PLAINTIFF'S EXHIBIT

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# Preshearing, pelletizing improves asbestos fibers for drilling mud

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ASBESTOS materials used as drilling mud additives provide one method of increasing the carrying capacity and suspending ability of clear fluids, without sacrificing the high penetration rates possible when using clear water.

But asbestos products have presented two main problems in the past—high bulk and slow yield. An improved asbestos material is now available which eliminates these two problems and reduces the cost of using asbestos as an additive.

By chemically and hydraulically shearing a top-grade chrysotile asbestos in a wet process, a high degree of fiber separation is achieved. Then for convenience, this presheared material is pelletized.

The process for shearing the asbestos was developed by Union Carbide Corp. and is still proprietary. But the presheared asbestos distributed as Super Visbesto by Montello, Inc., Sand Springs, Okla., is said to have these advantages over asbestos materials now being used in drilling muds:

- It has only about one-half the bulk. The material is compressed into pellets about ½-in. long and ¼-in. diameter and a given volume contains approximately twice the amount of asbestos as other products now available.
- It yields 8-10 times faster. Until now, asbestos products have been sheared on the location using special pumps or shearing equipment. This sometimes requires from several hours up to several days.
- It is more effective on a pound-per-pound basis. Lab and field tests indicate that the presheared material gives much better mud properties than other asbestos products.

The need for a low-solids, low-viscosity, and high-carrying capacity fluid will offer good possibilities for use of this material. And it will find application in shallow holes where mixing time and money are critical.

**The difference.** The electron micrographs in Fig. 1 show why the new material has provided some favorable results.

Typical Canadian chrysotile ore (A) is linear in structure and made up of bundles of asbestos fibers that are straight and tightly bonded. This ore usually assays about 7-15% asbestos and the rest is generally serpentine rock.

California chrysotile (B) is a unique formation in which the asbestos fibers are arranged in a random pattern.

The bonding is basically on a point-to-point contact, and the ore assays about 50% asbestos with some deposits going as high as 60%.

The higher purity and less tightly held bond of this ore makes it very suitable for a hydraulic separation process.

Micrograph (C) represents the fiber structure of California asbestos additives that have been dry processed with conventional methods. It still contains fiber bundles and maintains a considerable amount of linear contact.

Micrograph (D) shows the presheared asbestos of extremely high purity with up to 98% of the fibers being liberated. Since the fibers are the material that does the work in a drilling mud additive, this material is more efficient and economical.

After the separation of the fibers to the point shown in (D), the presheared asbestos is pelletized for storage and handling convenience.

**Lab and field tests.** In lab tests made to evaluate the effectiveness of the presheared asbestos each material was tested following the same procedure.

Five g of the material was added to 350 cc's of distilled water containing 3.5 g of common salt. The mixture was stirred for 10 min and then tested in a Fann V-G meter. Laboratory results are shown in Table 1.

Comparison field tests were also also made on six wells—three using the presheared material and three using a regular asbestos product—in the Texas Panhandle.

These 7,100-ft wells in the Perryton, Tex. area usually encounter a geologic column something like this: down to 3,000-4,000 ft are redbeds, (silty) dolomite and hydrates, and shale; at approximately 4,000 ft is the Wolfcamp dolomite; and from there to total depth—about 7,200 ft—sheets of shale, lime, and sand are found.

Completions are usually made in limestone that exhibits varying degrees of fracture.

In the three wells that were drilled with the presheared material, average rotating time per well was 186 hr compared to a 242-hr average for the wells in which regular asbestos products were used.

The average number of bits used on the wells using the regular asbestos-bentonite mud was 18, compared to 12.33 bits per well on the wells in which the presheared material was added to the bentonite mud system.

As far as the mud costs were concerned, the wells using the presheared additive averaged about $4,220 com-

Table 1

## Lab test results

| | Presheared | Unsheared (regular) | Product F |
|---|---|---|---|
| Apparent viscosity | 14.5 | 8 | 7 |
| Fann V-G meter 600 rpm | 29 | 16 | 14 |
| Fann V-g meter 300 rpm | 18 | 9 | 8 |
| Plastic viscosity (centipoises) | 11 | 7 | 6 |
| Yield point (lb per 100 sq ft) | 7 | 2 | 2 |
| Initial gel (lb per 100 sq ft) | 5 | 3 | 3 |

Table 2

## Here's how field comparison turned out

| | Unsheared asbestos | | | Presheared asbestos | | |
|---|---|---|---|---|---|---|
| Well No. | 1 | 2 | 3 | 4 | 5 | 6 |
| Hours rotating | 209.75 | 251.75 | 267.25 | 175.5 | 180.25 | 203.5 |
| Number bits | 19 | 21 | 14 | 13 | 13 | 11 |
| Mud cost | $14,586.31 | $25,474.82 | $7,544.23 | $3,573.06 | $4,232.98 | $4,861.65 |
| Days on location | 14 | 27 | 15 | 13 | 12 | 11 |
| Depth in ft | 7,475 | 7,160 | 7,202 | 7,200 | 7,142 | 7,300 |

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