

**APPENDIX XIII**

**MATES IV**

**FINAL REPORT**

**Responses to Comments Received on the MATES IV Draft Report**

Below is a compilation of comments received on the MATES IV Draft Report, followed by staff responses.

Comment: The draft MATES IV report, pp. 5-14 to 5-15, speculates 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.

Response: In the Phase III of the LAX AQSA Study, pp. 5-99, it is indicated that: *“The particle size distribution (PSD) data from the Winter Season indicates the 7-30 nm particles are likely associated with jet exhaust while the 30-160 nm particles were likely associated with aged aerosol and directly emitted vehicle exhaust emissions.”* which is not inconsistent with conclusions in MATES IV report. In the comprehensive LAX AQSA Study, the diurnal variations of PSD and other pollutants were measured and studied. The correlations of specific particle size ranges with other pollutants provide information regarding the relative contributions of different possible sources. The LAX AQSA Study (pp. 113) concludes: *“[d]ifferences in correlations of UFP with other pollutants and day-of-week variations in diurnal profiles in 7-30 nm and 30-160 nm particles suggest that particles in the two size ranges may have different origins. Good correlations of the 30-160 nm particles with CO, NO, and BC and strong weekday dependence of diurnal variations indicates an association of these particles with vehicle emissions. In contrast, the poorer correlations with SO<sub>2</sub> and NO<sub>2</sub> suggest contributions of jet exhaust and possibly secondary particles.”* identifying vehicular traffic as a possible contributor to the measured ultrafine particles.

Our findings from the LAX local-scale study show the influence of aircrafts on the measured UFP concentrations, however elevated concentrations adjacent to freeways were also observed. In the MATES IV LAX local study,

considering that site 8 is located immediately downwind of the I-405 freeway, this site is most susceptible to be affected by emissions originated from the freeway; therefore it is hypothesized in the report that the slightly higher measured UFP concentrations at site 8 (e.g. compared to site 4, also downwind but further away from the freeway) may be due to the contribution of vehicular emissions. The report has been revised to refer to the Phase III LAX AQSA Study for more information.

Comment: Has the District run a regression analysis against POLA and POLB throughput to see what effect, if any, higher or lower throughput has had on cancer risk.

Response: 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.

Comment: Given the significance of traffic sources in the Basin, and the fact that AQMD uses EC as a marker of carcinogenic diesel emissions, I attached our latest paper in which we used PMF on the speciation network data from 2002-2012 to do source apportionment, and showed that in L.A. and Riverside counties, the traffic emissions were reduced from the 2002-2006 to the 2008-2012 period by ~30% 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 effectiveness of the emission standard.

Reference: Long-term source apportionment of ambient fine particulate matter (PM<sub>2.5</sub>) in the Los Angeles Basin: A focus on emissions reduction from vehicular sources, Sina Hasheminassab, Nancy Daher, Bart D. Ostro, Constantinos Sioutas, Environmental Pollution 193 (2014) 54-64.

Response: Staff appreciates the reference, and it is included in Appendix XI.

Comment: 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.

Response: Standard deviations have been added to the diurnal variation plots of BC and UFP in Appendix VI.

Comment: 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?

Response: The highest annual average black carbon concentration measured during the MATES IV Study was observed in Inland Valley San Bernardino site. Similarly, elemental carbon concentration measured at this site during the MATES III Study, conducted between April 2004 and March 2006, was among the highest measured in the fixed sites throughout the basin. These observations suggest presence of local diesel sources. The addition of particulate matter number concentration measurements in MATES IV Study provides additional insight which may be helpful in identifying possible sources of BC emissions in this region, considering that the identification of such potential sources in this region was non-conclusive in the MATES III Study. Typically high BC concentrations not accompanied by high UFP concentrations could be attributed to heavy-duty diesel vehicle and locomotive emissions. In one of the local-scale studies of the MATES IV, BC and UFP were measured in vicinity of the San Bernardino Railyard as one of the potential sources of the observed elevated BC concentrations (Chapter 5 – Page 5-15). Railyards are a complex mix of many source types including trains, stationary equipment, terminal operations and on-road vehicles, particularly heavy-duty diesel trucks. Generally, elevated BC concentrations are expected in vicinity of a railyard facility due to high traffic activity of heavy-duty diesel vehicles. This is evident from higher measured BC concentrations around the railyard compared to the concentrations measured at the fixed Inland Valley San Bernardino site during the same period. The railyard and the chosen sampling sites in this study were all located upwind of I-215, and the light-duty vehicle traffic around the railyard is not significant; therefore, the measured concentrations mostly reflect emissions of heavy-duty diesel vehicles. This may explain highly elevated BC concentrations not accompanied by equally high UFP concentrations around the San Bernardino Railyard. Similar observation at the fixed Inland Valley San Bernardino site may also suggest higher contribution of diesel emissions compared to gasoline traffic in this region. It should be noted that the relative contribution of light-duty and heavy-duty vehicles to the measured BC and UFP levels and

identification of other possible sources of BC and UFP is difficult to assess with this limited dataset.

Comment: Fig 5-7, 5-8 and 5-9 are these averages across sites? If so, error bars need to be added.

Response: The error bars were not added to these plots in order to simplify the report for general public, since this report is intended mainly for an audience with a non-scientific background. Some of the plots in this chapter are presented with the error bars (including Figures 5-7 and 5-9; Figure 5-8 with the error bars is not readable) in Appendix VI – Black Carbon Measurements at Fixed Sites and Appendix VII – Ultrafine Particle Measurements at Fixed Sites, where more details and scientific discussions are included for more technical readers.

Comment: The LAX pilot study is very well presented and in concert with 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.

Response: Thank you for your comment and the reference. This study echoes the findings of the MATES IV Study and the reference has been added to the report.

Comment: Commenter notes a fundamental disagreement with the Elemental Carbon/Organic Carbon (EC/OC) apportionment method used in MATES.

Response: There was no apportionment of EC or OC in the MATES IV Study, other than the use of EC as a surrogate for diesel PM. Staff acknowledges that there is no specific method to measure diesel PM in ambient air. The method used employs EC as a surrogate measure and estimates diesel PM levels by applying the emissions ratio of diesel PM and EC from the emissions inventory to the measured EC concentrations. Additional details are provided in Appendix XI.

Comment: 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.

Response: The risk factors used for diesel PM and other air toxics, as noted in the report, are those adopted by the California EPA Office of Health Hazard Assessment.

Comment: There is concern that EMA was excluded from the MATES Technical Advisory Committee, 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.

Response: A Technical Advisory Group was selected to give input to SCAQMD staff on a range of technical areas. We note that all meetings of the Advisory Group were open to the public, notice of meetings were sent to interested stakeholders, and anyone with interest or relevant information was invited to provide comments.

Comment: 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.

Response: Staff believes that the substantial reductions in air toxics was emphasized and conveyed appropriately, including specific graphical comparisons of ambient levels measured with those from prior MATES studies. Staff has added additional language to point out the reductions.

Comment: The Policy Implications section should acknowledge 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.

Response: While staff may share the commenter's optimism that reductions in air toxics will continue into the future, staff believes that only future study of ambient levels of air toxics can provide the information needed to determine if future risks will indeed be reduced and to what extent. Whether future residual risk levels from diesel PM are acceptable is a question of policy and risk management that is beyond the scope of this report. Also note that the Basin is still in non-attainment for both the annual and 24-hour PM<sub>2.5</sub> standards

Comment: Suggest including additional figures and charts in the Executive Summary comparing estimated risks from MATES IV to MATES III:

- A pie chart of the MATES-III results in addition to the MATES-IV results showing the area of the pie charts proportional to the risk estimates at the fixed monitoring sites

- A bar chart should be added to the Executive Summary comparing the change in risk between the two studies and clearly show that risk have decreased from 1,200 in 2006 to 400 in 2013

Response: These reductions were noted in the summary text, and a chart showing the reductions in risks across the Basin is also included to show both the magnitude as well as the spatial extent of estimated risks in MATES IV compared to MATES III.

Comment: There has been no re-evaluation of the Diesel PM URF (Unit Risk Factor) 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.

Response: While the PM mass emissions of “new technology” diesel engines are substantially lower on a per mile or per hour operating basis, there is a lack of data that would indicate whether such emissions differ in terms of toxic potency per mass emitted. Again, staff used the potency factors established by OEHHA. Should OEHHA develop a different potency factor, staff will employ it in our estimates. Staff also notes a recent report from the Health Effects Institute describing the lack of tumors found in a laboratory animal study of “new technology” diesel exhaust, where the study’s Review Panel states that “whether the toxicity per unit mass of the PM emitted from the 2007-compliant engines was changed compared with older engines, the Panel pointed out that ACES was not designed to investigate this question.” And further that the most straightforward inference would be that the steep drop in particle mass and levels of organic components in exhaust significantly decreased the observed overall toxicity of exhaust compared with the toxicity of exhaust from older engines. That is, the decrease in toxic effects observed was likely due to the substantial reduction in the exposure level of diesel particulate, and not necessarily a change in the per unit mass risk factor.

Comment: The statement regarding increased ultrafine and particle number emissions in the MATES IV Report is wrong, and should be removed from the text. Page 5-12 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). 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.

Response: Staff concurs that proper controls on diesel engines can reduce both particle mass (PM) and particle number (ultrafines). A full discussion of the different emissions controls and their impacts is beyond the scope of this report, and thus this discussion has been removed.

Comment: 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.

Response: This erroneous statement has been removed.

Comment: There is concern expressed that the difference between the MATES III and MATES IV West Long Beach sites are considerable, especially with EC.

Response: The two-sample T-test was used to test the difference between the average pollutant concentration in the MATES III and MATES IV West Long Beach sites. Except for acetaldehyde, p values are above 0.05 for other species listed in Table V-1. Therefore, the differences between the MATES III and MATES IV West Long Beach sites are not statistically significant ( $p > 0.05$ ) for most constituents.

Note that ambient monitoring data is used to provide temporal and spatial trends of VOC/carbonyl/PM species. Cancer risk calculations and source identification are based on the emission inventory, which does not rely on monitoring data. More details about development of the 2012 emission inventory can be found in Chapter 3. Nonetheless, the following text has been added in Appendix X (page X-4) to highlight the potential observed differences:

“... relative to MATES III are in line with the monitoring data from the ports. Note that the levels of some PM constituents measured concurrently at the MATES IV West Long Beach site were slightly higher than those at the MATES III West Long Beach site (more details about the location and comparison of the two sites can be found in Appendix V). Therefore, the percentage reduction of PM species from the ambient monitoring program at West Long Beach might be a low estimate.

Comment: The impression is given that the major contributors of BC emissions measured at the WLB site are from the Port's operations - diesel-powered vehicles, non-road mobile



machinery, and ships. However other area sources play a significant role in the measurements in Appendix VI. Commenter presented an analysis of BC measurements conducted by the port, and concluded that local BC sources (within a few hundred meters) contributed between 15% and 19% of the total measured BC concentrations on January 3rd” and that on the days that “similar BC levels and meteorological conditions persist”, “there are significant urban and regional contributors to the levels of BC measured at the port monitoring stations”.

Response: This is in line with what is presented in MATES IV Appendix 6, where the major sources of BC in the port area are associated with the port activities, including ship emissions, port related traffic, goods movement and other activities related to the ports; while acknowledging other potential BC sources, such as the seasonal residential wood burning and other local sources. It should also be noted that the BC measurements in the MATES studies were not conducted for source apportionment analysis. Identifying and quantifying the contribution of various sources are achieved from the emission inventories and were not the purpose of BC measurements or Appendix 6. However, high time resolution BC measurements provide important information including the temporal trends which are helpful in identifying major and dominating sources.

Comment: In the analysis presented by commenter, based on 1-min BC concentration measurements, “[e]levated 1-min spikes of BC concentrations (up to  $40 \text{ ug/m}^3$ ) 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.”

Response: The sharp BC spikes in the 1-min data probably originate from nearby sources, which are most likely direct emissions from diesel trucks on the nearby roads since the continuous point-source emissions and neighborhood contributions are expected to appear as more slowly varying concentrations rather than sharp, short-lived spikes (Watson and Chow, 2001). Moreover, as the commenter indicated as well, these spikes are more common during the rush hours with higher vehicular traffic (coupled with shallower mixing heights). Given that the major vehicular emitters of BC are diesel trucks, these spikes are most likely related to the goods movements to and from the ports which

are considered as port activities in this report.

The commenter concludes that *“local BC sources (within a few hundred meters) contributed between 15% and 19% of the total measured BC concentrations on January 3<sup>rd</sup>”*. Based on the locations of the measurement stations the commenter expects that *“the Inner Harbor stations, 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”*, meaning that the Inner Harbor station is affected by local sources more than the Outer Harbor station. However based on the analysis presented by the commenter, the difference between the estimated contribution from local sources are only 4%, suggesting that the local sources at the Inner Harbor station are not a significant contributor to the total measured BC concentrations.

In the report it is clearly acknowledged that other than major BC sources, depending on the region, other sources may also contribute to the measured concentrations. For example it is mentioned in the report (Appendix VI – Page VI-1) that: *“While the major source of EC and BC in an urban area is diesel-powered vehicles, non-road mobile machinery, ship emissions, residential heating (such as wood burning stoves) and open biomass burning (e.g. forest fires or burning of agricultural waste) also contribute to the observed levels. For example, in some areas residential burning of wood or coal, or open biomass burning from wildfires, may be even more important sources of BC. In industrial regions, harbors and industrial facilities may have a pronounced effect on BC concentrations.”* and also (Appendix VI – Page VI-13) *“As mentioned earlier, other than diesel exhaust other sources contribute to increasing the total BC content of atmospheric PM. These may include biomass burning, coal burning, meat charbroiling and fuel oil (ship emissions).”*

Comment: The high correlation between two data sets collected comparing the MATES III and MATES IV West Long Beach sites might indicate a consistency where data points increase or decrease together on the same date. The increase in EC at the MATES IV WLB site might be due to its proximity to a localized source.

Response: The BC levels at the MATES IV West Long Beach site are probably affected by emissions from the Terminal Island Freeway 103, located only 300 feet

upwind of the sampling station, where vehicular traffic from goods movement associated with the San Pedro Bay Ports is particularly pronounced.

Comment: Suggested a comparison between UFP of the MATES III and MATES IV WLB sites.

Response: Unfortunately, particle counts were not in part of the sampling campaign in 2007-8 at the MATES III site. A detailed analysis of UFP spatial and temporal variation of the current MATES is presented in Appendix VII.

Comment: The Port's monitoring data at POLB's Inner Harbor station (1 miles south of the MATES III site) shows lower concentration of PM<sub>2.5</sub> mass, EC and OC compared to both the MATES III and MATES IV WLB sites.

Response: The MATES III and MATES IV West Long Beach sites are closer to the Terminal Island Freeway (300 feet and 0.7 mile downwind, respectively) than the Inner Harbor station (1 mile downwind). The Terminal Island Freeway is heavily impacted by heavy-duty diesel trucks traveling to and from the Ports. Vehicular traffic from goods movement associated with Ports' activities could be a significant source of PM emission at the WLB sites.

Comment: Suggested a more detailed analysis of the data due to seasonal meteorological and dispersion conditions in the study timeframe.

Response: Excluding low EC days (< 1 ug/m<sup>3</sup>), there are 3 days when the difference between MATES III and IV West Long Beach site exceeds 2x. For these 3 days, westerly wind prevailed most of the time, and wind speed was moderate to moderately low in the Long Beach area. For the diurnal profile of BC, please refer to Appendix VI.

Comment: The reduction in air toxic exposures of 65% since MATES III should be presented clearly as an unqualified success story. However, this message does not come across as strongly as it should when multiple results covering changes in the OEHHA exposure estimation are presented.

Response: Staff believes this description was included in the report. Regarding the changes in OEHHA risk estimation procedures, this is included to show what the changes are for the MATES IV modeling results that will be compared to future MATES studies using the new methodology. For consistency with previous MATES study results, the previous risk estimations were used to describe the changes in potential air toxics risks.

Comment: 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.

Response: Staff's view is that the changes in risk estimation methodology are important, and should be described. Also that the changes in the methodology, as pointed out by the commenter, do not imply that exposures and risks have gone up compared to previous MATES studies. Staff does not agree that the implication is that reductions in exposures are "offset" due to changes in the calculations for estimating risk. Staff has added revised language in the report to more fully address this.

Comment: Differing exposure methodologies should not be used in any presentations of risk, as it likely will result in confusion for policy makers and the public. Any presentations of MATES III risk in the MATES IV Report that use the new OEHHA exposure methods should be put in appendices, along with detailed explanations of the changes in the exposure calculation methodology.

Response: Staff considered a number of approaches to present the risks resulting from the revised OEHHA calculation methodology, and chose to use the method used in previous MATES reports to provide a comparison of exposures and estimated risks in the previous studies, and then to point out the magnitude of difference in the MATES IV Study when using the revised methodology. It is staff's view that these changes are important to acknowledge and describe for the public and for policy makers.

Comment: 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. Specific questions that should be addressed in an expanded Appendix XI, include the following, presented as

Response: Staff appreciates the detailed and valuable comments from the reviewer. The Appendix XI was revised to address the concerns raised by the reviewer.

Comment: 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

Response: In addition to the speciation profile, some regulatory actions and demographic changes, even though small, contributed to the change. More discussions about the changes are now incorporated in the Appendix XI.

Comment: Were there improvements or important changes in the DPM emission inventory from MATES III to IV?

Response: DPM and EC emissions are calculated using VMT estimated by SCAG and emission factors from EMFAC 2011. Other than the speciation profiles and updates made to EMFAC2011, there was no significant changes in methodology to estimate emissions.

Comment: 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.

Response: A figure (XI-1) is added to demonstrate the changes in speciation profile over time. The calendar year fleet represent an aggregated fleet with different engine type, control technology, engine operation mode, etc. More references are added as well.

Comment: 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?

Response: The ratios were estimated strictly based on the emissions inventory which were the state-of-art at the time of the study. As more advanced and refined data become available, the emission inventory has been updated based on them. Note that MATES II was conducted in 1998-1999 which is over 16 years ago and MATES III is almost a decade old. The changes in the ratio are largely driven by changes in the relative contribution of various EC sources and DPM sources, in addition to updates to speciation profiles.

Comment: 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.

Response: A new paragraph is added in the Appendix XI to discuss the geographical variation of the ratio.

Comment: The sensitivity test using the MATES III profiles for MATES IV data was a good idea but the results were not presented clearly.

Response: A paragraph and a table are now added to Appendix XI to clarify the calculation.

Comment: 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. 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.

Response: The effect of the DPM/EC ratio change due to the speciation methodology change only affects MATES III vs. MATES IV comparisons based on EC measurements. The overall risk assessment using numerical modeling results is not affected by the EC speciation profiles as DPM is estimated directly, and results from the modeling were consistent with the measurement approach. In addition, the DPM concentration estimated using MATES III diesel profile showed less than 25% of variation.

Comment: 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.

Response: Programs such as MATES are designed to monitor and characterize toxic emissions over the entire Basin. However, ambient monitoring is necessarily conducted at a limited number of locations, and modeling is limited to a spatial resolution of 2km. For this reason, communities located close to industrial sources or large mobile source facilities (such as marine ports, railyards and commercial airports) can be affected by higher air contaminant levels that cannot be captured in the typical MATES analysis. Near-road monitoring studies and dispersion modeling results for point sources indicate

that exposure can vary greatly over distances much shorter than 2 km. The local-scale monitoring program of MATES IV aimed to characterize the impacts of large sources on nearby communities by utilizing portable platforms designed to sample for a period of several weeks at selected locations with an emphasis on diesel particulate matter (DPM) and ultrafine particle (UFP) emissions. The studies are designed to assess gradients in ambient pollutant levels within communities as well as provide a comparison to the fixed MATES monitoring sites. The communities chosen for sampling were selected based on proximity to potential sources as well as environmental justice concerns. Please refer to Chapter 5.4 (Page 5-12).

Comment: 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.

Response: Staff appreciates the comment, but the study was designed on a regional scale and thus may not pick up exposures that would be influenced by a nearby source. The modeled risk based on the emissions inventory point out graphically that risks are higher near sources of emissions. For this reason the local-scale program was designed as part of the MATES IV Study to characterize the impacts of some of the large sources in selected locations and assess gradients in ambient pollutant levels within these communities. This local-scale program specifically focused on DPM emissions.

Comment: 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.

Response: The MATES studies are, of course, very resource intensive. Staff appreciates the comment and will take the suggestion into consideration for future studies. It should be noted as well that high-time resolution continuous measurement of black carbon concentrations will continue in four of the fixed MATES IV sites, including the suggested Central Los Angeles site (as well as Anaheim, Rubidoux and Inland Valley San Bernardino sites), in order to monitor the year-to-year variations. Moreover, some of the sampling stations in MATES IV Study, are also part of the National Air Toxics Trends Stations (NATTS),

or National Core (NCore) Multi-Pollutant Monitoring Station, or the Speciation Trends Network (STN) which provide the measured ambient levels of air toxics every year.

Comment: 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.

Response: Staff believes that the relative contributions to risks from the various air toxics measures have been presented in the report. Additional detail on risk weighted emissions is in Chapter 3, which also shows the large reduction from on road vehicles.

Comment: 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.

Response: Staff's view is that the actual estimates are most appropriate to convey the results. A map with percent of Basin average risk would look very similar to the absolute risks presented.

Comment: 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.

Response: Staff appreciates the comment. While most of the data are presented with two decimal points, there are small exceptions with an added digit to accommodate low concentrations observed in certain species.

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

Response: The sampling location addresses are given. It was not the purpose to list nearby potential sources of emissions, as this was a regional scale study with sites generally chosen to be representative of regional or urban scale levels. When local sources are thought to be influencing measurements, they are mentioned in the discussion.

Comment: 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-butadiene, 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.

Response: Changes in benzene air quality should show a lower percentage change than emissions. This is so because benzene has a relative long atmospheric residence time, i.e, there is a large global background benzene concentration.

Changes in 1,3-butadiene emissions are consistent with formaldehyde and acetaldehyde. These pollutants come from similar sources. While changes in air quality for acetaldehyde and formaldehyde are consistent with emissions, changes in 1,3-butadiene are smaller than changes in emissions. Like the commenter alluded to, there is significant measurement challenge in measuring 1,3-butadiene. This is so due to both challenges in analytic technique and the ambient concentrations of 1,3-butadiene have come down significantly over last decade and to levels frequently below analytical detection limit.

The Cr6 inventory increases are primarily due to the increases of brake wear emissions between the two versions of EMFAC used in MATES III and IV. The brake wear increases are also resulting in higher nickel emissions. The other part of nickel increases is due to changes in off-road diesel profile. Therefore, these increases in emissions are due to inventory methodology changes and are not necessary real emissions changes. As shown in Chapter 2, ambient levels for both of these metals showed a decrease from MATES III to MATES IV.

Comment: Calculating spatial correlations would highlight which compounds are global (e.g., high correlations for CCl4), 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.

Response: Intersite correlations are a good suggestion for further analysis, but the MATES Study focused more on determining risk levels from the combined impact of all sources, local or regional

Comment: 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%.

Response: Staff appreciates the comments. Presenting such correlations may be of interest to some, and the data is publically available for further analyses. Regarding presenting data below the limits of detection, staff chose to present the actual readings from the analyses. Setting an arbitrary fraction of the LOD for non-detects may artificially bias the averages high.

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

Response: Staff assumes the reference is to Appendix VI. Both figures (Figure 4 and Figure 13) are removed from the Appendix VI. Figure 4 that presented the daily BC concentrations at each site was not readable because daily concentrations for all ten sites were presented in one graph, with an intention to highlight generally higher concentrations during colder months. Figure 5 shows the trend of monthly (average) BC concentrations averaged over all ten sites which conveys same conclusion as Figure 4; therefore, figure 4 is deleted from the report.

Similarly, Figure 13 presents the correlations between EC and BC measurements for each of the ten sites combined in one plot, which as the commenter pointed out, is not readable in the printouts. Figure 14 presents the same correlation plots, for each site separately; therefore, with the same logic, figure 13 is also removed from the report.

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

Response: Table 3-5 in Chapter 3 (Development of the Toxics Emissions Inventory) lists emissions on a potency weighted basis.

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

Response: Staff presumes this is Appendix VI. Generally the daily BC concentrations measured in this study range from a few hundred to below 5,000 ng/m<sup>3</sup>, therefore log-scale plots were not used.

Comment: The latest scientific updates were not applied for the dose-response assessment portion of the study. Specific examples are for trichloroethylene and perchloroethylene, where more recent potency factors are available from the U.S. EPA Integrated Risk Information System. Commenter also noted that the reports use of OEHHA potency factors in not in line with EPA guidance “Use of IRIS Values in Superfund Risk Assessment”

Response: Staff has acknowledged in the report that the risk factors from OEHHA are often different than those in the EPA IRIS System. Should OEHHA revise the California risk factors, staff will apply such revised factors.

Comment: Concerned about the inclusion of CalEnviroScreen results in Section 4.8 of the Draft Report. Request that the Final Report explain the substantial differences between this screening tool and a comprehensive risk analysis and communicate that CalEnviroScreen scores are not an expression of health risk.

Response: Staff agrees that the difference between MATES and CalEnviroScreen should be emphasized. Section 4.8 has been revised to include the commenter’s recommendation.