US 20040198618A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2004/0198618 A1**

Abazajian et al. (43) **Pub. Date: Oct. 7, 2004**

(54) **HIGH STABILITY, HIGH LUBRICITY, LOW TOXICITY, HIGH BIODEGRADABILITY DRILLING FLUID**

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(21) Appl. No.: **10/785,317**

(22) Filed: **Feb. 24, 2004**

Related U.S. Application Data

(60) Provisional application No. 60/449,557, filed on Feb. 24, 2003.

Publication Classification

(51) **Int. Cl.**[7] **C10M 101/00**

(52) **U.S. Cl.** **508/575**

(57) **ABSTRACT**

A drilling fluid including at least about 2 wt % olefin, at least about 5 wt % n-paraffins, and at least about 2 wt % isoparaffins, wherein the isoparaffins are substantially wholly terminal monomethyl branched is provided. A method for producing the drilling fluid, and a method for drilling a borehole using the drilling fluid are disclosed.

HIGH STABILITY, HIGH LUBRICITY, LOW TOXICITY, HIGH BIODEGRADABILITY DRILLING FLUID

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Application Serial No. 60/449,557, filed on Feb. 24, 2003.

FEDERALLY SPONSORED RESEARCH

[0002] Not applicable.

REFERENCE TO MICROFICHE APPENDIX

[0003] Not applicable.

FIELD OF THE INVENTION

[0004] The present invention relates to drilling fluids derived from the products of a Fischer-Tropsch synthesis. More particularly, the invention relates to base fluids, and drilling fluids produced therefrom, having high stability, lubricity, and biodegradability while also having low toxicity. The invention further relates to processes of producing and using the drilling fluids.

BACKGROUND OF THE INVENTION

[0005] Drilling fluids, or drilling muds, are well known for use in oil and gas well drilling operations. In early applications, crude, diesel and mineral oils were used as base fluids in formulating drilling fluids. Such oil based drilling fluids, however, have unacceptable toxicity and persistence, or non-biodegradability. Toxicity and persistence issues are especially critical in offshore drilling operations. Pseudo-oil based drilling fluids are also well known wherein the base fluids are fatty acid esters or synthetic hydrocarbons. Such synthetic hydrocarbons have included polyalphaolefins, linear alphaolefins, internal olefins, and mixtures thereof as well as linear and branched paraffins and mixtures thereof. Synthetic olefinic and paraffinic base fluids produced by oligomerizing low carbon number hydrocarbons are well known but are expensive to produce. Similarly, ester base fluids are expensive to produce. 161 The cost of drilling fluids may be reduced by use of Fisher-Tropsch synthesis to produce paraffinic base fluids. Paraffinic drilling fluids, however, generally do not have adequate low temperature properties for use in offshore and cold weather drilling operations.

[0006] One approach to the low temperature issue incorporates multi-methyl branched isoparaffins or isoparaffins with branches of higher carbon number than methyl into the paraffinic base fluid. Such paraffinic base fluids contain C_{10}-C_{24} n-paraffins and isoparaffins, with an iso to normal ratio ranging from 0.5:1 to 9:1. Greater than 50% of the total isoparaffin content are mono-methyl branched isoparaffins and about 30% are multi-methyl substituted. A similar approach to the low temperature issue involves formulation of a drilling fluid containing a mixture of n-paraffins and isoparaffins wherein at least 90% of the isoparaffins are mono- or poly-methyl branched isomers. Although the use of Fisher-Tropsch synthesis somewhat lowers the cost of such paraffinic drilling fluids, the necessity of hydrocracking and hydroisomerization adds to the overall cost of the drilling fluid. Moreover, to sufficiently improve the low temperature properties of the paraffinic base fluids, pour point depressant additives may be required, further increasing the cost of the drilling fluid.

[0007] In another known drilling fluid a base fluid of a mixture of linear and branched alphaolefins with the linear to branch ratio ranging from 1:1 to 5:1 is used. In this known drilling fluid the olefins may be produced from high temperature Fischer-Tropsch synthesis. High temperature Fischer-Tropsch synthesis, however, results in primarily internal branching of the branched hydrocarbons. Thus, such drilling fluids are not wholly biodegradable resulting in increased persistence. Moreover, because of the reactivity of olefins, drilling fluids composed of olefins are easily oxidizable and, therefore, must be stored under a nitrogen blanket to provide a reasonable shelf life. Even with nitrogen padding, olefinic drilling fluids cannot be stored for periods as long as paraffinic drilling fluids. Therefore, the cost of using olefinic drilling fluids is increased by both its special storage requirements and loss of oxidized product.

[0008] Therefore, there remains a need for a further improved lower cost drilling fluid having oxidative stability, high lubricity, low toxicity, improved low temperature properties, and high biodegradability.

SUMMARY OF THE INVENTION

[0009] In one embodiment of the invention, a base fluid which may be used for drilling fluid formulation is provided. The base fluid includes at least about 5 wt % olefins, at least about 5 wt % n-paraffins and between about 2 and 50 wt % branched paraffins wherein substantially all of the branch groups are monomethyl and wherein the ratio of terminal monomethyl branching to internal monomethyl branching is at least about 1:1.5.

[0010] In other embodiments of the invention a drilling fluid is provided wherein the drilling fluid contains between about 2 and about 90 wt % olefins, between about 5 and about 90 wt % n-paraffins and between about 0 and about 10 wt % oxygenates.

[0011] Yet another embodiment of the invention provides a process for producing a drilling from a light Fischer-Tropsch liquid.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] None.

DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0013] The term "C_x", where x is a number greater than zero, refers to a hydrocarbon compound having predominantly a carbon number of x. As used herein, the term C_x may be modified by reference to a particular species of hydrocarbons, such as, for example, C_5 olefins. In such instance, the term means an olefin stream comprised predominantly of pentenes but which may have impurity amounts, i.e. less than about 10%, of olefins having other carbon numbers such as hexene, heptene, propene, or butene. Similarly, the term "C_{x+}" refers to a stream wherein the hydrocarbons are predominantly those having a hydrocarbon number of x or greater but which may also contain impurity levels of hydrocarbons having a carbon number of less than x. For example, the term C_{15+}means hydrocarbons

having a carbon number of 15 or greater but which may contain impurity levels of hydrocarbons having carbon numbers of less than 15. The term "C_x-C_y", where x and y are numbers greater than zero, refers to a mixture of hydrocarbon compounds wherein the predominant component hydrocarbons, collectively about 90% or greater by weight, have carbon numbers between x and y inclusive. For example, the term C_5-C_9 hydrocarbons means a mixture of hydrocarbon compounds which is predominantly comprised of hydrocarbons having carbon numbers between 5 and 9 inclusive, but may also include impurity level quantities of hydrocarbons having other carbon numbers.

[0014] As used herein the term "high lubricity" means having a wear scar of average diameter of about ≦0.46 mm at 60° C. tested in accordance with ASTM Standard D-6079-02 entitled "Standard Test Method for Evaluating Lubricity of Diesel Fuels by the High-Frequency Reciprocating Rig." The terms "high stability" and "high oxidative stability" mean having a total solids ≦1.5 mg/100 ml tested in accordance with ASTM Standard D-22-74-Ola entitled "Standard Test Method for Oxidation Stability of Distillate Fuel Oil (Accelerated Method)." Note that these methods are being applied herein to the analysis and characterization of synthetic products although the standards refer expressly to petroleum derived products.

[0015] Unless otherwise specified, all quantities, percentages and ratios herein are by weight.

[0016] Embodiments of the drilling fluid of the invention contain a base fluid having from about 5 to about 90 wt % linear alpha- and internal olefins, from about 5 to about 20 wt % isoparaffins, from about 5 to about 90 wt % n-paraffins and from about 0 to about 10 wt % oxygenates. To fully realize the lower cost potential of the invention, the base fluid for the drilling fluid of such embodiments may be obtained from a Fischer-Tropsch synthesis using synthesis gas as a feed stock. Moreover, production of the drilling fluid from a base fluid produced by the Fischer-Tropsch synthesis and subsequent processing as described herein is desirable as it results in a product having the desirable olefin and paraffin contents. However, the base fluid composition may be otherwise produced while yet retaining the remaining advantages of the invention. Thus, some embodiments of the base and drilling fluids of the invention are not produced by Fischer-Tropsch synthesis.

[0017] Three basic techniques may be employed for producing a synthesis gas, or syngas, which is used as the starting material of a Fischer-Tropsch reaction. These include oxidation, reforming and autothermal reforming. As an example, a Fischer-Tropsch conversion system for converting hydrocarbon gases to liquid or solid hydrocarbon products using autothermal reforming includes a synthesis gas unit, which includes a synthesis gas reactor in the form of an autothermal reforming reactor (ATR) containing a reforming catalyst, such as a nickel-containing catalyst. A stream of light hydrocarbons to be converted, which may include natural gas, is introduced into the reactor along with oxygen (O_2). The oxygen may be provided from compressed air or other compressed oxygen-containing gas, or may be a pure oxygen stream. The ATR reaction may be adiabatic, with no heat being added or removed from the reactor other than from the feeds and the heat of reaction. The reaction is carried out under sub-stoichiometric conditions whereby the oxygen/steam/gas mixture is converted to syngas. Examples of Fischer-Tropsch systems are described in U.S. Pat. Nos. 4,973,453; 5,733,941; 5,861,441; 6,130,259, 6,169,120 and 6,172,124, the disclosures of which are herein incorporated by reference.

[0018] The Fischer-Tropsch reaction for converting syngas, which is composed primarily of carbon monoxide (CO) and hydrogen gas (H_2) may be characterized by the following general reaction:

$$2nH_2+nCO \rightarrow (—CH_2—)_n+nH_2O \quad (1)$$

[0019] Non-reactive components, such as nitrogen, may also be included or mixed with the syngas. This may occur in those instances where air or some other non-pure oxygen source is used during the syngas formation.

[0020] The syngas is delivered to a synthesis unit, which includes a Fischer-Tropsch reactor (FTR) containing a Fischer-Tropsch catalyst. Numerous Fischer-Tropsch catalysts may be used in carrying out the reaction. These include cobalt, iron, ruthenium as well as other Group VIIIB transition metals or combinations of such metals, to prepare both saturated and unsaturated hydrocarbons. For purposes of this invention, a non-iron catalyst may be used. The F-T catalyst may include a support, such as a metal-oxide support, including silica, alumina, silica-alumina or titanium oxides. For the purposes of this reaction, a Co catalyst on transition alumina with a surface area of approximately 100-200 m^2/g is used in the form of spheres of 50-150 μm in diameter. The Co concentration on the support may also be 15-30%. Certain catalyst promoters and stabilizers may be used. The stabilizers include Group IIA or Group IIIB metals, while the promoters may include elements from Group VIII or Group VIIB. The Fischer-Tropsch catalyst and reaction conditions may be selected to be optimal for desired reaction products, such as for hydrocarbons of certain chain lengths or number of carbon atoms. Any of the following reactor configurations may be employed for Fischer-Tropsch synthesis: fixed bed, slurry reactor, ebullating bed, fluidizing bed, or continuously stirred tank reactor (CSTR). For the purposes of this reaction, a slurry bed reactor is used. The FTR may be operated at a pressure of 100 to 500 psia and a temperature of 375° F. to 500° C. The reactor gas hourly space velocity ("GHSV") may be from 1000 to 8000 hr^{-1}. Syngas useful in producing a Fischer-Tropsch product useful in the invention may contain gaseous hydrocarbons, hydrogen, carbon monoxide and nitrogen with H_2/CO ratios from about 1.8 to about 2.4. The hydrocarbon products derived from the Fischer-Tropsch reaction may range from methane (CH_4) to high molecular weight paraffinic waxes containing more than 100 carbon atoms. An overhead product stream is recovered from the FTR and may be separated into tail gas and light Fischer-Tropsch liquid ("LFTL") products in a cold separator. The LFTL stream may then be distilled to yield a hydrocarbon product of primarily C_{13}-C_{22} olefins and paraffins.

[0021] The C_{13}-C_{22} distillation cut may be used directly as the base fluid. Low levels of C_{13-}hydrocarbons may be present in the C_{13}-C_{22} cut provided such levels do not cause the drilling fluid to exceed current regulatory limits. C_{13-} hydrocarbons may be present in amounts between about 0.01 and 10 wt %. The presence of such small amounts of C_{13-} hydrocarbons permits incorporation of a wider distribution of C_{13+}hydrocarbons, particularly C_{16+}hydrocarbons,

for improved lubricity. The hydrocarbon number distribution is such as to result in a drilling fluid pour point below about 10° C.

[0022] Embodiments of the base fluid contains from about 5 to about 90 wt % linear alpha- and internal olefins. The olefin content may provide the mixture with lower pour-point, better surface activity, better lubricity and better adherence to metal. When the base fluid is produced from the Fischer-Tropsch synthesis with the appropriate Fischer-Tropsch catalyst and operating conditions, the Fischer-Tropsch product will have approximately 5% alpha and internal olefin content. Depending upon the reaction conditions of the FTR and catalyst used in the Fischer-Tropsch reaction, it may be necessary to concentrate the olefin content to achieve the higher percentages of olefins in the base fluid. Concentration of olefins may be undertaken, for example, by one or more of the following known techniques: (1) molecular sieve separation of olefins and paraffins, such as UOP's OLEX® process, and (2) distillation of paraffins away from individual C_X cuts.

[0023] The base fluid may contain between about 5 to about 95 wt % paraffins. Of the total paraffin content from about 3 to about 20 wt % are isoparaffins. Substantially all of the isoparaffins are terminal monomethyl species. As used herein, the terminal species include 2- and 3-methyl branched. The presence of monomethyl isoparaffins improves low temperature properties, such as pour point, as well as lubricity and viscosity. Moreover, because the isoparaffins are predominantly terminally branched, the paraffin content of the base fluid is substantially wholly biodegradable. Using the Fischer-Tropsch synthesis described herein, about 5 wt % terminal methyl branched paraffins are produced in the LFTL.

[0024] Concentration of isoparaffins may be increased by one or more of the following techniques: (1) molecular sieve separation of linear and branched paraffins, such as UOP's OLEX® process, and (2) isomeric distillation of isoparaffin.

[0025] Embodiments of the base fluid contain between about 0 and about 10 wt % oxygenates. The oxygenates are principally primary alcohols. Other oxygenates, including aldehydes, ketones, carboxylic acids and esters and di-esters of carboxylic acids are also present in small amounts. Oxygenate content in the C_{13}-C_{22} cut of the Fischer-Tropsch reaction product ranges from between about 0.5 to about 5.0 wt %. Low levels of oxygenates in the drilling fluid from between about 0 and about 10 wt % provide improved lubricity. Moreover, oxygenates may assist in emulsification in invert drilling muds.

[0026] Oxygenate control may be used on the C_{13}-C_{22} cut of the Fischer-Tropsch product stream. In one embodiment of the invention, a base fluid is produced by vaporizing a product stream and passing the vaporized product over an activated alumina catalysts to dehydrate alcohols to corresponding olefins. The conversion of the alcohol content of the product stream occurs according to the following reaction:

$$CH_3—(CH_2)_x—CH_2—CH_2OH \rightarrow CH_3—(CH_2)_x—CH=CH_2+H_2O \quad (2)$$

[0027] For example, the LFTL, C_{13}-C_{22} or other product stream may be vaporized at a temperature from about 400° F. to about 800° F. and then passed over one or more dehydration beds containing activated treated alumina or silica-alumina. In some embodiments, the dehydration beds are packed beds. Essentially all of the primary and internal alcohols present in the vaporized stream are dehydrated to their corresponding olefins, with conversion rates of at least 95%.

[0028] Dehydration reaction temperature may range from between about 400° and 800° F. The vaporized feed for the dehydration unit may be superheated prior to being fed into the dehydration beds or alternatively, may be heated within packed beds. The LHSV of packed beds may range from about 0.10 hr^{-1} to about 2.0 hr^{-1}. Reaction pressure may be maintained by the pressure of the accumulator and must be such to vaporize all of the dehydration feed. Typically, the pressure may range from between about 0 psia to about 100 psig.

[0029] In an alternative embodiment, a moving bed of alumina or silica-alumina catalyst may be used. Fluidized beds, slurry beds or ebullating beds may be used with continuous batch or semi-batch catalyst removal and regeneration. The catalyst may be removed by one of these methods and regenerated by passing a mixture of nitrogen and oxygen or air at elevated temperatures over the catalyst.

[0030] Depending upon the alumina used, some of the olefins present or produced in the dehydration beds may also be isomerized to internal olefins. Alumina catalysts useful for the dehydration of alcohols are known and include, for example, gamma-alumina, theta-alumina, pacified alumina, and activated alumina. High surface area aluminas are particularly useful in the invention and include those aluminas having a surface area of about 100 m^2/gm or greater. Commercially available alumina useful in the integrated Fischer-Tropsch process include, for example, S-400, which has a surface area of about 335 m^2/gm, and DD-470, which has a surface area of about 375 m^2/gm. S-400 ad DD-470 are alumina catalysts made and sold by Alcoa. Alumina catalysts for use in the integrated Fischer-Tropsch process generally contain at least about 90 wt % Al_2O_3, oxides of silicon and iron present in amounts of less than about 0 wt %, and oxides of sodium present in an amount of less than about 1 wt %. The alumina catalysts are generally supplied as substantially spherical particles having diameter from about ⅛ to about ¼ inch.

[0031] In another embodiment of the invention, molecular sieve or zeolitic molecular sieve forms of the alumina or silica-alumina catalysts may be used. For example, silico alumino phosphate ("SAPO") molecular sieves may be used in the packed beds. SAPO molecular sieves contain a 3-dimensional microporous crystal structure having 8, 10, or 12 membered ring structures. The ring structures can have an average pore size ranging from between about 3.5 angstroms to about 15 angstroms. Other silica-containing zeolitic molecular sieve catalysts, such as ZSM-5, may be used in the dehydration bed.

[0032] Following dehydration, the aqueous and organic phases may be separated. Such dehydration process may further be used to increase the olefin content of the product stream to be used to produce the base fluid.

[0033] Other methods of oxygenate control include, for example, reaction of the alcohol content of the C_{13}-C_{22} cut of a Fischer-Tropsch product stream with maleic or succinic

anhydride or with a carboxylic acid, such as formic acid, acetic acid, or other acids. The carboxylic acid esters may be retained in the stream as they are excellent lubricants which are also highly biodegradable. Both the lubricity and the biodegradability of the base fluid may be improved by converting at least a portion of the alcoholic oxygenate content to carboxylic acid esters.

[0034] The drilling fluid may optionally include one or more surfactants (e.g., emulsifiers, wetting agents), viscosifiers, weighting agents, fluid loss control agents, and proppants. Because the drilling fluid should be non-toxic, these optional ingredients, like the base fluid, are preferably also non-toxic. Acceptable emulsifiers include, but are not limited to, fatty acids, and fatty acid derivatives including amido-amines, polyamides, polyamines, esters, imidaxiolines, and alcohols. Typical wetting agents include, but are not limited to, lecithin, fatty acids, crude tall oil, oxidized crude tall oil, organic phosphate esters, modified imidazolines, modified amidoamines, alkyl aromatic sulfates, alkyl aromatic sulfonates, and organic esters of polyhydric alcohols. Exemplary weighting agents include, but are not limited to, barite, iron oxide, gelana, siderite, calcium oxide, and calcium carbonate. Acceptable proppants include sand, gravel, and nut shells. Exemplary viscosifiers include, but are not limited to, organophilic clays, non-organophilic clays, oil soluble polymers, polyamide resins, and polycarboxylic acids and soaps. Where additives are used in the drilling fluid, the base fluid constitutes from about 25 to about 85 volume percent of the total drilling fluid. Illustrative fluid loss control agents include, but are not limited to, asphaltics (e.g., asphaltenes and sulfonated asphaltenes), modified lignites, and polymers, such as polystyrene, polybutadiene, polyethylene, polypropylene, polybutylene, polyisoprene, natural rubber, and butyl rubber.

[0035] The following examples illustrate, but are not intended to limit, the invention.

EXAMPLE 1

[0036] A pilot installation consisting of two distillation columns was used to produce C_{6-10} naphtha, C_{10-13} light kerosene, and C_{13-20+} drilling fluid feedstock streams. The columns were fed approximately 3400 g/hr of light Fischer Tropsch liquid (LFTL). The LFTL feed had approximately the composition shown in Table 1:

TABLE 1

Carbon #	% by wt.
4	<0.1
5	0.01
6	0.3
7	1.0
8	2.9
9	5.9
10	8.1
11	9.2
12	9.5
13	9.2
14	8.4
15	7.9
16	7.1
17	6.2
18	5.4
19	4.6
20	3.7

TABLE 1-continued

Carbon #	% by wt.
21	3.0
22	2.3
23	1.7
24	1.2
25+	2.6
Total	100.00

[0037] The LFTL feed was introduced into a first packed distillation column and C_{13} and lighter materials were distilled overhead. The first distillation column was operated at the following conditions: 10 psig, 480° F. feed preheat temperature, 407° F. overhead temperature, 528° F. bottoms temperature. The first distillation column had approximately 98 inches of Sulzer Mellapack 750Y packing. The bottoms of the first distillation column constituted a C_{13-20+}hydrocarbon fraction, the composition of which is shown in Table 2. The overhead stream of the first distillation column was fed into a second packed distillation column operated at 12 psig, 370° F. overhead temperature and 437° F. bottoms temperature. The second distillation column had about 28 inches of Sulzer EX packing. The bottoms of the second column

TABLE 2

Total n-paraffins, isoparaffins, olefins and alcohols		
C_{11}−:	Mass %	0.97
C_{12}:	Mass %	1.77
C_{13}:	Mass %	11.43
C_{14}:	Mass %	13.68
C_{15}:	Mass %	12.35
C_{16}:	Mass %	10.96
C_{17}:	Mass %	9.06
C_{18}:	Mass %	7.84
C_{19}:	Mass %	6.79
C_{20}:	Mass %	7.04
C_{21}:	Mass %	5.66
C_{22}:	Mass %	4.63
C_{23+}:	Mass %	7.83
		100.00

EXAMPLE 2

[0038] The C_{13-20} and stream from Example 1 was fed via a syringe pump and mixed with 20 cc/min of nitrogen. The gas/liquid mixture was introduced upflow into a vessel packed with stainless steel mesh saddles, where the liquid was vaporized and superheated to reaction temperature of 675° F. The vaporized feed was fed upflow into a reactor packed with ⅛ Alcoa **S-400** alumina catalyst and suspended in a heated sandbath. The sandbath was maintained at the reaction temperature and ebulated by air. Reactor LHSV was maintained at about 0.26 hr^{-1}. The outlet pressure was maintained at about 5 psig. The reaction product composition is shown in Table 3.

TABLE 4

Sample Reference Number		FEED B	PRODUCT D
TOTAL			
N-PARAFFIN	mass %	82.46	82.87
ALPHA OLEFIN	mass %	2.26	3.48
INTERNAL OLEFIN	mass %	2.75	3.68
BRANCHED PARAFFIN	mass %	10.10	9.97
ALCOHOL	mass %	2.45	0.00
		100.00	100.00

EXAMPLE 3

[0039] An LFTL feed, substantially having the composition shown in Table 1, was hydrotreated at reactor conditions of 800 psig and 550° to 590° F. The resulting hydrotreated stream was distilled under conditions as described in Example 1 forming a hydrotreated analog of the C_{10-13} light kerosene product. This hydrotreated light kerosene material was analyzed on a Hewlett Packard Series II gas chromatograph with 60 m RTX 1 column with 0.32 mm diameter and 3 micron film thickness. The isomer content of this product is shown in Table 4.

TABLE 5

Component	Wt. %
nC_9-	0.02
2- and 3-monomethyl C_{10}	0.20
4- and higher - monomethyl C_{10}	0.03
nC_{10}	22.22
2- and 3-monomethyl C_{11}	1.19
4- and higher - monomethyl C_{11}	0.42
nC_{11}	27.93
2- and 3-monomethyl C_{12}	1.09
4- and higher - monomethyl C_{12}	0.50
nC_{12}	24.96
2- and 3-monomethyl C_{13}	0.92
4- and higher - monomethyl C_{13}	0.48
nC_{13}	18.99
2- and 3-monomethyl C_{14}	0.11
4- and higher - monomethyl C_{14}	0.13
nC_{14}	0.41
Total normal hydrocarbon	94.54
Total 2- and 3-monomethyl substituted hydrocarbons	3.51
Total 4- and higher - monomethyl substituted hydrocarbons	1.55
Total monomethyl hydrocarbons	99.61
Others	0.39

[0040] While the foregoing describes preferred embodiments of the invention, it is apparent that a number of changes and variations are within the scope and spirit of the invention.

What is claimed is:

1. A base fluid comprising:

at least about 5 wt % olefins;

at least about 5 wt % n-paraffins; and

between about 2 and 50 wt % branched paraffins wherein substantially all of the branch groups are monomethyl and wherein the ratio of terminal monomethyl branching to internal monomethyl branching is at least about 1:1.5.

2. The base fluid of claim 1 wherein the ratio of terminal monomethyl branching to internal monomethyl branching is at least about 1:1.

3. The base fluid of claim 1 wherein the n-paraffins are present in an amount of at least about 20 wt % and wherein the ratio of terminal monomethyl branching to internal monomethyl branching is at least about 1.5:1.

4. The base fluid of claim 1 wherein the n-paraffins are present in an amount of at least about 40 wt % and wherein the ratio of terminal monomethyl branching to internal monomethyl is at least about 2:1.

5. The base fluid of claim 1 wherein the base fluid is a product of a Fischer-Tropsch reaction.

6. The base fluid of claim 5 wherein the Fischer-Tropsch reaction incorporates feed syngas having 10-60% N_2.

7. A drilling fluid comprising:

the base fluid of claim 1.

8. The drilling fluid of claim 7 further comprising:

at least one additive selected from the group of surfactants, viscosifiers, weighting agents, fluid loss control agents and proppants.

9. A drilling fluid comprising:

from about 2 to about 90 wt % olefins;

from about 2 to about 50 wt % isoparaffins; wherein the isoparaffins are substantially terminal monomethyl branched.

from about 5 to about 90 wt % n-paraffins; and

from about 0 to about 10 wt % oxygenates.

10. The drilling fluid of claim 9 wherein the olefins are present in an amount of from about 7 to about 10 wt %.

11. The drilling fluid of claim 9 wherein the isoparaffins are present in an amount of from about 3 to about 15 wt %.

12. The drilling fluid of claim 9 wherein the n-paraffins are present in an amount of from about 65 to about 90 wt %.

13. The drilling fluid of claim 9 wherein the oxygenates are present in an amount of from about 0 to about 5 wt %.

14. The drilling fluid of claim 9 wherein the base fluid is a product of Fischer-Tropsch reaction on a synthesis gas.

15. The drilling fluid of claim 14 wherein the Fischer-Tropsch reaction incorporates feed syngas having 10-60% N_2.

16. The drilling fluid of clam 14 wherein the synthesis gas is produced by autothermal reformation.

17. The drilling fluid of claim 16 wherein the autothermal reformation occurs in the presence of air.

18. The drilling fluid of claim 16 wherein the autothermal reformation occurs in the presence of 10-60% N_2.

19. The drilling fluid of claim 9 further comprising:

at least one additive selected from the group of surfactants, viscosifiers, weighting agents, fluid loss control agents and proppants.

20. The drilling fluid of claim 9 wherein the olefins are:

from about 7 to about 10 wt %;

the isoparaffins are from about 2 to about 15 wt %; wherein the isoparaffins are substantially terminal monomethyl branched.

The n-paraffins are from about 65 to about 90 wt %; and

the oxygenates are from about 0 to about 5 wt %.

21. The drilling fluid of claim 20 wherein the drilling fluid is a product of a Fischer-Tropsch reaction.

22. The drilling fluid of claim 20 further comprising:

at least one additive selected from the group of surfactants, viscosifiers, weighting agents, fluid loss control agents and proppants.

23. The drilling fluid of claim 20 wherein the base fluid comprises from about 25 to about 85 volume % of the drilling fluid.

24. The drilling fluid of claim 23 wherein the base fluid comprises from about 25 to about 85 volume % of the drilling fluid.

25. The drilling fluid of claim 22 wherein the Fischer-Tropsch reaction incorporates feed syngas having 10-60% N_2.

26. The drilling fluid of claim 23 wherein the feed syngas is produced by autothermal reformation in the presence of air.

27. A process for producing a drilling fluid comprising the steps of:

(a) producing a light Fischer-Tropsch liquid;

(b) distilling the light Fischer-Tropsch liquid to obtain a C_{13}-C_{20+} product having C_{13}-C_{20+} hydrocarbons and oxygenates.

(c) dehydrating all or a part of the alcohols in the C_{13}-C_{20+} product by passing the C_{13}-C_{20+} product over an activated alumina catalyst to produce a dehydrated product;

(d) recovering the dehydrated product; and

(e) separating the aqueous and organic phases of the dehydrated product.

28. The process of claim 27 further comprising the step of:

(f) adding one or more additive selected from the group of surfactants, viscosifiers, weighting agents, fluid loss control agents and proppants to the organic phase of the dehydrated product.

29. The process of claim 27 further comprising the step of (b_1) vaporizing the C_{13}-C_{20+} product before step (c) and after step (b).

30. The process of claim 29 wherein the dehydrated product from step (c) is in the gaseous state and step (d) further includes condensing the dehydrated product.

31. The process of claim 30 wherein the heat from condensing the dehydrated product is recycled to at least partially vaporize the C_{13}-C_{20+} product in step (b_1).

32. The process of claim 27 wherein the light Fischer-Tropsch liquid is produced from a feed syngas having 10-60% N_2.

33. The process of claim 27 wherein the feed syngas is produced by autothermal reformation in the presence of air.

34. The process of claim 27 wherein a C_{14}-C_{18} product is obtained in step (b) and dehydrated in step (c).

35. A method of drilling a borehole in a subterranean formation comprising the steps of:

(a) rotating a drill bit at the bottom of the borehole;

(b) introducing a drilling fluid into the borehole wherein the drilling fluid comprises a base fluid comprising:

from about 5 to about 90 wt % olefins;

from about 2 to about 50 wt % isoparaffins; wherein the isoparaffins are substantially terminal monomethyl branched;

from about 5 to about 90 wt % n-paraffins; and

from about 0 to about 10 wt % oxygenates.

36. The process of claim 35 wherein the drilling fluid comprises:

from about 7 to about 10 wt % olefins;

from about 2 to about 15 wt % isoparaffins; wherein the isoparaffins are substantially terminal monomethyl branched;

from about 65 to about 90 wt % n-paraffins; and

from about 0 to about 5 wt % oxygenates.

37. The process of claim 35 wherein the base fluid is derived from a Fischer-Tropsch reaction.

38. The process of claim 37 wherein the Fischer-Tropsch reaction incorporates feed syngas having 10-60% N_2.

39. The process of claim 37 wherein the feed syngas is produced by autothermal reformation in the presence of air.

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