January 26. 2018

Marley Hart
Executive Officer
California Occupational Safety and Health Standards Board
2520 Venture Oaks Way, Suite 350
Sacramento, CA 95833

Subject: Supplementary Information for Petition File Number 568 – Petition for Amendments to Title 8 California Code of Regulations Section 1529

Dear Ms. Hart,

In a letter dated December 1, 2017, the NOA Regulations Task Group submitted a Petition for Amendments to Title 8 California Code of Regulations Section 1529 (Petition File Number 568). The purpose of this letter is to provide the Occupational Safety and Health Standards Board with supplementary data and information in support of the petition.

The information provided in this letter is derived from nearly seven years of experience on the Calaveras Dam Replacement Project (CDRP), the largest construction project involving Naturally Occurring Asbestos (NOA) ever undertaken in the United States. The project has an extremely large personal exposure monitoring and perimeter air monitoring data set that is supplemented by the analysis of particle morphology for air, rock and water samples. In addition, we have many years of experience conducting asbestos inspections and NOA investigations, writing specifications, overseeing asbestos removal and NOA excavation and grading activities, and conducting personal and perimeter air monitoring on public and private sector construction sites. Most of the data and examples are from the CDRP project, however, everything presented in this letter is directly transferable to earth disturbing projects of all types and sizes.

The potential health and safety threat to workers and the public by NOA is well established. As a response, the State of California developed several guidance documents and airborne toxic control measures that are designed to minimize NOA exposure to the public. The California Geological Survey (CGS) and the Department of Toxic Substances Control (DTSC) published guidance pertaining to the geological investigation of NOA. The California Air Resources Board (CARB) promulgated two asbestos Airborne Toxic Control Measures (ATCMs), one for surfacing applications at NOA sites, and the other for construction, grading, quarrying and surface mining operations. CARB also developed a test method for the identification and quantification of asbestos in rock and soil.

However, the Cal/OSHA standard does not offer clear guidance, requirements, or direction to assist employers and workers for their implementation when asbestos in construction issues are due to NOA. Our experience with NOA projects and interactions with consultants and

contractors indicate confusion with, and sometimes rejection of, the application of the current standard to NOA sites. An additional NOA subsection to the standard would, in our opinion, provide clarity, improve project specifications for bidding, save money by avoiding costly change orders, and ultimately, provide a framework to minimize exposure to asbestos resulting from disturbance of soil and rock where NOA is present.

We wish to emphasize the three most important points that provide the basis for the petition:

1. NOA is present in high concentrations within rocks and soils in California, has the potential for airborne emissions during earth disturbance activities, which could produce elevated exposures to workers on construction sites.
2. NOA projects are markedly different than building-related asbestos removal projects, and the current regulation does not provide adequate guidance to design and implement a project that provides a safe working environment on sites where NOA is disturbed.
3. Training that is specified for Competent Persons and workers do not address fundamental aspects of NOA sources (rocks and soils) and construction-related engineering controls or activities that could produce elevated exposures (such as heavy earth moving and drilling equipment).

Each of these three points are further discussed below.

Naturally Occurring Asbestos has the same morphology and chemistry as commercial asbestos, and can produce very high exposures to workers.

Cal/OSHA regulates chrysotile asbestos and five compositions of amphibole asbestos. These minerals are common constituents of rocks throughout California. In California, chrysotile is found in a rock called serpentinite (an ultramafic rock), whereas amphiboles are present in many types of igneous and metamorphic rocks. At the CDRP site, the asbestiform amphiboles are found in a rock called greenstone (metamorphosed basalt). Both rocks- serpentinite and greenstone, are a common constituent of the Franciscan metamorphic complex, a geological unit that ranges from Santa Barbara to north of the California-Oregon border.

Figure 1 shows scanning electron microscopy imagery of chrysotile asbestos in serpentinite, and amphibole asbestos in greenstone. Both of these rocks have a high potential to release airborne fibers. Concentrations of asbestos fibers released following pulverization of these rocks were measured to be 196.1 billion fibers per gram (BFG) of chrysotile in the site serpentinite, and 107.9 BFG of amphibole asbestos in the greenstone. Thus, when disturbed, the exposure potential of asbestos fibers in these rocks is very high.

The high release potential of chrysotile and amphibole in the source rocks produces high NOA emissions when disturbed, and ultimately, produces high exposures to workers. Figure 2 are histograms of frequency vs. exposure of all CDRP workers for chrysotile and amphibole asbestos. As can be seen, exposures above the PEL, particularly with amphibole asbestos, are highly elevated amongst a variety of construction related activities. Note that these samples were collected in compliance with the Cal/OSHA standard. Exposures would be expected to be significantly higher if no or poor dust control measures were in place.

Figure 3 is a table showing amphibole exposure by task. The highest exposures tend to be workers that are in the near field of the source being disturbed, including drillers and driller laborers; bulldozer operators and workers supplying water for dust control; and workers operating the compacting equipment.

The Current Regulation does not Adequately Address NOA on Construction Sites.

The current standard is focused on asbestos in buildings and building materials, and there are virtually no references to outdoor construction (excavation and grading), rock, soil, and NOA. This presents a challenge when trying to apply the standard to construction that involves excavation, grading, and other earth-disturbing activities. Preparation of the contractor specifications for the CDRP site required a line-by-line analysis of the standard, consultation with Cal/OSHA, and a detailed and thoughtful interpretation of how the standard should be implemented. The many contractors do not have the expertise on hand to interpret the standard, and are forced to make uninformed decisions that could be adverse to worker and public protection. In many cases, due to the lack of specificity and references to work practices on soil disturbance sites, many contractors feel that the standard does not apply at all.

To illustrate this issue, Figure 4 provides a pictorial comparison of topics that are required by the standard, and the approach used at the CDRP site and other projects that are not clearly specified in the current standard. On the left side are examples of the implementation of the standard on asbestos-containing material removal in buildings. On the right are comparable methods for compliance on NOA sites, but which are not referenced in the current standard. A new subsection for NOA would standardize the approach, and therefore, would help prevent non-compliance and adverse health and safety impacts to workers and the public.

Training Specified in the Standard is not sufficient for the Inspector or Competent Person to Recognize NOA Hazards in the Workplace.

The Cal/OSHA standard refers to the AHERA Model Accreditation Plan (MAP), or equivalency, for training as an Inspector or Competent Person. DOSH has implemented a certification program to assure that professionals are adequately trained and experienced. However, the Certified Asbestos Consultant (CAC) and Site Surveillance Technician (SST) certifications are required only for professional health and safety services relating to Asbestos Containing Construction Material (ACCM), and therefore, does not apply to NOA. Currently there is no approved training for NOA, and there are no applicable certification requirements by DOSH, OSHA, or EPA.

Consider:

- Those who complete the certification course for Asbestos Inspector learns about building materials, homogeneous areas, functional spaces, sampling protocol for manufactured products, and building systems, but are not informed of the location of NOA, geology and mineralogy, geologic structure, differenced between asbestiform habit and cleavage fragments, regulated vs. non-regulated amphiboles, incremental soil sampling methods, and test methods designed specifically for soil and rock.

- Those who take the Contractor Supervisor course learn about building systems and hazards related to asbestos removal, but are not trained to be a Competent Person on excavation and grading sites. As is illustrated in Figure 4, the nature of the project site, type of equipment used, field dynamics, influence of weather, methods to define a Regulated Area, decontamination procedures, and many other aspects of NOA in field construction are not part of the training for a Competent Person.

On behalf of the NOA Regulations Task Group, we request that you consider this supplementary information and grant the petition to amend 8 CCR 1529 by authorizing an advisory committee. We wish to stress that the purpose of the amendment is to provide clarity and guidance for applying the standard to earth disturbing projects, and not to fundamentally change the Standard in full or in part. This amendment would provide a much higher level of awareness to employers and workers at NOA sites, and promote better work practices designed for the protection of worker health and safety.

The NOA Regulations Task Group wishes to thank, in particular, two of its members, Bradley G. Erskine, Ph.D., PG, CAC, NOA Compliance Manager, Calaveras Dam Replacement Project, Kleinfelder, and Dan Hernandez, MPH, CIH, NOA Supervisor, Calaveras Dam Replacement Project, Flatiron Construction, for their work in preparing this supplementary information for your consideration.

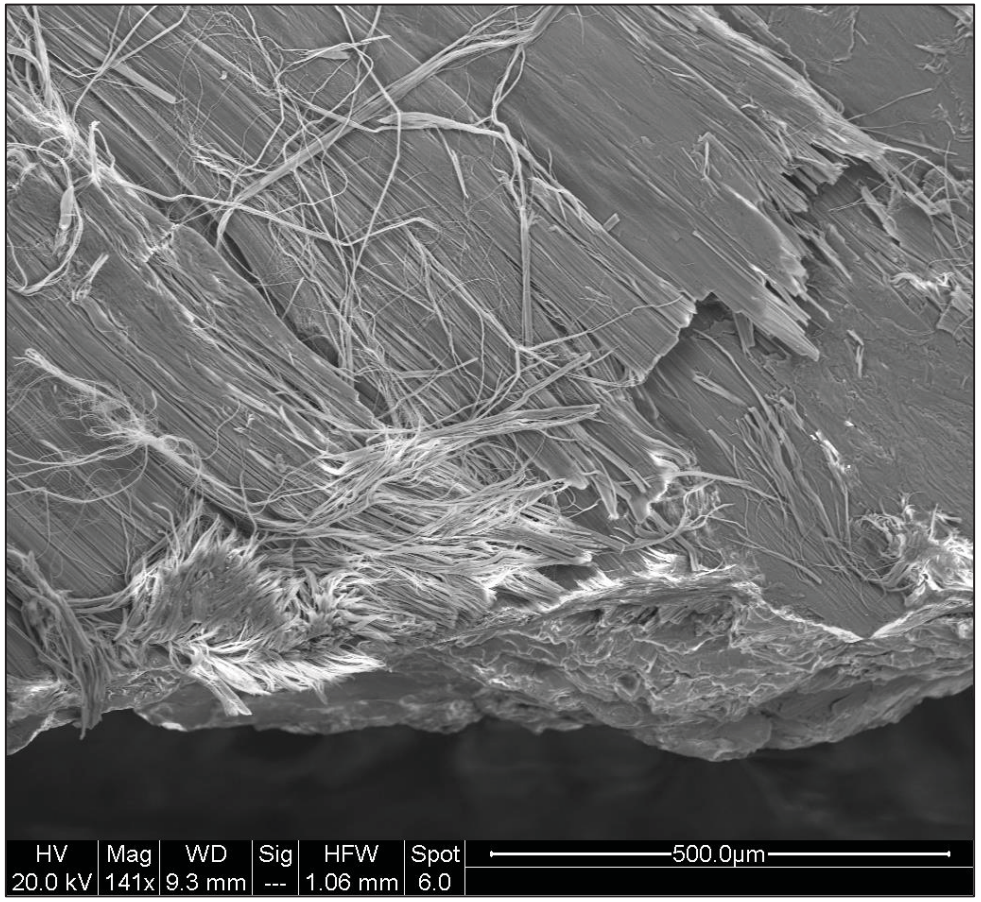
On behalf of the task group, please contact Pamela Murcell, as needed, by telephone at (916)712-4547, by email at kwa-sacramento@att.net, or by mail at P.O. Box 5573, El Dorado Hills, CA 95762. Thank you for your consideration.

Sincerely,

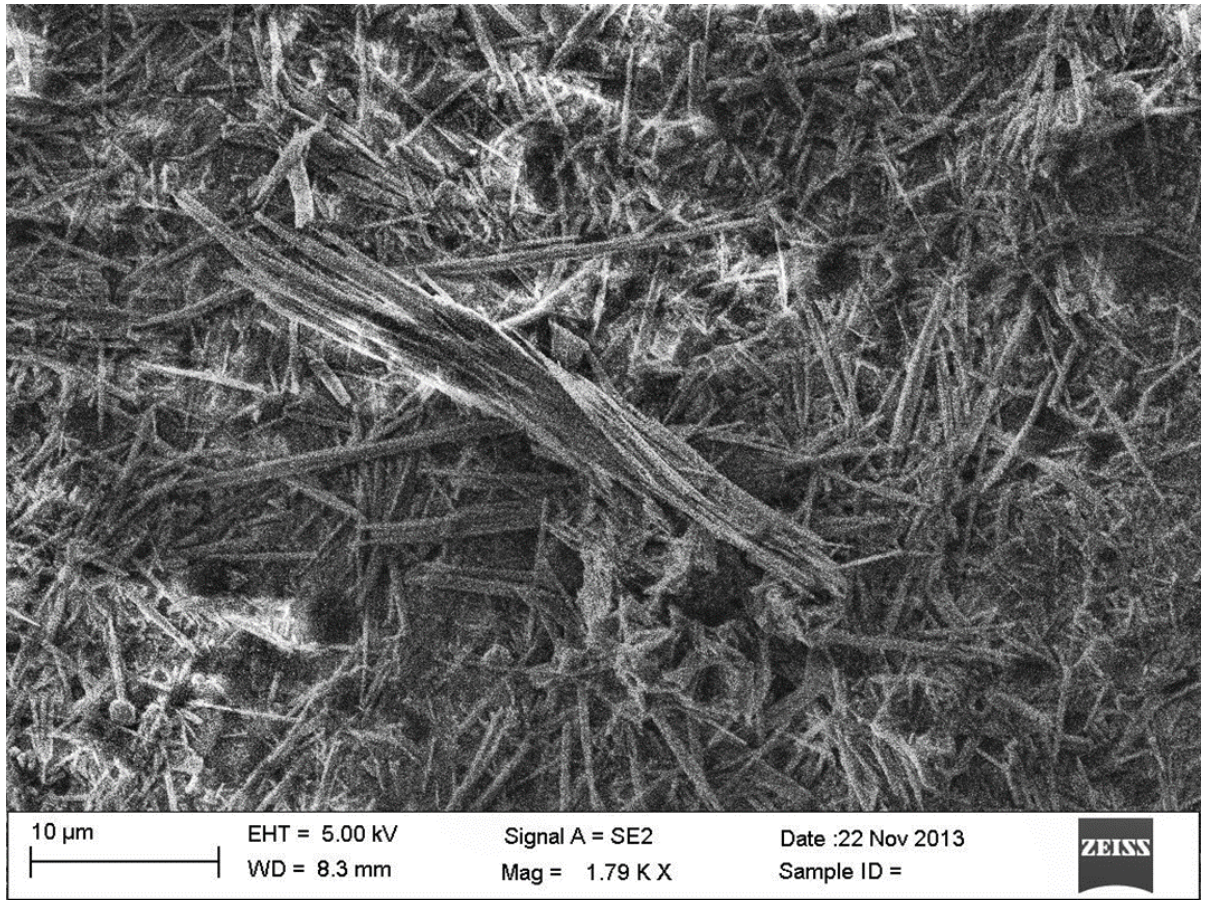
NOA Regulations Task Group

Attachments:
Figure 1: Photographs of Chrysotile and Amphibole Asbestos in its Natural State
Figure 2: Exposure Date for Chrysotile and Amphibole Asbestos
Figure 3: Amphibole Exposures by Task
Figure 4: Comparison of ACM Removal to NOA Disturbance- A Pictorial Representation

Figure 1
Photographs of Chrysotile and Amphibole Asbestos in its Natural State
(In Situ- Not Disturbed)



Scanning Electron Micrograph of chrysotile asbestos within serpentinite rock.

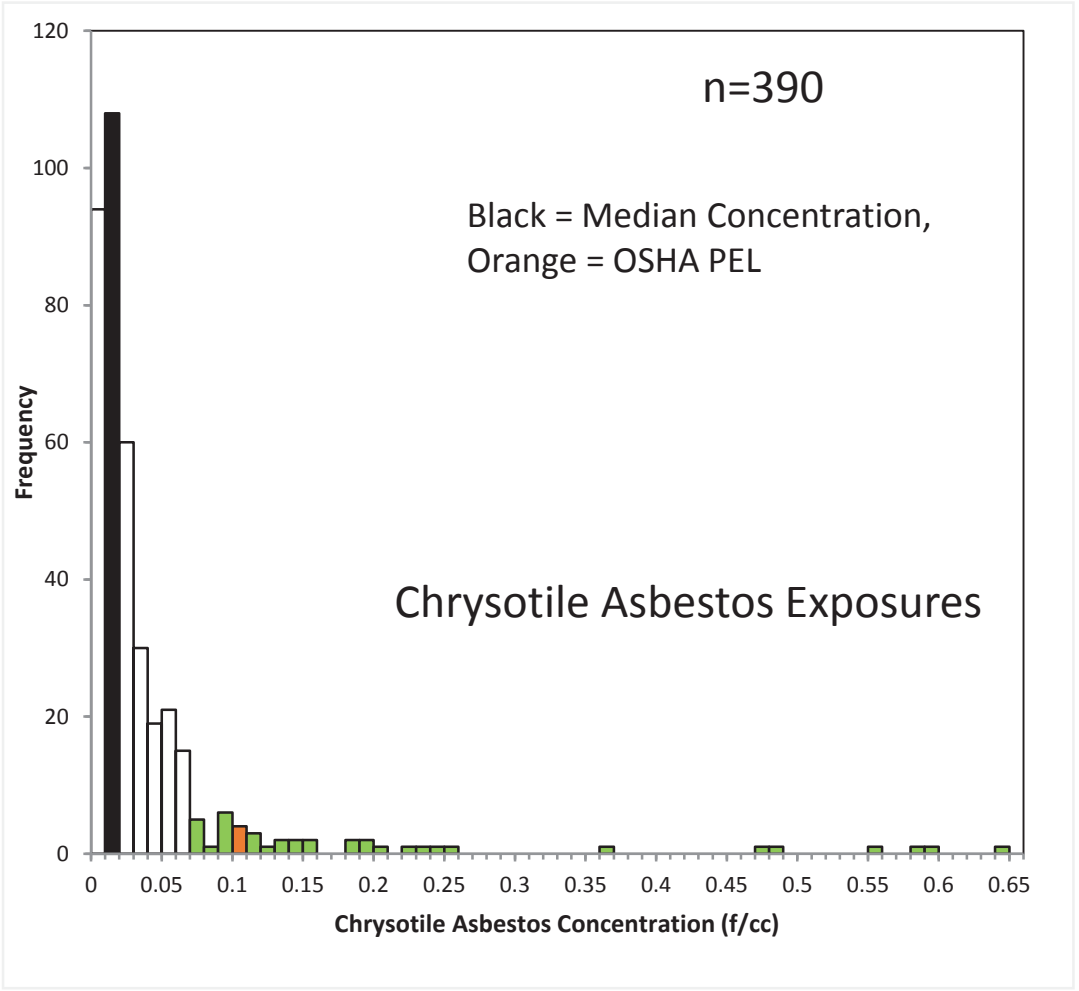


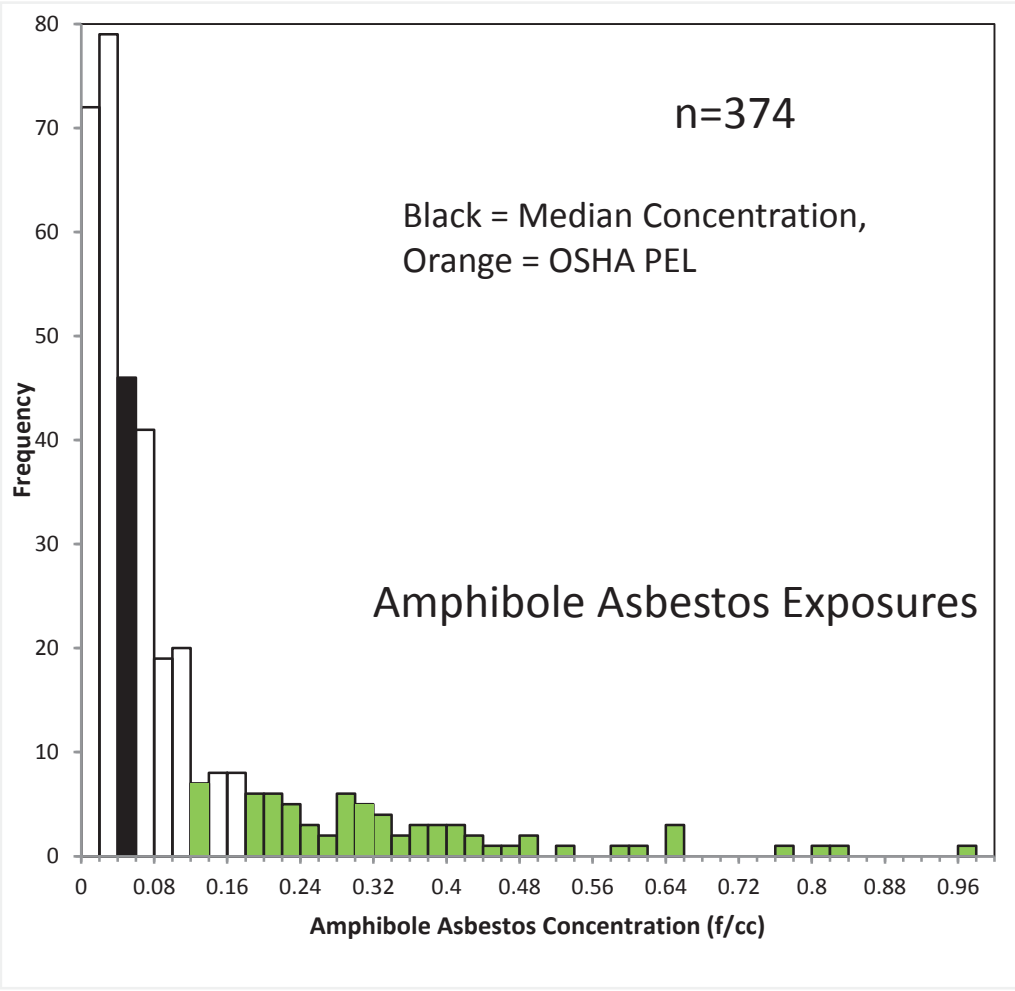
Scanning Electron Micrograph of amphibole asbestos in rock at the CDRP project.

Figure 2: Exposure Data of Chrysotile and Amphibole Asbestos

NIOSH 7402 Adjusted PCM Results

(Highest 15 results (>1 f/cc) removed for Visual Purposes)





Data collected by Dan Hernandez, MPH, CIH.
For Flatiron Construction.

Figure 3: Amphibole Exposures by Task
Rock and Soil Excavation Operations (January 2012 through September 21, 2016).

Tabulation of exposure results by Task during excavation operations. These are not 8-hour TWA's, rather, they represent the concentrations measured over a specific sampling period. These data are based on NIOSH 7400/7402 Adjusted. Data collected by Dan Hernandez, MPH, CIH for Flatiron Construction.

Equipment/Operation	N	Min f/cc	Max f/cc	Average f/cc	Median f/cc	Geomean f/cc
Bobcat/Front loader	2	0.017	0.043	0.030	0.030	0.027
Compactor	6	0.022	0.455	0.110	0.044	0.059
Dozer- Loadout	16	0.002	0.606	0.101	0.028	0.044
Driller	188	0.003	1.810	0.208	0.071	0.088
Driller Laborer	62	0.015	1.813	0.185	0.062	0.078
Dozer- Fill Placement	5	0.063	0.238	0.142	0.127	0.123
Excavator Operator	30	0.006	0.224	0.050	0.031	0.034
Hoeram Operator	42	0.011	0.647	0.082	0.037	0.045
Front Loader	4	0.007	0.129	0.040	0.012	0.018
Laborer	186	0.012	1.102	0.196	0.103	0.112
Rock Crusher	4	0.176	1.173	0.603	0.531	0.485
Rock Truck	24	0.001	0.156	0.053	0.044	0.034
Water Truck	9	0.014	0.099	0.040	0.032	0.032

Figure 4: Comparison of ACM Removal to NOA Disturbance

A Pictorial Representation

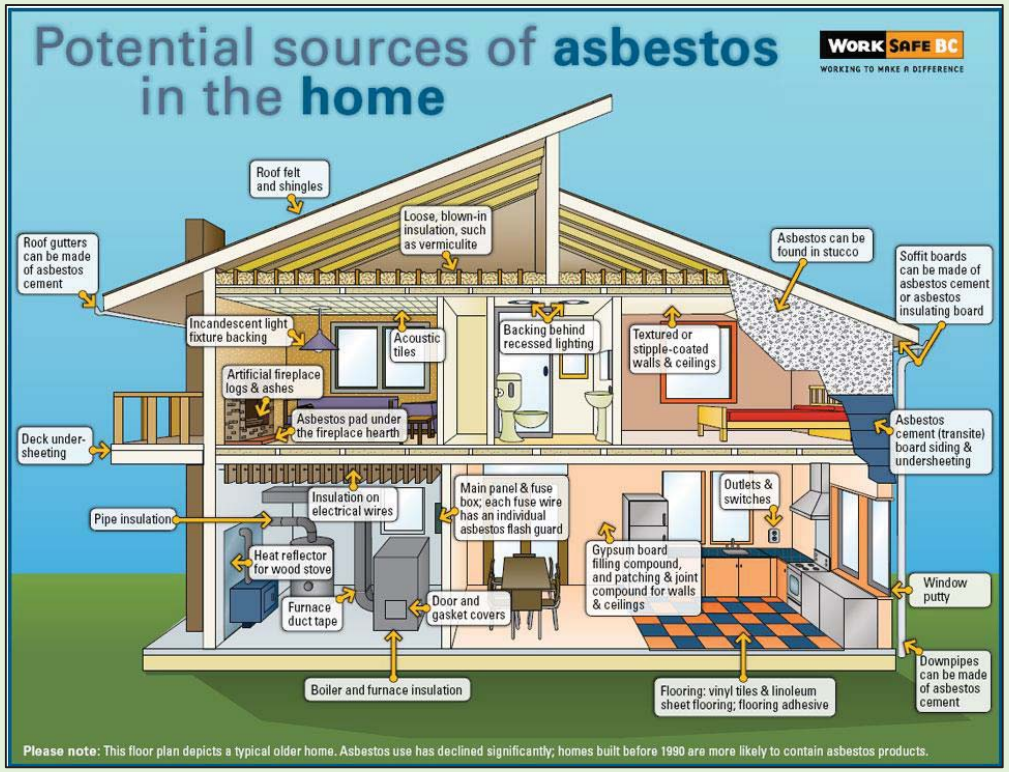
The following photographs illustrate some of the subjects in 8 CCR Section 1529 where mandatory actions and standard practices for ACM removal do not adequately translate to disturbance of NOA on construction sites.

On the left are photographs representing controls and practices commonly occurring on asbestos removal projects.

On the right are examples of controls and practices on NOA sites that are required to comply with the letter or spirit of the Cal/OSHA standard.

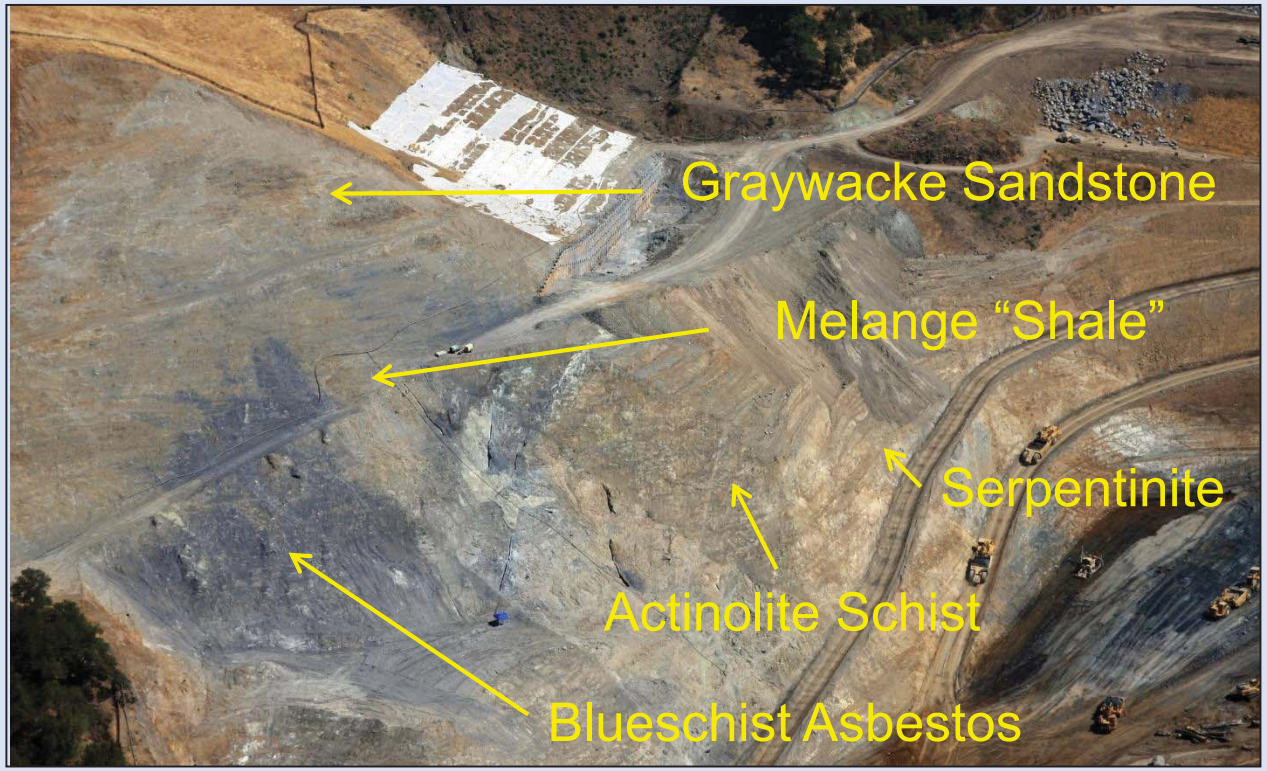
Location and Distribution of Asbestos

ACM Removal



ACM and ACCM are manufactured products placed in accordance with building plans. Their location and placement is relatively predictable.

NOA Disturbance



NOA is a naturally occurring geologic material (rock and soil), with a complex structure and mineralogical composition.

Site Location

ACM Removal

Most removal projects occur indoors where conditions are controlled.

NOA Disturbance

Outdoor construction projects have variable conditions, such as wind speed, wind direction, temperature, rainfall, and other factors that may affect the level of exposure to workers.

Classes of Work

ACM Removal

TSI or Surfacing ACM

Not TSI or Surfacing ACM

Repair and Maintenence

Custodial Activities

The four classes of work are assigned to work activities related to building materials, and are classified on the basis of potential for fiber release and exposure.

NOA Disturbance

Excavation of Loose Material

Moving Intact Material

Repair or Small Jobs

Inspections and Maintenance

Equivalent classes of work could be specified for disturbance of soil and rock, which could be based on relative potential for release and exposure.

Regulated Area

ACM Removal

Requirements for regulated areas include “critical barriers, drop cloths, and barrier or other isolation methods”. Posting generally occurs at a single point of ingress and egress.

NOA Disturbance

Outdoor NOA sites often have several points of ingress and egress (access and haul roads), which may routinely change in location or travel direction. The Regulated Area is posted at each point of ingress, and demarcated using exposure monitoring data.

Wet Methods

ACM Removal

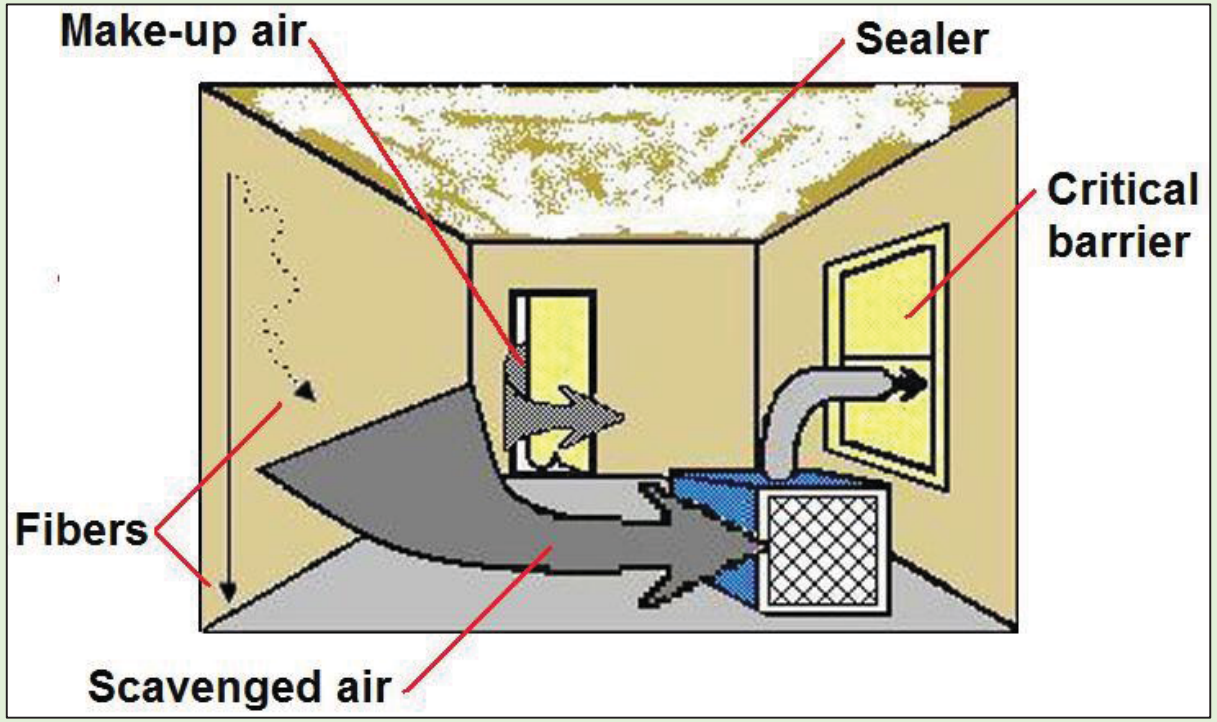
Wet methods in asbestos removal is generally achieved using a hand-held sprayer until the material is saturated. The material is then removed.

NOA Disturbance

NOA requires large amounts of water, with pre-wetting and continuous concurrent wetting to saturate soil to below the depth of soil excavation or bulldozing.

Fugitive Emission Control

ACM Removal



Standard techniques include the construction of a negative pressure enclosure where inside air is filtered and discharged to the outdoors.

NOA Disturbance

Emission capture techniques include the use of atomized sprays to impact fibers, and capture systems fitted on drill rigs and other equipment, such vacuum dust collection systems outfitted with HEPA filtration.

Housekeeping and Waste

ACM Removal

Waste is placed in leak tight labeled bags, and the work area cleaned and vacuumed to minimize re-suspension of fibers.

NOA Disturbance

NOA soil stockpiles are kept wet, covered, hydro-mulched, treated with a dust suppressant, or capped with non-NOA material to prevent re-suspension by wind or gusts from passing vehicles.

Hygiene Facilities

ACM Removal

Requirements for hygiene facilities are designed for building interiors. According to the Cal/OSHA Standard, “The decontamination area shall consist of an equipment room, shower area, and clean room in series.”

NOA Disturbance

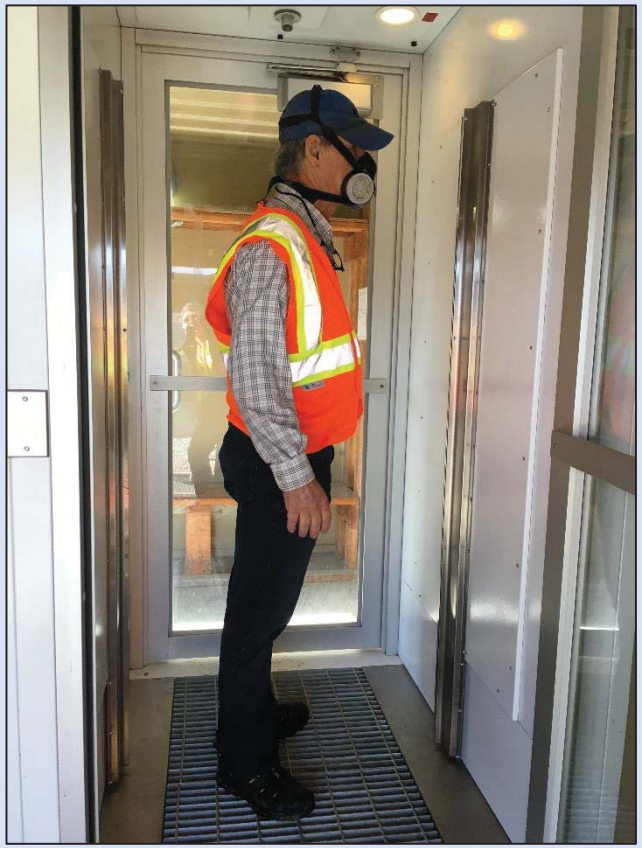
Hygiene facilities on NOA sites are best set up consistent with standards on Hazwoper sites. Decon units have decon water, roof for shade, HEPA filtered vacuums, Tyvek, and adjacent or nearby lunch areas.

Showers

ACM Removal

Portable showers are feasible on an asbestos removal project because the room is temperature controlled and relatively few workers require showering.

NOA Disturbance



Large construction projects may have more than a hundred workers on site, and standard showers are often not feasible. Alternative methods such as air-blade systems equipped with HEPA filtration allow efficient removal of residue dust following personal decon.

Equipment Decon

ACM Removal

Equipment requiring decontamination is of a size that can be cleaned using standard portable HEPA vacuums, brushes and wet-vacs.

NOA Disturbance

In addition to the use of HEPA vacuums and wet-vacs for basic equipment, large construction machinery requires power washing on an engineered pad with storm water control at the exit from the Regulated Area or NOA Controlled Area.

Trackout Prevention

ACM Removal

Vehicles generally do not enter a Regulated Area, and waste bags are cleaned during bag-out and loaded in containers and trucks in the clean zone. Trackout prevention of asbestos is generally not a necessary part of the project.

NOA Disturbance

Daily entry and exit of vehicles is common on NOA sites. Trackout prevention systems at exit points are necessary to prevent mud and dust from leaving the site.