



**DIESEL PARTICULATE MATTER
EXPOSURE OF UNDERGROUND
METAL AND NONMETAL MINERS
Final Rule May 18, 2006**

DIESEL PARTICULATE MATTER EXPOSURE OF U/G MNM Miners

- ❖ **Final Rule.....Jan 19, 2001**
- ❖ **Final Rule.....Jul 5, 2001**
- ❖ **Final Rule.....Feb 27, 2002**
- ❖ **Settlement Agreement.....Jul 18, 2002**
- ❖ **Final Rule.....Jun 6, 2005**
- ❖ **Final Rule.....May 18, 2006**
 - **Final DPM Limit**
 - **Special Extensions**
 - **Respiratory Protection**

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- ❖ **Final Rule.....May 18, 2006**
 - **Final DPM Limit**
 - **Special Extensions**
 - **Respiratory Protection**

May 18, 2006 Final Rule

- ❖ Final DPM Limit (PEL) phase-in
 - 3 steps over 2 years, as follows:
 - $308_{\text{EC}} \mu\text{g}/\text{m}^3$ Effective May 20, 2006
 - $350_{\text{TC}} \mu\text{g}/\text{m}^3$ Effective January 20, 2007
 - $160_{\text{TC}} \mu\text{g}/\text{m}^3$ Effective May 20, 2008
- ❖ 1st step, $308_{\text{EC}} \mu\text{g}/\text{m}^3$, is Elemental Carbon (EC) limit
- ❖ 2nd & 3rd steps are Total Carbon (TC) limits

May 18, 2006 Final Rule

- ❖ Starting January 20, 2007, and until rulemaking is completed to convert Final TC limits to Final EC limits, DPM compliance determinations will be based on TC
- ❖ For 350 $\mu\text{g}/\text{m}^3$ limit, TC will be determined by:
 - EC + OC
 - EC x 1.3 (as a check to eliminate interference from non-DPM sources of OC)
- ❖ Citations will be issued when:
 - EC + OC exceeds 350 $\mu\text{g}/\text{m}^3$ x EF AND
 - EC x 1.3 exceeds 350 $\mu\text{g}/\text{m}^3$ x EF
- ❖ This is the exact same practice MSHA followed prior to June 2005 Final Rule

May 18, 2006 Final Rule

- ❖ The 350_{TC} µg/m³ PEL will remain in effect from January 20, 2007 through May 19, 2008
- ❖ Starting May 20, 2008, the DPM PEL will drop to 160_{TC} µg/m³
- ❖ Rulemaking is required to convert 160_{TC} µg/m³ step to comparable EC-based PEL, and this rulemaking has not yet begun

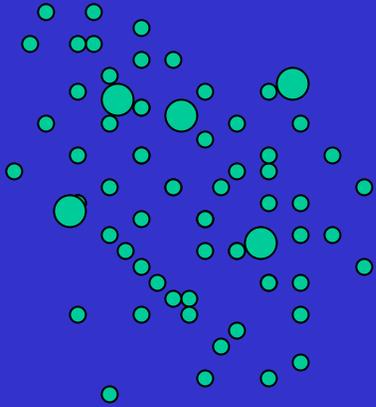
DPM, Total Carbon, EC + OC, EC x 1.3

Diesel particulate matter consists of:

- **solids, liquids, and vapors;**
- **burned and unburned hydrocarbons;**
- **oxides of sulfur, nitrogen;**
- **metal fragments, metal oxides,
other substances**
- **“Raw” mixture difficult to measure**
- **Carbon components can be accurately
measured at very low concentrations**

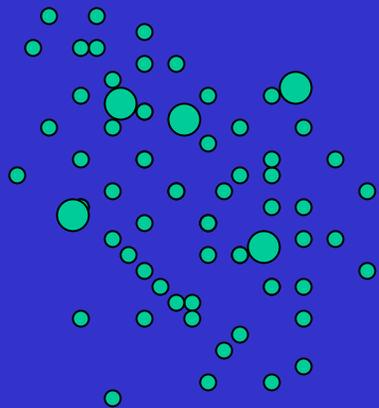
DPM Carbon Components

DPM Carbon Components

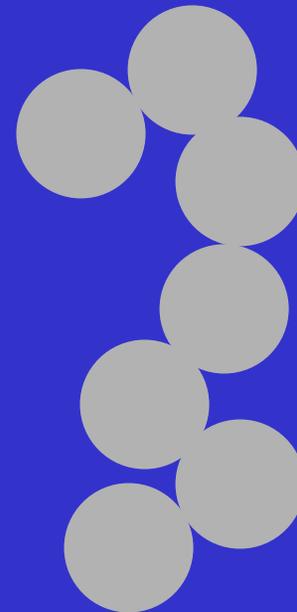


Vapor Phase
Hydrocarbons (OC)

DPM Carbon Components

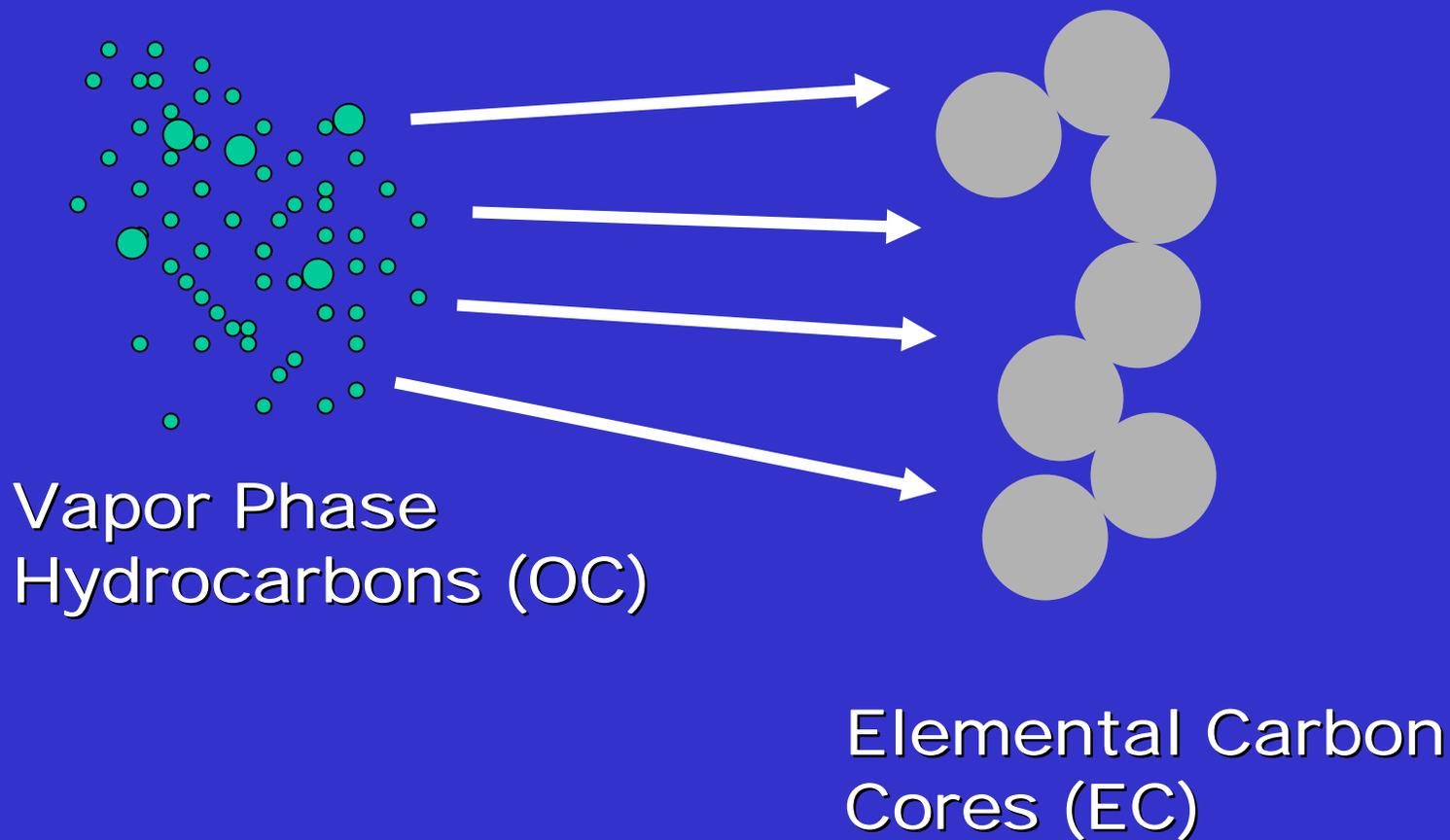


Vapor Phase
Hydrocarbons (OC)



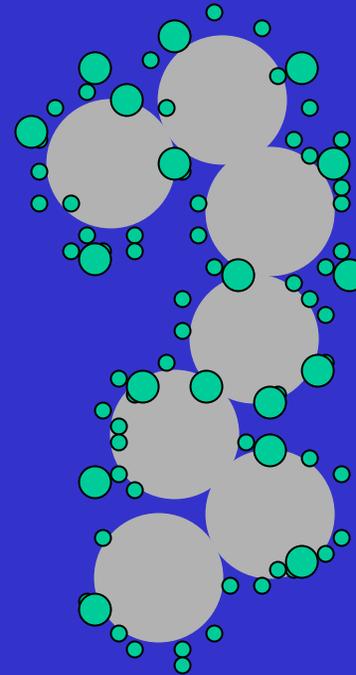
Elemental Carbon
Cores (EC)

DPM Carbon Components



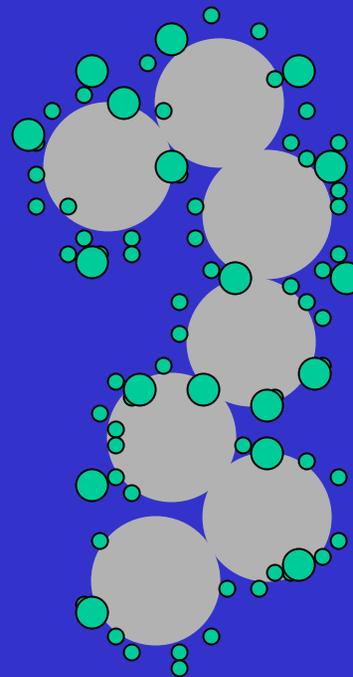
DPM Carbon Components

Hydrocarbons
Adsorbed Onto
Elemental Carbon
Cores (OC + EC)



DPM Carbon Components

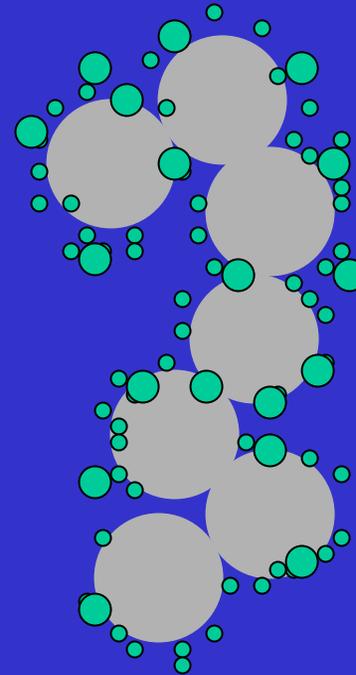
Hydrocarbons
Adsorbed Onto
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$$OC + EC = TC$$

DPM Carbon Components

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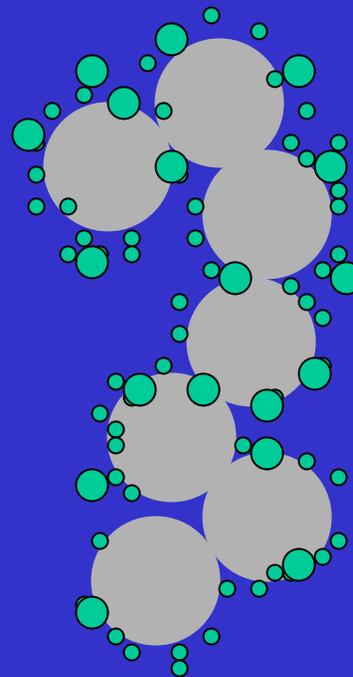


$$OC + EC = TC$$

Original Interim PEL = $400_{TC} \mu\text{g}/\text{m}^3$

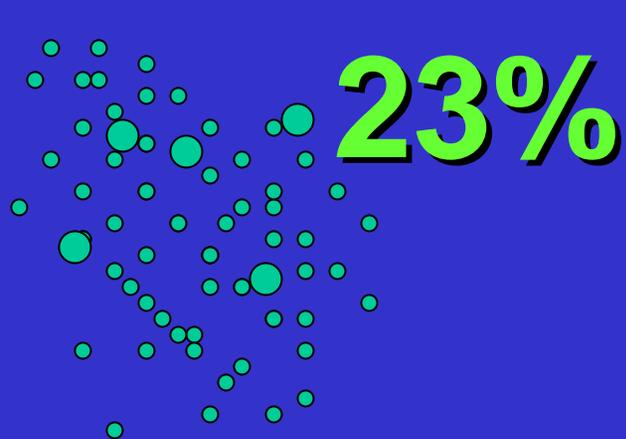
DPM Carbon Components

Hydrocarbons
Adsorbed Onto
Elemental Carbon
Cores (OC + EC)

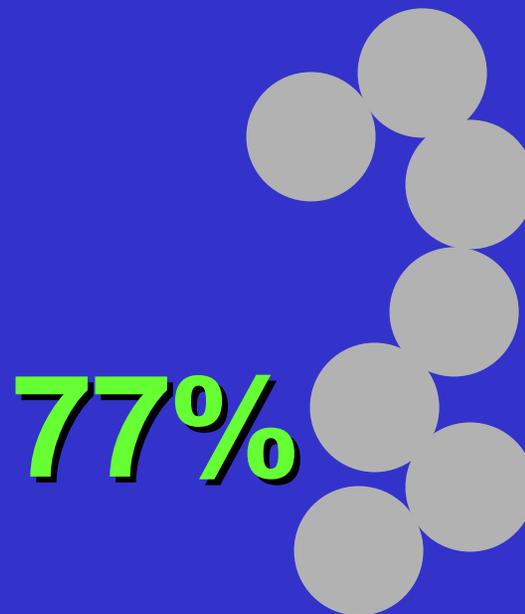


**Potential interference from
non-diesel sources of OC
(cigarette smoke, drill oil mist)**

DPM Carbon Components

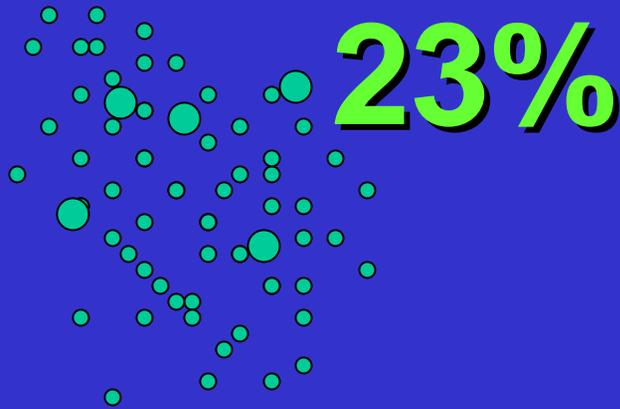


Vapor Phase
Hydrocarbons (OC)

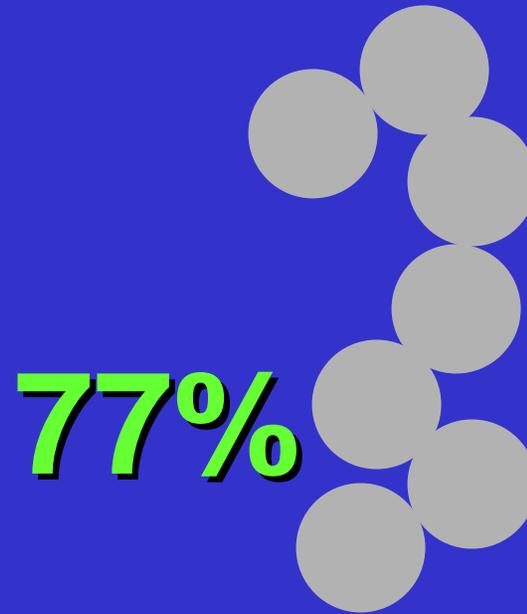


Elemental Carbon
Cores (EC)

DPM Carbon Components



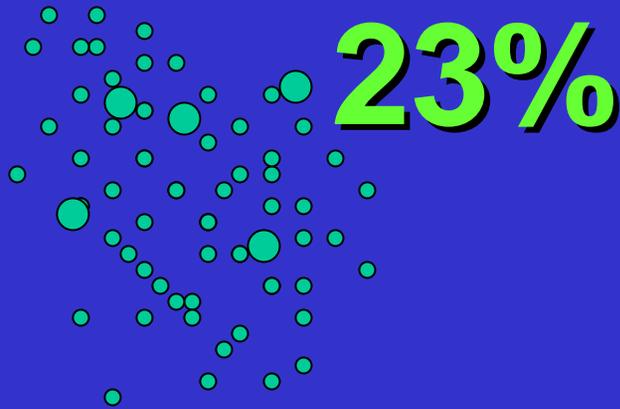
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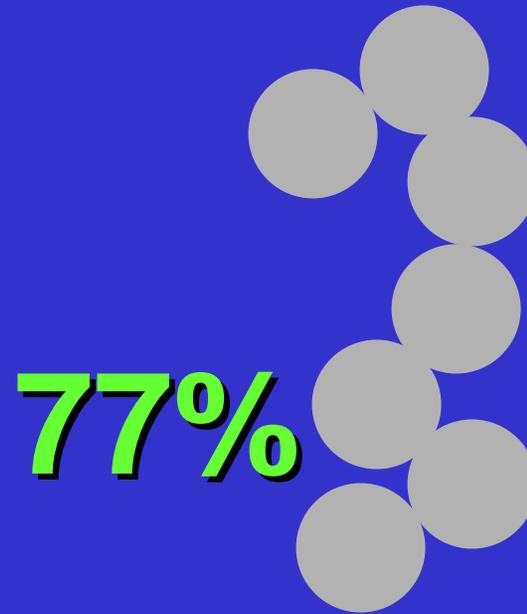
Elemental Carbon
Cores (EC)

$$77\% \times 1.3 = 100\%$$

DPM Carbon Components



Vapor Phase
Hydrocarbons (OC)

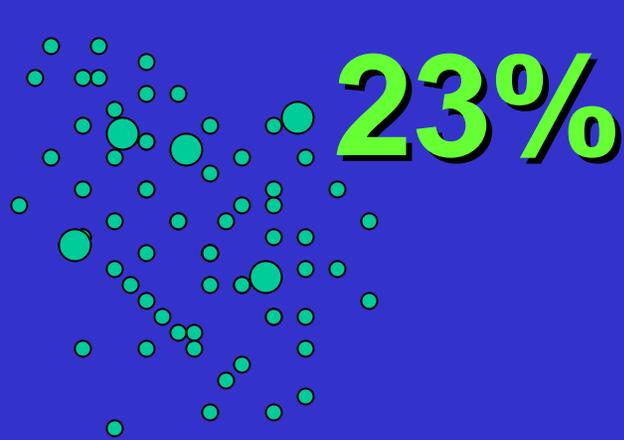


Elemental Carbon
Cores (EC)

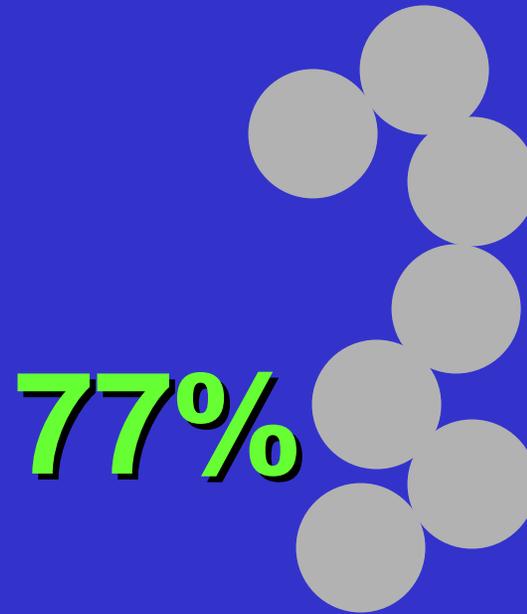
$$77\% \times 1.3 = 100\%$$

$$EC \times 1.3 = TC$$

DPM Carbon Components



Vapor Phase
Hydrocarbons (OC)



Elemental Carbon
Cores (EC)

$$77\% \times 1.3 = 100\%$$

EC



TC

For $TC > 200$ to $230 \mu\text{g}/\text{m}^3$

DPM PEL SUMMARY

❖ Starting January 20, 2007:

Final PEL = 350_{TC} µg/m³

❖ Enforcement based on:

Lower of EC + OC & EC x 1.3

❖ Starting May 20, 2008:

Final PEL = 160_{TC} µg/m³

❖ Enforcement based on:

???????

Special Extensions

- ❖ Any mine operator may apply for Special Extension to the Final PEL if they believe technological or economic infeasibility affect their ability to attain compliance
 - Previously, mines that began using diesel equipment after 10-29-98 were excluded
- ❖ All other Special Extension provisions unchanged from June 5, 2005 Final Rule:
 - Application filed with District Manager
 - Each extension limited to 1 year
 - Applications for subsequent 1 year extensions may be submitted thereafter

DPM Controls & Respiratory Protection

- ❖ DPM exposures must be controlled to the applicable PEL using feasible engineering and administrative controls**
- ❖ If controls do not reduce exposure to the PEL, controls are infeasible, or controls do not produce significant DPM reductions:**
 - All feasible engr and admin controls must be used to reduce exposures to as low a level as feasible**
 - Such controls must be supplemented with respiratory protection**

Respiratory Protection

- ❖ **Confidential medical evaluation required to determine miner's ability to use a respirator**
 - **Must be before fit testing or use at mine**
 - **No cost to miner**
 - **Evaluation must be by physician or other licensed health care professional (PLHCP)**
 - **If PLHCP determines miner is unable to wear negative pressure respirator, PLHCP must also evaluate miner's ability to wear powered air purifying respirator (PAPR)**

Respiratory Protection

- ❖ Miner must have opportunity to discuss evaluation with PLHCP before final dermination submitted to mine operator
- ❖ If miner disagrees with evaluation, they have 30 days to submit additional information to PLHCP
- ❖ Reevaluation required whenever mine operator has reason to believe conditions have changed which could adversely affect miner's ability to wear respirator

Respiratory Protection

- ❖ If PLHCP determines miner unable to wear respirator, miner must be transferred within 30 days to existing position at same mine where respirator is not required (with pay retention)
- ❖ Miner must continue to receive compensation at no less than regular rate of pay in the classification held by the miner immediately prior to transfer

Respiratory Protection

- ❖ **Increases in wages of the transferred miner based on new work classification**
- ❖ **Mine operator must maintain records of identity of PLHCP and the most recent determination of each miner's ability to wear respirator. Records must be kept for duration of miner's employment + 6 months**

SUMMARY OF MAY 2006 FINAL RULE

- ❖ These are only highlights of the new rule. There are many important details.

REVIEW THE ENTIRE RULE

AND

DPM COMPLIANCE GUIDE

Find links to both on MSHA's
MNM DPM single source page

<http://www.msha.gov/01-995/Dieselpartmnm.htm>

Thank You

