ASBESTOS MINERALS IN NEW MEXICO

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Asbestos is a mineral group that consists of six different silicate minerals (Table 1) that can be fibrous in crystalline form. OSHA defines asbestos fiber as any particle that is 5 microns or longer, with a length-to-width ratio of 3 to 1 or longer. Asbestos minerals can be found in bundles of fibers, which can be separated from the host matrix. The fibers have high tensile strength. The aspect ratios range from 20 to 100. The fibers are flexible and can be spun (Virta, 2002).

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Mineral	Formula
Serpentine mineral	
Chrysotile	Mg ₃ Si ₂ O ₅ (OH) ₄
Amphibole minerals	
Grunerite (amosite)	Fe_2 (Fe, Mg) $_5Si_8O_{22}$ (OH) $_2$
Riebeckite (crocidolite)	Na ₂ Fe ₂ 5(Si ₈ 8O ₂₂)(OH) ₂
Anthophyllite	Mg ₂ 7(Si ₈ O ₂₂)(OH) ₂
Tremolite	$Ca_2Mg_5Si8O_{22}$ (OH) $_2$
Actinolite	Ca ₂ (Mg, Fe) ₅ Si8O ₂₂ (OH) ₂

TABLE 1. Asbestos minerals

The term asbestos is typically used to identify commercial deposits of chrysotile, grunerite (commercially known as amosite or cummingtonite), and riebeckite (commercially known as crocidolite). Anthrophyllite, actinolite, and tremolite asbestos have no significant industrial applications. Asbestos minerals are found in a variety of other types of mineral deposits and can pose a health risk, specifically asbestosis, lung cancer, and mesothemlioma (Tweedale and McCulloch, 2004; Dodson and Hammer, 2006). Other amphibole minerals are known to occur as fibers or asbestoform habit (winchite, riechterite, and fluoro-edenite), but these minerals are not specifically listed in the asbestos regulations (Skinner et al., 1988; Van Gosen, 2007).

In New Mexico, asbestos minerals are found in small amounts in limestones adjacent to Laramide Cu and Pb–Zn skarn deposits, Laramide (polymetallic) vein deposits, Mo–W–Be contact metasomatic deposits, and porphyry copper deposits (Fig. 1, Appendix 1). Asbestos minerals are found in serpentinized ultramafic and mafic rocks in some Proterozoic terranes in New Mexico and can be associated with talc deposits. Asbestos is reported in the north bank of a creek near Highway 12, west of Reserve in Catron County. The amount of asbestos is so small in these areas in New Mexico that it is unlikely that asbestos minerals would be found in any alluvial deposits adjacent to these areas (Harris, 2004). At least one site in Torrance County has been designated as an official asbestos disposal site (Hawley, 1986).

There has been no reported production of asbestos minerals from New Mexico (Talmage and Wootton, 1937; Kottlowski, 1965; McLemore et al., 1996). However nonfibrous ricolite (a form of serpentine) has been produced from the Ricolite district in the Redrock area (Ricolite district) of the Burro Mountains for carving, decorative, and dimension stone (Talmage and Wootton,

1937; Benjovsky, 1946; McLemore et al., 1996). Fibrous ricolite also is found in the Redrock area.

Asbestos minerals are found in minor amounts in various geologic terranes throughout New Mexico (Fig. 1, Appendix 1). The amount of asbestos is so small in these areas that it is unlikely that any health risk exists for residents and visitors in these areas. However, workers and others that could be exposed to dust in these areas that could contain asbestos minerals should have the dust examined for potential asbestos minerals and if present follow appropriate protection recommendations.



FIGURE 1. Asbestos minerals occurrences in mining districts in New Mexico. See Appendix 1 for details.

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APPENDIX 1. Mines and mining districts in New Mexico with reported occurrences of asbestos minerals (from Northrop, 1959, 1996; McLemore et al., 1996, 2002). Mine id (mines identification number) and District id (district identification number) are from the New Mexico Mines Database (McLemore et al., 2002). Types of deposits are after North and McLemore (1986) and McLemore (2001). Locations of districts are in Figure 1.

Note that none of these mines have any potential for economic development and the health risk would have to be evaluated if workers in the area could be exposed to dust particles. The occurrence of asbestos minerals does not imply a health risk, but that workers and residents should conduct tests to determine if asbestos particles are present in the dust.

Mine id	County	District id	District	Mine name	Township	Range	Section	Latitude, latitude	Rock type	Type of deposit
NMDA0083	Dona Ana	DIS030	Organ Mountains	Hilltop	218	4E	29	32.4576 -106.557469	dolomite	copper-lead- zinc skarn
NMDA0092	Dona Ana	DIS030	Organ Mountains	Memphis	22S	3E	1	32.428264 -106.592233	limestone	copper-lead- zinc skarn
NMDA0090	Dona Ana	DIS030	Organ Mountains	Little Buck	21S	4E	30	32.455818 -106.570886	limestone	copper-lead- zinc skarn
NMDA0098	Dona Ana	DIS030	Organ Mountains	Ben Nevis	218	4E	32	32.435327 -106.56065	pegmatite	pegmatite
NMDA0097	Dona Ana	DIS030	Organ Mountains	Quickstrike	218	4E	32	32.437192 -106.554284	pegmatite	pegmatite
NMDA0155	Dona Ana	DIS030	Organ Mountains	Stevenson- Bennett	228	3E	11, 14	32.402316 -106.600603	dolostone	carbonate- hosted Pb-Zn (Cu, Ag) replacment
NMGR0233	Grant	DIS043	Bayard	Ground Hog	18S	12W	5	32.769444 -108.103333	hornblende quartz diorite	Laramide vein
NMGR0335	Grant	DIS051	Copper Flat	Copper Flat Magnetite	17S	12W	19	32.808333 -108.120833	limestone	copper-lead- zinc skarn
NMGR0361	Grant	DIS054	Fierro- Hanover	Pewabic	17S	12W	22	32.818611 -108.074722	limestone	Laramide skarn
NMGR0362	Grant	DIS054	Fierro- Hanover	Philadelphia	17S	12W	22	32.816667 -108.078611	limestone	Laramide skarn
NMGR0208	Grant	DIS054	Fierro- Hanover	Hanover Mountain	17S	12W	6	32.833 -108.083	granodiorite porphyry	porphyry copper
NMGR0372	Grant	DIS054	Fierro- Hanover	Union Hill- Republic	17S	12W	16	32.833889 -108.082222	limestone	Laramide skarn
NMGR0542	Grant	DIS062	Pinos Altos	Pinos Altos	238	13W	31	32.265 -108.221388		
NMGR0427	Grant	DIS063	Ricolite	Ricolite	18S	18W	16	32.7475 -108.712777	serpentine, granite	dimension stone
NMHI0224	Hidalgo	DIS080	Granite Gap	Scheelite	258	21W	27	32.105556 -108.997222	Tertiary granite contact with ls	tungsten skarns
NMHI0260	Hidalgo	DIS083	McGhee Peak	North Star	248	21W	27	32.181944 -108.986111	volcanics intercalated with conglomerate	Laramide vein
NMHI0263	Hidalgo	DIS083	McGhee Peak	Silver Hill	258	21W	3	32.163056 -108.994444	granite porphyry sill contacts limestone	copper-lead- zinc skarn
NMHI0138	Hidalgo	DIS088	Sylvanite	Copper Dick	285	16W	22	31.857222 -108.460555	monzonite, diorite	Laramide skarn
NMHI0143	Hidalgo	DIS088	Sylvanite	Gold Hill	285	16W	35	31.821111 -108.451944	monzonite and diorite	Laramide vein

Mine id	County	District id	District	Mine name	Township	Range	Section	Latitude, latitude	Rock type	Type of deposit
NMLI0113	Lincoln	DIS091	Capitan Mountains	Capitan Iron	85	14E	10	33.622383 -105.556492	limestone	Great Plains margin-iron skarn
NMLI0307	Lincoln	DIS091	Capitan Mountains	Mino Tiro Estrella	27	8S	16E	33.576006 -105.355790	granite	Great Plains margin-vein
NMLI0003	Lincoln	DIS092	Gallinas	American	15	11E	22	34.21025 -105.769694	syenite intruded limestone	Great Plains margin-iron skarn
NMLI0039	Lincoln	DIS092	Gallinas	Rare Metals	15	11E	22	34.206306 -105.774278	syenite, limestone	Great Plains margin-iron skarn
NMLI0312	Lincoln	DIS092	Gallinas	unknown	15	11E	23	34.204495 -105.7654	limestone, sandstone	Great Plains margin-iron skarn
NMLI0313	Lincoln	DIS092	Gallinas	Iron Lamp	18	11E	23	34.203951 -105.755569	limestone, sandstone	Great Plains margin-iron skarn
NMLI0064	Lincoln	DIS099	White Oaks	Yellow Jacket	6S	11E	22	33.770389 -105.786667	limestone	Great Plains margin
NMLI0018	Lincoln	DIS099	White Oaks	Ferro	6S	11E	15, 16	33.785639 -105.795306	limestone	Great Plains margin
NMLU0450	Luna	DIS114	Victorio	Gulf Oil Victorio Project	248	12W	29	32.185537 -108.105478	granitic intrusion	Mo-W-Be contact- metasomatic deposits
NMLU0467	Luna	DIS114	Victorio	Tungsten Hill	248	12W	29	32.189161 -108.101042	limestone	carbonate- hosted Pb-Zn (Cu, Ag) replacment
NMOt0026	Otero	DIS129	Orogrande	Cinco de Mayo	228	8E	4	32.422231 -106.122241	garnetite and limestone near contact with monzonite	Great Plains margin-iron skarn
NMOt0038	Otero	DIS129	Orogrande	Iron Duke	228	8E	4	32.423051 -106.122778	marble at contact with monzonite poprhyry	Great Plains margin-iron skarn
NMOt0095	Otero	DIS130	Pajarito	Pajarito	128	15E	25	33.243611 -105.433611	syenite, quartz syenite, alkali granite	disseminated Y-Zr deposits in alkaline rocks
NMSM0112	San Miguel	DIS164	Rociada	Good Hope	19N	14E	16	35.869863 -105.463248		Precambrian vein and replacements
NMSM0137	San Miguel	DIS167	Willow Creek	Pecos	18N	12E	27	35.75833 -105.6686	schist	volcanic massive sulfide
NMSF0060	Santa Fe	DIS189	Santa Fe	Blacklite	17N	11E	22, 27	35.679882 -105.7597	schist	volcanic massive sulfide
NMSF0095	Santa Fe	DIS189	Santa Fe	Jones Hill	17N	11E	1	35.73277 -105.7233	schist	volcanic massive sulfide
NMSI0943	Sierra	DIS192	Cuchillo	South Peak	108	8W	2	33.466306 -107.636966	limestone	Mo-W-Be contact- metasomatic deposits
NMSI0976	Sierra	DIS205	Tierra Blanca	Grey Eagle	168	9W	23	32.894614 -107.746095	limestone	carbonate- hosted silver- manganese (Pb) replacment

Mine id	County	District id	District	Mine name	Township	Range	Section	Latitude, latitude	Rock type	Type of deposit
NMSO0019	Socorro	DIS216	Jones Camp	Jones Camp	58	7E	13,14	33.8681 -106.1785	limestone?	Great Plains Margin-Fe skarn
NMTA0316	Taos	DIS238	Red River- Rio Hondo	Commodore	28N	14E		36.630041 -105.450316		volcanic- epithermal vein
	Luna	DIS105	Cooke's Peak						limestone	carbonate- hosted silver- manganese (Pb) replacment
	Hidalgo	DIS082	Lordsburg						limestone	skarn
	Taos	DIS148	Petaca						metamorphic	
	Taos	DIS236	Picuris						metamorphic	
	Socorro	DIS221	Magdalena						limestone	skarn
	San Miguel	DIS161	El Porvenior						metamorphic	
	Sierra	DIS197	Hillsboro						limestone	skarn
	San Miguel	DIS162	Elk Mountain- Spring Mountain						metamorphic	
	Sierra	DIS033	San Andrecito- Hembrillo						metamorphic	talc