatory compliance which must be very substantial. In order to make rational decisions, the District needs comprehensive, cogent cost benefit analyses of different measures, for those actually implemented in the past and for those measures to be deployed in the future. That is especially true when only a fraction of the funds may be available for just the incentive measures.

Given the lack of cost benefit studies relating to compliance proposals, and the hope that future studies will provide meaningful guidance on the most efficient and effective control plans, the District should first implement the better developed, presumably more efficient incentive plans before issuing new regulatory rules. Also as recited above, there are significant diminishing returns to compliance measures.

The currently established control programs will provide the greatest reduction in PM2.5 going forward. Indeed my reading of chapter 4 indicates that the additional reduction in emissions in PM2.5 TPD (tons per day) under the enhanced regulatory control programs would be very minimal (e.g., 1 TPD), but potentially extremely costly. Again, almost all the expected future emission reductions are coming from regulatory elements already in place. Thus, there is little loss by delaying implementation of new control measures, to allow time to assess the updated science, and undertake a proper cost-benefit analysis of the various proposed measures.

Letter to California Air Resources Board
January 18, 2019
Page 9

The EPA has already granted an extension to meet the 2012 PM2.5 standards until 2025. EPA guidance for extensions seems to allow the consideration of a number of factors relating to the science, health effects, natural conditions, economic feasibility, etc.

The statute also includes factors that EPA may consider in determining whether to grant the extension and the length of the extension, including the nature and extent of nonattainment, the types and numbers of sources or other emitting activities in the area (including the influence of uncontrollable natural sources and transboundary emissions), the population exposed to concentrations in excess of the standard, the presence and concentrations of potentially toxic substances in the mix of particulate emissions in the area, and the technological and economic feasibility of various control measures." (Page 6-2)

The District is in the vanguard of the "cleanest and the greenest" of all pollution control districts in the United States. Accordingly, the EPA would be reticent to impose sanctions due to a delay in implementation because of the decision to update scientific studies and assess costs and benefits, with a view to implementing the most health effective, cost effective actions. Has the EPA recently issued to the District or Board a minatory letter or notice threatening sanctions? The District has achieved remarkable success. It seems unlikely to face draconian sanctions from the EPA by continuing with its PM2.5 Plan even if there is some delay in implementing a few elements.

CONCLUSION.

The District and Board have produced a remarkable Plan that reflects very deep and sound analyses. Accordingly, the PM2.5 Plan should go forward with the two recommendations I proposed in this letter. I hope you will agree, the District and the Board should be open to updating the cogent science, and it should consider analyses of economic and policy alternatives.

In considering alternatives, I urge the District to explore the benefits of promoting enhanced tree planting and maintenance in the Valley to help reduce air pollution including PM2.5. At programs sponsored by my local chapter of the Sierra Club and Puentes, the substantial benefits of urban and rural tree planting and maintenance were explained.

Letter to California Air Resources Board
January 18, 2019
Page 10

I received and reviewed several interesting and potentially relevant scientific papers from Puentes that I passed on to the District, e.g., Variation in Tree Species Ability to Capture and Retain Airborne Fine Particulate Matter (2017 Nature Scientific Reports), and Tree and Forest Effects on Air Quality and Human Health in the United States (2014 Environmental Pollution). I do not want to presume too much, and I realize there must be cold, unbiased analysis behind any proposal, but there are deeply wonderful positive externalities from an environment blessed with an abundance of trees.

Sincerely,

Ned Leiba

Ned Leiba.

NL : ea

enc : January 31, 2012 letter to EPA Blumenfeld.
May 6, 2012, email from Seyed Sadredin.

NL letter CARB PM2.5.QED.wpd

MAR 14 2012

2nd
Request.

NED LEIBA
1047 North Hunter Street
Stockton, California 95202
(209) 948-9119

January 31, 2012

Jared Blumenfeld
EPA Regional Administrator
U.S. EPA Region 9
75 Hawthorne Street
San Francisco, CA, 94105

Dear Mr. Blumenfeld:

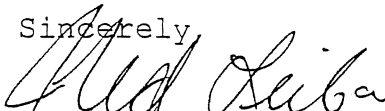
You were quoted in the Stockton Record 1/25/2012 as stating:

Four times more people die in the San Joaquin Valley from air pollution than they do from traffic fatalities.

Are there some good scientific (i.e., epidemiological) studies that support this statement? Such a study, I suppose, would need to compare deaths in San Joaquin Valley from acute and chronic respiratory illness that are clearly linked to specific types of airborne pollution (with known LDs etc), to a control population with the same risk factors except that the control population would not be exposed to the specific air pollutants present in the San Joaquin Valley. We want to see what is exceptional about the San Joaquin Valley in terms of mortality from air pollution compared to other places.

Could you pass on the studies and provide some additional background information.

Sincerely,


Ned Leiba

2012.0506 Re 0125.2012 Stockton Record Article and Quote by Jered Blumenfeld about air quality.txt
From: Ned Leiba [ned@leibacpa.com]
Sent: Tuesday, March 12, 2013 2:38 PM
To: ned@leibacpa.com
Subject: [Fwd: Re: 1/25/2012 Stockton Record Article and Quote by Jered Blumenfeld about air quality]

----- Original Message ----- Subject: Re: 1/25/2012 Stockton Record Article and Quote by Jered Blumenfeld about air quality

Date: Sun, 6 May 2012 00:53:53 +0000
From: Seyed Sadredin <Seyed.Sadredin@valleyair.org>
To: Ned Leiba <ned@leibacpa.com>
References: <4FA5787F.3080502@leibacpa.com>

I do not agree with the statistic attributed to Mr. Blumenfeld. He may have been referring to estimates of premature deaths attributed to air pollution by some studies. That's a bit more complicated and cannot be compared with traffic fatalities as suggested here.

Seyed Sadredin
Executive Director/APCO
San Joaquin Valley APCD
(559) 230-6036

On May 5, 2012, at 11:55 AM, "Ned Leiba" <ned@leibacpa.com> wrote:

Dear Sayed Sadredin:

You were quoted in the January 25, 2012 Stockton Record, along with EPA Regional Administrator Jered Blumenfeld. Mr. Blumenfeld was quoted:

"Four times more people die in the San Joaquin Valley from air pollution than they do from traffic fatalities."

I have written Mr. Blumenfeld twice (1/31/2012 and 3/14/2012) to get the source of this statement. I have enclosed a copy of my letter. He has not responded. As you can see I asked him:

2012.0506 Re 0125.2012 Stockton Record Article and Quote by Jered Blumenfeld about air quality.txt

Are there some good scientific (i.e., epidemiological) studies that support this statement? Such a study, I suppose, would need to compare deaths in San Joaquin Valley from acute and chronic respiratory illness that are clearly linked to specific types of airborne pollution (with known LDs etc), to a control population with the same risk factors except that the control population would not be exposed to the specific air pollutants present in the San Joaquin Valley. We want to see what is exceptional about the San Joaquin Valley in terms of mortality from air pollution compared to other places. Could you pass on the studies and provide some additional background information.

Mr. Sadredin, do you have any information about this contention of Mr. Blumenfeld? If not, do you know who I could contact to get that information?

Thank you.

Ned Leiba
Stockton, California
209 948-9119

<NL LET EPA JARED BLUMENFELD MAR 14 2ND REQ.pdf>