Asbestos Alert

The risk of exposure to airborne asbestos exists within Clear Creek. Visitors should take measures to reduce exposure to dust while in the area. Children are most at risk from exposure.

Recommendations to reduce exposure include: avoid the area during dry or dusty conditions, space vehicles widely when traveling, and wash vehicles and clothing before returning home. Learn more about the recent Asbestos Risk Assessment at:
www.epa.gov/region09/toxic/noa/clearcreek

ASBESTOS IN THE ENVIRONMENT AT THE CLEAR CREEK MANAGEMENT AREA

What is Asbestos?

- Asbestos is a group of six different fibrous minerals which occur naturally in soil and rock in some areas.
- Asbestos fibers are hard to see with the naked eye.
- Chrysotile asbestos is the main type found in the Clear Creek Management Area (CCMA).
- Asbestos fibers are resistant to heat and have been used in a variety of man-made products for insulation and heat-resistance.
- Asbestos fibers are very tough and stay in the same harmful form in the environment for a long time.

Why is there Asbestos in CCMA?

- CCMA is located on a formation of naturally occurring serpentine rock and soil which contains high concentrations of asbestos
- Asbestos mining activities in the area also contributed to the asbestos at CCMA
- In areas where there is naturally occurring asbestos from serpentine rock, the percentages of asbestos in the soil range from 1% to as much as 50% in areas where asbestos has been mined.

Why does Asbestos enter the environment?

- During geological processes, the crushing of serpentine rock results in asbestos which is more readily available to the environment.
- The mining industry and roads built to support the mining have broken up the asbestos causing it to disperse.
- Asbestos fibers are also dispersed in the environment by wind and water.
- Asbestos fibers stay suspended in the air for lengthy periods but ultimately settle onto the soil.

How does Asbestos get into my body?

- Asbestos fibers in the air can get into your lungs when you breathe.
- Asbestos fibers that get into your mouth can be swallowed into the stomach.
- Asbestos fibers are not likely to penetrate the skin.

How might my family or I be exposed to Asbestos while visiting CCMA?

- If you ride dirt bikes or motorcycles, camp, hunt , or hunt for rocks, you can be exposed to asbestos fibers on dusty trails, especially during the dry season.
- Because motorcycles raise considerable dust, if you watch motorcycle races, you may inhale asbestos fibers.
- If you are camping, especially in dry, dusty areas, you could be exposed to asbestos fibers which are in the air, dust and soil in the camping areas.
- Water in the creeks in CCMA may contain asbestos fibers and heavy metals.
- Asbestos fibers in dust and mud from CCMA can remain on your clothes and vehicles when you leave CCMA

How much Asbestos is too much?

- Low levels of asbestos are not likely to be harmful to your health.
- Asbestos is measured by the number of fibers(f) that are present in a cubic centimeter (cc) of outdoor air, or f/cc.
- Concentrations of .1 fibers per cubic centimeter, or .1 f/cc, should be avoided.

How could Asbestos affect my health?

Most of the information on the health effects of asbestos in humans comes from studies of people who were regularly exposed to high levels of asbestos in the workplace. Any exposure to asbestos involves some risk, but for people who are exposed to low levels of asbestos for short periods the risk should be minimal.

However, asbestos has been known to cause cancer in humans who have been exposed to high levels on a regular basis. The two most common cancers found in these situations are lung cancer and mesothelioma, a rare cancer of the lining that surrounds the lung and stomach.

Smoking and Asbestos Exposure

Smoking cigarettes dramatically increases the chance of getting lung cancer from asbestos exposure.

The non-cancer health effect most commonly associated with high levels of asbestos exposure is asbestosis which is scarring of the lung tissue.

- If you have asbestosis, your lungs cannot expand or contract like normal lungs, which makes it difficult to breathe.
- Asbestosis is only seen in people who received regular, high level exposure to asbestos.
- Both cancer and asbestosis can take twenty to thirty years or more to develop after exposure.

Is there a medical test to determine whether I have been exposed to Asbestos?

There area no tests to determine effects from low level asbestos exposure.

- Chest X-rays are only useful for identifying damage from exposure to asbestos from much higher exposure than you would receive from a visit to CCMA.
- Because asbestos-related diseases take many years to develop, effects from recent, low dose exposure cannot be seen on a chest x-ray.

Precautions to take when visiting CCMA

- Avoid areas where it is dusty or windy.
- Never drink the water from the streams or springs.
- Wash any vehicle that has been used at CCMA before returning home.
- Wash clothing worn at CCMA separately from you other clothes.
- If digging in dry dirt, try to minimize the amount of dust that is distributed.
- Do not ride Off Highway Vehicles (OHVs) around the campground. They create dust.
- If riding an OHV in a group, spread out along the trail and don't ride in another rider's dust.

Before visiting CCMA

Call the Hotline at **(831) 630-5060** to get recorded information about airborne asbestos concentrations and weather conditions. If the weather is hot, dry and dusty, avoid CCMA. If you would like clarification about the meaning of the asbestos fiber reading, call the Hazardous Materials Specialist at the Hollister Office of the Bureau of Land Management at (831) 630-5027.

For further information

Call Richard Procunier at the United States Environmental Protection Agency (EPA) at (415) 744-2219, or leave a message for him on EPA's toll free line: (800) 231-3075.

Information provided by:

U.S. Department of the Interior, Bureau of Land Management and U.S. Environmental Protection Agency

Children and Asbestos Exposure

Parents and guardians should be aware that children are more likely than adults to suffer from adverse long term health effects after asbestos exposure.

Case reports have shown that children exposed to high levels of asbestos infrequently (during recreational use) have developed asbestos-related diseases or their X-rays show future problems.

Please think twice before bringing your child to the CCMA.

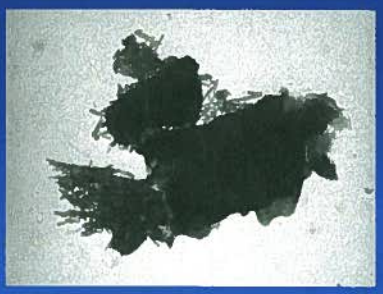
Study Design

- Monitoring Exposure
- **Quantifying Exposure**
- Assessing Variation
- Assessing Risk

Quantifying Exposure

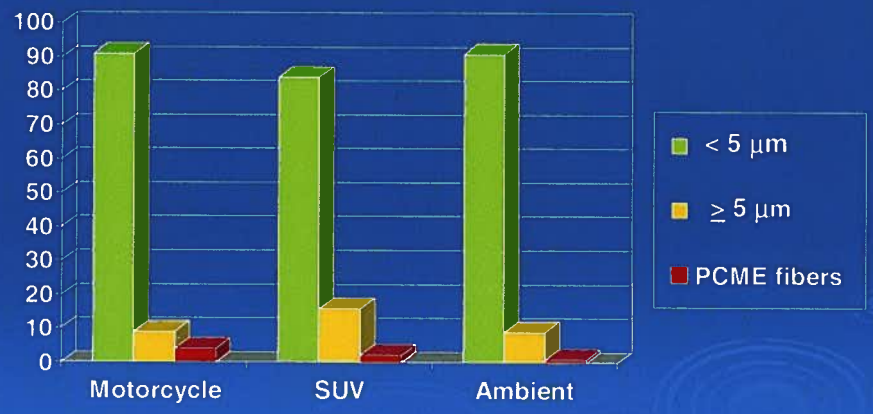
- **Transmission Electron Microscopy**
- **International Standard ISO 10312**
  - Standard definitions of fiber types
  - Counting Rules
  - QA/QC
- **Binning**
  - Phase Contrast Microscope equivalent (PCME) fibers
  - Other fiber categories

CCMA Chrysotile



Structure Types:
Fibers
Bundles
Matrices
Clusters

Chrysotile Dimensions vs. Scenarios (Dry Season)



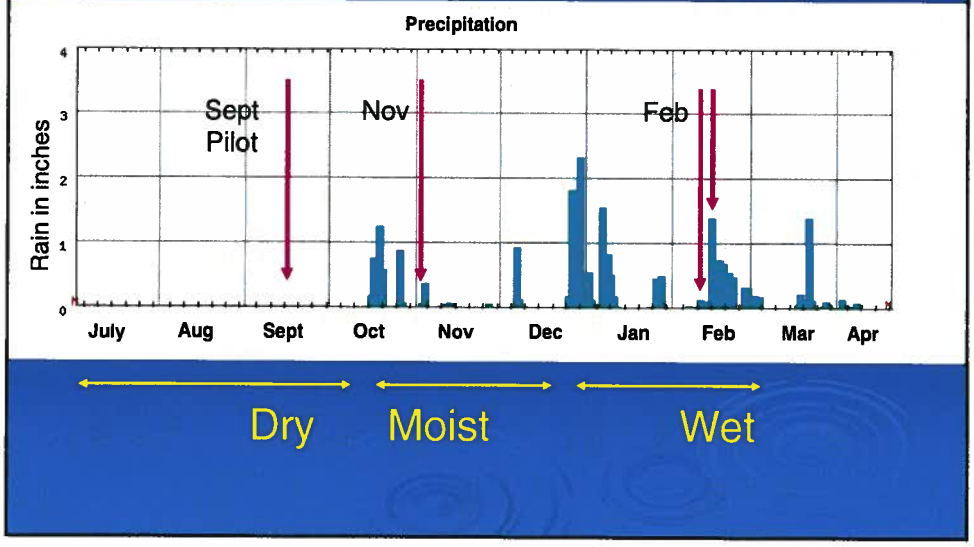
Study Design

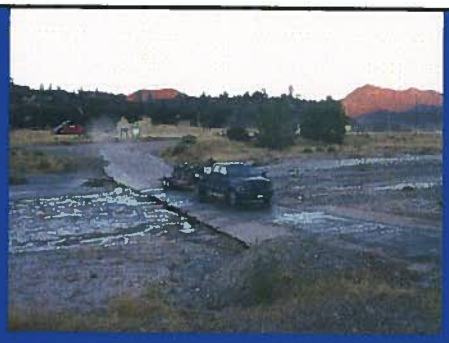
- Monitoring Exposure
- Quantifying Exposure
- **Assessing Variation**
- Assessing Risk

Assessing Variation

- Scenario repetition
  - 1-2 times/day X 2-3 days
- Seasonal sampling
  - September, 2004 (dry)
  - November, 2004 (moist)
  - February, 2004 (wet)
  - September, 2005 (dry)

Assessing Variation:
Rainfall vs. Sampling Events





DRY
(September)

Pacific Strike Team
crossing
San Benito Creek

WET
(February)

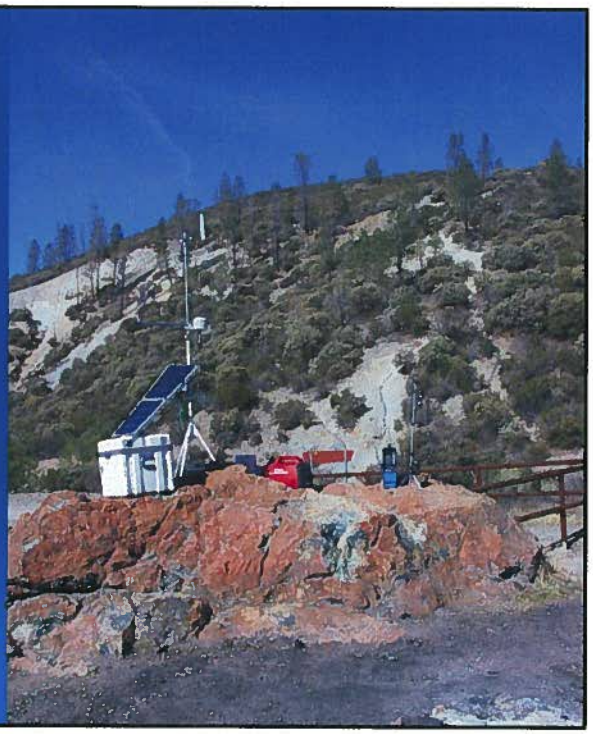
Assessing Variation

- **Ambient air and weather monitoring**
  - 4 stations/event
  - Upwind/downwind
- **Soil moisture and asbestos concentrations**
  - 3 samples/route/day
- **Dust generation**
  - Photodocumentation of dust plumes/event

Assessing Variation:

Ambient Air and Meteorological Monitoring

Staging Area 2



Study Design

- Monitoring Exposure
- Quantifying Exposure
- Assessing Variation
- **Assessing Risk**

Assessing Risk

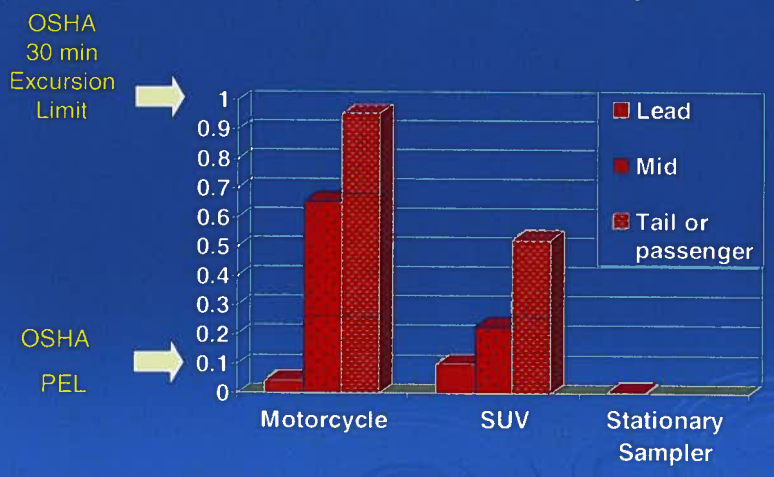
- **PCM-equivalent (PCME) fibers**
  - > 5 μm long; ≥0.25 – ≤3.0 μm wide; ≥ 3:1 aspect ratio
  - OSHA compliance
  - EPA risk calculations
- **EPA (IRIS) Cancer Slope Factor**
- **Exposure Assumptions (BLM, 1992)**

Exposure Assumptions (BLM, 1992)

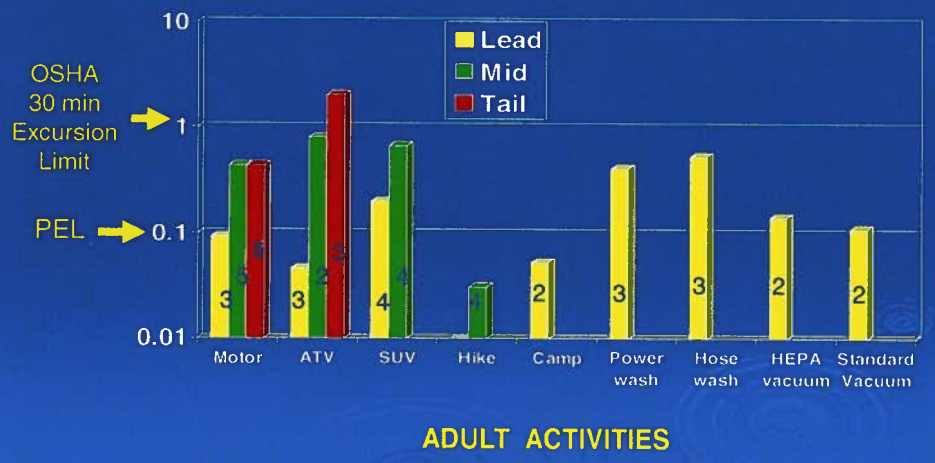
- 1 day/year
- 5 days/year = Reasonable Maximum Exposure
- 12 days/year = High estimate
- 30 year exposure averaged over 70 year lifespan

Results

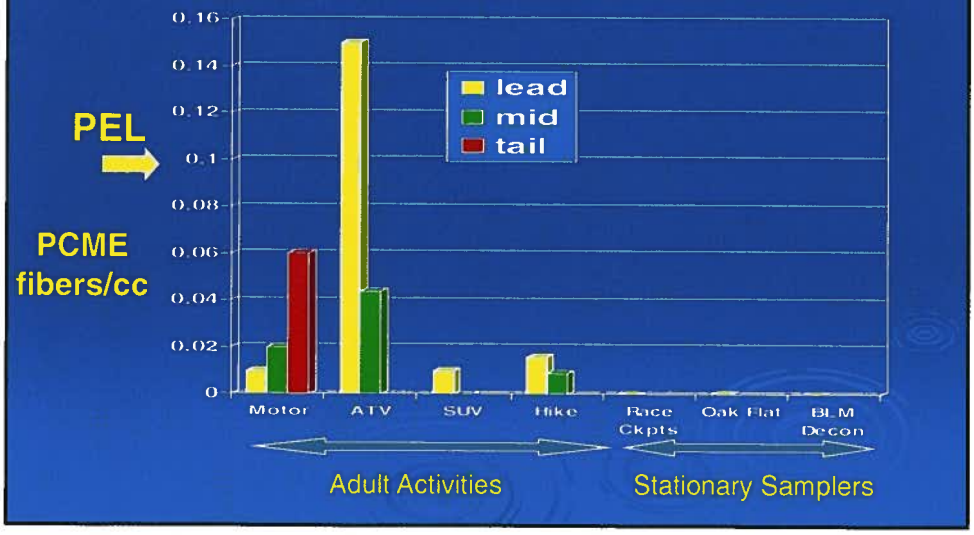
September (dry soil) Asbestos Concentrations (PCME fibers/cc)



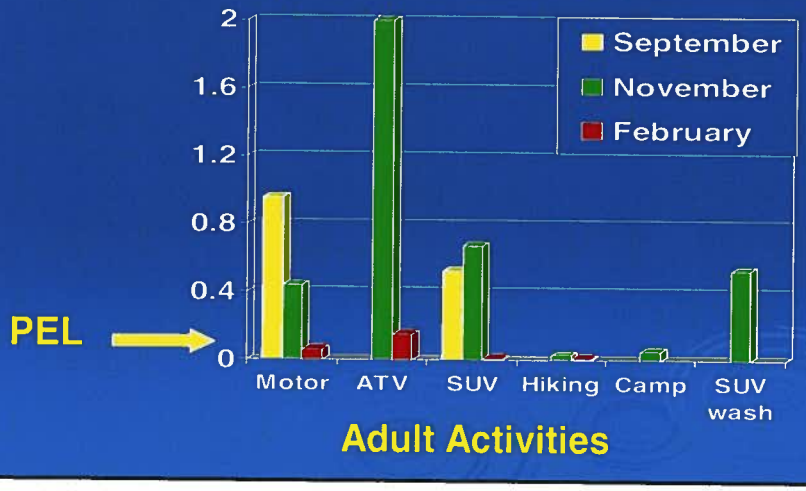
November (moist soil) Maximum Asbestos Concentrations (PCME fibers/cc)



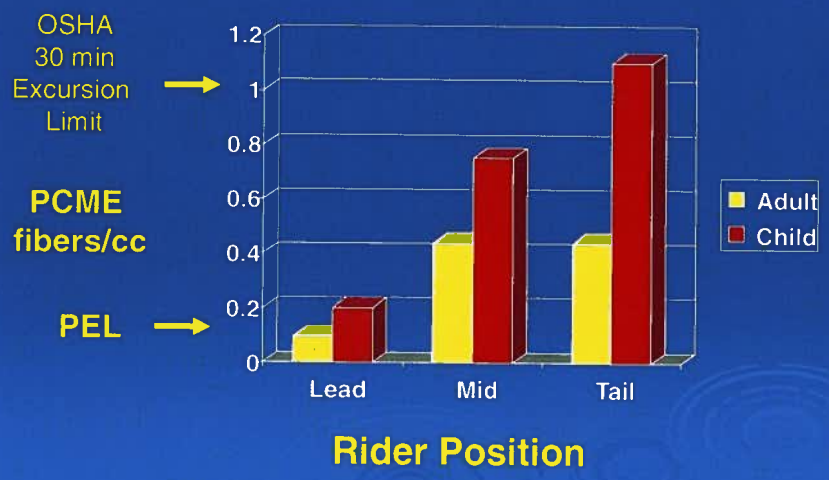
February (wet soil) Max. Asbestos Concentrations (PCME fibers/cc)



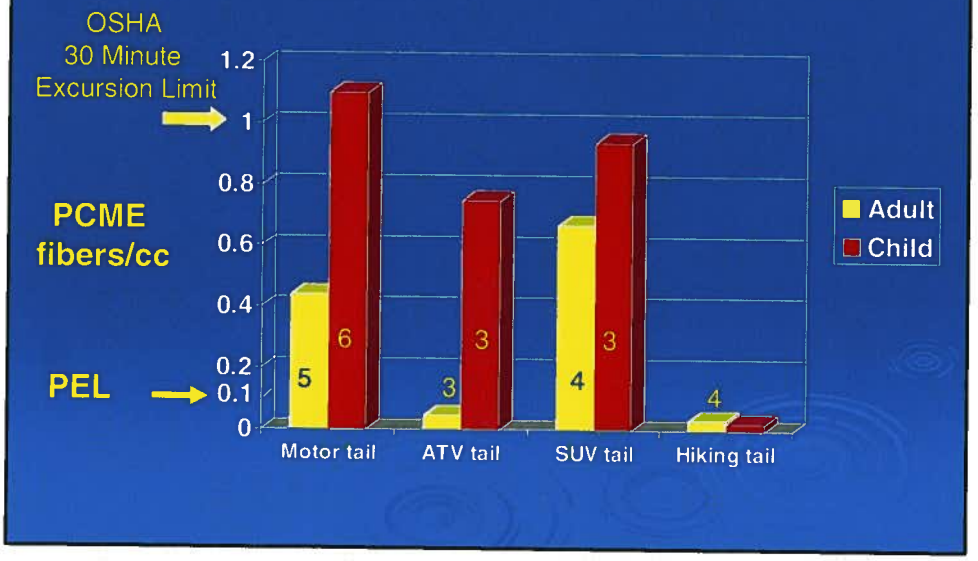
Seasonal Comparison of Max. Asbestos Concentrations
(PCME fiber/cc)



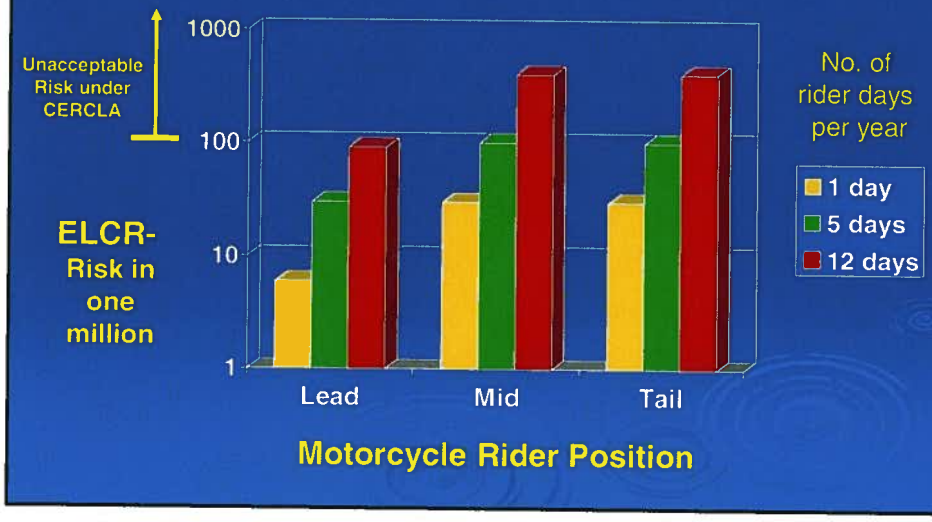
Adult vs. Child Motorcyclist
(PCME fibers/cc)



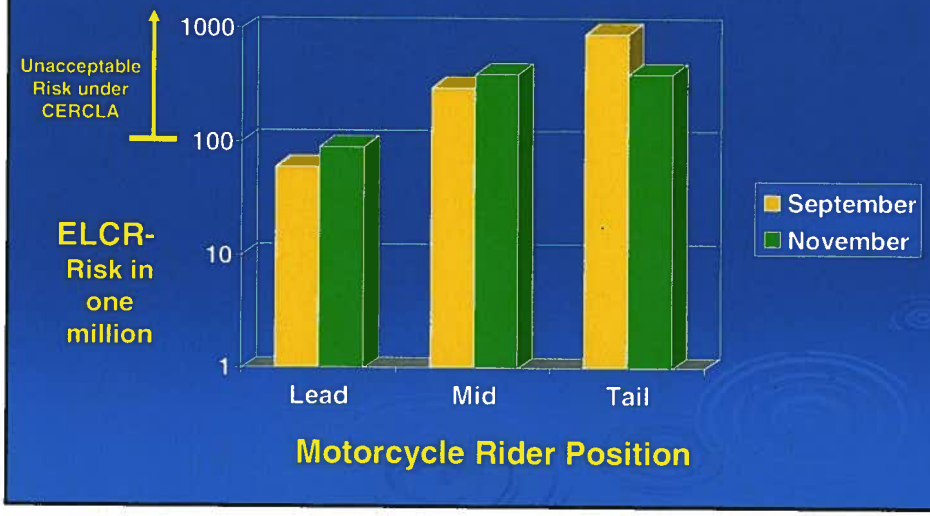
Adult vs. Child Max. Exposures
(PCME fibers/cc)



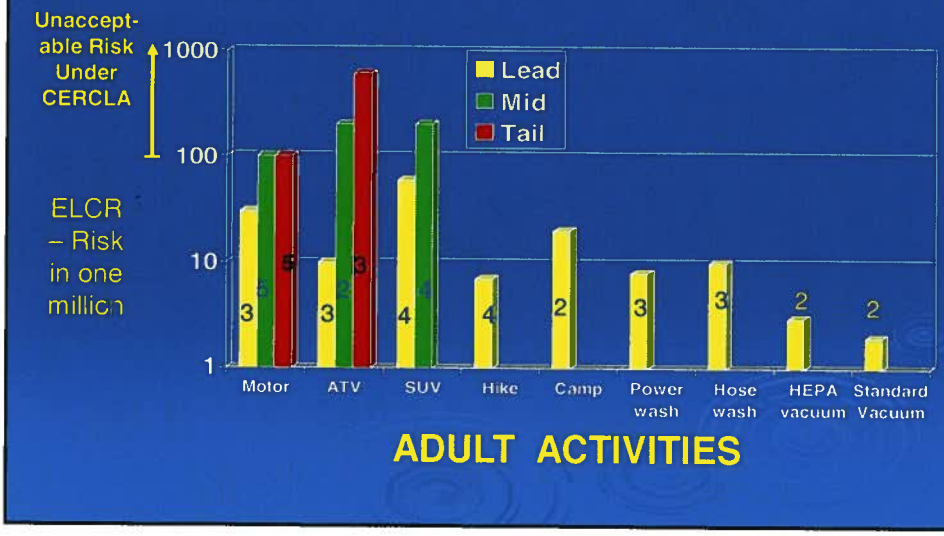
Excess Lifetime Cancer Risk (ELCR) vs. Motorcycle Rider Position and Exposure Scenario (November)



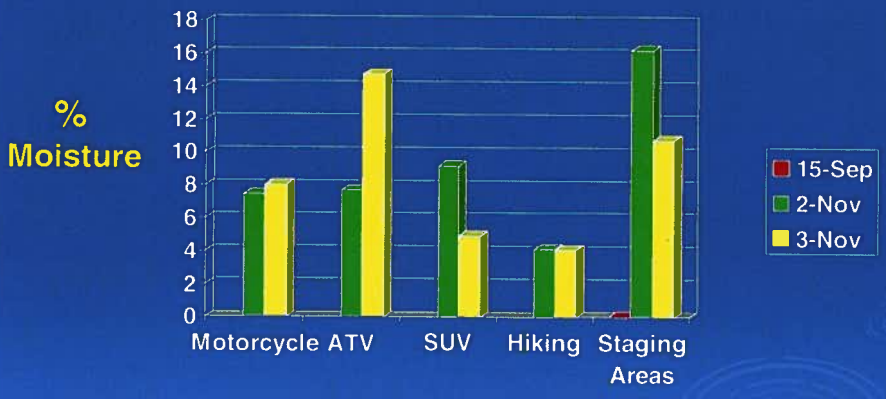
Comparison of September and November Max. Excess Lifetime Cancer Risk (ELCR) for Motorcycle riding



November (moist) RME Excess Lifetime Cancer Risk (ELCR)



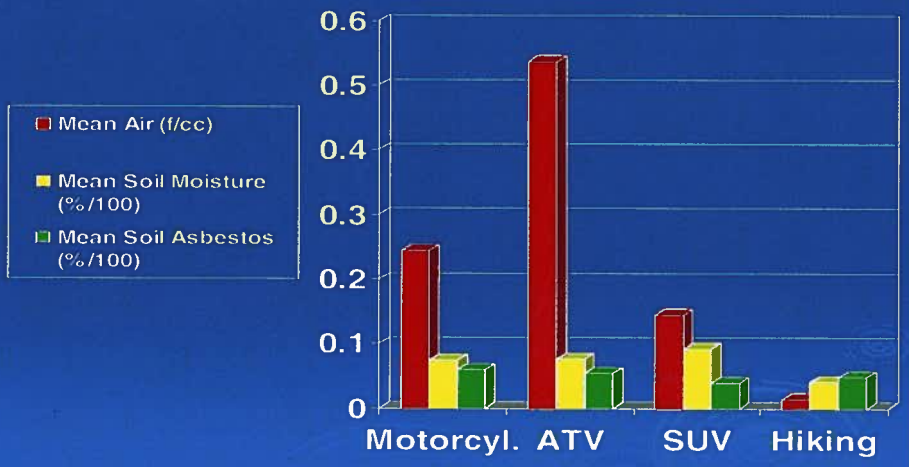
Mean Soil Moisture: Dry (Sept) and moist (Nov)



Soil: Percent Asbestos

CCMA Route	Range	Mean
Motorcycle	2% – 15%	6.0 (n=5)
ATV	2% - 15%	5.5 (n=6)
SUV	1%– 10%	3.9 (n=9)
Hiking	2% - 8%	4.9 (n=4)

Asbestos exposure levels, soil moisture, and soil asbestos concentrations



Conclusions To Date

- Asbestos exposure is greatest for trailing OHV riders
- Exposure for trailing riders frequently exceed OSHA PEL
- Exposure for trailing riders sometimes exceeds the 30 minute Excursion Limit
- Cancer risk exceeds 1 X 10^{-4} for trailing riders

Conclusions (cont.)

- Child exposure greater than adults for same activities
- Exposures exceeding OSHA standards can occur during moist (November) or wet (February) conditions
- Reasonable Maximum Exposure (RME) Risk can exceed 1 X 10^{-4} (CERCLA risk management range) during moist conditions
- Exposure is not correlated with differences in soil asbestos or soil moisture at levels reported to date

More Results to Come

http://www.epa.gov/region09/toxic/noa/clearcreek

Future Documents

http://www.epa.gov/region09/toxic/noa/clearcreek

Date	Document	Contents
10/30/05	Tech Memo	November, 2004 sampling event – risks for adult individual activities
11/15/05	Tech Memo	February, 2005 sampling event – risks for adult individual activities
12/20/05	Tech Memo	Risks for combined scenarios – child/adult, combined activities
6/30/06	Tech Memo	September, 2005 sampling event
8/15/06	Final Summary Report	Complete summary of project, including all air and soil data

Respirable Amphibole Asbestos Exposure While Rototilling in Soils Containing Less than 1% Asbestos

As part of EPA's Phase 2 Study in Libby,.Montana, samples of personal air were collected by an individual engaged in rototilling a garden. The soil concentrations in this garden were measured in six samples by PLM. **Four of the six samples analyzed were "non-detects," and two samples detected "trace" amounts (less than 1% by mass) of asbestos.**

Using PCM analytical method, .227 fibers/cc were detected using a personal monitor. Stationary monitors recorded .020 fibers/cc. Using TEM analysis, personal monitors detected .0666 fibers/cc and stationary monitors detected .019 fibers cc.

As seen, elevated levels of fibers were observable in both personal air samples and in nearby stationary monitors during the rototilling activity. The increase is larger when measured by PCM than by TEM (PCME-asb), suggesting that some of the increase detected by PCM is non-asbestos in nature.

Source: US Environmental Protection Agency Region VIII, Amphibole Mineral Fibers in Source Materials in Residential and Commercial Areas of Libby Pose an Imminent and Substantial Endangerment to Public Health. Christopher P. Weis, Ph.D., DABT, Senior Toxicologist, Science Support Coordinator, Libby Asbestos Site, Dec. 20, 2001

Let's calculate how many fibers could be inhaled by the measurements from this test. For purposes of this formula, we use the TEM assay of .066 fibers/cc.

The average person takes 16 breaths per minute at rest, higher during activities

Each of the 16 breaths takes in about 500 cc of air in each breath. (500 x 16 = 8,000)

8,000 cc of air are inhaled each minute

.066 f/cc x 8,000 cc of air = 528 fibers inhaled/minute

One hour of rototilling would generate 31,680 fibers inhaled/ hour.

Four hours of rototilling = 126,720 fibers inhaled.

NOTE: These numbers are conservative. The calculation of 500 cc is the tidal volume at rest. The volume would more likely be 1,000-2,000 cc of air during strenuous activity. Children also breathe faster, and would therefore inhale more fibers.

California Environmental Protection Agency

Air Resources Board

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Fact Sheet #3
Ways to Control Naturally-Occurring Asbestos Dust

- Shown below are ways to control asbestos dust from construction projects and roadways. These control actions will not eliminate asbestos, but offer options to reduce release of airborne asbestos fibers from various activities.

Construction Projects and Roadways

Dust Source	Mitigation Measure	Application Frequency	Relative Effectiveness[1]
Excavation	Water wetting	as needed	2-3
	Excavate during calm periods	when possible	1
Mobile Construction Equipment	Water wetting of roads surfaces	as needed	2-3
	Rinse vehicles / equipment	as needed	3
	Wet loads of excavated material	each load	3
	Cover loads of excavated material	each load	2-3
	Wet and cover loads	each load	4
Exposed Ultramafic or Serpentine Areas	Water wetting	as needed	3-4
	Cover with 6 to 12 inches of non-asbestos material	end of project	4
	Wind breaks / berms	where needed	1-2
	Chemical sealants / dust suppressants	3 mos. - 1 yr.	3
	Vegetative reclamation	end of project	3
	Asphalt cement paving	as needed	4
Roads	Water wetting	as needed	3-4
	Speed control	always	1-3
	Wind breaks / berms	where needed	1-2
	Cover with 2 to 4 inches of non-asbestos rock	as needed	3-4
	Chemical sealants / dust suppressants	3 mos. - 1 yr.	2-3
	Single-coat chip/seal	as needed	4
	Triple-coat chip/seal	as needed	4
	Petroleum sealants	as needed	4
	Asphalt cement paving	as needed	4

1. Subjective rating where: 1 = least effective, and 4 = most effective

01/02