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ASBESTOS IN DRILLING MUDS

I have conducted a patent and literature search for asbestos in drilling muds. The patent search was accomplished using the internet and, therefore, is not exhaustive. The literature search was also done on the internet, using the Compendex Index, which incorporates the Engineering Index. In general, I limited the search to the years 1950 through 1980. I have listed the references into two groups below, those without any disclosure to asbestos in drilling muds and those that mention asbestos. The patents are listed separately in each group and further broken down by company chronological order. The patent dates are the date of issue and not the date of filing for the patent.

The conclusion to the search is that asbestos was not a necessary ingredient in drilling muds as many alternatives are mentioned.

REFERENCES DISCLOSING DRILLING MUDS WITHOUT ASBESTOS

US 3,014,862	Gulf Oil	Dec 26, 1961
US 2,802,783	Texaco	Aug 13, 1957

This was apparently an important patent to Texaco, as it was referred to in many later patents to Texaco.

US 2,973,320	Texaco	Feb 28, 1961
US 2,555,469	Phillips	Jun 5, 1951
US 2,578,888	Phillips	Dec 18, 1951
US 2,620,300	Phillips	Dec 2, 1952

US 2,805,990 Phillips Sep 10, 1957

US 3,150,726 Phillips Sep 29, 1964

Lost circulation additive.

US 4,000,076 Phillips Dec 28, 1976

US 4,123,366 Phillips Oct 31, 1978

US 2,781,313 Esso Feb 12, 1957

US 2,785,125 Esso Mar 12, 1957

US 3,251,768 Esso May 17, 1966

US 3,410,797 Esso Nov 12, 1968

"Mud Materials as Tools for the Drilling Industry," *Oil and Gas Journal*, vol 49, no. 12, pp 220-221, 330, 332, Jul 27, 1950.

Typical lost circulation additives listed on page 221: flake mica, cellophane flakes, organic fibers, cottonseed hulls, etc.

"Drilling Muds…A Symposium," *Oil and Gas Journal*, vol 51, no. 21, starting on p 246, Sep 29, 1952.

Reviews various lost circulation materials.

"Today's Drilling Fluids…A Symposium," *Oil and Gas Journal*, vol 53, no. 32, pp 106-119, Dec 13, 1954.

"Chemicals in drilling mud," *Oil and Gas Journal*, vol 56, no. 50, pp 90-98, Dec 15, 1958.

"New muds and techniques improve drilling practices," *World Oil*, vol 148, no. 5, pp 194-206, Apr 1959.

World Oil was published by Gulf Publishing Company, which I believe was owned by Gulf Oil Corporation, although I have no proof of this.

"New Mud Features Low Filtrate Loss, Good Rheology Retention," *Oil and Gas Journal*, vol 57, no. 45, pp 83-87, Nov 2, 1959.

Grouts and Drilling Muds in Engineering Practice, pp 211-217, May 1963.

This was a symposium held in Britain at their Institution of Civil Engineers.

Composition and Properties of Oil Well Drilling Fluids, Third Edition, Walter F. Rogers, 1963.

Rogers worked for Gulf Oil Corporation and the book was published by Gulf Publishing Company. The first chapter of the book, giving the history of drilling fluid, is enclosed. On pages 40-50, there is an extensive list of materials for drilling fluid systems. Asbestos is not included in this list. Asbestos is not in the index and the only mention of it I could find was on page 206 in Table 5-1, Specific Gravity of Common Materials. The Fourth Edition of this book is discussed in the section below of references mentioning asbestos.

"What's new in mud engineering? Part 1," *World Oil*, vol 164, no. 5, pp 135-139, Apr 1967.

"What's new in mud engineering? Part 2," *World Oil*, vol 164, no.6, pp 118-122, May 1967.

REFERENCES DISCLOSING DRILLING MUDS CONTAINING ASBESTOS

British 2,038,662 Union Carbide Jul 30, 1980

This patent discloses a particular type of asbestos with an organo-silane coating useful in drilling fluid.

US 3,498,394 Gulf Mar 3, 1970

A mixture of asbestos and clay is used in a hydraulic jet drilling method. The mixture is apparently not effective in the ordinary rotary drilling process. At column 5, lines 63-67: "Circulating the asbestos-laden drilling fluid in the ordinary rotary drilling process in which the drilling liquid merely conveys rock particles out mechanically by the drill bit does not impart the unique properties to the drilling liquid."

British 1,404,112 Texaco Aug 28, 1975

This patent discloses a drilling fluid useful in certain shale formations. On page 3, lines 18-22, attapulgite clay is equated with asbestos to control the viscosity of the drilling fluid.

British 1,179,859 Phillips Feb 4, 1970

A drilling fluid containing a combination of asbestos and carboxymethylcellulose.

US 3,708,014 Phillips Jan 2, 1973

The patent is directed to a method for removing asbestos from bore holes by disintegrating the asbestos with a mixture of hydrochloric and hydrofloric acids. In column 1, lines 16-37, the uses of asbestos in drilling muds are discussed along with its disadvantages.

British 592,754 Shell Sep 29, 1947

On page 2, lines 30-35, this patent equates flake mica with asbestos to prevent excessive loss of drilling fluid.

"The Properties of Lost-Circulation Materials," *Oil and Gas Journal*, vol 49, no. 18, pp 82, 85, Sep 7, 1950.

The article lists many substances used to combat lost circulation, including straw, grain, hay, mica, ground rubber, bentonite balls, cane fibers, cottonseed and rice hulls, beet pulp, shredded balsam wood, sage brush, manure, peat moss, asbestos, saw dust, tree bark, vermiculite and volcanic rocks. The article is promoting a lost circulation substance called, Strata-Seal, which is composed of glass-like cellular spheres.

Composition and Properties of Oil Well Drilling Fluids, Fourth Edition, George R. Gray, H.C.H. Darley and Walter F. Rogers, 1980.

This edition mentions asbestos in two places. On page 546, the use of asbestos "has found some limited applications." Further down the page it states: "Asbestos has been classed as a "hazardous material" under the Occupational Safety and Health Act, with the threshold limit value set at 2 fibers longer than 5 μm per cm^3 of air for those handling the material. Special processing methods have been introduced to minimize the possibility of inhaling the fibers while handling the product. Consumption in 1978 is estimated to have been about 10,000 tons (9100 tonnes).

The second place is on page 581, Table 11-6, a table of lost circulation substances. On page 582, it states that mica has been widely used as a lost circulation substance.

"Asbestos in drill water helps cut drilling costs," *World Oil*, vol 161, no. 4, pp 116-118, Sep 1965.

Although the article states that costs can be cut using asbestos, equivalent drilling results can be achieved using attapulgite.

"Presheared asbestos muds help cut costs, rotating time," *Oil and Gas Journal*, vol 68, no. 23, pp 93-95, Jun 8, 1970.

Use of presheared asbestos called Super Visbestos supplied by Montello.