APPENDIX XII

MATES IV

FINAL REPORT

Comments Received

MATES IV Comments
(Comment Period: October 3, 2014 – January 2, 2015)

Joseph K. Lyou, Ph.D.
President and CEO, Coalition for Clean Air and
Governor's Appointee to SCAQMD Governing Board

David Pettit, Senior Attorney
Natural Resources Defense Council

Constantinos Sioutas, Sc.D.
Fred Champion Professor
Civil and Environmental Engineering,
USC

Joseph L. Suchecki, Vice President, Public Affairs
Engine Manufacturers Association

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Christopher Cannon, Director of Environmental Management
Port of Los Angeles &
Heather Tomley , Director of Environmental Planning
Port of Long Beach

John Pastore, P.E.
Executive Director, SCAP

Scott Fruin
USC Occupational & Environmental Health

C. L. Stathos, Environmental Coordinator, Region 9
Department of Defense

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From: Joe Lyou <joe@ccair.org>
Date: October 6, 2014 11:47:50 AM PDT
To: "Barry Wallerstein (bwallerstein@aqmd.gov)" <bwallerstein@aqmd.gov>
Subject: MATES IV

I was just reading the draft MATES IV report, pp. 5-14 to 5-15, re speculation that I-405 Freeway traffic emissions may have contributed to the elevated UFP concentrations at site 8.

The LAX Air Quality Source Apportionment Study includes evidence that the freeway did not influence UFP concentrations measured east of the freeway. Specifically to address this question, the researchers collected simultaneous measurements downwind of the runway and the same distance from the freeway about a mile and a half south of the runway. See Phase III of the LAX AQSA Study, pp. 5-99 to 5-113.

The results showed that the elevated UFP concentrations could be attributed to aircraft, not the freeway. The language on pp. 5-14 to 5-15 of MATES IV should be revised to acknowledge the LAX AQSA study finding and suggest instead that, while the freeway could be a source of UFP, existing evidence shows that the elevated concentrations result from aircraft.

Joe

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From:	Pettit, David
To:	Philip Fine
Cc:	Leben, Danielle; Jean Ospital
Subject:	RE: MATES IV draft
Date:	Wednesday, October 08, 2014 5:27:21 PM

Thanks.

David Pettit
Senior Attorney
Natural Resources Defense Council
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From: Philip Fine [mailto:pfine@aqmd.gov]
Sent: Wednesday, October 08, 2014 5:26 PM
To: Pettit, David
Cc: Leben, Danielle; Jean Ospital
Subject: RE: MATES IV draft

Good suggestions. You are reading table IX-5 correctly.

-Phil

Philip M. Fine, Ph.D.
Asst. Deputy Executive Officer
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South Coast AQMD

From: Pettit, David [mailto:dpettit@nrdc.org]
Sent: Wednesday, October 08, 2014 3:54 PM
To: Philip Fine
Cc: Leben, Danielle; Jean Ospital; Pettit, David
Subject: RE: MATES IV draft

Phil, I think that those are good comparisons for the public to see, and you might want to think about a comparison with local GDP also.

A question on the draft: do I read Table IX-5 correctly as setting out modeled vs observed data for 2012-2013 for the locations listed?

Thanks.

David Pettit
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From: Philip Fine [mailto:pfine@aqmd.gov]
Sent: Tuesday, October 07, 2014 1:54 PM
To: Pettit, David
Cc: Leben, Danielle; Jean Ospital
Subject: RE: MATES IV draft

Since the MATES studies are just single year snapshots, it is hard to do a regression analysis with just two or three data points. The total combined ports container throughput in 2005 (MATES III) was about 14.2 million TEU vs. 14.1 million TEU in 2012 (MATES IV). So with similar throughput, the risks have dropped significantly.

We have also looked at container throughput vs. ambient Elemental Carbon (a marker for diesel PM which drives most of the risk) levels over time. It shows that since the 2009 recession period, container throughput at the ports has increased while Elemental Carbon has significantly decreased.

Let me know if you have any suggestions for additional analyses that could be conducted related to this.

-Phil

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South Coast AQMD

From: Pettit, David [mailto:dpettit@nrdc.org]
Sent: Tuesday, October 07, 2014 1:00 PM
To: Philip Fine
Cc: Leben, Danielle; Pettit, David

Subject: MATES IV draft

Phil: I'm reading through the MATES IV draft and I wondered if the District has run a regression analysis against POLA and POLB throughput to see what effect, if any, higher or lower throughput has had on cancer risk.

David

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From: Constantinos Sioutas [mailto:sioutas@usc.edu]
Sent: Saturday, November 01, 2014 3:29 PM
To: Jean Ospital; Marilyn Traynor
Cc: Philip Fine; Andrea Polidori
Subject: Re: MATES IV Technical Advisory Group meeting at 1:00 p.m. on November 6, 2014 @ SCAQMD in Conference Room GB

Given the significance of traffic sources in our basin, and the fact that you/AQMD use EC as a marker of carcinogenic diesel emissions, I attach our latest paper in which we used PMF on the speciation network data from 2002-2012 to do source apportionment, and showed that in LA and Riverside counties, the traffic emissions were reduced from the 2002-2006 to the 2008-2012 period by ~30% (a very impressive number) following the 2007 emission standards ; this was despite an actual increase in overall traffic volume in the post standard period. This is very relevant to the work presented in your draft document and corroborates the effectivenss of the emission standard

Please use the paper "Long-term source apportionment of ambient fine particulate matter (PM2.5) in the Los Angeles Basin: A focus on emissions reduction from vehicular sources," authors Hasheminassab, Daher, Ostro, Sioutas (Environmental Pollution 193 (2014) 54-64) for your reference and let me know if you have any comments

cs

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November 3, 2014

VIA E-MAIL

Dr. Jean Ospital
Health Effects Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: EMA's Comments on Draft MATES-IV Report

Dear Dr. Ospital:

The Truck and Engine Manufacturers Association (EMA) hereby submits the following comments and recommendations regarding the draft report of the Multiple Air Toxics Exposure Study (MATES-IV) that was released for public comment on October 3, 2014. EMA is the trade association that represents the world's leading manufacturers of heavy-duty trucks, as well as the leading manufacturers of internal combustion engines utilized in a wide variety of other mobile and stationary applications. One of EMA's core functions is to represent its 29 member companies in working with the United States Environmental Protection Agency, the California Air Resources Board, and other state and local agencies on a broad range of air quality issues and initiatives. In that role, EMA has been involved in reviewing and commenting on the SCAQMD's MATES initiative since the issuance of the first MATES report.

In its MATES-IV draft report, the South Coast Air Quality Management District (SCAQMD) states that it has used the same monitoring, modeling, and risk assessment methods that were used in the previous three MATES reports. The draft report acknowledges the short-comings and caveats regarding those methods, and in particular the uncertainties in estimating ambient levels of diesel particulate matter (diesel PM) and actual human exposure to air toxics, as well as the uncertainties in interpreting the estimates of cancer health risks. These uncertainties are significant, since, as acknowledged in the draft report, the real value to the public of the MATES-IV report stems from its ability to document and communicate clearly and accurately the long-term trends of reduced air toxics in the South Coast Air Basin.

In general, EMA has no new comments on the methodologies or analyses used in the MATES-IV draft report. That said, we remain in fundamental disagreement with the Elemental Carbon/Organic Carbon (EC/OC) apportionment method used in MATES, and also continue to believe that the unit risk factor (URF) applied for diesel PM is not based on sound science, stemming as it does from flawed dose-response assumptions derived from the 1987 and 1988 Garshick, et al. studies of railroad workers. We also are very concerned that EMA was excluded from the MATES technical advisory committees, and that, in fact, no industry representatives were included on that committee. That basic lack of industry representation calls into question the objectivity of the MATES-IV report, and needs to be addressed.

With those long-standing objections in mind, EMA offers the following specific recommendations and suggestions regarding the presentation and reporting of the MATES-IV results, with emphasis on the draft report's discussion of the emission of diesel PM and other air toxics from mobile sources.

The MATES-IV Report does not adequately convey the very significant reductions in ambient levels of air toxics or the successful efforts to reduce air toxics risk in the South Coast Basin.

As noted above, the most significant public benefit from the periodic MATES reports is providing accurate and up-to-date information regarding the long-term trends in air quality in the South Coast Air Basin, and, in particular, the downward trends in ambient levels of air toxics. In that regard, the air toxics monitoring and modeling completed as part of MATES-IV demonstrate that there have been very significant reductions in ambient levels of air toxics between 2006 (MATES III) and 2013 (MATES-IV). For example, estimated Basinwide risk has decreased from 1,194 per million in 2006 to 418 per million in 2013, based on the fixed-site monitoring data. Similarly, modeled risk estimates have decreased from 853 per million in MATES III to 367 per million in MATES-IV. Equally significant, estimated average concentrations of diesel PM in the Basin have decreased from approximately 3.5 ug/m^3 in 2006 to less than 1.0 ug/m^3 in 2013, and the estimated risk attributable to diesel PM has declined by 70% (or more) over that time period. Equivalent reductions can be seen for all other air toxics as well. Reductions in levels of ambient air toxics are even greater if compared to the earlier MATES reports (MATES-I and MATES-II), although the results may not be directly comparable due to changes in certain measurement methods. All of those trends are very positive, and are testaments to the fact that the current programs to promote advanced emission-control technologies, especially ultra-clean new-technology diesel engines and vehicles, are working.

Although the overall results of the MATES-IV draft report are contained in the Executive Summary, the draft report does not place sufficient emphasis on the remarkable reductions in air toxics that have been achieved. The reductions in ambient levels of air toxics, and therefore the reductions in exposures and estimated public health risk, are very significant accomplishments that need to be highlighted in the report. In its current format, the draft report does not present the most relevant information in a "user-friendly" manner that clearly shows the very significant reductions that have been achieved over the last seven years. The Executive Summary, as well as other portions of the report, needs to be revised to present and emphasize more fully the improvements in air quality that have been confirmed through the MATES-IV findings.

EMA has the following specific recommendations to improve the Executive Summary of the draft MATES-IV report to better convey the results of the study to the general public.

Page ES-4 Conclusion

The conclusion section of the Executive Summary should explain in more detail the very significant reductions in ambient levels of air toxics, as well as estimated cancer risk, in the Basin. To that end, the conclusion should provide a direct comparison of the current results with past studies showing the greater than 70% reduction in risk over the time period of the four MATES reports, highlighting the especially large reductions in diesel PM emissions (which have resulted from the development of ultra-clean new-technology diesel engines), and clearly indicating that all major air toxics are continuing to decline in a very significant manner. In essence, the conclusion needs to highlight the tremendous success of the regulatory programs to reduce air toxics and diesel PM in the Basin.

Page ES-5 Policy Implications

The discussion of policy implications states that remaining risks are unacceptably high, that OEHHA's revised risk calculation methods will make those risks appear higher, and that, as a result, there is a need for continued focus on air toxic reductions, particularly diesel PM. Rather than focusing on OEHHA's new modeling approach to assessing childhood exposures, however, the policy implications section should focus on the programs and regulations that are in place and that have contributed to the very large reductions in ambient air toxics, as confirmed in MATES-IV. In the case of diesel PM emissions, the existing suite of mobile source regulations has worked exceedingly well to reduce diesel emissions and hence exposure to diesel PM for all residents in the South Coast Air Basin. More specifically, the current EPA and CARB regulations governing emissions from on-highway and nonroad diesel engines have reduced PM emissions to essentially-zero levels. As the entire diesel fleet transitions to the new-technology diesel vehicles, the benefits of zero-PM emissions will continue to multiply across the Basin.

Thus, this section should acknowledge that the current regulations and incentive programs governing diesel emissions will continue to reduce the amount of diesel emissions and ambient concentrations of diesel PM below the levels identified in MATES-IV, which are already less than 1 ug/m^3. Consequently, it should be stated that the existing programs in California are sufficient to reduce any health risks attributable to diesel PM to acceptable levels in the near future, and that the diesel PM issues have been essentially resolved, as evidenced in part, by the attainment demonstrations that have been made for the PM NAAQS in the South Coast Air Basin. Failing to mention the many positive aspects of the remarkable improvements and reductions in ambient air toxics, especially diesel PM, renders the draft MATES-IV report both incomplete and fundamentally misleading to the general public.

Page ES-7 Figures ES-2 and ES-3

Figure ES-2 should be revised to include a pie chart of the MATES-III results in addition to the current MATES-IV results to show, again, the very significant reductions in risk and to provide a better visual perspective of the changes between 2006 and 2013. The area of the pie charts should be proportional to the Basinwide risk estimates at the fixed monitoring sites. For example, the MATES-IV pie chart should be 70% smaller than the MATES-III pie chart.

In addition, a second bar chart should be added to the Executive Summary comparing the MATES-III and MATES-IV air toxics risks. The second chart should provide a comparison of the change in risk between the two studies and clearly show that risk have decreased from 1,200 in 2006 to 400 in 2013.

Page ES-8, Figure ES-4

Figure ES-4 presents the results of the estimated Basinwide risk for the MATES-IV modeling results. Although the changes in modeled risk between the two studies are presented in Figure ES-9, the impact of the significant reductions is not clear from the two figures. EMA recommends that an additional figure be added to the Executive Summary that shows the modeled risks from the MATES-III report. That figure should present the MATES-III results using the same color scheme and scale so that the reader can readily see and understand how the modeled concentrations and risks have been reduced so dramatically between the two study periods. Inclusion of the additional graphic will greatly enhance the lay reader's understanding of the positive changes that have occurred.

Additional Comments on Specific Sections of the Report

Page 1-3 Dose-Response Assessment

One topic that should be mentioned in this section, as well as in the other sections relating to diesel PM, is that the OEHHA Unit Risk Factor (URF) for diesel PM that is used in the reported risk calculations (which EMA continues to believe is flawed) is based on an assessment of exposures to emissions from uncontrolled diesel locomotive engines from the 1950s, 1960s and 1970s, prior to the development and deployment of modern emission-control technologies, including catalyzed diesel particulate filters (DPFs). New-technology diesel engines have completely different emissions profiles that are qualitatively and quantitatively different from the emissions assessed in developing the OEHHA unit risk factor. New-technology diesel engines are equipped with DPFs that reduce particulate matter emissions and hydrocarbons by over 99%. In addition, new-technology engine emissions no longer contain high levels of organic carbon or adsorbed hydrocarbons that were characteristic of the emissions from the 1950-1980 time frame.

Because there has been no re-evaluation of the URF to address the significantly different emissions profile of new-technology diesel engines, application of the "old" OEHHA risk value to today's diesel engines is not valid. This adds to the uncertainty of MATES-IV, and most certainly overestimates the risk ascribed to diesel PM emissions in MATES-IV. This issue needs to be addressed.

One of the necessary additions to the MATES-IV report to address this critical issue is to highlight the discussion regarding new-technology diesel engines that the International Agency for Research on Cancer (IARC) included in its Monograph 105. See IARC Monograph 105: "Diesel and Gasoline Engine Exhausts and Some Nitroarenes." More specifically, Monograph 105 includes the following conclusions regarding new-technology diesel engines, which conclusions should be stated in the body of the MATES-IV report to highlight the fact that the risks ascribed to diesel PM are being controlled and managed effectively:

> To meet the most stringent current emission-control regulations, diesel engines must be designed and constructed according to modern technology, which includes wall-flow particulate filters and diesel oxidation catalysts, in combination with the use of diesel fuel that has a very low sulfur content. The new diesel engine technology has been shown to reduce particulate mass emissions by more than two orders of magnitude. Although the implications for carcinogenicity are not yet know, *the "new technology" diesel engines, due to their much lower emissions of particulate matter, will probably bring about an improvement with regard to public health.* It should be noted that the human epidemiological studies reviewed in this Monograph [and that underly the OEHHA URF] were conducted before the introduction of the modern diesel engine technology. (Monograph 105, p. 34, emphasis added.)

* * *

> [E]vidence has also been found that exhaust aftertreatment can contribute to substantial reductions in the activity of extracts of diesel engine particulate matter or of exhaust semi-volatile organic compounds as expressed per unit of engine work or volume of emitted exhaust. No comparative data were available to the Working Group to evaluate the genetic and related effects of new-technology diesel exhaust. (Monograph 105, p. 457.)

Like IARC, the SCAQMD needs to acknowledge that the emissions from new-technology diesel engines are significantly different from earlier diesel technologies, that diesel PM levels are essentially zero, and that the old assumptions about the potential health effects of diesel emissions may no longer be applicable to assessments of current and, more especially, future risks.

Page 5-12 Summary of Fixed Sites

The discussion indicates that there are ongoing concerns that the application of advanced emissions control technologies to diesel engines has led to uncertainties regarding the potential formation of ultrafine particles (UFPs). The issue stems from concerns that the new technologies may actually increase emissions of UFPs.

Notwithstanding that speculation, extensive emissions testing has shown that the use of DPFs and selective catalytic reductions systems actually reduces the number of fine particles emitted from new-technology diesel engines. EMA refers AQMD staff to the recently completed Phase 2 Report from the Advanced Collaborative Emissions Study (ACES), published by the Health Effects Institute and the Coordinating Research Council, for a comprehensive presentation on the dramatic reductions in particle mass and number (as well as all other air pollutants) from today's new-technology diesel engines. Thus, the statement regarding increased ultrafine and particle number emissions in the MATES-IV report is wrong, and should be removed from the text.

Page 5-13 Gradient Studies

The report refers to UFPs and black carbon (BC) as air toxics. Neither UFPs nor BC are considered or regulated as air toxic contaminants in California. The text of the MATES-IV report should be changed to reflect their correct classification throughout the document.

Conclusion

EMA appreciates the opportunity to offer the foregoing comments and recommendations on the MATES-IV Draft Report. Please do not hesitate to contact me should you have any questions regarding EMA's comments and concerns.

Very truly yours,

Joseph L. Suchecki

Joseph L. Suchecki
Vice-President, Public Affairs

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From: Constantinos Sioutas [sioutas@usc.edu]
Sent: Wednesday, November 05, 2014 2:22 PM
To: Jean Ospital; Marilyn Traynor
Cc: Philip Fine; Andrea Polidori
Subject: Re: MATES IV Technical Advisory Group meeting at 1:00 p.m. on November 6, 2014 @ SCAQMD in Conference Room GB

Dear all

Few comments on the ultrafine section after reviewing your draft:

1. Overall a very fine job!

2. Please note that at least last time that I checked , the Appendix associated with the Ultrafine PM section is blank, it has no contents

3. Adding error bars in the plots and .or some metric of standard deviations or uncertainty in tables would make the presented data more defensible and the conclusions drawn more robust-this is a MUST in almost any scientific publications, as those you have been former members of my group know!

4. The use of a mobile or portable platform for freeway measurements , proposed as an upcoming activitiy, will add tremendous value to your work in characterizing exposures to UFP. I would even propose to devise a coherent sampling stately, currently missing in the draft, and I could even help you with it if need me to, whereby yo monitor by rotation different freeways every weekday, and/ or as many as you can afford depending on number of mobile platforms that you plan to employ . Regardless, I feel that knowing the freeway levels of UFP concurrently with measurements in stationary sites are essential in developing exposure models of these pollutants.

5. The elevated BC levels at the Inland Valley SB , not accompanied by equally high levels of UFP, are intriguing and require some further thoughts and investigation – are there any BC sources other than traffic in the area?

6. Fig 5-7 are these data averages across sites ? Here again SD/SE would be vey helpful

7. Same comment about figures 5-8 and 5-9 ;are these averages across sites? If so, error bars need to be added

8. The LAX pilot study is very well presented and in concert with our earlier work by Westerdahl, D., Fruin, S. A., Fine, P. L., & Sioutas, C. (2008). The Los Angeles International Airport as a source of ultrafine particles and other pollutants to nearby communities. *Atmospheric Environment*, *42*(13), 3143-3155.

I think that is all for now - let me know if you have any additional questions, comments or requests

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THE PORT OF LOS ANGELES

The Port of LONG BEACH

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mmT

December 30, 2014

Dr. Jean Ospital
Health Effects Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

Dear Dr. Ospital:

SUBJECT: COMMENTS ON THE DRAFT SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT MULTIPLE AIR TOXICS EXPOSURE STUDY (MATES IV) REPORT

The Ports of Long Beach and Los Angeles (Ports) appreciate the opportunity to comment on the Draft South Coast Air Quality Management District Multiple Air Toxics Exposure Study (MATES IV) Report, and to submit the attached technical comments focused on Appendix V and Appendix VI.

In summary, Appendix V states that the differences in average levels of various gaseous species and pollutants between the West Long Beach (WLB) MATES III and MATES IV sites are not statistically significant (except for acetaldehyde), even though the sites are 0.8 miles away from each other. However, to the contrary and most notably, there was wide variability in elemental carbon (EC) concentrations between the WLB MATES III and MATES IV sites.

Additionally, Appendix VI gives the impression that the major contributors of black carbon (BC) emissions measured at the WLB site are from Ports' operations. Instead, our findings strongly suggest that weather conditions and BC emissions from other areas played a significant role in the measurements seen in Appendix VI.

The Ports appreciates your consideration of our comments into the Final MATES-IV Report. If you have any comments or questions, please contact Janna Watanabe at the Port of Long Beach at (562) 283-7100; or Amber Coluso at the Port of Los Angeles at (310) 732-3950.

Sincerely,

CHRISTOPHER CANNON
Director of Environmental Management
Port of Los Angeles

HEATHER TOMELY
Director of Environmental Planning
Port of Long Beach

CC:LW:TJD:AC:yo
APP No: 120626-996

Enclosure: Technical Comments on MATES IV Draft Report

APPENDIX

TECHNICAL COMMENTS ON MATES IV DRAFT REPORT

Prepared by Leidos, Inc., in Consultation with the Ports of Long Beach and Los Angeles

These technical comments are focused on two areas: Appendix V, entitled *Comparison between the West Long Beach Site in MATES III and MATES IV;* and Appendix VI, entitled *Black Carbon (BC) Measurements at Fixed Sites.*

APPENDIX V - COMMENTS

1. While there was only a 5% increase in $PM_{2.5}$ concentrations in comparing data from the West Long Beach (WLB) MATES III to IV sites, an almost 25% increase in elemental carbon (EC) concentrations was observed, as shown in Table V.1 (summarized below). In addition, review of Figure V-4 in Appendix V indicates several days when EC at the MATES IV site are more than 2x the EC at the MATES III site. Appendix V states the change in EC concentrations between the MATES III and IV sites is not statistically significant at the 95% level. However a comparison of the data in Table V-1 shows that the average EC concentration at the MATES IV site is outside the 95% confidence limits of the EC concentrations at the MATES III site, and the average EC concentration at the MATES III site is outside the 95% confidence limits of the EC concentrations at the MATES IV site. Therefore, this analysis shows that the differences in average concentrations between the two stations are statistically significant ($p > 0.05$), and the two stations do not have equivalent EC levels.

Re-creation of Table V-1 in Appendix V

	$PM_{2.5}$ Mass (µg/m3)	$PM_{2.5}$ OC (µg/m3)	$PM_{2.5}$ EC (µg/m3)	Nitrate (µg/m3)	Sulfate (µg/m3)	1,3-Butadiene (ppb)	Benzene (ppb)	Formaldehyde (ppb)
MATES III WLB Site	17.6 ±2.0	6.50 ±0.82	2.22 ±0.44	3.07 ±0.70	3.67 ±0.55	0.048 ±0.01	0.39 ±0.06	2.47 ±0.27
MATES IV WLB Site	18.5 ±2.1	6.30 ±0.74	2.77 ±0.51	3.34 ±0.78	3.87 ±0.57	0.058 ±0.01	0.39 ±0.07	2.50 ±0.23
% Difference	5.11%	-3.08%	**24.77%**	8.79%	5.45%	20.83%	0.00%	1.21%

2. Table V-2 (reproduced below for $PM_{2.5}$ mass, $PM_{2.5}$ OC and $PM_{2.5}$ EC, with an added estimate of R^2), shows the correlations between the MATES-III and MATES-IV data set for $PM_{2.5}$ mass, OC and EC. The R^2 value (coefficient of determination) provides an indication of how much of the variance of one variable is predictable from the other variable. Here, we agree that $PM_{2.5}$ mass and EC have statistically high correlations with both at $R^2 = 0.80$. It appears OC at the sites are minimally related at $R^2 = 0.20$.

   Two data sets that are highly correlated do not necessarily equate to equivalency. It may be that a high correlation simply indicates a consistency where data points increase or decrease together on the same date. The increase in EC at the MATES IV site compared to the MATES III site is concerning in terms of representativeness since the MATES IV site is located much closer to a localized source.

   Table V-2 with added R^2

	$PM_{2.5}$ Mass	**$PM_{2.5}$ OC**	**$PM_{2.5}$ EC**
R	0.92	0.46	0.89
m	0.90	0.40	1.02
n	72	68	67
R^2	0.8464	**0.2116**	0.7921

3. Based on the data collected in the POLA and POLB monitoring programs, it appears that the measured pollutant which has the highest spatial variability is ultrafine particle (UFP) counts. This also seems to be the case for the UFP analysis in Chapter 5 of the Draft MATES IV report, although the full analysis is apparently not completed (Appendix VII, Particle Counts at Fixed Sites is listed as *In Preparation*). UFP measurements were not taken in MATES III, but it would be useful to compare UFP measurements from the MATES IV and MATES III in WLB. The MATES-IV WLB site is located 0.8 miles to the northwest of the MATES-III site, closer to major emission sources such as a rail yard. Given that UFP counts may be the most sensitive indicator of nearby emission sources, as shown in the studies near LAX, San Bernardino Railroad, and near a freeway, as discussed in Chapter 5.roadways. Detailed analysis of the UFP data from MATES-IV (especially with wind speed and direction data) would be useful.

4. Presented below are the $PM_{2.5}$ Mass, EC and OC concentrations at POLB's Inner Harbor station (located approximately 1 mile south of the MATES III site) for the estimated dates used in this study. All PM concentrations presented below were measured using a DRI Sequential Filter Sampler (SFS). Assumptions were made on the exact start and end dates for the averaging period, but comparatively the results show that the Port monitoring stations are consistently lower. The POLB Inner Harbor station's measurements were the highest of the six stations in the POLA/POLB monitoring program. For this study, the SCAQMD

deployed filter-based SASS units for their PM monitoring, so some discrepancy in concentrations might be expected due to the difference in instruments.

Comparison of $PM_{2.5}$ Mass, EC, and OC Levels at 3 Sites during the MATES IV Study

	$PM_{2.5}$ Mass (μg/m3)	$PM_{2.5}$ Mass (% Reduction)	$PM_{2.5}$ EC (μg/m3)	$PM_{2.5}$ EC (% Reduction)	$PM_{2.5}$ OC (μg/m3)	$PM_{2.5}$ OC (% Reduction)
MATES IV WLB Site	18.5	-	2.77	-	6.30	-
MATES III WLB Site	17.6	5%	2.22	20%	6.50	-3%
POLB Inner Harbor	15.3	17%	1.71	38%	3.33	47%

It should be noted that measured $PM_{2.5}$ Mass, EC and OC concentrations presented above all decrease moving south as the POLB Inner Harbor station is located approximately 1 mile due south of the MATES III West Long Beach station. Thus, the monitoring stations located closest to the Ports have lower concentrations than the MATES IV WLB stations, indicating that sources outside the vicinity of the Ports are producing higher ambient levels of $PM_{2.5}$ Mass, EC and OC.

5. The data collected in this MATES IV monitoring program were affected by seasonal meteorological and dispersion conditions during the timeframe of the study. Appendix V states the data was collected from February to November 2007 and April to December 2008. Typically, the highest levels of $PM_{2.5}$ and EC (in particular) are measured during the winter months from November to February. While emissions remain generally constant throughout the year, ground level concentrations tend to increase during these timeframes due to the lower dispersion of ground-based emissions.

   It might be instructive to conduct a more detailed review of the data. For example:

   a. There are at least three days on which EC at the MATES IV site > 4 $\mu g/m^3$, while EC at the MATES III site < 2 $\mu g/m^3$ which is more than 100% higher. Are these anomalies, or were there special atmospheric conditions or other events that affected the data?

   b. During this study, not much data was collected during the winter months for these two time periods. Under southerly or southwesterly winds, common during spring and summer months when most of the measurements took place, the sites are likely exposed to the same general sources to the south and southwest. However under light northerly or northwesterly flow, localized sources may impact the MATES IV site due to its close proximity to Route 163 and rail yard sources. Since the MATES IV site is 0.8 mile closer to both Route 163 and the rail yard, it is feasible that measured EC levels (and potentially OC) could be higher under the light northerly winds commonly found during the nighttime hours (stable nocturnal boundary layer) in the fall and winter months.

APPENDIX VI - COMMENTS

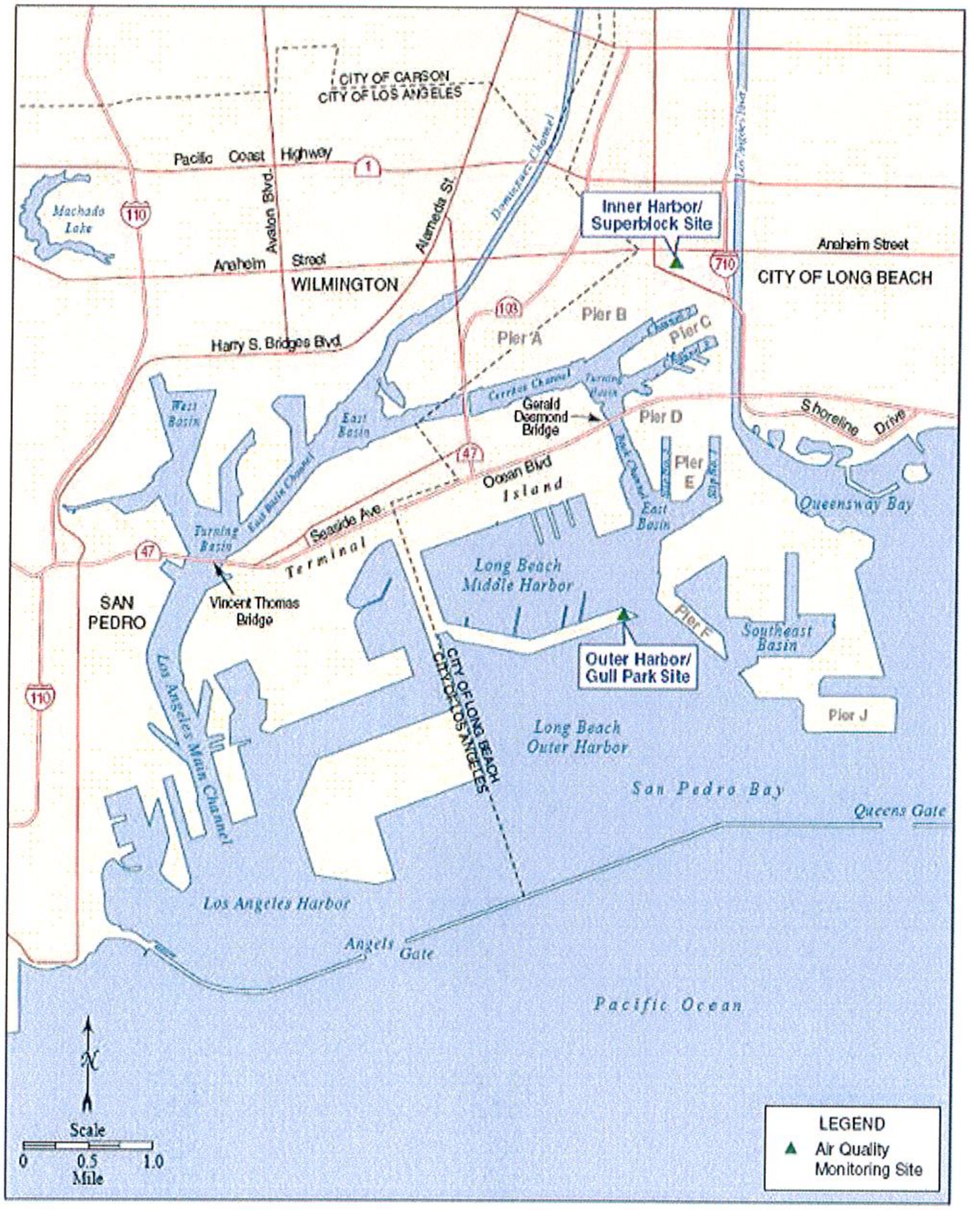
Most sites presented in Appendix VI, Figure 6 indicate that maximum BC concentrations occurred during the fall and winter seasons. The WLB site, the monitoring station closest to the Ports area in the MATES-IV program, has the second-highest winter average BC concentration of the 10-site MATES-IV monitoring program, estimated at approximately 2.3 $\mu g/m^3$ from Figure 6. In this report and in a presentation to the MATES-IV Technical Advisory Group (Polidori, 2014), the impression is given that the major contributors of BC emissions measured at the WLB site are diesel-powered vehicles, non-road mobile machinery, and ships.

The Ports would like to offer some general findings from their BC monitoring program to provide additional insight into BC levels in the Ports area, specifically BC data collected at the Inner and Outer Harbor stations in the POLB monitoring network. A brief description of these stations is presented below and Figure 1 shows the locations of the two monitoring sites:

a. The Inner Harbor station is located in a heavy industrial area at the north end of the POLB complex. There are several truck distribution depots in the vicinity, and two busy roads are located nearby, West Anaheim Ave and I-710, both of which are used by large numbers of diesel trucks.

b. The Outer Harbor station is located at the end of the "Navy Mole" (i.e. eastern end of Nimitz Road), a peninsula that terminates at the Long Beach Channel. It is located near the southern end of the POLB complex, and diesel-powered mobile sources will primarily be located at Port terminals, located some distance away (except for the occasional ship that passes nearby while moving through the Long Beach Channel). The two POLB stations are located approximately 2.7 miles apart, in a roughly north-south line.

Figure 1. Locations of Air Monitoring Stations for Port of Long Beach BC Study



Because the highest average BC concentrations measured in the MATES-IV program were found during the winter season, the focus of this analysis is the winter season (assumed to be December 2012 through February 2013). Average winter season BC concentrations at the two POLB monitoring stations are comparable to the average observed at the WLB station, as shown in the table below.

BC Concentrations at Three Monitoring Stations in the Ports Area

Period	Average BC Concentration at Selected Sites (μg/m3)		
	MATES IV West Long Beach	POLB Outer Harbor	POLB Inner Harbor
2012 - 2013 Winter Season	2.3	2.3	3.0

Detailed Review of the Black Carbon Hourly Data

Figure 7 in Appendix VI illustrates that across the 10 stations in the MATES IV study, the highest monthly BC concentrations during the winter were recorded in January 2013. The Aethalometers deployed at the Ports' monitoring stations also measured the highest monthly BC concentrations during January 2013. Detailed analysis of the 1-minute BC data channel on the Aethalometers, in conjunction with meteorological data collected at the Port's monitoring sites, yields insight into the potential origin and transport of the BC material measured during January 2013.

The 24-hour average BC concentrations measured at the Inner and Outer Harbor stations on January 3, 2013 were 6.92 $\mu g/m^3$ and 5.83 $\mu g/m^3$, respectively. However, the Aethalometers also provide 1-minute average BC concentrations, which allow in-depth analysis of BC concentrations and correlations with key meteorological parameters to assess changes in BC levels with changes in boundary layer and transport parameters.

Mr. George Allen of NESCAUM (Northeast States for Coordinated Air Use Management) has performed research suggesting that stable 1-minute BC data can be evaluated to differentiate BC sources on multiple scales (Allen, 2014). His research states that local sources (within a few hundred meters) will produce rapid spikes in the BC signal. Sources that are on a larger scale (urban and regional) will drive smoother increases and decreases in BC levels that can occur over a morning or evening. Through the analysis of the 1-minute BC data, it is possible to develop some conclusions on the spatial scales that are influencing the measured BC data.

Through review of the simultaneous 1-minute data at the Inner and Outer Harbor stations, we can draw insights into the spatial scales of the measured BC. The Inner Harbor station would likely be influenced by a combination of regional, urban, and local sources; the Outer Harbor station would be expected to be influenced primarily by regional and urban sources.

The following three figures illustrate 1-minute BC concentrations measured at the POLB Inner Harbor and Outer Harbor stations on January 3, 2013, which was selected as a typical weekday in January that had high BC concentrations.

Figure 1 provides the raw 1-minute BC concentrations at the Inner (green) and Outer (red) Harbor stations over the 24-hour period. There are two major features of the BC concentrations at these two stations that can be seen in Figure 1:

1. The general pattern of BC concentrations measured throughout the day on January 3rd at the two stations is very similar. Elevated BC concentrations at both stations occur during the morning (averaging around 10-15 $\mu g/m^3$) until about 9 AM, when BC concentrations begin decreasing to the low of the day which was reached in early afternoon. The BC concentrations remain relatively constant (averaging 2-3 $\mu g/m^3$) until early evening, when they begin to increase again.
2. Elevated 1-min spikes of BC concentrations (up to 40 $\mu g/m^3$) are much more prevalent at the Inner Harbor station, indicating that there are a number of BC sources close to that station. These measurements reflect the environment around the two stations, because nearby BC sources appear to be common at the Inner Harbor station and less common at the Outer Harbor station. The other feature evident in the 1-min BC measurements is that elevated BC spikes are common only during certain parts of the day, primarily in the early morning and late afternoon/evening hours.

Assessment of the co-located meteorological parameters measured on January 3rd indicates an overnight low temperature of 41° F, which is quite cold for the South Coast Air Basin. This can be used to infer a strong nocturnal boundary layer with a low capping inversion and little mechanical turbulence. None of the nighttime hours record a wind speed measurement over 3 mph. Wind direction measurements indicating light northerly winds persist throughout the nocturnal hours until 11AM, so we have light flow from the greater LA air basin south towards the Port's monitoring stations. Around 11AM, the winds switch to a more south-southwest direction indicating a more onshore flow regime. On the graphic, the vertical black line at 11AM (as well as the wind rose graphic) provides a visual indication of when the winds switch from northerly to more southwesterly flow. The onshore flow remains until about 8PM, when once again the winds become light and turn north-northeast for the remainder of the evening. The meteorological parameters in combination with the 1-minute BC data provide strong evidence that the Aethalometers are being influenced by a variety of sources from several directions.

Figures 2 and 3 estimates the contribution from local scale BC sources and from urban and regional scale BC contributions. This was done by using the approach pioneered by John Watson and Judy Chow (JAWMA, 2001) at the Desert Research Institute (DRI), in which a moving average subtraction method was applied to BC measurements taken at stations around Mexico City. In this method, an hourly average BC concentration is calculated for each 1-min BC measurement, using the 60 1-min BC averages centered on the 1-min BC measurement. The hourly average BC calculation is then subtracted from the 1-min BC measurement, which provides an estimate of the contributions from local BC sources (the 1-min BC measurement minus the hourly BC moving average), and the contributions from urban and regional BC sources (the hourly BC moving average). These calculations were conducted for each minute of the day and then averaged over the day, to provide an estimate of the contribution to the BC concentrations from the two spatial scales.

Figure 2 shows the estimated contribution at the Inner Harbor station from urban and regional BC sources ("baseline BC level") and from local BC sources. Local sources contributed approximately 19% of the 24-hour average BC concentration (6.92 $\mu g/m^3$) on January 3rd, while the baseline BC level was 81% of the 24-hour average BC contribution. Figure 3 shows the estimated contribution at the Outer Harbor station from the local and baseline BC sources. Local sources contributed approximately 15% of the 24-hour average BC concentration (5.83 $\mu g/m^3$) on January 3rd, while the baseline BC level was 85%.

This analysis shows that local BC sources (within a few hundred meters) contributed between 15% and 19% of the total measured BC concentrations on January 3rd, which is comparable to the 12% contribution from local sources in Mexico City estimated in the John Watson and Judy Chow paper. Their paper also estimated that the neighborhood contribution (1-5 km) was an additional 23%, indicating that BC sources from larger scales contributed the majority to their BC measurements.

This analysis was conducted on only one day in January 2013. However, the POLB monitoring stations collected BC and meteorological data throughout the winter (December 2012 through February 2013), and a preliminary review of the data indicates this was not an isolated event. There are many other days, particularly in January 2013, where similar BC levels and meteorological conditions persist, indicating that there are significant urban and regional contributors to the levels of BC measured at the Port monitoring stations. We encourage the South Coast AQMD to conduct a similar analysis for the winter months to see if the WLB data agrees with the Ports' data presented above.

References

Allen, G., 2014. Email correspondence between G. Allen (Northeast States for Coordinated Air Use Management, NESCAUM) and G. Bertolin (Leidos, Inc.), December 2014.

Watson, J.G. and J.C. Chow, 2001. *Estimating Middle-, Neighborhood-, and Urban-Scale Contributions to Elemental Carbon in Mexico City with a Rapid Response Aethalometer*, J. Air & Waste Management Association, **51**:1522-1528.

Figure 1: Inner and Outer Harbor BC Concentrations (1-min) on January 3, 2013

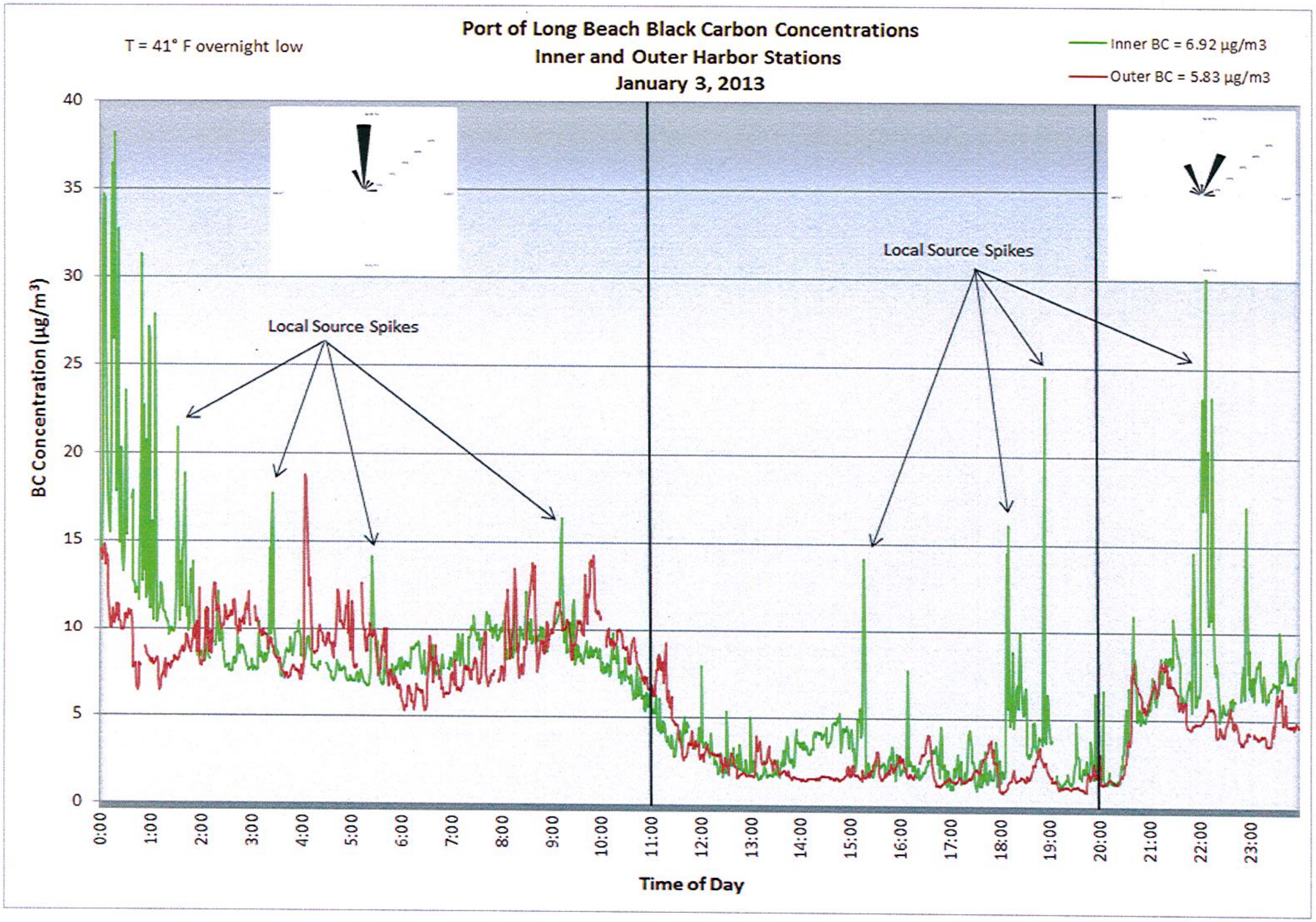


Figure 2: Detailed Inner Harbor BC Concentrations (1-min) on January 3, 2013

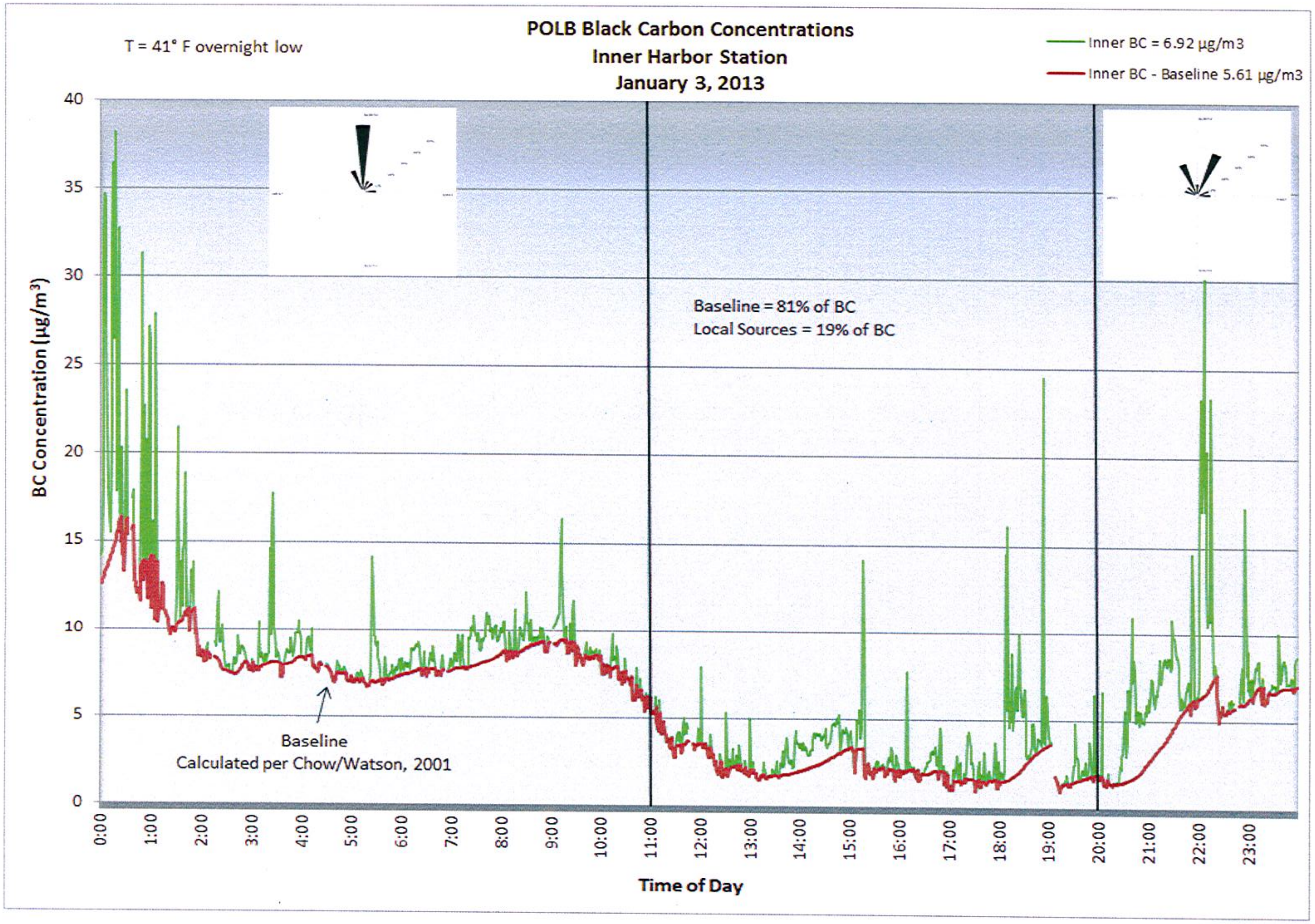
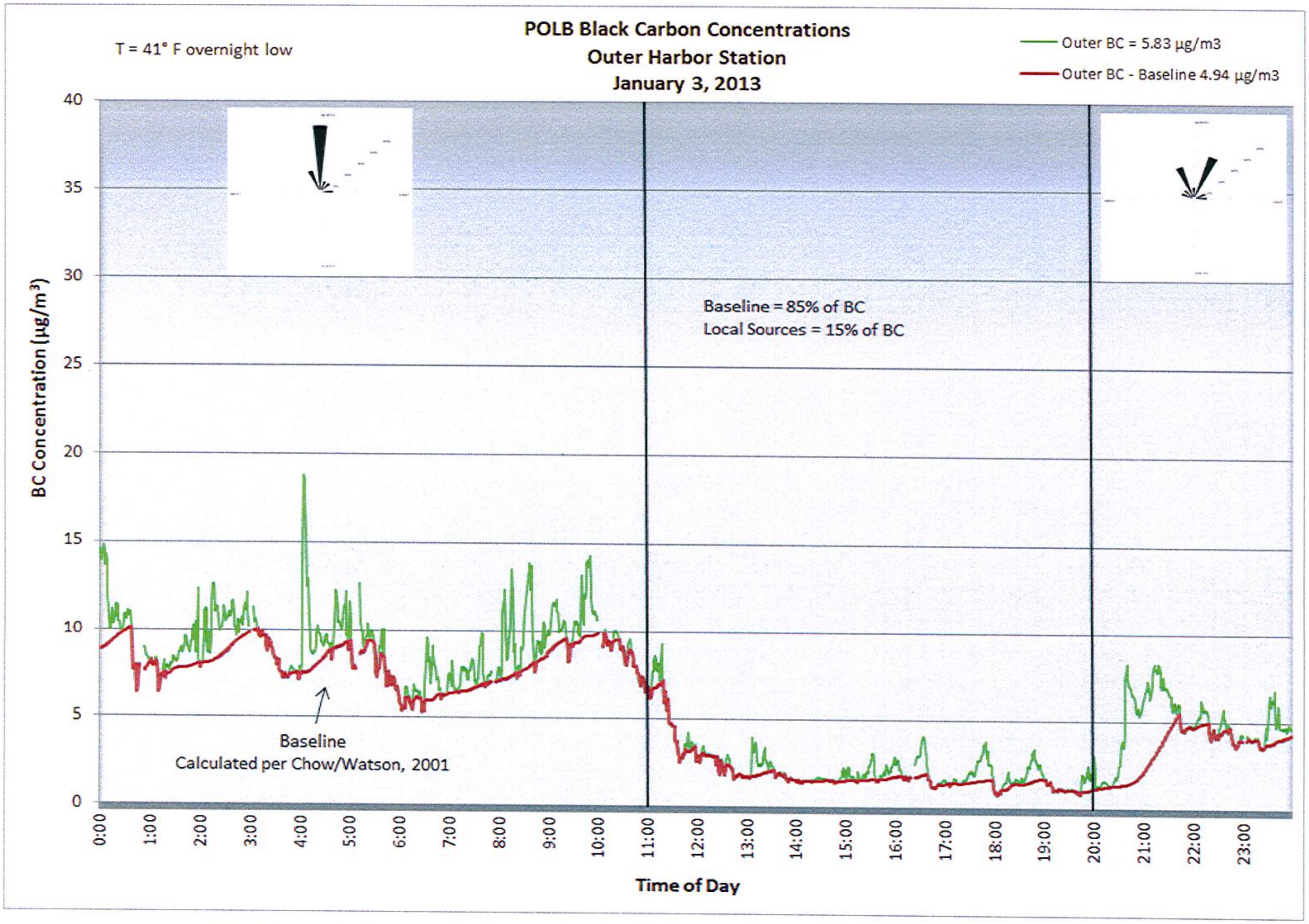


Figure 3: Detailed Outer Harbor BC Concentrations (1-min) on January 3, 2013



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SCAP

SOUTHERN CALIFORNIA ALLIANCE OF PUBLICLY OWNED TREATMENT WORKS

December 30, 2014

Dr. Jean Ospital, Health Effects Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4178

Re: Comments on the MATES IV Draft Report

Dear Dr. Ospital:

The Southern California Alliance of Publicly Owned Treatment Works (SCAP) represents 82 public agencies that provide essential water and wastewater treatment to nearly nineteen million people in Los Angeles, Orange, San Diego, Santa Barbara, Riverside, San Bernardino and Ventura counties. We provide environmentally sound, cost-effective management of more than two billion gallons of wastewater each day and, in the process, convert wastes into resources such as recycled water and renewable energy.

SCAP appreciates this opportunity to comment on the MATES IV Draft Report (Draft Report). SCAP has followed all the MATES efforts, and we continue to remain impressed at the level of scientific rigor and dedication we find in each report. The most recent Draft Report continues this laudable trend.

It seems logical and appropriate that MATES should discuss, where valid, comparisons of its results to those from other reputable and scientifically valid sources. Thus, we are concerned about the inclusion of CalEnviroScreen results in Section 4.8 of the Draft Report. While we understand the interest to include a discussion regarding CalEnviroScreen, SCAP respectfully requests that the Final Report explain the substantial differences between this screening tool and a comprehensive risk analysis. For example, CalEnviroScreen has been used to estimate a community's combined "pollution burden and population characteristics" score, while MATES provides a lifetime risk estimate from exposure to air toxics.

SCAP's comments on Section 4.8 of the Draft Report are incorporated into the attached document for your consideration. Our membership believes that it is important to communicate that CalEnviroScreen scores are not an expression of health risk, and this screening tool is not intended to be used as a health or ecological risk assessment for a specific area or site.

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Encinitas, CA 92024-1565
Fax: 760-479-4881 Tel: 760-479-4880 Website: www.scap1.org Email: info@scap1.org

We appreciate your consideration of our comments, and look forward to working with SCAQMD on our mutual goal of cleaning the air. If you have any questions regarding these comments, please do not hesitate to contact me at (760) 479-4121.

Sincerely,

John Pastore, Executive Director

cc: Elaine Chang, SCAQMD
Philip Fine, SCAQMD

ATTACHMENT

SCAP's Recommended Revised Section 4.8 of the MATES IV Draft Report

4.8 California Communities Environmental Health Screening Tool (CalEnviroScreen)

Since the completion of the MATES III Study, the California Environmental Protection Agency (CalEPA) and Office of Environmental Health Hazard Assessment (OEHHA) developed a screening tool for evaluating multiple pollutants and stressors in communities, called the California Communities Environmental Health Screening Tool (CES). This tool has been used to estimate a community's "Pollution Burden and Population Characteristics" score, while MATES provides a lifetime risk estimate from exposure to air toxics. The purpose of this section is to outline the fundamental difference between MATES and CES.

In August 2014, CES version 2.0 was released. This version produces results at the census tract level for approximately 8,000 census tracts in California and approximately 3,600 tracts within the jurisdiction of SCAQMD. The model consists of two component groups – pollution burden and population characteristics. Unlike MATES, which provides a traditional health risk assessment approach using measured air toxic contaminants, CES considers pollution surrogates and community characteristics that have been shown to affect vulnerability to pollution, such as socioeconomic factors or underlying health status. A set of statewide indicators (Table 4-8), selected based on existing environmental, health, demographic and socioeconomic data, is used by CES to create a screening score for communities across the state.

Table 4-8

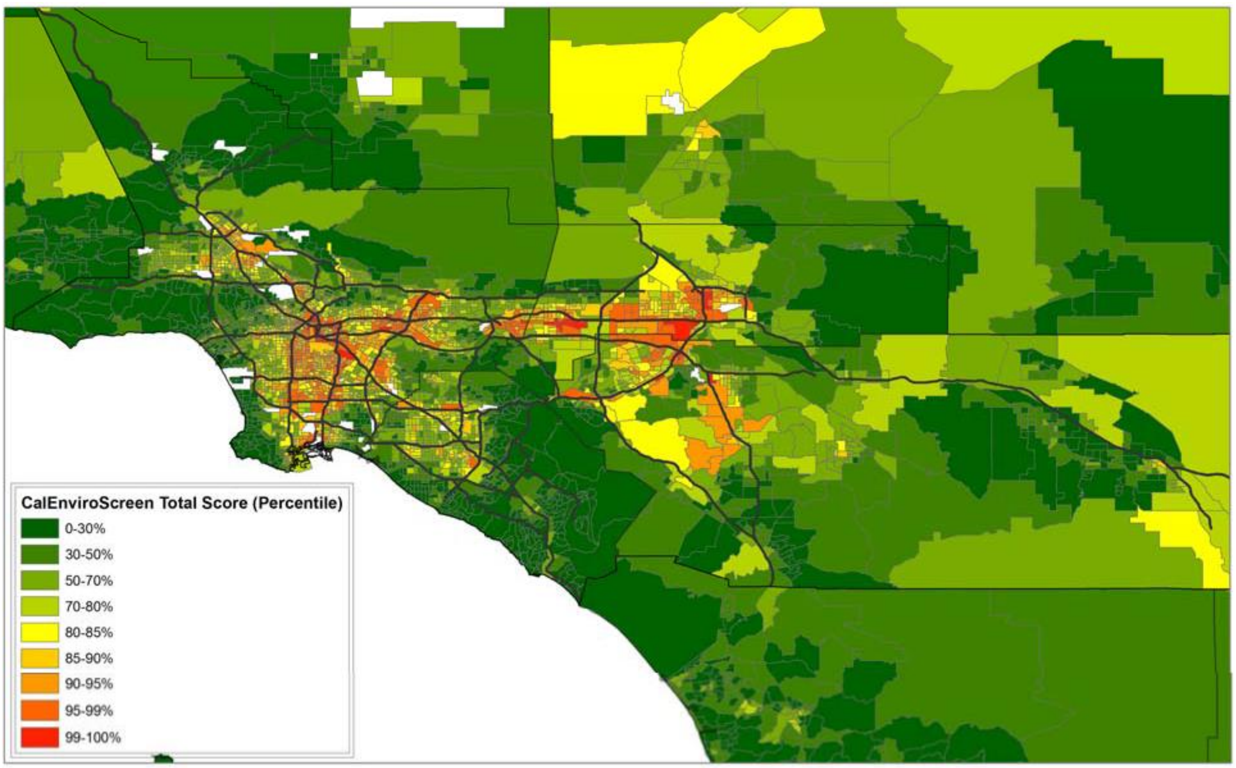
Indicators used to Represent Pollution Burden and Population Characteristics in CES Version 2.0

Component Group 1: Pollution Burden		**Component Group 2: Population Characteristics**	
Exposures	Environmental Effects	Sensitive Populations	Socioeconomic Factors
PM 2.5 concentrations Ozone concentrations Diesel PM emissions Pesticide use Toxic releases from facilities Traffic density Drinking water quality	Cleanup sites Groundwater threats Impaired water bodies Solid waste sites and facilities Hazardous waste	Children and elderly Asthma emergency department Low birth weight births	Educational attainment Linguistic isolation Poverty Unemployment

For each indicator, a value is assigned for each census tract. Among the areas with an indicator value, the values are ranked from highest to lowest and a statewide percentile score is created for each indicator in each census tract. The percentile score for all individual indicators is averaged in each component group and then divided by the maximum value observed in the State. In the pollution burden component group, environmental effects indicators are weighted half as much as the exposure indicators. The component group scores are both scaled to a maximum of 10 with a possible range of zero to 10. Finally, the overall CES score is calculated by multiplying the scaled component group score for pollution burden by the scaled component group score for population characteristics. The highest possible CES percentile score is 100 with an equal contribution from the two component groups. An area with a high score would be expected to have higher pollution burdens and vulnerabilities than other areas with low scores. Results produced by CES can help decision-makers determine how to focus available time, resources and programs to improve the environmental health of Californians.

Figure 4-17 depicts the CES score in SCAQMD highlighting the census tracts scoring in the highest percentiles across the state. Most urbanized areas are in the top 30% score, indicating these tracts have higher pollution burden and population characteristics compared to other communities in the State. In particular, a significant fraction of census tracts in the Los Angeles, Riverside and San Bernardino counties are in the top 10% of the relative statewide scoring.

Figure 4-17



CES Version 2.0 Overall Scores. ***Data retrieved from OEHHA in September 2014.***

While CES can assist CalEPA in prioritizing resources and helping promote greater compliance with environmental laws, it is important to note some of its limitations. The tool's output provides a relative ranking of communities based on a selected group of available datasets, through the use of a summary score. Unlike MATES, the CES score is not an expression of health risk, and does not provide quantitative information on increases in cumulative impacts for specific sites or projects. Further, as a comparative screening tool, the results do not provide a basis for determining when differences between scores are significant in relation to public health or the environment. Accordingly, the tool is not intended to be used as a health or ecological risk assessment for a specific area or site.

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Keck School of Medicine of USC

Scott Fruin
Assistant Professor

Dr. Jean Ospital
Health Effects Officer
South Coast Air Quality Management District
21865 Copley Dr,
Diamond Bar, CA 91765

Re: Comments on MATES Ill Report

Dear Dr. Ospital:

I appreciate the opportunity to comment on the October 2014 draft of the MATES IV study. This study importantly demonstrates the continuing success of SCAQMD and CARB regulations and policies to improve air quality and reduce exposures in the South Coast Air Basin. I have grouped my recommendations into three major areas:

1) presentation and interpretation of results;
2) conversion of elemental carbon (EC) to diesel particulate matter (DPM) concentrations; and
3) characterization of uncertainties.

PRESENTATION AND INTERPRETATION OF RESULTS

The reduction in air toxic exposures of 65% since MATES III should be presented clearly as an unqualified success story. In fact, the MATES III basin *average* would be considered a hot spot by MATES IV standards. However, I do not feel this message comes across as strongly as it should when multiple results covering changes in the OEHHA exposure estimation are presented.

A key point is that the exposure and risk reductions measured by MATES IV are not affected by the changes in the OEHHA exposure methodology. The OEHHA changes can and should apply to all MATES studies and any risk calculations and risk maps comparing different MATES studies should be based on a single, consistent method. Using different exposure methodologies (such as was done in the maps of ES-4 and ES-6) sends a confusing message that the risk reductions measured in MATES IV are somehow offset due to previous flaws in assessing exposure.

I also suggest that differing exposure methodologies not be used in any presentations of risk, as it likely will result in confusion for policy makers and the public. If you disagree, I suggest that any presentations of MATES III risk in the MATES IV report that use the new OEHHA exposure methods be put in appendices, along with detailed explanations of the changes in the exposure calculation methodology.

Other recommendations for presenting results are listed in the Appendix under “Specific Suggestions for Data Presentation.”

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CALCULATION OF DIESEL PM CONCENTRATIONS
Because a large part of the reduction in cancer risk was due to changes in the DPM/EC ratio, more detail should be provided about the changes in this ratio along with estimates of uncertainty.

Appendix XI should be expanded and included in the main report due to its importance. Because the overall risk numbers are dominated by diesel PM exposure, the uncertainty in the conversion of measured EC to DPM may dominate the overall cancer risk uncertainty. This conversion factor should be given a detailed uncertainty analysis based on estimated uncertainties in the emission inventories and speciation profiles. (Another large uncertainty in the risk numbers that should be mentioned is the large uncertainty in the DPM cancer potency factor.)

Below are some questions that I feel should be addressed in an expanded Appendix XI:

1. Were the large changes in DPM/EC ratios from MATES III to IV due to actual reductions in this ratio or were they primarily due to better speciation profiles (e.g., better methods, larger sample numbers, etc.)? For example, was the single 2005 exhaust profile (based on much older engines) appropriate to use for 2005? How uncertain was this profile? Were sample numbers adequate and were the tested engines sufficiently representative of 2005 engines?
2. Were there improvements or important changes in the DPM emission inventory from MATES III to IV?
3. Was the decrease in DPM/EC ratio expected or reasonable due to changes in engine technology and fleet turnover? This was discussed briefly for ocean-going vessels but not for other source categories.
4. In light of the above information, is it reasonable that the DPM/EC ratio changed from 1.04 to 1.95 then back down to 0.85 over the course of the last three MATES studies?
5. Were different contributions by source category in different parts of the basin taken into account? If not, should they have been? One example might be a decrease in DPM/EC ratio as one goes inland and the average ratio is less influenced by the high ratio for ocean-going vessels.
6. The sensitivity test of using the MATES III profiles for MATES IV data was a good idea but the results were not presented clearly.

UNCERTAINTY
A detailed uncertainty analysis including all uncertainties should be part of this report. It is clear that there are large differences in relative uncertainties between the analysis methods, emission inventories, DPM/EC ratios and cancer potency factors. As described above, the uncertainty in the DPM/EC ratio may dominate the overall risk numbers and be worthy of increased attention, as described below.

Besides giving readers an appreciation for the sometimes large uncertainties present in cancer risk estimations, knowing what uncertainties contribute most to the overall risk uncertainty can be useful in determining where future resources and efforts should be focused. At the same

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time, any measurements contributing significantly less total risk than the overall risk uncertainty could be considered for elimination. This would allow diverting resources to other study needs such as increased DPM measurements and/or reducing the measurement and analysis uncertainty for Cr(VI) and 1,3-butadiene, two challenging compounds to measure with good accuracy.

Any uncertainty analysis should also include the spatial uncertainty. For example, DPM shows near road and near-freeway concentrations several times higher than ambient. While these may have been included in the 2 x 2 km grid average, there are large, socioeconomic-related differences in proximity to roadways across the basin. These should be an explicit concern in a study of this type.

Please feel free to contact me regarding any of these recommendations.

Best regards,

Scott Fruin

Dr. Scott Fruin, P.E.
Assistant Professor
Environmental Health Sciences
USC Keck School of Medicine

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Scott Fruin
Assistant Professor

APPENDIX
Additional Recommendations
One important caveat to include is that people who live, work, attend school, or drive in locations of elevated DPM may be subject to significantly higher risks than these calculations indicate.

One new aspect of the large downward temporal trend in concentrations is that the risk reductions in a year or two are now larger than the site-to-site differences within a given year. This might justify the continuous temporal coverage of one location, such as Central Los Angeles, which matches the overall basin average for most compounds, and fewer numbers of sites or reduced sampling frequencies at sites that do not differ very much.

In absolute terms, the big reductions are from on-road diesel. The actual decreases in the inventory as modeled should be highlighted up front, along with the regulations and programs that are believed to be behind them. The other risk reductions should be prioritized by quantity.

Specific Suggestions for Data Presentation
One alternative inter-study mapping strategy that might be useful would be to make maps of the percent of basin average risk. This would allow direct inter-study comparisons of spatial differences that would not have been produced in previous reports. These will show a reduction in spatial disparities from MATES III to IV.

For credibility, the results should not be presented with three or four digit precision. If the uncertainty is +/- 50%, for example, only two digit precision is justified.

Table 2-2 (Sampling locations): It would be useful to list distance from and orientation to the nearest busy road.

Section 3.8 and Table 3-6: More discussion of these results seems warranted. Table 3-6 seems to show fairly large discrepancies in MATES III versus IV inventory changes and changes in the air measurements. Cr(VI), 1,3-butadiene and benzene are important since they contribute significantly to total risk. For Cr(VI) and 1,3-butadience, relatively large discrepancies may be due to measurement challenges and may be deserving of more resources while other compounds contributing little risk might be considered for elimination if that results in a cost savings.

Calculating spatial correlations would highlight which compounds are global (e.g., high correlations for CCl_4), which are regional and which are more localized (with lower correlations). It is important to show where BC/EC fits in this picture—it may be localized most of the time but build up to be a regional pollutant during times of summer inversions.

In Appendix IV, correlation matrices for elements and VOCs would be useful to present. Also, readings below the Limit of Detection (LOD) should be set to 2/3 of the LOD rather than zero. This is less conservative and also more appropriate if the fraction of readings below the LOD is moderate, i.e., fewer than 20 or 30%.

Appendix G seems repetitive in some places. Some graphs are not readable (Figures 4, 13).

Suggest listing emissions by contribution to risk rather than just alphabetically for enhanced public understanding.

Linear regressions for scatter plots like Fig 14 in Appendix G (EC vs BC) should probably be log transformed.

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DEPARTMENT OF DEFENSE
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5090
Ser N40JRR.mh/001
January 5, 2015

Jean Ospital
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Subject: DRAFT MULTIPLE AIR TOXICS EXPOSURE STUDY MATES IV

Thank you for the opportunity to comment on the Draft Multiple Air Toxics Exposure Study IV (MATES IV) on behalf of the military services in California. The Study validates the efforts of the South Coast Air Quality Management District (SCAQMD) to reduce air toxics since MATES III was conducted in the 2004-2006 timeframe.

However, we understand the MATES IV Study is not consistent in the use of scientific advancements in the assessment of risk. While recent advancements in modeling and exposure assessment were incorporated into MATES IV, the latest scientific updates were not applied for the dose-response assessment portion of the Study. This is in specific reference to page 1-3 in the Dose Response Assessment, "For this study, the dose-response estimates developed by OEHHA are used to estimate the potential for adverse health effects." The Study and SCAQMD would be best served by using the best and most current dose-response data and unit risk cancer potency factors from U.S. EPA.

Unfortunately, some of the key OEHHA cancer dose response/ potency factors are over 20 years old and thus do not reflect current knowledge, which the Study as a whole is to be based on. While MATES IV acknowledges on page 1-3 that OEHHA cancer potency "estimates sometimes differ from those developed by the U.S. EPA", the MATES IV report does not affirm that it applied any dose-response advancements since the MATES series began. Specifically, key inhalation cancer potency values used (as per Appendix I of MATES IV and as shown on Table 4-6 of the Draft Report) were proposed in October 1990 (for trichloroethylene, TCE) and October 1991 (for perchloroethylene, PCE), suggesting 23-24 years have passed since the OEHHA toxicity studies for these chemicals were developed. The MATES IV Report should incorporate in their risk assessment process the best and most current dose-response science as it has incorporated recent exposure assessment science.

Specifically, OEHHA's outdated unit risk cancer potency factor for PCE is based on a toxicological study from 1986. The current state of knowledge for PCE toxicity was reviewed on a national scale from 2004-2012, with an updated unit risk cancer potency factor established using a 1993 study with a 2010 National Research Council panel report, that was documented by written and oral comments from scientists within the U.S. EPA, other federal agencies, and the Office of Management and Budget, as well as the public (Regulations.gov 2008). The output of the national PCE unit risk update effort was finalized by the EPA Integrated Risk Information System (IRIS) in February 2012 (http://www.epa.gov/iris/subst/0106.htm). A similar update for TCE was completed on a national scale in September 2011 (http://www.epa.gov/iris/subst/0199.htm.

The MATES IV practice of retaining the outdated TCE unit risk cancer potency factor that has been in use since October 1990 means the MATES IV risk calculations use 24-year old dose-response science, whereas other OEHHA and California DTSC guidance directs the use of the updated (U.S. EPA IRIS) TCE toxicity value by way of HERO Note 3 (posted 14 Jul 14 at http://www.dtsc.ca.gov/assessingrisk/humanrisk2.cfm), making the California MATES IV approach using the 1990 OEHHA value for TCE inconsistent with HERO Note 3. In particular, HERO Note 3 (http://www.dtsc.ca.gov/AssessingRisk/upload/HHRA-Note-3-2.pdf) now directs risk assessors at California "hazardous waste sites and permitted facilities" to use the U.S. EPA Regional Screening Level for TCE (i.e., to use the U.S. EPA TCE IRIS unit risk cancer potency factor). Thus, SCAQMD and the MATES IV study should be consistent with DTSC guidance and incorporate the latest scientific knowledge of dose-response and unit risk factor selection.

Additionally, the MATES IV use of OEHHA cancer potency values contradicts the U.S. EPA OSWER Guidance Directive 9285.7-6, *Use of IRIS Values in Superfund Risk Assessment* which directs a hierarchy of cancer potency values be used in certain federal (i.e., Superfund) risk assessments. The OSWER guidance is clear to state that a Tier 1 value from U.S. EPA IRIS is to be used in risk assessment if one exists for a given chemical, which is the case for PCE and TCE. Please note that the OEHHA inhalation cancer potency values are considered Tier 3 values in the OSWER

Guidance hierarchy. Since a Tier 1 value exists for PCE and TCE, it is the best value to use particularly at federal sites subject to compliance with U.S. EPA guidance.

The Study notes in the Executive Summary that uncertainty in the risk estimates may be reduced with further scientific studies. Uncertainty in the risk estimates would be reduced by the use of the most current cancer potency value published in the U.S. EPA IRIS database, produced by rigorous nationwide scientific and peer-reviewed efforts.

On behalf of the military services in California, please consider this input to improve the Final MATES IV Study by consistently applying the most credible and current state of dose-response knowledge.

My point of contact for this is David Bell who can be reached at (415)977-8845 or Michael Huber at (619)532-2303.

Sincerely,

C. L. Stathos

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By direction