State of California
AIR RESOURCES BOARD

Staff Report: Initial Statement of Reasons for the Proposed Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations

Executive Summary

I. INTRODUCTION

In 1986, the Air Resources Board (ARB or Board) identified asbestos as a toxic air contaminant (TAC) based on its classification as a known cancer causing pollutant. In that process, the Board found that no threshold exposure level could be identified below which adverse health effects would not be expected.

Last year the Board approved amendments to an airborne toxic control measure (ATCM) that was originally adopted in 1990. This amended ATCM reduced the allowable asbestos content in materials used for surfacing applications from five percent to 0.25 percent. At that time, staff advised the Board that we would be returning with a complementary ATCM addressing asbestos emissions from construction, grading, quarrying, and surface mining operations. Air monitoring information, emission estimates using published emission factors, and site visits indicate that construction, grading, quarrying, and surface mining in areas with naturally-occurring asbestos can result in potentially harmful asbestos exposure to the general public. Because of this, staff is proposing an Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations. The proposed regulation is designed to require work practices that will minimize emissions of asbestos-laden dust from operations that occur in areas where naturally-occurring asbestos is found or is likely to be found. If approved by the Board, the proposed ATCM will be sent to the local air pollution control or 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 ATCM.

II. BACKGROUND

1. Why is the staff proposing an ATCM for Construction, Grading, Quarrying, and Surface Mining?

Air monitoring conducted in California and Virginia has indicated that activities associated with construction, grading, quarrying, and surface mining in areas known to

have naturally-occurring asbestos can result in offsite asbestos concentrations in the air that represent a potential hazard to public health. Because of the variability of asbestos concentrations and dust producing activities, exposures are variable over time and from location to location. However, air monitoring has demonstrated that actions currently being taken in some locations to control dust emissions from these activities are effective in reducing asbestos emissions.

This proposed regulation would apply to construction, grading, quarrying, and surface mining operations in areas identified as geographic ultramafic rock units on maps developed by the Department of Conservation (DOC), Division of Mines and Geology. This is consistent with the approach used in the Asbestos ATCM for Surfacing Applications, which the Board approved last year. The DOC has identified ultramafic rock, and its metamorphic derivative serpentine, as the rock types more likely to contain asbestos. For some sources that would be subject to this ATCM, some dust mitigation measures are currently required for air quality or water quality protection. This proposed measure would promote statewide consistency in control requirements and compliance. The proposed ATCM is expected to apply to only one percent of the new construction in California and 25 of the approximately 800 mines and quarries in California.

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

The 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) in consideration of cost and risk. 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 an ATCM consistent with this State law mandate and believes that the proposed dust mitigation measures are technically feasible and will achieve the greatest reductions in exposure at the lowest cost of any approach identified for these source types.

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.

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

Two of the most common varieties of asbestos minerals that are found naturally in many parts of California are chrysotile and tremolite. The most common and abundant type is chrysotile. Tremolite also occurs but is found in much lower quantities than chrysotile. 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, broken, or otherwise disturbed, the asbestos is released to the air and can present a potential health risk. Asbestos released when asbestos-containing soil or rock is disturbed is commonly referred to as "naturally-occurring" asbestos.

III. PUBLIC OUTREACH

An open public process that involves all parties affected by the proposed ATCM is an important component of all ARB’s actions. Since 1998, ARB has maintained a website to facilitate the dissemination of up-to-date information on the issues and progress of the regulatory process for naturally-occurring asbestos at www.arb.ca.gov/toxics/asbestos.htm. Many useful advisories and informational items are available at this site, which has received an average of about 950 hits per month. The website has also been used to notify interested parties of meetings and make draft versions of the proposed ATCM available to the public.

ARB staff has held five public workshops to discuss the regulatory approach and draft regulatory language. ARB staff has also participated in four other public meetings and has had numerous meetings with individuals and small groups. ARB staff also meets on a regular basis with representatives of 13 state and federal agencies with an interest in regulation of naturally-occurring asbestos. ARB staff have coordinated with the districts through the California Air Pollution Control Officers Association. ARB staff have also met and talked with concerned citizens, especially citizens from the El Dorado County area.

Industry involvement has included several of the major industry associations with an interest in construction, the production of aggregate materials, mining, and timber production. These associations and individual quarry operators and their representatives have participated in the public workshops and have met with staff on an individual basis.

IV. EMISSIONS AND POTENTIAL HEALTH IMPACTS

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

Sources of naturally-occurring asbestos emissions include unpaved roads, driveways, and other surfaces covered with asbestos-containing serpentine or ultramafic rock; and construction, grading, quarrying, and surface mining activities in serpentine and ultramafic rock areas. The use of asbestos-containing material for surfacing was addressed in the Asbestos Airborne Toxic Control Measure for Surfacing

Applications, which the Board approved in July 2000. This measure prohibits the use of material for surfacing if it has an asbestos content greater than 0.25 percent. This proposal addresses emissions of naturally-occurring asbestos from construction, grading and quarrying activities.

2. How much asbestos is emitted from construction, grading, quarrying, and surface mining?

Quantitative assessments of the asbestos emissions from these activities 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 the size of the area being disturbed; the level of soil disturbance; the equipment being used including equipment size, speed, and mode of operation; the asbestos content of the material being disturbed; seasonal variations; and meteorological conditions. However, the ARB and others have done air monitoring in locations near these activities in areas where naturally-occurring asbestos was known to be present and found asbestos in the air at potentially harmful concentrations. It is a well-established fact that these activities result in emissions of fine particulate matter. When asbestos is present in soil and rock, it is reasonable to conclude that asbestos, like other particulate matter, will be emitted during such activities.

3. What are the potential health impacts from asbestos exposures related to construction, grading, quarrying, and surface mining?

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 six mineral forms, was identified by the ARB as a TAC in 1986 and is included on the United States Environmental Protection Agency's (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 (DHS, 1986).

The asbestos concentrations measured by air monitoring near construction projects, mines, and quarries represent a wide range of estimated potential risks from zero to over a thousand chances per million. 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 disturbed material, the magnitude of soil disturbance, the measures being taken to reduce dust emissions, and meteorological conditions. The exposure from some of the sources proposed for regulation tends to be episodic. Because the exposures in some locations may be episodic and not a true annual average concentration, the estimated cancer risks may be overstated. 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.

V. SUMMARY OF THE PROPOSED ATCM

1. What does the proposed ATCM require?

The proposed ATCM is designed to minimize the public's exposure to asbestos by requiring work practices that will minimize dust emissions from activities associated with construction, grading, quarrying and surface mining. The ATCM proposes different requirements for three sectors of the industries covered: construction and grading, road construction and maintenance, and quarrying and surface mining. These requirements apply to projects where the area to be disturbed is in an area specified on maps published by the DOC showing ultramafic rock units or where ultramafic rock, serpentine, or naturally-occurring asbestos is known to occur even if not shown on the maps.

In developing the ATCM, one of our goals was to evaluate current practices being used by these sources to minimize dust emissions. We have designed this proposed ATCM by reviewing the existing regulations and incorporating best management practices into the measure. A number of information sources formed the basis for this proposed regulation. Among them are visits to numerous quarries and construction sites, district dust control rules, district permits for sources subject to dust control rules, asbestos air monitoring data collected over many years, U.S. EPA studies of fugitive dust sources, and the emission factors published in the U.S. EPA Compilation of Air Pollutant Emissions Factors (AP-42). The requirements in the proposed regulation reflect the best dust mitigation measures currently being used on these sources. The adoption of this ATCM will help ensure that sources throughout the State are subject to a consistent set of requirements.

The requirements for construction projects are divided into requirements for projects that disturb one acre or less (small construction projects), and those that disturb more than one acre (large construction projects). The requirements for small construction projects specify wetting the soil area to be disturbed; wetting, covering, or stabilizing storage piles; limiting vehicle speeds to 15 miles per hour (MPH) or less; cleaning equipment before moving it off-site; and cleaning up visible track-out on the paved public road. These requirements would not apply to individuals working on their own property that are less than one acre.

Large construction projects are required to prepare a dust mitigation plan and receive approval from the district prior to start of the project. The plan must specify measures that will be taken to ensure that no visible dust crosses the property line and must address specific topics. The dust mitigation plan must address control of emissions from: track-out, disturbed surface areas, storage piles, on-site vehicle traffic, off-site transport of material, and earthmoving activities. The plan must also address

post construction stabilization and air monitoring (if required by the district). Table 1 shows control options for the topics to be addressed in the asbestos dust mitigation plan for large construction projects. Many of these requirements would already be carried out by such projects to minimize nuisance dust complaints and protect water quality.

Table 1. Dust Mitigation Options For Large Construction Projects

Emission Sources	Dust Mitigation Options
Track-out	• Gravel pad • Grizzly • Wheel wash system • Wet sweeping • HEPA filter vacuum
Disturbed surface areas and inactive storage piles	• Apply water • Maintain a crust • Apply dust suppressants or chemical stabilizers • Cover with tarps or vegetative cover • Install wind barriers
Traffic on unpaved on-site roads	• Restrict vehicles to 15 MPH or less • Keep roads adequately wetted • Apply dust suppressants • Cover with non-asbestos gravel
Active storage piles	• Keep wet • Cover with tarps
Earthmoving activities	• Pre-wet to depth of cuts • Suspend grading when winds are high • Apply water
Off-site transport of material	• Ensure trucks are maintained such that no spillage can occur from holes or other openings in cargo compartments • Ensure that loads are wet and tarped or wet and loaded with 6 inches of freeboard
Post-construction disturbed areas	• Establish and maintain a vegetative cover • Cover with at least 3 inches of non-asbestos material • Pave

The requirements for road construction and maintenance include notifying the district before starting the project, wetting the area to be disturbed, restricting traffic speed to 15 MPH or less, and preventing visible track-out on the paved public roadway. Again, many of these projects currently employ measures to control fugitive dust.

Quarries and surface mines must obtain district approval for an asbestos dust mitigation plan that ensures that emissions from processing equipment does not exceed either 10 percent or 15 percent opacity depending on the equipment. Also, the plan must ensure that visible dust does not pass over the property line. In addition to processing controls, the plan must include track-out control, control for on-site public

roads, and air monitoring (if required by the district). Table 2 shows control options for the topics to be addressed in the asbestos dust mitigation plan.

Table 2. Dust Mitigation Options for Quarries and Surface Mines

Emission Sources	Dust Mitigation Options
Material handling	• Spraybars on conveyors • Shrouds on drop points • Keep materials wet during excavation, grading, and truck loading
Track-out prevention and removal	• Gravel pad • Grizzly • Wheel wash system • 50 feet of paving • Wet sweeping • HEPA filter vacuum
On-site roads open to the public	• Pave with asphalt or concrete • Treat with a dust suppressant • Cover with non asbestos gravel
On-site traffic	• 15 MPH speed limit • Keep roads wetted
Active stock piles	• Keep wetted
Offsite transport of material	• Ensure trucks are maintained such that no spillage can occur from holes or other openings in cargo compartments • Ensure that loads are wet and tarped or wet and loaded with 6 inches of freeboard
Inactive stockpiles and exposed areas	• Keep wetted • Apply dust palliatives or suppressants • Cover with non-asbestos material

The proposed ATCM also contains sections addressing recordkeeping and reporting, test methods, timelines, and definitions.

2. What exemptions are allowed?

Potentially affected sources can obtain an exemption from the ATCM if a geologic evaluation determines that the area to be disturbed does not contain any serpentine or ultramafic rock. Agricultural operations and timber harvesting activities, except for the construction of roads and buildings, are exempted. Individuals engaged in construction and grading activities on property they own or rent are exempt if the area disturbed is one acre or less. This exemption is provided because staff believes the administrative burden on the local air districts, and the difficulty in enforcing the requirements for work practices on homeowners and renters, makes such an approach unworkable. The ARB plans to pursue an education and outreach program to inform homeowners and renters of the potential for exposure and what they can do to reduce their exposure. An exemption is provided for emergency road construction or repair. Road construction and maintenance activities can obtain an exemption if the activity is

more than a mile from any receptor. Sand and gravel operations working from an alluvial deposit can obtain an exemption from the dust mitigation measures for processing equipment if the material being processed is from an alluvial deposit.

3. What are the key unresolved issues?

While ARB staff have been able to resolve the majority of the concerns raised by the industry and concerned citizens, there are some issues on which we have not reached a consensus. Some people believe different types of asbestos should be regulated differently. This would not be consistent with State law and the guidance from the Office of Environmental Health Hazard Assessment on health effects analysis. Some companies fear that the districts will routinely require extensive air monitoring without a reasonable cause. We have been working with the air districts informally on this issue and do not expect the districts to respond in this way. Also, we will provide air monitoring guidance to the districts. Some organizations want to be allowed an exemption if they can demonstrate that there is no asbestos in an ultramafic rock area. We are working with the DOC on this issue to see if criteria and a methodology can be developed to reliably make such a determination. Staff does not believe that the necessary tools and techniques exist that would enable a geologist to make this determination. Additionally, implementing this option could result in significant costs to state and local government agencies, including the ARB and DOC.

VI. IMPACTS OF THE PROPOSED ATCM – HEALTH, ECONOMIC, ENVIRONMENTAL

1. Will the revisions reduce public health risk?

The proposed revisions will minimize health risks associated with the disturbance of asbestos-containing material in construction and grading projects, road construction and maintenance projects, and the excavation and processing of asbestos-containing material in quarries and surface mines. This proposed measure will ensure that best management practices for minimizing dust emissions from these activities are implemented when the soil or rock is disturbed. The proposed regulation will also result in a small reduction in the total emissions of particulate matter statewide. Another potential result of this proposed regulation would be reduced worker exposure.

2. What will the ATCM cost?

The increase in cost for small construction projects at existing homes is estimated to be less than $55 per project. Additional costs for new housing construction are estimated to range from $200 to $500 per lot. Costs may vary depending on dust management practices currently being used. Less than one percent of new housing construction is expected to be located in an area covered by the ATCM.

No significant additional costs to California Department of Transportation (Caltrans) or public works departments for road construction and maintenance are expected because these agencies routinely employ measures to minimize dust emissions during road construction.

There are about 800 mines and quarries in California that hold active permits under the Surface Mining and Reclamation Act. Of these, the staff has identified 25 that may incur costs to comply with the ATCM.

Costs to quarries will vary depending on which activities will need additional control and which options are available to sources. Small mines and quarries, that do not have on-site public roads and do not have roads that exit onto a paved public road, would incur the lowest costs. We estimate these quarries will incur first year costs of $500 to $700 and ongoing costs from $0 to $2,000 per year.

Quarries which must add process control, track-out control, and control for on-site public roads. Those that can not use their own gravel for on-site road control are expected to incur the highest costs. These costs range from $5,500 to $6,800 the first year depending on which of the available options they chose. Ongoing costs could range from $0 to $2,000 per year. These costs are not expected to be a significant burden. However, the ATCM will affect the same three quarry operations located in serpentine or ultramafic rock deposits that were identified as having potentially significant economic impacts from a prohibition of the use of asbestos-containing materials for surfacing (ARB, 2000). Several quarries currently are using effective dust mitigation measures for many of the activities addressed in the proposed regulation.

Overall, the proposed regulation is estimated to cost approximately $3 to $5 million over 5 years or an average of $600,000 to $1 million per year.

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

No significant adverse environmental impacts are expected, with the exception that staff has identified a potential for a very small increase of emissions from diesel-powered water trucks, a small increase in water use, and a small increase in electricity used to pump that additional water.

The ARB is committed to evaluating community impacts of proposed regulations, including environmental justice concerns. Because some communities experience higher exposures to toxic pollutants, it is a priority of the ARB to ensure that full protection is afforded to all Californians. The proposed ATCM is not expected to result in significant negative impacts in any community. The proposed ATCM is designed to reduce emissions of asbestos-laden dust in those geographic areas within ultramafic rock units. The result of the regulation will be reduced exposures to potential asbestos emissions for all communities in these areas, with associated lower potential health risks.

VII. NEXT STEPS

If the proposed ATCM is adopted, the local districts must implement and enforce the ATCM. 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. Sources would need to be in compliance by the date the district implemented and enforced the ATCM or by a compliance date specified in the alternative regulation.

The staff is working with the DOC 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 for the exemption clause in both the amended ATCM for surfacing applications and this ATCM for construction, grading, quarrying, and surface mining. ARB staff will also be working with the DOC to provide updated maps for critical areas likely to contain naturally-occurring asbestos.

VIII. RECOMMENDATION

The ARB staff recommends that the Board adopt the proposed Asbestos ATCM for Construction, Grading, Quarrying, and Surface Mining Operations. In recognition of the State law requirement for the ATCM to reflect BACT, the staff is proposing provisions that will require the use of best management practices for control of dust from construction, grading, quarrying and surface mining operations with the potential to emit asbestos to the air. Benefits from the proposed ATCM are reduced public exposures to asbestos emissions from activities that disturb the soil surface in areas that are known or likely to contain naturally-occurring asbestos. 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 the lowest level achievable to prevent endangerment to public health.