

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
18 December 2003 (18.12.2003)

PCT

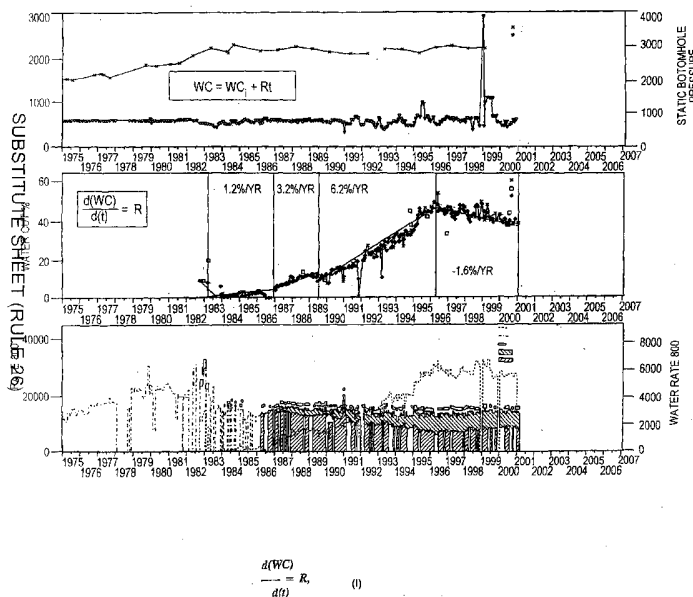
(10) International Publication Number
WO 2003/104752 A3

- (51) International Patent Classification⁷: E21B 47/00, 49/08, G01F 22/00
- (74) Agent: SPATH, Thomas, E.; Abelman, Feayne & Schwab, 150 East 42nd Street, New York, NY 10017-5612 (US).
- (21) International Application Number: PCT/US2003/017280
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (22) International Filing Date: 30 May 2003 (30.05.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 10/167,294 10 June 2002 (10.06.2002) US
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
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Published:
 — with international search report
 — before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: WATER CUT RATE OF CHANGE ANALYTIC METHOD



(57) Abstract: A method of measuring a water effect on an underground non-water well includes the steps of assembling a history of water cut (WC) measurements for the well over an extended period of time, determining a water cut rate of change (R) for the well based upon the history of water cut measurements, wherein the water cut rate of change is defined as follows: (formula 1); $d(WC)/dt$ and identifying whether an anomaly exists based on the determined R.

WO 2003/104752 A3



(88) Date of publication of the international search report:
22 July 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/17280⁴

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : E21B 47/00, 49/08; G01F 22/00
 US CL : 073/152.23, 152.55

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. : 073/152.23, 152.55

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y, E	US 2003/0170077 A1 (Herd et al.) 11 September 2003 (11-09-2003), page 12, paragraph 0172.	1-4, 6-11, and 13-15
Y	US 6,000,468 A (Pringle) 14 December 1999 (14-12-1999); column 1, lines 17-30; column 2, lines 15-24l	1-4, 6-11, and 13-15
Y	US 5,757,570 A (Shaposnikov et al.) 19 May 1998 (19-05-1998), column 2, lines 25-52.	1-4, 6-11, and 13-15
Y	Beyer, William H., "CRC Standard Mathematical Tables and Formulae", CRC Press, 1991, pages 174-175.	1-4, 6-11, and 13-15
Y	Epic Consulting Services, "ResAssist for Windows - Understanding Your Watershed", April 2002, page 2.	5 and 12
Y	Robertson et al., "A System Engineering Approach to Field Development", Society of Petroleum Engineers, September 2001 (09-2001), page 4	1 and 8
Y	"Network News", Petroleum Technology Transfer Council, June 2000 (06-2000), page 2.	1, 5, 8, and 12
Y	"Recovery of Bypassed Oil in the Dundee Formation Using Horizontal Drains", Michigan Technological University, 1994, Available online at <http://www.geo.mtu.edu/cvl/michproj/intro.html > , see link to <http://www.geo.mtu.edu/cvl/michproj/maps/crys_hor.htm >	5 and 12

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	"T"
"A" document defining the general state of the art which is not considered to be of particular relevance	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
"E" earlier application or patent published on or after the international filing date	"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
"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)	"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
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 17 March 2004 (17.03.2004)	Date of mailing of the international search report 02 JUN 2004
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INTERNATIONAL SEARCH REPORT

PCT/US03/17244

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P	Vance, Harold, "Preferred Waterflood Management Practices for the Scraberry Trend Area", 26 September 2002 (26-09-2002), see figures 1.4, 1.5, and 1.6	5 and 8

INTERNATIONAL SEARCH REPORT

PCT/US03/17280

Continuation of B. FIELDS SEARCHED Item 3:

United States Patent Office Patents, Pre-grant Publications, DERWENT, JPO, EPO search terms: water cut, water-cut, oil, gas, well, borehole, downhole, change, changing, time, rate