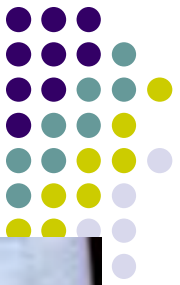


January 6, 2007



FOUNDED 1867

The Sacramento Bee

FRIDAY, JANUARY 26, 2007 **

www.sacbee.com

** FINAL EDITION 50 CENTS

Senator: Cheney interfered

New intelligence panel chief
criticizes efforts to stall Iraq probe.



'ROCK-
LLER

Senator says
administration
dropping
arm is

By Jonathan S. Landay
McCLATCHY WASHINGTON BUREAU
WASHINGTON - Vice President Dick Cheney exerted "constant" pressure on the Republican former chairman of the Senate Intelligence Committee to stall an investigation into the Bush administration's use of flawed intelligence on Iraq, the panel's Democratic chairman charged Thursday.

In an interview with McClatchy Newspapers, Sen. Jay Rockefeller of West Virginia also accused President Bush of running an illegal program by ordering eavesdropping on Americans' international e-mails and

Living near busy roads tied to kids' lung risk

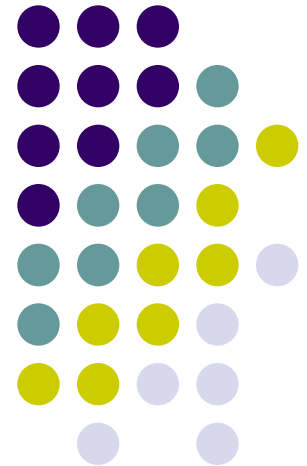
Impact on breathing is long-term health threat, study says

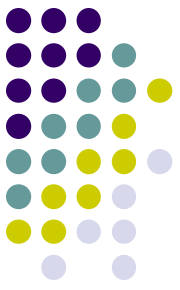


**So we know that there is an
urgent need for mitigation for
roads, ports, and rail roads –
how can we do it - now?**

Tom Cahill

Professor of Physics and Atmospheric
Sciences and Head, DELTA Group,
University of California, Davis

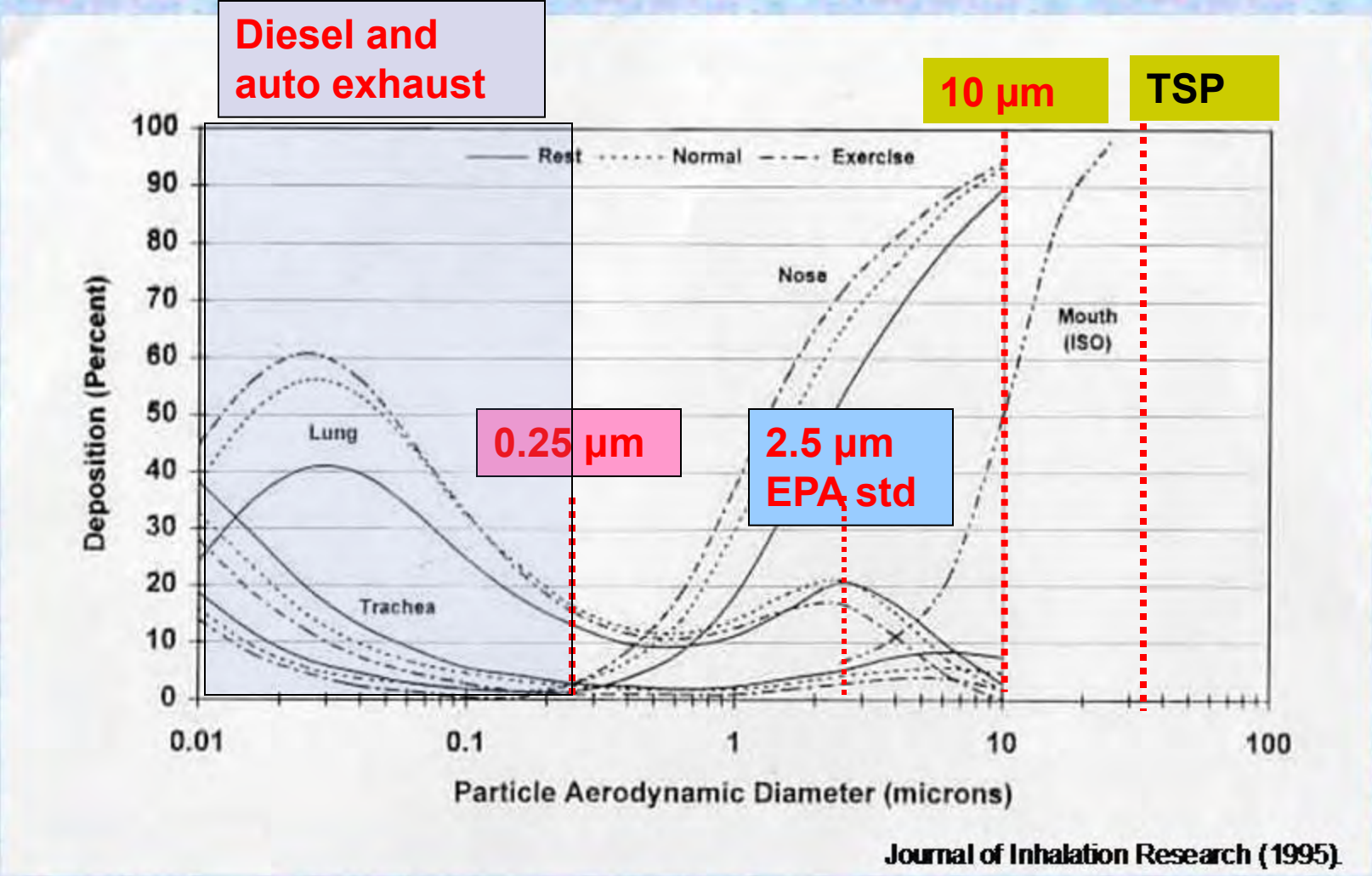




Barriers to effective, timely mitigation

- **Source improvements, mostly engines and fuels**
 - **Engine changes – years to decades to do**
 - Federal preemption of trucks and trains
 - **Fuel changes – more rapid, but still many years**
 - **Best and most rapid – remove gross polluters**
- **Source to right-of way fence**
 - **Distance – must be done in design phase**
 - Costs money for extra land, remote siting
 - **Roadway and facility design – also in design phase**
 - **Existing polluters – Vegetation barriers, operations,...**
- **Right of way to receptor (residences, schools, ...)**
 - **Distance – must be done in planning phase**
 - **Existing developments – Transport alternatives, vegetation, barriers**
- **Receptor – residences, schools, etc**
 - **Indoor air quality improvement**
 - Positively pressurized filtered receptors

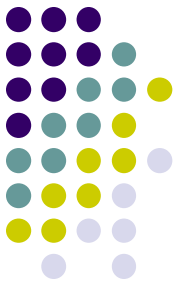
Particle Size versus fraction deposited – mouth, nose, trachea, and lung



Journal of Inhalation Research (1995).

This figure shows the relationship between particle size and what percent is deposited in different parts of the respiratory tract.

1. Source improvements, mostly engines and fuels



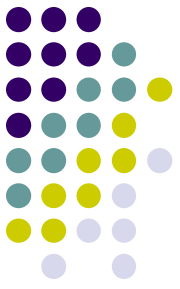
- **Responsibility: The polluter**

- **Oversight: Federal EPA, Calif ARB and IMRC -smog check**
- **Options:**
 - Cleaner engines
 - Better fuels
 - Removal of gross emitting vehicles (~ 3%) from roadways

- **However, new findings require new source mitigation efforts**

- The health impacts of ultrafine metals
- New data on organic carcinogens

2. Source to right-of way fence



1. Responsibility: The Polluter

2. Oversight: None

1. Options:

1. **Distance**,
2. Roadway, facility design options,
3. “Complete Streets”,
4. Vegetation,
5. Land use changes, ...

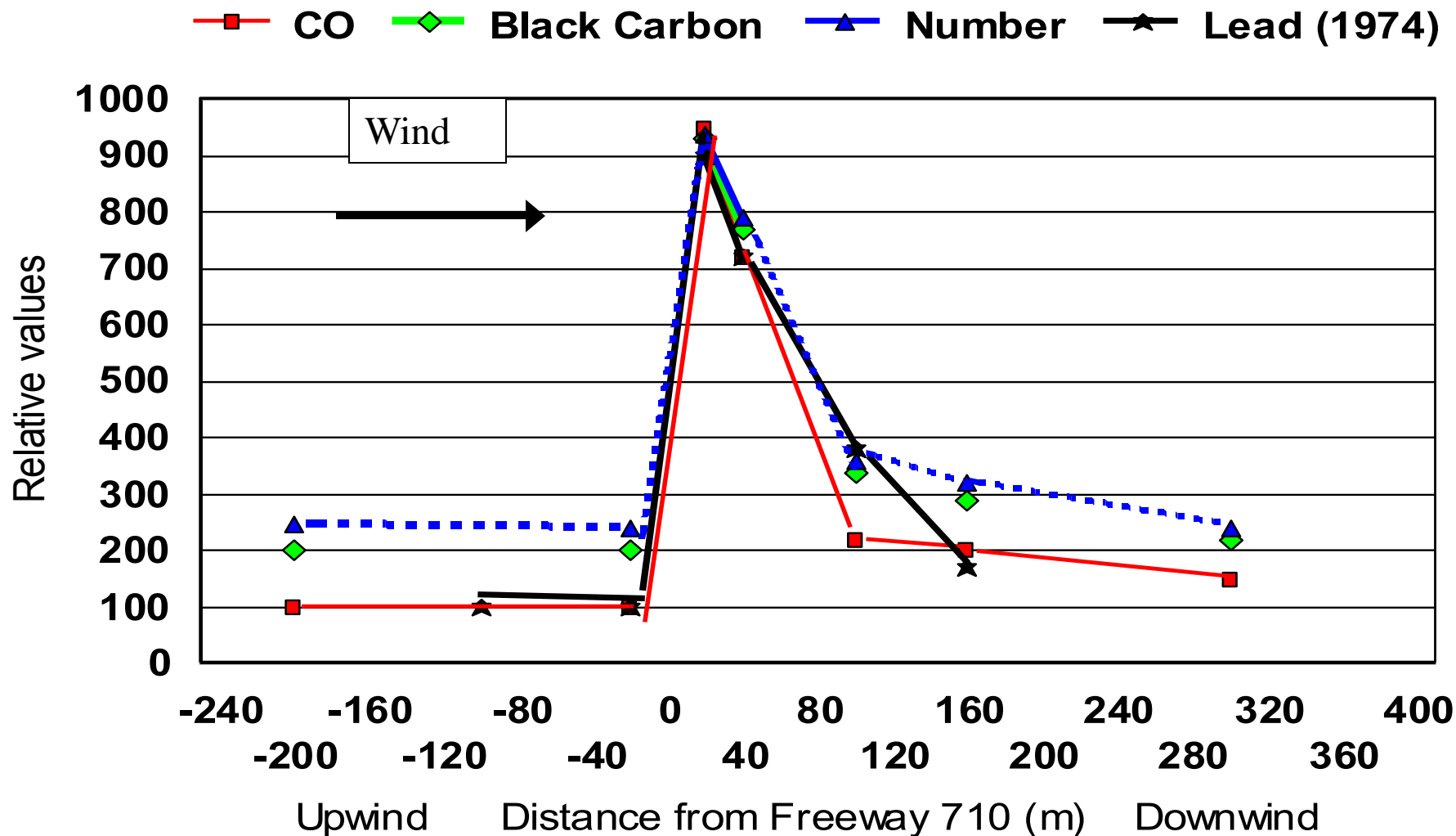
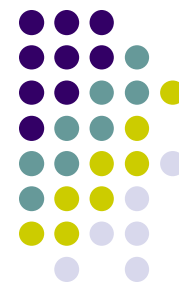
3. Biggest mitigation impacts –

1. Roadway Design

1. Elevated roadways – a disaster downwind
2. At grade – matches models
3. Cut or depressed section – least local impact

2. Vegetation

LATERAL TRANSPORT OF ULTRA FINE PARTICLES – EFFICIENT TRANSPORT, NO COAGULATION!

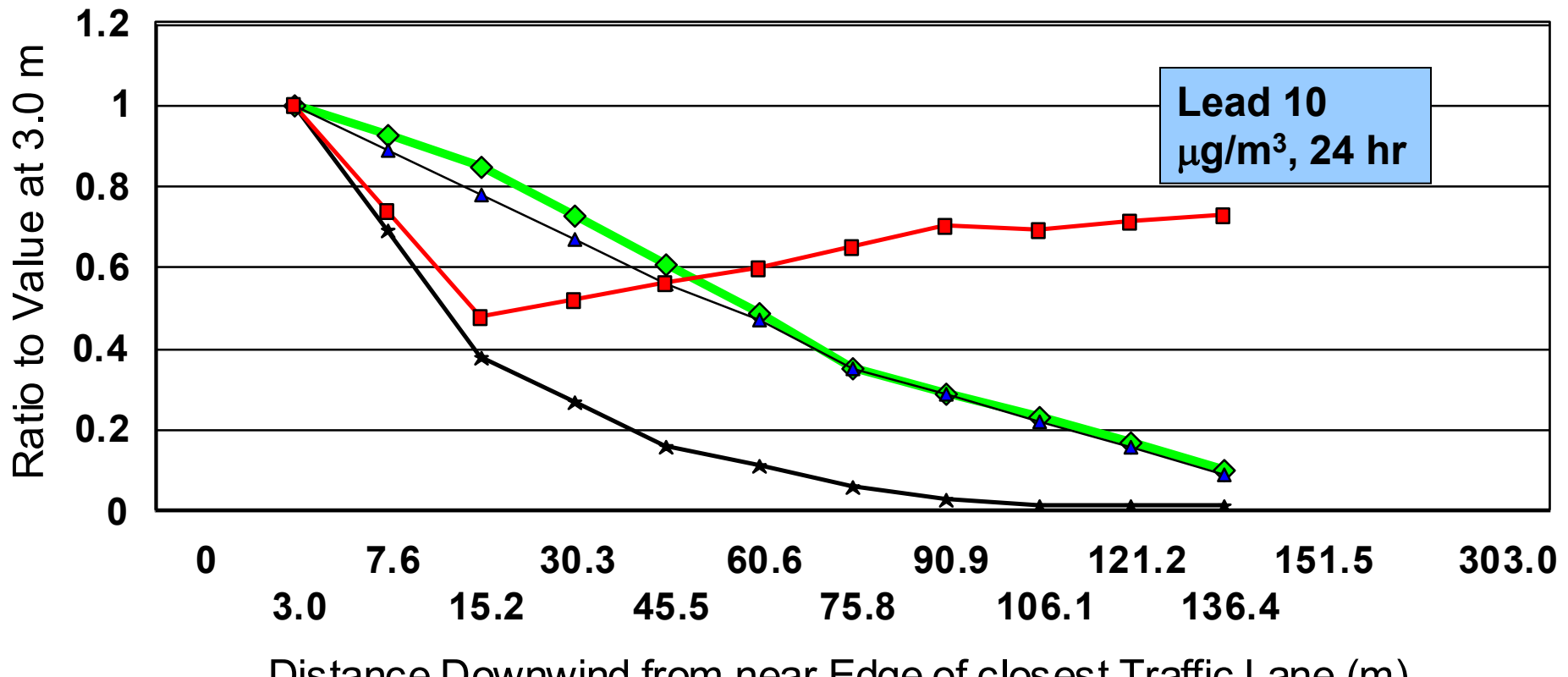


Lateral transport – at grade, cut and fill – no trees or barriers

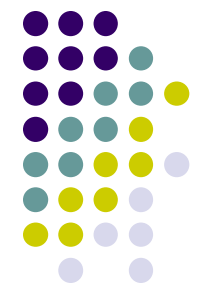
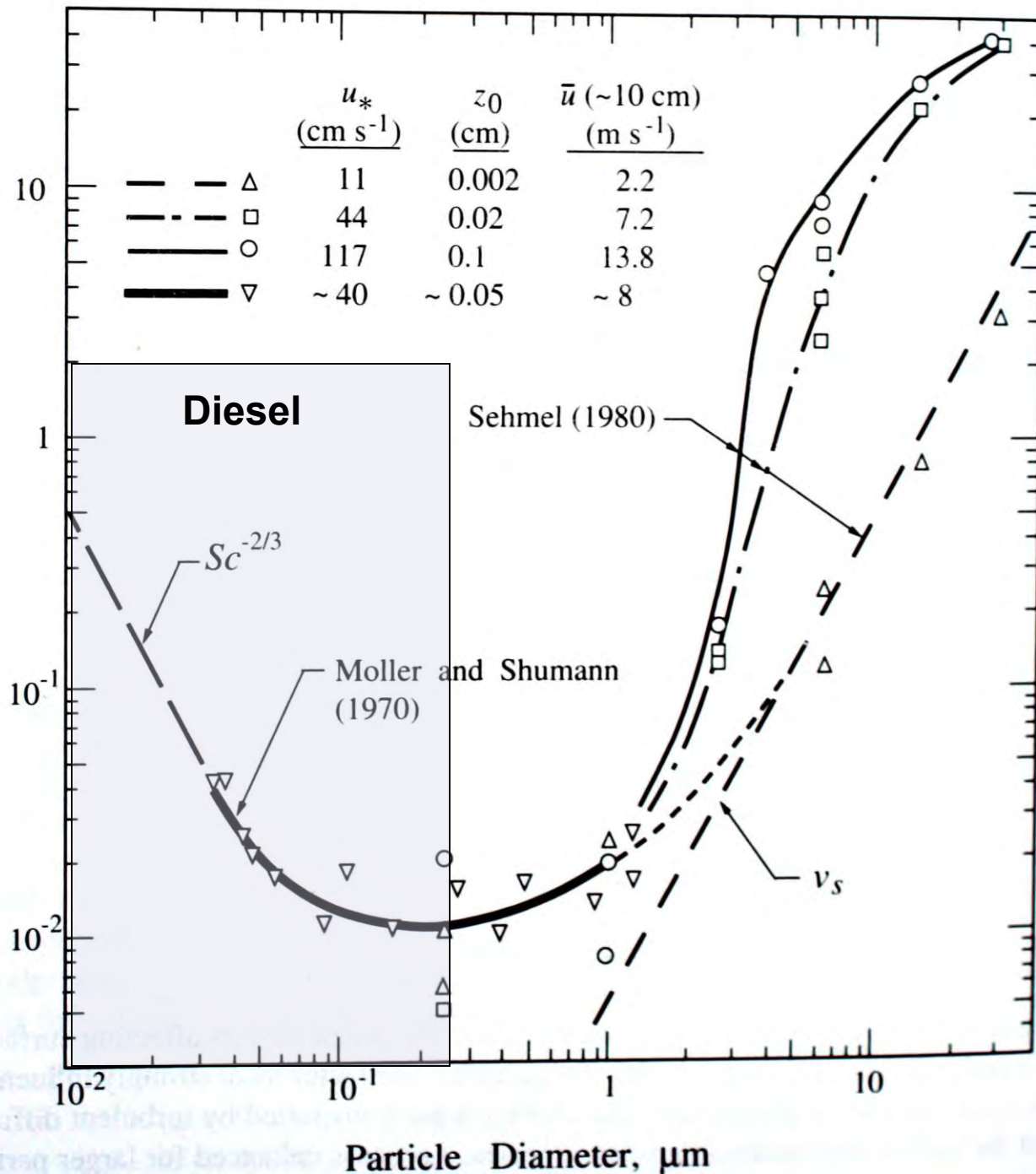


Lateral Dispersion Downwind from Freeways

- ◆ Theory Pasquill C at grade
- ▲ Lead 1973 at grade
- ★ Lead 1973 cut section
- Lead 1973 fill section

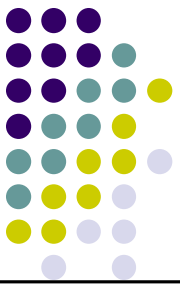


Deposition Velocity, v_d , cm s^{-1}

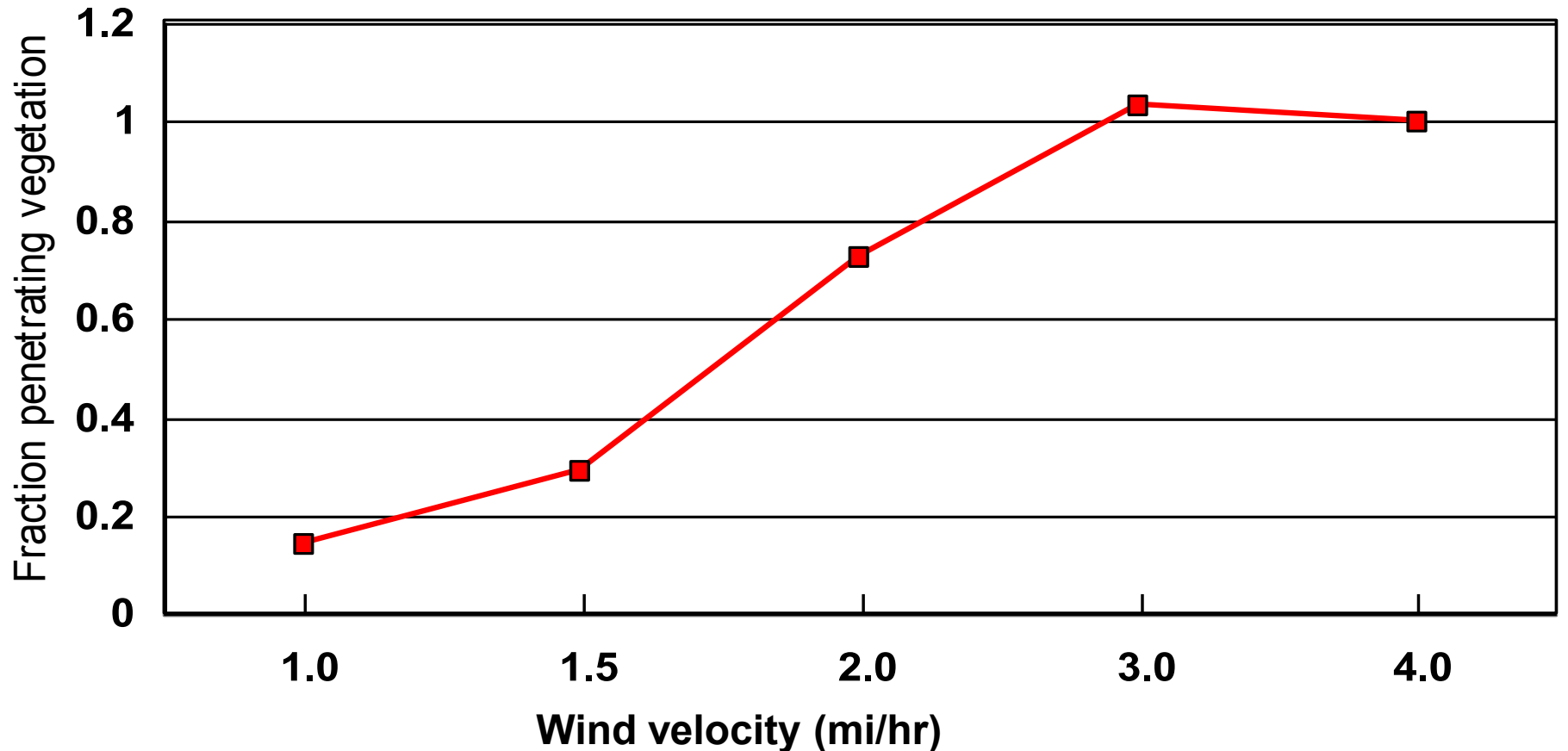


Bottom line:
Very fine and ultra fine particles can be preferentially removed by diffusion to surfaces, such as vegetation

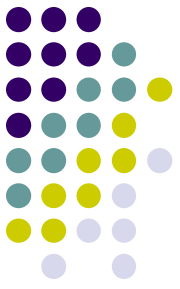
Mitigation of very fine and ultra fine particles by vegetation (preliminary: ongoing HETF project)



Removal of very fine particles in redwood vegetation HETF/UC Davis Tunnel Studies

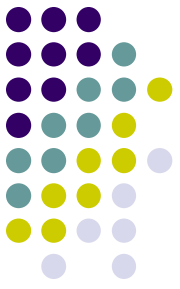


With vegetative barriers on both sides (and ideally the median) of roadways, one benefits by -



- At high and medium wind velocities, turbulence mixes and lofts roadway pollutants
- At medium and low wind velocities, the barriers slow lateral transport and allow vehicular waste heat to loft pollutants
- At low wind velocities, very fine and ultra fine particles will be captured as they migrate through the semi-transparent barriers

3. Right of way to receptor – schools, residences, ...



1. **Responsibility: local planning agencies**

2. **Oversight: None**

1. **Options:**

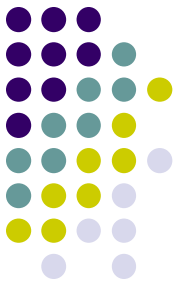
1. **Distance,**
2. vegetation,
3. barriers,
4. complete streets,
5. Reduced traffic via transportation alternatives

3. **Biggest mitigation impacts –**

1. **Community planning**

1. **Distance**
2. **Transportation alternatives**
3. **Vegetation**
4. **“Complete Streets” vegetation, bikes lanes, sidewalks**

4. Receptors – residences, schools...



1. Responsibility: Homeowner

1. Oversight: None

2. Best option – improved home, school, design

1. Must be done at construction

2. Existing residences, schools, etc.

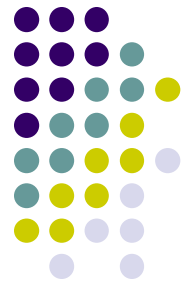
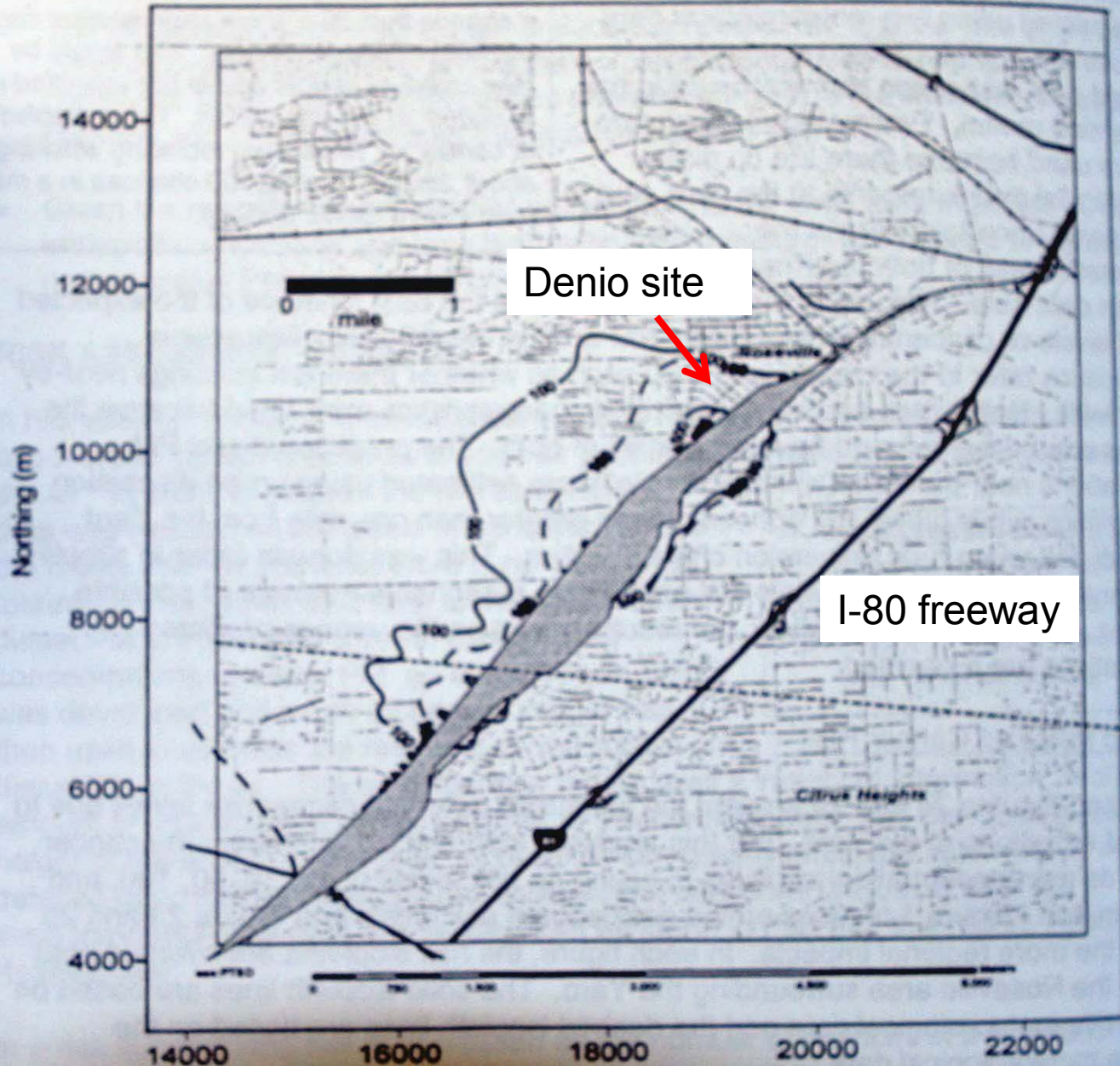
1. Control of indoor sources – smoking, etc

2. Indoor air improvements

1. Interior filtration,

2. Positively pressurized filtered for existing receptors

Figure 1
Estimated Cancer Risk from the Yard
(100 and 500 in a million risk isopleths)



Based on the 2000 census, between 500 and 700 residents live in the > 500 in a million area, and 14,000 to 26,000 in the 100 to 500 per million areas.

“...short term and long term mitigation measures are needed to significantly reduce diesel PM emissions...”

Roseville railyard – no barrier



**New moderate income housing, 2006,
in the 500 per million cancer rate zone**

Denio Site

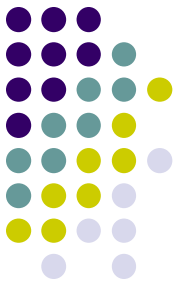
Pool Site

Night winds



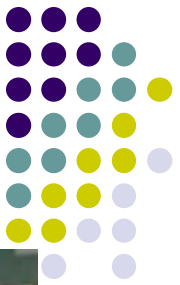
Figure 1 The Davis Union Pacific Rail Road Roseville Railyard.

Making houses and schools better - Positively pressured filtration



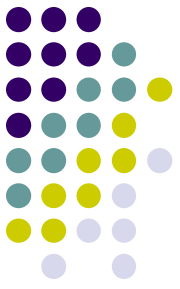
- Initiative of the UC Davis DELTA Group and CA Department of Toxic Substances Control
- Prepare outside air with low velocity filtration to remove diesel exhaust, ultra-fine metals,....
 - Standard MMM Filtrete – any hardware store
 - Inject super clean air into house (window modification)
 - Goal is about one air change/hr
 - All home leaks now bar dirty air from entering house
 - For summer, high efficiency misting with distilled water
 - for cooling and
 - pollution removal on the charged water droplets
 - Cost - circa \$500; operation circa \$50/year; Patents? No, plans on the web
- Major test starting Nov. 15 with 2 houses near the San Bernardino BNSF inter-modal rail-truck facility
 - Residences at up to 2,500 extra cancer deaths/lifetime
 - Detailed monitoring of air quality indoor and outdoor

David with “Green Air” prototype – 77% removal; upgraded now to 90% removal



Innovative design for parallel filters and low face velocity

Conclusion



- Mitigation can be done, now, and at a reasonable cost
- Mitigation is far more effective at the design and planning phase
 - Largely ignored up to the present
- Cost should be borne by the polluter
 - Deployment of “Green Air” system widely around BNSF, plus a subsidy for annual cost to run
- Extensive use of vegetation has additional benefits
 - energy conservation
 - carbon sequestration