



Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California

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Introduction

This map (*Plate.pdf*) and the accompanying digital datasets (*asbestos_sites.xls* and *Death_Valley_talc.xls*) provide information on 290 natural occurrences of asbestos in California, using descriptions found in the geologic literature. This report allows the user to examine the distribution and geologic characteristics of the reported asbestos occurrences in California. Data on location, mineralogy, geology, and relevant literature for each asbestos site are provided in the digital files. The reported natural occurrences of asbestos in California include 25 former asbestos mines, 72 former asbestos exploration prospects, 138 other sites with described asbestos mineralization, and 55 talc deposits in the southern Death Valley region (trace amounts of asbestos minerals are intergrown with the talc in these deposits, which are listed in *Death_Valley_talc.xls*). In addition, this report includes a dataset of sites where amphibole(s) was described as fibrous in the geologic literature (*fibrous_amphiboles.xls*). Although amphibole "asbestos" was not specifically mentioned at these sites, the occurrence of fibrous amphiboles indicates geologic settings with the potential to host asbestos.

This report is part of an ongoing study by the U.S. Geological Survey (USGS) to identify and map reported natural occurrences of asbestos in the United States, which thus far includes reports of similar format for the Eastern United States (Van Gosen, 2005), the Central United States (Van Gosen, 2006), the Rocky Mountain States (Van Gosen, 2007), the Southwestern United States (Van Gosen, 2008), and the Pacific Northwest States of Oregon and Washington (Van Gosen, 2010). These reports provide Federal, State, and local government agencies and other stakeholders with geologic information on natural occurrences of asbestos.

The file *asbestos_sites.xls* was compiled through a systematic search of the published geologic literature. The search did not include unpublished documents, such as consulting or company reports. Although this asbestos dataset represents an extensive study of published literature, it should not be construed as the complete list. An asbestos site was included only when the literature specifically mentioned asbestos and (or) described the commonly recognized asbestos minerals as occurring in the asbestiform crystal habit. No attempt was made to infer the presence of asbestos if asbestos was not explicitly described. Only a small percentage of the sites were visited or sampled during this study.

For descriptions of the occurrences, the user should refer to references cited in *asbestos_sites.xls* for each asbestos-site entry. Asbestos occurrences were described from outcrop exposures or in rock exposed by exploration and mining operations. Note that these site descriptions related to the time of each report's publication. Sites may have been subsequently modified by human activities since their description. For example, site remediation may have occurred since the source literature description.

In some instances, an occurrence of asbestos could not be included in the digital dataset, because the description of the site's location was too vague. Examples are discussed in the accompanying report (*Pamphlet.pdf*).

Note: The accompanying report (*Pamphlet.pdf*) contains discussion on these topics:

- What is Asbestos?
- Defining Asbestos
- Health Effects and Regulation of Asbestos
- Natural Occurrences of Asbestos in California
- California Asbestos Regulations
- California Asbestos Occurrences
- The Geology of Asbestos in California
- Asbestos-Bearing Talc Deposits of the Southern Death Valley Region
- Fibrous Amphiboles in California
- History of Asbestos Discovery and Mining in California
- Studies by the California Geological Survey of Natural Occurrences of Asbestos in California

Digital Datasets

The report dataset *asbestos_sites.xls* summarizes information found in geologic references examined by the authors. The entries in the database are sorted by county and ascending order of latitude (south to north). The dataset includes these data fields:

State
"CA" indicates that the site occurs in California.

County
Name of the county in which the site is located.

Historic site name as reported
The name of the former asbestos mine, former asbestos prospect, or reported occurrence, matching the nomenclature used in the source literature.

Development
This field indicates whether the asbestos site represents a former asbestos mine, former prospect, or an occurrence. "Past producer" indicates that the deposit was mined and produced asbestos ore for commercial uses sometime in the past. "Past prospect" indicates that the asbestos deposit was once prospected (evaluated) for possible commercial use, typically by trenching and (or) drilling, but the deposit was not further developed. "Occurrence" indicates that asbestos was reported at this site. The occurrence category includes (1) sites where asbestos-bearing rock is described in a geologic map or report; and (2) asbestos noted as an accessory mineral or vein deposit within another type of mineral deposit.

Latitude

The latitude of the site's location in decimal degrees, measured using the North American Datum of 1927. The number of significant figures following the decimal point indicates the believed accuracy of the location: (1) two significant figures (for example, 44.03) indicate an approximate location based on a general description; (2) three significant figures (for example, 44.094) indicate a fairly accurate location based on a detailed description or location shown on a small-scale map (1:50,000 scale or smaller); and (3) four significant figures (for example, 42.5586) indicate a precise location based on a detailed description or a location shown on a large-scale map (1:24,000 scale or larger).

Longitude

Longitude was calculated in the same manner as latitude. *Asbestiform mineral(s) reported*
This field identifies the type of asbestos present as described in the source literature.

Associated minerals reported

Minerals mentioned in association with the asbestos, as they were described in the source literature. The order in which each mineral is listed does not necessarily indicate its relative abundance in the deposit, but rather its order of mention in the source report.

Host rock(s) reported

The host rock type(s) for the asbestos is (are) listed when available as described in the source literature.

References

The references used to compile the site information are listed in this field. The full reference citations are provided in the accompanying digital files *References.pdf* and *References.xls*.

A second dataset, *Death_Valley_talc.xls*, lists 55 talc deposits of the southern Death Valley region in which trace amounts of amphibole asbestos are likely to be intergrown with the talc. The data fields in this database—*State*, *County*, *Historic site name as reported*, *Latitude*, *Longitude*, and *References*—are used in the same manner as those in the dataset *asbestos_sites.xls*.

A third dataset, *fibrous_amphiboles.xls*, lists 16 localities where fibrous amphiboles are described in the geologic literature.

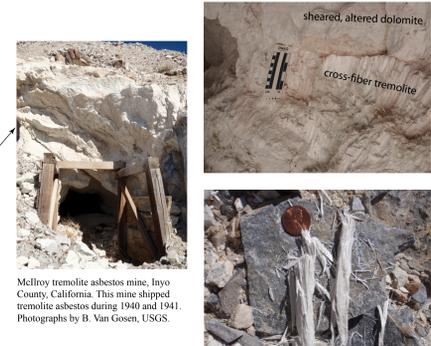
References Cited

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EXPLANATION

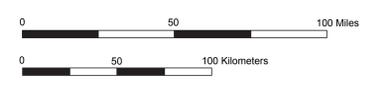
- Former asbestos mine (25 sites)
 - Former asbestos prospect (72 sites)
 - Reported asbestos occurrence (138 sites)
 - Asbestos-bearing talc deposit (55 sites)
 - Reported fibrous amphibole(s) (16 sites)
 - Ultramafic rock in outcrop (from Krevor and others, 2009)
- NAPA County name



McLroy tremolite asbestos mine, Inyo County, California. This mine shipped tremolite asbestos during 1940 and 1941. Photographs by B. Van Gosen, USGS.



Figure 1 of Report.pdf Photograph taken in 1998 of KCAC mine, Joe Pit, in the Coalinga asbestos district of San Benito and Fresno Counties, west-central California. This large chrysotile mine was the last asbestos operation in the United States; the mine closed in 2002. Photograph by California Geological Survey.



Projection: Lambert Conformal Conic
False Easting: 0.00000
False Northing: 0.00000
Central Meridian: -121.000000
Standard Parallel 1: 33.000000
Standard Parallel 2: 45.000000
Latitude of Origin: 0.000000
Datum: North American 1927