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Pneumoconiosis IN DIATOMITE MINING AND PROCESSING

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ture content may exceed 5 percent. The values in the table are within the general range reported by others (*38, 39, 47, 48*). No apparent difference is noted in the chemical composition of the crude diatomite from the two sources.

TABLE 1. *Percent composition by dry weight of crude diatomite according to source*

Component	Percent by dry weight		Component	Percent by dry weight	
	Salt water diatomite	Fresh water diatomite		Salt water diatomite	Fresh water diatomite
Ignition loss	6.4	8.1	MgO	0.5	0.2
SiO_2	[1] 87.8	[1] 85.5	K_2O	.2	.1
Al_2O_3	2.6	3.6	Na_2O	.6	.1
Fe_2O_3	.9	1.6	Undetermined	.8	.5
TiO_2	.2	.2			
CaO	[2] 0	.1	Total	100.0	100.0

[1] Essentially amorphous silica.
[2] Trace.

Quartz in Parent Material, Settled Dust, and Airborne Dust

Table 2 shows the percent by weight of quartz in overburden, crude diatomite, and mixed mill dust. The crude and various diatomite products, and their settled and airborne components, had a mean quartz content of 2 percent and under. Overburden had a mean quartz content under 5 percent. Although the percentage values for quartz will vary with the source of the crude and within the same deposit, these values based on a total of 68 samples are believed to be representative. The values found indicate that exposure to quartz is not a problem in the diatomite processing industry studied.

TABLE 2. *Percent by weight of quartz in parent material, settled dust, and airborne dust according to product, 5 plants combined*

Product	Parent material			Settled dust			Airborne dust		
	Number of samples	Quartz percent by weight		Number of samples	Quartz percent by weight		Number of samples	Quartz percent by weight	
		Range	Mean		Range	Mean		Range	Mean
Overburden	4	0-12	5	3	2-7	4	1	....	1
Crude diatomite	11	0-7	2	6	<1-3	2	4	0-4	1
Mixed product	13	0-5	<2	29	<1-4	2	3	1-2	2

Cristobalite in Parent Material, Settled Dust, and Airborne Dust

No cristobalite was noted in the overburden, crude diatomite, natural diatomite or low-temperature straight-calcined diatomite

products. Although a small percentage of cristobalite was found in one sample of airborne natural powder dust, this was likely due to contamination, from high-temperature straight-calcined and flux-calcined materials. The crude diatomite and the natural and low-temperature straight-calcined products were essentially amorphous silica. In this report, low-temperature straight-calcined diatomite was included and treated as a part of the natural powder category. Diatomite with only trace amounts of cristobalite is classed as cristobalite-free material.

Tridymite was not detectable in any of the parent materials, settled dust or airborne dust by X-ray diffraction techniques and does not appear to constitute a problem in the diatomite processing industry studied.

The percent of cristobalite in parent material, settled dust, and airborne dust according to type of diatomite product is shown in table 3.

TABLE 3. *Percent by weight of cristobalite in parent material, settled dust, and airborne dust according to product, 5 plants combined*

Product	Parent material			Settled dust			Airborne dust		
	Number of samples	Cristobalite, percent by weight		Number of samples	Cristobalite, percent by weight		Number of samples	Cristobalite, percent by weight	
		Range	Mean		Range	Mean		Range	Mean
Natural:									
Main product	0	0-<1	<1	1	.....	<1	1	..	<5
Baghouse product	1	.....	0	3	.....	<1	0	....	
Straight-calcined: [1]									
Main product	4	10- 20	15	3	8-37	27	3	12-26	17
Baghouse product	2	11- 31	21	1	.....	[2] 52	1	.	22
Flux-calcined:									
Main product	5	44- 59	49	8	16-66	38	7	15-46	32
Baghouse product	4	58- 64	61	4	24-64	45	4	23-40	32
				4	57-95	[2] 75			
All types (mixed)	.....	.....	.....	18	10-53	25	4	7-26	16

[1] High temperature.
[2] Baghouse classification areas.

The high-temperature, straight-calcined diatomite had an average cristobalite content of 15 percent for main product, and 21 percent for baghouse product. Flux-calcined diatomite had an average cristobalite content of 49 percent for main product, and 61 percent for baghouse product. The cristobalite content of the high-temperature straight-calcined product was variable and was probably influenced by the amount of natural flux in the purified crude. X-ray diffraction patterns showing percent of cristobalite