

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
31 January 2008 (31.01.2008)

PCT

(10) International Publication Number
WO 2008/014356 A3

(51) International Patent Classification:
E21B 43/00 (2006.01) *E21B 43/263* (2006.01)

(21) International Application Number:
PCT/US2007/074372

(22) International Filing Date: 25 July 2007 (25.07.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/820,256 25 July 2006 (25.07.2006) US
11/782,463 24 July 2007 (24.07.2007) US

(71) Applicant (for all designated States except US): **MOUNTAIN WEST ENERGY LLC** [US/US]; 573 East 950 North, Salt Lake City, Utah 84097 (US).

(71) Applicant and

(72) Inventor: **SHURTLEFF, Kevin J.** [US/US]; 573 East 950 North, Orem, UT 84097 (US).

(74) Agents: **KUNZLER, Brian C.** et al.; 8 East Broadway, Suite 600, Salt Lake City, Utah 84111 (US).

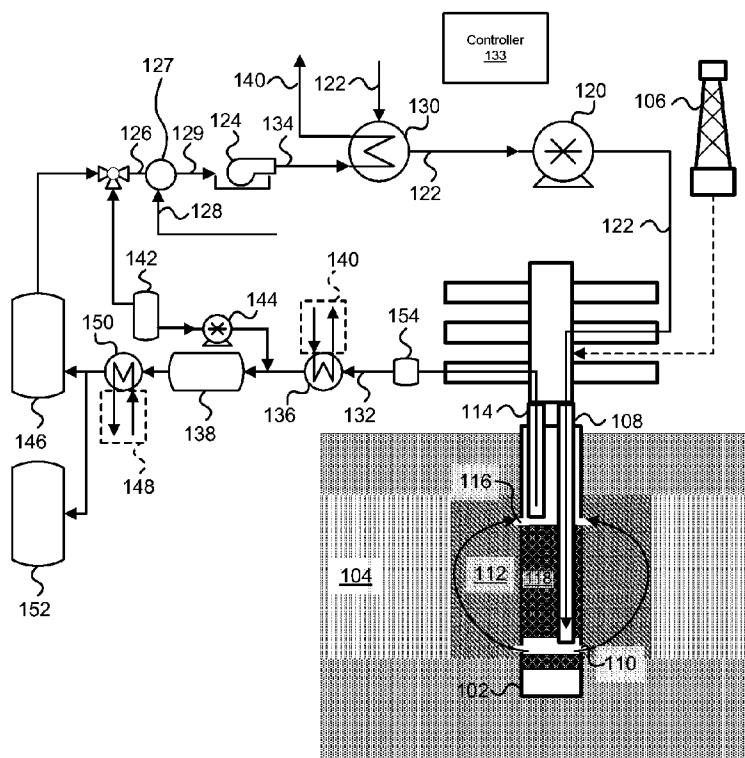
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN,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

(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, MT, 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).

Published:
— with international search report

(88) Date of publication of the international search report:
27 March 2008

(54) Title: APPARATUS, SYSTEM, AND METHOD FOR IN-SITU EXTRACTION OF HYDROCARBONS



(57) Abstract: An apparatus, system, and method are disclosed for in-situ extraction of hydrocarbons from a hydrocarbon-bearing formation 104. The system 100 includes a well 102 drilled through a hydrocarbon-bearing formation 104, and a completion unit 106 that places an injection tube 108 near a fluid injection point 110 at the bottom of a target zone 112 and a production tube 114 near a fluid production point 116 at the top of the target zone 112. An isolation unit 118 isolates the fluid injection point 110 from the fluid production point 116 such that injected fluid 122 flows through the target zone 112. The system 100 further includes a heat source 124, and a fluid 122 that delivers thermal energy from the heat source 124 to the hydrocarbons in the target zone 112 to entrain the hydrocarbons in the fluid 122. The resulting production fluid 132 is heated, free hydrogen is added, and the production fluid 132 is treated on a catalytic reactor 138 to reduce the size of the hydrocarbon chains.

WO 2008/014356 A3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US07/74372

A. CLASSIFICATION OF SUBJECT MATTER
 IPC: **E21B 43/00(2006.01);E 21B 43/263**

 USPC: 166/259,266
 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. : 166/259,266

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| X | US 2002/0033257 (Shahin JR. et al.) 21 March 2002 (21.03.02) | 1-36 |

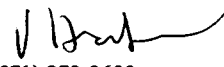
Further documents are listed in the continuation of Box C. See patent family annex.

| Special categories of cited documents: | | |
|---|-----|--|
| "A" document defining the general state of the art which is not considered to be of particular relevance | "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 |
| "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 | | |
| "P" document published prior to the international filing date but later than the priority date claimed | "&" | document member of the same patent family |

Date of the actual completion of the international search
 19 December 2007 (19.12.2007)

Date of mailing of the international search report
 09 JAN 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
 Jennifer Gay 
 Telephone No. (571) 272-3600