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USE OF PECAN HULLS FOR TREATING MUDS

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The present invention is directed to a method for controlling the characteristics of a mud laden drilling fluid.

In the rotary drilling of wells it is conventional to use a circulating stream of drilling fluid which serves several purposes among which may be mentioned the lubrication of the drill bit, the supporting of the wall of the bore hole, the plastering of the wall to prevent filtration of fluids into or out of the bore hole, the conveyance of the cuttings from the drill bit to the surface and the deposition of these cuttings at the surface. In order to perform all of these functions, the drill fluid must have certain viscosity characteristics and gelling properties. It should, for example, be thixotropic in nature.

The present invention is based on the discovery that the viscosity and the thixotropic character of aqueous drilling fluids can be suitably maintained and regulated by the addition to the drilling fluid of an active principle derived from pecans. This active principle is found primarily in the fibrous layer immediately inside the shell of the pecan. The entire shell, including the fibrous layer, can be ground up to a fine powder and used or the fibrous layer may be separated from the hull and used in a ground condition or an aqueous or caustic extract of the fibrous layer or of the entire shell may be employed. In any case, the active principle is employed in conjunction with caustic.

The inner fibrous portion of the pecan in which the bulk of the active principle utilized for the purpose of the present invention is concentrated, constitutes between about 10 and 12% by weight of the pecan hull. Separation of the fibrous material from the hull is best accomplished by subjecting the hull to a relatively short grinding operation in an attrition mill followed by a blowing operation in which the less dense fibrous material is separated from the ground hull. This latter operation is conveniently carried out by dropping the ground hull through a horizontally or vertically moving stream of air. The proper length of the grinding operation to provide maximum recovery of the fibrous material may be established with reasonable accuracy by preliminary experiment. In general, a grinding from two to four hours will ordinarily give satisfactory separation of the two materials. Such grinding followed by a blowing results in a yield of fibrous material of about 10 to 12% by weight of the total hull, the fibrous material, however, having a large volume due to its low density. After separation of the fibrous material from the rest of the hull the latter can be utilized for the production of active carbon or for other known purposes with a result that the raw material for the practice of the present invention is obtainable at a very low cost.

The ground fibrous material utilized in the present invention ordinarily will have a particle size such that it will pass through a 200 mesh screen. When ground to this size the fibrous material is soluble to a large degree in water, about 85% going into solution. By the addition of alkali to the water the solubility of the fibrous material is increased.

By comparison with a known treating agent, commonly employed in the regulation of desired viscosity characteristics of drilling mud, caustic and quebracho extract, the treating agent of the present invention displays very desirable treating characteristics. It has been found, for example, that a slightly better treating effect can be obtained with a caustic-pecan mixture containing only one part of caustic for every five parts of pecan hull by weight than can be obtained with a caustic-quebracho mixture containing five parts of caustic to five parts of quebracho by weight. This represents a large saving in caustic for a given treating effect.

To be specific, a treating agent was made by grinding up pecan shell so as to pass 200 mesh and mixing it with caustic and water. The pecan shell constituted 5% by weight of the mixture and the caustic 1% by weight. Another treating agent was prepared by mixing quebracho extract, caustic and water with the quebracho constituting 5% by weight of the mixture and the caustic constituting 5% by weight. The two treating agents were applied to a hydrated shale mud weighing 11.4 pounds per gallon and having a viscosity of 40 centipoises. 4% by volume of each treating agent reduced the viscosity of mud to 7.5 centipoises.

The affect of these addition agents on the filtration characteristics of the same mud were also observed. The mud before treatment lost 18½% of its water in 30 minutes at 100 pounds per square inch when tested according to the method described in a paper entitled "Evaluation of filtration properties of drilling muds" by Milton Williams and G. E. Cannon published in the 1938 volume of "Drilling and Production Practice" by the American Petroleum Institute beginning at page 20. The addition of 4% by volume of caustic and quebracho reduced this filtration rate to 11½% while the same amount

of the pecan-caustic reduced the filtration to 11% in thirty minutes.

The ground pecan fiber showed greater effectiveness than the ground whole shell including the fiber. Pecan fiber ground to pass 200 mesh was employed to make up a treating agent with caustic and water, the ground fiber constituting 5% by weight of the mixture and the caustic constituting 1% by weight. 4% by volume of this treating agent reduced the viscosity of a 10.3 pound per gallon hydrated shale mud, having a viscosity of 63 centipoises, to 9 centipoises. The same quantity of the aforesaid caustic-quebracho treating agent reduced the viscosity of the same mud to 14 centipoises. Increased quantities of the pecan fiber-caustic treating agent effected a further reduction in viscosity, whereas additional quantities of the caustic and quebracho treating did not bring about a further reduction in viscosity.

This 63 centipoise mud when tested for filtration qualities lost about 17% of its water in 30 minutes at 100 pounds per square inch. 4% by volume of either of the last mentioned treating agents reduced this water loss to about 7½%. Thus the treating agent derived from the pecan fiber was considerably better than that derived from the quebracho both for viscosity reduction and for decreasing water loss by filtration since the pecan fiber treating agent required only 1% of caustic as compared to 5% required by the quebracho.

It will be understood that the new treating agent can be prepared as a water or caustic extract as well as a suspension. As previously indicated, a large per cent of the fiber goes into solution in any case whether in water or in caustic. When the whole shell is used, however, the percentage which dissolves is considerably smaller, but even in this case an extract of the shell can be obtained by lixiviating the same with a caustic solution containing from 1 to 5% by weight of caustic soda and the resulting extract used as a treating agent.

The nature and objects of the present invention having been thus described and illustrated by specific examples, what is claimed as new and useful and desired to be secured by Letters Patent is:

1. A method for improving the characteristics of an aqueous drilling mud which comprises adding thereto the fibrous material found inside the shell of pecans in combination with caustic alkali.

2. A method for improving the characteristics of an aqueous drilling mud which comprises adding thereto a powdery substance obtained by grinding the fibrous layer found inside the shell of pecans until it passes 200 mesh in combination with caustic alkali.

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