SUMMARY OF BOARD ITEM

ITEM # 00-7-4: PUBLIC HEARING TO CONSIDER THE PROPOSED AMENDMENTS TO THE ASBESTOS AIRBORNE TOXIC CONTROL MEASURE FOR ASBESTOS-CONTAINING SERPENTINE

STAFF RECOMMENDATION: The staff recommends the Board adopt the proposed amendments to the Asbestos Airborne Toxic Control Measure for Asbestos-Containing Serpentine (Asbestos ATCM).

DISCUSSION: In 1990, the Air Resources Board (ARB or Board) adopted the Asbestos ATCM, which prohibits the use of serpentine aggregate on unpaved surfaces if the asbestos content is greater than five percent.

Since the adoption of the Asbestos ATCM, additional information from ambient air monitoring studies and dust emission models has been developed. This information demonstrates a potential for significant exposures and risks for individuals living near unpaved roads surfaced with asbestos-containing aggregates such as serpentine and ultramafic rock. Therefore, staff is proposing to amend the Asbestos ATCM to further protect public health from asbestos exposures by prohibiting the use of aggregate likely to contain asbestos in unpaved surfacing applications.

Last fall, the El Dorado County Board of Supervisors considered a county ordinance proposed by the local air pollution control district that would have lowered the allowable asbestos content of surfacing materials below five percent. The proposed ordinance was not adopted. The Chair of the El Dorado County Board of Supervisors stated that asbestos exposures from surfacing applications is a statewide issue and needed to be dealt with by the ARB through a statewide regulation. Accordingly, the ARB staff decided to pursue the development of an updated Asbestos ATCM.

SUMMARY AND IMPACTS:

The 1990 Asbestos ATCM prohibits the use or sale of serpentine material for surfacing applications, if the material contains more than five percent asbestos. The proposed amendments would expand this prohibition by prohibiting the use or sale of all serpentine material for surfacing applications on unpaved roads and other surfaces. The proposed amendments would also prohibit the use or sale of ultramafic rock for surfacing, unless it has been tested and determined to contain less than 0.25 percent asbestos. In addition, staff is proposing to prohibit the use for surfacing of any other material that has been tested and determined to have an asbestos content of 0.25 percent or more. All of these materials could still be sold and used for non-surfacing applications, but sellers would be required to provide written notice to purchasers that the materials cannot be used for surfacing.

Implementation of the proposed amendments will further reduce potential health impacts by eliminating the use of asbestos-containing materials on new and existing unpaved roads. Also, as non-asbestos-containing aggregate is added to existing serpentine-covered roadways, the potential for release of asbestos from these roadways will be reduced.

There are over 200 mines and quarries in California that sell aggregate for use in surfacing. Of these, the staff has identified about five quarry operations located in serpentine or ultramafic rock deposits that may incur significant economic impacts from a prohibition of the use of asbestos-containing materials for surfacing. In addition, quarries in ultramafic rock areas will incur cost for testing of ultramafic rock to determine the asbestos content. Testing costs are approximately $0.06 to $0.10 per ton of material produced for surfacing.

The costs to businesses that buy rock for resale should be insignificant since only recordkeeping is required. Costs to homeowners and other end users will be minimal, as alternative materials are available at similar costs. Minor increases in hauling costs may be incurred if alternative material must be purchased from a more distant supplier. However, in the long term, these minor increases in cost will be offset because of the less frequent need to replace

rock due to the greater durability of alternative aggregates.

The estimated cost to State agencies would be approximately $250,000 per year for testing of aggregate. The total statewide costs to local air pollution agencies to implement the regulation are estimated to be $150,000 for the first year and $35,000 for each subsequent year.

No significant adverse environmental impacts are expected to occur, with the exception that there may be a very small increase in emissions from diesel vehicles if alternative rock is transported from a longer distance away. However, the increase in truck travel is small, approximately 500 miles per day out of a total of 30 million miles per day now driven by diesel trucks. The level of risk posed by this increase in traffic is estimated to be less than one in a million for any individual. Because alternative aggregate material (i.e., limestone, river rock, decomposed granite, and basalt) is more durable, these diesel emissions will be offset or decrease in the future as the aggregate will not have to be replaced as frequently.

TITLE 17. CALIFORNIA AIR RESOURCES BOARD

NOTICE OF PUBLIC HEARING TO CONSIDER THE ADOPTION OF PROPOSED AMENDMENTS TO THE ASBESTOS AIRBORNE TOXIC CONTROL MEASURE – ASBESTOS-CONTAINING SERPENTINE

The Air Resources Board (ARB or Board) will conduct a public hearing at the time and place noted below to consider the adoption of amendments to the Asbestos Airborne Toxic Control Measure—Asbestos-Containing Serpentine (title 17, California Code of Regulations, section 93106):

DATE:	July 20, 2000
TIME:	9:30 a.m.
PLACE:	Air Resources Board Board Hearing Room, Lower Level 2020 L Street Sacramento, California

This item will be considered at a two-day meeting of the ARB, which will commence at 9:30 a.m. on Thursday, July 20, 2000, and may continue at 8:30 a.m., Friday, July 21, 2000. This item may not be considered until July 21, 2000. Please consult the agenda for the meeting, which will be available at least ten days before July 20, 2000 to determine the day on which this item will be considered.

This facility is accessible to persons with disabilities. If accommodation is needed, please contact ARB's Clerk of the Board by July 6, 2000, at (916) 322-5594, or TDD (916) 324-9531, or (800) 700-8326 for TDD calls from outside the Sacramento area, to ensure accommodation.

INFORMATIVE DIGEST OF PROPOSED ACTION AND PLAIN ENGLISH POLICY STATEMENT OVERVIEW

Sections Affected: Proposed amendments to section 93106, title 17, California Code of Regulations (CCR).

Background

The California Toxic Air Contaminant Identification and Control Program (Program), established under California law by Assembly Bill 1807 (Chapter 1047, Statutes of 1983) and set forth in Health and Safety Code (HSC) sections 39650–39675, requires the ARB to identify and control air toxics in California. The Board identified asbestos as a toxic air contaminant (TAC) in 1986. Asbestos was identified without a Board–specified threshold exposure level.

Following the identification of a substance as a TAC, HSC section 39665 requires the ARB, with participation of the air pollution control and air quality management districts (districts), and in consultation with affected sources and interested parties, to prepare a report on the need and appropriate degree of regulation for that substance.
HSC section 39666(b) requires that this "needs assessment" address, among other things, the technological feasibility of proposed airborne toxic control measures (ATCMs) and the availability, suitability, and relative efficacy of substitute products or processes of a less hazardous nature. A needs assessment for asbestos was conducted between 1989 and 1990 as part of the ARB's development of the Asbestos ATCM for Asbestos-Containing Serpentine ("Asbestos ATCM"; title 17, California Code of Regulations, section 93106). The ARB staff has prepared an Initial Statement of Reasons (ISOR) for the proposed amendments to the Asbestos ATCM that, together with the 1990 needs assessment, serves as the report on the need and appropriate degree of regulation for the proposed amendments.

Once the ARB has evaluated the need and appropriate degree of regulation for a TAC, HSC section 39666 requires the ARB to adopt regulations (ATCMs) to reduce emissions of the TAC to the lowest level achievable through the application of best available control technology (BACT) or a more effective control method, in consideration of cost, risk, environmental impacts, and other specified factors. In developing the proposed amendments, State law also requires assessment of the appropriateness of substitute products or processes.

The Asbestos ATCM adopted by the Board imposed an asbestos limit of five percent for serpentine material for surfacing applications. At the time of the adoption, the Board directed the staff (Resolution 90-27, 1990) to return to the Board at such time that it be deemed necessary to further control emissions of asbestos from existing sources. Since the 1990 adoption of the Asbestos ATCM, additional information from monitoring and modeling studies has been developed. This information shows a potential for significant exposures and risks for individuals living near unpaved roads surfaced with serpentine material meeting the current five percent asbestos limit. Furthermore, since 1990 two air districts (Lake County Air Pollution Control District and North Coast Unified Air Quality Management District) adopted asbestos regulations that are more health protective than the current statewide ATCM. Also, in 1999 the El Dorado County Air Pollution Control District considered a district staff proposal to further protect the public by lowering the allowable asbestos content of surfacing materials. That staff proposal was not adopted and in making this decision the Chair of the El Dorado County Board stated that this is a statewide issue best dealt with by the ARB. Accordingly, staff is proposing to amend the current Asbestos ATCM to protect public health by further reducing asbestos emissions from surfacing applications.

Description of the Proposed Regulatory Action

The proposed amendments to the Asbestos ATCM would prohibit the use or application of serpentine, serpentine material, and asbestos-containing ultramafic rock for unpaved surfacing. These amendments would prohibit any new use or application of serpentine

and serpentine material on unpaved roads and other surfaces, such as alleys, parking lots, playgrounds, and trails, including the use of these materials for decorative purposes. The amendments would also prohibit the use of ultramafic rock for surfacing applications, unless it has been tested and determined to contain less than 0.25 percent asbestos. Staff is also proposing to prohibit the use for surfacing of any material which has been tested at the request of the Executive Officer and determined to have an asbestos content of 0.25 percent or more.

In addition to restrictions described above, the proposed amendments would impose requirements on persons who sell, supply, or offer for sale serpentine, serpentine material, ultramafic rock, or asbestos-containing material. These requirements would prohibit the sale for surfacing applications of serpentine, serpentine material, asbestos-containing ultramafic rock, or any other material which has been tested and determined to have an asbestos content of 0.25 percent or more. (These materials could still be sold for non-surfacing applications.) Furthermore, the proposed amendments would require persons who sell such materials to provide written notice to purchasers. The contents of the required notice would vary depending on the type of rock, the asbestos content of the rock, whether or not the person is the producer of the rock (e.g., the owner or operator of a rock quarry), and whether the seller represents that the rock is suitable for surfacing.

The proposed amendments would also impose recordkeeping requirements. Sellers of serpentine, serpentine material, and ultramafic rock would be required to retain for at least seven years copies of all sales receipts, and copies of any test results from asbestos testing. Persons who use or apply ultramafic rock for unpaved surfacing must also retain the receipt, or other record documenting the asbestos content of the material, for at least seven years. Such records must be provided to the ARB or a district upon request.

The proposed amendments also provide eight exemptions. Three of these exemptions are new, and five exist in the current Asbestos ATCM. Staff is proposing various modifications to the five existing exemptions. These five exemptions are: (1) an exemption from certain ATCM requirements for aggregate extracted from sand and gravel operations; (2) an exemption for roads located at quarries or mines (if the material was obtained on site from the quarry or mine); (3) an exemption for certain emergency road repairs; (4) an exemption for material used in concrete or asphalt production; and (5) an exemption for landfill operations (other than the surfacing of public access roads).

The proposed three new exemptions are: (1) an exemption from certain ATCM requirements for aggregate produced on property where a registered geologist has conducted a geologic assessment and determined that asbestos is not likely to be found on the property; (2) an exemption for the use of asbestos-containing aggregate on non-wearing surfaces (such as exposed hillsides); and (3) an exemption from certain ATCM requirements for remote locations.

Finally, the proposed amendments specify that any testing to determine asbestos content must use ARB Test Method 435, or an alternative bulk asbestos test method approved by the ARB Executive Officer. The ARB or the district is also authorized to require testing for the asbestos content of any material represented as being suitable or used for surfacing.

Comparable Federal Regulations

There are no comparable federal regulations that apply to asbestos emissions from the use of serpentine or other naturally-occurring rock that may contain asbestos. There exist federal regulations establishing asbestos standards that apply to asbestos mills, roadways constructed with asbestos mine tailings or asbestos-containing waste material, manufacturing operations using asbestos, demolition or renovation where asbestos may be present, spraying of asbestos-containing material, fabricating operations using asbestos, insulating material containing asbestos, and disposal of asbestos waste from various sources [see the Asbestos National Emission Standard for Hazardous Air Pollutants (NESHAP) ; 40 C.F.R. Part 61, Subpart M, sections 61.140 et seq.]. Staff reviewed the existing federal regulations on asbestos and determined that the proposed amendments do not duplicate or conflict with these federal regulations.

AVAILABILITY OF DOCUMENTS AND AGENCY CONTACT PERSON

The ARB staff has prepared a Staff Report: Initial Statement of Reasons (ISOR) for the proposed regulatory action which includes the full text of the proposed regulatory language, a summary of the environmental and economic impacts of the proposal, and supporting technical documentation. Copies of the ISOR may be obtained from the ARB's Public Information Office, 2020 L Street, Sacramento, California 95814, (916) 322-2990, at least 45 days prior to the scheduled hearing (July 20, 2000). To obtain the ISOR in an alternative format, please contact the Air Resources Board ADA Coordinator at (916) 323-4916, TDD (916) 324-9531, or (800) 700-8326 for TDD calls from outside the Sacramento Area. This notice, the ISOR, and all subsequent regulatory documents are being made available on the ARB Internet site for this rulemaking, **http://www.arb.ca.gov/regact/asbestos/asbestos.htm.**

The staff has also compiled a record that includes all information upon which the proposal is based This material is available for inspection upon request to the agency contact person identified below.

The ARB has determined that it is not feasible to draft the regulation in plain English due to the technical nature of the regulation; however, a plain English summary of the regulation is available from the agency contact person named in this notice, and is also contained in the ISOR for this regulatory action.

Further inquiries regarding this matter should be directed to the agency contact person for this rulemaking, Mr. Todd Wong, Manager, Emissions Evaluation Section, Stationary Source Division, at (916) 322-8285.

COSTS TO PUBLIC AGENCIES AND TO BUSINESSES AND PERSONS AFFECTED

The determinations of the Executive Officer of the ARB concerning the cost or savings necessarily incurred in reasonable compliance with the proposed regulatory action are presented below.

The ARB's Executive Officer has determined that the proposed regulatory action will not create costs or savings, as defined in Government Code section 11346.5(a)(6), in federal funding to the State, costs or mandate to any school district whether or not reimbursable by the State pursuant to Part 7 (commencing with section 17500), Division 4, Title 2 of the Government Code, or non-discretionary costs or savings to state or local agencies. The ARB's Executive Officer has also determined that the proposed regulatory action will create costs, as defined in Government Code section 11346.5(a)(6), to state agencies. Affected state agencies should be able to absorb their costs within existing budgets and resources.

The proposed regulatory action will also impose a mandate upon and create costs to local agencies (i.e., local air pollution control and air quality management districts; the "districts"). However, in this case, such administrative costs to the districts are recoverable by fees that are within the districts' authority to assess (see Health and Safety Code sections 42311 and 40510). Therefore, the Executive Officer has determined that the proposed regulatory action imposes no costs on local agencies that are required to be reimbursed by the State pursuant to Part 7 (commencing with section 17500), Division 4, Title 2 of the Government Code, and does not impose a mandate on local agencies that is required to be reimbursed pursuant to Section 6 of Article XIII B of the California Constitution.

In accordance with Government Code section 11346.3(b)(1), the Executive Officer has determined that the proposed amendments should have minimal impacts on the creation or elimination of jobs within the State of California, minimal impacts on the creation of new businesses and the elimination of existing businesses within the State of California, and minimal impacts on the expansion of businesses currently doing business within the State of California. A detailed assessment of the economic impacts of the proposed amendments can be found in the ISOR.

In developing this regulatory proposal, the ARB staff evaluated the potential economic impacts on private persons and businesses. The Executive Officer has determined that the proposed regulatory action may have a significant adverse economic impact on businesses, including the ability of California businesses to compete with businesses in other states.

As explained in the ISOR, it is possible that a few individual businesses may be adversely affected by the proposed regulatory action. Therefore, the Executive Officer finds that the adoption of the proposed amendments may have a significant adverse impact on some businesses.

The businesses that may be adversely impacted by the proposed regulatory action are certain producers that extract or process aggregate material (e.g., quarries).

The projected reporting, recordkeeping, and other compliance requirements that would result from the proposed regulatory action are described in this notice under the "Description of the Proposed Regulatory Action."

The Executive Officer has considered proposed alternatives that would lessen any adverse economic impact on business and invites you to submit proposals. Submissions may include the following considerations:

(i) The establishment of differing compliance or reporting requirements or timetables which take into account the resources available to businesses;

(ii) Consolidation or simplification of compliance and reporting requirements for businesses;

(iii) The use of performance standards rather than prescriptive standards;

(iv) Exemption or partial exemption from the regulatory requirements for businesses.

The Board's Executive Officer has also determined, pursuant to Government Code section 11346.5(a)(3)(B), that the regulation will affect small business.

Finally, the Executive Officer has determined that there may be a potential cost impact on private persons or businesses directly affected as a result of the proposed regulatory action.

Before taking final action on the proposed regulatory action, the ARB must determine that no alternative considered by the agency would be more effective in carrying out the purpose for which the action is proposed or would be as effective and less burdensome to affected private persons or businesses than the proposed action.

SUBMITTAL OF COMMENTS

The public may present comments relating to this matter orally or in writing at the hearing, and in writing or by e-mail before the hearing. To be considered by the ARB, written submissions must be addressed to and received by the Clerk of the Board, Air Resources Board, P.O. Box 2815, Sacramento, CA 95812, or 2020 L Street, 4th Floor, Sacramento, CA 95814, no later than 12:00 noon, July 19, 2000, or received by the Clerk of the Board at the hearing. To be considered by the ARB, e-mail submissions must be addressed to **asbestos@listserv.arb.ca.gov** and received at the ARB no later than 12:00 noon July 19, 2000.

The ARB requests, but does not require, that 30 copies of any written statement be submitted, and that all written and e-mail statements be filed at least ten days prior to the hearing so that ARB staff and Board Members have time to fully consider each comment. The ARB encourages members of the public to bring any suggestions for modification of the proposed regulatory action to the attention of staff in advance of the hearing.

STATUTORY AUTHORITY AND REFERENCES

This regulatory action is proposed under the authority granted to the ARB in the Health and Safety Code sections 39600, 39601, 39650, 39658, 39659, 39666, and 41511. This action is proposed to implement, interpret, or make specific, Health and Safety Code sections 39650, 39658, 39659, 39666, and 41511.

HEARING PROCEDURES

The public hearing will be conducted in accordance with the California Administrative Procedure Act, Title 2, Division 3, Part 1, Chapter 3.5 (commencing with section 11340) of the Government Code. Following the public hearing, the ARB may adopt the regulatory language as originally proposed or with non-substantial or grammatical modifications. The ARB may also adopt the proposed regulatory language with other modifications if the modifications are sufficiently related to the originally proposed text that the public was adequately placed on notice that the regulatory language as modified could result from the proposed regulatory action. In the event that such modifications are made, the full regulatory text, with the modifications clearly indicated, will be made available to the public for written comment at least 15 days before it is adopted.

The public may request a copy of the modified regulatory text from the ARB's Public Information Office, 2020 L Street, Sacramento, California 95814, (916) 322-2990.

CALIFORNIA AIR RESOURCES BOARD

Michael N. Schmidt

for MICHAEL P. KENNY
EXECUTIVE OFFICER

Date: May 23, 2000

State of California
California Environmental Protection Agency
AIR RESOURCES BOARD

STAFF REPORT

INITIAL STATEMENT OF REASONS FOR THE PROPOSED AMENDMENTS TO THE ASBESTOS AIRBORNE TOXIC CONTROL MEASURE FOR SURFACING APPLICATIONS

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ACKNOWLEDGMENTS

We wish to acknowledge the participation and assistance of the following local air districts for their technical support in the development of the proposed revisions to the Asbestos Airborne Toxic Control Measure for Surfacing Applications:

Bay Area Air Quality Management District
El Dorado County Air Pollution Control District
Lake County Air Pollution Control District
North Coast Unified Air Quality Management District
Northern Sierra Air Pollution Control District
Placer County Air Pollution Control District
Sacramento Metropolitan Air Quality Management District
San Joaquin Valley Unified Air Pollution Control District
Tuolumne County Air Pollution Control District

The ARB would also like to acknowledge the assistance of the following individuals and agencies for their assistance in the development and review of this report:

Kitty Howard, Stationary Source Division, ARB
Reza Mahdavi, Research Division, ARB
Juli Sawaya, Stationary Source Division, ARB
Sonia Villalobos, Stationary Source Division, ARB
Ron Churchill, Department of Conservation, Division of Mines and Geology
Dr. Melanie Marty, Office of Environmental Health Hazard Assessment

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State of California
AIR RESOURCES BOARD

Staff Report: Initial Statement of Reasons for the Proposed Amendments to the Asbestos Airborne Toxic Control Measure for Surfacing Applications

Executive Summary

I. INTRODUCTION

In 1990, the Air Resources Board (ARB or Board) adopted the Asbestos Airborne Toxic Control Measure for Asbestos-Containing Serpentine (Asbestos ATCM) that prohibits the use of serpentine aggregate on unpaved surfaces if the asbestos content is greater than five percent. The ARB staff is now proposing revisions to the Asbestos ATCM to further protect public health from asbestos exposures by minimizing future placement of asbestos-containing materials on surfaces. The proposed revisions to the Asbestos ATCM were developed to reduce the public's exposure to airborne asbestos emissions from surfacing applications, such as unpaved roads, driveways, parking lots, and walkways located in areas with naturally-occurring asbestos.

II. BACKGROUND

1. Why is the staff proposing to revise the current Asbestos ATCM?

Since the adoption of the current Asbestos ATCM, additional information from ambient air monitoring studies and dust emission models has been developed. This information demonstrates a potential for significant exposures and risks for individuals living near unpaved roads surfaced with material containing asbestos. Therefore, staff is proposing to amend the existing regulation to further reduce asbestos emissions from surfacing applications by eliminating the use of aggregate most likely to contain asbestos. This aggregate is produced for surfacing at a limited number of surface mines and quarries in areas of serpentine and ultramafic rock. Also, asbestos-containing soils and rock from private properties under development are occasionally placed on unpaved roads, driveways, and other surfaces. Staff also views this proposal as a pollution prevention measure that will essentially eliminate public exposure to airborne asbestos from new applications of surfacing materials. Alternative aggregate materials are available in most areas of the State at similar costs.

Last fall, the El Dorado County Board of Supervisors considered revisions to their county ordinance proposed by the local air pollution control district to lower the allowable asbestos content of surfacing materials below five percent. That revision was not adopted and in making this decision, the Chair of the El Dorado County Board of Supervisors stated that he believed that this is a statewide issue best dealt with by the ARB. Following this decision, ARB staff decided to expeditiously pursue the development of an updated asbestos measure for surfacing applications and to expand the measure to include construction and surface mining operations.

2. What does the law require to protect public health?

The Toxic Air Contaminant (TAC) Identification and Control Program is established in Health and Safety Code (H&SC) sections 39650 et seq. State law requires the Board to reduce emissions of TACs to the lowest level achievable through the application of best available control technology (BACT). The Board may require the use of a more effective control method if it is determined to be necessary to prevent an endangerment of public health. The staff is proposing revisions to the ATCM consistent with this State law mandate and believes that the proposed amendments to prohibit the use of the aggregates most likely to contain asbestos for surfacing applications to represent BACT.

The law is clear in its intent that emissions of TACs should be controlled to levels that reduce health risks and prevent harm to the public health. The law also states that it may be necessary to take action even when undisputed scientific evidence may not be available to determine the exact nature and extent of risk from a TAC. The law further supports the pollution prevention principle by promoting the use of less hazardous alternative materials. The vast majority of aggregate and other surfacing materials in California does not come from quarries in serpentine or ultramafic rock deposits and, therefore, does not contain asbestos.

3. How is serpentine and ultramafic rock related to asbestos?

Two different forms of asbestos minerals are found naturally in many parts of California. The most common and abundant type is chrysotile. A second type, tremolite, also occurs in much lower quantities. Both of these types of asbestos are found in serpentinite, commonly referred to as serpentine or serpentine rock. Ultramafic rock is the parent igneous rock for serpentinite. Ultramafic rock, other than serpentine, may also contain asbestos. Known areas of serpentine and ultramafic rock can be located on geologic maps under the designation of "ultramafic rock units." The total land area of the State represented by ultramafic rock units is about 1.4 percent, much of which is located in remote areas of northwestern California (DOC, 2000).

When serpentine or asbestos-containing ultramafic rock is crushed or broken, the asbestos is released to the air and can present a potential health risk. This type of asbestos has become referred to as "naturally-occurring" asbestos.

III. EMISSIONS AND POTENTIAL HEALTH IMPACTS

1. What are the sources of naturally-occurring asbestos?

Some of the major sources of naturally-occurring asbestos emissions are unpaved roads, driveways, and other surfaces covered with asbestos-containing serpentine or ultramafic rock. Construction and grading activities and rock quarries and surface mines in serpentine and ultramafic rock areas are also major sources of naturally-occurring asbestos emissions.

2. Why is the staff only proposing to control surfacing applications?

The use of asbestos-containing material for surfacing is the initial focus of the staff's asbestos regulatory efforts. Regulations for other potential asbestos sources such as mining, quarrying, and construction and grading activities in areas containing ultramafic rock, including serpentine, will be addressed in a second ATCM to be proposed later this year.

3. How much asbestos is emitted from unpaved roads and surfaces?

Quantitative assessments of the asbestos emissions from unpaved surfaces are difficult to estimate because of the many factors which influence the rate of release of the asbestos fibers, and the high degree of variability of each of these factors. These factors include vehicular traffic and speed, asbestos content of the aggregate material, seasonal variations, and meteorological conditions. Further, we do not have an accurate estimate of the number of miles of unpaved roads surfaced with asbestos-containing material. However, the ARB and others have monitored near selected unpaved roads and obtained measured concentrations of asbestos in the air. In addition, the ARB and United States Environmental Protection Agency (U.S. EPA) have developed models as tools to predict ambient concentrations using a variety of assumptions. Both the monitoring and modeling results identify ambient asbestos concentrations of concern for people living near unpaved roads or other surfaces covered with asbestos-containing aggregate.

Two districts, the Lake County Air Pollution Control District and the North Coast Unified Air Quality Management District, have adopted and implemented regulations that are more stringent than the 1990 Asbestos ATCM. The regulations limit the asbestos content of serpentine aggregate for surfacing to one percent or less. In addition, Mariposa County has an ordinance that prohibits the use of serpentine for unpaved surfaces. In discussions with the California Department of Transportation (Caltrans) staff, they indicated that the State does not build or maintain serpentine unpaved roads. Caltrans also does not use serpentine aggregate as road base material for paved roads.

4. What are the potential health impacts from asbestos exposures related to unpaved surfaces?

Asbestos is classified as a known human and animal carcinogen by State, federal, and international agencies. Inhalation of asbestos fibers has been shown to cause several serious illnesses including lung cancer, mesothelioma, and asbestosis. Asbestos, in all its mineral forms, was identified by the ARB as a TAC in 1986 and is included on the U.S. EPA's list of hazardous air pollutants. There has been some debate by members of the scientific community regarding the different cancer potencies of the various forms of asbestos. Tremolite and other amphibole asbestos forms are considered by some to be more potent than chrysotile in inducing mesothelioma; however, the available data does not currently enable State or federal scientists to make a distinction of cancer potency by fiber type. It should be noted that chrysotile appears to be equally potent as all other forms of asbestos in causing lung cancer.

The asbestos concentrations near unpaved roads, based on air monitoring data and modeled predictions, result in a wide range of estimated potential risks from tens to thousands of chances of cancer per million based on various conditions and assumptions. The wide range of risk occurs due to the high variability of several factors influencing the rate of emissions, including the asbestos content of the road material, vehicle traffic, vehicle speed, and meteorological conditions. The monitored exposures tend to be episodic and there are no scientific studies available to indicate how to accurately estimate the risk from these types of episodic exposures to asbestos. However, data from dust emission models provide average asbestos concentrations that are more representative of long-term exposure. In this report, the ARB assumes the exposure to both measured and modeled concentrations are long-term and constant. Because the monitored concentrations of asbestos are assumed to be long-term and constant, the estimated cancer risks may be overstated if the exposure was episodic and not a true annual average concentration. While exact risk numbers are difficult to estimate, health officials agree that asbestos is a known human carcinogen and exposure to it should be minimized.

IV. SUMMARY OF PROPOSED ATCM

1. What do the proposed revisions require?

The proposed revisions are designed to minimize the public's exposure to asbestos by prohibiting the use or sale of materials most likely to contain asbestos for surfacing applications. To accomplish this, the staff proposes to prohibit the use of serpentine and asbestos-containing ultramafic rock for surfacing applications. The proposal also includes provisions to allow the Executive Officer of the ARB or local air district to require the testing of any surfacing material. If any material that is tested is determined to contain asbestos, the material could not be sold or used in surfacing applications. This provision was included to provide a mechanism for local air districts to prohibit the use of asbestos-containing material if information was brought to their

attention indicating that materials not directly covered by the rule are suspected of containing asbestos. The proposed revisions incorporate pollution prevention as a key element by prohibiting the use of the materials most likely to contain asbestos.

2. What are the primary differences from the existing ATCM?

The current Asbestos ATCM prohibits the use and sale of serpentine for surfacing if it contains more than five percent asbestos. The proposed revisions make the ATCM more health protective by prohibiting the use and sale of all serpentine material for surfacing applications. The proposed revisions also expand the prohibition to include ultramafic rock that contains more than 0.25 percent asbestos, and surfacing material that has been tested and determined to contain asbestos.

The proposed revisions also include new definitions and exemptions. The new definitions were added for clarity. The new exemptions address situations where serpentine or ultramafic rock may be used for non-wearing surfaces, remote locations, and where a geologic assessment has shown that asbestos is not likely to be present in ultramafic rock. The recordkeeping provisions were also revised to be consistent with the expanded prohibitions.

V. IMPACTS OF REGULATION – HEALTH, ECONOMIC, ENVIRONMENTAL

1. Will the revisions reduce public health risk?

Yes. The proposed revisions will minimize health risks associated with the use of asbestos-containing material for surfacing. This measure will prevent asbestos from being released into the air from unpaved surfaces. Asbestos emissions from new unpaved roadways will be abated as the regulation is implemented. Further, as new aggregate is added to existing serpentine-covered roadways, the potential for release of asbestos from these roadways will diminish.

2. What will the revisions to the ATCM cost?

There are over 200 mines and quarries in California that sell aggregate for use in surfacing. (USCB, 1999) Of these, the staff has identified three quarry operations located in serpentine or ultramafic rock deposits that may incur significant economic impacts from a prohibition of the use of asbestos-containing materials for surfacing. In addition, quarries in ultramafic rock areas will incur cost for testing of ultramafic rock to determine the asbestos content. Testing costs are approximately $0.06 to $0.10 per ton of material produced for surfacing. The costs to businesses that buy rock for resale should be insignificant since only recordkeeping is required. Costs to homeowners and other end users will be minimal, as alternative materials are available at similar costs. Minor increases in hauling costs may be incurred if alternative material must be purchased from a more distant supplier. However, in the long term, these minor increases in cost will be offset because of the less frequent need to replace rock due to the greater durability of alternative aggregates. The estimated cost to State agencies

would be approximately $250,000 per year for testing of aggregate. The total statewide costs to local air pollution agencies to implement the regulation are estimated to be $150,000 for the first year and $35,000 for each subsequent year.

3. Are there any significant adverse environmental impacts associated with the proposed revisions?

No significant adverse environmental impacts are expected to occur, with the exception that staff has identified a potential for a very small increase of emissions from diesel vehicles in the event that alternative rock would have to be transported from a more distant source in the near term. However, the increase in truck travel is very small, approximately 500 miles per day out of a total of 30 million miles per day now driven by diesel trucks. The level of risk posed by this increase in traffic is estimated to be less than one in a million for any individual. Because alternative aggregate material (i.e. limestone, river rock, decomposed granite, and basalt) is more durable, these diesel emissions will be offset or decrease in the future as the aggregate will not have to be replaced as frequently.

VI. NEXT STEPS

If the proposed revisions to the ATCM are adopted, the local air pollution control or air quality management districts (district) must implement and enforce the amended regulation. However, if the district wishes to adopt an alternative regulation, it has 120 days to propose a regulation that is at least as stringent as the ATCM. The alternative regulation must be adopted within six months of the adoption of the ATCM.

The staff will work with the Department of Conservation, Division of Mines and Geology to develop guidance to assist local air districts and geologists on the appropriate contents of a geologic assessment for facilities or operations in asbestos-containing soils. This guidance can be used in part for the exemption clause in the proposed revisions to this ATCM and in the forthcoming ATCM for construction and grading activities and quarrying operations. While our overall goal is to have guidance that could be used to determine the likelihood that material would have a detectable asbestos content, we believe the most immediate need is to provide guidance for identifying serpentine and ultramafic rock. ARB staff will also be working with the Division of Mines and Geology to provide updated maps on the areas likely to contain naturally-occurring asbestos.

As mentioned, the staff plans to propose a second ATCM later this year to address asbestos emissions from construction and grading activities and surface mining and quarrying operations. This ATCM will include best management practices for reducing the potential for asbestos emissions arising from these activities.

VII. RECOMMENDATION

The ARB staff recommends that the Board adopt the proposed revisions to the Asbestos ATCM. In recognition of the State law requirement for the ATCM to reflect BACT, the staff is proposing revisions that will prohibit the use and sale of serpentine, serpentine material, and asbestos-containing ultramafic rock for surfacing applications. Benefits from the proposed revisions to the Asbestos ATCM are reduced public exposures to asbestos emissions from unpaved surfaces covered with serpentine or other asbestos-containing materials. Exposure to asbestos is known to cause lung cancer and mesothelioma. The proposed actions to minimize the public's exposure to this known carcinogen are consistent with State policy to control TACs to levels that prevent harm to the public health and to promote the use of alternative materials of a less hazardous nature.

I. INTRODUCTION

In 1990, the Air Resources Board (ARB or Board) adopted the Asbestos Airborne Toxic Control Measure for Asbestos-Containing Serpentine (Asbestos ATCM) that prohibits the use of serpentine aggregate on unpaved surfaces if the asbestos content is greater than five percent. Serpentine rock (proper rock name serpentinite) is abundant in California and often contains chrysotile asbestos. When serpentine rock is crushed or broken, the asbestos is released to the air and can present a potential health risk. Sources of asbestos emissions include: unpaved roads or driveways surfaced with serpentine rock, construction activities in serpentine deposits, or rock quarrying activities where serpentine rock is present. In addition, another form of asbestos, tremolite, is found along with chrysotile in areas of ultramafic rock (a geological category that includes serpentine rock), particularly near faults. The ARB staff is now proposing revisions to the Asbestos ATCM to further reduce exposure to asbestos from surfacing applications. A copy of the proposed revisions to the current Asbestos ATCM is included as Appendix A. The proposed revisions to the Asbestos ATCM were developed to reduce the public's exposure to airborne asbestos emissions from surfacing applications, such as unpaved roads located in areas with naturally-occurring asbestos.

A toxic air contaminant is an air pollutant that may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health. Asbestos was identified by the ARB as a toxic air contaminant in 1986 and is a known human carcinogen. As part of this identification, the Board determined that there is no identifiable threshold exposure level below which no significant adverse health effects are anticipated. Under California Health and Safety Code (H&SC) section 39666, the Board has the responsibility for reducing emissions of toxic air contaminants with no identified threshold exposure level to the lowest level achievable through the application of best available control technology or a more effective control method, unless the Board determines that an alternative level of emission reduction is adequate or necessary to prevent an endangerment of public health. In making this determination, the Board must consider potential alternatives to the proposed control measure.

When the current Asbestos ATCM was adopted, the Board directed the staff (Resolution 90-27, 1990) to return to the Board if staff found that further control of emissions from serpentine material on existing sources was necessary. Since the adoption of the current Asbestos ATCM in 1990, additional information from ambient monitoring studies and modeling has been developed that demonstrates significant potential exposures and risks remain from asbestos emissions associated with unpaved roads even when the asbestos content of the road material is less than one percent.

Beginning in late March 1998, the Sacramento Bee newspaper ran a series of articles discussing issues related to the risks from naturally-occurring asbestos in El Dorado County. These articles raised public awareness of the potential health threats from asbestos. A Task Force of representatives from several State, federal, and

local agencies was formed and issued a *White Paper* and *Findings and Recommendations* regarding the asbestos issue (included as Appendix B). The ARB staff participated on the Task Force and provided technical assistance, including ambient air monitoring. One of the Task Force findings suggested that El Dorado County consider lowering the current five percent limit for the asbestos content of serpentine used for surfacing. However, since similar conditions (in terms of use of asbestos-containing materials on unpaved roads and surfaces) exist in several parts of the State, ARB staff began an effort to develop additional statewide controls for asbestos.

Based upon the Task Force *Findings and Recommendations* and information from the monitoring and modeling studies, staff is proposing to amend the current regulation to further reduce asbestos emissions from surfacing applications by eliminating the use of asbestos-containing aggregate in such applications.

The ARB staff proposes to prohibit the sale, use, or application of serpentine, serpentine-containing materials, and asbestos-containing ultramafic rock for unpaved surfacing. These revisions will eliminate the use of serpentine and serpentine material on unpaved roads and other surfaces, such as alleys, parking lots, playgrounds, and trails, including the use of these materials for decorative purposes. In addition, the staff is proposing to prohibit the use of ultramafic rock for surfacing applications, unless it has been tested and shown to contain less than 0.25 percent asbestos, the current detection limit of the approved test method.

There are additional activities that result in the release of naturally-occurring asbestos, such as mechanical disturbances associated with mining, quarrying, grading, and construction activities in areas with asbestos-containing soils or rocks. Asbestos emissions resulting from these activities also pose a public health risk. However, the use of asbestos-containing material for surfacing is the initial focus of the staff's asbestos regulatory efforts. Regulations for other potential asbestos sources such as mining, quarrying, grading, and construction activities in areas containing ultramafic material, including serpentine deposits, will be addressed in a second ATCM to be proposed later this year.

This report presents the proposed ATCM for the control of emissions of asbestos from the use of asbestos-containing material for surfacing. If adopted by the ARB, the proposed control measure will be sent to the local air pollution control and air quality management districts (districts) to be implemented and enforced. The local districts may implement the proposed ATCM, as approved by the Board, or adopt an alternative rule at least as stringent as the ARB's ATCM. For example, two local air districts adopted more stringent measures, limiting the asbestos content of serpentine material to no more than one percent, after the adoption of the Asbestos ATCM in 1990.

II. BACKGROUND

A. Naturally-Occurring Asbestos in Serpentine and Ultramafic Rock

The term asbestos refers to a group of fibrous, inorganic minerals that are commercially valued for their high tensile strength and resistance to heat. Asbestos minerals belong to either the serpentine mineral group or the amphibole mineral group. The predominant asbestos types in California are chrysotile, tremolite, and actinolite.

The host rock for chrysotile asbestos is serpentinite (hereafter referred to as serpentine or serpentine rock). Serpentine is widely distributed in California. It is mostly derived from the ultramafic rock, peridotite. Serpentine usually occurs near major faults or within fault zones. Chrysotile asbestos veins can be found in many of the serpentine masses in California. (DOC, 2000)

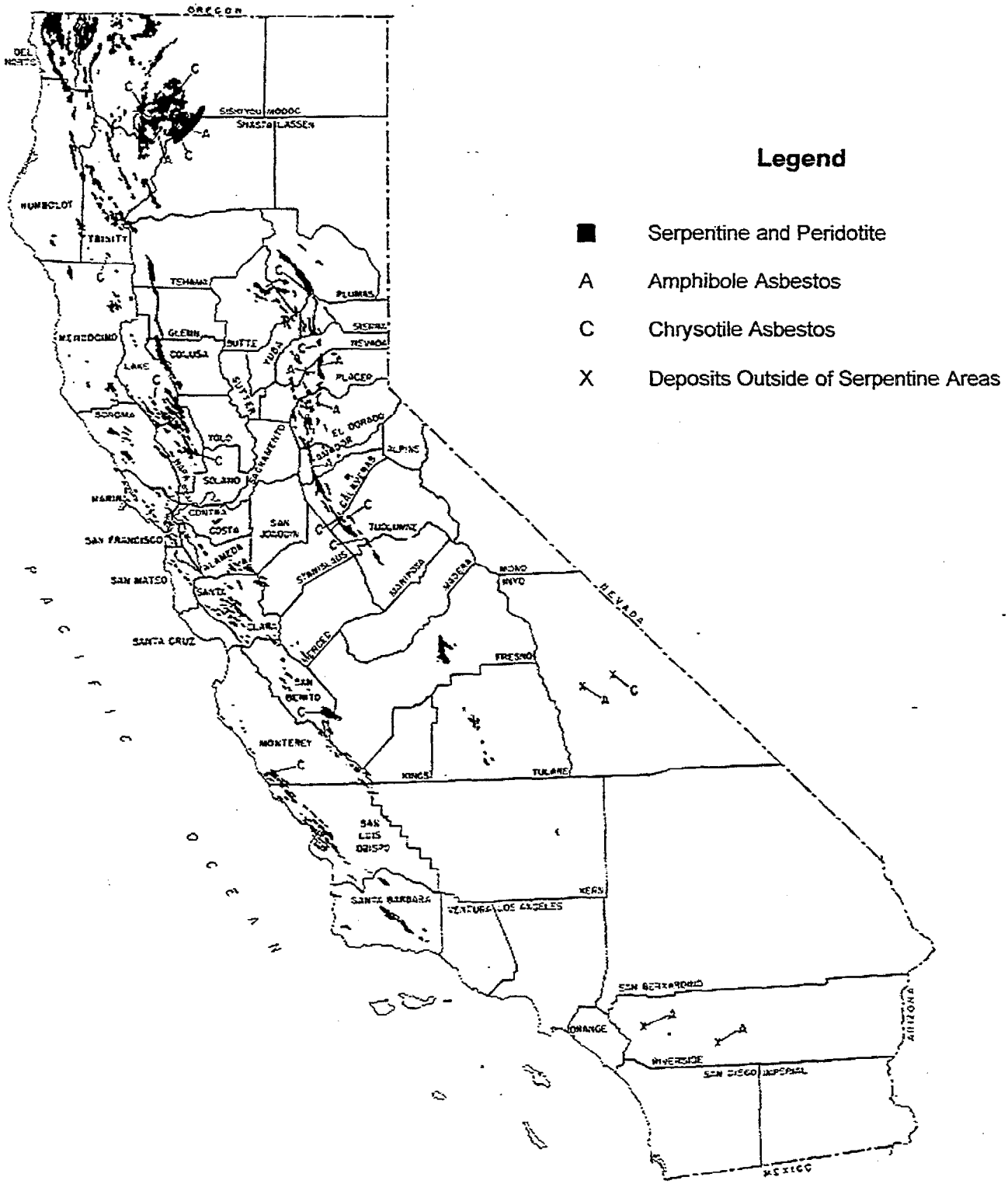
Ultramafic rocks are those igneous rocks composed mainly of the iron-magnesium silicate minerals. They include the rock types dunite, peridotite and pyroxenite. Metamorphism of ultramafic rocks usually results in the formation of the rock serpentine. Because metamorphism of ultramafic rocks to produce serpentine normally proceeds in successive steps rather than all at once, many ultramafic rocks will only be partially converted to serpentine when they are finally exposed at the surface of the earth. Asbestos may form at any time during the conversion of ultramafic rocks to serpentine if the physical and chemical conditions are right. Consequently, depending on its metamorphic history, serpentine may contain chrysotile asbestos, tremolite-actinolite asbestos, or both. Figure 1 is a copy of the State map showing identified locations of deposits of ultramafic rock units in California. (Rice, 1957)

Tremolite and actinolite asbestos are the most common amphibole mineral group asbestos types in California. Tremolite asbestos has been found in most of the counties of the Sierra Nevada and the Klamath Mountains. It generally occurs in veins associated with fault or shear zones in serpentine. Such veins are ordinarily no more than a few inches wide, but some contain pockets several feet wide and maximum lengths on the order of 50 to 110 feet (Churchill, 2000). Tremolite and actinolite asbestos also occurs along serpentine contacts with other metamorphic rocks (rocks that have been transformed from their original state due to temperature, pressure, and chemical environment). (Rice, 1957)

In addition to serpentine, other rock types in California with documented occurrences of tremolite or actinolite asbestos are carbonates (limestone, dolomite and marble), metamorphic rocks such as certain kinds of schist (a type of crystalline rock), and in certain kinds of igneous rock. However, the number of documented occurrences of tremolite or actinolite asbestos is much lower for these other rock types than for serpentine. The most favorable areas for asbestos occurrences within these non-serpentine rock types are along faults or within fault zones that traverse them. (Rice, 1957)

Figure 1

Map of California Showing Ultramafic Rock Units



Source: Rice, S. J. 1957, California Department of Conservation, Divisions of Mines and Geology bulletin 176, Mineral Commodities of California, p. 52.

Table 1 lists the 42 counties that are known to have serpentine and ultramafic rock. The total land area of the State of California represented by these deposits is about 1.4 percent. In addition to the counties in Table 1, Riverside and Inyo counties have small serpentine and asbestos deposits related to localized metamorphism of certain carbonate rocks. (DOC, 2000)

Table 1

Counties with Serpentine and Ultramafic Rock That May Contain Asbestos

Alameda	Imperial	Nevada	Siskiyou
Amador	Kern	Placer	Sonoma
Butte	Kings	Plumas	Stanislaus
Calaveras	Lake	San Benito	Tehama
Colusa	Los Angeles	San Francisco	Trinity
Contra Costa	Marin	San Luis Obispo	Tuolumne
Del Norte	Mariposa	San Mateo	Tulare
El Dorado	Mendocino	Santa Barbara	Yolo
Fresno	Merced	Santa Clara	Yuba
Glenn	Monterey	Shasta	
Humbolt	Napa	Sierra	

Source: DOC, 2000.

The occurrence of asbestos varies with different rock types and geologic conditions. In general, the vast majority of serpentine rock potentially contains asbestos. However, the occurrence of asbestos in ultramafic rock is variable. Ultramafic rock, especially in and around earthquake faults has a higher probability of containing asbestos. Other forms of rock that have been identified as having a small potential for containing asbestos includes gabbroic rocks (in special cases) and dolomitic limestone near igneous rock intrusions.

Disturbances of serpentine or asbestos-containing ultramafic rock can cause asbestos fibers to be released into the ambient air when disturbed, crushed, or worn down by human activities or by the natural forces of weathering.

B. Identification of Asbestos as a Toxic Air Contaminant

In March 1986, the Board identified asbestos in accordance with Health and Safety Code section 39650, et seq. as a toxic air contaminant (TAC). The Board identified the following mineral forms of asbestos as a TAC: chrysotile, actinolite, amosite, anthophyllite, crocidolite, and tremolite. The Board concluded there was not sufficient available scientific evidence to identify a threshold exposure level for asbestos below which no significant adverse health effects are anticipated (Title 17, California Code of Regulations, section 93000). The United States Environmental Protection Agency (U.S. EPA) has also listed asbestos, in all its forms, as a hazardous air pollutant (HAP) pursuant to section 112 of the federal Clean Air Act.

There has been debate by some members of the scientific community on whether there are different cancer potencies for the various forms of asbestos. Some believe the chrysotile form of asbestos is a less potent carcinogen for mesothelioma than other forms of asbestos, such as tremolite. However, no distinction in cancer potencies between the various asbestos forms has been made by either the ARB or U.S. EPA due to the lack of conclusive scientific data. Both agencies currently treat all forms of asbestos to be equally hazardous. This issue is further discussed in the following section.

C. Health Effects of Asbestos

Asbestos is classified as a known human and animal carcinogen by state, federal, and international agencies. When asbestos fibers are inhaled they are deposited deep into the lung and may be retained there for long periods. The fibers can cause inflammation of body tissue and can disrupt cell division, leading to various diseases. These diseases may not occur until many years after exposure, even after the exposure has ended. Inhalation of asbestos fibers has been shown to cause several serious illnesses including lung cancer, mesothelioma, and asbestosis.

Lung Cancer: Lung cancer is a relatively common form of cancer, which has been linked to smoking, asbestos exposure, and a variety of occupational exposures. Cigarette smoking significantly increases the risk of lung cancer for those people exposed to asbestos.

Mesothelioma: Mesothelioma is a rare, incurable cancer of the thin membranes lining the lungs, chest, and abdominal cavity. Almost all cases are linked to prior occupational asbestos exposure. However, mesothelioma from environmental exposure to tremolite has been found in people living in Greece, Turkey, and New Caledonia.

Asbestosis: Asbestosis (a form of pulmonary fibrosis) is a non-cancerous lung disease related to diffuse fibrous scarring of the lungs. Inhaling asbestos fibers can cause scar tissue (fibrosis) to form inside the lung. This scarring of the lung tissues reduces the lung's ability to expand and contract, thereby reducing the uptake of oxygen and impeding respiration. Asbestosis can cause progressive shortness of breath and coughing. This disease has occurred in people heavily exposed to asbestos in the workplace and in the families of asbestos workers.

Ingestion of asbestos fibers can occur by drinking water that contains asbestos fibers. It also can occur when inhaled asbestos fibers are coughed up and swallowed. Ingestion of asbestos fibers has not been consistently linked to cancer or any other adverse health effects.

As part of the identification of asbestos as a TAC, the California Department of Health Services (DHS) staff (now part of California Environmental Protection Agency's Office of Environmental Health Hazard Assessment) was responsible for evaluating the

health effects that may result from exposure to asbestos. A report on the health effects of asbestos was published at that time and is referred to here for additional detailed information regarding health effects (Staff Report for the Identification of Asbestos as a Toxic Air Contaminant Part B - Health Effects, 1986).

At the time of identification, the Office of Environmental Health Hazard Assessment (OEHHA) staff developed a range of cancer unit risk factors, also referred to as potency values, for lung cancer and mesothelioma. A cancer unit risk factor is the estimated probability of contracting cancer as a result of constant long-term exposure to a given concentration of a substance. The cancer unit risk factors that were developed differ by gender and smoking status. All cancer unit risk factors developed by OEHHA are reviewed and approved by the Scientific Review Panel on Toxic Air Contaminants (SRP). The SRP is an independent group of scientists established by Health and Safety Code section 39670 appointed to advise the ARB on the health effects and toxicity of substances. Both the lung cancer and mesothelioma unit risk factors recommended for use by OEHHA are presented below in Table 2. For specific details on the development of the cancer unit risk factors, please refer to the identification report referenced above.

Table 2

Cancer Potency Values for Lung Cancer and Mesothelioma Due to Continuous Exposure to Asbestos [1]

(Expressed as potential cancer cases per million people exposed)

Cancer Type	Exposure Group	Potency Value[2]
Lung	Male smoker	110
Mesothelioma	Female nonsmoker	190

1 0.0001 asbestos fibers (determined by phase contrast microscopy) per cubic centimeter of air
2 Scientific Review Panel approved cancer potency value

The OEHHA staff has reviewed several health studies that were published subsequent to the ARB's 1986 identification of asbestos as a TAC. These reviews were prompted by assertions that these health studies indicate that tremolite and other amphibole asbestiforms are more carcinogenic for inducing mesothelioma than chrysotile. In 1990, the ARB requested that the SRP review the issues surrounding these assertions. The SRP, after reviewing these health studies, found that the data submitted did not warrant a change to the risk assessment. (Aldrich, 1990)

While tremolite and other amphibole asbestos forms are considered by some scientists to be more potent than chrysotile in inducing mesothelioma, the available data do not allow quantification of potency by fiber type. It should be noted that chrysotile appears to be equally potent as all other forms of asbestos in causing lung cancer. The risk of contracting a disease from asbestos exposure is related to the cumulative inhaled

dose, and increases with the time from initial exposure. Many factors may influence the disease-causing potency of any asbestos forms, such as fiber length and width and fiber type. Most health officials agree that all forms of asbestos must be considered to pose a carcinogenic risk, and that exposure to all of the forms of asbestos should be minimized.

D. Other Regulations for Asbestos

Asbestos emissions in California are regulated on the federal, State, and local levels. Through its program for hazardous air pollutants, the U.S. EPA promulgated regulations for asbestos milling activities, the manufacture of asbestos products, demolition and renovation activities, and waste-disposal operations. The U.S. EPA has also promulgated the Asbestos Hazardous Emergency Response Act (AHERA), which provides a framework for dealing with asbestos in schools. In 1990, the U.S. EPA adopted a ban on most of the remaining uses of asbestos in commercial products. The federal Occupational Safety and Health Administration (OSHA) and the Mine Safety and Health Administration (MSHA) regulate workplace practices and set maximum asbestos exposure levels for workers. Also, the federal Consumer Product Safety Commission regulates the use of asbestos in consumer products.

III. MONITORING, ESTIMATED RISKS, AND NUMBER OF UNPAVED ROADS

A. Overview of Recent Monitoring and Associated Risks

Over the past 15 years, the ARB, and to a lesser extent the U.S. EPA, have conducted or sponsored asbestos monitoring programs in California. Ambient monitoring was conducted to support the adoption of the 1990 Asbestos ATCM, in response to requests from districts for assistance in asbestos monitoring, ARB enforcement efforts, and development of an unpaved road model.

Since April 1998, the ARB has conducted an extensive asbestos airborne monitoring program, sampling at over 60 sites mainly in El Dorado County, but also including sites in Placer and Nevada counties. The focus of the air monitoring effort was two-fold: 1) to determine if there was a widespread and consistent pattern of elevated exposures in those counties; and, 2) to determine if the public was generally exposed to elevated asbestos concentrations near potential sources. The potential sources included known unpaved serpentine roads, quarrying operations, and construction activities.

The monitoring sites were selected based on input by the districts, private citizens, school officials, fire department officials, and the judgement of the ARB staff. In selecting these sites, U.S. EPA guidelines for siting monitors, including proper distances away from obstructions and barriers, were met. A description of the ARB monitoring techniques and procedures is included in Appendix C. A summary of the monitoring information and results are provided in Appendix D. The monitoring results are also available on the ARB web site at: *www.arb.ca.gov/toxics/asbestos.htm.*

The monitoring conducted to assess "background" asbestos levels does not show a widespread and consistent pattern of the general public being exposed to elevated levels of asbestos. This monitoring effort included the collection of 277 samples at 28 sites. Less than 25 percent of the samples had positive results above the minimum detection level. The estimated average risk from the sites included in the background study showed a potential cancer risk from one to 10 chances in a million for mesothelioma and lung cancer. The unit risk factors used to calculate risks in this report are those reported in Table 2 in the previous chapter. The lung cancer risks are calculated using the unit risk factor for male smokers and the mesothelioma risks are calculated using the unit risk factor for female nonsmokers. This is consistent with OEHHA recommendations and uses the Scientific Review Panel approved unit risk factors. All of the estimates assume a lifetime exposure (24 hours a day for 70 years).

The monitoring conducted to assess asbestos levels near potential sources shows a consistent pattern of elevated asbestos levels. The ARB's monitoring near potential sources of asbestos was conducted at 36 sites. The sites selected for this monitoring provided information on general exposures near potential sources. The potential sources included active serpentine quarries, unpaved roads with local traffic activity, and construction/grading sites. A total of 255 samples were taken as part of the

asbestos monitoring near sources. Of these, 161 samples, or over 60 percent, had positive results for asbestos. Near these potential sources, the associated potential cancer risk from the measured asbestos concentrations was typically one to 50 chances in a million for a lifetime exposure. The highest average measurement at one site near the entrance to a serpentine quarry resulted in an average mesothelioma risk estimated of about 300 chances in a million.

In addition, the ARB staff conducted air monitoring near a construction site and a site where asbestos-contaminated dirt piles were being removed and transported to a waste landfill. All the asbestos levels measured were below the detection level of the instruments. The low asbestos levels may be attributed to good dust mitigation measures, such as watering, being utilized and the recent rains prior to the start of the monitoring efforts.

From these monitoring results, the ARB staff determined that near source exposures to asbestos could result in elevated potential cancer risks. The staff further investigated the asbestos emissions and associated risks from one of the potential sources, unpaved roads.

B. Risks from Unpaved Roads

Asbestos-containing serpentine has been used on unpaved roads in several areas of the State. Asbestos is released from these roads as the aggregate material becomes broken or crushed and as vehicles travelling over the road kick up clouds of dust. The exposure to the public near these roads can be significant. Vehicle traffic disturbs the road surface and exposes new material that can be further eroded and crushed, increasing the amount of asbestos available to be made airborne by passing vehicles. As discussed previously, unpaved roads are considered to be one of the major sources of asbestos emissions. This section of the report will discuss the risk estimates for unpaved serpentine roads derived by air monitoring and the use of unpaved road dust emission models.

1. Monitoring Near Unpaved Roads

Since 1990, six road studies have been conducted in California by various governmental agencies or independent groups to measure airborne asbestos concentrations near unpaved serpentine roads. The studies show asbestos concentrations that could produce elevated risks downwind of the unpaved serpentine roads. Table 3 summarizes the estimated risks for mesothelioma and lung cancer based on the measured asbestos concentrations obtained from the studies, assuming a person had long-term, constant exposure to those concentrations. Some of these studies show extremely high estimated risks. The reader should be cautioned that these risks might be overestimated because the average annual concentrations are likely to be much lower in some cases and, therefore, the risks would be much lower. The measured concentrations and resulting risks will vary based upon several factors, including the number of vehicle passes, vehicle speed, and asbestos content of the

road material. However, we believe that these studies overall demonstrate the potential of significant exposure and risks to residents living adjacent to unpaved serpentine roads, even with an asbestos content of less than one percent. Copies of the studies are included in Appendix E. There were additional road studies conducted prior to 1990 that were used in the adoption of the current Asbestos ATCM. These studies are also included for reference in Appendix E.

Table 3

Estimated Risks from Monitoring Studies Near Unpaved Roads[1]

Road Monitoring Information	Asbestos Content (percent)	Range of Distances (feet)	Vehicle passes per hour	Mesothelioma[2] Range of Risk (chances per million)	Lung Cancer[3] Range of Risk (chances per million)
ARB Foresthill Study [N1]	0.20[4]	1	10	30 – 130	20 – 70
ARB Quarry Entrance Study[N2]	0.40[4]	5	20	20 – 1,000	15 – 580
U.S.EPA/Diamond XX Road Study [N3]	9	25 – 150	5 – 15	8,300 – 55,000	4,800 – 32,000
ARB/Valley Road Model Study [N4]	16	25 – 250	5 – 45	180 – 58,000	100 – 34,000
Sacramento Bee Road Monitoring[N5]	n/a	1	6	1,300	750
ARB Weaverville Road Study [N6]	n/a	15	n/a	3 – 50	2 – 30

1 The range of risk presented assumes that the asbestos concentrations reported in the study represents the annual average asbestos concentration. However, the actual annual average asbestos concentrations are likely to be less.
2 Mesothelioma risk based on female nonsmoker unit risk factor
3 Lung cancer risk based on male smoker unit risk factor
4 Asbestos content determined by ARB Test Method 435 using a 1,000 point count analytical procedure.
n/a not available
N1 ARB study of county road with potholes, conducted in 1999. Potholes exposed serpentine aggregate sub-base material.
N2 ARB study of a serpentine quarry, conducted in 1999. Paved entrance to quarry was covered with layer of serpentine dust. Local traffic traveling perpendicular to paved entrance of quarry whipped up and entrained serpentine dust.
N3 USEPA /Region 9 sponsored study of serpentine aggregate covered road, conducted in 1994.
N4 ARB / Research Division sponsored contract study serpentine aggregate covered roads, conducted in 1992.
N5 Sacramento Bee sponsored monitoring in El Dorado County, conducted in 1998. Only one sample was taken.
N6 ARB/ Weaverville Quarry Road Study, Preliminary Draft, conducted in 1999.

2. Modeling Information Near Unpaved Roads

In order to estimate the impact of unpaved roads with asbestos containing material in other parts of the State, models have been developed to estimate the potential downwind asbestos concentrations. In 1990, a model was developed for the U.S. EPA (U.S. EPA Model). In 1992, the ARB had contracted with Valley Research, who reviewed, validated, and refined the U.S. EPA Model. The models presented below represent the best tools available at this time for estimating average asbestos concentrations from unpaved serpentine roads which are more representative of long - term exposure.

U.S. EPA Model: Prior to the development of the U.S. EPA Model, the Emergency Response Section of U.S. EPA, Region 9, had performed three Superfund

Remediation projects in California related to roads covered with serpentine aggregate. Since many aggregate covered driveways and private roads in the foothills of California contained serpentine aggregate, the U.S. EPA contracted for the development of a model to estimate potential asbestos exposures. This model can also be used as a screening tool to prioritize road investigations based on estimated downwind asbestos exposure. The U.S. EPA Model was based on a sampling study conducted in the late 1980's. A more complete description of the U.S. EPA Model can be found in Appendix F.

ARB/CALSCRAM Model: After the development of the U.S. EPA Model, the ARB funded a research study to refine and validate the U.S. EPA Model. The resultant model developed by Valley Research is called the California Serpentine Covered Roadway Asbestos Model or CALSCRAM. Air monitoring was conducted on unpaved serpentine roads as part of the model development. A more complete description of the CALSCRAM Model can be found in Appendix G.

Both models were used to estimate average concentrations and associated risks at various distances from a serpentine road and at various asbestos concentrations of the bulk road material. The results are considered to be more representative of long-term exposures, as opposed to the monitoring results which are more episodic in nature. The results from the models are summarized below in Tables 4 and 5. The results support the finding that asbestos-containing aggregate, even with asbestos content of less than one percent, could present a potential health risk to nearby residents. The key assumptions for variables used in the calculations for both models included: silt content of seven percent, vehicle speed on the unpaved road of 30 miles per hour, five vehicle passes per hour, wind speed of seven miles per hour, and moisture content of the road of one percent or the number of days of rain per year.

Table 4

Estimated Cancer Risk Near Unpaved Roads Using the U.S. EPA Road Model[1]

Distance From Road (feet)	U.S. EPA Road Model							
	Mesothelioma Risk (cancer cases per million)				Lung Cancer Risk (cancer cases per million)			
% Asbestos	0.25%	1%	5%	10%	0.25%	1%	5%	10%
0	36	143	715	1420	21	83	414	822
5	35	140	696	1400	20	81	403	811
50	17	67	330	660	10	39	191	382
100	10	38	190	380	6	22	110	220
1000	1	5	24	47	< 1	3	14	27
1 Mile	< 1	1	5	10	< 1	< 1	3	6

[1] Based on estimated average concentrations

Table 5

Estimated Cancer Risk Near Unpaved Roads Using CALSCRAM Model[1]

Distance From Road (feet)	CALSCRAM Model							
	Mesothelioma Risk (cancer cases per million)				Lung Cancer Risk (cancer cases per million)			
% Asbestos	0.25%	1%	5%	10%	0.25%	1%	5%	10%
0	24	96	481	963	14	56	278	558
5	24	94	469	938	14	54	272	543
50	11	45	223	446	6	26	129	258
100	7	26	128	256	4	15	74	148
1000	1	3	16	32	< 1	2	9	19
1 Mile	< 1	1	4	7	< 1	< 1	2	4

[1] Based on estimated average concentrations

C. Number of Unpaved Roads Surfaced with Asbestos-Containing Material

Based upon phone surveys (see discussion below), there are at least 430 miles of unpaved public roads surfaced with serpentine. We believe this figure is an underestimate of the total miles of unpaved serpentine roads. However, we are unable to determine the magnitude of the underestimation. This estimate does not account for private roads and driveways covered with serpentine. As a result, staff is unable to provide a quantitative assessment of current emissions from unpaved serpentine surfaces or a reliable estimate of total asbestos emission reductions due to the ATCM.

Many government agencies maintain unpaved roads and shoulders. These unpaved roads are for recreational, commercial, and general travel. Government agencies with jurisdiction over unpaved roads include the United States Forest Service (USFS), the Bureau of Land Management (BLM), the California Department of Transportation (Caltrans), and the county Department of Public Works. However, the total number of miles of private serpentine unpaved roads and driveways in California are not known. The ARB staff conducted a phone survey of these government agencies to determine the number of miles of unpaved serpentine-covered roads that are under their jurisdiction and whether they have policies on the use of serpentine materials for unpaved surfacing applications.

All of the 19 USFS regional offices in California were contacted for information; 11 of which responded to our survey. Only three offices indicated that they had unpaved serpentine roads totaling 260 miles. This number probably underestimates the miles of unpaved serpentine roads because the Shasta-Trinity, Sierra, and Los Padres offices did not respond to the survey. These offices are located in areas with ultramafic rock formations. There is a strong likelihood that they will have serpentine roads. With regards to policies, six regional offices indicated that they do not use serpentine rock,

two offices test serpentine materials for asbestos content in accordance to ARB Test Method 435, and three offices did not have policies on the use of serpentine materials.

Sixteen BLM field offices were contacted as part of the survey of governmental agencies. Thirteen field offices responded to the survey, with the Hollister and Alturas field offices indicating that they have unpaved serpentine roads. These roads total 112 miles. Seven field offices do not use serpentine materials and three indicated that they did not have policies on the use of serpentine materials. The Hollister field office indicated that on-site serpentine material is used for unpaved roads. However, if the material is purchased and hauled onto their property, then only non-serpentine material is used.

Fifty-eight county Department of Public Works (Departments) were surveyed to determine the number of miles of county unpaved serpentine roads they maintain in California. Forty-one Departments responded to the survey and provided information. Six Departments indicated that they had unpaved serpentine roads totaling 51 to 57 miles. Six other Departments did not know whether they had unpaved serpentine roads. The remaining responding Departments did not have unpaved serpentine roads. Of the non-responding counties, nine counties are located in areas with ultramafic rock and have the potential for unpaved serpentine roads. Seven counties indicated that they have policies to try and not use serpentine on unpaved roads. Only Mariposa County has an ordinance strictly prohibiting the use of serpentine.

In discussions with Caltrans staff, they indicated that the State does not build or maintain serpentine unpaved roads. Caltrans also does not use serpentine aggregate as road base material for paved roads.

The survey results for USFS, BLM, and county Department of Public Works are summarized in Appendix H.

IV. RATIONALE AND BASIS FOR AMENDMENTS TO THE ASBESTOS ATCM

A. Rationale for Staff Proposal

The current Asbestos ATCM was adopted by the ARB in 1990 and focused on reducing public exposures to asbestos associated with the use of serpentine materials in surfacing applications. The Asbestos ATCM limits the allowable asbestos content of materials to five percent or less if used for surfacing applications. The implementation of the Asbestos ATCM has resulted in lower asbestos content materials used in surfacing applications; thereby, reducing emissions of asbestos. However, since the adoption of the Asbestos ATCM, the ARB and others, including the U.S. EPA, have conducted studies that indicate that unpaved surfaces containing material even with an asbestos content of less than one percent continue to present a potential public health risk from exposure to airborne asbestos (see Tables 4 and 5 in Chapter III). As previously mentioned, health officials agree that all forms of asbestos are carcinogens and that exposure to asbestos should be minimized.

Vehicular and other disturbances of unpaved surfaces that contain serpentine or asbestos-containing ultramafic rock generate dust that contains asbestos fibers. In some areas of the State, population growth is spreading rapidly into areas that were once considered rural. Many of these areas have homes with unpaved driveways or are located near unpaved roads surfaced with serpentine and ultramafic material. Vehicle travel on these roads and driveways can create asbestos exposures to the residents. While the current Asbestos ATCM did reduce the use of serpentine with higher asbestos contents, the actual public exposure to asbestos in some areas, like the Sierra foothills, may have increased given the large increases in population and vehicular traffic in these areas.

It is difficult to make quantitative assessments of the emissions and risk from unpaved surfaces. There are many factors that influence the release of the asbestos fibers. Some of these factors that influence asbestos emissions include vehicular activity patterns, asbestos content of the material, seasonal variations, the physical characteristics of the surface, and meteorological conditions. However, it is reasonable to assume that if there is asbestos in the aggregate and vehicles drive over the material and break it up, asbestos will be released into the air. Therefore, eliminating asbestos in the material used for new surfacing applications will reduce exposures.

To minimize exposures to naturally-occurring asbestos, staff evaluated various control options to further reduce emissions from unpaved surfaces covered with material such as serpentine and ultramafic rock that contains asbestos. The options ranged from lowering the allowable asbestos content to a prohibition on the use of serpentine and asbestos-containing ultramafic rock. In consideration of cost and risk, we believe that prohibiting the use of serpentine and asbestos-containing ultramafic material for surfacing applications represents best available control technology (BACT). Based on discussions with suppliers, the ARB staff believes that suitable, alternative aggregate material exists for use at similar costs in most areas.

From a compliance perspective, it is also less burdensome to comply with a prohibition on the use of serpentine than a limit on asbestos content. This is because the new application of serpentine material can be easily recognized and no testing would be needed. Testing of material is then limited only to quarry operators supplying and selling ultramafic rock. Compliance is also a problem with borrow pits, which, for the purposed of this discussion, are temporary quarries set up to obtain aggregate material. There are situations where borrow pits were operated for short periods of time and there is no documentation of whether any asbestos testing took place. Also, borrow pits are frequently abandoned and the sites are not reclaimed pursuant to State mining laws. These borrow pits provide a source of untested serpentine material. The most effective approach to address enforcement concerns is to prohibit the use of any serpentine material for unpaved surfacing.

To reduce asbestos emissions, the ARB staff has developed proposed revisions to the current Asbestos ATCM. The proposed revisions address not only serpentine (which is the largest source of asbestos-containing aggregate in California), but also other rocks in which asbestos is likely to be found. Specifically, the proposed revisions are primarily focused on reducing the public's exposure to the major sources of asbestos through eliminating asbestos-containing materials for use on surfaces that could be disturbed and cause the release of asbestos into the air. By prohibiting the use of serpentine material and asbestos-containing ultramafic rock, asbestos emissions from new unpaved roadways will be abated. Further, as new aggregate is added to existing roadways covered with asbestos-containing material, the potential for release of asbestos from these roadways will diminish.

B. Explanation and Basis of Proposed Revisions

This section discusses the principle revisions and basis for the proposed amendments to the current ATCM. The complete text of the proposed ATCM is provided in Appendix A.

1. Requirements for the Use and Sale or Supply of Material for Unpaved Surfacing

The current Asbestos ATCM prohibits the use and sale or supply of serpentine with an asbestos content that exceeds five percent for unpaved surfacing. This five percent limit targeted the vast majority of serpentine aggregate used for unpaved surfacing. At the time of the adoption of the ATCM, most serpentine aggregate sampled contained asbestos in the range of five to 20 percent.

The ARB staff proposes to make the current ATCM more effective by lowering the current five percent limit to a prohibition of the use of serpentine and serpentine materials on unpaved surfaces. In addition, the use of ultramafic rock (or other material that has been tested) that has an asbestos content of more than 0.25 percent would be prohibited. The proposed revisions will clarify that decorative uses of serpentine and asbestos-containing ultramafic rock for surfacing are also prohibited. These revisions were added because there is a potential for elevated asbestos exposures from

disturbed surfaces even with a low asbestos content. By prohibiting the use of serpentine and asbestos-containing ultramafic rock, significant exposures to asbestos can be avoided. Further, there are a number of alternatives to asbestos-containing aggregate materials available for sale and use. These alternatives include river rock, limestone, decomposed granite, and basalt. These materials do not contain asbestos, are available at a comparable price, and will usually greatly outlast serpentine rock. The use of alternative material will, over time, significantly reduce the public's exposure from asbestos-containing unpaved surfaces. This action is consistent with State policy to promote pollution prevention through the use of less hazardous alternatives when available.

The proposed revisions also explicitly provide that the Executive Officer of either the local air district or the ARB may require testing of any surfacing material that he or she believes may have a detectable asbestos content. If any material is determined to have an asbestos content of 0.25 percent or greater, including that tested at the request of the Executive Officer, it cannot be used or sold for surfacing applications. This provision is included to ensure that material other than serpentine or ultramafic rock that contains asbestos can be addressed by this proposed regulation. For example, the Executive Officer could require testing based on information from a geologic assessment. Based on our conversations with Department of Conservation, Divisions of Mines and Geology, we believe that these occurrences outside of ultramafic rock will be rare.

The proposed revisions for the sale and supply of asbestos-containing material parallel the revisions discussed above concerning the use of the material. The sale of serpentine and serpentine materials for surfacing applications is prohibited. The proposed revisions allow the sale of ultramafic rock for surfacing, provided it is tested and determined to have an asbestos content of less than 0.25 percent. Testing for the asbestos content of the ultramafic rock must be conducted according to ARB Test Method 435 or an alternative test method approved by the ARB. In addition, the Executive Office of the ARB or local air pollution control district may require the testing of any surfacing material for its asbestos content. If any material that has been tested has an asbestos content of greater than or equal to 0.25 percent asbestos, it cannot not be sold or supplied for unpaved surfacing applications. The prohibition from surfacing would also apply to material that was tested and determined to have an asbestos content of 0.25 percent or more regardless of whether the material was required to be tested by the Executive Officer or not. These provisions are intended to eliminate serpentine and other asbestos-containing rock at the source, before it could be used for surfacing.

2. Requirements for Noticing and Recordkeeping

The current ATCM requires the supplier of any serpentine or serpentine material to provide a receipt or record documenting the transfer and asbestos content of the material. These records must be maintained for seven years. These requirements

were included in the current ATCM to provide a noticing provision to inform the recipient that the material is suitable for unpaved surfacing and to demonstrate compliance.

The proposed revisions will extend these requirements to ultramafic rock used for surfacing. In addition, the proposed revisions require the supplier to retain records for at least seven years. Further, whenever serpentine, serpentine material, or ultramafic rock that has not been demonstrated to have a asbestos content less than 0.25 percent are supplied, the supplier must provide a notice to the end user. The notice must make the following statement:

> **WARNING!**
> **This material may contain asbestos.**
>
> It is unlawful to use this material for surfacing applications in which it would remain exposed and subject to possible disturbances.
>
> Extreme care should be taken when handling this material to minimize the generation of dust.

This statement will provide important information to the purchaser regarding the requirements against the use of asbestos-containing material for use in surfacing applications and the potential for asbestos exposure.

The current ATCM requires end users, such as homeowners, nurseries, and construction contractors, to retain a receipt for serpentine and ultramafic material used for surfacing. This receipt must be maintained for seven years. With the receipt, the source of the aggregate can be easily determined. In the revisions, the requirement remains essentially unchanged, except for expanding the provision to include ultramafic rock. The end user of any ultramafic rock that has been tested for asbestos content, and is used for surfacing, must maintain the receipt or record documenting that the material has been tested and has an asbestos content of less than 0.25 percent. These records must be retained for at least seven years. This documentation must be made available to either the ARB or the district upon request. The seven-year retention period was included in the current Asbestos ATCM for compliance purposes.

3. Exemptions

There are eight exemptions to the prohibition on the use and/or sale and supply of serpentine and asbestos-containing ultramafic material for surfacing. Five of these exemptions are carried over from the current Asbestos ATCM and three are new exemptions designed to provide flexibility to address special circumstances. The

exemptions carried over from the current regulation would remain largely unchanged. These exemptions are discussed briefly below.

Sand and gravel operations: The current Asbestos ATCM exempts aggregate from sand and gravel operations. The revisions to the Asbestos ATCM maintain this exemption for sand and gravel operations. The reason for this exemption is that rocks found in alluvial deposits (in which sand and gravel operations are located) have a low probability of containing asbestos. Alluvial deposits form as a result of erosion of material that is washed downstream and deposited over time. The erosion, grinding action, mixing and settling caused by rivers and streams tend to wash away any asbestos that may have been present in materials deposited in the alluvial fans. Consequently, the material quarried from these deposits should not contain asbestos. Minor revisions to this exemption will clarify that the exemption applies to the material extracted from sand and gravel operations operating in alluvial deposits.

Surface Mining Operations: The current exemption allows unpaved roads located at mines operating in serpentine deposits to be surfaced with serpentine rock. The exemption was included to allow the use of on-site material for surfacing of roads located at these operations. Otherwise, these operations would have to import compliant material from other sources. The proposed revisions will amend this exemption to include ultramafic areas. Minor revisions were made to clarify that the material must be obtained on-site to avoid the importation of non-compliant material.

Maintenance Operations on Existing Roads: The current exemption allows for the maintenance of unpaved road surfaces as long as no additional serpentine material is added to the road surface. This exemption would be removed. Maintenance operations will be addressed in the construction and grading ATCM to be presented to the Board later this year. The addition of new material to existing roads is subject to the requirements of this regulation.

Emergency Road Repairs: The current exemption allows the use of any serpentine for surfacing for an emergency road repair, such as a flood or landslide. The proposed exemption would shorten the allowable time for the exemption from six months to 90 days. If a project operator needs more than 90 days, a variance may be sought from local air districts.

Bituminous and Concrete Material: The current exemption allows the use of any serpentine material to make bituminous asphalt or concrete. The exemption would be revised to include ultramafic rock.

Landfill Operations: The current ATCM allows the use of serpentine in landfill operations, except on public access roads. This exemption would not be changed.

The proposed revisions also provide for three new exemptions. These exemptions are for non-wearing surfaces, remote locations, and a provision to allow for

the use of the results from a geologic assessment to show that the material in an ultramafic rock unit is not likely to contain asbestos.

Non-Wearing Surfaces: This proposed exemption would allow the district or the ARB to approve the use of serpentine or ultramafic rock on non-wearing surfaces such as riprap (large rock use for stabilization of levees and other slopes) or exposed hill sides. This exemption will only be allowed where it is unlikely to have vehicular or pedestrian use and would have a slope of 20 percent or more. Zoning and land use plans for the area would have to be considered in granting this exemption. Staff believes these surfaces, as long as they remain undisturbed, would not present a significant health risk to the public.

Remote Locations: This proposed exemption would allow the district or the ARB to exempt surfaces in remote locations. A remote location is defined as a place that is at least one mile from the nearest receptor. The term "receptor" includes residences, schools, daycare centers, businesses, hospitals, and permanent campgrounds. This would accommodate forest roads in areas where there are no alternatives to serpentine. Remote roads surfaced with serpentine are likely to pose a minimal risk to distant receptors because the volume of traffic is generally not high and the topography tends to reduce the transport of the dust emissions. In providing this exemption, the following conditions must be met: consideration of land use planning and zoning to address current and future uses of the impacted area, solicitation and consideration of public comments, and requiring that the exempted surface be posted with a permanent warning to anyone who may travel on or use the surface. Staff believes that the potential health impact from the use of serpentine or asbestos-containing ultramafic material in a remote location is minimal.

Geologic Assessment: This proposed exemption will allow the district or ARB to consider the results of a site-specific geologic assessment of the location from which ultramafic rock is being quarried. If the geologic assessment indicates that asbestos would not likely be found at that site, the material would be exempted from the testing and prohibition of sale provisions. Most serpentine rock contains some asbestos; however, some ultramafic rock may not contain asbestos. ARB staff is currently in consultation with the staff of the Department of Conservation, Divisions of Mines and Geology on the development of the methodology for conducting an asbestos geological assessment.

4. Test Methods

The current ATCM requires the use of ARB Test Method 435 for all asbestos testing for compliance purposes. The proposed revisions will expand this provision to allow alternative test methods for the determination of the asbestos content of bulk material. ARB Test Method 435 refers to "serpentine aggregate", however this method can apply to ultramafic material as well. The proposal specifies that either ARB Test Method 435 or a bulk test method approved by the Executive Officer of the ARB must be used to comply with any test requirements of this regulation. As discussed above,

this provision was included to provide flexibility to businesses that may prefer an approvable alternative test procedure.

The current ATCM specifies if multiple tests are conducted, that the average of the results of will be used to determine the asbestos content of the material tested. The revisions will modify this provision. If the material is tested for asbestos on more than one occasion, the test results indicating the greater amount of asbestos is to be used to characterize the material. This provision will allow for the testing of any suspected material by a third party, such as the district or the ARB. If the second test indicated an asbestos content of 0.25 percent or more, then the material could not be used for surfacing.

It should be noted that intent of requiring the use of ARB Test Method 435 and any other method that may be approved for compliance with this proposed regulation is to determine the presence of asbestos. ARB Test Method 435 use polarized light microscopy (PLM) to assess for the presence of asbestos. Light microscopy, including PLM, is not considered appropriate for assessing the presence of asbestos in ambient air samples and the results obtained from the use of ARB Test Method 435 is not intended and should not be used to assess risk.

C. Summary of Differences Between the Current and Proposed ATCM

Table 6 compares the proposed revisions to the current ATCM.

TABLE 6

Summary of the Differences Between the Current and Proposed Revised ATCM

	Current Asbestos ATCM	Proposed Revised ATCM
Applicability	Surfacing applications using serpentine	Surfacing applications using serpentine, ultramafic rock, or asbestos-containing material
Definitions		• 13 new definitions • 4 amended definitions • 1 deleted definition • clarifies requirements apply to decorative use
Surfacing Applications Requirements	Prohibits the sale or use of serpentine with an asbestos content greater than 5%	Prohibits the sale or use of: • serpentine • ultramafic rock with an asbestos-content of 0.25% or greater • asbestos-containing material with an asbestos-content of 0.25% or greater
Non-Surfacing Applications Requirements	Must provide written warning that material may contain asbestos and cannot be used for surfacing	Similar requirements
Special Testing Provision	No provision	Specifies that the EO may require testing for the asbestos content of any material sold or used for surfacing. Prohibits sale/use if the material has an asbestos content of 0.25% or greater. This provision addresses rare instances of asbestos-containing material that is not serpentine or ultramafic rock.
Test Methods	Test Method 435	Test Method 435 or a method approved by the Executive Officer of the ARB.
Records	Retain receipts and testing results for seven years. Provide testing information to purchaser.	Similar requirements
Exemptions:		
Sand and Gravel Operations	Exempts sand and gravel operations from sale/use requirements	Clarifies that the aggregate specifically obtained from a sand and gravel operation is exempted from the sale/use requirements. Includes ultramafic rock.
Roads at Surface Mining Operations	Allows roads at mining operation located in serpentine to be covered with serpentine material.	Clarifies that the material used must come from on site. Includes ultramafic rock
Emergency Road Repairs	Allows the district to provide an exemption for the sale/use of serpentine or ultramafic rock for emergency road repair. Exemption can last up to 6 months.	Same requirement however, the length of the exemption is shortened from 6 months to 90 days. Includes ultramafic rock.
Bituminous concrete and cement	Any serpentine can be used for asphalt or concrete.	Expands exemption to include ultramafic rock
Landfill Operations	Allows the use of on-site serpentine in landfill operations, except on public access roads.	Unchanged except includes ultramafic rock
Geologic Assessment	Not Addressed	Allows the EO to provide an exemption from the use/sale requirements for non-serpentine ultramafic rock provided a geologic assessment confirms that asbestos is not likely to be found in the material.
Non-wearing surfaces	Not Addressed	Allows the EO to provide an exemption for the use of serpentine or ultramafic rock on slopes with a 20 percent or greater incline in non-populated areas.
Remote Locations	Not Addressed	Allows the use of material on surfaces located at one mile from a receptor; requires public notice, permanent sign.

D. Alternatives

Discussed below are the alternatives considered for the actions required by the proposed revisions to the Asbestos ATCM.

1. No Action

One alternative to the proposed revisions would be to take no action to amend the Asbestos ATCM, that is, to maintain the *status quo*. This alternative would continue the current situation where the public is likely to be exposed to elevated levels of asbestos emissions. Asbestos-containing materials could be placed on any surface as long as the asbestos content did not exceed five percent. Surfaces include playgrounds, daycare centers, school grounds, or any other surface, irrespective of the potential exposure to the public. This alternative also does not address non-serpentine sources of asbestos such as other forms of ultramafic rock. Further, this alternative does not meet the requirement of HSC section 39666 to reduce emissions to the lowest level achievable through the application of best available control technology (BACT) or a more effective control method in consideration of risk and cost.

The current Asbestos ATCM has contributed to the reduction of asbestos emissions from the use of material with high asbestos content for surfacing applications. However, air monitoring and modeling studies show that there continues to be potential public health risks at the current level of five percent asbestos in serpentine material. For this reason, the staff of the ARB does not recommend the "No Action" alternative.

2. Lower the Asbestos Content Limit Below Five Percent

During the development of the existing Asbestos ATCM, staff recommended prohibiting the use of any serpentine material with an asbestos content greater than one percent for unpaved surfacing. During development of the proposed revisions, it has been recommended that the one percent limit be recommended again. Although lowering the allowable asbestos content would, in time, proportionately reduce exposures, this approach would not achieve the lowest levels achievable as required by Health and Safety Code section 39666. Modeling and monitoring information indicate that potentially significant exposures to asbestos can result from the use of material with asbestos content above 0.25 percent. There is little need to continue to use any serpentine or asbestos-containing ultramafic rock for unpaved surfacing when alternatives, such as river rock, limestone, decomposed granite, or basalt, are reasonably available. For very limited situations where alternatives to serpentine are not reasonably available, the proposed revisions would allow the use of serpentine or ultramafic rock in remote locations, provided this did not result in undue asbestos exposures to the public.

3. Prohibition of Use of Asbestos-Containing Material

Prohibiting the use of all material with any detectable asbestos content was also an alternative considered during this rulemaking process. This approach would eliminate any asbestos-containing material used in unpaved surfacing, however, it has the potential of requiring that all materials used for surfacing be tested for its asbestos content. Because of liability concerns, some suppliers may believe that they must test all material intended for unpaved surfacing. Therefore, the proposed revisions are structured to require testing in limited circumstances.

Currently, the staff from the Department of Conservation, Division of Mines and Geology (DMG) has indicated that asbestos is most likely to be found in ultramafic rock units. These units comprise approximately 1.4 percent of the surface area of California and are indicated on DMG geologic maps. (DOC, 2000) The staff has proposed to apply an explicit prohibition for surfacing applications to serpentine material, which is recognized as likely to contain asbestos. This approach eases testing requirements and increases enforceability of the proposed revisions since it is easier to identify serpentine material than to quantify the amount of asbestos present in that serpentine material. Under the proposed revisions, using material for unpaved surfacing that is identified as serpentine or serpentine material is a violation of the proposed ATCM. Ultramafic materials can be used for surfacing if it is tested and found to contain less than 0.25 percent asbestos.

The DMG staff has reports of far less common occurrences of asbestos in areas outside of these ultramafic rock units. To address the issue of the occurrence of asbestos outside of ultramafic rock areas, the proposed revisions would allow the district or the ARB to have any material tested when information is presented that indicates that asbestos is likely to be present. Any material tested and found to have an asbestos content greater than 0.25 percent would also be prohibited.

V. IMPACTS

A. Exposure and Risks

The proposed revisions to the Asbestos ATCM reflect best available control technology for emissions of naturally-occurring asbestos from surfacing applications. Due to the nature of the emission source (e.g., asbestos content, vehicle speeds, traffic volumes, distances to the receptors, and meteorology), quantitative estimates of emissions and the reduction in exposure to asbestos, and the associated lowered risks, are not possible. However, implementation of the proposed revisions will result in further reductions of exposure and risk to this known carcinogen. State statute requires, and prudent public health policy suggests, the ARB to take action to minimize the exposures to asbestos where it is technically and economically reasonable.

B. Economic Impacts Analysis on California Businesses as Required by The California Administrative Procedure Act (APA)

Overall, we do not expect the proposed revisions to the ATCM to impose a significant hardship on quarries and surface mines. While most California quarries are able to withstand the impact of the proposed revisions to the ATCM without a significant impact on their revenues, there are three small quarries with a significant portion of their revenues coming from serpentine sale for use in unpaved surfacing applications. These three small quarries may be adversely impacted if they are unable to find alternative uses for their asbestos-containing materials. Staff believes the chances for such a scenario are high for one quarry, low for another, and unknown for the third quarry.

The proposed revisions to the ATCM are not expected to impose unreasonable costs on retail rock distributors that buy the rock for resale and homeowners who purchase serpentine to surface an unpaved driveway. The proposed revisions to the ATCM may create some business opportunities for some mines and quarries due to increased demand for non-serpentine material. As a result, staff expects the proposed revisions to the ATCM to impose no noticeable adverse impact on California employment, business status, and competitiveness.

1. Legal Requirements

Section 11346.3 of the Government Code requires State agencies to assess the potential for adverse economic impacts on California business enterprises and individuals when proposing to adopt or amend any administrative regulation. The assessment shall include a consideration of the impact of the proposed regulation on California jobs, business expansion, elimination or creation, and the ability of California business to compete with businesses in other states.

Also, State agencies are required to estimate the cost or savings to any State or local agency and school district in accordance with instructions adopted by the

Department of Finance. The estimate shall include any non-discretionary cost or savings to local agencies and the cost or savings in federal funding to the state.

Health and Safety Code section 57005 requires the ARB to perform an economic impact analysis of submitted alternatives to a proposed regulation before adopting any major regulation. A major regulation is defined as a regulation that will have a potential cost to California business enterprises in an amount exceeding ten million dollars in any single year. The proposed ATCM is not a major regulation.

2. Affected Businesses

Any quarry located in a serpentine or ultramafic rock formation and providing material for use in surfacing applications would potentially be affected by the proposed revisions to the ATCM. Also affected are retail rock distributors that buy rock from affected quarries and resell it.

According to the U.S. Census Bureau, there are approximately 281 non-metallic mineral mines and quarries in California, of which, 232 (stone mining, and sand and gravel) sell aggregate for use in surfacing. These quarries are classified into four Standard Industrial Classifications (SICs): 1422, 1423, 1429, 1442. (USCB, 2000)

According to the U.S. Census Bureau, there were 462 establishments in the United States that produced crushed and broken stones other than limestone and granite in 1997, of which 36 were in California. This segment of aggregate producers would include those that produce serpentine. These mines and quarries shipped products valued at $1.3 billion in 1997, of which California mines and quarries accounted for $82 million or 6.4 percent of the total national value of shipments (USCB, 1999).

To determine the number of mines and quarries potentially subject to the proposed revisions to the ATCM, the staff used a map provided by the Department of Conservation. This map shows formations of ultramafic rock and the locations of all mines and quarries in California holding current permits under the Surface Mining and Reclamation Act. From this map, staff identified all mines and quarries in or near ultramafic rock formations. Staff then contacted each of these mines and quarries. When the staff was unable to contact a specific mine or quarry, they obtained the assistance of the local Air Pollution Control District and/or county planning departments. Using this approach, the staff identified three quarries producing serpentine aggregate for unpaved surfacing applications in California.

3. Potential Revenue Loss to Quarries and Surface Mines

The proposed revisions to the ATCM would prohibit the sale and use of serpentine and asbestos-containing ultramafic rock. Quarries that process ultramafic rock for surfacing would be required to test for the presence of asbestos. Based upon our phone survey, we did not identify any quarries processing ultramafic rock for surfacing. However, we do believe such quarries exist.

Quarries and surface mines that currently sell a significant quantity of asbestos-containing rock (either serpentine or ultramafic rock that has an asbestos content of 0.25 percent or greater) would potentially experience a loss of revenue. The cost of the additional recordkeeping and reporting requirements is expected to be negligible. No other costs are expected to result from this proposed regulatory action.

Staff has identified three quarries that produce serpentine aggregate for unpaved surfacing applications. Information from two of the three affected quarries was used to calculate potential loss of revenue. No information was available from the third quarry. The two affected quarries sell approximately 30,000 tons per year each of serpentine aggregate. The cost of serpentine for surfacing ranges between $5.25 to $7.00 per ton. (Weber Creek, 2000) Quarry 1 sells approximately 10 to 15 percent of their serpentine aggregate for surfacing applications. The total potential loss of revenue for this quarry could range from $15,750 to $31,000 per year. Quarry 2 sells approximately 33 percent to 50 percent of its serpentine aggregate for surfacing applications. The total potential loss of revenue for this quarry could range from $52,000 to $105,000. The potential loss of revenue for Quarry 3 is unknown. Table 7 shows the potential loss of revenue.

Table 7

Potential Loss of Revenue to Affected Quarries

	Range	
	Low ($5.25 per ton)	High ($7.00 per ton)
Quarry 1 (10-15% surfacing)	$15,750	$31,000
Quarry 2 (33-50% surfacing)	$52,000	$105,000
Quarry 3	Unknown	Unknown
Total potential revenue loss	$67,750	$136,000

4. Potential Impact on California Businesses

As mentioned earlier, the staff did not identify any specific quarrying operations in ultramafic rock which were providing aggregate for surfacing. However, we believe there may be such operations. These operations would be required to test their material to demonstrate an asbestos content of less than 0.25 percent if the material is used in surfacing applications. Staff estimates testing costs to be approximately $60 to $100 per test ($19 to $30 sample collection, $10 sample preparation, $6 to $8 shipping, $25 to $50 sample analysis). The proposed ATCM requires testing every 1000 tons of material produced. Assuming $100 per test, the cost of testing would be $0.10 per ton of material produced for sale as surfacing material. If the material had an asbestos content of 0.25 percent or greater, the material could not be sold for surfacing and costs associated with potential loss of revenue may result.

The proposed revisions to the ATCM would potentially result in a loss of revenue to mines and quarries that process and sell serpentine for use in unpaved surfacing applications. Staff was able to identify only three quarries that sell a significant quantity of their serpentine production for surfacing applications. (While we believe that there may be other quarries impacted by this regulation, we were unable to specifically identify them.) As estimated above, the potential annual loss of revenue to these two quarries are estimated to range from about $67,750 to $136,000. Staff believes that one quarry will likely be able to find alternative uses for much of the material volume previously sold for surfacing. As a result, we do not expect the proposed ATCM to cause a significant adverse impact on it. However, because of the large amount of serpentine material sold for surfacing at the second quarry, we expect the ATCM to have a significant adverse impact on them. We can not determine the impact of the ATCM third quarry.

Staff expect revenue gains, equivalent to the revenue loss, at quarries near the affected quarries. These revenue gains are a result of increased sales of non-serpentine material as a substitutes for the now prohibited serpentine material.

Businesses that buy serpentine rock for resale may also be affected due to the need to change the wording of the receipt they are required to provide to the purchaser. The economic impact on these businesses is expected to be minimal.

5. Potential Impact on Homeowners

The proposed revisions to the ATCM may have a minimal economic impact on homeowners who wish to purchase crushed aggregate to cover the surface of an unpaved driveway. The cost to purchase crushed aggregate includes the cost of the material plus the cost of transportation when it is delivered. If the quarry nearest to the consumer cannot supply the material that does not contain asbestos, there may be an increase in the delivery cost.

Based on quotes from several hauling companies, staff estimated that if the round trip to the quarry were to increase by 30 to 45 minutes, the additional delivery cost would be $30 to $60. This is less than a 10 percent increase in the cost of the job. This is the highest incremental cost we should expect any individual to experience as a result of adoption of the proposed revisions to this ACTM. Most homeowners would experience no additional cost.

The alternative aggregate available to the homeowner will most likely be river rock or limestone. The cost for these alternatives is comparable to serpentine (the cost for limestone was quoted as $6.75 per ton). Both alternative aggregates have been found to be more durable in surfacing applications than serpentine and therefore, do not need to be replaced as often. Thus, over the lifetime of the surface, we believe the homeowner will experience no additional cost and potentially a cost saving.

6. Potential Impact on Employment

California employment in the industry (SIC 1429, which includes establishments primarily involved in mining or quarrying crushed and broken stone other than limestone and granite) was 623 in 1997 according to the U.S. Census Bureau. This represents 2.8 percent of the mining jobs in California. These employees working in 36 establishments generated approximately $24 million in payroll. Fourteen establishments had 20 or more employees; the rest had less than 20 employees. (USCB, 1999) The quarry employment accounts for only a small portion of the total mining employment in California. Thus, the proposed ATCM is unlikely to cause a noticeable change in California employment.

As stated above, however, staff has identified only three quarries that sell a significant portion of their serpentine production for surfacing applications. These quarries may cut back their operations and lay off some employees if they are unable to find alternative uses for their asbestos-containing material. While these quarries might be impacted adversely by the proposed ATCM, other mines and quarries that produce alternative material would potentially benefit as they experience increased demand for their material. This may actually result in the creation of some jobs.

7. Potential Impact on Business Creation, Elimination or Expansion

The proposed ATCM is not expected to have a noticeable impact on the status of California quarries and surface mines. Staff was able to identify only three commercial quarries that sell a significant portion of their asbestos-containing materials for surfacing. These quarries may experience a reduction in revenue if they are unable to find alternative uses for their rock. It is possible, that at least one may have to cease operation.

The proposed ATCM may create some business opportunities for mines and quarries that produce alternative materials. These mines and quarries may experience an increase in demand for their material as replacement for previously used serpentine or ultramafic rock.

8. Potential Impact on Business Competitiveness

The proposed revisions to the ATCM would have no significant impact on the ability of California quarries and surface mines to compete with quarries and surface mines in other states. This is because aggregate for surfacing applications is usually sold in areas close to the quarry. It is cost-prohibitive to transport aggregate great distances from a quarry. Thus, the vast majority of California quarries compete for business within California's borders. A few quarries located in the border areas between California and other states, however, may compete with the quarries located nearby in other states. Nevertheless, these interstate transactions are not expected to be significant.

C. Analysis of Potential Impacts to California State or Local Agencies

1. Impacts to State Agencies

The proposed revisions to the Asbestos ATCM may impact State agencies that maintain roads that are surfaced with serpentine aggregate. These costs will be used to test alternative aggregate sources to determine if the materials contain asbestos. To estimate the costs to these State agencies, staff adjusted the estimated costs to State agencies from the *1990 Technical Support Document for the Proposed Control Measure for Asbestos-Containing Serpentine Rock in Surfacing Applications* using the ratio of the consumer price indices for 1990 (130.7) and 1999 (166.6) (CEA, March 2000). The original 1990 cost estimates addressed complying with a proposed one percent asbestos content for serpentine, which was contended by impacted businesses at the time to be similar costs for a prohibition due to the lack of available serpentine with less the a one percent asbestos content. We believe an analogous situation exists with the proposed revisions to the Asbestos ATCM. In this case, it is ultramafic rock that will need to be tested.

In 1990, the California Department of Transportation estimated that they would spend approximately $25,000 ($32,000 in 1999 dollars) to survey and test their sources of surfacing material and additional costs of $178,000 ($227,000 in 1999 dollars) per year to purchase material that they would otherwise produce. Hence their first year cost would be approximately $203,000 ($260,000 in 1999 dollars) and $178,000 ($227,000 in 1999 dollars) annually thereafter. The California Department of Forestry (CDF) staff said they would not incur a testing cost but their unpaved road budget may be affected because they may choose to purchase more expensive alternate material instead of serpentine rock. ARB staff estimated that CDF could incur an increase cost of $20,000 ($26,000 in 1999 dollars) per year. The Department of Parks and Recreation staff said that they had a few limited sources of local aggregate and may incur a maximum of $1,000 ($1,300 in 1999 dollars) in testing costs. (ARB, 1990) See Table 8 for a summary of updated estimates of cost to comply with the revised ATCM. (See Appendix I for more information on the 1990 cost analysis.) Staff does not believe these costs represent a significant impact because they represent only a small percentage of these agencies budgeted costs for road construction and maintenance.

Table 8

Estimation of Cost to State Agencies

Agency	Initial Costs	Annual Costs
California Department of Transportation	$227,000	$227,000
	$31,900	–
California Department of Forestry	$25,000	–
California Department of Parks and Recreation	$1300	–
Totals	**$285,000**	**$227,000**

2. Impacts to Local Agencies

The proposed revisions to the ATCM may impact local county public works departments if they use serpentine aggregate or ultramafic rock for sufacing applications. However, as a result of the development of the original 1990 ATCM, most counties had already discontinued the use of serpentine rock for surfacing – including those counties where serpentine was most prevalent. Therefore, these departments either have an already established policy of using non-asbestos containing material for surfacing or should be able to obtain alternative material at approximately the same costs. Therefore, no fiscal impact is anticipated for local governmental agencies.

3. Impacts to California Air Pollution Control and Air Quality Management Districts

The proposed revisions to the Asbestos ATCM will have an economic impact on the local air pollution control and air quality management districts (districts). Health and Safety Code section 39666 requires that after the adoption of the proposed ATCM by the Board, the districts must implement and enforce the ATCM or adopt and enforce an equal or more stringent regulation. Local air district responsibilities under the proposed regulation can be fully financed from the fee provisions authorized by Section 42311 and 40510 of the Health and Safety Code.

To calculate the fiscal impact on the districts, the economic analysis for the original 1990 ATCM was used (see Attachment 3, *1990 Technical Support Document for the Proposed Control Measure for Asbestos-Containing Serpentine Rock in Surfacing Applications*). The 1990 analysis included the costs for adoption of the regulation, determining the number of facilities with serpentine rock, and the cost to enforce the regulation. Staff believes the current situation is analogous. The cost numbers from the 1990 analysis were adjusted to 1999 dollars using the ratio of the consumer price indices for 1990 (130.7) and 1999 (166.6) (*Economic Indicators*, Council of Economic Advisors, February, 2000).

To evaluate the fiscal impact for the proposed revisions to the ATCM, staff made the following assumptions: 1) half of the districts will adopt the revised ATCM by

reference, which will be a negligible cost; 2) half of the districts will adopt the revised ATCM as a new regulation; 3) the costs to identify the sources of serpentine and ultramafic rock will be the same as in 1990; and 4) enforcement of the revised ATCM should increase by ten percent. Table 9 shows the adjusted estimated costs to the districts.

Table 9

Estimated Cost For Districts to Adopt Revisions to ATCM

	1990 Costs	1999 Costs
Cost to adopt revisions to ATCM	$4000 - $5000	$5,000 - $6,400
Cost to identify facilities	$800 - $1,600	$1,000 - $2,000
Cost of enforcement (annual)	$500 - $1,000 (10% of original cost)	$640 - $1,280

The 1990 cost estimates were based on a telephone survey of 15 districts. Ten of the fifteen districts surveyed were districts that were aware of serpentine deposits in their districts and five of the fifteen had little or no serpentine deposits. The remaining 26 districts (now 20 districts) may or may have had serpentine deposits. Therefore, total costs to these 26 districts were calculated based on the midpoint of the average cost for the ten districts surveyed known to have serpentine and the average cost for the five districts surveyed known to have little or no serpentine.

Using the same approach, the costs to the districts have been estimated for three categories using costs adjusted to 1999 dollars (Table 10): 1) surveyed districts known to have serpentine, 2) surveyed districts known to have little or no serpentine, and 3) districts not surveyed. The total cost statewide for all of the districts will be $150,000 for the first year, and $35,000 for each year following the adoption of the regulation.

Table 10

Cost Calculations For Districts to Adopt Revisions to ATCM

Districts	Cost to adopt revisions to ATCM x Number of districts[1]	Cost to identify facilities x Number of districts	Cost of enforcement (annual) x Number of districts
Known to have serpentine	$5,000 x 10 = $50,000	$1,000 x 10 = $10,000	$1,280 x 10 = $12,800
Known to have little or no serpentine	$6,400 x 5 = $32,000	$2,000 x 5 = $10,000	$640 x 5 = $3,200
District not surveyed[2]	$5,700 x 3 = $17,000	$1,500 x 20 = $30,000	$960 x 20 = $19,200
Totals	$99,100 (first year cost)	$50,000 (first year cost)	$35,200 (annual cost)

1. Seventeen districts adopted by reference, cost negligible
2. Calculated based on the midpoint of the average cost for the 10 districts surveyed known to have serpentine and the average cost for the 5 districts surveyed known to have little or no serpentine.

D. Adverse Environmental Impacts of the Proposed Revisions to the Airborne Toxic Control Measure

The ARB staff has investigated the potential adverse environmental impacts of the proposed revisions to the asbestos ATCM. The intent of the proposed revisions is to protect the public health by reducing the public's exposure to naturally-occurring asbestos. An additional consideration is the impact that the proposed revisions may have on other areas of the environment. Based on available information, the ARB has determined that no significant adverse environmental impacts should occur, with the exception that there may be very small increases in emissions of diesel particulate matter, carbon monoxide, nitrogen oxides, and hydrocarbons from heavy-duty diesel vehicles. (This potential impact is discussed below in d(5).) This section describes the potential impacts that the proposed revisions to the ATCM may have on water quality, hazardous waste disposal, and air quality.

1. Legal Requirements Applicable to the Analysis

The California Environmental Quality Act (CEQA) and ARB policy require an analysis to determine the potential adverse environmental impacts of proposed regulations. Since the ARB's program involving the adoption of regulations has been certified by the Secretary of Resources (see Public Resources Code section 21080.5), the CEQA environmental analysis requirements are allowed to be included in the Initial Statement of Reasons for a rulemaking in lieu of preparing an environmental impact report or negative declaration. In addition, the ARB will respond in writing to all significant environmental issues raised by the public during the public review period or

at the Board hearing. These responses will be contained in the Final Statement of Reasons for the Proposed revisions.

Public Resources Code section 21159 requires that the environmental impact analysis conducted by ARB include the following: (1) an analysis of the reasonably foreseeable environmental impacts of the methods of compliance; (2) an analysis of reasonably foreseeable feasible mitigation measures; and, (3) an analysis of reasonably foreseeable alternative means of compliance with the proposed revisions to the ATCM. Regarding reasonably foreseeable mitigation measures, CEQA requires an agency to identify and adopt feasible mitigation measures that would minimize any significant adverse environmental impacts described in the environmental analysis. The staff's analysis of the environmental impacts of the methods of compliance is presented below.

2. Methods of Compliance with the Proposed Revisions

The proposed revisions prohibit the use of serpentine or serpentine material for surfacing, but allow ultramafic rock to continue to be used for surfacing as long as the rock has been tested and determined to have an asbestos content that is less than 0.25 percent. With respect to serpentine and serpentine material, the method of compliance is for individuals to use alternative aggregate materials for surfacing, instead of serpentine or serpentine material. With respect to ultramafic rock, individuals would comply with the proposed revisions either by: (1) using alternative material for surfacing, or (2) testing the ultramafic rock to determine its asbestos content, and using alternative material for surfacing if asbestos is detected. No adverse impacts are expected from testing of ultramafic rock or, as discussed below, from the use of substitute aggregate materials.

Because surfacing of roads and other surfaces has been undertaken for many years in California, the alternative materials that would be used are well known. These materials include limestone, river rock, decomposed granite, and basalt.

3. Potential Water Quality Impacts

The staff has not identified any adverse environmental impacts on water quality from the reasonably foreseeable methods of compliance with the proposed revisions or from any reasonably foreseeable alternative methods of compliance. As discussed above, the proposed revisions would result in the use of alternative materials for surfacing applications where serpentine, serpentine material, or asbestos-containing ultramafic rock might otherwise have been used. Using these alternative materials should not adversely impact water quality because the alternative materials do not have any unusual physical or chemical properties that would adversely impact water quality. In fact, the impacts on water quality should be less because less asbestos will get into the water because of the prohibition of use of asbestos-containing material for surfacing applications.

4. Potential Hazardous Waste Impacts

The proposed revisions to the ATCM do not require the removal of serpentine from any existing roads. Therefore, staff does not anticipate that compliance with the regulation will result in the production of any additional hazardous waste. The proposed revisions should also result in be a positive impact on the creation of asbestos-containing hazardous waste, since the proposed revisions should reduce the demand for materials that contain asbestos and might otherwise be used for surfacing. This reduction in demand should result in decreased production and use of asbestos-containing material, and a corresponding decrease in the creation of asbestos-containing waste material from these activities. Finally, the use of alternative materials for surfacing is not expected to cause any other hazardous waste impacts, because the alternative materials do not have any unusual physical or chemical properties that would result in adverse hazardous waste impacts.

5. Potential Air Pollution Impacts

Staff has determined that in some cases alternative sources of aggregate may have to be transported an additional 25 to 50 miles. This situation could occur if the alternative source of aggregate was not available in the near vicinity of a quarry producing serpentine or asbestos-containing ultramafic rock. Using information obtained from two existing serpentine quarries, we estimated the additional emissions from diesel trucks used to transport alternative material and the anticipated increase in the number of trucks entering and leaving the quarry that produces the alternative material.

Assuming a total of 18,500 tons of aggregate will have to be obtained from an alternative source and that the trucks used to transport it carry seven tons per load, approximately 2,650 truck loads might have to be transported an additional 25 to 50 miles. The ARB has estimated that heavy-duty diesel vehicles emit 0.67 grams of particulate matter per mile (ARB, 1996). The emissions that would result from the additional miles traveled by these trucks would be between 100 and 200 pounds of diesel particulate matter per year. These trucks would also emit 200 to 400 pounds of carbon monoxide, 2000 to 4000 pounds of nitrogen oxides, and 200 to 400 pounds of hydrocarbons per year.

The magnitude of potential emission increases identified above is insignificant compared to statewide emissions of these pollutants from on-road diesel vehicles. For example, the ARB staff estimates current particulate matter emissions from on-road diesel vehicles to be about 20,000 tons per year (ARB, 1998). Furthermore, since alternative aggregate material is more durable than serpentine, any increase in emissions is expected to be a short-tem impact as replacement of the aggregate will not occur as frequently.

To estimate the number of additional trucks that would be entering and leaving the quarry, we assumed 15,000 tons of the rock would come from one alternative source, trucks would carry seven tons per load, and trucks would be entering and leaving the quarry 250 working days per year. Using these assumptions, we estimate a daily average of 9 additional truck trips would be needed.

Because of the extra trips to the quarry from which the alternate materials would be obtained, persons living near this quarry would experience a slight increase in exposure to diesel particulate. However, this additional exposure is not expected to result in an increased cancer risk of one in a million. The increase in risk for these persons may be offset by an equivalent reduction in exposure to diesel particulate for persons living near the serpentine quarry. A similar offsetting shift in the exposure of quarry workers to diesel particulate emissions may also occur.

The emission increases described above are extremely small. Nevertheless, these emissions increases could still constitute an adverse environmental impact. Staff evaluated a number of alternatives to the proposed revisions (see Chapter IV, section d). However, staff was not able to identify any feasible alternatives that would substantially reduce the potential adverse impacts of the proposed revisions, while at the same time insuring that the positive environmental impacts (i.e., a reduction in exposure to asbestos emissions) would be achieved. Staff was also unable to identify any feasible mitigation measures that would substantially reduce the potential adverse impacts of the proposed revisions, while at the same time insuring that the positive environmental impacts would be achieved. Staff believes that reducing asbestos exposure is a consideration that overrides the very small adverse impacts that may occur as a result of the proposed revisions.

6. Reasonably Foreseeable Alternative Means of Compliance with the Proposed Revisions to the ATCM

The ARB is required to do an analysis of reasonably foreseeable alternative means of compliance with the proposed revisions. As discussed above, there is really only one means of compliance with the prohibition on using serpentine or serpentine material for surfacing: individuals must use some alternative aggregate material for surfacing. The potential environmental impacts of using alternative materials are discussed above. For ultramafic rock, individuals have a choice of: (1) using alternative material for surfacing, or (2) testing the ultramafic rock to determine its asbestos content, and using alternative material if asbestos is detected. Therefore, testing is an alternative means of compliance with the proposed revisions. No adverse impacts are expected from simply testing ultramafic rock to determine the presence of asbestos.

Other than the alternative discussed above, the ARB staff was not able to identify any other alternative means of compliance with the proposed revisions.

VI. PUBLIC OUTREACH

An open public process that involves all parties affected by the proposed ATCM is an important component of all ARB's actions. The ARB established a website in 1998 to make information readily available to the public regarding asbestos. Since the website has been established, it has received an average of about 900 monthly hits. This website was mentioned in the Sacramento Bee as a good site to obtain information regarding asbestos. The website is available at *www.arb.ca.gov/toxics/asbestos.htm*. The ARB has held three public workshops to discuss the proposed ATCM and receive public comments. In addition, staff has been involved in numerous contacts with the public, other government agencies, and industry on an ongoing basis. Described below is a summary of the efforts involved.

A. General Public Involvement

In March 1998 the Sacramento Bee ran a series of articles concerning the potential health risk to persons in El Dorado County from naturally-occurring asbestos. The articles raised public awareness and as a result of the articles numerous persons contacted the ARB. The public has been very involved with the issues related to naturally-occurring asbestos and has been engaged with the ARB on a regular basis to discuss issues and actions to be taken. A summary of the public involvement includes:

- Hundreds of telephone conversations with various members of the public
- Public forums to present information and answer questions
  - June 8, 1998 public meeting of Task Force
  - September 2, 1999 Grange Hall meeting in Garden Valley, California
  - October 4, 1999 pubic meeting in Forresthill, California
  - March 4, 2000 public tour and meeting in El Dorado County
- Numerous individual and small group meetings at the request of the public

In December 1999, the ARB also released a school advisory warning school officials of the possible health impacts from the use of materials containing naturally-occurring asbestos. This advisory was sent to over 1,300 school officials statewide.

B. Government Agency Involvement

In April 1998, the California Environmental Protection Agency (Cal/EPA) offered assistance to El Dorado County officials in response to the public's concerns raised by the series of articles in the Sacramento Bee regarding naturally-occurring asbestos. To address these needs, the Asbestos Task Force was formed including representatives from the offices of Senator Tim Leslie and Assemblyman Rico Oller, and the El Dorado County Air Pollution Control District and Board of Supervisors. Several state agencies also participated including the ARB, OEHHA, Department of Health Services (DHS), Department of Toxic Substances Control (DTSC), and Department of Conservation (DOC). Additional members included representatives from the United States Geological Survey and the Geology Department of the University of California at Davis. The Task

Force was disbanded after the release of *the Findings and Recommendations* report in March 1999 (see Appendix B).

The Task Force and ARB made several informational items available to the public regarding asbestos. These items included:

- A White Paper: entitled "*Naturally-Occurring Asbestos in El Dorado County*"
- A Report *of Findings and Recommendations* to El Dorado County
- A Series of Fact Sheets
  - Naturally-Occurring Asbestos: General Information
  - Health Information on Asbestos
  - School Advisory for Naturally-Occurring Asbestos
  - Ways to Control Naturally-Occurring Asbestos Dust
  - Naturally-Occurring Asbestos Around Your Home
  - Monitoring for Asbestos
- A Health Provider Education Fact Sheet
- A telephone Hot Line: 1-800-CLEANUP (253-2687).

After the Task Force disbanded, several federal, state, and local agencies continued, and still continue, to meet on a regular basis to address ongoing asbestos issues. The agencies represented include:

- California Attorney General's Office
- California Department of Transportation
- California Environmental Protection Agency
- California Occupational Safety and Health Administration
- Department of Conservation, Division of Mines and Geology
- Department of Education
- Department of Health Services
- Department of Real Estate
- Department of Toxic Substance Control
- El Dorado County Air Pollution Control District
- Office of Environmental Health Hazard Assessment
- Office of Planning and Research
- United States Environmental Protection Agency

C. Industry Involvement

Industry involvement in the process has included the participation of several of the major associations in the State with members with an interest in to the production of aggregate materials and mining. These association representatives have participated during workshops and have met with staff on an individual basis. In addition, quarry operators and their representatives have participated in the public workshops.

VII. RECOMMENDATION

The ARB staff recommends that the Board adopt the proposed revisions to the Asbestos ATCM contained in Appendix A of this staff report. In recognition of the requirement for the ARB to adopt best available control technology, the staff is proposing revisions that will prohibit the use and sale of serpentine, serpentine material, and asbestos-containing ultramafic rock for surfacing applications. Benefits from the proposed revisions to the Asbestos ATCM are reduced public exposures to asbestos emissions from unpaved surfaces covered with serpentine or other asbestos-containing materials. Exposure to asbestos is known to cause asbestosis, lung cancer, and mesothelioma. The proposed actions represent the best available control technology for reducing asbestos emissions from unpaved surfaces. The proposed actions to minimize the public's exposure to this known carcinogen are consistent with State policy to control toxic air contaminants to levels that prevent harm to the public health and to use alternative materials of a less hazardous nature.

VIII. REFERENCES

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ATTACHMENT A

PROPOSED REGULATION ORDER

ASBESTOS AIRBORNE TOXIC CONTROL MEASURE FOR SURFACING APPLICATIONS

PROPOSED REGULATION ORDER

ASBESTOS AIRBORNE TOXIC CONTROL MEASURE FOR SURFACING APPLICATIONS

[Note: The proposed amendments to Section 93106 are shown in ~~strike-out~~ to indicated proposed deletions and underline to indicate proposed additions.]

Section 93106. Asbestos Airborne Toxic Control Measure ~~—Asbestos-Containing Serpentine~~ for Surfacing Applications.

(a) Definitions. For the purposes of this section, the following definitions shall apply:

(1) "Aggregate" means a mixture of mineral fragments, sand, gravel, rocks, or similar minerals.

(2) "Alluvial deposit" means any deposit of sediments laid down by running water including but not limited to streams and rivers.

(3) "Approved asbestos bulk test method" means ARB Test Method 435 or an alternative asbestos bulk test method approved in writing by the Executive Officer of the Air Resources Board.

(4) "ARB" means the California Air Resources Board.

~~(3)~~(5) "ARB Test Method 435" means the test method specified in Title 17, California Code of Regulations, section 94147.

~~(4)~~(6) "Asbestos" means asbestiforms of the following hydrated minerals: chrysotile (fibrous serpentine), crocidolite (fibrous riebeckite), amosite (fibrous cummingtonite--grunerite), fibrous tremolite, fibrous actinolite, and fibrous anthophyllite.

(7) "Asbestos-containing material" means any material that has an asbestos content of 0.25 percent or more as determined by an approved asbestos bulk test method

~~(5) "Asbestos-containing serpentine material" means serpentine material that has an asbestos content greater than five percent (5.0%) as determined by ARB Test Method 435.~~

(8) "Asbestos geologic assessment" means a geologic evaluation of a property conducted by a registered geologist to determine the presence of asbestos, asbestos-containing material, or ultramafic rock.

(9) "District" means any air pollution control or air quality management district created or continued in existence pursuant to Part 3 (commencing with section 40000), Division 26, Health and Safety Code.

(10) "Executive Officer" means the Executive Officer of the ARB, the executive officer or air pollution control officer of any district, or designee thereof.

(11) "Non-wearing surface" means any non-road surface that has an incline greater than twenty (20) percent, including, but not limited to, the use of riprap, road cuts, or soil stabilization.

(12) "Owner/operator" or "person" includes, but is not limited to, an individual, trust, firm, joint stock company, business concern, partnership, limited liability company, association, or corporation including, but not limited to, a government corporation. "Owner/operator" or "person" also includes any city, county, district, commission, the state or any department, agency, or political subdivision thereof, any interstate body, and the federal government or any department or agency thereof to the extent permitted by law. "Owner/operator" or "person" also includes a project proponent and any of its contractors and subcontractors.

(13) "Producer" means any person that extracts and processes aggregate material from the ground.

~~(6)~~(14) "Receipt" means any written acknowledgement that a specified amount of serpentine, serpentine material, or ultramafic rock was received, delivered, or purchased. Receipts include, but are not limited to, bills of sale, bills of lading, and notices of transfer.

(15) "Registered geologist" means an individual that is currently licensed with the State of California, Department of Consumer Affairs, Board of Geology and Geophysicists as a geologist.

(16) "Remote location" means any location that is at least one (1.0) mile from the location of a receptor, which includes, but is not limited to, hospitals, schools, day care centers, work sites, businesses, residences, and permanent campgrounds. The distance of one (1.0) mile is to be measured from the outer most limit of the area to be disturbed or road surface, whichever is further.

~~(7)~~(17) "Road surface" means the traveled way of a road and any shoulder which may extend~~s~~ up ten (10) feet from the edge of the traveled way.

~~(8)~~(18) "Sand and gravel operation" means any aggregate-producing facility operating in alluvial deposits.

~~(9)~~(19) "Serpentine" means any form of hydrous magnesium silicate minerals – including, but not limited to, antigorite, lizardite, and chrysotile.

~~(10)~~(20) "Serpentine material" ~~is~~ means any material that contains at least ten percent (10%) serpentine as determined by a registered geologist. The registered geologist must document precisely how the serpentine content of the material in question was determined.

(21) "Serpentinite" means a rock consisting almost entirely of serpentine, although small amounts of other minerals such as magnetite, chromite, talc, brucite, and tremolite-actinolite may also be present.

~~(11)~~(22) "Surfacing" means the act of covering any surface used for pedestrian, vehicular, or non-vehicular travel; or decoration, including, but not limited to, roads, road shoulders, streets, access roads, alleys, lanes, driveways, parking lots, playgrounds, trails, squares, plazas, and fairgrounds.

(23) "Ultramafic rock" means an igneous rock composed chiefly of one or more iron/magnesium-rich, dark-colored minerals such as pyroxene, amphibole, and olivine; includes, but is not limited to serpentinite, dunite, peridotite, and pyroxenite.

~~(b) Requirements for use or sale of asbestos-containing serpentine material.~~

~~(1) No person shall use or apply serpentine material for surfacing in California unless the material has been tested using ARB Test Method 435 and determined to have an asbestos content of five percent (5.0%) or less. A written receipt or other record documenting the asbestos content shall be retained by any person who uses or applies serpentine material, for a period of at least seven years from the date of use or application, and shall be provided to the Air Pollution Control Officer or his designee for review upon request.~~

~~(2) Any person who sells, supplies, or offers for sale serpentine material in California shall provide with each sale or supply a written receipt containing the following statement: "Serpentine material may have an asbestos content greater than five percent (5.0%). It is unlawful to use serpentine material for surfacing unless the material has been tested and found to contain less than or equal to five percent (5.0%) asbestos. All tests for asbestos content must use California Air Resources Board Test Method 435, and a written record documenting the test results must be retained for at least seven years if the material is used for surfacing.~~

~~(3) No person shall sell, supply, or offer for sale serpentine material for surfacing in California unless the serpentine material has been tested using ARB Test Method 435 and determined to have an asbestos content of five percent (5.0%) or less. Any person who sells, supplies, or offers for sale serpentine material that he or she represents, either orally or in writing, to be suitable for surfacing or to have an asbestos content that is five percent (5.0%) or less, shall provide to each purchaser or person receiving the serpentine material a written receipt which specifies the following information: the amount of serpentine material sold or supplied; the dates that the serpentine material was produced, sampled, tested, and supplied or sold; and the asbestos content of the serpentine material as measured by ARB Test Method 435. A copy of the receipt must, at all times, remain with the serpentine material during transit and surfacing.~~

~~(4) Any person who sells, supplies, or offers for sale serpentine material, shall retain for a period of at least seven years from the date of sale or supply, copies of all receipts and copies of any analytical test results from asbestos testing of the serpentine material. All receipts and test results shall be provided to the Air Pollution Control Officer or his designee for review upon request.~~

[Note: The existing language in subsection 93106(b) has been reorganized and amended. Some of the language shown below in new subsections (b), (c), and (d) is new language, and some is language that currently appears in the existing subsection 93106(b)(1) through (b)(4). To improve the readability of the proposed amendments, however, the entire text of the existing subsection 93106(b)(1) through (b)(4) has been struck out, and all of the language in new subsections (b), (c), and (d) is shown in underline format.]

(b) Prohibitions on the Use or Sale of Certain Materials for Surfacing

(1) The Executive Officer may require testing for the asbestos content of any material represented as being suitable or used for surfacing.

(2) No person shall use, apply, sell, supply, or offer for sale or supply any of the following materials for surfacing, unless one of the exemptions listed in subsections (f) or (b)(3) applies:

(A) Serpentine or serpentine material,

(B) Ultramafic rock, or

(C) Any material that has been tested and found to have an asbestos content of 0.25 percent or more.

(3) *Exemption for Ultramafic Rock that Has Been Tested:* Ultramafic rock may be used, applied, offered for sale or supply, sold, or supplied for surfacing, if the rock has been tested using an approved asbestos bulk test method, and has been determined to contain less than 0.25 percent asbestos.

(4) *Nonsurfacing Applications:* All of the materials listed above in (b)(2) may be used, applied, offered for sale or supply, sold, or supplied for nonsurfacing applications. However, the noticing requirements specified in section (c)(3) must be complied with, as well as the recordkeeping and reporting requirements specified in subsection (d)(3).

(c) Noticing Requirements

(1) *Noticing Requirements for Producers of Ultramafic Rock for Surfacing.* A producer is any person that extracts and processes aggregate material from the ground. Any producer who sells, supplies, or offers for sale or supply ultramafic rock that the person represents, either orally or in writing, as being suitable for surfacing, must provide to the recipient of the ultramafic rock a written receipt that displays all of the following information:

(A) The amount of ultramafic rock sold or supplied;

(B) The dates that the ultramafic rock was sampled and tested, or a statement that the material is exempt pursuant to subsection (f)(6);

(C) The asbestos content of the ultramafic rock, if tested; and

(D) The dates that the ultramafic rock was supplied or sold.

(2) *Noticing Requirements for Persons, Other than Producers, Who Sell Ultramafic Rock for Surfacing.* Any person, other than a producer, who sells, supplies, or offers for sale or supply ultramafic rock that the person represents, either orally or in writing, as being suitable for surfacing, must provide to the recipient of the ultramafic rock a written receipt that displays all of the following information:

(A) The amount of ultramafic rock sold or supplied;

(B) The dates that the ultramafic rock was sold or supplied; and

(C) Verification that the asbestos content of the ultramafic rock is less than 0.25 percent.

(3) *Noticing Requirements for Persons Who Sell Material for Nonsurfacing Applications.* Any person who sells, supplies, or offers for sale or supply any of the following materials:

(A) Serpentine or serpentine material,

(B) Ultramafic rock that has not been tested,

(C) Ultramafic rock that has been tested and found to have an asbestos content of 0.25 percent or greater; or

(D) Any material that has been tested and found to have an asbestos content of 0.25 percent or greater,

must provide with each sale or supply a written receipt that displays the following statement:

"WARNING!
This material may contain asbestos.

It is unlawful to use this material for surfacing or any application in which it would remain exposed and subject to possible disturbances.

Extreme care should be taken when handling this material to minimize the generation of dust."

(4) All of the written notices and statements required by this section must be displayed in such a manner that they are readily observable and clearly legible.

(d) Recordkeeping and Reporting Requirements

(1) *Recordkeeping Requirements for Persons who Use or Apply Ultramafic Rock for Surfacing:* Any person who uses or applies ultramafic rock (other than serpentine) for surfacing must retain any written receipt or other record verifying that the material is suitable for surfacing for a minimum of seven years from the date the material is used or applied. In addition, the person must have a copy of any receipt or record at all times during the actual application of the ultramafic rock for surfacing.

(2) *Recordkeeping Requirements for Persons who Transport Utramafic Rock for Surfacing:* Any person who transports ultramafic rock for surfacing must maintain a copy of any receipt or record required by subsection (c) with the ultramafic rock at all times during transport.

(3) *Recordkeeping Requirements for Persons who Sell or Supply Serpentine, Serpentine Material, or Ultramafic Rock:* Any person who sells, supplies, or offers for sale or supply serpentine, serpentine material or ultramafic rock must retain copies of all receipts, and any analytical test results from asbestos testing of the rock, for a minimum of seven years from the date of sale or supply.

(4) *Reporting Requirements:* Any receipts, records, or test results referred to in this section shall be provided to the Executive Officer for review upon request.

(e) Test Methods

(1) ARB Test Method 435 or an alternative asbestos bulk test method approved in writing by the Executive Officer of the Air Resources Board shall be used to determine compliance with this section. For the purposes of determining compliance with this section, references in ARB Test Method 435 to "serpentine aggregate" shall mean "aggregate material."

~~(5)~~(2) If ARB Test Method 435 or an alternative asbestos bulk test method approved in writing by the Executive Officer of the Air Resources Board has been used to perform two or more tests on any one volume of ~~serpentine~~ material, whether by the same or a different person, ~~the arithmetic average of these test results shall be used to determine the asbestos content of the serpentine~~ the test results indicating the greater amount of asbestos shall be used to determine the presence of asbestos in the material.

~~(c)~~(f) Exemptions.

(1) *Sand and Gravel Operations*: The provision of subdivisions (b)(2)(A), (b)(2)(B), (c) and (d) ~~through (b)(5)~~ shall not apply to aggregate extracted from sand and gravel operations.

(2) *Roads located at Surface Mining Operations*: The provisions of subdivision (b)~~(1)~~ shall not apply to roads located at ~~serpentine quarries, asbestos mines,~~ quarries or mines ~~located in serpentine deposits~~ that are in ultramafic rock units ~~or asbestos mines,~~ provided the material was obtained on site from the quarry or mine property.

~~(3) *Maintenance Operations on Existing Roads:* The provisions of subdivision (b)(1) shall not apply to maintenance operations on any existing road surfaces, or to the construction of new roads in serpentine deposits, as long as no additional asbestos-containing serpentine material is applied to the road surface.~~

(3) *Emergency Road Repairs*: The ~~air pollution control officer~~ Executive Officer may issue a temporary exemption from the requirements of subdivision (b)~~(1)~~ to an applicant who demonstrates that a road repair is necessary due to a landslide, flood, or other emergency and that the use of material other than serpentine or ultramafic rock is not feasible for this repair. The ~~air pollution control officer~~ Executive Officer shall specify the time during which such exemption shall be effective, provided that no exemption shall remain in effect longer than ~~six (6) months~~ 90 days.

(4) *Bituminous and Concrete Materials*: The provisions of subdivision (b)~~(1)~~, (c) and (d) shall not apply to serpentine, serpentine material, or ultramafic rock that is an integral part of the production of bituminous concrete, portland cement concrete, or construction of a bituminous surface, or other similar cemented materials.

(5) *Landfill Operations*: The provisions of subdivision (b)~~(1)~~ shall not apply to landfill operations other than the surfacing of public-access roads dedicated to use by vehicular traffic.

(6) *Geologic Assessment:* The Executive Officer may provide an exemption from subdivisions (b)(2)(B) and (c)(3) for aggregate composed of ultramafic rock other than serpentine provided a registered geologist has conducted an asbestos geologic assessment of the property from which the aggregate was obtained and determined that asbestos is not likely to be found in any of the ultramafic rock located on the property. The owner/operator shall provide a written copy of the asbestos geologic assessment to the Executive Officer for his consideration when providing this exemption.

(7) *Non-wearing surfaces*: The Executive Officer may provide an exemption from the provisions of subdivision (b) for the use of aggregate on non-wearing surfaces provided that the owner/operator can demonstrate that:

(A) There are no reasonably alternative aggregate available; and

(B) The surface is not located in an area zoned or identified in a land use plan for civic, residential, or commercial use;

(8) *Remote locations:* The Executive Officer may provide an exemption from the provisions of subdivision (b) for the use of aggregate on unpaved provided that:

(A) The own/operator can demonstrate that:

1. The surface is located in a remote location; and

2. There are no reasonably available alternative aggregate.

(B) In providing this exemption, the Executive Officer shall:

1. Consider the following information: county land use plans, the current use of the surrounding land, and the current and anticipated zoning designations;

2. Provide public notice and solicit comments for a 30-day period before providing this exemption; and

3. Require that any surface exempted pursuant to this subdivision be posted with a permanent sign alerting the public to potential asbestos exposures.

NOTE: Authority cited: Sections 39600, 39601, 39650, 39658, 39659, 39666, and 41511, Health and Safety code. Reference: Sections 39650, 39658, 39659, 39666, and 41511, Health and Safety Code..