

## Prospective Characterization of Ambient Diesel for MATES III

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March 31, 2004

## MATES II: Methodology

- EC/OC measurements determined using IMPROVE method from PM<sub>10</sub> samples
- Factor of 1.04 applied to EC concentrations to estimate diesel particulate concentrations
  - 67% diesel engine contribution to ambient fine EC concentrations in Los Angeles
  - 64% of diesel exhaust is EC

## Recent Studies on PM Sources

- Molecular markers and source-oriented and/or receptor-oriented chemical mass balance models
  - Most thorough apportionment of PM sources
  - Few laboratories capable of doing analysis
  - Expensive
  - Labor intensive

## Major Particulate Sources and Corresponding Molecular Markers

Source	Examples of Molecular Markers
Diesel Exhaust	EC, Hopanes, Steranes, PAHs, Carbonyls
Automobile Exhaust	Hopanes, Steranes, Benzo[ghi]perylene (BGP), EC (small amounts)
Meat Charbroiling	PAHs, Cholesterol, Nonanal, Oleic Acid, EC (small amounts)
Biomass Burning	Levoglucosan, Pimaric Acid
Tire Rubber	Particle Bound PAHs, EC (small amounts)
Coal Combustion	Sulphates
Paved Road Dust	Triacantane, Hentriacontane, Dotriacontane, Tetracontane
Natural Gas Combustion	Benz[de]anthracen-7-one

## Source Contributions to Fine Particle Elemental Carbon (EC)

Location	Date	EC/OC Method	Diesel Exhaust			Biomass Burning	Other
			%	%	%		
South Coast Basin	1982	Huntzicker <i>et al</i>	67	11	---	22	
Downtown LA	1982 Average	NIOSH	94	3.5	1.1	1.0	
West LA	1982 Average	NIOSH	89	5.5	3.3	2.2	
Pasadena	1982 Average	NIOSH	96	1.2	0.7	1.7	
Rubidoux	1982 Average	NIOSH	88	5.9	3.6	2.4	
Los Angeles Basin	1993 Average	NIOSH	57	19	6.4	17	
Bakersfield, CA	Winter 1995	NIOSH	86	1.2	11	1.6	
Fresno, CA	Winter 1995	NIOSH	80	0.8	18	1.4	
Brighton, CO	Winter 96-97	IMPROVE	66	26	2.2	5.1	
Welby, CO	Winter 96-97	IMPROVE	51	42	4.2	2.5	
Southeastern US	January 2000	NIOSH	74	0.3	25	0.7	
Southeastern US	April 1999	NIOSH	84	0.8	14	0.6	
Southeastern US	July 1999	NIOSH	92	0.1	7.4	1.0	
Southeastern US	October 1999	NIOSH	85	0.2	15	0.5	

Studies used molecular marker source apportionment or emissions inventory source attribution. Adapted from Schauer (2003).

## Proposed Analysis

- PM<sub>10</sub> and PM<sub>2.5</sub> Measurements
- EC/OC measured via IMPROVE method on all PM<sub>10</sub> and PM<sub>2.5</sub> samples
- EC/OC measured via NIOSH method on 5-10% of the PM<sub>10</sub> and PM<sub>2.5</sub> samples

## Concluding Remarks

- Establish EC trend in South Coast Basin
- Determine best way to calculate diesel's contribution to ambient PM concentrations in the Basin
  - Compare updated results to results calculated using Gray (1986) factor
  - Use updated emissions inventory and recent literature and incorporate into a source-oriented model
  - Other Alternative Approaches?
- Determine possibility of analyzing a small fraction of PM samples for molecular markers

## References

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