UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 9

Naturally Occurring Asbestos in El Dorado Hills: Questions and Answers

The U.S. Environmental Protection Agency (U.S. EPA) and the *Agency for Toxic Substances and Disease Registry* (ATSDR) held a public meeting for the Oak Ridge High School community on February 24, 2004, to address concerns regarding naturally occurring asbestos in the area of the school. Many of the meeting participants submitted written questions to the agencies. Since the presenters ran out of time to answer them, the agencies committed to developing and distributing answers to the questions in writing as an action item from the meeting. This document presents these questions in their original form, with minimal editing, and the promised answers from the U.S. EPA/ATSDR team. Please refer to the glossary on the last page for definitions of italicized terms in the answers.

Asbestos Science

1. Can amphibole asbestos fibers be identified with the naked eye? Does it appear as common dust?

No. Asbestos fibers cannot be seen with the naked eye. An experienced geologist can distinguish between the mineral-bearing rock types that bear *amphibole* or *chrysotile* fiber bundles. *Amphibole* asbestos fibers can be best identified through *polarized light microscopy (PLM)* or *transmission electron microscopy (TEM).*

2. Could walking, running, etc., on gravel or dirt trails affect the movement of asbestos? Does digging in a yard or digging up rocks stir up asbestos? Does landscaping or construction generate more asbestos into the air?

Yes. Any activity that causes asbestos-bearing soils and/or rocks to be disturbed can potentially result in releasing asbestos fibers into the air. The U.S. EPA is conducting an *Integrated Assessment* that will collect information about the number and behavior of asbestos fibers released into the air through *activity-based monitoring*.

3. *How long do amphibole asbestos fibers stay airborne before settling out of the breathing zone? How far can amphibole asbestos fibers travel in the wind? Have any studies been done concerning this? What is considered a zone of concern for amphibole asbestos exposure around a given source of fibers? 100 yards or 100 miles?*

A number of factors can influence how long any fibrous material, including *amphibole* asbestos, stays airborne and how far it travels before settling. Important factors include

the characteristics of the disturbed soil (i.e., hardness, moisture content, particle size), the nature and force of the disturbance activity, and wind speed and direction. For example, a fast-moving vehicle on a dry unpaved road on a windy day may generate a dust cloud that can move hundreds of feet, whereas a person digging into moist soil on a calm day may generate fibers that move only a few feet.

EPA is not aware of any scientific studies that systematically addressed how each factor can influence airborne time and/or distance traveled. However, the *activity-based testing* at Oak Ridge High School seem to indicate that *amphibole* fibers may not travel far. The Oak Ridge tests showed significantly higher exposures for people engaged in activities on the ballfields than did monitors immediately adjacent to the fields, suggesting that individual exposure is highly influenced by personal activities. U.S. EPA will conduct tests as part of its *Integrated Assessment* in El Dorado Hills to address some of these questions through the use of both personal and downwind monitors during *activity-based sampling*.

4. The 1960s "Minerals of California" says that tremolite is found in limestone and schist, primarily. This isn't to say that it cannot be associated with ultramafic/serpentine, but ... why does "everyone" keep implying that tremolite occurs only in ultramafic/serpentine substrate?

You are right. According to the "2000 Open-File Report 2000-002," prepared by the California Division of Mines and Geology, the exposed rocks in the Sierra Nevada foothills of western El Dorado County are predominantly metamorphic rocks created at high pressures and temperatures by re-crystallization of sedimentary rocks such as shales, limestones, and sandstones, as well as igneous rocks derived from melts. *Amphibole* asbestos and *chrysotile* asbestos may occur in these metamorphic rocks, especially near faults. Metamorphosis of some high-magnesium and high-iron igneous rock, called "ultramafics," may produce serpentinite, which in turn may contain chrysotile or *amphibole* asbestos, or both, or no asbestos, depending on its metamorphic history. *Amphibole* asbestos occurs most commonly as slip-fiber veins in fault zones.

5. The vicinity of Oak Ridge High School isn't plotted as either [an area of ultramafic rock or an area of limestone and schist] on either the California Geologic Atlas, Sacramento sheet, or on the 1974 Soil Survey of Western El Dorado County. With what certainty do we know where asbestos exists in El Dorado Hills? How do we know if new construction is not hitting asbestos in areas deemed safe?

U.S. EPA can rely only on the most recent versions of maps issued by the California Department of Conservation and on local knowledge. As additional mapping of El Dorado County is completed, the certainty about where asbestos-bearing formations occur will increase.

Asbestos Policy

6. What are the current regulatory standards for asbestos contamination cited at the meeting?

Federal Regulatory Standards

(1) Under the Clean Air Act, the federal National Emission Standards for Hazardous Air Pollutants (NESHAP) for asbestos defines "friable asbestos material" generally as greater than 1% measured by *polarized light microscopy (PLM)* (40 C.F.R. § 61.141). The asbestos NESHAP regulates demolition of buildings containing asbestos, as well as asbestos mining and milling operations, to ensure proper handling, management, and disposal of asbestos-containing materials.

(2) Occupational Safety and Health Administration (OSHA) regulations define "asbestos-containing material" to be those materials that include more than 1% asbestos (29 C.F.R. §1910.1001). The OSHA *permissible exposure limit (PEL)* is 0.1 asbestos structures per cubic centimeter of air (29 C.F.R. § 1910.1001(c)). OSHA regulations are intended to protect workers from inhalation exposure in the workplace.

(3) The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) definition of a hazardous substance, while not a regulatory standard for asbestos, provides authority for taking action under CERCLA where asbestos is present that presents a threat or potential threat to human health or the environment.

(4) The Asbestos Hazard Emergency Response Act (AHERA) requires schools to identify materials containing more than 1% asbestos by weight in their school buildings, and to take appropriate actions to control release of asbestos fibers (40 C.F.R. Part 763), including inspection and preparation of management plans. Materials that may contain asbestos include, for example, ceiling tiles, insulation, carpet backing, and flooring.

State Regulatory Standards

(1) Asbestos Airborne Toxic Control Measure for Surfacing Applications, which became effective on 11/13/01, regulates the use of materials containing 0.25 percent asbestos or more for surfacing unpaved roads.

(2) Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, or Surface Mining Operations, which became effective on 7/27/2002, requires the use of dust control measures during construction, grading, and other covered activities in areas of naturally occurring asbestos, and the use of materials containing less than 0.25 percent asbestos.

(3) Advisory from the Governor's Office of Planning and Research, "Addressing Naturally Occurring Asbestos in California Environmental Quality Act (CEQA)

Documents," October 26, 2000, provides guidance to lead agencies to analyze the environmental effects of naturally occurring asbestos through the CEQA review process (http://www.opr.ca.gov/clearinghouse/asbestos.html).

(4) State law mandates that school districts complete environmental assessments and cleanups before acquiring prospective school sites or constructing school buildings, in order to qualify for state funding. The Department of Toxic Substances Control of the State of California Environmental Protection Agency (Cal/EPA) is responsible for evaluating these assessments and cleanups to ensure they comply with state law and standards. School districts must remediate prospective school sites in areas of naturally occurring asbestos before the school is occupied.

7. Will EPA test the residential areas of El Dorado Hills for asbestos? If not, why not?

U.S. EPA has no plans to test private residences for asbestos. We are focusing our remediation and assessment efforts on public areas where people congregate – especially children who are at greatest risk. The results of these tests will provide additional information which concerned residents and/or homeowner associations can use to decide for themselves whether testing of their property is warranted. Qualified consultants are available for hire to conduct those evaluations and tests. The California Air Resources Board has a brochure for homeowners which may be helpful: http://www.arb.ca.gov/cap/pamphlets/asbestosbrochure.pdf.

8. Why is EPA singling out El Dorado County?

U.S. EPA is not singling out El Dorado County, El Dorado Hills, or Oak Ridge High School. U.S. EPA Region 9 has a long history of involvement in assessing and remediating asbestos in Arizona, Hawaii, and a number of counties in California including Alameda, Calaveras, Fresno, Los Angeles, Santa Clara, Santa Cruz, San Benito, and San Mateo, in addition to El Dorado.

9. Is EPA taking any steps to enact (or revise) regulations, ordinances, or statutes so that other "potentially hazardous" areas don't crop up (like Oak Ridge) after the fact (i.e., after construction), given the extent of development going on in El Dorado County?

U.S. EPA has no plans to promulgate regulations covering construction in "potentially hazardous" areas, such as those with naturally occurring asbestos. Development and land-use planning issues are most appropriately handled at the State and local level. The California Air Resources Board has passed an Airborne Toxic Control Measure regulating use of quarried rock for unpaved roads and construction practices in areas of naturally occurring asbestos (NOA). If the community wants further controls on development in the area, residents need to work with the State or local government to develop those controls. As an example, Fairfax County, Virginia, has developed regulations for construction

activities on asbestos-containing soils. You can review them on the Fairfax County website: http://www.co.fairfax.va.us/service/hd/asbintro.htm.

10. What is the acceptable background level of disease due to amphibole exposure we as a society are willing to accept or tolerate? Who would willingly become part of this increased 'background' or allow their children to be?

U.S. EPA and other State and local regulatory agencies have a role in identifying and responding to situations involving environmental contamination, and the U.S. EPA will make a decision on clean-up levels at each site based on our assessment of human health and environmental risks at the site, and with meaningful public participation. However, each individual or family must make their own decisions about the relative risks and benefits of living in any particular community. U.S. EPA can assist by gathering and making available the information necessary to help State and local regulatory agencies, the community, and individuals make those decisions.

Past Exposure and Health Effects

11. How much or how little exposure to amphibole asbestos can cause health problems in 20 to 40 years? How many or how few incidences of exposure? How many or how few fibers inhaled?

We do not know how much exposure to *amphibole* asbestos, i.e., how many or how few incidences of exposure or how many or how few fibers inhaled, can result in a person developing asbestos-related disease. We do know that long-term exposure to relatively high concentrations of airborne asbestos is a potent cause of disease such as cancer and asbestosis. Therefore, it is prudent to reduce environmental exposures whenever possible. The Agency for Toxic Substances and Disease Registry will evaluate the risk associated with past exposures in their upcoming public health consultation (see #14).

12. How much were students and staff at Oak Ridge exposed to asbestos from construction dust when school was in session, before the remediation projects? Have people been exposed to asbestos continually since the school was built?

We cannot reconstruct the past and therefore cannot know or measure past asbestos exposures which may have occurred. The results of air monitoring of classrooms last summer, conducted after the remediation of the soccer fields and the cleaning of the rooms, showed the classrooms did not require cleanup actions, based on State and U.S. EPA-recommended levels of asbestos fibers in air.

13. Have my children been exposed to asbestos? How can I tell? Is anyone developing a method to measure past exposures? Should I have the soil that they play on tested? Should I have activity-based air sampling done?

Asbestos fibers are frequently detectable in air in urban areas from industrial sources and automobile brakes. In addition, you and your children have been exposed to asbestos if you breathed in fibers disturbed from asbestos-containing soil. No reliable test to measure past exposures is available, and we are unaware of anyone developing a test that would be capable of measuring past exposures. If your children are playing on bare soil that might contain asbestos, it would be prudent to provide a barrier such as landscape materials or grass, to prevent contact with the soil. The California Air Resources Board has a brochure for homeowners which you may find helpful: http://www.arb.ca.gov/cap/pamphlets/asbestosbrochure.pdf.

14. What can I tell my kids about their health risk from asbestos exposure, now that they've attended school here, played on the sports fields here, experienced the dust clouds here? Are they at risk of serious health consequences in 20 years, given the amount of time they've been exposed?

It is likely that students at Oak Ridge High School were exposed to asbestos if they breathed in dust suspended from soil containing asbestos. However, The *Agency for Toxic Substances and Disease Registry* (ATSDR) does not think student asbestos exposures were as high or lasted as long as people who worked closely with asbestos (in mines, for example), who are known to have increased rates of asbestos-related disease. ATSDR will be attempting to evaluate the risk associated with past exposures at the school in their upcoming public health consultation and will provide further information in that report. It is important for your children to be aware of their history of potential past exposure to asbestos so they can inform their doctor in the future, if necessary.

Health Testing

15. Can we determine if we have asbestos in our lungs? What tests for asbestos are available and where? Should we have our kids or ourselves tested?

Everyone in the U.S. has some amount of asbestos in their lungs from living in an industrialized country, some more and some less. But measuring how much asbestos is in your lungs will not determine if asbestos-related health effects will occur. Certain methods (sputum tests and lung biopsies) can show whether asbestos is present in your lungs; however, since most people have some asbestos in their lungs, these tests don't tell whether you've been exposed to enough asbestos to cause disease. Other tests can detect asbestos in blood and urine, but only indicate recent exposures and cannot determine risk for asbestos-related disease. Chest x-rays can show changes to the lungs caused by asbestos, but not until after many years (usually 20 to 50) have passed. Child lung x-rays are considered to be an unnecessary test because changes to the lung associated with asbestos exposure usually take many years to develop; additionally, the x-ray radiation could be a greater health risk to children than exposure to asbestos.

16. Will the government test Oak Ridge students and staff for asbestos exposure or health effects? Are you going to track residents of El Dorado Hills to see if they develop disease?

ATSDR is currently evaluating potential exposures at the school to see if further public health activities are warranted.

Health Effects Data

17. Oak Ridge was built and opened almost 25 years ago. Has there been any investigation or studies regarding the health of that first graduating class? I would expect to see an increase in asbestos-related health conditions, wouldn't I? Have any of the original construction crew of Oak Ridge High shown adverse affects due to asbestos exposure?

To our knowledge, no one has investigated or tracked the health of former students or staff at Oak Ridge High School, or former construction workers. Investigating the health of these groups now would not be likely to provide meaningful information because the diseases usually take at least 20 to 50 years to appear. Too little time has passed for many of those potentially exposed to asbestos to develop disease.

18. Is any other school in the same situation as Oak Ridge High School regarding health effects from naturally occurring asbestos? How long ago was this discovered?

We will investigate this question as we learn more about asbestos in this area and in other areas of California.

19. Please give us the public health statistics on our county and our town. Tell us about actual cases (e.g., of asbestos-related cancer) from the past 20 or so years that can be traced to El Dorado Hills. Have you seen any increase in lung disease per capita in El Dorado County? If it is widespread, do we have demographics that show higher death rates from asbestos-related cancers in the areas surrounding Oak Ridge High School?

In 1999, the California Cancer Surveillance Program evaluated mesothelioma deaths from 1988-1997 and found two to three cases per year or 22 cases for the 10-year period, concluding that the difference between this number and the expected 12 cases is not statistically significant and that mesothelioma rates were not significantly elevated in El Dorado County compared to Sacramento. ATSDR is currently working with the California Department of Health Services to evaluate whether California's cancer registry has enough data to update this information. Meanwhile, the National Institutes of Health (NIH) has funded Dr. Mark Schenker at UC Davis to study mesothelioma rates in California. Dr. Schenker's data is submitted for publication and not available at this time. However, ATSDR and other health agencies will be reviewing this data once it becomes available.

20. If naturally occurring asbestos is common throughout California, what have we learned in other areas? How is it affecting the health of citizens?

It is not clear how exposure to naturally occurring asbestos is affecting the health of people living with it. U.S. EPA and ATSDR will investigate the potential for health effects as the *Integrated Assessment* proceeds. The information gathered in El Dorado County will add to the overall knowledge about the relationship between naturally occurring asbestos and health effects.

21. Is the issue of dangerous levels of asbestos confined to the local high school area or is it widespread throughout the foothill neighborhoods? Why no health study of Serrano and the community surrounding Oak Ridge High School?

The California Geological Survey has identified a number of areas within El Dorado County (including El Dorado Hills) as potentially containing naturally occurring asbestos (see California Geological Survey Map for El Dorado County on the web at http://www.consrv.ca.gov/CGS/minerals/hazardous_minerals/asbestos/el_dorado.htm). Work is continuing to determine how widespread naturally occurring asbestos is in El Dorado County. A health study done at this time would not likely provide useful information because diseases associated with asbestos exposure usually take at least 20 years to develop. Too little time has passed since Oak Ridge High School was built for many people to show health effects even if they were present during construction or since opening, and most people have moved to the area more recently.

Canine Health

22. How were the fibers in the dogs' lung tissue counted? In what neighborhoods were the dogs found? What was the cause of the dogs' deaths? Where were the autopsies performed? Could UC Davis School of Veterinary Medicine provide a second opinion?

Neither U.S. EPA nor ATSDR was involved in the studies in question. If we are provided copies of the studies, ATSDR has veterinarians on staff who will review the data.

23. How would asbestos concentrations in dogs relate to asbestos concentrations in humans living in the same area? Could the common behavior of dogs to sniff the ground as they walk contribute to the amphibole asbestos concentrations in their lungs?

Significant differences in behavior and physiology between humans and dogs would make correlating asbestos exposure difficult. However, dog behavior would appear more likely to create contact with dust, increasing the potential for exposure to soil constituents including asbestos. If you are concerned about your pet's potential exposure, it would be prudent to cover bare soil in areas with naturally occurring asbestos, and to reduce dusty conditions and prevent tracking soil into your home.

Prevention

24. What are EPA's current "guidelines" to minimize asbestos exposure and health effects?

U.S. EPA has not promulgated regulations or guidance for minimizing exposures to naturally occurring asbestos, but we have published several suggestions in recent newsletters. These include avoiding areas of bare soil and mud, wiping soil off shoes outside, and wet-mopping and wet-wiping indoor surfaces. The California Air Resources Board website provides several fact sheets on living with naturally occurring asbestos at http://www.arb.ca.gov/toxics/asbestos/geninfo.htm.

25. Although it is always good advice to tell people not to smoke, how much value does this advice have with a toxin as dangerous as asbestos?

Both smoking and exposure to asbestos increase your risk of developing lung cancer, but the combination causes you to have a much greater risk of developing lung cancer than either smoking or asbestos exposure alone. Avoiding cigarette smoke will reduce the risk related to smoking as well as the combined risk from smoking and asbestos exposure, to a great extent. We encourage anyone who has been exposed to asbestos to try to quit smoking to reduce their risk of disease.

26. What precautions should someone take in doing yard work or digging tasks?

When working in areas of bare soil or digging in areas where asbestos occurs, it's important to keep the dust down by wetting the soil. The California Air Resources Board website has some excellent recommendations for homeowners (see http://www.arb.ca.gov/toxics/asbestos/4home.pdf). El Dorado County has an Asbestos Airborne Toxic Control Measure that addresses dust releases from construction projects (http://www.co.el-dorado.ca.us/emd/apcd/asbestos.html).

27. Are there low-cost asbestos monitoring systems for use in the home? How do we go about having our home tested for asbestos?

Low-cost testing methods are available to test soils containing high levels of asbestos (1% or greater). However, *activity-based monitoring* has shown the potential for airborne asbestos at levels of concern from relatively low levels of asbestos in soil which only expensive analytical methods can detect. Should you decide to have your home tested, you should arrange for a qualified expert to conduct the sampling. Please see the California Air Resources Board fact sheet on their website at http://www.arb.ca.gov/toxics/asbestos/5monitor.pdf.

Risk Assessment

28. What are the ambient levels of asbestos in El Dorado Hills? Is EPA measuring ambient air quality? Isn't the overall ambient concentration of asbestos in the air in El Dorado County very low and comparable to other counties having asbestos?

The California Air Resources Board's (CARB) website at http://www.arb.ca.gov/toxics/asbestos/monitoring.htm provides the data from CARB's monitoring of ambient air in El Dorado County, as well as from Monterey, Santa Clara, Placer, and Nevada counties. While this data indicates the quality of El Dorado County air in general, it provides no information on asbestos in the immediate breathing zone of people engaged in activities that stir up dust from soils that might contain asbestos. This is the issue that U.S. EPA's *Integrated Assessment* is designed to address. U.S. EPA hopes to be able to provide more information on localized exposures to asbestos in El Dorado Hills when the *Integrated Assessment* is complete.

29. Are the results of EPA's November 2003 sampling available to the public in full?

Yes. U.S. EPA distributed these results to State and local agencies and to the public at the February community meeting. The results are also available at the U.S. EPA information repository located at the Oak Ridge High School branch of the El Dorado Public Library and will soon be on the U.S. EPA website at http://www.epa.gov/region09/toxic/noa.

30. How do the November samples compare to the controls, i.e., 50 soil samples from Raleys Field or Folsom High School baseball field, etc. Please give examples from recent data.

U.S. EPA did not collect control samples during the November sampling, and neither U.S. EPA nor ATSDR are aware of any samples collected at Raleys Field or Folsom High School. The levels of asbestos found in the soils at Oak Ridge High School were in themselves of concern (33% of the samples taken at Oak Ridge High School had total asbestos exceeding 1% by weight) without comparison to other areas. This is why U.S. EPA is conducting its remediation project on the campus.

31. What were the differences in measurements that let the school district declare the Oak Ridge High School campus safe at the start of school in August and yet find elevated levels in November?

The different sampling events tested different media for different purposes. Air sampling by the California Air Resources Board was designed to measure the effectiveness of dust control measures during the soccer field remediation. The data from this effort showed a few detections of airborne asbestos, but most of the samples demonstrated that dust control measures were effective. The school district's sampling focused on whether asbestos from the remediation of the soccer field impacted the classrooms. To ensure that classroom

conditions were acceptable, the school district rigorously cleaned the classrooms and then tested them. U.S. EPA sampled exposed soil on campus in November to determine whether additional areas of the campus required remediation (please see the response to question 30, above).

32. When air sampling was done at Silva Valley school, the equipment was shut down and water trucks kept the dirt wet, and no measurements were gathered from the classrooms, especially the portables by the construction site and garden where the kids play. These controlled measurement practices seem intended to minimize the amounts of asbestos detected. Were the results of this sampling valid?

U.S. EPA was not involved in the previous sampling at the Silva Valley school and cannot comment on it but may include Silva Valley in the *Integrated Assessment* this summer.

33. What health risk data or exposure data does EPA/ATSDR have for Oak Ridge or for El Dorado Hills?

The California Air Resources Board ambient air monitoring data collected in El Dorado County since 1998, as well as the ambient air monitoring data collected during the soccer field remediation and the *activity-based monitoring* conducted by the school district, provide some limited data for El Dorado Hills and Oak Ridge High School (ORHS) on potential exposure to airborne asbestos. *Activity-based monitoring* that U.S. EPA plans to conduct during the *Integrated Assessment* will also provide exposure data.

34. Please explain your methodology in monitoring for asbestos:
(1) air quality inside classrooms or work environments;
(2) outside air quality on the school campus;
(3) measurement of asbestos fibers non-airborne.

U.S. EPA will make specific information about the monitoring methodology available to the public at the information repository at Oak Ridge High School branch of the El Dorado Public Library.

35. What is the plan to monitor over a five-year period? How do you plan to develop baseline data for Oak Ridge High School, Rolling Hills Middle School, and Silva Valley Elementary School?

U.S. EPA is currently developing plans to conduct ambient air and *activity-based monitoring* for potential asbestos exposures as part of its *Integrated Assessment*. The ambient air monitoring will be designed to provide data for a representative variety of plases and weather conditions. U.S. EPA will make the *Integrated Assessment* plan available for review by the general public as well as State and local agencies.

36. There continues to be development in Oak Ridge Village. Is this a hazard for Oak Ridge [High School], especially since the elevation [of Oak Ridge Village] is higher than Oak Ridge [High School]?

U.S. EPA doesn't know if development in Oak Ridge Village represents a hazard for ORHS. Air monitoring at the site of the Oak Ridge Village development would be required to determine if asbestos fibers were airborne and available for inhalation. Concerned residents are encouraged to contact the El Dorado County Division of Environmental Management, which has responsibility for enforcing the Asbestos Airborne Toxic Control Measure.

37. Is asbestos still in brakes? How do the air samples compare to samples taken while driving in stop-and-go traffic?

Yes, asbestos is still used in vehicle break pads. A 1989 Federal court decision exempted existing products containing asbestos, such as brake pads, from the U.S. EPA asbestos ban. We have not reviewed the literature for asbestos fibers released into air in stop-and-go traffic.

38. How does the risk from asbestos exposure compare to other health risks: being in an accident on the freeway, or contracting breast cancer or colorectal cancer, heart disease, or diabetes? How does it compare to the risk in our county of liver disease, obesity, drug abuse, alcoholism, stress, etc.? To breathing second-hand smoke over long periods of time?

The National Institute of Environmental Health and Safety classifies asbestos as a known human carcinogen based on current scientific evidence, and studies clearly show that long-term exposures to high concentrations of asbestos fibers in air is a significant health risk. Many daily activities carry a higher risk than exposure to naturally occurring asbestos (NOA) does (for example, a 1-in-75 lifetime risk of death from car accidents or a 1-in-130 lifetime risk from death due to accidents in the home). However, people generally have a lower tolerance for involuntary risks, such as those from environmental contamination, than for risks which are voluntary or somewhat under their control or provide a personal benefit (e.g., driving a car).

39. According to El Dorado County officials, breathing in a minimum of 52,000 amphibole asbestos fibers per day does not pose a health risk to children. Do your agencies agree with the County's position?

U.S. EPA and ATSDR are not aware of such a statement by El Dorado County officials. Nevertheless, while we would prefer the air to be completely free of asbestos, we recognize that asbestos is a part of our environment from both industrial and natural sources and everyone carries some amount of asbestos in the lungs. Where asbestos occurs naturally, as in some areas of California and the other parts of the country, the potential for higher ambient and indoor air concentrations of asbestos is greater. When the *Integrated*

Assessment **is complete U.S. EPA, ATSDR, other agencies, and the community will have more information to make decisions about levels of asbestos in the air.**

40. *What other communities in the U.S. have a range of amphibole asbestos fibers in air that translates to inhaling 52,000 to 300,000 fibers per day?*

These fiber intake values correspond to range of 0.0026 to 0.015 fibers per cubic centimeter of air, assuming a daily inhalation rate of 20 cubic meters of air per day. We do not know the source of these data and therefore cannot comment on their validity. Several other areas of the US contain naturally occurring asbestos (NOA), such as the Appalachian and Rocky Mountains, but we know of no continuous monitoring data collected in these communities. The California Air Resources Board's website (http://www.arb.ca.gov/toxics/asbestos/monitoring.htm) provides the best ambient-air-monitoring data from other NOA areas within California. These data appear to be from intermittent sampling; some appear to be from areas near localized sources of asbestos (e.g., quarries), and therefore may not represent typical ambient conditions in these locations. The U.S. EPA's *Integrated Assessment* will collect additional air data in the El Dorado community.

41. What risk analysis has been done based on air monitoring of naturally occurring asbestos? What is the quantified health risk posed by the naturally occurring asbestos on the Oak Ridge High School campus (i.e., if an individual spends four years here as a student, his or her risk of contracting cancer or asbestos-related disease is ? cases per 1,000,000 people)?

Estimating risk when exposures are short-term, intermittent, and of varying concentrations involves significant scientific uncertainty. The clearance level of 0.0009 fibers per cubic centimeters of air (f/cc) used for the classroom testing at Oak Ridge High School in the summer of 2003 is the level used for the clean-up of residences in New York following the World Trade Center disaster. This level represents a potential risk of 100 excess cancers in a population of one million people (a 10^{-4} risk level), assuming a virtually continuous 30-year residential exposure. For an intermittent and shorter exposure (such as for four years as a student at the school), the potential risk would be correspondingly lower. Assuming a 40-hour school-week, with 40 weeks of school per year for four years, the potential excess cancer risk at a 0.0009 f/cc exposure level would be approximately 2 to 3 excess cancers in one million people. And even this estimate assumes continuous exposure at the 0.0009 f/cc level, whereas actual levels of asbestos in the air likely vary with location.

42. Do students at the high school who participate in outdoor sports activities continue to be at risk?

The cleanup activities conducted by the School District and U.S. EPA, which will be completed this summer, will minimize the potential for any students at the high school to be exposed to airborne asbestos either during sporting activities or in the classroom.

43. What about the risk from exposure to naturally occurring asbestos brought home on shoes, clothing, and backpacks?

If soils with naturally occurring asbestos are brought into the home, higher levels of asbestos fibers could be present in indoor air. U.S. EPA and ATSDR are not aware of any specific data that address the question of how much additional exposure could result from this phenomenon. Therefore it may be prudent for homeowners to consider taking protective measures to minimize this potential. The California Air Resources Board's website (http://www.arb.ca.gov/toxics/asbestos/geninfo.htm) provides recommendations for homeowners on specific measures they can take to minimize exposure.

44. If Libby, Montana, had more than 100 people with lung abnormalities (5%) who had no known exposures, do you believe there is a high risk for asbestos disease among children or residents here who had many exposure pathways, such as school?

While *amphibole* asbestos is present in both El Dorado County and Libby, Montana, the two places are otherwise very different. Industrial activities and the widespread use of asbestos-contaminated waste material in and around homes created a very high level of asbestos exposure in Libby. The U.S. EPA's *Integrated Assessment* will provide more information about potential asbestos exposures in El Dorado County.

45. Would you feel confident and good about sending your children to school here?

Each family must make this decision for themselves, but the U.S. EPA will try to provide information on which to base a decision. To date, all sampling results at Oak Ridge High School show no immediate health threat to students in classrooms, and the remediation work on campus is addressing the potential for significant short-term exposures during outdoor activities. To keep indoor levels low, we recommend that students and staff avoid walking in exposed soil at the high school and that the school continue to employ recommended procedures to exclude or remove soil from inside classrooms.

46. Knowing about the asbestos problem, would you want to live in El Dorado Hills? Especially with young children? Would you raise your children within one mile of the areas that have been disturbed and have amphibole asbestos fibers in the air?

While the people living in El Dorado County may be exposed to airborne asbestos, ambient air monitoring performed to date by the California Air Resources Board (CARB) indicates exposures to airborne asbestos are comparable to those in other areas of California with naturally occurring asbestos. The U.S. EPA's *Integrated Assessment* will provide more information about potential asbestos exposures in El Dorado Hills, so that residents will have the information they need to make their own decisions about the relative risks and benefits of living in an area with naturally occurring asbestos. The CARB website (http://www.arb.ca.gov/toxics/asbestos/geninfo.htm) provides excellent recommendations about how to minimize potential personal exposures in and around the home.

Local Asbestos Regulation and Enforcement

Questions 47 through 60 address issues related to construction activities, especially of schools. We list the questions below and provide a combined response at the end of the list.

47. Why were schools in El Dorado Hills built in locations where they wouldn't build houses?

48. I have a letter from the Superintendent's office dated April 11, 1998; he was concerned about asbestos then on Oak Ridge's campus. Why was Oak Ridge allowed to move the soil on a known amphibole asbestos vein? Why did the school "cut in" the soccer field last year when we all objected to its doing so? How were school authorities allowed to do all of this grading in 2002 when local residents were forced to mitigate grading activities prior to 2002?

49. What about regulating construction of new schools that are planned but not built?

50. Will digging of pools and landscaping, creating dust and exposed soil, be controlled at houses surrounding schools?

51. Do all new construction projects in El Dorado Hills (homes, roads) need testing before and during the project? If not, why aren't greater precautions taken regarding new development?

52. Is the County Air Quality Management District, California Air Resources Board, or EPA considering requiring enhanced dust control and dust monitoring for asbestos at construction sites throughout El Dorado Hills?

53. If the source [of asbestos at Oak Ridge High School] turns out to be the disturbance of soil due to residential development in the area and the air drift of asbestos from development, will there be a plan to curtail development? Would El Dorado Hills consider a building moratorium such as in Davis, to prevent more construction that is releasing asbestos into our air?

54. How would you approach the general problem of allowing construction of schools, parks, and such on site contaminated with amphibole asbestos? What should local government do? A county general plan is in the offing.

55. What controls can be placed on land uses or land disturbing activities to control dust?

56. Who will be responsible for enforcement [of land-use controls]?

57. Cameron Park Lake has gotten a large amount of crushed gravel from the same quarry as Oak Ridge High School. Is there any way it can be checked for asbestos?

58. Is the construction at surrounding housing developments, e.g., at Highway 50 and East Bidwell or the ridge east of Bidwell, disturbing asbestos? Was that area tested? Results? If

not, will EPA sample dust from surrounding developments? Has EPA evaluated the impact of development in the area as a potential contributing factor to the asbestos problem?

59. El Dorado County plans to build a park on a property situated around Bass Lake. This property has been shown on the 2000 geological map of serpentine rock as being an area most likely to have this rock and they did find asbestos during the minimal testing already completed. We are concerned about the implications of an active sports complex as planned by the County being sited here. Should this soil be disturbed?

60. Who was responsible for approving the construction of the work that caused the contamination?

U.S. EPA has no authority to regulate land use or school construction. In general, decisions on construction permits, Environmental Impact Report (EIR) approvals, and zoning changes are made at the local (city and county) level. In addition to local approvals, State review and approval is required when the State funds construction of new schools, and the State of California's Department of Toxic Substances Control is developing guidance on construction of new schools in areas with naturally occurring asbestos (NOA). The Governor's Office of Planning and Research has issued guidance to local agencies on addressing NOA exposures in environmental reports under the California Environmental Quality Act (CEQA) (http://www.opr.ca.gov/clearinghouse/asbestos.html). Also, the Asbestos Airborne Toxic Control Measure, promulgated by the California Air Resources Board (CARB) and adopted by El Dorado County, applies to any construction activities, including schools.

Any activity that disturbs soil (e.g., excavation for pool construction) in an area containing naturally occurring asbestos has the potential to release asbestos fibers into the air. Following the Airborne Toxic Control Measure and recommendations listed on the CARB website (http://www.arb.ca.gov/toxics/asbestos/geninfo.htm) will help minimize these potential exposures.

Residents should direct questions and concerns regarding school construction in El Dorado County to the relevant school district and county authorities. Concerns or questions about land use, development, and the Asbestos Air Toxic Control Measure are best addressed to El Dorado County authorities such as the Environmental Management and Planning departments. For more information, please see the County's website at http://www.co.el-dorado.ca.us/emd/apcd/asbestos.html.

61. Why do we have active quarries that mine asbestos in El Dorado County close to nearby schools when the risk is considered dangerous?

While El Dorado County has no asbestos mines, it does have quarries that mine aggregate rock which may contain naturally occurring asbestos. The California Environmental Protection Agency (Cal/EPA) has conducted a study of potential asbestos exposures in

Garden Valley, evaluating quarries and unpaved roads for potential airborne asbestos sources. The study concluded that use of asbestos-containing rock to surface unpaved roads is the largest source of airborne asbestos exposures in the area. The Asbestos Airborne Toxic Control Measure regulates the current and future use of quarried rock that contains asbestos for surfacing unpaved roads. At the present time, Cal/EPA's Department of Toxic Substances Control and Office of Environmental Health Hazard Assessment is completing an assessment of risks from roads in the Garden Valley area surfaced with asbestos-containing rock. Further information is available at http://www.dtsc.ca.gov/SiteCleanup/Garden_Valley/index.html.

Oak Ridge High School Response Action

62. If any other school is in the same situation as Oak Ridge [regarding asbestos contamination], how has this been treated there?

U.S. EPA is not aware of any other schools where response actions were taken to reduce exposure to naturally occurring asbestos. However, U.S. EPA would take an action similar to the current action at Oak Ridge High School if another school site with similar issues was identified, and the *Integrated Assessment* will look at other schools in the area. U.S. EPA response actions are intended to prevent asbestos from becoming airborne. If the asbestos is not in the air, risk of exposure is minimal.

63. Are you getting objections to the clean-up you are doing? From who and why?

As in other communities where U.S. EPA is active, we hear a variety of opinions. Some have expressed their opinion that U.S. EPA is doing too much or should not take any action; others are concerned that we are not doing enough.

Source

64. What was the exact source of the contamination at Oak Ridge High School, the high school grounds, or across the street, or airborne from surrounding construction sites? Did the asbestos on the sports fields come from the soccer field work, or was it always there? If the source is not known, will there be an effort to discover the source?

U.S. EPA does not know the exact source of asbestos contamination, but it is likely to be a combination of the soccer field excavation and grading, fill material that was brought onto the Oak Ridge High School campus, and native soils.

65. When was the earliest probable and earliest possible date at which asbestos at Oak Ridge High School was disturbed?

The school was built in 1980 and the soccer field was carved out of the hillside in 2002, but U.S. EPA has no independent information on disturbance of asbestos during these events. Our focus now is to evaluate current potential for exposure to asbestos.

66. Are you concerned about people (kids) tracking mud onto campus from other asbestos areas? What is the likelihood of redeposition of asbestos after the cleanup, via New York Creek or from dust-laden wind from off-site sources?

The U.S. EPA action will cover most of the asbestos-containing soil at Oak Ridge High School (ORHS). However, because ORHS is in an area of naturally occurring asbestos, we recommend that people avoid stirring up dust or tracking in mud. El Dorado Union High School District has prepared an Operations and Maintenance (O & M) Plan for the high school campus that provides for long-term maintenance. The plan is available at on the web at http://www.co.el-dorado.ca.us//emd/apcd/PDF/Final_Draft_OM_Plan.pdf. The district may need to revise the O & M plan to maintain the mitigation provided by U.S. EPA's action, once it is completed.

Remediation

67. My understanding is that the mitigation of the baseball fields has been completed as of last Friday (February 20, 2004). Please explain in some detail what has been done to mitigate the baseball fields and why we should feel comfortable that our children will be safe competing on those fields.

The baseball infields and surrounding bare dirt areas were excavated to six inches below the ground surface. A layer of filter fabric was installed and covered with compacted clean fill. The soil containing asbestos is now covered and cannot become airborne.

68. Please diagram the exact plans for the cleanup at Oak Ridge High School. Are the mounds of contaminated soil at the baseball fields going to be removed? What analysis has been performed and what construction has been proposed to remedy the problem of overflows of New York Creek? When will the construction on the creek/culvert occur?

The cleanup plan for Oak Ridge High School is to cover all areas of exposed soil that could be disturbed and potentially release asbestos fibers into the air. U.S. EPA will grade and cover the soil mounds so that asbestos fibers cannot escape, and will clean out New York Creek on the school grounds and install an additional culvert to increase flow capacity. Most of the work will be done this summer.

69. Does simple covering (landscaping) of dirt remediate? Has landscaping ever been used for mitigation?

Simply, yes. If asbestos-containing soil cannot become airborne, risk of exposure is minimal. Landscaping has been used for mitigation at various sites, and it is always prudent to cover bare soil in areas with naturally occurring asbestos.

70. What precautions will be taken regarding nearby residents (e.g., on Meadow Wood Drive) as well as students on campus during mitigation?

Most of the work will take place during breaks in the school schedule when students are mostly absent. Throughout the remediation project, U.S. EPA will be taking precautions to assure that our work generates no dust. We will have dust monitors operating continuously and, if we detect dust emissions, we will correct the problem immediately. U.S. EPA expects no effects on nearby residences from our remediation activities.

71. Do you have a plan for testing of homes around Oak Ridge (e.g., Meadow Wood Drive), both before and after the mitigation process is complete? Is the fire road at the end of Meadow Wood Drive adequately mitigated of asbestos contamination?

U.S. EPA has no plans to test homes. Rather, we are focusing our testing efforts in public areas where people congregate – especially children who are at greatest risk. The results of these tests will provide additional information which concerned residents in these areas can use to decide for themselves whether testing of their property is warranted. Qualified consultants are available to conduct those evaluations and tests. The California Air Resources Board has brochure for homeowners which may be helpful, on the web at http://www.arb.ca.gov/cap/pamphlets/asbestosbrochure.pdf. Asbestos clean-up of county roads is the responsibility of the appropriate El Dorado County agency.

Clearance Testing

72. What is being done to address the students concerns? They are told that there will be a clean-up during Spring Break, but they also hear that they are breathing asbestos till then.

Based on available data, ATSDR does not think students at Oak Ridge High School have been routinely exposed to high levels of asbestos. The response action conducted by U.S. EPA is expected to reduce the potential for any remaining asbestos to be released into the air.

73. Will post-testing be done in the same area as was done in November, i.e., all the fields, > 100 samples, soil and air?

U.S. EPA is not planning post-remediation outdoor sampling. U.S. EPA will do clearance sampling of indoor air in classrooms before the 2004/2005 school year begins.

74. Why was the trail at the end of Meadow Wood Drive that leads towards the south end of the baseball field not covered with fabric and soil?

U.S. EPA will remediate this area during the summer.

Operations and Maintenance

75. If exterior landscaping has adequate coverage (i.e., grass, plants, redwood bark, concrete) and test results are negative for asbestos, is sweeping/blowing OK?

No, U.S. EPA does not recommend dry-sweeping or leaf-blowing in areas with naturally occurring asbestos.

76. What will be the long-term monitoring for Oak Ridge High School (i.e., resampling of courts and other paved areas)? When? By whom? How often?

El Dorado Union High School District has prepared an Operations and Maintenance (O & M) Plan for the high school that provides for inspection and on-going maintenance but does not provide for resampling of mitigated areas. The O&M plan does include one-time clearance sampling of classrooms once the U.S. EPA remediation is complete. The plan is available at http://www.co.el-dorado.ca.us/emd/apcd/PDF/Final_Draft_OM_Plan.pdf. The school district may need to revise the O & M plan to maintain the mitigation provided by U.S. EPA's action.

Preliminary Assessment of El Dorado Hills

Answers to questions 77 through 79 follow question 79.

77. The Preliminary Assessment was initiated in September 2003.
(A) What areas have been identified so far for assessment?
(B) How will EPA solicit public involvement in scoping?
(C) When will this involvement occur, specifically?
(D) When will the one-year estimate of duration end, one year from the beginning (9/04) or one year from the February 2004 meeting (2/05)?
(E) How many (roughly) locations will be evaluated?
(F) What are the general criteria for selecting areas for assessment?

78 Will EPA compare the results of the Preliminary Assessment to a background location for reference?

79. What is the likelihood that the baseball fields at the Community Services District also contain high levels of asbestos? If so, can anything be done now to correct the problem before the Little League season begins, as was done on the high school baseball field?

Scope of the assessment

The Superfund law, officially the Comprehensive Environmental Compensation, Response, and Liability Act (CERCLA), provides that any person who is or may be affected by a release or threatened release of a hazardous substance may petition EPA to conduct an assessment of the hazards the releases poses to public health and the environment. U.S. EPA received such a *Preliminary Assessment* petition, submitted on September 30, 2003, and later clarified. The petition requested assessment of naturally occurring asbestos at the El Dorado Hills Community Center, the Harvard Way road cut, Silva Valley Elementary School, Rolling Hills Middle School, and Oak Ridge High School. Subsequently, U.S. EPA also received a letter from the California Environmental Protection Agency (Cal/EPA) suggesting scientific studies on naturally occurring asbestos in addition to the site-specific evaluation of the *Preliminary Assessment*.

U.S. EPA is currently determining the scope of the *Preliminary Assessment*, which we plan to conduct as an *Integrated Assessment*. An Integrated Assessment includes collection of information to determine whether a immediate response is warranted at any of the locations, as well as whether a long-term investigation and cleanup is indicated. U.S. EPA has decided not to include Oak Ridge High School in the Integrated Assessment, as the school district and U.S. EPA have already taken actions to address the campus. Otherwise, U.S. EPA has not yet made a final determination on what sites to include in the *Integrated Assessment*.

U.S. EPA has also received a petition to do a *Preliminary Assessment* at the proposed Bass Lake Park, but we believe that the State's Environmental Impact Report (EIR) process is the more appropriate avenue to address naturally occurring asbestos concerns related to park development. For more information please see the Advisory from the Governor's Office of Planning and Research, "Addressing Naturally Occurring Asbestos in California Environmental Quality Act (CEQA) Documents," October 26, 2000, on the web at (http://www.opr.ca.gov/clearinghouse/asbestos.html).

Assessment work plan

U.S. EPA's *Integrated Assessment* will investigate whether asbestos is present and whether a pathway for human exposure is present at specific locations. U.S. EPA expects to have a draft work plan for the *Integrated Assessment* ready for public review and comment in the summer of 2004. U.S. EPA will announce the availability of the work plan publicly and make the plan available to the public at the information repository at the Oak Ridge High School branch of the El Dorado Public Library as well as on our website at

http://www.epa.gov/region09/toxic/noa (currently under development). U.S. EPA will also hold workshops to share thoughts on the work plan with community members.

Assessment field work

U.S. EPA is preparing to do some sampling of the playing fields at the Community Center to check for asbestos before we begin the full *Integrated Assessment*. U.S. EPA expects that the field work for the larger *Integrated Assessment* will take place over the summer and fall of 2004, although some aspects of the Assessment may require sampling over all the seasons. U.S. EPA expects to have a report on our findings available in 2005.

80. What has been done or what will be done at the adjacent schools, Rolling Hills and Silva Valley? When? By whom? If EPA is not collecting data from these schools, why not? If EPA is, when will these results be evaluated? When would the mitigation process be released to the public? Is this part of the "assessment scope"?

The adjacent schools were included in the petition and U.S. EPA is considering including them in the *Integrated Assessment*.

81. Have any air studies been done at Green Valley Elementary, where the Sierra Crossing housing development could be contaminating our children's air with asbestos? If so, what were the results? If not, how do I go about getting testing done there? Is Green Valley Elementary in the asbestos area shown on the map in the Sacramento Bee article?

One of the items under consideration in the *Integrated Assessment* is monitoring of air around development and construction sites. We will keep this area in mind when we look for development locations.

The maps provide information on general locations of geologic formations which may contain asbestos. It is hard to know whether the soil at Green Valley Elementary or its vicinity contains asbestos without sampling the soil at those locations.

82. Will the EPA assessment include the Promontory Point school site, about 3-4 miles north of Oak Ridge High School, where the finding of asbestos has delayed construction? If not, why not?

The school siting program of State of California's Department of Toxic Substances Control is addressing Promontory Point school, and U.S. EPA has no plans to assess this site.

83. Why are not all schools in El Dorado Hills being tested? Will daycare and preschool sites in the area be tested?

U.S. EPA is not planning to test all schools in El Dorado County. The information we gather during the *Integrated Assessment* will help all interested parties develop strategies to

minimize exposures to asbestos throughout the community and to identify areas for further research.

84. Is there going to be on-going testing of schools yearly to ensure safety?

Maintenance activities at schools in El Dorado County will need to be conducted in ways which limit the potential for release of asbestos fibers into the air and ensure that landscaping is maintained. Schools such as Oak Ridge High School, which required some remedial action, will have to develop an Operations and Maintenance Plan to ensure that the improvements are maintained.

85. Since the asbestos problem is a community issue, not just a school-and-community-center issue, will you test Serrano and the surrounding neighborhoods to determine how widespread the asbestos problem is in the area?

While U.S. EPA does not plan to test any residential areas at this time, the *Integrated Assessment* is designed to provide information that can be applied to additional areas, not just the specific sites tested. We will determine follow-up needs in conjunction with our State and local partners.

Communication

86. Currently, County officials are withholding all test results from the citizenry, and County officials have blasted EPA for sharing exposure data with the public and have requested that EPA withhold all future exposure data. Will EPA continue to share exposure data with the citizens who are concerned and wish to obtain it?

U.S. EPA is not aware of any withholding of final test results. In any case, U.S. EPA will continue to share all our data with the public.

87. Who will notify the public of opportunities to comment on agency actions, and how will public comment requests be made?

In conducting environmental and health investigations, U.S. EPA and ATSDR are committed to an open process with meaningful community involvement. We will notify the public of opportunities to review and comment on our work via websites, newsletters, newspaper advertisements, press releases, community meetings, and personal contacts. In addition, you can always call or leave a message with our community involvement staff: Don Hodge (U.S. EPA) at 415-972-3240 or toll-free at 800-231-3075 and Yolanda Outin (ATSDR) at 404-498-1748 or toll-free at 888-422-8737.

88. Does the EPA regard the rapidly increasing population in El Dorado Hills and environs as a safety concern that suggests a need for better disclosure and a greatly improved education

process? Why does there appear to be little information to help residents evaluate the risk of living in El Dorado County? Why has there not been more available for parents in the way of information as to how to safely deal with the spread of asbestos in our homes?

U.S. EPA has no authority regarding local land-use planning. Concerns and questions about zoning, planning, and development issues are best addressed by the local authorities such as the Departments of Environmental Management and Planning (see http://www.co.el-dorado.ca.us/edc.html). If you are concerned about exposures to naturally occurring asbestos, the California Air Resources Board provides excellent recommendations for minimizing potential personal exposures in and around the home on the web at http://www.arb.ca.gov/toxics/asbestos/geninfo.htm provides.

Property Value

89. We are considering buying a home in this area. Faced with a possible label as a Superfund cleanup site, we are uneasy to make this decision until after the Preliminary Assessment report is released. Could this problem possibly affect property values in El Dorado Hills? Do you believe we are wise to wait?

Many factors come under consideration in home-buying. The presence of naturally occurring asbestos and the potential for exposure to airborne asbestos may be two of them. Each family must weigh the factors important to them and make their own judgements about how circumstances in El Dorado Hills affect their home-purchase decision. U.S. EPA and ATSDR are committed to sharing timely information from our environmental and health investigations with the community to help you make such decisions. The most current general information U.S. EPA has on the effects of Superfund site cleanups on property values is available from the EPA website at http://www.epa.gov/superfund/programs/recycle/property.htm.

Glossary

Activity-based monitoring (or sampling or testing): taking samples of air using small collectors that technicians wear while engaging in typical activities that could disturb asbestos fibers in the soil and release them into the air

Agency for Toxic Substances and Disease Registry (ATSDR): a agency of the federal Department of Health and Human Services whose mandate is to provide health information related to toxic substances in the environment

Amphibole: one of the two main groups of asbestos minerals (the other being serpentine); amphibole types of asbestos include actinolite (found in El Dorado Hills, California) and tremolite (found in Libby, Montana). Amphiboles have a longer, narrower shape than chrysotile asbestos and may be more irritating and resistant to destruction in the body than chrysotiles

Chrysotile: the type of asbestos found in serpentine rock, chrysotile asbestos dissolves more easily in the lungs than amphiboles; all asbestos forms, however, are classified as known human carcinogens

Integrated assessment: an assessment of a potential hazardous waste cleanup site that considers whether the site presents either an imminent threat requiring immediate action or a complex situation requiring long-term investigation and cleanup, or both

Permissible exposure limit (PEL): the time-weighted average amount of exposure to a substance over an eight-hour day that the Occupational Safety and Health Administration allows

Polarized light microscopy (PLM): a microscope technology that uses the polarity (or orientation) of light waves to provide better images than a standard optical microscope

Preliminary Assessment: the first assessment of a potential hazardous waste cleanup site to determine if it may warrant the use of Superfund resources under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Transmission electron microscopy (TEM): a microscope technology that uses the properties of electrons to provide more detailed images than even polarized light microscopy