RI bureau of mines
report of investigations 5948

MOUNT EDDY AND SHASTA VIEW ASBESTOS DEPOSITS, SISKIYOU COUNTY, CALIF.

By Kevin Malone, W. T. Benson, and A. L. Engel

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF MINES

1962

Digitized by Google

Digitized by Google

MOUNT EDDY AND SHASTA VIEW ASBESTOS DEPOSITS, SISKIYOU COUNTY, CALIF.

By Kevin Malone, W. T. Benson, and A. L. Engel

* * * * * * * * * * * report of investigations 5948



UNITED STATES DEPARTMENT OF THE INTERIOR
Stewart L. Udall, Secretary

BUREAU OF MINES
Marling J. Ankeny, Director

Digitized by Google

This publication has been cataloged as follows:

Malone, Kevin

Mount Eddy and Shasta View asbestos deposits, Siskiyou County, Calif., by Kevin Malone, W. T. Benson, and A. L. Engel. [Washington] U. S. Dept. of the Interior, Bureau of Mines [1962]

ii, 29 p. illus., maps, tables. 27 cm. (U. S. Bureau of Mines, Report of investigations, 5948)

1. Asbestos. I. Title. II. Title: Shasta View asbestos deposit. (Series)

TN23.U7 no. 5948 622.06173

U. S. Dept. of the Int. Library

Digitized by Google

CONTENTS

	Page
Summary	1
Introduction	2
Acknowledgments	2
Location and ownership	2
History	3
Physical features	5
Geology	5
Description of the deposits	6
Fieldwork by the Bureau of Mines	6
Mineral dressing	11
Test procedures	12
Results	13
Industrial pilot plant tests	14
Costs of investigation	15
Appendix A. - Diamond drill hole logs	16
Appendix B. - Classification of asbestos fibers	27
Appendix C. - Prices of asbestos	29

ILLUSTRATIONS

Fig.		
1.	Location map, Mount Eddy and Shasta View deposits	3
2.	Topographic map, Mount Eddy deposit, showing hole locations	4
3.	Claim map, showing hole locations, Shasta View deposit	7

Digitized by Google

ILLUSTRATIONS (Con.)

Fig.		Page
4.	Vertical section, hole No. 1, Mount Eddy deposit....	8
5.	Vertical section, hole No. 2, Mount Eddy deposit....	8
6.	Vertical section, hole No. 3, Mount Eddy deposit....	9
7.	Vertical section, hole No. 4, Mount Eddy deposit....	9
8.	Vertical section, hole No. 1, Shasta View deposit...	10
9.	Vertical section, hole No. 2, Shasta View deposit...	10

TABLES

1.	Brunton and Tro-Pari readings of bearings and inclinations of two drill holes.....	11
2.	Diamond drill footage and recovery.....	11
3.	Footage drilled and core recovery by hole sizes.....	11
4.	Mineral dressing results.....	14
5.	Results of mill tests.....	15
6.	Summary of costs.....	15
A-1.	Mount Eddy deposits, hole ME-1, footage, recoveries, and formation.....	16
A-2.	Mount Eddy deposits, hole ME-2, footage, recoveries, and formation.....	19
A-3.	Mount Eddy deposits, hole ME-3, footage, recoveries, and formation.....	21
A-4.	Mount Eddy deposits, hole ME-4, footage, recoveries, and formation.....	23
A-5.	Shasta View deposits, hole SV-1, footage, recoveries, and formation.....	25
A-6.	Shasta View deposits, hole SV-2, footage, recoveries, and formation.....	26
B-1.	Guaranteed minimum shipping test, Canadian standard testing machine.....	27

Digitized by Google

MOUNT EDDY AND SHASTA VIEW ASBESTOS DEPOSITS, SISKIYOU COUNTY, CALIF.[1]

by

Kevin Malone,[2] W. T. Benson,[3] and A. L. Engel[4]

SUMMARY

Chrysotile asbestos occurs in many counties in California, and a small production had been reported at times, but development of deposits had been disappointing. A reconnaissance survey by the Bureau of Mines indicated that several deposits in the serpentine belt in Shasta, Trinity, and Siskiyou Counties might contain enough asbestos of filler grade to supply the growing demand on the west coast. Accordingly from 1956 to 1958 parts of the Mount Eddy and Shasta View deposits were investigated by trenching and diamond drilling to determine their potential.

The work comprised construction of roads, bulldozer trenching, excavation of areas for diamond drilling, sampling, and mapping. The trenches were excavated to expose the surface extent of some of the asbestos-bearing areas. To determine the downward continuation of asbestos-bearing sections and to secure samples for test purposes, six diamond drill holes, totaling 1,738 linear feet, were drilled in two selected areas. The trenching and core-drilling indicated that the asbestos-bearing material occurs as ribs and lenses of varying thicknesses in a broad belt of serpentine, about 600 feet wide and several miles long.

Industrial pilot plant tests on three composite core samples from the Mount Eddy deposits revealed an asbestos fiber low in iron content and strength compared with Canadian chrysotile. The fibers were found to be very short, and the percentage of recoverable asbestos was lower than at existing commercial operations. There appears to be little possibility of using the Mount Eddy asbestos in shingles and paper products, but there were indications that the material might be useful for certain filler applications. The

[1]Work on manuscript completed June 1961.
[2]Physical scientist, Alaska Office of Mineral Resources, Bureau of Mines, Juneau, Alaska.
[3]Mining engineer, Reno Field Office, Division of Mineral Resources, Bureau of Mines, Reno, Nev.
[4]Metallurgist, Reno Metallurgy Research Center, Bureau of Mines, Reno, Nev.

Digitized by Google

favorable freight differential to west coast markets compared with rates from producing sources might offer some incentive in conducting more detailed studies in the area.

Samples of surface material from both deposits as well as cores from Mount Eddy Holes 1 and 2 were treated in the laboratory to develop a procedure for recovering the very short fiber. A wet-scrubbing procedure was used on the ungradable granular residues to determine the quantity of very short fiber that might be obtained by further processing. Results were not comparable to the corresponding Canadian grades because of the high recovery of very short fibers resulting from repeated scrubbings and cleaning.

INTRODUCTION

The Bureau of Mines made a reconnaissance survey of the asbestos deposits in the serpentine belt of northern California during 1956 and 1957.[5] From this survey, the Mount Eddy and Shasta View deposits, about 6 miles southeast of Weed, Siskiyou County, Calif., were selected for more detailed examination by bulldozer trenching and core-drilling.

The country rock on both properties is peridotite, which has been altered to serpentine in areas of considerable size. Intrusive diorite and pyroxenite dikes cut the serpentine in the mineralized sections. Cross-fiber chrysotile asbestos occurs in the serpentine as veinlets, generally one-eighth of an inch or less wide but occasionally three-fourths of an inch or more wide. Closely spaced chrysotile veinlets, one-sixteenth of an inch or less wide frequently are found, but they constitute only a small part of the rock mass.

The investigations of the Mount Eddy and Shasta View deposits were started June 8, 1958. A total of 1,460 feet was core-drilled in four angle holes on the Mount Eddy deposit, which ranged from 245 to 468 feet in depth. Five shallow trenches were excavated, and two inclined holes totaling 278 feet in length were drilled on the Shasta View deposit. Fieldwork was concluded November 1, 1958.

ACKNOWLEDGMENTS

Acknowledgment is made to A. Q. Adams, lessee of both properties, for his whole-hearted cooperation and to Walter Hansen of the Ralph L. Smith Lumber Co., owners of the Mount Eddy deposit, for generously contributing information and maps of the Mount Eddy area.

LOCATION AND OWNERSHIP

The Mount Eddy and Shasta View deposits are in secs. 8 and 19, T. 41 N., R. 5 W., Mount Diablo Base and Meridian, Mount Eddy mining district, Siskiyou County, Calif. Weed is 5 air miles northeast and Mount Shasta, 10 miles

---

[5]Wiebelt, F. J., and Smith, M. C., A Reconnaissance of Asbestos Deposits in the Serpentine Belt of Northern California: Bureau of Mines Inf. Circ. 7860, 1957, pp. 27-32.

Digitized by Google

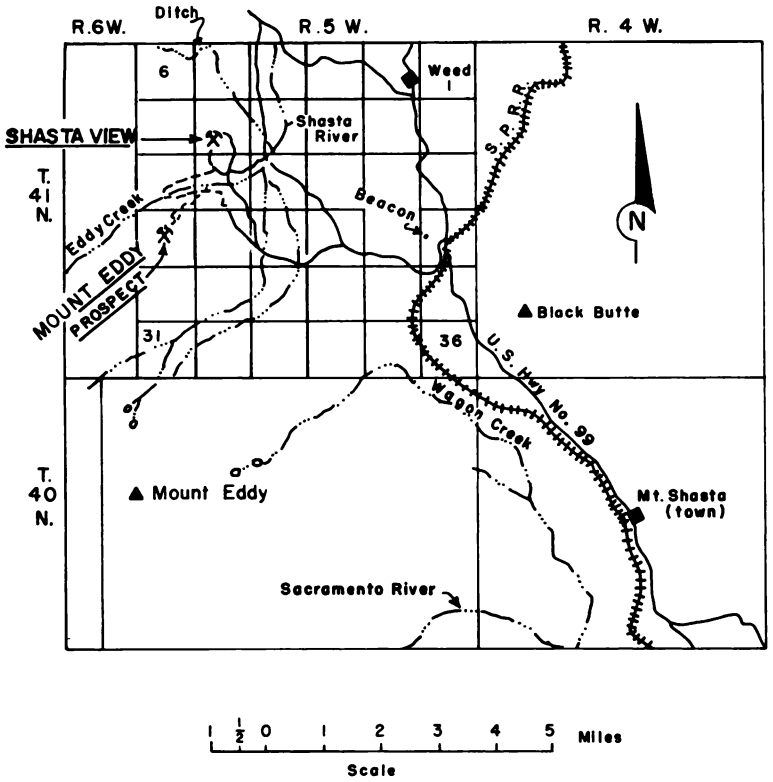


FIGURE 1. - Location Map, Mount Eddy and Shasta View Deposits.

southeast (fig. 1). Both towns are on U.S. Highway 99 and the Southern Pacific railroad and are supply centers for the surrounding area. Redding, the largest commercial town in northern California, is 63 miles south.

Section 19, embracing the Mount Eddy deposit, is owned by the Ralph L. Smith Lumber Co., Anderson, Calif. The Valley View, Shasta View Extension, Opal Summit, Opal Summit Extension No. 1, Gulch, Gulch Extension, After-Thought, After-Thought Extension, and Skyline (fig. 2) lode mining claims, in section 8 are owned by Norman Hartley. Both properties are leased by A.Q. Adams, Weed, Calif.

HISTORY

The Mount Eddy asbestos occurrences have been known for years. In the early 1950's, the Mount Shasta Mining Co. leased the property and attempted unsuccessfully to put it into production. This company removed surface overburden, exposing asbestos-bearing material for a distance of approximately 400 feet, and stockpiled 200 to 300 tons of hand-sorted asbestos-bearing material on a flat at the mouth of Eddy Creek canyon.

After leasing the property, A. Q. Adams built a new access road from the Eddy Creek side and further developed the deposit. Samples totaling several tons were milled in Globe, Ariz. and at the Taber mill, in Monticello, Napa County, Calif. In November 1958, milling machinery was accumulated near the Mount Eddy deposit for a proposed air-separation plant of 600-ton daily capacity.

George C. Taylor and W. H. Gassoway formerly held the Shasta View property, which was purchased in 1950 by Norman Hartley and leased in 1956 to A. Q. Adams, who did some prospecting on the Shasta View deposit but mostly worked on the Mount Eddy deposit.

Digitized by Google

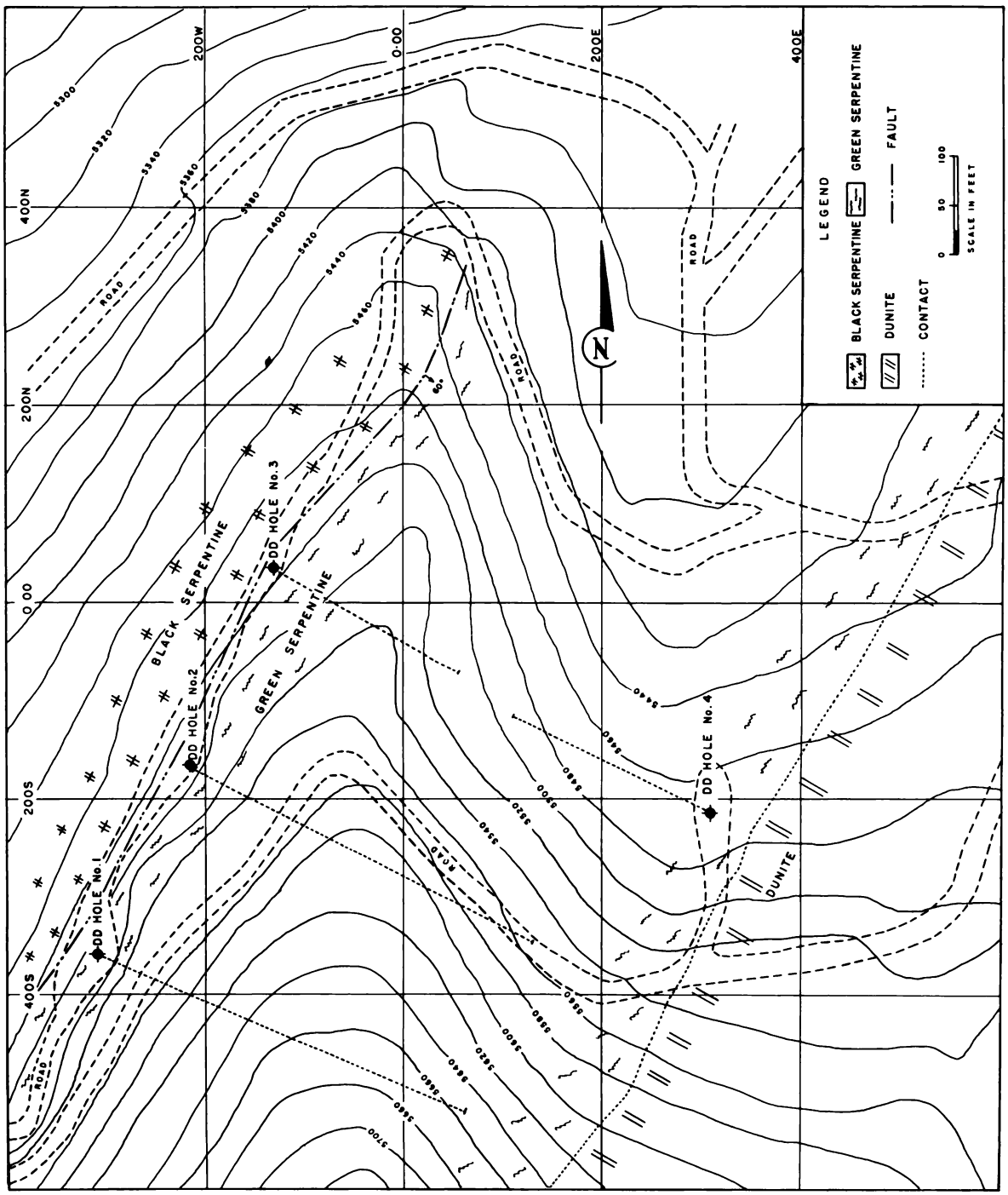


FIGURE 2. - Topographic Map, Mount Eddy Deposit, Showing Hole Locations.

Digitized by Google

The National Concrete Products Co. did some work on the Shasta View property in 1921-22, obtaining 10 tons of serpentine rock containing 25 percent cross-fiber chrysotile.[6]

PHYSICAL FEATURES

The Mount Eddy asbestos deposit is in an area of steep and rugged topography. The altitudes of the east-west-trending ridges surrounding the area exceed 7,000 feet. The northward-trending ridge, on which the deposit is located, ranges from 5,400 to 5,700 feet high.

The Shasta View deposit is on a low ridge in a sparsely timbered area about 4,000 feet above sea level.

The climate is typical of the mountainous areas of northwest California with moderately hot summers and cold winters. Annual precipitation has ranged from 12 to 35 inches. Usually the greater amount of moisture comes as snow, with occasional rains during the fall and spring months. The Mount Eddy property is inaccessible because of snow from December until late May or early June.

Eddy Creek and numerous small springs supply ample water for the Mount Eddy deposit. Water for the Shasta View deposit is available from a feeder stream to Eddy Creek, about one-half mile from the property and 500 feet lower in elevation.

Transmitted electric power is available about 2-1/2 to 3 miles northeast of the Mount Eddy deposit and about a mile southeast of the Shasta View deposit.

The Hartley ranch, in a narrow valley about 2 miles east of the deposits, is served by a county road. From the ranch area, access roads to the asbestos deposits were constructed by the owners and lessees.

GEOLOGY

The geologic map of California published in 1938 by the State of California Division of Mines shows irregular masses of ultrabasic intrusives of Jurassic age and large remnants of Jurassic intrusives in the general area of the deposits. The Mount Eddy and Shasta View deposits occur near the eastern edge of one of the irregular ultrabasic masses. The mass is elongated on a northeast-southwest axis and is about 25 miles long by 7 miles wide. The exposed rocks in the Mount Eddy and Shasta View areas are mainly pyroxenite, peridotite, dunite, and serpentine. A discontinuous dike 30 feet wide and striking N. 10° E. cuts the serpentine in the Mount Eddy pit. Smaller dikes are exposed elsewhere in the pit faces. Below and north of the pit, a narrow, fine-grained, basic dike of pyroxenite strikes N. 10° E. and dips 70° E. but does not show in other surface exposures; either this dike or rock of similar

[6]Work cited in footnote 5 (p. 2), p. 32.

Digitized by Google

texture was cut in holes ME-1 and ME-2. A calculated strike of N. 20° E. and a dip of 50° E. was obtained by assuming it to be the same dike.

Cross-fiber chrysotile asbestos occurs in serpentine and dunite both in a ribbon structure and in veinlets containing fiber up to three-fourths of an inch long. A considerable part of the fiber, one-eighth of an inch in length, has one or more transverse parting planes so that no great quantity of fiber in grades 5 and above can be recovered. Asbestos fiber in ribbon-like veinlets occurs frequently throughout the deposit but does not constitute an appreciable part of the rock mass. Field examination of the serpentine and dunite with a hand lens showed varying amounts of very short fibrous material in the rock ground mass. Photomicrographs and other laboratory tests were made to confirm this observation. Some ferro-magnesian minerals were present in small amounts, and extremely fine-grained magnetite occurred in small quantity interspersed in the asbestos fibers and as inclusions in the other minerals.

DESCRIPTION OF THE DEPOSITS

Core drilling on the Mount Eddy deposit indicated that the asbestos-bearing material occurs in a belt of serpentine, which is about 560 feet wide and strikes S. 30° W. The lateral extent has not been definitely determined, but surface cuts and core drilling show a strike length of about 1,000 feet. In this serpentine belt, chrysotile-bearing sections occur in two elliptical pods, 75 and 85 feet thick through the short axis and 200 to 400 feet long. A central rib or belt about 155 feet thick was tested by core drilling for a distance of 400 feet and to a depth of 165 feet.

There are two sets of asbestos veinlets. In the Mount Eddy deposit, one strikes N. 25° E. and dips steeply east; the other strikes N. 20° W. and dips east. Those striking N. 25° E. predominate. Random veinlets also occur. The northwest boundary of the mineralized zone is a well-defined contact between waxy, slickensided, black serpentine and green serpentine. The contact is well exposed at intervals for a strike length of 600 feet. It strikes N. 30° E. and dips 60° E., forming the footwall of the asbestos-bearing zone. Short, discontinuous basic dikes, identified as diorite, are exposed in the faces of the Mount Eddy pit and are porphyritic in texture. The best showings of asbestos occur adjacent to these dikes.

Additional work would be required on the Shasta View deposit to delineate and test the asbestos areas thoroughly. The limited trenching done and the two holes drilled did not reveal significant mineralization.

FIELDWORK BY THE BUREAU OF MINES

Roads to the properties were graded and made passable under Government contract by using a crawler-type bulldozer. On each property, drill stations were prepared, and on the Shasta View deposit, five shallow prospect trenches were excavated.

Digitized by Google

On the Mount Eddy property, 1,460 feet were drilled in four holes that ranged from 245 to 468 feet in length. Holes ME-1, ME-2, and ME-3 were drilled on 200-foot centers in a southeasterly direction at inclinations of -30°. Hole ME-3 was abandoned at 245 feet because of broken and caving ground. Hole ME-4, bearing N. 64° W., 299 feet long, was drilled at an inclination of -43°. (See figure 3 for location of drill holes and figures 4, 5, 6, and 7 for vertical sections.)

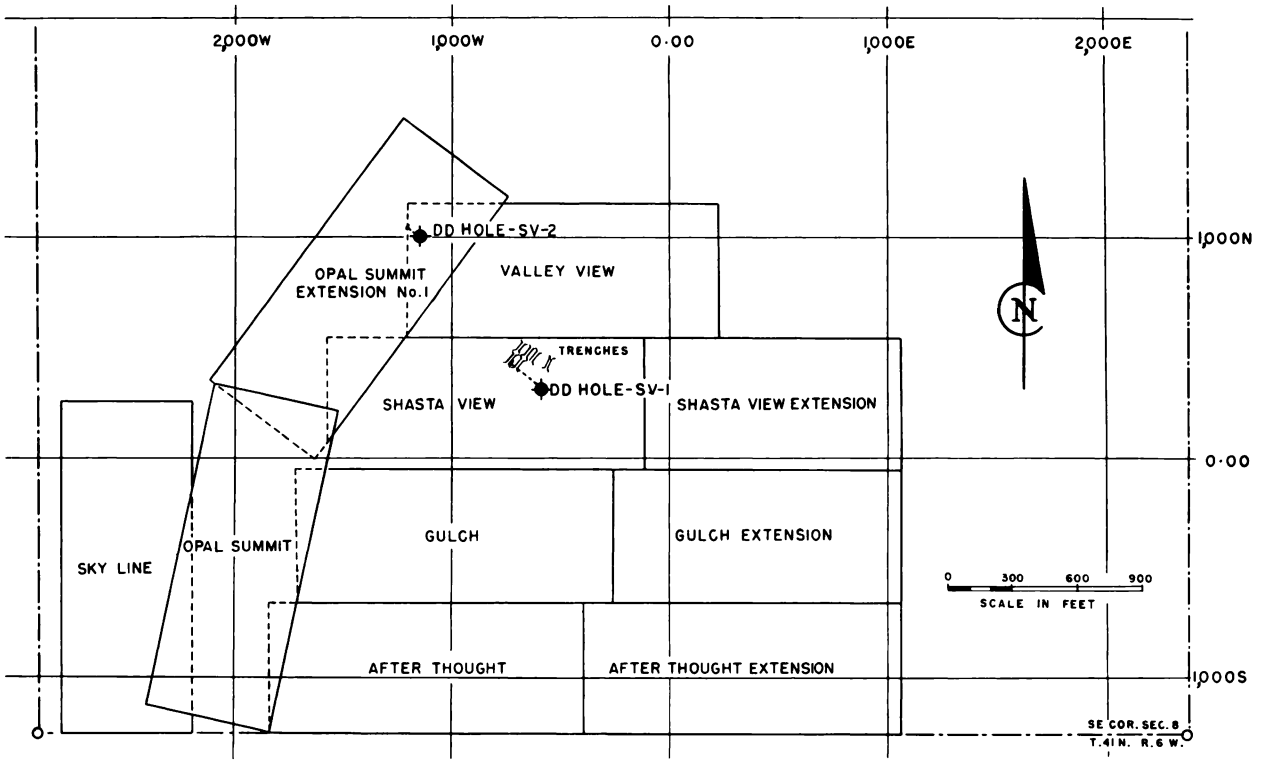


FIGURE 3. - Claim Map, Showing Hole Locations, Shasta View Deposit.

Two holes, which inclined -30°, and were 74 and 203 feet long, were drilled crosscutting the formations in a northwesterly direction on the Shasta View property. Figure 2 shows hole locations and figures 8 and 9 show vertical sections.

Both properties were surveyed by transit and stadia. Additional survey detail was obtained by using a Brunton compass.[7]

The bearing and inclination of holes were checked for drift with a Tro-Pari Bore-Hole surveying instrument. This surveying method cannot be used in caving or broken ground because the in-hole instrument may be lost. Results of Tro-Pari measurements in holes ME-1 and ME-4 are shown in table 1.

[7]Reference to specific makes or models of equipment is made to facilitate understanding and does not imply endorsement of such brands by the Bureau of Mines.

Digitized by Google

Published by AsbestosClaims.Law
asbestosclaims.law/library/10934/13

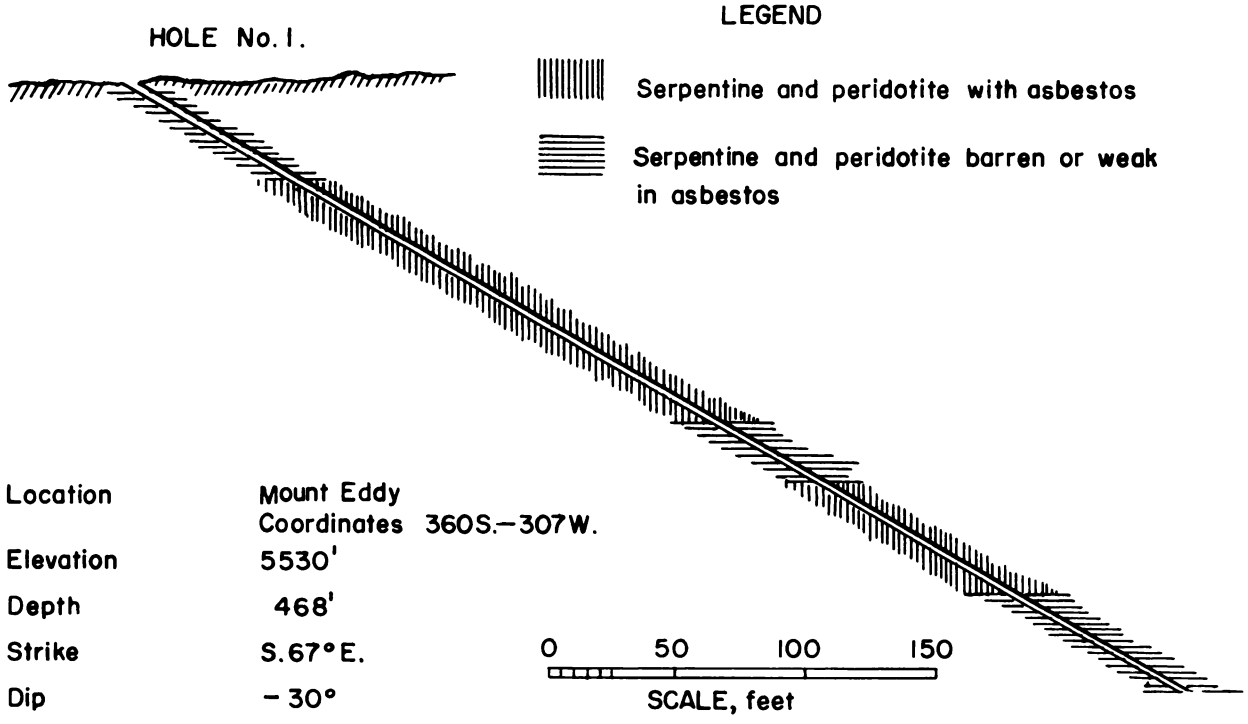


FIGURE 4. - Vertical Section, Hole No. 1, Mount Eddy Deposit.

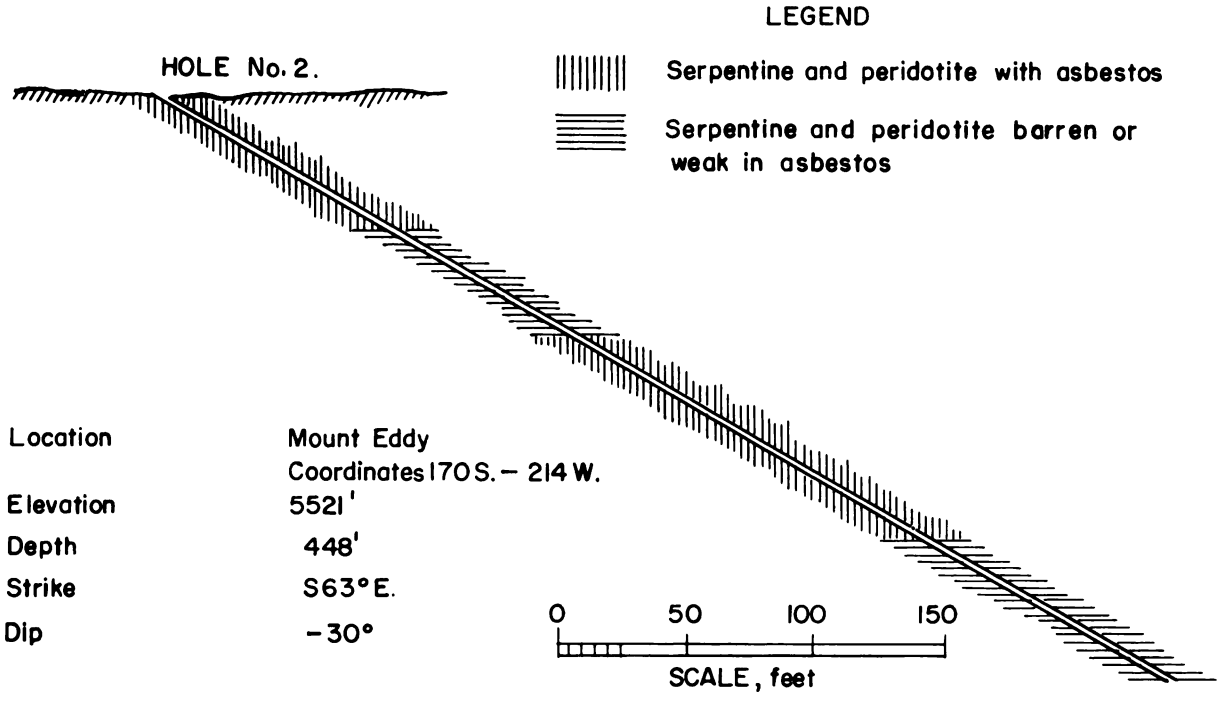


FIGURE 5. - Vertical Section, Hole No. 2, Mount Eddy Deposit.

Digitized by Google

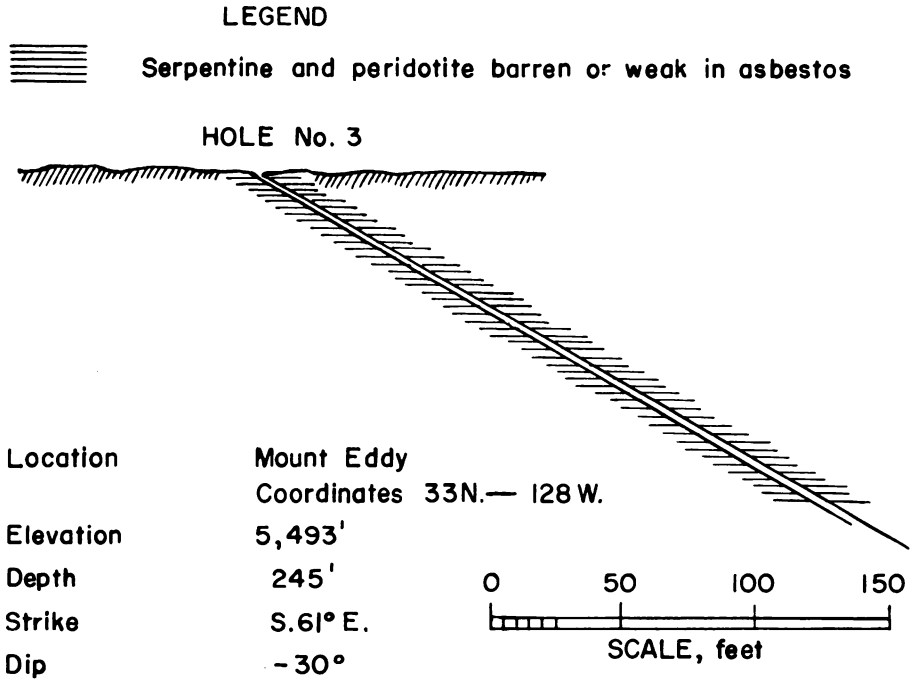


FIGURE 6. - Vertical Section, Hole No. 3, Mount Eddy Deposit.

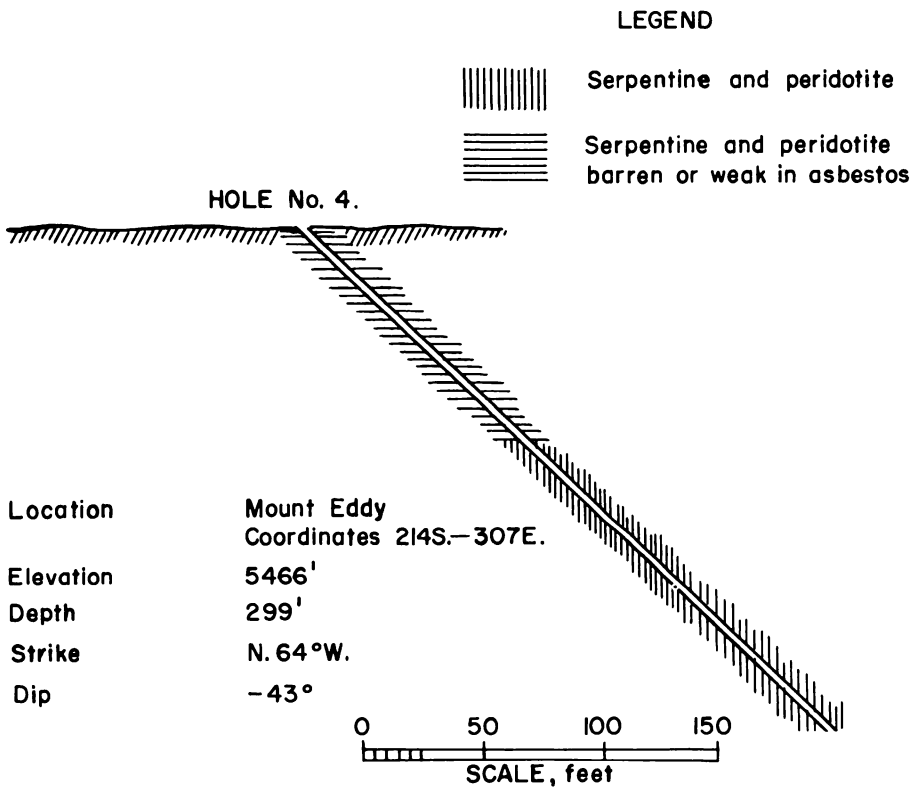


FIGURE 7. - Vertical Section, Hole No. 4, Mount Eddy Deposit.

Drilling was started July 23, 1958, and completed November 1, 1958. One drill was operated on a two-shift basis throughout the program, working a total of 159 shifts. Drilling was done under Government contract.

Table 2 shows statistics on footage, progress, and core recovery.

A skid-mounted machine with a capacity of 800 feet of AX rods was driven by a 4-cylinder industrial engine. It was equipped with a hydraulic feed, and the rate of feed was independent of the revolutions per minute. The engine speed controlled the revolutions per minute of the rods. A cable hoist threaded through a single sheave was used to raise and lower the rods.

A tripod, fashioned in the field from light poles and high enough to permit the handling of 20-foot rod sections, was used to raise and lower the tools.

Double tube, swivel-type (available in BX and AX

Digitized by Google

Published by AsbestosClaims.Law
asbestosclaims.law/library/10934/15

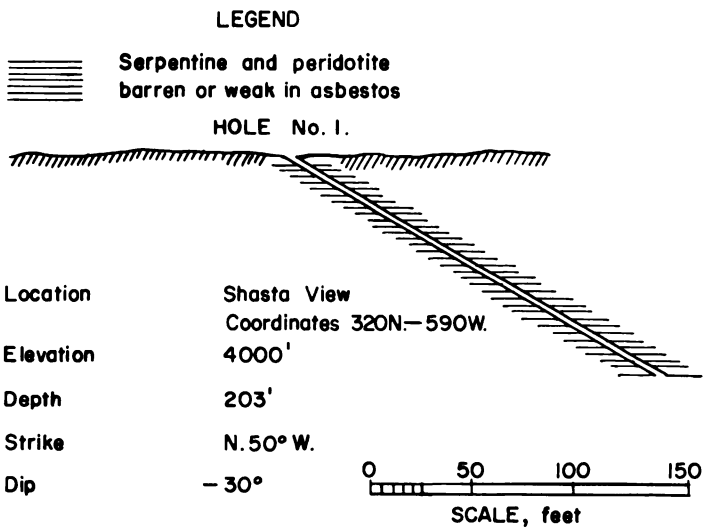


FIGURE 8. - Vertical Section, Hole No. 1, Shasta View Deposit.

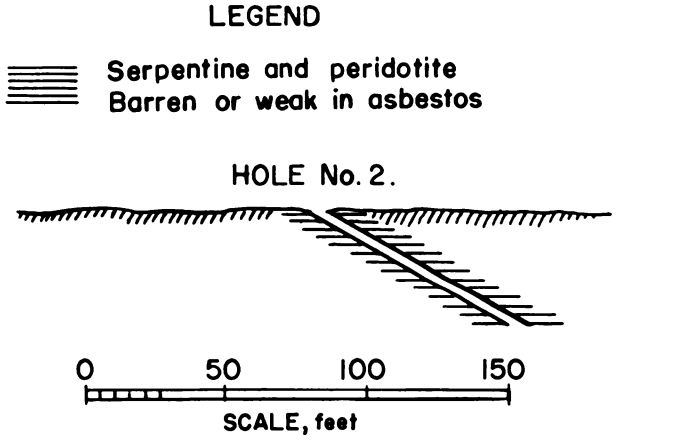


FIGURE 9. - Vertical Section, Hole No. 2, Shasta View Deposit.

sizes) and double tube, rigid-type (available in all sizes) core barrels were used. In general, holes were collared with NX size bit to various depths and finished with BX size. Sometimes, it was necessary to reduce to AX size to complete a hole. Footage drilled and core recovery for the various sizes are shown in table 3.

The core recovery for NX size was low because of weathered and broken ground in the upper parts of the holes.

Holes were cemented whenever necessary to obtain high water return and prevent caving. Calseal and Lumnite cements proved most effective in this ground. Total cemented footage was 198 feet, or 11.4 percent of the total drilling.

Drilling water for the Mount Eddy deposit was delivered from a small creek through 2,400 feet of 4-inch irrigation pipe and 500 feet of 1-1/2 inch plastic pipe under a head of 400 feet. On the Shasta View deposit, water for drilling was hauled by tank truck about 2 miles.

A Matson automatic sampler, developed in the Bureau of Mines, was used for collecting sludge samples.

Core was removed from the core barrel at 5-foot intervals unless conditions found in drilling the hole made removing the core at shorter intervals necessary. It was placed in a wooden trough and transferred to cardboard boxes with wooden blocks inserted at intervals corresponding to the depth of the hole. The cardboard boxes, which held 10 feet of core, were cheaper and lighter than wooden boxes and proved to be entirely satisfactory for transporting and storing cores. Core was picked up daily and stored in the field office until it could be shipped to the Reno laboratory for logging.

Digitized by Google

TABLE 1. - Brunton and Tro-Pari readings of bearings and inclinations of two drill holes

Hole	Instrument	Depth, feet	Bearing	Inclination, degrees
ME-1.....	Brunton	([1])	S. 67° E.	-30
	Tro-Pari	150	S. 67° E.	-28
	do.	300	S. 67° E.	([2])
	do.	450	S. 67° E.	-28
ME-4.....	Brunton	([1])	N. 64° W.	-43
	Tro-Pari	150	N. 62° W.	-37

[1]Collar.
[2]Lost.

TABLE 2. - Diamond drill footage and recovery

Deposit	Number of holes	Feet drilled	Drill shifts	Average feet per shift	Core recovery	
					Feet	Percent
Mount Eddy.....	4	1,460	137	10.66	1,144.0	78.4
Shasta View....	2	278	22	12.67	189.2	68.1

TABLE 3. - Footage drilled and core recovery by hole sizes

Hole size	Total feet	Core recovery	
		Feet	Percent
NX.....	193	66.6	34.5
BX.....	876	722.1	82.4
AX.....	669	544.5	91.4

The core for each interval was measured and recovery calculated. Geologic logging was done on a combination graphic and descriptive log. Rock types, structural features, and other pertinent data were recorded. Logs of the diamond drill holes are shown in appendix A.

The core from all holes were split, and one-half were retained in the original boxes for storage and possible future use. The other half were crushed, and selected parts were used for metallurgical testing. All reject material was bagged and saved.

MINERAL DRESSING

Bureau of Mines engineers obtained samples for mineral dressing during examinations of the Mount Eddy and Shasta View properties before drilling began. The Mount Eddy sample represented a stockpile of hand-sorted material and contained, in addition to gradable asbestos fiber, a large quantity of very short fiber in the rock matrix. The Shasta View sample was surface material, which contained no gradable fiber, but did contain a large quantity of very

Digitized by Google

short fiber. The treatment procedure, developed to recover the very short fiber asbestos in these samples, was subsequently used in treating two drill-core samples from the Mount Eddy deposit. The other two Mount Eddy drill cores and the Shasta View drill cores were not tested because the quantity of asbestos present was insignificant.

The demand in California for filler fibers, coupled with a high freight differential between a local source and foreign sources of asbestos, may provide a market for the very short fibers, which are below commonly accepted Canadian grades. These fibers can be recovered by mineral dressing from ores containing very short fibers in a texture like that of the samples treated.

A wet-scrubbing procedure was used on the ungradable granular residues to determine the quantity of very short fibers that might be obtained by further processing.

Test Procedures

Each sample was examined for gradable asbestos fiber to determine the degree of crushing required to liberate the coarsest fiber. The lump samples from the Mount Eddy stockpile and the Shasta View surface were crushed to pass a 1/2-inch screen, and enough parts for laboratory treatment were cut on a Jones splitter. The Mount Eddy drill core samples were already broken and required little further crushing. After crushing, any clean asbestos fiber was removed by hand-picking. The remaining parts of the samples were further crushed in several stages, to liberate more asbestos, if possible. As fiber was liberated, it was removed by shaking the ore on screens until the free fibers gathered on the surface of the granular material and could be picked off with a suction tube, simulating the air-separation used in plants. When all the residual material had been crushed to minus 10-mesh, the collected fiber was cleaned by screening and,when necessary, washed and dried. The cleaned fiber was then graded on a nest of screens with square openings, successively 1/2-inch, 4-mesh, and 10-mesh. The fiber was placed on the top screen and the nest of screens shaken with a short horizontal movement for 2 minutes to simulate Canadian standard grading. The parts of asbestos remaining on each screen and in the bottom pan were then weighed, and the grade was expressed in the terms defined in appendix B on classification.

The minus 10-mesh granular material remaining, after the liberated fiber was removed as described, was agitated in a laboratory scrubber with about four parts of water to one part of ore for 30 minutes. This scrubbing disintegrated the rock particles by impact and attrition and liberated much of the very short fiber present.

When the agitation was stopped, the liberated fiber formed bulky, flocculated masses in the top part of the pulp. Granular rock particles settled to the bottom of the vessel. The fiber flocs were removed by decantation and then repeatedly washed by settling and decantation until no more granular material dropped out. The granular material from the washing operations was combined with residue from the scrubbing operation and again agitated and scrubbed to liberate more short fiber. This entire process was repeated until

Digitized by Google

no more fiber was liberated and no more granular material could be removed from the fiber product. The cleaned fiber was filtered and dried.

In a few instances, when the matrix was quite hard, it was necessary to grind the minus 10-mesh ore. This was done in the laboratory pebble mill and had the same effect as the described agitation and scrubbing of softer material. Subsequent separation of fiber was then continued as previously described.

Some of the core samples contained clayey material and a small quantity of short fiber. The clayey material and any fiber present also was removed from the granular parts of the sample and cleaned by settling and decantation.

When the recovered short fiber was filtered and dried, a tough mat was formed unless considerable clay was present. Grading the fiber products required fluffing them first by tumbling the matted fiber dry in a pebble mill. The fluffed products were graded by determining their weight per cubic foot, loose measure. The clayey products of some of the samples were graded in the same manner.

Results

The mineral dressing results are shown in detail in table 4. Only the gradable fiber, designated as product a, is closely comparable to Canadian standards. The cleaned very short fiber, designated as product b, derived by wet scrubbing the minus 10-mesh granular material, and the clayey material designated as product c, although graded in terms of Canadian grades 7 and 8 by loose measure weights per cubic foot, are not comparable to the corresponding Canadian grades because of the high recovery of very short fibers resulting from the repeated scrubbing and cleaning treatment not normally applied to the grading of Canadian asbestos.

The Mount Eddy hand-sorted stockpile sample contained 33 percent of 0-1-6-9 grade asbestos fiber, which was shingle 4Z or paper 5D grade. It also contained 28 percent very short fiber, which met the loose measure weight requirement of refuse 7-22 grade.

The cores from Mount Eddy holes 1 and 2 contained no plus 10-mesh fiber but large amounts of very short fiber or refuse grade and sand grade mixtures of clay and short fiber.

The Shasta View surface samples contained 50 percent refuse, 7-24 grade, very short fiber.

Apparently treating this type of asbestos ore in the manner described could produce a very short fiber asbestos, suitable for filler purposes.

Digitized by Google

Published by AsbestosClaims.Law
asbestosclaims.law/library/10934/19

TABLE 4. - Mineral dressing results

Sample	Product[1]	Weight-percent	Classification
Mount Eddy stockpile.....	a	33	0-1-6-9 shingle 4Z, or paper 5D.
	b	28	Refuse 7-22 (22 lb./cu.ft.).
Mount Eddy cores:			
Hole ME-1:			
0-65 feet.....	a	0	
	b	0	
	c	43	Sand 8-53 (53 lb./cu.ft.).
65-376 feet.....	a	0	
	b	38	Refuse 7-30 (30 lb./cu.ft.).
	c	27	Sand 8-42 (42 lb./cu.ft.).
376-468 feet.....	a	0	
	b	0	
	c	50	Sand 8-48 (48 lb./cu.ft.).
Hole ME-2:			
0-79 feet.....	a	5	0-0-0-16 refuse 7-M to 7-20.
	b	50	Refuse 7-25 (25 lb./cu.ft.).
	c	25	Refuse 7-35 (35 lb./cu.ft.).
79-448 feet.....	a	0	
	b	0	
	c	40	Sand 8-43 (43 lb./cu.ft.).
Shasta View surface.....	a	0	
	b	50	Refuse 7-24 (24 lb./cu.ft.).

[1]a is gradable fiber; b is cleaned very short fiber; c is clayey material with small quantity of very short fiber.

INDUSTRIAL PILOT PLANT TESTS

Composite core samples from Mount Eddy holes Nos. 1, 2, and 4, and a composite sample combining cores from Shasta View holes Nos. 1 and 2, were tested in an industrial pilot plant. The plant flowsheet included a small jaw crusher, hammer mill, fiber opener, and screening and dust recovery equipment. The screens used in the tests were 3/64- and 1/32-inch perforated plates. Floats were recovered as a byproduct of the mill dust-control system.

The results of the mill tests are given in table 5. Evaluation of the fractions showed that the graded fibers[8] on the 1/32- and 3/64-inch screens were in group 7 and ranged from nearly minimum value (quoted at $40 per ton) shorts to maximum value waste (quoted at $86 per ton), except the plus 3/64-inch material from Mount Eddy hole No. 2, which was low-quantity paper stock (quoted at $114 per ton). The additional recovery of floats in the dust

[8]Canadian grading and classification, see appendix B.

Digitized by Google

Published by AsbestosClaims.Law
asbestosclaims.law/library/10934/20

collecting system have a nominal market value of $44 per ton at Canadian mills. Because large tonnages of such material are thrown away at Canadian mills for lack of markets, there has been little incentive to recover additional very short fiber such as might be obtained by applying the methods used in the Bureau's tests.

Analyses reveal about 50 percent as much iron as occurs in Canadian chrysotile. This relatively low iron content would favor the use of Mount Eddy fiber in products that require short fibers with a low iron content.

TABLE 5. - Results of mill tests

Sample	Sample weight, pounds	Asbestos on 3/64 perforated plate, percent	Asbestos on 1/32 perforated plate, percent	Iron, percent	Additional recovery
Mount Eddy:					
Hole No. 1	105.7	0.88	0.70	2.21	3.78 percent in floats 7RF or 7TF.
Hole No. 2	107.75	1.88	.53	2.10	4.63 percent in floats 7RF or 7TF.
Hole No. 4	107.75	.86	.46	-	3.70 percent in floats 7RF or 7TF.
Shasta View:					
Holes Nos. 1 and 2	107.75	([1])	([1])	-	No floats recovered.

[1]None.

COSTS OF INVESTIGATION

Costs for the various phases of the program are shown in table 6. The costs under office expense and planning include all preliminary work preceding the exploratory phase of the investigation. The preliminary work included surveying and mapping the areas to be investigated, obtaining agreements from property owners, and securing information that would be relevant to the investigation.

TABLE 6. - Summary of costs[1]

	Engineering and supervision	Supplies	Contracts	Total	Unit costs	
					Per foot	Per mile
Office expense and planning.....	$4,115	-	-	$4,115	-	-
Roads (4,860 feet)...	95	-	$358	453	$0.093	-
Trenches (780 feet)..	95	-	357	452	.580	-
Mapping.....	632	-	-	632	-	-
Drilling (1,738 feet)	4,115	$220	14,828.50	19,163.50	10.85	-
Transportation (10,689 miles).....	-	349	-	349	-	-
Sample preparation...	1,050	-	-	1,050	-	-
Metallurgical testing	4,355	-	193.50	4,548.50	-	$0.032
Total.....	$14,457	$569	$15,737.00	$30,763.00	-	-

[1]Project 3410, October 1957 to August 1959.

Digitized by Google

APPENDIX A. - DIAMOND DRILL HOLE LOGS

A-1. - Mount Eddy deposits, hole ME-1, footage, recoveries, and formation

Elevation at collar, 5,530 feet.
Depth, 468 feet.
Coordinates, 360 S. - 307 W.
Size, NX to 50, BX to 200, AX to 468.
Dip, minus 30°.
Bearing, S. 67° E.

Footage	Recoveries		Formation
	Core, feet	Asbestos, estimated percent	
0- 8	7.3	0	Very broken black and gray serpentine.
8- 15	7.0	-	Black and gray serpentine, some asbestos.
15- 23	7.4	0	Coarse-grained gray serpentine with clay minerals.
23- 35	7.6	0	Porphyritic diorite (?) iron-stained, some chlorite, broken black serpentine 30 to 34 feet.
43- 51	7.8	([1])	Very broken black serpentine with purple hues, tighter from 50-51 feet. Some asbestos.
51- 57	7.8	0	Broken black and gray serpentine.
57- 65	8.0	.25	Broken to 63 feet; very broken 63 to 65 feet, black and green serpentine, pencil line asbestos.
65- 73	7.8	5	Broken black serpentine to 70 feet with pencil line asbestos, 70 to 73 feet cored well and good asbestos.
73- 80	7.0	15	Cored well, black serpentine with much asbestos, some to 3/8 inch.
80- 89	8.8	14	Cored very well, black serpentine with barren peridotite 84 to 85 feet, much asbestos, some to 1/2 inch.
89- 97	8.0	8	Black serpentine, cored well with barren peridotite 91 to 92 feet and 92 to 93 feet, some asbestos to 3/8 inch.
97-106	9.0	5	Black serpentine, cored well with barren peridotite 98 to 103 feet. Some asbestos to 3/8 inch.
106-116	9.8	8	Bluish serpentine, cored very well with much pencil line asbestos, 1 seam 1/8 inch and 1 at 1/4 inch.
116-125	9.0	1	Mostly peridotite, cored very well, some pencil line asbestos, also groundmass fiber, 2 seams at 1/16 inch.
125-135	8.9	3	Somewhat broken to 128 feet with pencil line asbestos in black serpentine. Remainder cored well, 5 seams at 1/4 inch, 1 at 1/8 inch.
135-144	9.0	1	Cored very well with longitudinal splits. Black serpentine with pencil line asbestos, some seams to 1/8 inch.
144-152	8.0	1	Cored fairly well to 149 feet, then broken longitudinal splits. Black serpentine with pencil line asbestos.

See footnotes at end of table.

Digitized by Google

A-1. - Mount Eddy deposits, hole ME-1, footage, recoveries, and formation (Con.)

Footage	Recoveries		Formation
	Core, feet	Asbestos, estimated percent	
152-161	8.6	2	Black serpentine with sections of peridotite, somewhat broken, some asbestos 1/8 inch.
161-169	7.8	4	Very broken 161 to 163 feet, and 167 to 169 feet black serpentine with seams of 1/8, 3/16, 1/2 inch and large amount of ribbon.
169-180	8.0	5	Black serpentine with sections peridotite, broken and with clay seams, asbestos at 1/8 and 3/16 inch.
180-190	9.3	8	Broken black serpentine to 184 feet, remainder solid good pencil line asbestos with many seams, some to 1/2 inch.
190-199	9.1	7	Black serpentine cored very well, much pencil line asbestos and seams to 3/8 inch.
199-208	8.9	4	Black serpentine and barren peridotite, cored very well, good asbestos.
208-216	8.0	2	Some black serpentine with asbestos, mostly barren peridotite, 2 seams at 1/8 inch, cored well.
216-224	8.0	1	Cored well with broken section 220-222 feet, black serpentine to 221 feet, remainder barren peridotite, with pencil line asbestos.
224-233	8.8	1	Cored very well, peridotite with short sections black serpentine with good asbestos, seams to 1/4 inch.
233-238	5.0	1	Cored well, mostly peridotite with some black serpentine showing asbestos, all pencil line.
238-248	9.3	1	Cored well with broken section 240-242 feet black serpentine and peridotite, 2 seams at 1/4 inch, 1 at 1/8 inch.
248-259	8.5	-	Cored well to 240 feet, remainder very broken, black serpentine with a 1/32 inch seam at 248.
259-268	8.4	0	Broken black serpentine to 262 feet, remainder tight peridotite.
268-276	8.0	1	Barren peridotite and serpentine to 270 feet, remainder cored well. Serpentine with asbestos 270-271 feet.
276-286	9.9	-	Cored well throughout barren peridotite with calcite seams, some pencil line asbestos last 18 inches.
286-292	6.0	([2])	Black serpentine and peridotite with calcite streaks, cored very well.
292-300	7.0	3	Peridotite to 293 feet, very broken black serpentine with asbestos to 296 feet, remainder broken black serpentine and peridotite, 1 seam at 1/4 inch.

See footnotes at end of table.

Digitized by Google

Published by AsbestosClaims.Law
asbestosclaims.law/library/10934/23

A-1. - Mount Eddy deposits, hole ME-1, footage, recoveries, and formation (Con.)

Footage	Recoveries		Formation
	Core, feet	Asbestos, estimated percent	
300-312	8.1	<2	Black serpentine cored well to 305 feet, no asbestos; remainder very broken with much asbestos (too broken to read).
312-320	7.7	2	Broken 314 feet, remainder cored well, black serpentine with pencil line asbestos, 1 seam at 316 feet.
320-328	8.0	3	All black serpentine with asbestos, few seams to 1/8 inch.
328-337	8.9	1	Black and gray serpentine with asbestos, cored very well, all pencil line asbestos.
337-345	7.7	+1	Gray serpentine, somewhat broken to 339 feet, remainder black serpentine with pencil line asbestos, 2 seams at 1/8 inch.
345-352	6.9	2	All black serpentine with much pencil line asbestos.
352-361	8.6	2	All black serpentine with much pencil line asbestos, some calcite seams.
361-369	7.4	2	All black serpentine with much pencil line asbestos, seams less than 1/16 inch, some calcite.
369-376	7.0	1.5	Broken to 370-373 feet, remainder black serpentine with pencil line asbestos.
376-387	7.8	.25	Black serpentine to 379 feet with pencil line asbestos, very broken black serpentine to 383 feet. Barren 383 to 387 feet, basic dike with quartz.
387-395	8.0	([2])	Pyroxenite dike (longitudinal splits) some clay minerals.
395-406	7.6	-	Clay, contorted migmatite and light green serpentine very broken to 400 feet, broken black serpentine to 406 feet with pencil line asbestos.
406-414	7.5	.75	Black serpentine to 408 feet with pencil line asbestos, remainder same with less asbestos, clay partings.
414-422	7.7	.25	Broken black serpentine with very little asbestos.
422-432	9.4	.25	Broken black serpentine, some pencil line asbestos.
432-439	6.9	([2])	Black serpentine to 433 feet, pyroxene to 438 feet, contorted migmatite 438 to 439 feet.
439-446	7.0	([2])	Clay minerals to 439 feet, pyroxenite to 442 feet, remainder black serpentine, mostly broken.
446-457	9.0	([2])	Very broken black serpentine to 455 feet, iron-stained amphibolite schist to 456 feet, remainder pyroxenite.
457-467	8.5	([2])	Pyroxenite to 458 feet, contorted migmatite to 460 feet, very broken schist, black serpentine, and clay.
467-468	.8	([2])	Very broken black serpentine.

[1]Trace. [2]None.

Digitized by Google

A-2. - Mount Eddy deposits, hole ME-2, footage, recoveries, and formation

Elevation at collar, 5,521 feet.
Depth, 448 feet.
Coordinates, 170 S. - 214 W.
Size, NX to 11, BX to 358, AX to 448.
Dip, minus 30°.
Bearing, S. 67° E.

Footage	Recoveries		Formation
	Core, feet	Asbestos, estimated percent	
0- 11	5.9	3	Very broken black serpentine with much asbestos, 1 at 3/4 inch, 5 or more at 1/4 inch, (too broken to read).
11- 24	9.3	5	Black serpentine with much asbestos, mostly broken some to 3/8 inch.
24- 33	8.1	4	Very broken black serpentine with good asbestos, some to 1/4 inch but mostly pencil line, some harsh.
33- 41	7.8	8	Very broken black serpentine with asbestos, some to 1/2 inch, much pencil line, (too broken to read).
41- 49	7.9	10	Very broken black serpentine with asbestos, some to 1/2 inch, (too broken to read).
49- 61	7.8	4	Black serpentine and peridotite, serpentine is broken and has good asbestos.
61- 69	8.0	5	Very broken black serpentine with asbestos, some to 1/4 inch.
69- 79	7.5	2.5	Very broken black serpentine to 72-78 feet with asbestos, some to 3/8 inch, remainder barren peridotite.
79- 90	8.7	.5	Black serpentine mostly broken, some peridotite, a little pencil line asbestos.
90- 98	7.0	.5	Mostly peridotite with some very broken black serpentine, very little asbestos.
98-108	7.7	1	Mostly peridotite, with some broken black serpentine, a little asbestos.
108-115	7.0	([1])	Peridotite, somewhat broken serpentine at 115 feet.
115-129	11.9	([1])	Peridotite, no serpentine.
129-135	6.0	1	Peridotite to 131 feet, remainder serpentine, only a little pencil line asbestos in serpentine.
135-143	7.8	1	Peridotite and black serpentine, very little asbestos to 141 feet, serpentine with fair asbestos 142 feet, remainder barren peridotite.
143-151	7.4	.5	Broken black serpentine and peridotite, mostly broken with pencil line asbestos.
151-159	7.9	.25	Black serpentine and peridotite, with pencil line asbestos.
159-168	8.1	([1])	Broken black serpentine to 161 feet.
168-179	8.0	.5	Black serpentine somewhat broken, with pencil line asbestos.

See footnote at end of table.

Digitized by Google

A-2. - Mount Eddy deposits, hole ME-2, footage, recoveries, and formation (Con.)

Footage	Recoveries		Formation
	Core, feet	Asbestos, estimated percent	
179-186	7.0	0.5	Broken black serpentine.
186-195	8.5	1	Black serpentine with asbestos 187 to 189 feet and with pencil line asbestos throughout, 1 seam at 1/4 inch, 1 at 1/8 inch.
195-204	9.0	1	Broken black serpentine with asbestos to 197, some very fine pencil line asbestos, 1 seam at 1/4 inch, 1 at 1/8 inch.
204-215	8.1	1	Black serpentine to 214 feet, remainder broken, some pencil line to 1/16 inch.
215-224	7.6	1	Broken black serpentine to 218 feet with asbestos, remainder same with pencil line asbestos to 1/32 inch.
224-233	8.3	3.5	All black serpentine with asbestos, ribbon fiber, many seams at 1/16 inch, 1 at 1/8 inch.
233-241	8.0	3	All black serpentine to 238 feet, broken to 240 feet, with pencil line asbestos, some over 1/32 inch.
241-251	8.1	2	Black serpentine somewhat broken, pencil line throughout, 1 seam at 1/32 inch.
251-263	8.5	1	Black serpentine mostly broken, some pencil line asbestos.
263-273	8.4	1	Broken black serpentine to 270 feet, pencil line asbestos only.
273-281	8.0	1	All dense black serpentine somewhat broken, with pencil line asbestos.
281-290	7.8	1.5	Dense black serpentine with pencil line asbestos, 2 seams at 1/32 inch.
290-299	8.4	2	Dense black serpentine to 297 feet, then vuggy black serpentine, pencil line asbestos.
299-308	8.5	2	Dense black serpentine to 306 feet, remainder broken, with pencil line asbestos, silica coatings on joint planes.
308-318	8.9	1	Dense broken black serpentine to 312 feet, remainder had much pencil line asbestos.
318-324	6.0	2	Dense bluish black serpentine, silica coatings in joint planes.
324-333	9.0	2	Dense black serpentine with pencil line asbestos.
333-341	8.0	2	Dense black serpentine, with pencil line asbestos, silica coatings.
341-349	7.6	1	Dense black serpentine, cored fairly well, with line asbestos to 347 feet, seams to 1/32 inch at 349 feet.

See footnote at end of table.

Digitized by Google

A-2. - Mount Eddy deposits, hole ME-2, footage, recoveries, and formation (Con.)

Footage	Recoveries		Formation
	Core, feet	Asbestos, estimated percent	
349-358	7.9	1	Dense black serpentine, with pencil line asbestos, silica coatings in seams.
358-370	8.0	.25	Dense black serpentine to 368 feet, broken to 368 feet, pyroxenite dike at 368 feet, some pencil line asbestos to 359 feet.
370-383	7.7	([1])	Dike to 373 feet, black serpentine to 378 feet, dike to 382 feet, remainder broken black serpentine.
383-393	9.3	([1])	Dike to 390 feet, remainder broken black serpentine.
393-408	10.2	([1])	Dike with seam bare serpentine at 400 feet, highly silicated to 406-407 feet.
408-419	9.5	([1])	Highly altered pyroxenite to 411 feet, dike to 418 feet, highly altered pyroxenite to 419 feet.
419-432	10.0	([1])	Dike to 427 feet, remainder broken black serpentine.
432-448	10.0	.25	Broken black serpentine with pencil line asbestos.

[1] None.

A-3. - Mount Eddy deposits, hole ME-3, footage, recoveries, and formation

Elevation at collar, 5,493 feet.
Depth, 245 feet.
Coordinates, 33 N. - 128 W.
Size, NX to 12, BX to 136, AX to 245.
Dip, minus 30°.
Bearing, S. 61° E.

Footage	Recoveries		Formation
	Core, feet	Asbestos, estimated percent	
0- 12	4.0	0.25	Mostly gray serpentine with some pencil line asbestos; serpentine is light colored.
12- 20	7.8	([1])	Black serpentine to 17 feet, gray serpentine to 20 feet, some asbestos.
20- 28	8.0	.5	Gray and black serpentine with pencil line asbestos, some magnesite.
28- 38	8.2	.75	Black and gray serpentine to 34 feet, somewhat broken to 38 feet, some pencil line asbestos--not over 1/64 inch.
38- 48	7.5	.5	Very broken black gray and purple serpentine, with pencil line asbestos, none over 1/32 inch; magnetite, also some magnesite.
48- 57	7.9	.5	Black serpentine, badly broken, good pencil line asbestos to 55 feet, then weak, 1 seam at 1/4, 3 at 1/8 inch.

See footnote at end of table.

Digitized by Google

A-3. - Mount Eddy desposits, hole ME-3, footage, recoveries, and formation (Con.)

Footage	Recoveries		Formation
	Core, feet	Asbestos, estimated percent	
57- 68	7.3	1	Broken black serpentine with pencil line asbestos to 59 feet, remainder weak in asbestos, none over 1/16 inch.
68- 93	8.9	.75	Gray and black serpentine with pencil line asbestos, 2 seams at 3/16, 2 at 1/8, 5 at 1/16, no core recovered to 81 feet.
93-101	8.0	([1])	Broken black and gray serpentine.
101-113	9.0	.25	Broken black serpentine with pencil line asbestos.
127-136	7.4	.5	Broken black serpentine with pencil line asbestos, considerable groundmass fiber.
136-167	8.8	1	Broken black serpentine to 140 feet, then broken black serpentine to 167 feet, pencil line asbestos throughout, none to 1/16 inch.
167-185	7.4	.75	Broken black serpentine to 173 feet, remainder broken with pencil line asbestos.
185-194	8.6	.75	Black serpentine to 185 feet, remainder peridotite, with pencil line asbestos, none to 1/16 inch, some blue mineral.
194-207	8.4	.5	Broken black serpentine to 195 feet, peridotite to 200 feet, broken black serpentine to 207 feet, some pencil line asbestos 200 to 207 feet.
207-218	8.1	1	Black serpentine to 211 feet, very broken to 213 feet, considerable pencil line asbestos, 3 seams at 1/16 inch, 3 at 1/8 inch, no waxy sheen to serpentine.
218-240	8.7	.5	Gray and black serpentine to 227 feet, dike with opal to 231 feet, black serpentine to 235 feet, rusty oxidized serpentine to 240 feet, some pencil line asbestos to 1/16 inch.
240-245	.7	.25	Very broken black serpentine with blue (Ni, Cu) mineral to 243 feet, dense fine-grained dark basic rock to 245 feet, with pencil line asbestos to 1/32 inch.

[1] None.

Digitized by Google

A-4. - Mount Eddy deposits, hole ME-4, footage, recoveries, and formation

Elevation at collar, 5,466 feet.
Depth, 299 feet.
Coordinates, 214 N. - 307 E.
Size, NX to 79, BX to 157, AX to 299.
Dip, minus 43°.
Bearing, N. 64° W.

Footage	Recoveries		Formation
	Core, feet	Asbestos, estimated percent	
0- 38	([1])	([1])	Talus and decomposed surface overburden.
38- 79	9.6	([1])	Light gray serpentine, broken to 55 feet, oxidized muddy-gray serpentine to 63 feet, all broken.
79-107	10.0	([1])	Broken gray serpentine and peridotite.
107-113	6.0	0.25	Broken black serpentine to 108 feet, remainder broken, blue minerals (Cu, Ni) with pencil line asbestos, 1 seam at 1/8 inch, 1 at 1/16 inch.
113-121	8.0	([1])	Broken peridotite with opal streaks to 117 feet, opal and black serpentine to 121 feet, some groundmass asbestos.
121-130	9.0	([1])	Mostly peridotite, with broken sections at 122 feet and 125 feet.
130-139	8.5	2	Light gray serpentine with asbestos to 139 feet, with pencil line asbestos to 131 feet and 134-139 feet, 1 seam at 1/2 inch, 1 at 1/4 inch, 1 at 1/8 inch.
139-148	9.0	2	Barren peridotite to 147 feet, asbestos last 6 inches, 2 seams at 3/4 inch (partings) peridotite has dark red crystals, also opal and calcite.
148-157	8.7	1	Peridotite to 156 feet, remainder serpentine with asbestos at 153 feet and 156-157 feet, 2 seams at 3/8 inch, 2 at 1/8 inch, Cu, Ni minerals in core.
157-169	11.5	5	Highly altered serpentine and clay, broken to 159 feet, no asbestos to 162 feet, much asbestos in serpentine beyond 162 feet, 4 seams at 1/4 inch, 4 at 1/8 inch, 1 at 3/8 inch, with many pencil line asbestos streaks.
169-177	8.0	4	Barren gray serpentine to 171 feet, good asbestos to 175 feet, 2 seams at 3/8 inch, 1 at 1/4 inch, many at 1/16 inch.
177-184	7.0	4	Barren black serpentine to 178 feet, some asbestos to 180 feet, much asbestos 180-184 feet, 2 seams at 3/4 inch, 2 at 3/16 inch, many at 1/16 inch.
184-194	9.3	3	Gray serpentine, no asbestos to 185 feet, much asbestos in black serpentine to 190 feet, remainder some asbestos, 1 seam at 3/8 inch, 1 at 1/4 inch, many at 1/16 inch.

See footnote at end of table.

Digitized by Google

A-4. - Mount Eddy deposits, hole ME-4, footage, recoveries, and formation (Con.)

Footage	Recoveries		Formation
	Core, feet	Asbestos, estimated percent	
194-204	9.6	2	Barren black serpentine and peridotite to 200 feet, then good asbestos in black serpentine to 204 feet, 2 seams at 3/8 inch, 9 at 3/16 inch.
204-210	6.2	6	Green serpentine, much asbestos to 206 feet, barren peridotite to 209 feet, much asbestos 209-210 feet, 2 seams at 5/8 inch, 1 at 1/2 inch, 4 at 3/8 inch, 3 at 1/8 inch, many 3/16 inch.
210-221	10.7	1.5	Broken gray serpentine to 218 feet with some pencil line asbestos, remainder barren black serpentine, some groundmass asbestos, 3 seams at 1/16 inch.
221-229	8.0	5	Black serpentine, some asbestos to 226 feet, heavy asbestos at 229 feet, 13 seams at 1/8 inch, 2 at 1/4 inch.
229-238	8.5	10	Black serpentine with asbestos, 6 seams at 3/16 inch, 7 at 1/4 inch.
238-250	9.5	10	Broken to 247 feet, remainder black and gray serpentine with asbestos, many seams at 1/8 to 1/4 inch, with pencil line asbestos, 1 seam at 1/2 inch.
250-261	10.8	6	Black and gray serpentine with pencil line asbestos, 13 seams at 1/8 inch, 3 at 3/16 inch.
261-269	8.0	8	Gray and black serpentine with asbestos, 13 seams at 3/16 inch, 1 at 1/4 inch, scattered blue mineral in dense black serpentine.
269-278	9.0	5	Black serpentine with asbestos, 1 seam at 1/4 inch, 2 at 1/8 inch, many at 1/16 inch, and many pencil line asbestos seams.
278-287	9.0	3	Bluish serpentine with asbestos, 5 seams at 1/8 inch, 3 at 1/16 inch, many pencil line asbestos seams.
287-296	9.0	.75	Black serpentine with asbestos in groundmass.
296-299	3.0	.75	Black serpentine with pencil line asbestos.

[1] None.

Digitized by Google

Published by AsbestosClaims.Law
asbestosclaims.law/library/10934/30

A-5. - Shasta View deposits, hole SV-1, footage, recoveries, and formation

Elevation at collar, 4,000 feet.
Depth, 203 feet.
Coordinates, 320 N. - 590 W.
Size, NX to 10, BX to 143, AX to 203.
Dip, minus 30°.
Bearing, N. 50° W.

Footage	Recoveries		Formation
	Core, feet	Asbestos, estimated percent	
0- 10	([1])	([1])	Overburden.
10- 44	9.6	([2])	Broken black serpentine with picrolite section.
44- 53	8.5	0.25	Gray and black serpentine to 47 feet, remainder broken picrolite with pencil line asbestos.
53- 60	7.0	.25	Broken black and gray serpentine to 55 feet, with very fine pencil line asbestos and picrolite sections.
60- 76	9.5	([1])	Black serpentine containing groundmass asbestos and picrolite.
76- 84	8.0	([1])	Black and gray serpentine, peridotite at 84 feet.
84- 93	9.0	([2])	Gray serpentine and peridotite, trace asbestos, some harsh asbestos.
93-102	9.0	([1])	Gray serpentine and peridotite, some opal and magnetite.
102-112	9.7	([1])	Gray serpentine and peridotite.
112-124	9.1	.25	Gray and black serpentine, mostly broken, with some very fine pencil line asbestos, some harsh.
124-134	9.5	([2])	Gray and black serpentine with harsh asbestos and seams of good asbestos.
134-143	8.9	([1])	Gray serpentine, mostly broken, some harsh asbestos.
143-155	9.8	([1])	Gray serpentine, some tight, some broken.
155-169	10.6	.5	Gray and black serpentine, generally broken, with some pencil line asbestos, some harsh asbestos, 2 seams at 1/16 inch.
169-188	10.7	.25	Broken gray serpentine with pencil line asbestos at 169-170 feet and 187 feet. Some harsh asbestos and quartz.
188-199	10.7	([1])	Broken gray serpentine to 192 feet, remainder tight black serpentine, some harsh asbestos.
199-203	3.9	([1])	Tight black serpentine, some harsh asbestos.

[1]None.
[2]Trace.

Digitized by Google

A-6. - Shasta View deposits, hole SV-2, footage, recoveries, and formation

Elevation at collar, 4,020 feet.
Depth, 75 feet.
Coordinates, 1,000 N. - 1,150 W.
Size, NX to 31, BX to 75.
Dip, minus 30°.
Bearing, N. 49° W.

Footage	Recoveries		Formation
	Core, feet	Asbestos, estimated percent	
0-10	([1])	([1])	Overburden.
10-31	10.0	([1])	Light and dark gray serpentine.
31-40	9.0	([1])	Gray and black serpentine.
40-45	4.8	0.25	Gray serpentine, somewhat broken, with pencil line asbestos.
45-49	3.8	([1])	Gray serpentine with a 6-inch section of black serpentine.
49-52	2.9	([1])	Broken gray serpentine.
52-68	10.1	([1])	Gray serpentine, mostly broken, with magnesite.
68-75	5.1	([2])	Broken gray and black serpentine, 1 asbestos seam 1/64 inch.

[1]None.
[2]Trace.

Digitized by Google

APPENDIX B. - CLASSIFICATION[9] OF ASBESTOS FIBERS

U. S. production of asbestos is but a small percentage of the world output and only 5 to 6 percent of domestic consumption. The principal producing States are Vermont and Arizona.

More than one-half of the world's asbestos is produced in Canada, and most of the asbestos used in the United States is imported from there, although imports also are made from Australia, southern Rhodesia, and the Union of South Africa. Procedures in grading and classification of asbestos, drill-core logging, and methods of evaluating drilling results have been developed in Canada, and these practices have been generally adopted in the United States.

The value of processed chrysotile asbestos materials for industrial use is based on grading by the Quebec standard screening test. The standard Quebec testing machine has three screens with openings of one-half inch, 4-mesh, 10-mesh, and a pan for minus 10-mesh or fines. Screen openings are 0.500, 0.187, and 0.053 inch. Wire diameters are 0.105, 0.063, and 0.047 inch. For the test, a 16-ounce (avoirdupois) sample is placed in the top screen of the 3-screen nest, which is then covered and clamped into the machine. The screens and contained material are given a horizontal, reciprocating motion, at from 300 to 328 strokes per minute, for 2 minutes, when the machine automatically stops. The asbestos remaining on each screen and in the pan is then weighed to tenths of an ounce. From this test, the results can be classified from the following standard list of grades that were generally accepted by the trade in 1949.

Canadian Standard Asbestos Classification

Group One:
Crude No. 1 - crude 3/4-inch staple or longer.

Group Two:
Crude No. 2 - crude 3/8-inch to 3/4-inch staple.
Crude Run of Mine - unsorted crudes.
Crudes Sundry - crudes other than above specified.

B-1. - Guaranteed minimum shipping test, Canadian standard testing machine

Standard designations of grades	Screen size			
	1/2-inch	4-mesh	10-mesh	Pan-size
Group 3:				
3F.....	7	7	1.5	0.5
3K.....	4	7	4	1
3R.....	2	8	4	2
3T.....	1	9	4	2
3Z.....	0	8	6	2

[9]Bowles, Oliver, Asbestos. A Materials Survey: Bureau of Mines Inf. Circ. 7880, 1959, pp. 24-32.

Digitized by Google

B-1. - Guaranteed minimum shipping test, Canadian standard testing machine (Con.)

Standard designations of grades	Screen size			
	1/2-inch	4-mesh	10-mesh	Pan-size
Group 4:				
4H	0	5	8	3
4K	0	4	9	3
4M	0	4	8	4
4R	0	3	9	4
4T	0	2	10	4
4Z	0	1.5	9.5	5
Group 5:				
5D	0	.5	10.5	5
5K	0	0	12	4
5M	0	0	11	5
5R	0	0	10	6
Group 6:				
6D	0	0	7	9
Group 7:				
7D	0	0	5	11
7F	0	0	4	12
7H	0	0	3	13
7K	0	0	2	14
7M	0	0	1	15
7R	0	0	0	16
[1]				
[2]				
[3]				

[1] In group 8, 8S weighs under 50 pounds per cubic foot, loose measure.
[2] In group 8, 8T weighs under 75 pounds per cubic foot, loose measure.
[3] In group 9, 9T weighs more than 75 pounds per cubic foot, loose measure.

For example, a sample of 16 ounces of asbestos fiber is screened in a standard test. None of the fiber is left on the top, 1/2-inch screen; 1.5 ounces are left on the second, 4-mesh screen; 9.5 ounces are left on the third, 10-mesh screen; and 5 ounces have dropped through into the bottom pan. This material is then classified as 0-1.5-9.5-5, corresponding to grade 4Z.

In group 7 (refuse or shorts), when all the asbestos fiber is less than 10-mesh, grading is done by weight per cubic foot, loose measure up to 40 pounds. For example, 7-22 would be a product all minus 10-mesh and weighing 22 pounds per cubic foot, loose measure.

In group 8, all the material is minus 10-mesh and from 40 to 75 pounds per cubic foot, loose measure, and is designated as sand; for example, sand, 8-53.

Group 9 includes similar products of more than 75 pounds per cubic foot, loose measure.

Digitized by Google

Published by AsbestosClaims.Law
asbestosclaims.law/library/10934/34

APPENDIX C. - PRICES OF ASBESTOS

The prices of asbestos per short ton, E&MJ Metal and Mineral Markets on March 2, 1961, were quoted:

Quebec	Per short ton, Can. $
Crude No. 1	$1,400-1,725
Crude No. 2	750-1,155
Spinning fibers:	
3F	590- 600
3K	500- 505
3R	425- 430
3T	400- 405
3Z	370- 375
Shingle stock 4K	180- 220
Paper stock (group 5)[1]	120- 142
Waste (group 6)[1]	75- 86
Shorts (group 7)[1]	40- 75
F.o.b. Morrisville, Vt.	**US $**
Spinning fiber (group 3 or longer)[1]	353- 408
Shingle stock (group 4)[1]	181- 218
Paper stock (group 5)[1]	120- 142
Waste, stucco, or plaster (group 6)[1]	86
Refuse or shorts (group 7)[1]	41- 75

[1]Group classification added by the authors.

INT.•BU.OF MINES,PGH.,PA. 3536

Digitized by Google

Published by AsbestosClaims.Law
asbestosclaims.law/library/10934/35

Digitized by Google

UNIVERSITY OF MICHIGAN
3 9015 07848 1044

Digitized by Google

Published by AsbestosClaims.Law
asbestosclaims.law/library/10934/37

Digitized by Google

Published by AsbestosClaims.Law
asbestosclaims.law/library/10934/38