Asbestos in California
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Sources of asbestos in California

- All six regulated forms of asbestos
- Extensive geologic formations with NOA
- Former mine sites.
- Industrial sites
- Releases from manufactured products
- Serpentine aggregate surfaced roads
- Alluvial wash out areas

REGULATORY FRAME WORK

California Air Resources Board

Air Toxic Control Measures

- asbestos content in surfacing material
- Construction and quarrying

Department of Toxic Substances Control

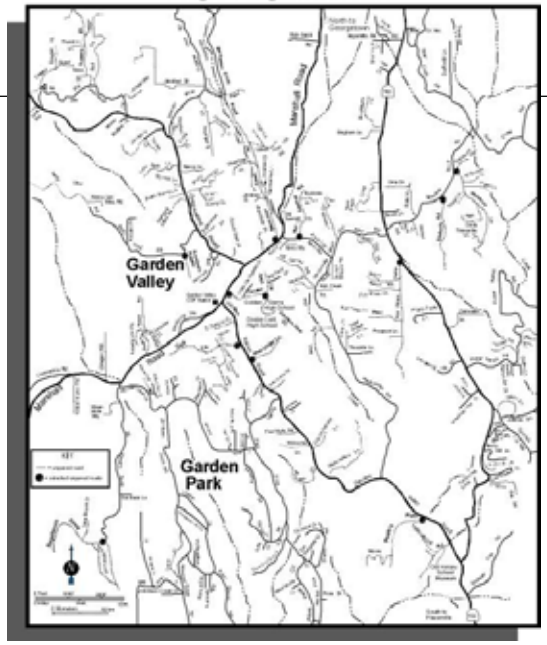
- Cleanup of hazardous substances release sites
- Environmental appraisal of new school sites
- Regulate hazardous waste disposal
- School Property evaluation

Garden Valley Source Study

- 1998 and 1999 air monitoring detected elevated levels of asbestos in ambient air
- Identify potential sources within a 16 mile study area
- Possible sources included an Active Quarry, Inactive quarry, unpaved roads and bus stops surfaced with serpentine aggregate

Garden Valley Site Discovery Area

Map of Unpaved Roads



Serpentine Covered Roads and Road Cuts

School Bus Stops

Two Serpentine Rock Quarries

Bear Creek Quarry

Garden Valley Aggregates

Sampling and Analysis

- Soils
  - 137 surface scrape
  - Some size fractionated
- Air
  - Stationary samplers
  - Meteorological data

Report Conclusions

- **AIR:**
  - All air data combined yielded risk assessment 3 x 10^{-5}
  - Quarry results similar to those in the community
- **Soils:**
  - Chrysotile is the primary form of asbestos found
  - Asbestos levels in the 75 micron sieved fractions are slightly higher than the larger size fraction
- **Primary source is likely the unpaved roads**
- **Recommended road emission study**

ANALYSIS ISSUES

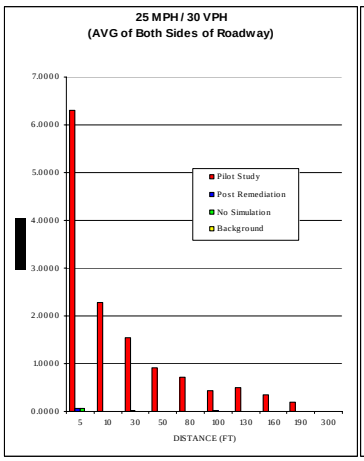
- Laboratory analyses were inconsistent with expectations
- TEM counts lower than PLM
- Possible inconsistencies in lab prep methods
- Data not reproducible among labs.

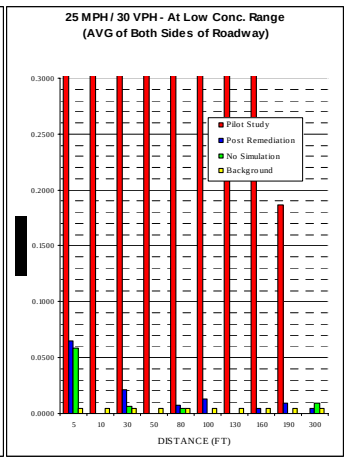
Road Emission Study

- Conducted on Slodusty Road in July 2002
- Experimental design: Stationary monitors placed at distances from road way
- Vehicles driven at 10 mph, 10 per hour or 25 mph, 30 per hour.
- Collected Meterological data, air particulate data and bulk soils samples within road way.

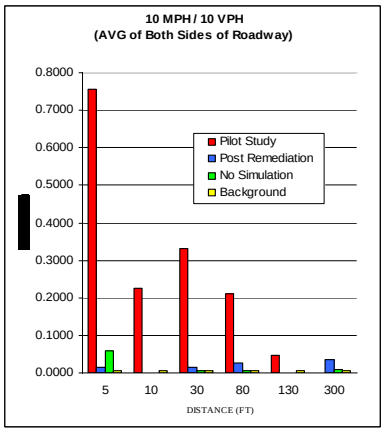
Slodusty Road

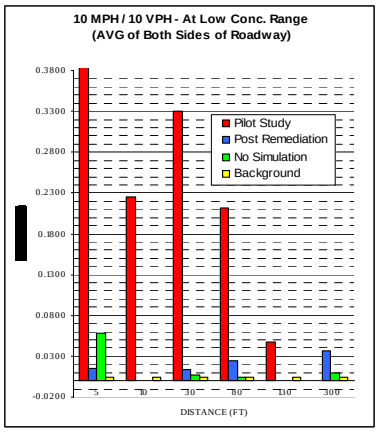
30 vehicles per hour
25 miles per hour





10 vehicles per hour
10 miles per hour





Resurfaced Slodusty Road

Emission Study Phase II

- August 2003
- Repeated road emission study after road resurfacing completed
- Two runs
- Results show an order of magnitude reduction in asbestos releases

Air Analysis Issues

- Detection limits
- Counting rules
- Transition fibers
- Fractured lizardite that looks like fibers
- Chemistry of lizardite, chrysotile is same

SITE BACKGROUND
Oakridge High School

- Oakridge High School, El Dorado Hills
- 1600 students
- Middle of a rapidly developing area
- NOA deposits on and next to high school

Oakridge High School: Assessment and Mitigation

- Soccer fields
  - Mitigation: clean fill, sod, erosion control
- Class rooms
  - World Trade Center indoor air assessment
- Athletic fields
  - Activity/exposure assessment and resurface
- Foot and vehicle traffic areas
  - Soil testing and resurfacing

Soccer Field Before Completion

TRACK photo

Basketball photo

Baseball photo

UNION PACIFIC RAIL YARD, SACRAMENTO

- Hub of Southern Pacific Operations since 1863 until 1999
- 240 acres of prime real estate in the heart of downtown Sacramento
- Proposed for mixed residential and commercial uses with institutional controls
- Solvents, PAHs, TPHs, metals and asbestos debris in fill material

WHAT IS NEEEDED: Science

- Uniform analysis and reporting methods to ensure reproducibility of data
- Activity/ exposure testing
- Protocol for incorporating the scenarios into a specific site risk assessment
- Background studies on soils and ambient air concentrations
- Health effects studies on non-occupational exposures, cleavage fragments and transition fibers

What is needed:
Risk Managment

- Soil screening levels linked to activities
- Enhance existing methods of communicating information to the public and local agencies about NOA and asbestos
- Improved regulatory coordination within and among state, federal and local agencies
- Expand range of funding to mitigate asbestos exposures