

MATES V

Diesel Particulate Matter Estimation

MATES V TECHNICAL ADVISORY GROUP MEETING

JULY 6TH, 2017



What is Diesel Particulate Matter?

Diesel Particulate Matter (DPM) is the particulate component of mobile and stationary diesel engine exhaust.

- It consists mainly of soot, volatile organic matter (VOC), sulfate, nitrate, metals, and other trace elements.

DPM cannot be measured directly and has to be estimated.

Emissions from diesel powered engines have substantially changed over the last decade because of

- Improved fuel quality
- Changed engine designs
- Improved emission control technologies

Why is DPM Important?

In California, DPM is identified as a Toxic Air Contaminant (TAC) and classified as a carcinogen.

- In previous MATES studies, DPM was the key driver for air toxic risk.
- In MATES IV DPM accounted for 68% of the total estimated air toxics risk.

The primary interest in the estimation of ambient DPM concentrations is for assessment of inhalation cancer risk in the South Coast Air Basin.

- Estimating the health benefits of emission reductions brought out by implementation of regulations targeting diesel emissions in the Basin.
- Since MATES IV there have been numerous regulations and initiatives to reduce diesel exhaust emissions by local, state and national authorities.

DPM Estimation

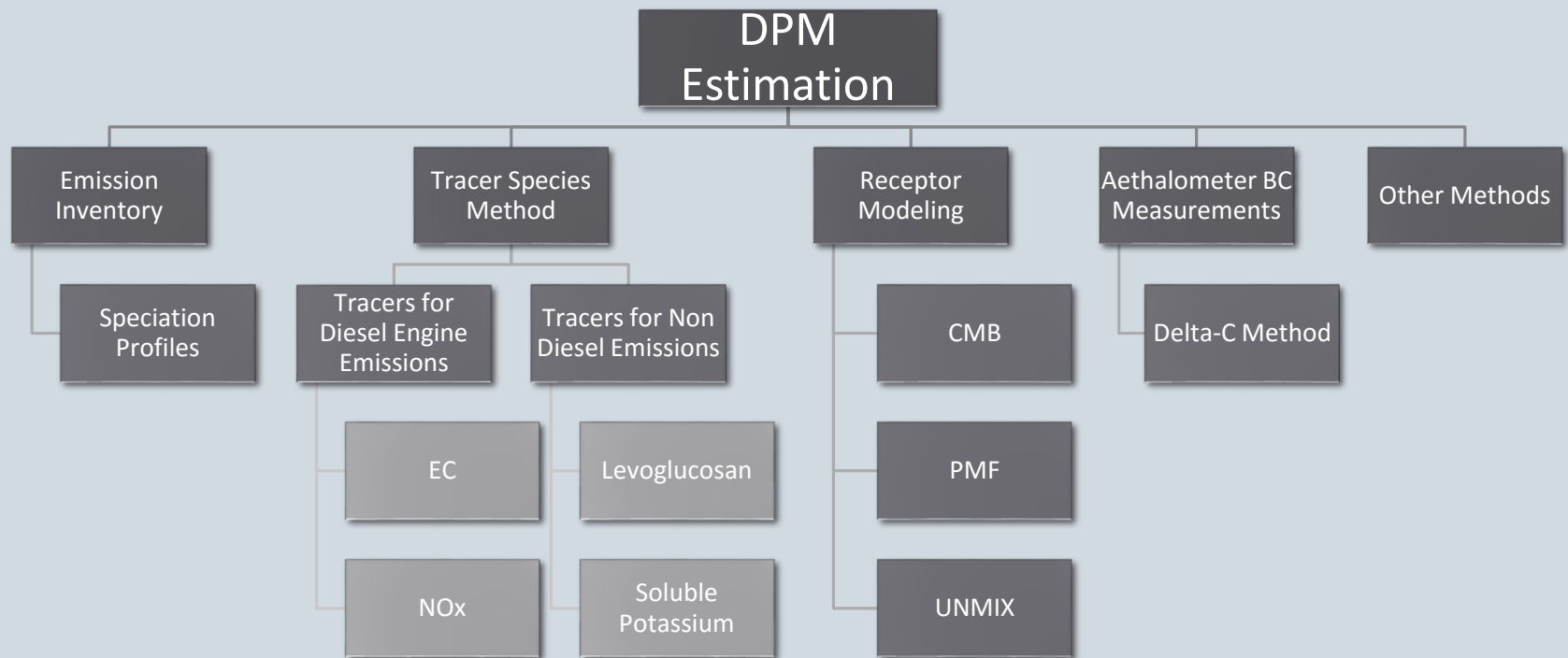
DPM estimations rely on emissions chemical speciation profiles

- Speciation profiles provide estimates of the chemical composition of emissions, and are used in the emission inventory and air quality models.
- ARB maintains and updates chemical speciation profiles and size fractions of PM for a variety of emission source categories.

The Evolution of speciation profiles

- The updated PM speciation profiles are developed based on recent dynamometer experiments and comprehensive source testing studies.
- They vary substantially depending on fleet type, engine technology, engine model year, emission control technologies, driving cycles, loading, etc.
- The more recent speciation profiles, if/when available, provide the means for potentially a more accurate DPM estimation.

Other DPM Estimation Methodologies



MATES V Approach and Considerations

The use of multiple methods will provide for a more accurate DPM estimation and validation.

- Perform a comprehensive literature research and obtain updated speciation profiles and emission inventory if available
- Construct DPM database based on speciation profiles and emission inventory
- Perform receptor modeling
- Explore the possibility of using the Aethalometer Delta-C method
- Perform sensitivity analysis to quantify the effect of methodology change (and updated speciation profiles) on the results when compared to previous MATES studies if applicable
- Potential collaborative source apportionment studies

Questions and Discussion...

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