

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
8 September 2006 (08.09.2006)

PCT

(10) International Publication Number
WO 2006/093863 A3

(51) International Patent Classification:
E21B 37/08 (2006.01) *E21B 43/27* (2006.01)

(74) Agent: CINAMON, Jay, S.; ABELMAN, FRAYNE
AND SCHWAB, 666 Third Avenue, New York, New York
10017-5621 (US).

(21) International Application Number:
PCT/US2006/006840

(81) Designated States (*unless otherwise indicated, for every
kind of national protection available*): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV,
LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI,
NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG,
SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US,
UZ, VC, VN, YU, ZA, ZM, ZW.

(22) International Filing Date:
27 February 2006 (27.02.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
11/070,105 1 March 2005 (01.03.2005) US

(84) Designated States (*unless otherwise indicated, for every
kind of regional protection available*): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT,
RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA,
GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(71) Applicants (*for all designated States except US*): SAUDI
ARABIAN OIL COMPANY [SA/SA]; R-3080, North
Admin Building, Dhahran, 31311 (SA). ARAMCO SER-
VICES COMPANY [US/US]; 9009 West Loop South,
Houston, Texas 77096 (US).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): AL-TAQ, Ali,
A. [SA/SA]; Al-Zubaidi Street No. 12, Qatif (SA).
NASR-EL-DIN, Hisham, A. [CA/SA]; Radhwa Avenue
No. 539, Dhahran, 31311 (SA). AL-SHAFAI, Tawfiq, A.
[SA/SA]; 15th Street No. 128, Saihat (SA).

Published:

— with international search report

(88) Date of publication of the international search report:
5 June 2008

(54) Title: METHOD AND COMPOSITION FOR FORMING PROTECTIVE PRECIPITATE ON CEMENT SURFACES

(57) Abstract: A method and composition for protecting cement surfaces in a well bore treatment zone from the destructive effects of acid mud and other acidization processes commonly used to stimulate hydrocarbon production from the formation, includes contacting the cement with an aqueous acid mixture of HAc and HF in a mutual solvent for a sufficient period of time to form a protective deposit or precipitate layer that is resistant to the acidization composition. In a preferred embodiment, the aqueous acid mixture includes corrosion inhibitors and inhibitor aids, and a preflush with an ammonium chloride solution in a mutual solvent is used to prepare the cement surfaces in the treatment zone.



WO 2006/093863 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US06/06840

A. CLASSIFICATION OF SUBJECT MATTER

IPC: E21B 37/08(2006.01),43/27(2006.01)

USPC: 166/300,307,312;507/261,269,277

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 166/300,307,312; 507/261,269,277

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

East: ((protect\$3 precipitat\$4 coat\$3) with cement\$3) and ((acetic and hydrofluoric) with acid\$2)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4,665,990 A (PERLMAN) 19 May 1987 (19.05.1987), see entire document.	1-15



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

18 February 2008 (18.02.2008)

Date of mailing of the international search report

20 MAR 2008

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (571) 273-3201

Authorized officer

Zakiya W. Bates

Telephone No. (571) 272-5150

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US06/06840

Continuation of Item 4 of the first sheet:

METHOD AND COMPOSITION FOR FORMING PROTECTIVE PRECIPITATE ON CEMENT SURFACES