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Señores

SUPERINTENDENCIA DE INDUSTRIA Y COME
DIVISION DE NUEVAS CREACIONES
E. S. D.

SUPERINDUSTRIA Y COMERCIO
Radicacion : 04001055 00000001 Folios: 51
Fecha (002): 2004-02-18 15:40:13
Tramite : 002 PATENTES D 1 REGISTRO/ 329 COMPLEMEN
Dependencia: 2020 DIVISION DE NUEVAS CREACIONES

REF: Expediente No. 04 001.055 - Solicitud de Patente

A favor de INTEVEP S.A.

Titulada: FLUIDO DE PERFORACIÓN CON ADITIVOS QUE REDUCEN LA
PÉRDIDA DE CIRCULACIÓN

RAMIRO CASTRO DUQUE, vecino de Bogotá, portador de la tarjeta profesional No. 1003, obrando como apoderado de la sociedad, INTEVEP S.A., según lo acredita el documento de poder protocolizado en esa División bajo el No. 14558, me permito anexar al presente escrito los siguientes documentos:

1. Documento donde consta la cesión del derecho a la Patente otorgado por los inventores al solicitante.
2. Copia certificada por la Oficina de Patentes de Estados Unidos de la primera solicitud presentada para la misma invención, de la cual REIVINDICAMOS PRIORIDAD, junto con su correspondiente traducción del inglés al castellano.
3. Dibujos formales.

De la señora Jefe atentamente,



RAMIRO CASTRO DUQUE
C.C. No. 170.322 de Bogotá
Código 340
Cra 7 No. 16-56 Piso 9

Bogotá, Febrero 17, 2004
CHP/MEV/hsr.

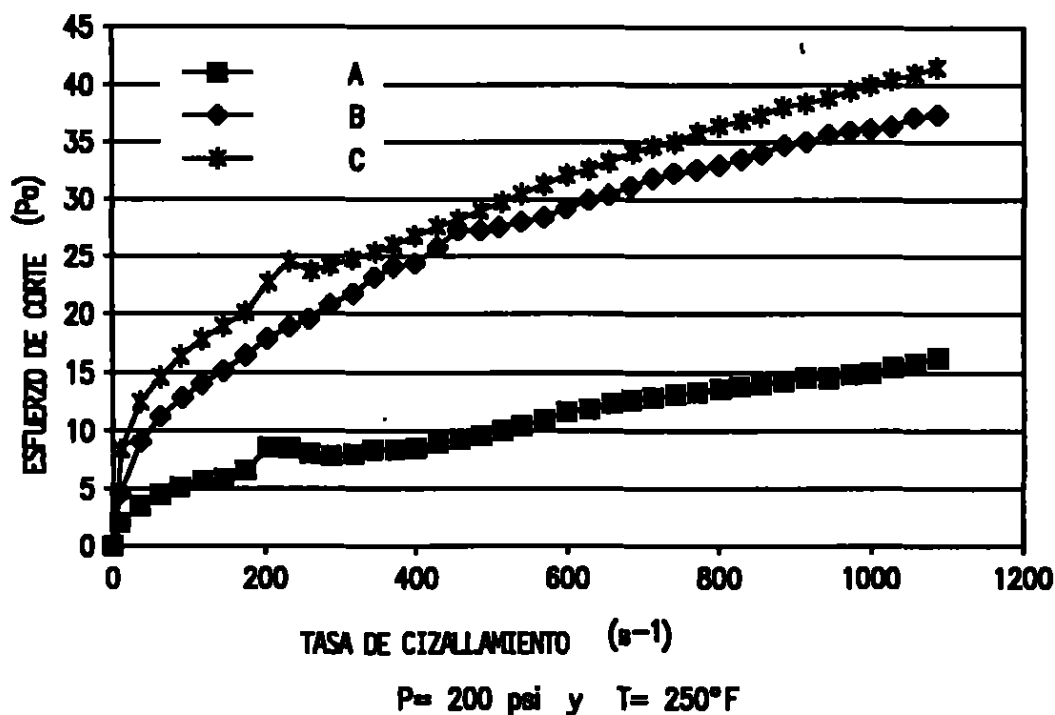


FIG. 1

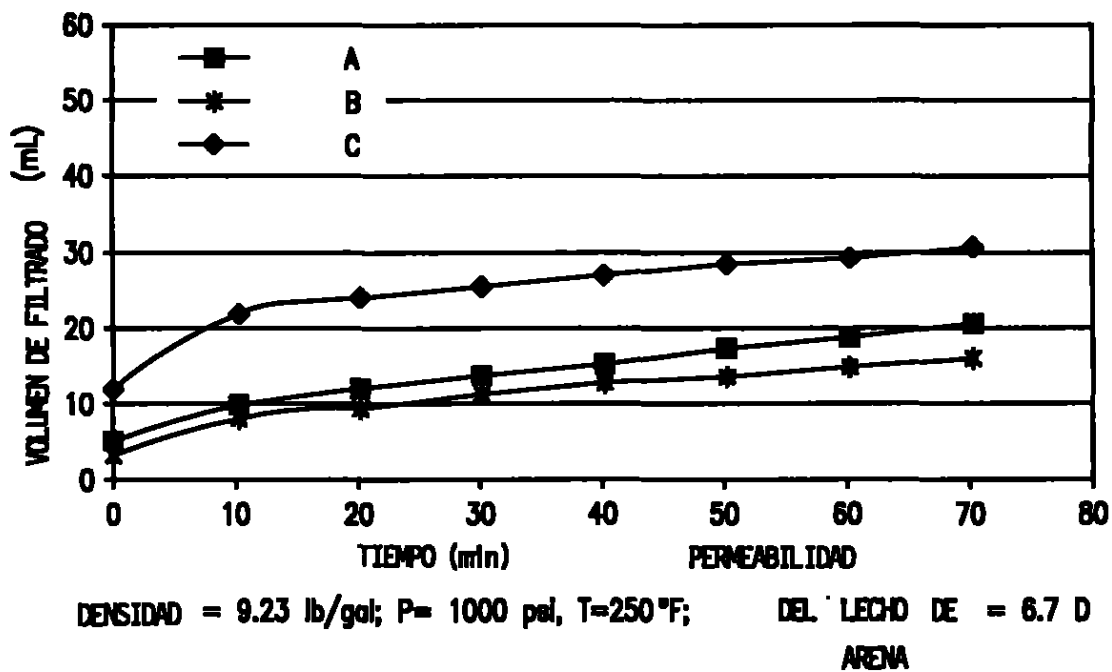


FIG. 2

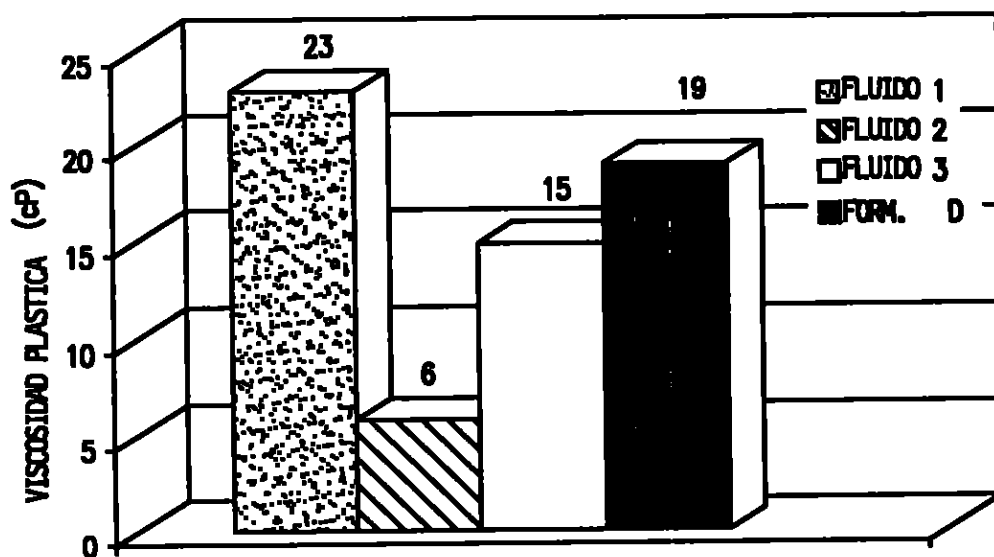


FIG. 3

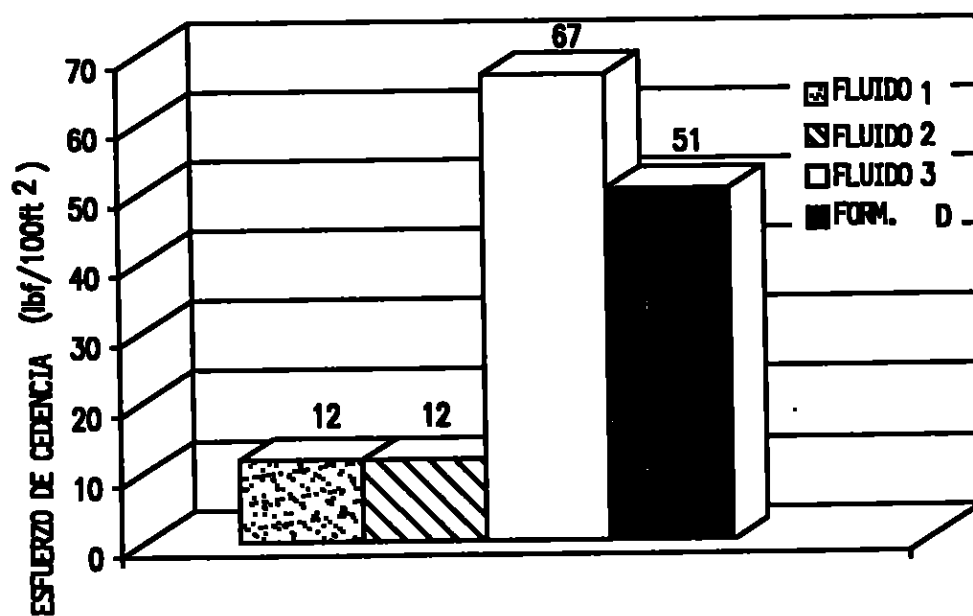
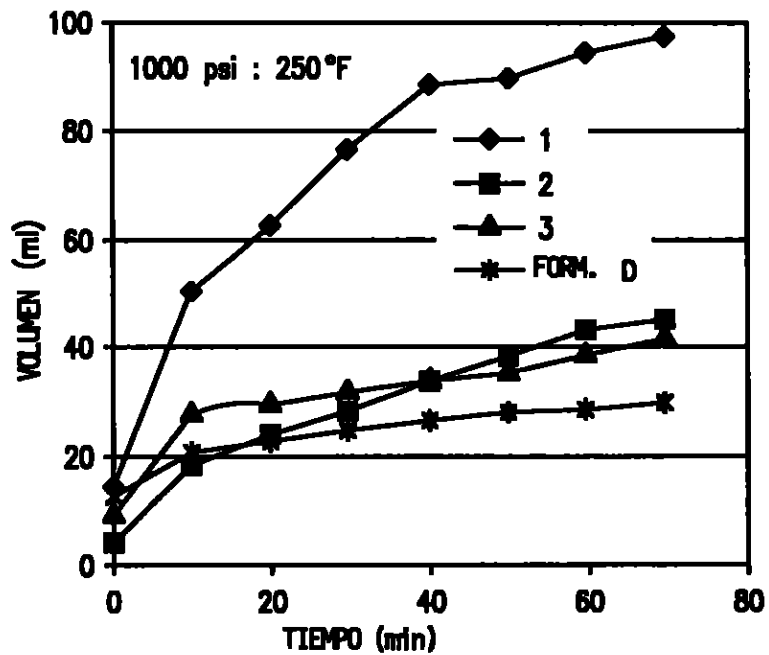


FIG. 4



DENSIDAD = 9.23 lb/gal; P=1000psi; T=250°F
 PERMEABILIDAD DE = 6.7 D
 LECHO DE ARENA

FIG. 5

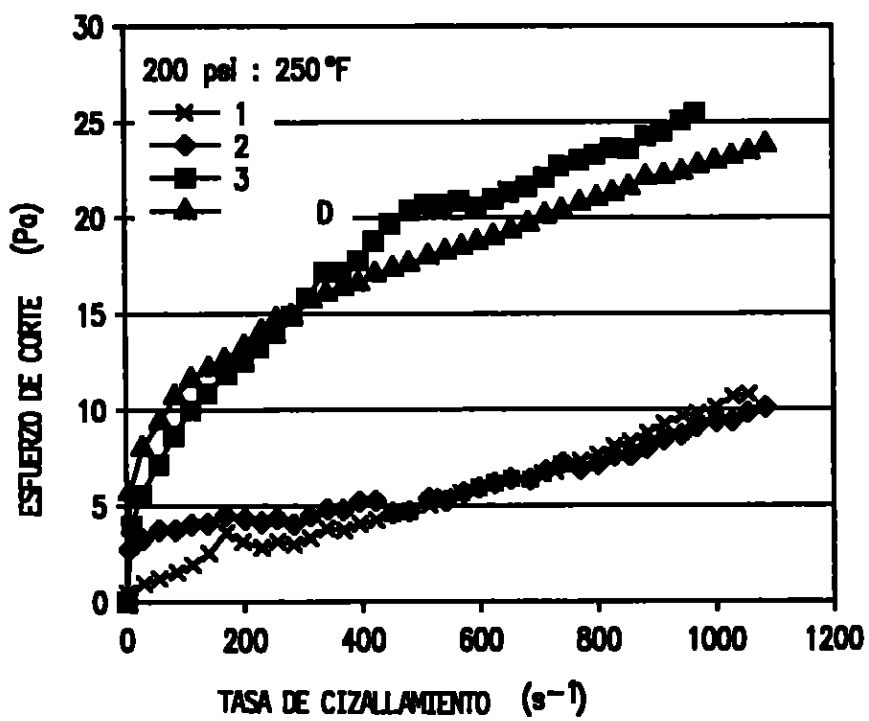


FIG. 6

45
846

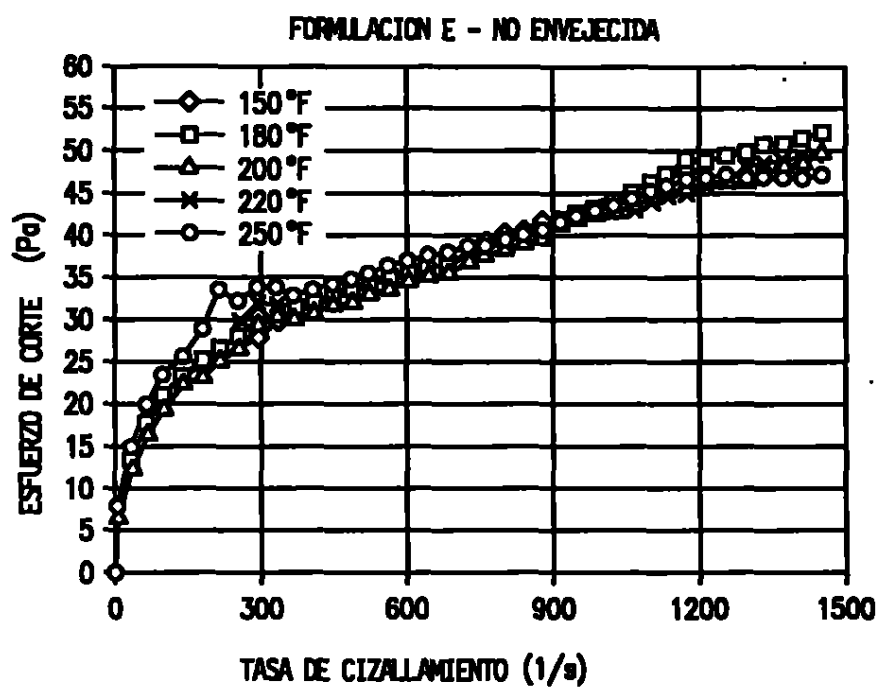


FIG. 7

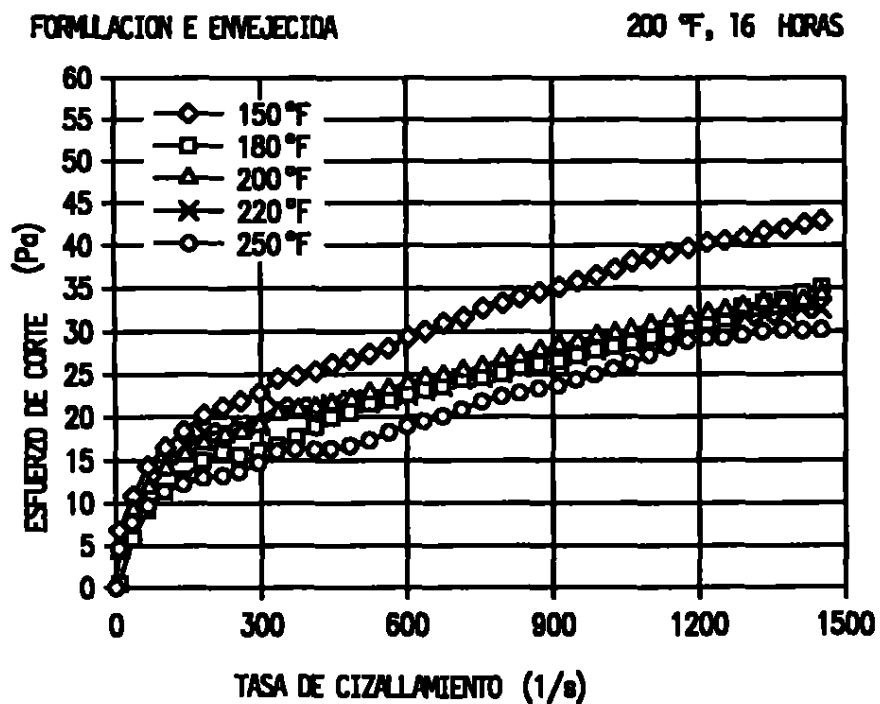


FIG. 8

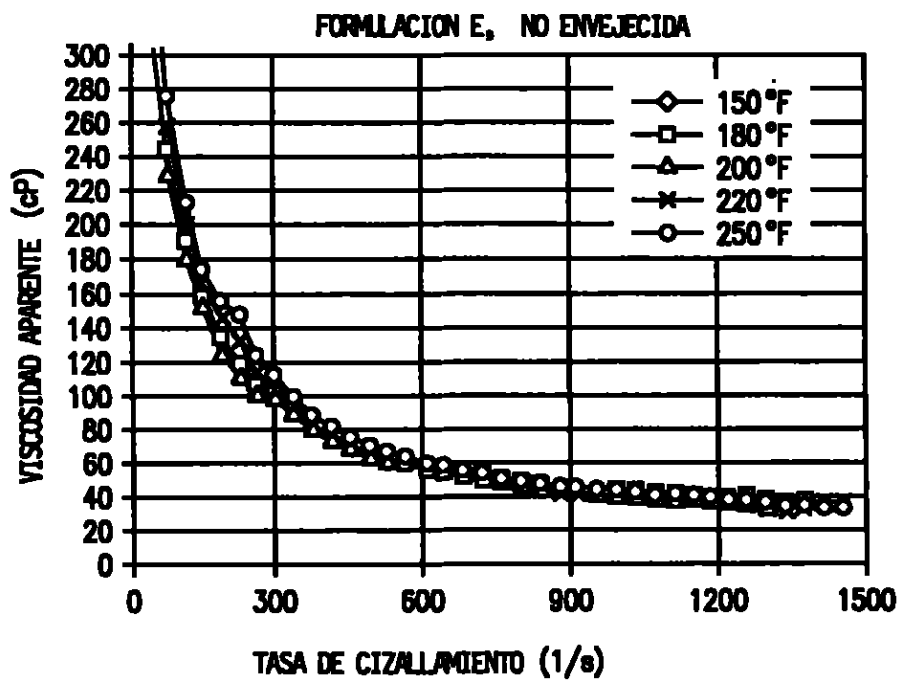


FIG. 9

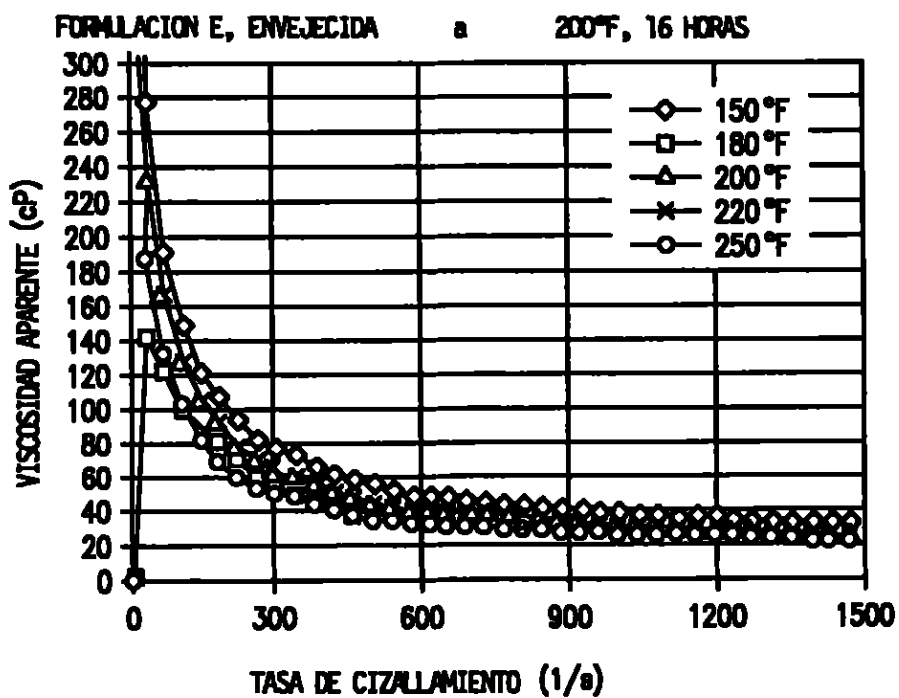


FIG. 10

47
48

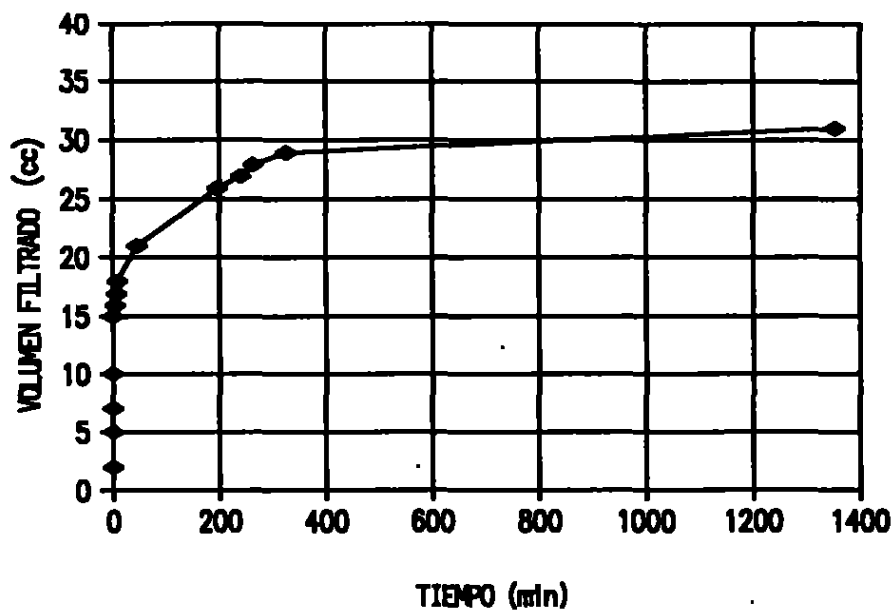


FIG. 11

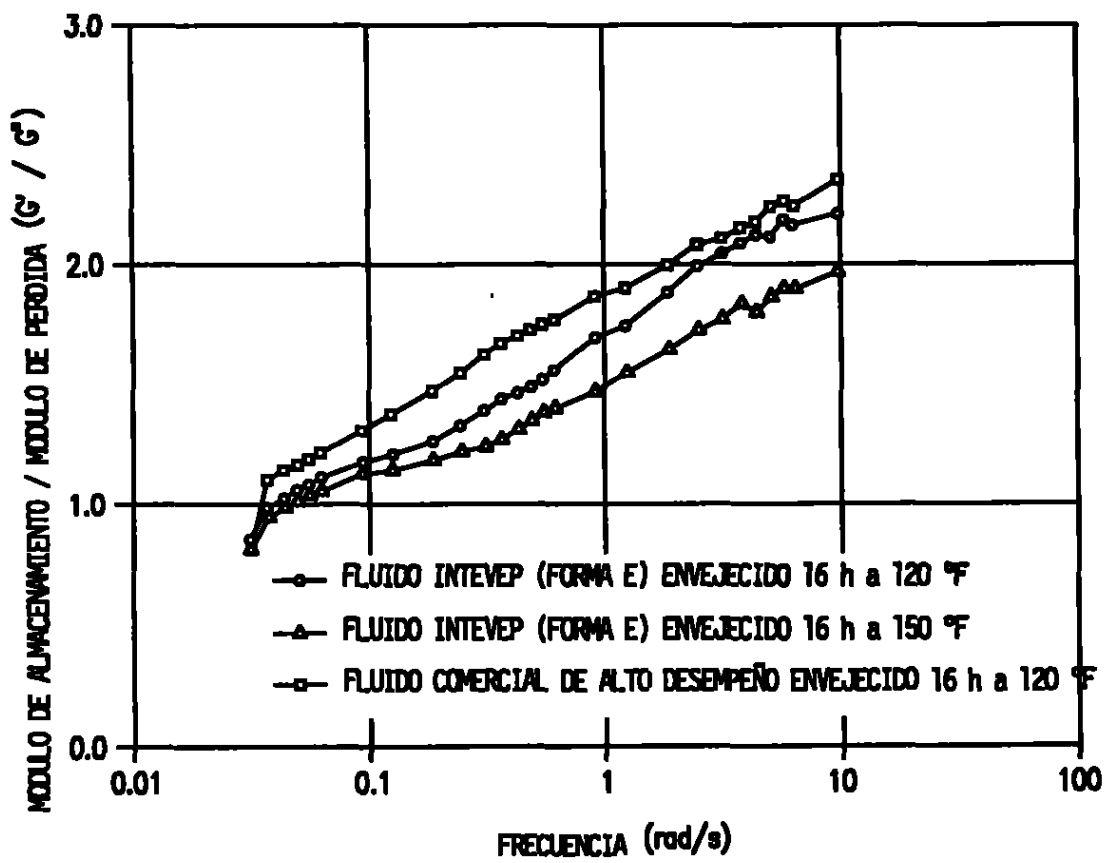


FIG. 12

PA 1112363

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FILING DATE UNDER 35 USC 111.**

APPLICATION NUMBER: 10/342,852**FILING DATE: January 15, 2003**

**By Authority of the
COMMISSIONER OF PATENTS AND TRADEMARKS**


P. SWAIN**Certifying Officer**

01/15/03

01-16-03

10342852-014503

49

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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No. 01-684
First Inventor Sarkis Kakadjian et al.
Title DRILLING FLUID WITH CIRCULATION LOSS
Express Mail Label No. EL394334975US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

- ☒ Fee Transmittal Form (e.g., PTO/BB/17)
(Submit an original and a duplicate for fee processing)
- ☐ Applicant claims small entity status.
See 37 CFR 1.27.
- ☒ Specification [Total Pages 18]
(preferred arrangement and form below)
 - Descriptive title of the invention
 - Cross Reference to Related Applications
 - Statement Regarding Fed sponsored R & D
 - Reference to sequence listing, a table, or a computer program listing appendix
 - Background of the invention
 - Brief Summary of the invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
- ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets 6]
- Oath or Declaration [Total Pages 5]
 - ☒ Newly executed (original or copy)
Copy from a prior application (37 CFR 1.63 (d))
(for continuation/divisional with Box 18 completed)
 - ☐ **DELETION OF INVENTOR(S)**
Signed statement attached deleting inventor(s)
named in the prior application, see 37 CFR
1.63(d)(2) and 1.52(d).
- ☐ Application Data Sheet. See 37 CFR 1.78

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 - Specification Sequence Listing are:
 - ☐ CD-ROM or CD-R (2 copies); or
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ACCOMPANYING APPLICATION PARTS

- ☒ Assignment Papers (cover sheet & document(s))
- ☐ 37 CFR 3.73(b) Statement [Power of Attorney]
(when there is an assignee)
- ☐ English Translation Document (if applicable)
- ☐ Information Disclosure Statement (IDS) PTO-1449 [Copies of IDS Claims]
- ☐ Preliminary Amendment
- ☒ Return Receipt Postcard (MPEP 603)
(Should be specifically itemized)
- ☐ Certified Copy of Priority Document(s)
(if foreign priority is claimed)
- ☐ Nonpublication Request under 35 U.S.C. 122
(b)(2)(B). Applicant must attach form PTO/BB/05
or its equivalent.
- ☐ Other:

18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment, or in an Application Data Sheet under 37 CFR 1.78:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP)

of prior application No. _____

Prior application information:

Resubmitter

Group Art Unit

For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 1b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

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City

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Fax

Name (Print/Type)

George A. Soud

Registration No. (Attorney/Agent)

34,309

Signature

Date

1/15/2003

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1/15/03
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FEE TRANSMITTAL
for FY 2003

Effective 01/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27TOTAL AMOUNT OF PAYMENT (\$)**790.00****Complete if Known**

Application Number	
Filing Date	
First Named Inventor	Sarkis Kakadjian et al.
Examiner Name	
Art Unit	
Attorney Docket No.	01-684

METHOD OF PAYMENT (check all that apply)☐ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None☒ Deposit Account:

Deposit Account Number	02-0184
Deposit Account Name	BACHMAN & LAPOINTE, P.C.

The Commissioner is authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☒ Credit any overpayments☒ Charge any additional fee(s) during the pendency of this application☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.**FEE CALCULATION****1. BASIC FILING FEE**

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1001 750	2001 375	Utility filing fee	750
1002 330	2002 165	Design filing fee	
1003 520	2003 260	Plant filing fee	
1004 750	2004 375	Reissue filing fee	
1005 180	2005 90	Provisional filing fee	
SUBTOTAL (1)			(\$) 750

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims	Extra Claims	Fee from Table	Fee Paid
20	-30** = 0	0	0
2	-3** = 0	0	0
Multiple Dependent		0	0

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1202 18	2202 9	Claims in excess of 20	
1201 84	2201 42	Independent claims in excess of 3	
1203 280	2203 140	Multiple dependent claims, if not paid	
1204 84	2204 42	** Release independent claims over original patent	
1205 18	2205 9	** Release claims in excess of 20 and over original patent	
SUBTOTAL (2)			(\$) 0

**or number previously paid, if greater; For Reissues, use above

FEE CALCULATION (continued)**3. ADDITIONAL FEES****Large Entity - Small Entity**

Fee Code (\$)	Fee Code (\$)	Fee Description	Fee Paid
1061 130	2061 65	Surcharge - late filing fee or oath	
1062 90	2062 28	Surcharge - late provisional filing fee or cover sheet	
1063 130	2063 130	Non-English specification	
1812 2,620	2812 2,620	For filing a request for ex parte reexamination	
1804 820	2804 820	Requesting publication of BRI prior to Examiner action	
1805 1,840	2805 1,840	Requesting publication of BRI after Examiner action	
1251 110	2251 55	Extension for reply within first month	
1252 410	2252 205	Extension for reply within second month	
1253 830	2253 415	Extension for reply within third month	
1254 1,430	2254 725	Extension for reply within fourth month	
1255 1,770	2255 885	Extension for reply within fifth month	
1401 320	2401 160	Notice of Appeal	
1402 320	2402 160	Filing a brief in support of an appeal	
1403 280	2403 140	Request for oral hearing	
1451 1,510	2451 1,510	Petition to institute a public use proceeding	
1462 110	2462 55	Petition to revive - unreasonable	
1453 1,300	2453 650	Petition to revive - unintentional	
1801 1,300	2801 650	Utility issue fee (or release)	
1502 470	2502 235	Design issue fee	
1603 630	2603 315	Plant issue fee	
1480 130	2480 130	Petitions to the Commissioner	
1807 80	2807 80	Processing fee under 37 CFR 1.17(a)	
1808 180	2808 180	Submission of Information Disclosure Sheet	
8021 40	28021 40	Recording each patent assignment per property (times number of properties)	40
1809 750	2809 375	Filing a submission after final rejection (37 CFR 1.128(a))	
1810 750	2810 375	For each additional invention to be examined (37 CFR 1.128(b))	
1801 750	2801 375	Request for Continued Examination (RCE)	
1802 900	2802 900	Request for expedited examination of a design application	
Other fee (specify)			
Reduced by Basic Filing Fee Paid			
SUBTOTAL (3)			(\$) 40

SUBMITTED BY

Name (Print/Type)	George A. Courty	Registration No.	34,309	Telephone	(203) 777-6628
Signature		Date	1/15/2003		

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January 15, 2003

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1/15/03
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DRILLING FLUID WITH CIRCULATION LOSS REDUCING ADDITIVE PACKAGEBACKGROUND OF THE INVENTION

The invention relates to drilling fluid and, more particularly, to drilling fluids including a circulation loss reducing additive package which is particularly useful in high permeability reservoirs and the like.

When drilling through highly permeable, unconsolidated or micro-fractured formations, for example while drilling wells to hydrocarbon-bearing subterranean formations and the like, fluid is circulated through the hole to lubricate the drill bit, remove cuttings from the bottom of the hole, control pressure within the hole and for other reasons.

Unfortunately, highly permeable, unconsolidated or micro-fractured formations allow flow of the drilling fluid to leave the hole, which is called lost circulation. This fluid loss into the formations through which the hole is being drilled results in extra cost due to the need for constantly replacing the fluid, and further can result in damage to potentially valuable and hydrocarbon bearing formations.

It is clear that the need remains, therefore, for drilling fluids that can be used in highly permeable, unconsolidated or micro-fractured formations and the like, without substantial circulation losses.

It is therefore the primary object of the present invention to provide such a drilling fluid.

Other objects and advantages of the present invention will appear hereinbelow.

SUMMARY OF THE INVENTION

In accordance with the present invention, the foregoing objects and advantages have been readily obtained.

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According to the invention, a drilling fluid is provided which comprises a base fluid and a circulation loss reducing additive package comprising a polysaccharide, a cellulose derivative and a pH controlling component. 54

In further accordance with the invention, the additive package preferably also includes starches, bridging agents, anti-oxidants and biocides, as well as other additives which may be desirable for particular applications.

In still further accordance with the present invention, a circulation loss reducing additive package is provided comprising a polysaccharide, a cellulose derivative and a pH controlling component.

BRIEF DESCRIPTION OF THE DRAWINGS

A detailed description of preferred embodiments of the present invention follows, with reference to the attached drawings, wherein:

Figure 1 schematically illustrates shear rate verses shear stress for fluids in accordance with the present invention after aging for sixteen hours at a temperature of 250°F;

Figure 2 graphically illustrates filtrate volume over time for drilling fluids in accordance with the present invention;

Figures 3 and 4 illustrate plastic viscosity and yield point for conventional drilling fluids and a drilling fluid in accordance with the present invention;

Figure 5 graphically illustrates filtration loss over time for a fluid in accordance with the present invention and for conventional fluids;

Figure 6 graphically illustrates shear stress verses shear rate for a fluid in accordance with the present invention as compared to conventional fluids;

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Figures 7 and 8 illustrate shear stress verses shear rate for a further fluid in accordance with the present invention, before and after aging for sixteen hours at a temperature of 200°F;

Figures 9 and 10 graphically illustrate apparent viscosity verses shear rate in accordance with the present invention, before aging and after aging for sixteen hours at a temperature of 200°F;

Figure 11 graphically illustrates filtrate volume over time for a further fluid in accordance with the present invention; and

Figure 12 illustrates storage modulus/loss ratio over a range of frequencies.

DETAILED DESCRIPTION

The invention relates to a drilling fluid and, more particularly to a drilling fluid including an additive package for controlling circulation loss which is well suited for use in drilling through highly permeable, unconsolidated or micro-fractured formations and the like.

In accordance with the invention, a drilling fluid, preferably a water based drilling fluid, is provided including a circulation loss reducing additive package which includes a polysaccharide component which helps to improve rheology and reduce filtration losses, a cellulose derivative component which also serves to improve rheology and reduce filtration losses, and a pH controlling component. The polysaccharide component and cellulose derivative component combine to provide the fluid with excellent elastic properties.

In further accordance with the invention, it is preferred to also incorporate starches, bridging agents, anti-oxidants, biocides and other components into the additive package of the

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present invention as will be further described below and package containing all of these components provides particularly effective fluid loss control.

In accordance with the present invention, it has been found that drilling fluids containing the additive package in accordance with the present invention advantageously demonstrate much lower circulation losses when used in drilling through highly permeable, unconsolidated, micro-fractured and similar formations. Such drilling fluid formulations containing the additive package of the present invention further demonstrate desirable shear properties, filtrate loss, plastic viscosity and yield point, and apparent viscosity.

The polysaccharide component is preferably a non or low ionic charge polysaccharide.

In accordance with the invention, a preferred non-ionic polysaccharide is a non-ionic polysaccharide having double helix or triple helix configuration, or combinations thereof, in aqueous solutions. A particularly preferable non-ionic polysaccharide is scleroglucan which can be purified (CS11-Degussa) or not (Biovis or Actigum CS-Degussa), which, in combination with the cellulose derivative and bridging agent components, provide the fluid with improved viscoelastic, rheological and sealing properties

Suitable low ionic charge polysaccharides include xanthan gum, which can be clarified or not, and further which can be acetylated or not. Commercial examples of suitable non and low ionic polysaccharides include Actigum CS, from Degussa, Xanvis, Diutam and NAX, all from CP Kelco. Of course, other non or low ionic charge polysaccharides can also be used in accordance with the broad scope of the present invention.

In addition, the additive in accordance with the present invention also preferably includes a cellulose derivative

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component which can preferably be provided in the form of hydroxypropyl cellulose, carboxymethyl hydroxyethyl cellulose, hydroxyethyl cellulose, hydrophobically modified cellulose and the like, preferably hydroxyethyl cellulose. This component of the additive package, combined with the polysaccharide component, advantageously serves to improve rheological and viscoelastic properties of the drilling fluid, and also serves to reduce filtration losses or losses of fluid into a high permeability, unconsolidated or micro-fractured formation.

In accordance with the present invention, the additive further preferably includes a pH controlling component or additive, and this pH controlling component can advantageously be selected from the group consisting of monoethanolamine, ethanolamine, magnesium oxide, triethanolamine, sodium hydroxide, sodium carbonate, potassium carbonate and combinations thereof. The pH controlling additive is preferably added so as to pH at desired levels, preferably up to about 12.

A further component of the additive package in accordance with the present invention may preferably be a starch or starch derivative, which advantageously serves to provide further filtrate volume control. Examples of suitable starch or starch derivative components include carboxymethyl starch, hydroxyethyl starch, hydroxypropyl starch, starches cross-linked with etherifying and/or esterifying agents and the like, preferably slightly cross-linked starches such as FL-7 Plus, M-I Drilling Fluids. These starches, starch derivatives and modified starches are collectively referred to herein as a starch component.

A bridging agent is preferable to include to achieve good filtration control and low fluid loss, and a particularly preferred bridging agent is calcium carbonate. Sized calcium carbonate, such as Milcarb from Baker Hughes Inteq, is

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particularly suitable for use in the package of the present invention. The size of the calcium carbonate particle is selected to avoid formation damage and also to control fluid loss. Although calcium carbonate serves mainly as a bridging agent, to control fluid loss into the reservoir, calcium carbonate also serves to increase density of the fluid as desired so as to provide a final fluid having the desired density.

A still further component which may be included in the additive package of the present invention is an antioxidant component, and suitable antioxidants include sodium bisulfite, sodium sulfite and the like, preferably sodium bisulfite. These components serve to protect the biopolymers used in the additive package and drilling fluid formulation from oxidation, and thereby help to maintain the molecular weight of the polymers relatively constant as desired.

A biocide component is also preferably incorporated into the additive package of the present invention. Suitable biocide components include isothiazolones, glutaraldehyde, quaternary amines and the like. The biocide component advantageously serves to avoid undesirable hydrolysis of biopolymers in the formulation by reducing oxidative and enzymatic degradation of same.

In accordance with the present invention, the fluid itself can advantageously be water-based, and thus the base fluid may be water. Of course, other base fluids can be used as well. However, water based fluids are preferable in that the cost of the base fluid is desirably low, and the additives perform as desired in a water base.

A drilling fluid containing a circulation reducing additive package according to the invention preferably includes at least about 0.05 ppb of polysaccharide component, at least about 0.05

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ppb of cellulose derivative component, at least about 1.0 ppb of pH controlling component, at least about 0.05 ppb of starch component, at least about 20 ppb of bridging agent, at least about 1.0 ppb of antioxidant and at least about 0.05 ppb of biocide, all taken with respect to weight of the component per barrel of drilling fluid.

Table 1 below sets forth preferred ranges and specific values for amounts of the various components of a drilling fluid and drilling fluid additive in accordance with the present invention.

TABLE 1

	Preferred range	Preferred values
Guar gum derivative (CMHPG) (ppb)	0.05-5	2.36
Hydroxyethylcellulose (HEC) (ppb)	0.05-5	1.15
Scleroglucan (ppb)	0.05-4	2.00
Xanthan gum (ppb)	0.05-4	2.00
Starch (ppb)	0.05-5	4.00
Biocide (ppb)	0.05-0.50	0.02
Sodium bisulfite (ppb)	1.00-2.00	2.00
Monoethanolamine (ppb)	1.00-2.00	1.00
Magnesium oxide (ppb)	0.25-2.00	0.50
Potassium chloride (ppb)	0-7.00	7.00
Calcium carbonate (ppb)	from at least about 20 to amount needed to reach weight	10 2
Mineral oil (% v/v) (*)	0-15	
Clay swelling inhibitor (% v/v) (**)	0-3	

Magnesium oxide may be used instead of the monoethanolamine as the pH controller agent

(*) Mineral oil is used to improve lubricity during drilling operation

(**) This additive is used only when drilling through reservoirs containing reactive shale.

Further examples of specific combinations of additive components include combinations such as those illustrated in Table 2 below.

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TABLE 2

Additive	Form. A	Form. B	Form. C	Form. D	Main function
Water (bbl)	0.950	0.950	0.950	0.950	Fluid base
Guar gum derivative (CMHFG) (ppb)	2.36	0	2.36	0	Viscosifier
Hydroxyethylcellulose (HEC) (ppb)	0	2.36	0	1.15	Filtration control agent
Scleroglucan (ppb)	2.00	2.00	0	2.00	Main viscosifier
Xanthan gum (ppb)	0	0	2.00	0	Main viscosifier
Starch (ppb)	4.00	4.00	4.00	4.00	Filtration control agent
Biocide (ppb)	0.20	0.20	0.20	0.20	Biocide
Sodium bisulfite (ppb)	2.00	2.00	2.00	2.00	Antioxidant
Monoethanolamine (ppb)	1.00	1.00	1.00	1.00	Buffer agent
Potassium chloride (ppb)	7.00	7.00	7.00	7.00	Inhibitive agent (shales)
Calcium carbonate (ppb)	60.0	60.00	60.00	60.00	Bridging agent

In accordance with the present invention, the drilling fluid can advantageously be prepared by sequentially mixing in the various additive components into the base fluid.

For example, assuming water is the base fluid, a starting volume of water may advantageously first be mixed with potassium chloride, then fumaric acid and then the hydroxyethylcellulose. After these components, then biocide materials can be added, followed by sodium bisulfides, scleroglucan, starch and finally calcium carbonate, each with a mixing time of between about 5 and about 20 minutes before addition of the next component.

Of course, other methods can be used to prepare the drilling fluid well within the scope of the present invention.

It has been found that fluids prepared in accordance with the present invention have excellent high pressure, high temperature rheological and viscoelastic properties. For example, a fluid prepared in accordance with the present invention was aged for sixteen hours at a temperature of about 250°F, and then subjected to HPHT rheological property testing, and the results are shown in Figure 1. As shown, formulas A, B and C from Table 2 each provided excellent shear stress over shear rate, as desired.

These same fluids, formulas A, B and C from Table 2, were then also evaluated for filtration properties after aging at

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250°F for a period of sixteen hours, and the results are shown in Figure 2. As shown in this figure, although the filtrate volume loss was most ideal for formula B, and least ideal for formula C, the values obtained are nevertheless excellent, particularly as compared to conventional fluids.

EXAMPLE 1

In order to compare to conventional fluids, a series of fluids were prepared, with fluids 1-3 being prepared according to conventional or commercially available formulas, and with formula D being prepared in accordance with the present invention, the components of each of these fluids are shown below in Tables 3-6.

TABLE 3

Service company No. 1

Additives	Concentration	Mixing time (min)
Water	0.976 bbl	-
Fumaric acid	0.30 lb/bbl	5
HEC	2 lb/bbl	10
Biocide	0.20 lb/bbl	5
Sodium bisulfite	2 lb/bbl	5
Starch	4 lb/bbl	15
Calcium carbonate	60 lb/bbl	20

TABLE 4

Service company No. 2

Additives	Concentration	Mixing time (min)
Water	0.971 bbl	-
Xanthan gum	2 lb/bbl	15
Magnesium oxide	2 lb/bbl	5
Biocide	0.20 lb/bbl	5
Sodium bisulfite	2 lb/bbl	5
Starch	4 lb/bbl	15
Calcium carbonate	60 lb/bbl	20

TABLE 5

Service company No. 3

Additives	Concentration	Mixing time (min)
Water	0.976 bbl	-
Polymer 1	5 lb/bbl	15
First activator	1 lb/bbl	15
Second activator	1 lb/bbl	5
Polymer 2	1 lb/bbl	5
Polymer 3	1 lb/bbl	5
Calcium carbonate	60 lb/bbl	20

TABLE 6

Formulation D		
Additives	Concentration	Mixing time (min)
Water	0.950 bbl	-
Potassium chloride	7 lb bbl	5
Fumaric acid	0.05 lb/bbl	5
HEC (hydroxyethylcellulose)	1.15 lb/bbl	10
Biocide	0.20 lb/bbl	5
Sodium bisulfite	2 lb/bbl	5
Scleroglucan	2 lb/bbl	10
Starch	4 lb/bbl	15
Calcium carbonate	60 lb/bbl	20

The plastic viscosity and yieldpoint were then determined, at 120°F, and after sixteen hours of aging at 250°F, and the results of this evaluation are shown in Figures 3 and 4. As shown, the fluid in accordance with the present invention provides excellent properties as desired. This is particularly advantageous when combined with the filtration loss control properties of the fluid of the present invention as well.

The filtration loss was then measured, after aging for sixteen hours at 250°F, for the conventional formulations and also the formulations in accordance with the present invention as described in connection with Tables 3-6 above. These formulations were evaluated and the results are shown in Figure 5. As shown, the fluid of the present invention had the best characteristics in terms of low volume of filtration loss over time.

Fluid loss sealing tests were run with commercial formulations, that is, commercial fluids 1, 2 and 3, and formulation D in accordance with the present invention. After plotting filtrate volume as a function of time for all formulations, new curves were plotted dividing filtrate volume between area of filtration and extracting the square root of time, in order to determine the spurt loss values and Cw coefficients - intercepts and slopes of the curves, as indicated by filtration theory. Table 7 shows the data obtained.

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TABLE 7

Fluids	Cw (cm/min ⁴)	Spurt loss (mL/cm ²)
Commercial fluid 1	0.324	0.558
Commercial fluid 2	0.155	0.095
Commercial fluid 3	0.109	0.406
Form. D	0.063	0.435

Table 7 shows that the fluid of the present invention has excellent properties in connection with Cw coefficients and spurt loss.

Next, the conventional fluids and fluid in accordance with the present invention were evaluated for shear stress verses shear rate after aging at a temperature of 250°F for a period of sixteen hours. The results of this testing are shown in Figure 6, and show excellent performance of the fluid in accordance with the present invention as compared to the commercial formulas, which is particularly advantageous in light of the filtration control qualities of the fluid of the present invention.

A further fluid was prepared in accordance with the present invention, and this formulation, designated Formulation E, was prepared as shown in Table 8 below.

Table 8

Additives	Concentrations
Hydroxyethylcellulose	3.0 (lb/bbl)
Scleroglucan	2.0 (lb/bbl)
Starch	2.5 (lb/bbl)
Biocide	0.15 (lb/bbl)
Magnesium oxide	0.5 (lb/bbl)
KCl	2.0 (%)
CaCO ₃	20.0 (lb/bbl)
Mineral oil	10.0 (%)
Clay swelling inhibitor	2.0 (%)

Formulation E was evaluated in a series of tests so as to determine shear stress verses shear rate for various temperatures after no aging, and after aging for sixteen hours at a temperature of 200°F. Figures 7 and 8 show the results of

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this testing, and show excellent results for the fluid of the present invention, both prior to and after aging.

The measurements obtained in order to show Figures 7 and 8 are based upon parameters derived from adjustment to a Bingham model (between 350 and 1450.1/s). Further, data was obtained from a Haake HPHT viscometer at a pressure of 300 psi and at different temperatures and this data is set forth in Table 9 below.

Table 9

Temperature (°F)	No aging		Aged at 200°F, 16 hours	
	Plastic viscosity (cP)	Yield Point (lb/100sq. ft.)	Plastic viscosity (cP)	Yield Point (lb/100sq. ft.)
150	20.6	48	17.9	51
180	20.9	46	15.2	26
200	18.1	50	13.1	34
220	15.4	55	12.6	31
250	14.4	57	15.7	20

The properties of formulation E were further evaluated so as to determine apparent viscosity as a function of shear rate, and the results of this testing are shown in Figures 9 and 10. Figures 9 and 10 demonstrate that apparent viscosity is maintained as desired even after aging at 200°F, and that the apparent viscosity is not affected by increases in temperature in the range of 150°F-250°F.

Permeability return tests were then carried out as follows.

A semi-dynamic test was run at a temperature of 150°F and filtrate volume using a fluid prepared with formulation E was measured.

The core conditions for carrying out this evaluation include a Berea core type, permeability of 500 mD, formation water containing approximately 2% wt. KCl, crude oil from a field in Western Venezuela, and the additive package of Formulation E. Figure 11 shows the filtrate volume obtained with this formulation, and the test further shows an initial mobility of 1.04 mD/cP, a final mobility of 0.84 mD/cP, and a

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delta P of 1000 psi, and a formation damage of 18.87% had occurred.

Formulation E in accordance with the present invention was also evaluated to determine storage and loss moduli as a function of frequency at a deformation located in the linear viscoelastic range, by using an oscillatory rheometer. Moduli of a high commercial viscoelastic fluid were also evaluated and compared to results obtained using Formulation E. Both formulations had been aged for 16 hours at 120°F before taking of these measurements, and Figure 12 shows the results in terms of the storage modulus/loss modulus (G'/G''), vs. frequency. Figure 12 shows that Formulation E has G'/G'' values that are comparable to those of the high performance commercial viscoelastic fluid, and both fluids have a high elastic component over a wide range of frequencies, since the G'/G'' ratio is greater than unity. Such fluids are reported to provide better cuttings suspension and hole cleaning functions when used as drilling fluids. Thus, Formulation E provides a drilling fluid having desirable cutting suspension properties and sealing properties, and elasticity is comparable to high performance commercial viscoelastic fluids.

In addition, Formulation E was also subjected to this testing after having been aged at a temperature 150°F for 16 hours, and even after such aging Formulation E holds elasticity over a wide range of frequencies as demonstrated by the ratio G'/G'' which is still greater than unity.

A displacement test was conducted for a fluid similar to Formulation E, but not having the CaCO_3 additive. The test was conducted under severe conditions to maximize formation damage and to simulate fluid invasion. The core type was Berea, with a 500 mD permeability, and fluid conditions included 2% KCl, West Venezuela crude, and Formulation E in the form of an additive

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package according to the invention. The test was conducted under these conditions to maximize potential damage and simulate fluid invasion of the well.

This was done at a fluid injection pressure of 1500 psi, a fluid injection volume of about 5 pore volumes, and a fluid soaking time of about sixteen hours.

The results obtained include an initial mobility of 0.78 mD/cP, a final mobility of 0.59 mD/cP, a percent damage of 24.44, and a final delta P which was higher than an initial delta P.

The drilling fluid of the present invention was also field tested during the drilling of a horizontal reservoir in Western Venezuela. The fluid weight was 8.8 ppg, and estimated production was 800 bpd. Real production reached 1500 bpd, and no operational problems were observed during the entire course of the operation. Thus, field testing confirmed the excellent performance of the fluid of the present invention.

It should readily be appreciated that an additive package has been provided in accordance with the present invention which provide excellent results in terms of creating drilling fluid that have desirable properties for use in high permeability reservoirs.

It is to be understood that the invention is not limited to the illustrations described and shown herein, which are deemed to be merely illustrative of the best modes of carrying out the invention, and which are susceptible of modification of form, size, arrangement of parts and details of operation.. The invention rather is intended to encompass all such modifications which are within its spirit and scope as defined by the claims.

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WHAT IS CLAIMED IS:

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1. A drilling fluid, comprising:
a base fluid; and
a circulation loss reducing additive package comprising a polysaccharide, a cellulose derivative and a pH controlling component.
2. The fluid of claim 1, wherein said polysaccharide is selected from the group consisting of non-ionic polysaccharides, low ionic charge polysaccharides, and combinations thereof.
3. The fluid of claim 1, wherein said polysaccharide is selected from the group consisting of double helix compounds, triple helix compounds and combinations thereof.
4. The fluid of claim 1, wherein said polysaccharide is scleroglucan.
5. The fluid of claim 1, wherein said cellulose derivative is selected from the group consisting of hydroxypropyl cellulose, carboxymethyl hydroxyethyl cellulose, hydroxyethyl cellulose, hydrophobically modified cellulose, and combinations thereof.
6. The fluid of claim 1, wherein said cellulose derivative is hydroxyethyl cellulose.

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7. The fluid of claim 1, wherein said pH controlling additive is selected from the group consisting of monoethanolamine, ethanolamine, magnesium oxide, triethanolamine, sodium hydroxide, sodium carbonate, potassium carbonate and combinations thereof.

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8. The fluid of claim 1, wherein said additive package further comprises a starch component.

9. The fluid of claim 7, wherein said starch component is selected from the group consisting of carboxymethyl starch, hydroxyethyl starch, hydroxypropyl starch, starches cross-linked with etherifying agents, starches cross-linked with esterifying agents and combinations thereof.

10. The fluid of claim 1, wherein said additive package further comprises a bridging agent component.

11. The fluid of claim 10, wherein said bridging agent component is calcium carbonate.

12. The fluid of claim 1, wherein said additive package further comprises an antioxidant component.

13. The fluid of claim 12, wherein said antioxidant component is selected from the group consisting sodium bisulfite, sodium sulfite and combinations thereof.

14. The fluid of claim 12, wherein said antioxidant is sodium bisulfite.

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15. The fluid of claim 1, wherein said additive package further comprises a biocide component.

16. The fluid of claim 15, wherein said biocide component is selected from the group consisting of isothiazolones, glutaraldehyde, quaternary amines and combinations thereof.

17. A circulation loss reducing additive package, comprising a polysaccharide, a cellulose derivative and a pH controlling component.

18. The circulation loss reducing additive package of claim 17, further comprising a starch, a bridging agent, antioxidant and a biocide.

19. The circulation loss reducing additive package of claim 18, wherein said pH controlling additive is selected from the group consisting of monoethanolamine, ethanolamine, magnesium oxide, triethanolamine, sodium hydroxide, sodium carbonate, potassium carbonate and combinations thereof.

20. The circulation loss reducing additive package of claim 19, wherein said starch component is selected from the group consisting of carboxymethyl starch, hydroxyethyl starch, hydroxypropyl starch, starches cross-linked with etherifying agents, starches cross-linked with esterifying agents and combinations thereof, wherein said bridging agent is calcium carbonate, wherein said antioxidant component is selected from the group consisting of sodium bisulfite, sodium sulfite and combinations thereof and wherein said biocide component is selected from the group consisting of isothiazolones, glutaraldehyde, quaternary amines and combinations thereof.

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ABSTRACT

A drilling fluid includes a base fluid and a circulation loss reducing additive package having a polysaccharide, a cellulose derivative and a pH controlling component.

PATENT

Attorney's Docket No. 01-684

COMBINED DECLARATION AND POWER OF ATTORNEY
(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT, SUPPLEMENTAL, DIVISIONAL,
CONTINUATION OR CIP)

As a below named inventor, I hereby declare that:

TYPE OF DECLARATION

This declaration is of the following type: (check one applicable item below)

- ☒ original
☐ design
☐ supplemental

NOTE: If the declaration is for an International Application being filed as a divisional, continuation or continuation-in-part application, do not check next item; check appropriate one of last three items.

- ☐ national stage of PCT

NOTE: If one of the following 3 items apply, then complete and also attach ADDED PAGES FOR DIVISIONAL, CONTINUATION OR CIP.

- ☐ divisional
☐ continuation
☐ continuation-in-part (CIP)

INVENTORSHIP IDENTIFICATION

WARNING: If the inventors are each not the inventors of all the claims, an explanation of the facts, including the ownership of all the claims at the time the last claimed invention was made, should be submitted.

My residence, post office address and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TITLE OF INVENTION

DRILLING FLUID WITH CIRCULATION LOSS REDUCING ADDITIVE PACKAGE

SPECIFICATION IDENTIFICATION

the specification of which: (complete (a), (b) or (c))

- (a) ☒ is attached hereto.
(b) ☐ was filed on _____ as ☐ Serial No. 0 / _____
or ☐ Express Mail No., as Serial No. not yet known _____
and was amended on _____ (if applicable).

NOTE: Amendments filed after the original papers are deposited with the PTO which contain new matter are not accorded a filing date by being referred to in the declaration. Accordingly, the amendments involved are those filed with the application papers or, in the case of a supplemental declaration, are those amendments claiming matter not encompassed in the original statement of invention or claims. See 37 CFR 1.67.

- (c) ☐ was described and claimed in PCT International Application No. _____ filed on _____ and as amended under PCT Article 19 on _____ (if any).

(Declaration and Power of Attorney [1-1]—page 1 of 5)

ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information

- ☒ which is material to patentability as defined in 37, Code of Federal Regulations, § 1.56

(also check the following items, if desired)

- ☒ and which is material to the examination of this application, namely, information where there is a substantial likelihood that a reasonable examiner would consider it important in deciding whether to allow the application to issue as a patent, and

- ☐ In compliance with this duty there is attached an information disclosure statement in accordance with 37 CFR 1.98.

PRIORITY CLAIM (35 U.S.C. § 119)

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate or of any PCT International application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT International application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

(complete (c) or (e))

- (c) ☒ no such applications have been filed.

- (e) ☐ such applications have been filed as follows.

NOTE: Where item (e) is entered above and the International Application which designated the U.S. itself claimed priority check item (e), enter the details below and make the priority claim.

**A. PRIOR FOREIGN/PCT APPLICATION(S) FILED WITHIN 12 MONTHS
(6 MONTHS FOR DESIGN) PRIOR TO THIS APPLICATION
AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. § 119**

COUNTRY (OR INDICATE IF PCT)	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 37 USC 119
			☐ YES NO ☐
			☐ YES NO ☐
			☐ YES NO ☐
			☐ YES NO ☐
			☐ YES NO ☐

(Declaration and Power of Attorney [1-1]—page 2 of 5)

**ALL FOREIGN APPLICATION(S), IF ANY FILED MORE THAN 12 MONTHS
(6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION**

NOTE: If the application filed more than 12 months from the filing date of this application is a PCT filing forming the basis for this application entering the United States as (1) the national stage, or (2) a continuation, divisional, or continuation-in-part, then also complete **ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR DIVISIONAL, CONTINUATION OR CIP APPLICATION** for benefit of the prior U.S. or PCT application(s) under 35 U.S.C. § 122.

POWER OF ATTORNEY

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (List name and registration number)

Robert H. Bachman (19,374) all members of the firm
Gregory P. LaPointe (28,395) Bachman & LaPointe, P.C.
Barry L. Kelmacher (28,989)
George A. Coury (34,309)

(check the following item, if applicable)

- ☐ Attached as part of this declaration and power of attorney is the authorization of the above-named attorney(s) to accept and follow instructions from my representative(s).

SEND CORRESPONDENCE TO

Gregory P. LaPointe
Bachman & LaPointe, P.C.
900 Chapel Street, Suite 1201
New Haven, CT 06510-2802

DIRECT TELEPHONE CALLS TO:
(Name and telephone number)

Gregory P. LaPointe
(203) 777-6628

DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

(Declaration and Power of Attorney [1-1]—page 3 of 5)

SIGNATURE(S)

NOTE: Carefully indicate the family (or last) name as it should appear on the filing receipt and all other documents.

Full name of sole or first inventor

SARKIS

(GIVEN NAME)

(MIDDLE INITIAL OR NAME)

KARADJIAN

(FAMILY OR LAST NAME)

Inventor's signature

Date 03/10/2004

Country of Citizenship

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(GIVEN NAME)

REINALDO

(MIDDLE INITIAL OR NAME)

GABAY

(FAMILY OR LAST NAME)

Inventor's signature

Date 11/4/2002

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Alonso

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Sánchez

(FAMILY OR LAST NAME)

Inventor's signature

Date 11/4/2002

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Venezuela

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(GIVEN NAME)

(MIDDLE INITIAL OR NAME)

(FAMILY OR LAST NAME)

Inventor's signature

Date

Country of Citizenship

Residence

Post Office Address

Full name of fifth joint inventor, if any

(GIVEN NAME)

(MIDDLE INITIAL OR NAME)

(FAMILY OR LAST NAME)

Inventor's signature

Date

Country of Citizenship

Residence

Post Office Address

CHECK PROPER BOX(ES) FOR ANY OF THE FOLLOWING ADDED PAGE(S) WHICH FORM A PART OF THIS DECLARATION

- ☐ Signature for third and subsequent joint inventors. Number of pages added _____
 . . .
- ☐ Signature by administrator(trix), executor(trix) or legal representative for deceased or incapacitated inventor. Number of pages added _____
 . . .
- ☐ Signature for inventor who refuses to sign or cannot be reached by person authorized under 37 CFR 1.47. Number of pages added _____
 . . .
- ☐ Added page for signature by one joint inventor on behalf of deceased inventor(s) where legal representative cannot be appointed in time (37 CFR 1.47).
 . . .
- ☐ Added pages to combined declaration and power of attorney for divisional, continuation, or continuation-in-part (C-I-P) application.
☐ Number of pages added _____
 . . .
- ☐ Authorization of attorney(s) to accept and follow instructions from representative.
 . . .

(If no further pages form a part of this Declaration, then end this Declaration with this page and check the following item.)

☒ This declaration ends with this page.

(Declaration and Power of Attorney [1-1]—page 5 of 5)

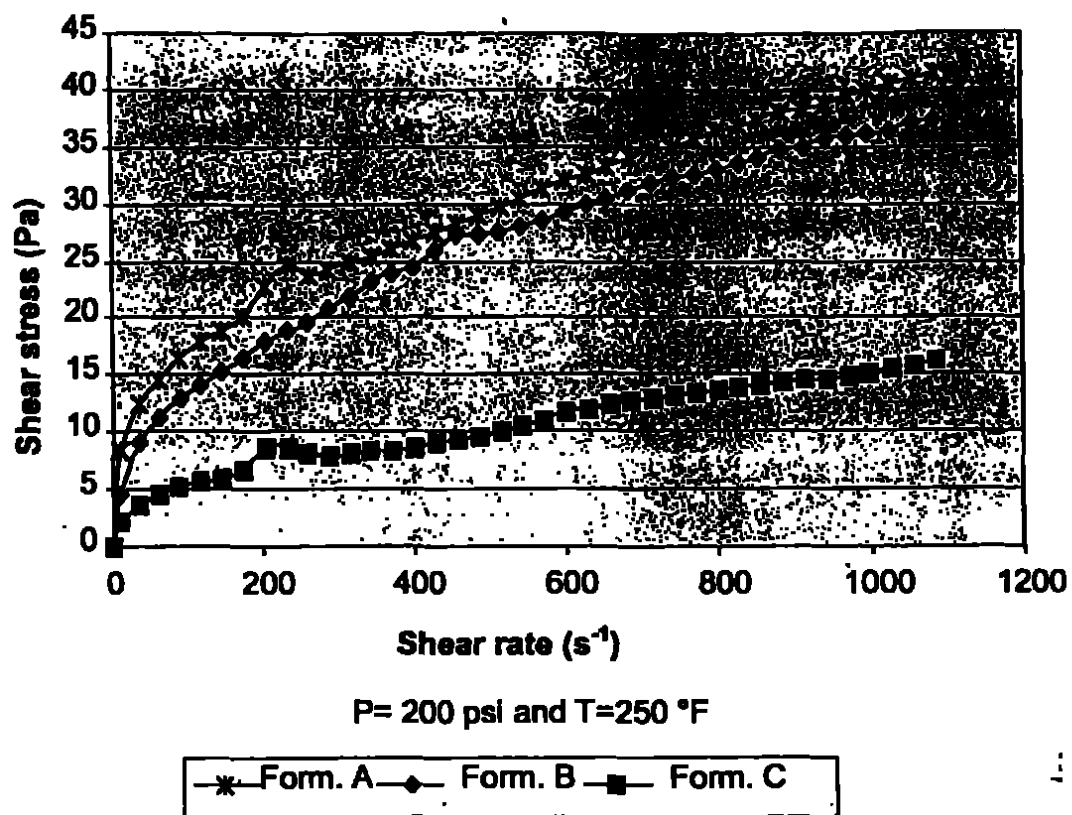


FIG. 1

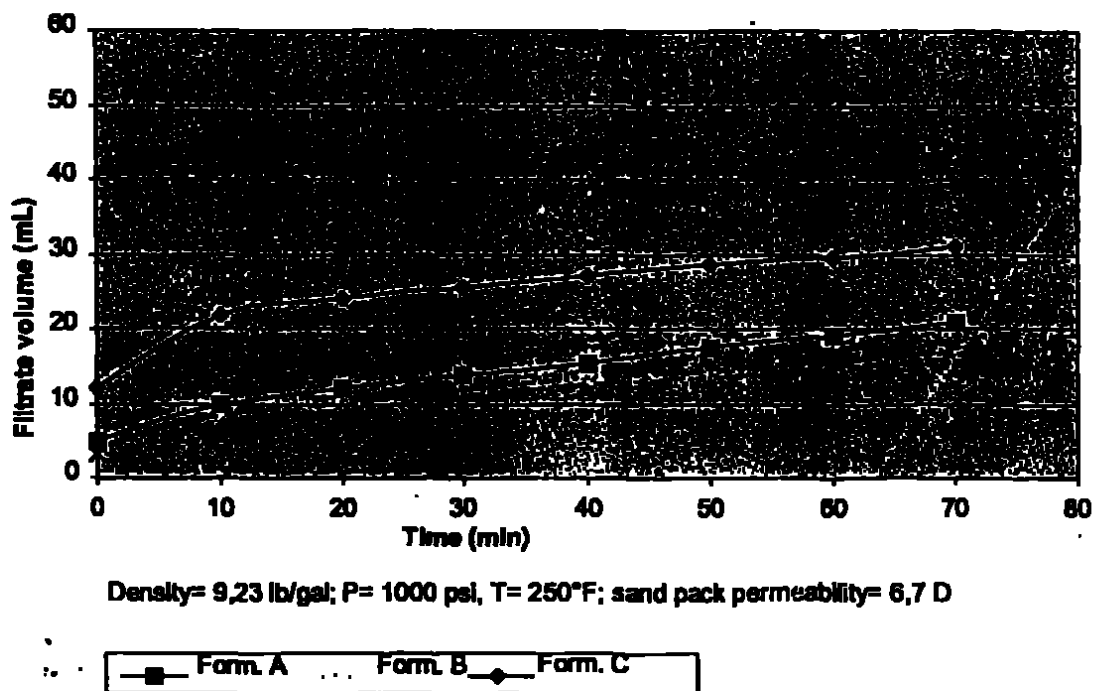


FIG. 2

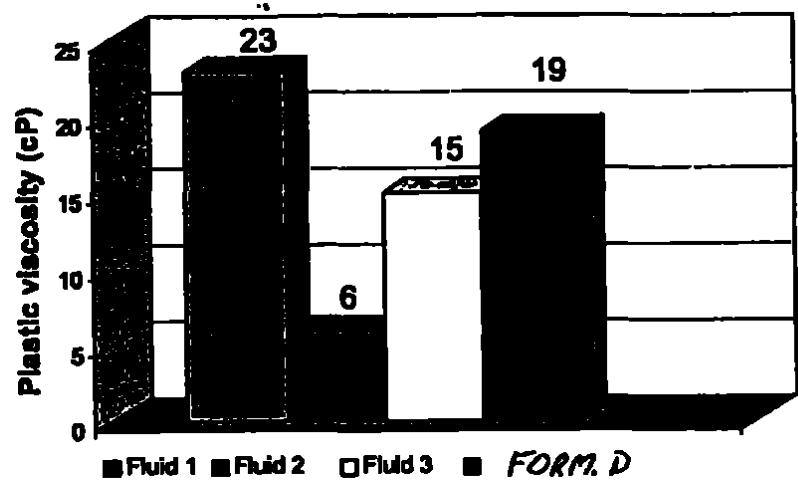


FIG. 3

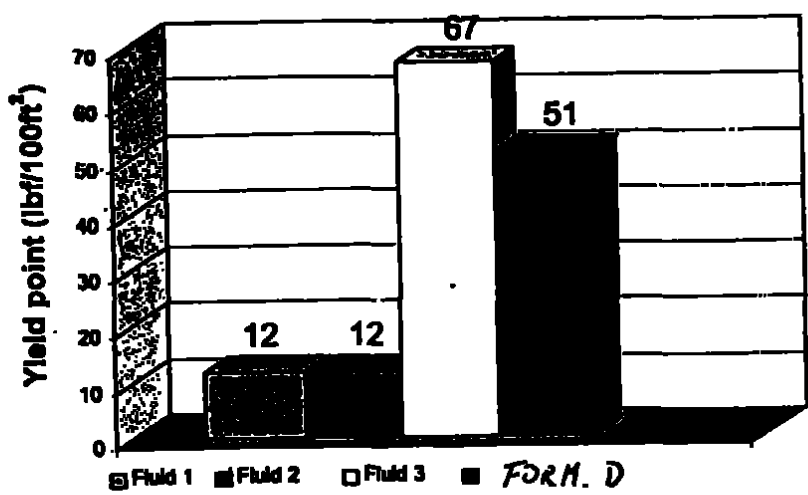
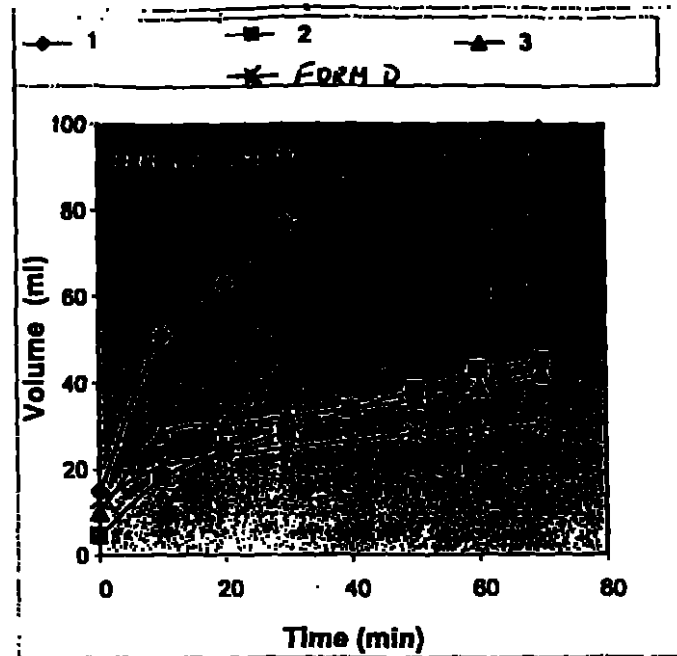


FIG. 4

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Density= 9.23 lb/gal; P=1000 psi; T=250 °F;
sand pack permeability= 6.7 D

FIG. 5

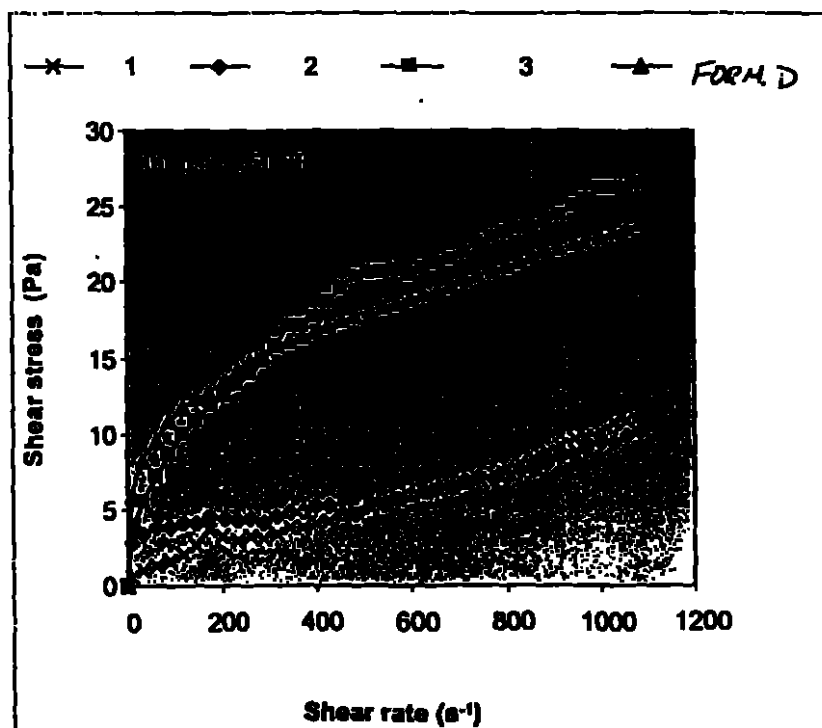


FIG. 6

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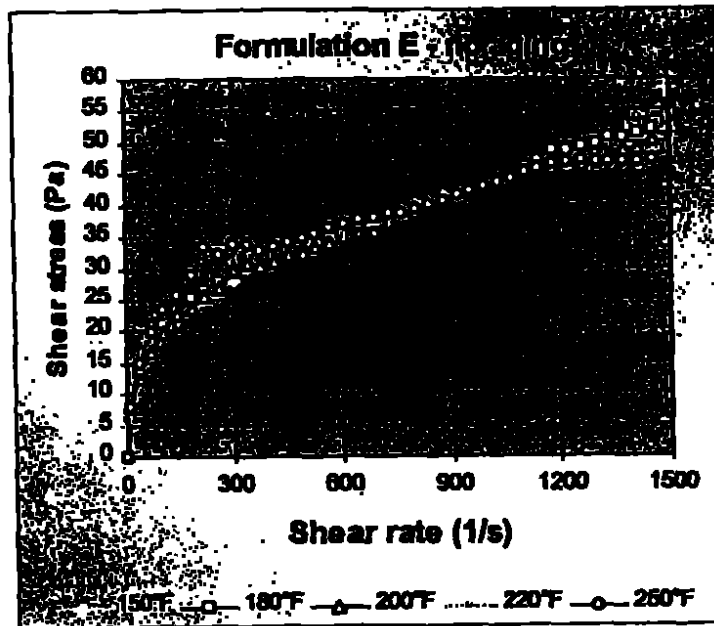


FIG. 7

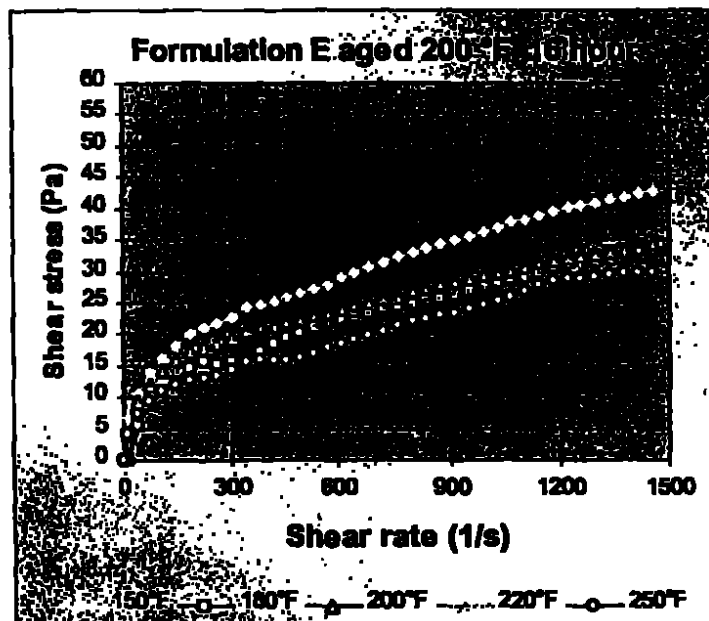


FIG. 8

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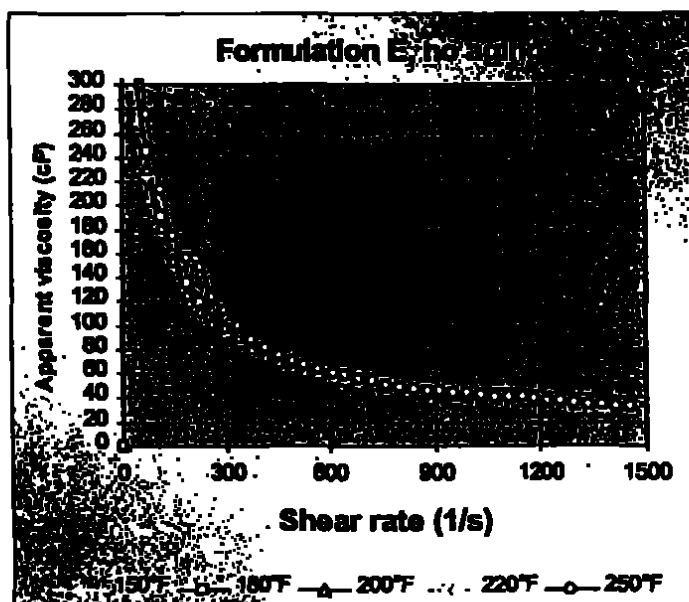


FIG. 9

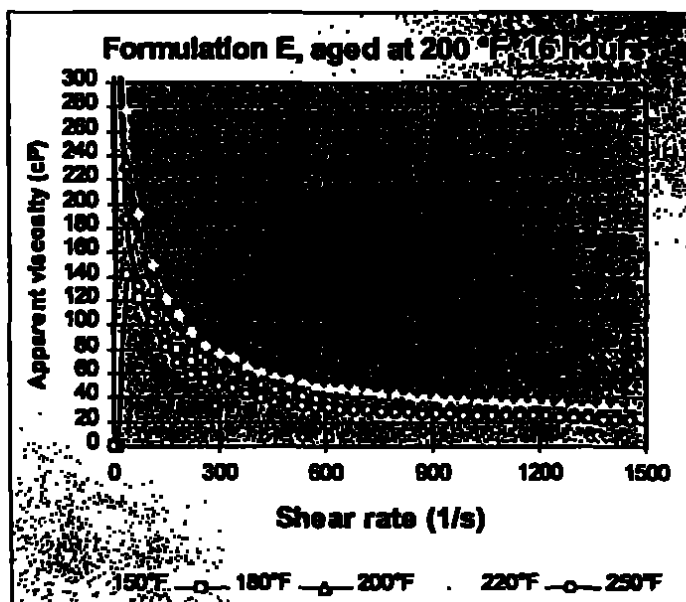


FIG. 10

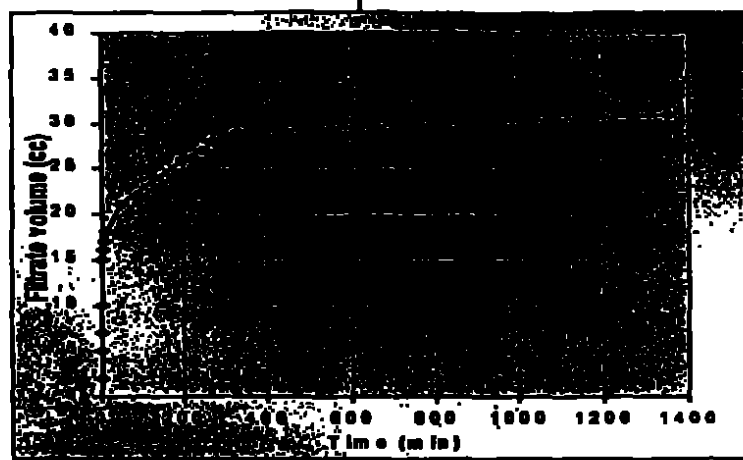


FIG. 11

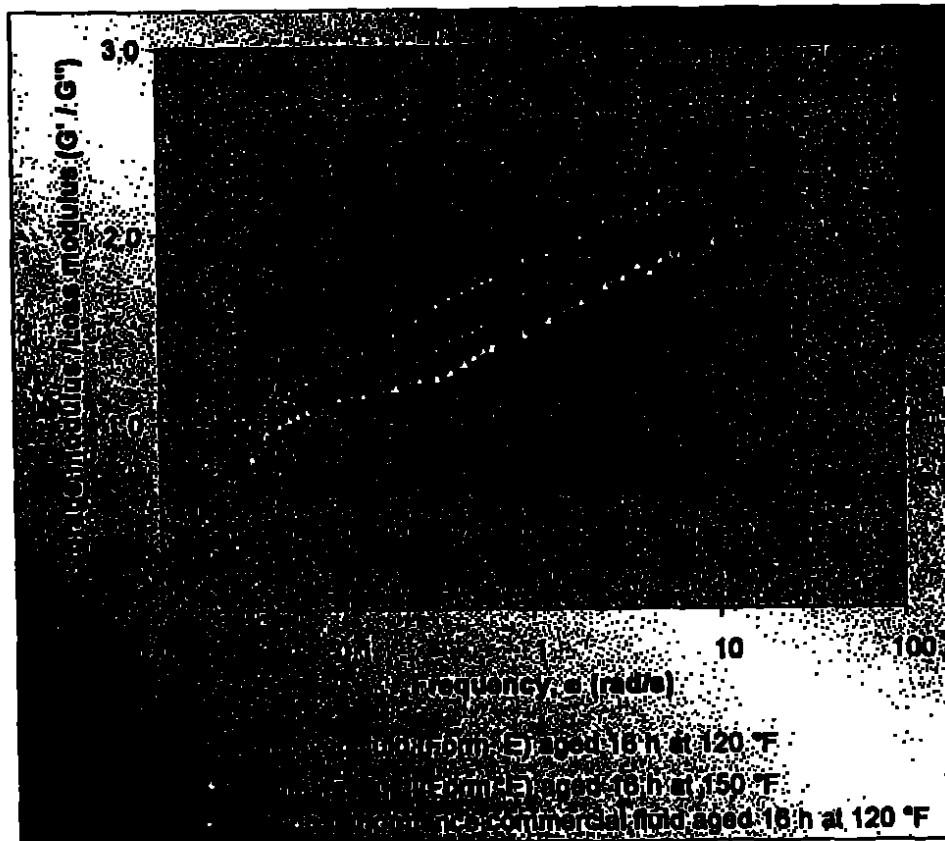
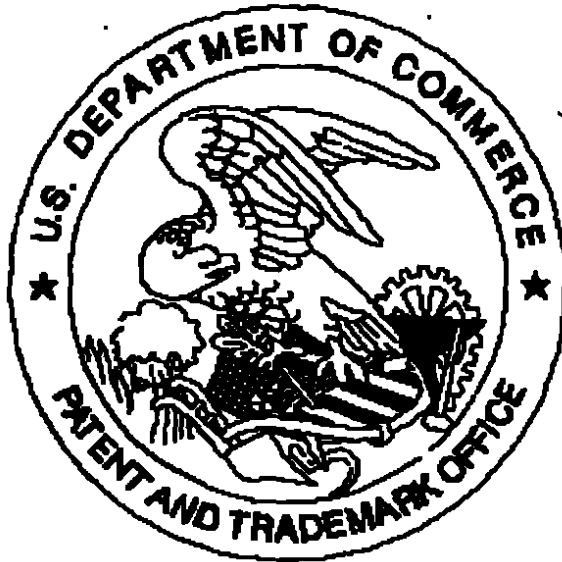


FIG. 12

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Scanned copy is best available drawing are dark

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89

TRADUCCIÓN DEL INGLÉS AL CASTELLANO de las reivindicaciones de la Solicitud de Patente de los Estados Unidos No. 10/342,852 relacionada con:

FLUIDO DE PERFORACION CON PAQUETE ADITIVO PARA REDUCIR PERDIDAS DE CIRCULACION

ANEXOS. La Solicitud de Patente de los Estados Unidos Serie No. 10/342,852 arriba mencionada. Declaración y Poder, Solicitud de Patente, Certificación del Comisionado de Patentes y Marcas de los Estados Unidos de América.

LOS ESTADOS UNIDOS DE AMÉRICA

DEPARTAMENTO DE COMERCIO DE LOS ESTADOS UNIDOS DE AMÉRICA

Oficina de Patentes y Marcas de los Estados Unidos

Enero 12 de 2004

ESTE PARA CERTIFICAR QUE ANEXO AL PRESENTE SE ENCUENTRA UNA FIEL COPIA TOMADA DE LOS REGISTROS DE LA OFICINA DE PATENTES Y MARCAS DE LOS ESTADOS UNIDOS DE AQUELLOS DOCUMENTOS DE LA SOLICITUD DE PATENTE IDENTIFICADA ABAJO LA CUAL CUMPLE LOS REQUISITOS PARA CONCEDERLE UNA FECHA DE PRESENTACIÓN BAJO LA NORMA 35 USC 111.

NUMERO DE SOLICITUD: *10/342,852*
FECHA DE PRESENTACIÓN: *Enero 15 de 2003*

SELLO ADHERIDO

**Por autorización de
COMISIONADO DE PATENTES Y MARCAS
P. SWAIN (Firmado)
P. SWAIN
Funcionario de Certificaciones**

Lo que se reivindica es:

1. Un fluido de perforación, que comprende:
un fluido base; y
un paquete aditivo para reducir las pérdidas de circulación que comprende
un polisacárido, un derivado de la celulosa y un componente controlador del
pH.
2. El fluido de la reivindicación 1, en donde dicho polisacárido es seleccionado
de un grupo que consiste de polisacáridos no iónicos, polisacáridos de baja carga
iónica, y combinaciones de los mismos.
3. EL fluido de la reivindicación 1, en dónde dicho polisacárido se selecciona
del grupo que consiste de compuestos de doble hélice, compuestos de triple hélice
y combinaciones de los mismos.
4. El fluido de la reivindicación 1, en dónde dicho polisacárido es
escleroglucana.
5. El fluido de la reivindicación 1, en dónde dicho derivado de la celulosa es
seleccionado del grupo consistente en hidroxipropilcelulosa, carboximetil
hidroxietilcelulosa, hidroxietilcelulosa, celulosa modificada hidrofóticamente y
combinaciones de los mismos.
6. El fluido de la reivindicación 1, en dónde dicho derivado de la celulosa es
hidroxietilcelulosa.

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7. El fluido de la reivindicación 1, en dónde dicho aditivo para controlar el pH es seleccionado del grupo que consiste en monoetanolamina, etanolamina, óxido de magnesio, trietanolamina, hidróxido de sodio, carbonato de sodio, carbonato de potasio, hidróxido de sodio y combinaciones de los mismos.

8. El fluido de la reivindicación 1, en dónde dicho paquete aditivo comprende adicionalmente un componente de almidón.

9. El fluido de la reivindicación 7, en dónde dicho componente de almidón es seleccionado de un grupo que consiste de carboximetilalmidón, hidroxietilalmidón, hidroxipropilalmidón, almidones con enlaces cruzados con agentes eterificantes, almidones con enlaces cruzados con agentes esterificantes y combinaciones de los mismos.

10. El fluido de la reivindicación 1, en dónde dicho paquete aditivo comprende adicionalmente un componente que es un agente para formar puentes.

11. El fluido de la reivindicación 10, en dónde dicho componente que es un agente para formar puentes es carbonato de calcio.

12. El fluido de la reivindicación 1, en dónde dicho paquete aditivo comprende adicionalmente un componente antioxidante.

13. El fluido de la reivindicación 12, en dónde dicho agente antioxidante es seleccionado del grupo que consiste en bisulfito de sodio, sulfito de sodio y combinaciones de los mismos.

14. El fluido de la reivindicación 12, en donde dicho antioxidante es bisulfito de sodio.

15. El fluido de la reivindicación 1, en donde dicho paquete aditivo comprende adicionalmente un componente biocida.

16. El fluido de la reivindicación 15, en donde dicho componente biocida es seleccionado de un grupo que consiste en isotiazolonas, glutaraldehído, aminas cuaternarias y combinaciones de los mismos.

17. Un paquete aditivo para reducir pérdidas de circulación que comprende un polisacárido, un derivado de la celulosa y un componente para el control del pH.

18. El paquete para reducir pérdidas de circulación de la reivindicación 17, que adicionalmente comprende un almidón, un agente para formar puentes, un antioxidante y un biocida

19. El paquete para reducir pérdidas de circulación de la reivindicación 18, en donde dicho aditivo para controlar el pH es seleccionado del grupo consistente en monetanolamina, etanolamina, óxido de magnesio, trietanolamina, hidróxido de sodio, carbonato de sodio, carbonato de potasio y combinaciones de los mismos.

20. El paquete para reducir pérdidas de circulación de la reivindicación 19, en donde dicho componente de almidón es seleccionado del grupo consistente en carboximetilalmidón, hidroxietilalmidón, hidroxipropilalmidón, almidones con enlaces cruzados con agentes esterificantes, almidones con enlaces cruzados con agentes esterificantes, y combinaciones de los mismos, en donde dicho agente para formar puentes es carbonato de calcio, en donde dicho componente

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antioxidante es seleccionado del grupo consistente en bisulfito de sodio, sulfito de sodio y combinaciones de los mismos y en donde dicho componente biocida es seleccionado del grupo consistente en isotiazolonas, glutaraldehído, aminas cuaternarias y combinaciones de los mismos.

APOSTILLE

(Convention de La Haye du 5 octobre 1961)

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Certified

5. at Washington, D.C.

6. the twentieth of January, 20047. by Assistant Authentication Officer, United States Department of State8. No. 04008359-2

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January 09, 2004

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3. Nature of conveyance: ☒ Assignment ☐ Merger ☐ Security Agreement ☐ Change of Name ☐ Other _____			Execution Date: <u>11/4/02</u>		
4. Application number(s) or patent number(s): If this document is being filed together with a new application, the execution date of the application is: <u>3/10/2001</u> <u>11/4/2002</u> A. Patent Application No.(s) _____ B. Patent No.(s) _____			Additional numbers attached? ☐ Yes ☒ No		
5. Name and address of party to whom correspondence concerning document should be mailed: Name: <u>George A. Coury</u> Internal Address: <u>Suite 1201</u> Street Address: <u>900 Chapel Street</u> City: <u>New Haven</u> State: <u>CT</u> Zip: <u>06510</u>			6. Total number of applications and patents involved: <u>1</u> 7. Total fee (37 CFR 3.41).....\$ <u>40</u> ☐ Enclosed ☒ Authorized to be charged to deposit account 8. Deposit account number: <u>02-0184</u> <u>including any deficiencies or credit any overpayment</u> (Attach duplicate copy of this page if paying by deposit account)		
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0145-Assignment

8000 INDUSTRIAL BLVD., EEDBROOK-LEAH
STATIONERY CO., INC., 40 WEST ST., NYC 10012

Assignment

In consideration of One Dollar (\$1.00), and other good and valuable consideration, the receipt of which is hereby acknowledged, we, the undersigned, **Sarkis Karamjian, Jacques Reinaldo Gabay, and Gerardo Alonso Sanchez**, citizens and residents of **VENEZUELA**

Hereby sell, assign and transfer to **INTEREP, SA**

a corporation of **VENEZUELA**
having a place of business at **Apartado 76343, Caracas 10508, VENEZUELA**
its successors, assigns and legal representatives, the entire right, title and interest for the United States and all foreign countries, in and to any and all improvements which are disclosed in the application for United States Letters Patent, which has been executed by the undersigned concurrently herewith and is entitled **DRILLING FLUID WITH CORROSION LOSS REDUCING ADDITIVE PACKAGE**
(Attorney's Docket No. **02-684**)

, and in and to said application and all divisional, continuing, substitute, renewal, renewal, and all other applications for Letters Patent which have been or shall be filed in the United States and all foreign countries on any of said improvements; and in and to all original and renewed patents which have been or shall be issued in the United States and all foreign countries on said improvements;

Agree that said Assignee may apply for and receive Letters Patent for said improvements in its own name; and that, when requested, without charge to but at the expense of said Assignee, its successors, assigns and legal representatives, to carry out in good faith the intent and purpose of this assignment, the undersigned will execute all divisional, continuing, substitute, renewal, renewal, and all other patent applications on any and all said improvements; execute all rightful oaths, assignments, powers of attorney and other papers; communicate to said Assignee, its successors, assigns, and representatives, all facts known to the undersigned relating to said improvements and the history thereof; and generally do everything possible which said Assignee, its successors, assigns or representatives shall consider desirable for aiding in securing and maintaining proper patent protection for said improvements and for vesting title to said improvements and all applications for patents and all patents on said improvements, in said Assignee, its successors, assigns and legal representatives; and

Covenant with said Assignee, its successors, assigns and legal representatives that no assignment, grant, mortgage, license or other agreement affecting the rights and property herein conveyed has been made to others by the undersigned, and that full right to convey the same as herein expressed is possessed by the undersigned.

Date: **11/4/02**
Date: **11/4/02**
Date: **11/4/02**
Date:

Sarkis K.
SARKIS KARADJIAN (L.S.)
JACQUES REINALDO GABAY (L.S.)
GERARDO ALONSO SANCHEZ (L.S.)

RECORDED: 01/16/2003

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