



# Emissions Inventory

MATES III Technical  
Advisory Group  
March 13, 2008

**DRAFT REPORT**  
Multiple Air Toxics Exposure Study  
In the South Coast Air Basin



**MATES-III**  
January 2008



South Coast  
Air Quality  
Management District  
21865 Copley Drive  
Diamond Bar, CA 91765  
AQMD *Cleaning the air that we breathe.™*

# Outline

- Methods
- Results for carcinogens
  - ✓ Species apportionment
  - ✓ Source apportionment
  - ✓ Emissions and air quality changes since MATES-II

# Methods

- 2007 AQMP inventory forms the basis of the MATES-III toxic inventory.
- 2002 baseline emissions projected to 2005.
- “Top-down” approach used for developing toxic emissions.
  - i.e., chemical composition of TOG and PM emissions determined by ARB’s speciation profiles.
  - <http://www.arb.ca.gov/ei/speciate/speciate.htm>.
- Emissions spatially allocated to 2 km by 2 km grid cells.

# Why “Top-down Approach?”

- Speciating TOG and PM inventories affords consistency with 2007 AQMP.
  - Fits in with AQMD’s goal of a comprehensive plan
- Photochemical modeling requires complete speciation of TOG; an inventory of just toxics would be insufficient.
- AQMP tools for projecting future emissions & air quality benefits can also be used for MATES-III to estimate cancer risk benefits from the AQMP.

# Pollutants Inventoried

Acetaldehyde*	Elemental carbon	Organic carbon
Acetone	Ethylene dibromide*	p-Dichlorobenzene*
Arsenic*	Ethylene dichloride*	Perchloroethylene*
Benzene*	Ethylene oxide*	Propylene oxide*
1,3 Butadiene*	Formaldehyde*	Selenium
Cadmium*	Hexavalent chromium*	Silicon
Carbon tetrachloride*	Lead*	Styrene
Chloroform*	Methyl ethyl ketone	Toluene
Chromium	Methylene chloride*	Trichloroethylene*
1,1 Dichloroethane*	MTBE*	Vinyl chloride*
Diesel particulate*	Naphthalene*	
1,4 Dioxane*	Nickel*	* denotes carcinogen

# Emission Inventory Results

# Preliminaries

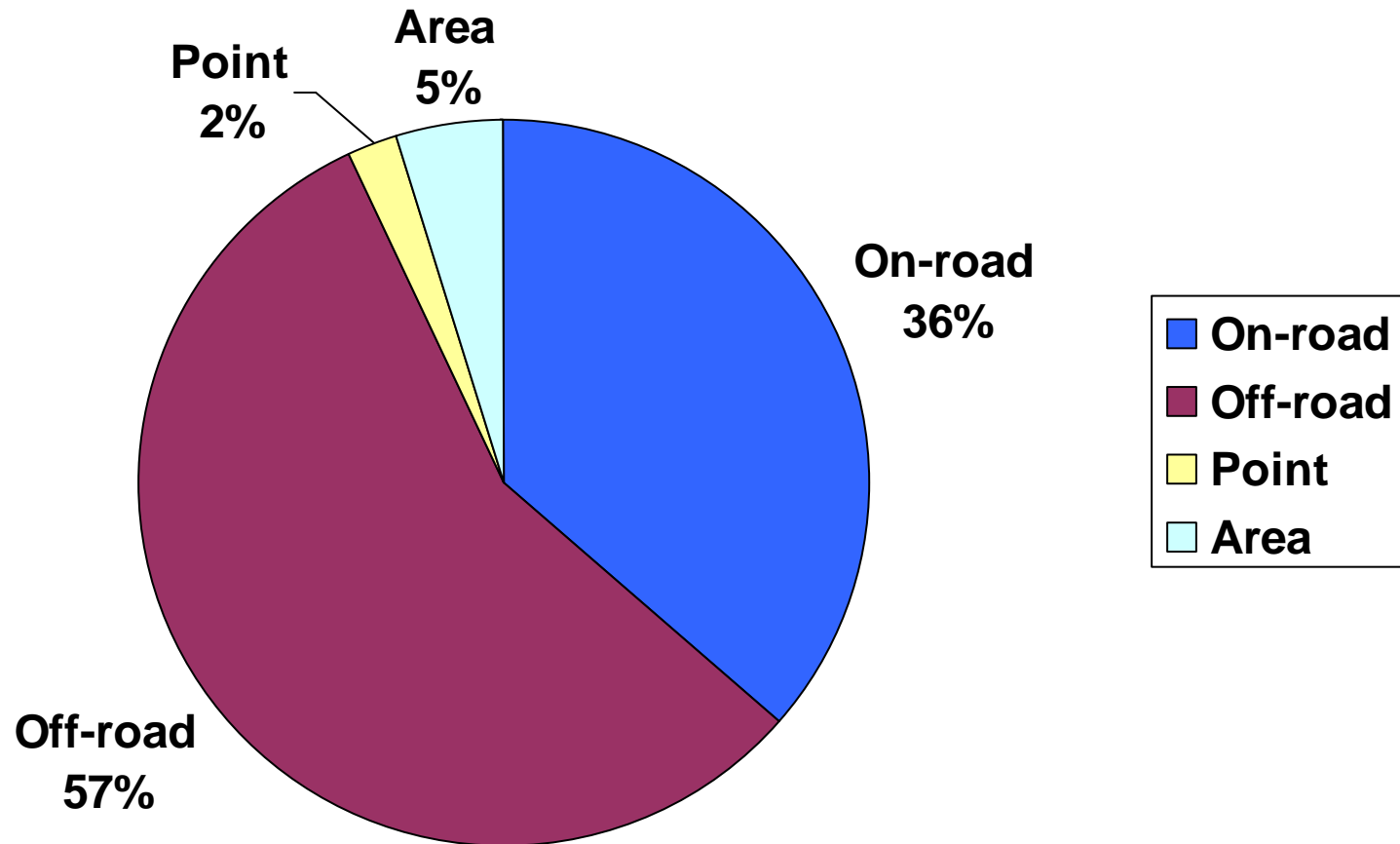
- Slides that follow only consider carcinogens.
- Emissions are in diesel PM currency.
  - i.e., emissions weighted by the ratio of the carcinogen's cancer potency to the cancer potency of diesel PM.
- 1998 = MATES-II; 2005 = MATES-III

# Species Apportionment of Cancer Potency Weighted Emissions

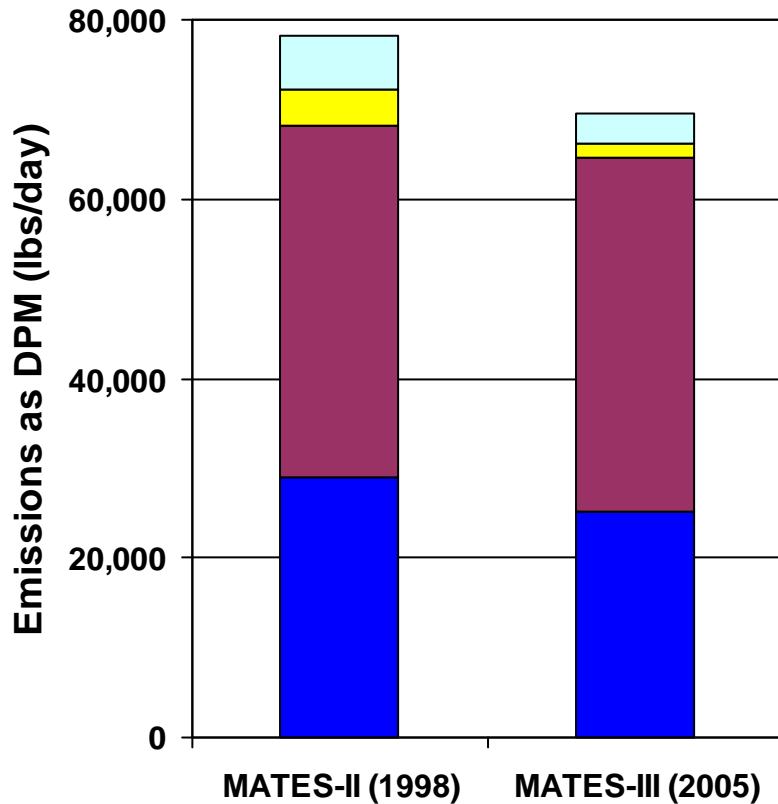
<b>Toxic</b>	<b>Contribution (%)</b>	<b>Toxic</b>	<b>Contribution (%)</b>
Diesel particulate	86.94	Arsenic	0.66
1,3-Butadiene	4.02	p-dichlorobenzene	0.30
Benzene	2.95	Cadmium	0.29
Perchloroethylene	2.92	Hexavalent chromium	0.26
Formaldehyde	0.97	Naphthalene	0.24
		<b>Total</b>	<b>99.6</b>



# Carcinogenic Source Apportionment



# Carcinogenic Emissions (MATES-II vs. MATES-III)



■ On-road ■ Off-road ■ Point ■ Area

Source Category	Percent Change
On-road	13% decrease
Off-road	1% increase
Point	65% decrease
Area	43% decrease

# Emission and Air Quality Changes Since MATES-II

<b>Gases</b>	<b><math>\Delta E</math></b>	<b><math>\Delta AQ</math></b>	<b>Particulates</b>	<b><math>\Delta E</math></b>	<b><math>\Delta AQ</math></b>
Acetaldehyde	-9%	-9%	Arsenic	-20%	-59%
Benzene	-36%	-50%	Cadmium	-19%	-75%
1,3 Butadiene	-31%	-73%	Elemental Carbon	-2%	-28%
Formaldehyde	-21%	-9%	Hex. Chromium	-85%	-5%
Methylene Chloride	-38%	-53%	Lead	-14%	-53%
Perchloroethylene	-58%	-78%	Nickel	-22%	-34%
Trichloroethylene	-65%	-81%			