

Search query (2): [SP]: related applications[0001] this application is a continuation-in-part application of pct international application no. pct/ca2016/051114 filed on sep. 22, 2016, which claims the benefit of u.s. provisional patent application no. 62/221,936 filed on sep. 22, 2015.technical field[0002] the present invention relates to the field of oil production from subsurface oil deposits.background[0003] oil reservoirs are geological units within the subsurface of the earth that contain an accumulation of oil. the oil from the reservoirs is extracted or recovered for use by a process commonly referred to as oil production. conventional oil production typically involves two stages: primary recovery and secondary recovery. primary recovery involves the use of natural in-reservoir high pressure forces to drive the flow of oil to oil production wells. secondary recovery typically involves the maintenance of this high pressure by pumping fluids into the reservoir so that oil production may continue.[0004] in oil reservoirs that contain heavy oil or oil-sands (also known as tar sands, bitumen, or bituminous sands), the oil is too viscous to flow freely to the production wells by conventional methods. as such, other means of oil production, such as thermal recovery strategies, must be employed. thermal recovery strategies involve heating the oil reservoirs to improve the mobility of the oil and thus the ease of its subsequent extraction. the applied heat reduces the oil's viscosity allowing it to flow to production wells. an example of a commonly used thermal recovery strategy in heavy oil recovery is the steam-assisted gravity drainage (sagd) method.[0005] the sagd method involves the use of steam injection well 5 and production well 7 pairs, as depicted in figs. 1, 2 and 3 of the prior art. the steam injection well introduces steam into a clean sand area 8 of an oil reservoir. the injected steam migrates upwards until reaching geological units that prevent further migration of the steam. the injected steam heats the reservoir to temperatures of approximately 200 degrees centigrade, reducing the viscosity of the oil and allowing it to flow to the oil production wells. this is referred to as the steam chamber 10, shown in figs. 2 and 3. the steam is constantly injected to decrease oil viscosity, facilitating the continuous flow of oil towards the production wells, and to help displace the oil from the sand.[0006] there are several drawbacks to the sagd process. one major issue is that the sagd steam-generation process has a negative environmental impact. for example, the sagd process is a large contributor of greenhouse gas emissions. this is because large amounts of natural gas must be combusted to provide the energy to heat water to create the steam. not only does burning natural gas contribute significantly to greenhouse gas emissions, it also represents an added cost for bitumen production. furthermore, the sagd process also consumes large amounts of water resources for the creation of the steam.[0007] as the production of steam is the primary contributor to the environmental and economic impact of the sagd method, the environmental efficiency of sagd operations may be expressed in terms of the steam-to-oil ratio (gates and larter, 2014, incorporated herein by reference). the steam-to-oil ratio encompasses both the environmental and economic cost of steam generation in relation to the amount of crude oil resource that is recovered. a lower steam-to-oil ratio means fewer greenhouse gas emissions and improved environmental performance per unit of production.[0008] the energy costs and greenhouse gas emissions associated with unconventional oil sands extraction and production, such as sagd operations, are approximately 100-200 percent greater than for conventional oil production ("the truth about dirty oil: is ccs the answer?", bergerson and keith, environmental science and technology, 2010, 44, 6010-6015, incorporated herein by reference). as such, new strategies and technologies for improving the environmental and economic performance in oil sands extraction must be developed to lower the steam-to-oil ratio associated with sagd operations.[0009] production from conventional oil reservoirs is typically inefficient at extracting all of the available oil from the targeted region. as such, there are many strategies that aim to increase oil recovery. some of these strategies include the use of microorganisms in the subsurface.[0010] subsurface environments are microbial habitats and include a wide variety of microbial taxa. fig. 4 of the prior art shows a histogram of the abundance rank order of different microbial taxa in a subsurface environmental sample adapted from pedros-alio (2006) "marine microbial diversity, can it be determined?", trends in microbiology, vol 14, no 6, pp 257-263. the bars of the histogram are indistinguishable as they are very close together. the lighter shaded area 1 on the left of the histogram represents abundant taxa, and the darker shaded area 2 to the right represents the rare taxa. therefore, in a given environmental sample, there is often a large proportion of abundant and active microorganisms along with a variety of low abundance, inactive and/or dormant microorganisms. for example, in some microbial communities, one species might encompass up to 20 percent of the total cells present, whereas hundreds of rare species may collectively make up less than 1 percent of the total. [0011] microbially enhanced oil recovery (meor) is a term to describe strategies for conventional oil production that target the use of microbial communities for enhancing and increasing oil recovery from conventional oil reservoirs. meor is typically employed after primary and secondary recovery. with meor, microbes are utilized in the conventional target regions of the reservoir to improve oil production. meor is believed to occur by a variety of mechanisms related to microbial metabolism in oil reservoirs, including biosurfactant production, metabolism of oil, and production of gas as a metabolic by-product. each of the processes mentioned above helps to increase the fluid mobility of the oil, leading to the production of the residual oil still present in the reservoir after primary and secondary recovery strategies.[0012] meor is typically attempted as a tertiary recovery strategy in conventional oil reservoirs. however, due to the unconventional nature of heavy oil and oil sands and the unconventional production methods for producing this oil, meor strategies are not frequently applied in heavy oil and oil sands.[0013] meor may be applied to the commonly-targeted region of a heavy oil or oil sands unit before or after the application of strategies such as the sagd method. meor involves either (1) biostimulation, i.e., the injection of nutrients to stimulate the native predominant and abundant taxa, or (2) bioaugmentation, i.e., the injection of foreign bacteria that are thought to be suitable for the reservoir conditions.[0014] the high temperature of the sagd steam chamber sterilizes the conventional target region of the oil sands reservoir. therefore, when meor is utilized for enhancing oil recovery from the sagd steam chamber of a heavy oil sands reservoir, meor may only be applied either before the steam is injected into the reservoir, or after the sagd method is complete and the reservoir has cooled down to low temperatures. u.s. patent application ser. no. 14/070,095, incorporated herein by reference, describes a method of injecting foreign bacteria prior to injecting steam as a part of sagd for increasing the fluid mobility of oil in a heavy oil reservoir. in this method, microorganisms are introduced into the reservoir through both injection and production wells, prior to steam injection, to pre-condition the reservoir for enhanced (shorter) start-up of the sagd process.[0015] u.s. pat. no. 4,475,590, incorporated herein by reference, provides an example of biostimulation in a conventional oil reservoir in conjunction with waterflood technology. waterflooding aims at displacing the residual oil in the reservoir with water, rather than the steam that is applied during the sagd method. similarly, u.s. pat. no. 4,971,151, and u.s. pat. no. 5,083,611, incorporated herein by reference, describe methods involving the injection of nutrients in the conventional oil reservoirs for enhancing oil recovery.[0016] all of these methods, however, focus on the active taxa present in high relative abundance in the microbial communities that are adapted to local prevailing in situ conditions (temperature, geochemistry, salinity, mineralogy, etc.) and that are readily investigated by microbiological methods. yet, in nearly every environment there are microbial seed banks that include many species or taxa of microorganisms present in low relative abundance. these microbial taxa can be inactive or dormant, and may include dormant bacterial endospores. microbial seed banks may constitute significantly less than 0.01 percent of the total cells present, and often exist in a dormant state. as such, they are typically not detected or highlighted by most environmental dna extraction surveys, and other more traditional methods for microbial characterization of oil reservoir environments.[0017] furthermore, the subsurface regions beyond the boundaries of the sagd steam chamber, such as inclined heterolithic strata (ihs), may contain up to twice as much oil sands resource as the targeted steam chamber region. however, production of the oil in the ihs region during sagd is limited. this ihs oil is interbedded with thin, but laterally extensive, low-permeability mudstone layers through which the steam cannot p

Results: 8

Search history

Search FT=(method and recovering oil and microorganism* and produce gas) and IC=(E21B43/22) (Results 2)

1:

Search [SP]: related applications[0001] this application is a continuation-in-part application of pct international application no. pct/ca2016/051114 filed on sep. 22, 2016, which claims the benefit of u.s. provisional patent application no. 62/221,936 filed on sep. 22, 2015.technical field[0002] the present invention relates to the field of oil production from subsurface oil deposits.background[0003] oil reservoirs are geological units within the subsurface of the earth that contain an accumulation of oil. the oil from the reservoirs is extracted or recovered for use by a process commonly referred to as oil production. conventional oil production typically involves two stages: primary recovery and secondary recovery. primary recovery involves the use of natural in-reservoir high pressure forces to drive the flow of oil to oil production wells. secondary recovery typically involves the maintenance of this high pressure by pumping fluids into the reservoir so that oil production may continue.[0004] in oil reservoirs that contain heavy oil or oil-sands (also known as tar sands, bitumen, or bituminous sands), the oil is too viscous to flow freely to the production wells by conventional methods. as such, other means of oil production, such as thermal recovery strategies, must be employed. thermal recovery strategies involve heating the oil reservoirs to improve the mobility of the oil and thus the ease of its subsequent extraction. the applied heat reduces the oil's viscosity allowing it to flow to production wells. an example of a commonly used thermal recovery strategy in heavy oil recovery is the steam-assisted gravity drainage (sagd) method.[0005] the sagd method involves the use of steam injection well 5 and production well 7 pairs, as depicted in figs. 1, 2 and 3 of the prior art. the steam injection well introduces steam into a clean sand area 8 of an oil reservoir. the injected steam migrates upwards until reaching geological units that prevent further migration of the steam. the injected steam heats the reservoir to temperatures of approximately 200 degrees centigrade, reducing the viscosity of the oil and allowing it to flow to the oil production wells. this is referred to as the steam chamber 10, shown in figs. 2 and 3. the steam is constantly injected to decrease oil viscosity, facilitating the continuous flow of oil towards the production wells, and to help displace the oil from the sand.[0006] there are several drawbacks to the sagd process. one major issue is that the sagd steam-generation process has a negative environmental impact. for example, the sagd process is a large contributor of greenhouse gas emissions. this is because large amounts of natural gas must be combusted to provide the energy to heat water to create the steam. not only does burning natural gas contribute significantly to greenhouse gas emissions, it also represents an added

cost for bitumen production. furthermore, the sagd process also consumes large amounts of water resources for the creation of the steam.[0007] as the production of steam is the primary contributor to the environmental and economic impact of the sagd method, the environmental efficiency of sagd operations may be expressed in terms of the steam-to-oil ratio (gates and larter, 2014, incorporated herein by reference). the steam-to-oil ratio encompasses both the environmental and economic cost of steam generation in relation to the amount of crude oil resource that is recovered. a lower steam-to-oil ratio means fewer greenhouse gas emissions and improved environmental performance per unit of production.[0008] the energy costs and greenhouse gas emissions associated with unconventional oil sands extraction and production, such as sagd operations, are approximately 100-200 percent greater than for conventional oil production ("the truth about dirty oil: is ccs the answer?", bergerson and keith, environmental science and technology, 2010, 44, 6010-6015, incorporated herein by reference). as such, new strategies and technologies for improving the environmental and economic performance in oil sands extraction must be developed to lower the steam-to-oil ratio associated with sagd operations.[0009] production from conventional oil reservoirs is typically inefficient at extracting all of the available oil from the targeted region. as such, there are many strategies that aim to increase oil recovery. some of these strategies include the use of microorganisms in the subsurface.[0010] subsurface environments are microbial habitats and include a wide variety of microbial taxa. fig. 4 of the prior art shows a histogram of the abundance rank order of different microbial taxa in a subsurface environmental sample adapted from pedros-alio (2006) "marine microbial diversity, can it be determined?", trends in microbiology, vol 14, no 6, pp 257-263. the bars of the histogram are indistinguishable as they are very close together. the lighter shaded area 1 on the left of the histogram represents abundant taxa, and the darker shaded area 2 to the right represents the rare taxa. therefore, in a given environmental sample, there is often a large proportion of abundant and active microorganisms along with a variety of low abundance, inactive and/or dormant microorganisms. for example, in some microbial communities, one species might encompass up to 20 percent of the total cells present, whereas hundreds of rare species may collectively make up less than 1 percent of the total.[0011] microbially enhanced oil recovery (meor) is a term to describe strategies for conventional oil production that target the use of microbial communities for enhancing and increasing oil recovery from conventional oil reservoirs. meor is typically employed after primary and secondary recovery. with meor, microbes are utilized in the conventional target regions of the reservoir to improve oil production. meor is believed to occur by a variety of mechanisms related to microbial metabolism in oil reservoirs, including biosurfactant production, metabolism of oil, and production of gas as a metabolic by-product. each of the processes mentioned above helps to increase the fluid mobility of the oil, leading to the production of the residual oil still present in the reservoir after primary and secondary recovery strategies.[0012] meor is typically attempted as a tertiary recovery strategy in conventional oil reservoirs. however, due to the unconventional nature of heavy oil and oil sands and the unconventional production methods for producing this oil, meor strategies are not frequently applied in heavy oil and oil sands.[0013] meor may be applied to the commonly-targeted region of a heavy oil or oil sands unit before or after the application of strategies such as the sagd method. meor involves either (1) biostimulation, i.e., the injection of nutrients to stimulate the native predominant and abundant taxa, or (2) bioaugmentation, i.e., the injection of foreign bacteria that are thought to be suitable for the reservoir conditions.[0014] the high temperature of the sagd steam chamber sterilizes the conventional target region of the oil sands reservoir. therefore, when meor is utilized for enhancing oil recovery from the sagd steam chamber of a heavy oil sands reservoir, meor may only be applied either before the steam is injected into the reservoir, or after the sagd method is complete and the reservoir has cooled down to low temperatures. u.s. patent application ser. no. 14/070,095, incorporated herein by reference, describes a method of injecting foreign bacteria prior to injecting steam as a part of sagd for increasing the fluid mobility of oil in a heavy oil reservoir. in this method, microorganisms are introduced into the reservoir through both injection and production wells, prior to steam injection, to pre-condition the reservoir for enhanced (shorter) start-up of the sagd process.[0015] u.s. pat. no. 4,475,590, incorporated herein by reference, provides an example of biostimulation in a conventional oil reservoir in conjunction with waterflood technology. waterflooding aims at displacing the residual oil in the reservoir with water, rather than the steam that is applied during the sagd method. similarly, u.s. pat. no. 4,971,151, and u.s. pat. no. 5,083,611, incorporated herein by reference, describe methods involving the injection of nutrients in the conventional oil reservoirs for enhancing oil recovery.[0016] all of these methods, however, focus on the active taxa present in high relative abundance in the microbial communities that are adapted to local prevailing in situ conditions (temperature, geochemistry, salinity, mineralogy, etc.) and that are readily investigated by microbiological methods. yet, in nearly every environment there are microbial seed banks that include many species or taxa of microorganisms present in low relative abundance. these microbial taxa can be inactive or dormant, and may include dormant bacterial endospores. microbial seed banks may constitute significantly less than 0.01 percent of the total cells present, and often exist in a dormant state. as such, they are typically not detected or highlighted by most environmental dna extraction surveys, and other more traditional methods for microbial characterization of oil reservoir environments.[0017] furthermore, the subsurface regions beyond the boundaries of the sagd steam chamber, such as inclined heterolithic strata (ihs), may contain up to twice as much oil sands resource as the targeted steam chamber region. however, production of the oil in the ihs region during sagd is limited. this ihs oil is interbedded with thin, but laterally extensive, low-permeability mudstone layers through which the steam cannot pass (Results 8)

1) Family number: 35862023 (US2010163230A)

© PatBase

Title: METHOD OF ENHANCING OIL RECOVERY

Abstract: The invention provides a method of enhancing oil recovery from a subterranean hydrocarbon reservoir, said method comprising injecting into said reservoir through a matrix injection section of a well a microorganism capable of digesting oil, and recovering oil from an oil receiving section of a production well, where said injection section is in said production well or is in an injection well and is above or adjacent said oil receiving section, and wherein microorganism injection is preceded by another oil extraction enhancing procedure.

Classifications:

International (IPC 8-9): C09K C09K8/582 C09K8/592 C12N C12N1/00 C12N1/20 C12N1/26 C12P39/00 E21B43/16 E21B43/22

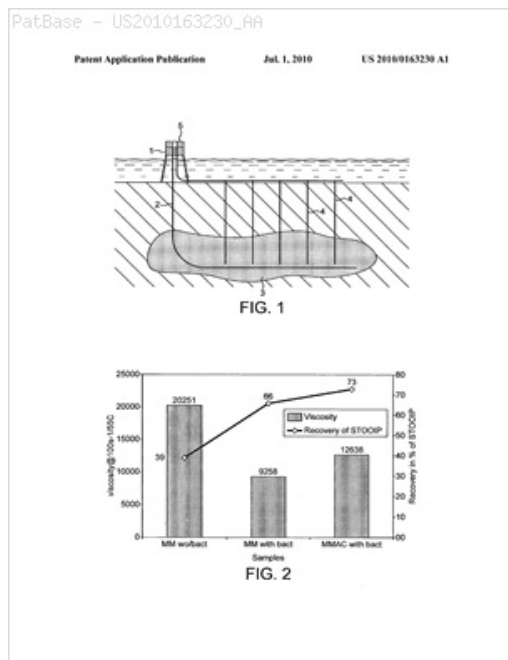
E21B43/24 (Advanced/Invention);
C09K8/58 C12N1/00 C12N1/20 E21B43/16 (Core/Invention)

International (IPC 1-7): C12N1/00

CPC: C09K8/582 C09K8/592 C12N1/20 C12N1/26 C12P39/00

European: C09K8/582 C09K8/592 C12N1/20 C12N1/26 C12P39/00

US: 166/246 166/272.1 166/272.4 166/272.400P 166/402 435/252.4 435/252.400S



Family:

Publication number	Publication date	Application number	Application date
BRPI0814804 A2	20150203	BR2008PI14804	20080626
BRPI0814804 B1	20181113	BR2008PI14804	20080626
CA2693008 AA	20091223	CA20082693008	20080626
CA2693008 C	20160405	CA20082693008	20080626
CN101842459 A	20100922	CN200880104117	20080626
CN101842459 B	20140219	CN200880104117	20080626
EA018191 B1	20130628	EA20100000027	20080626
EA201000027 A1	20100630	EA20100000027	20080626
GB200712395 A0	20070801	GB20070012395	20070626
GB2450502 A1	20081231	GB20070012395	20070626
GB2450502 B2	20120307	GB20070012395	20070626
US2010163230 AA	20100701	US20080452259	20080626
US8863855 BB	20141021	US20080452259	20080626
WO09001098 A2	20081231	WO2008GB02209	20080626
WO09001098 A3	20090423	WO2008GB02209	20080626
ZA200909178 A	20110223	ZA20090009178	20091223

Priority:

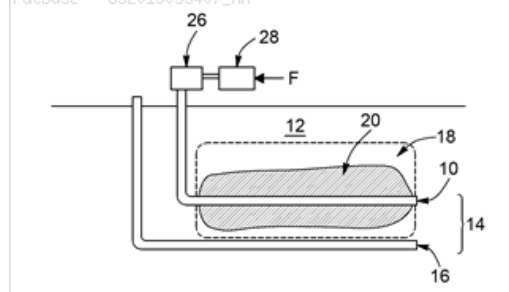
GB20070012395 20070626 WO2008GB02209 20080626

Probable Assignee: STATOIL ASA**Assignee(s):** (std): COCKBAIN JULIAN ; KOTLAR HANS KRISTIAN ; STATOIL ASA ; STATOILHYDRO ASA**Assignee(s):** STATOILHYDRO ASAI & K IR PATFORUSBEEN 50N-4035STAVANGERNO ; STATOIL ASAFORBUSBEEN 504033STAVANGERNO**Inventor(s):** (std): HANS KRISTIAN KOTLAR ; KOTLAR HANS KRISTIAN ; KRISTIAN KOTLAR HANS**Inventor(s):** KOTLAR HANS KRISTIENNO**Agent(s):** FREEDMAN AND ASSOCIATES; SHAPIRO COHEN LLP; AVENTUM IP LAW LLP; BALLARD SPAHR LLP; COCKBAIN JULIAN ET AL**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW**2) Family number: 54510029 (US2015053407A)**

© PatBase

Title: MICROBIAL ENHANCED TREATMENT OF CARBONATE RESERVOIRS FOR IN SITU HYDROCARBON RECOVERY**Abstract:** Techniques for hydrocarbon recovery from a carbonate reservoir include injecting a microbial stimulation fluid including H₂ which enters a region of the reservoir that includes CO₂ and a microbial culture which converts at least a portion of the H₂ and CO₂ into a byproduct to promote dissolution of carbonate compounds in the region of the reservoir, thereby increasing porosity of the region to promote hydrocarbon recovery.**Classifications:****International (IPC 8-9):** C09K8/582 C09K8/72 E21B43/16 E21B43/22 E21B43/24 (Advanced/Invention)**CPC:** E21B43/164 E21B43/24 E21B43/2406 E21B43/16**US:** 166/302 166/303 166/307 166/308.2

PatBase - US2015053407_AA

**Family:**

Publication number	Publication date	Application number	Application date
CA2767846 AA	20130803	CA20122767846	20120203
CA2863617 AA	20140801	CA20132863617	20130201
US2015053407 AA	20150226	US20130376394	20130201
WO13113126 A1	20130808	WO2013CA50082	20130201

Priority:CA20122767846 20120203 US20120696482P 20120904 CA20132863617 20130201
WO2013CA50082 20130201 US20130376394 20130201**Probable Assignee:** UTI PARTNERSHIP LTD**Assignee(s):** (std): SUNCOR ENERGY INC ; UNIV ALBERTA**Assignee(s):** NATHOO SAFIA2500 UNIVERSITY DRIVE NWALGARYA1T2N 1N4CA ; GOVERNORS OF UNIV OF CALGARY2500 UNIVERSITY DRIVE NWALGARYA1T2N 1N4CA ; UTI PARTNERSHIP LTD ; VOORDOUW GERRIT ; NATHOO SAFIA ; VOORDOUW GERRIT2500 UNIVERSITY DRIVE NWALGARYA1T2N 1N4CA ; DIAZ GOANO CAROLINA ; DIAZ GOANO CAROLINA236 WOODBROOK MEWS SWALGARYA1T2W 4P8CA ; FOLARIN YETUNDE ; FOLARIN YETUNDE2500 UNIVERSITY DRIVE NWALGARYA1T2N 1N4CA ; GOVERNORS OF UNIV OF CALGARY

Inventor(s): (std): DIAZ GOANO CAROLINA ; FOLARIN YETUNDE ; NATHOO SAFIA ; VOORDOUW GERRIT

Inventor(s): DIAZ GOANO CAROLINA236 WOODBROOK MEWS SWCALGARYA1T2W 4P8CA ; NATHOO SAFIA2500 UNIVERSITY DRIVE NWCALGARYA1T2N 1N4CA ; FOLARIN YETUNDE2500 UNIVERSITY DRIVE NWCALGARYA1T2N 1N4CA ; VOORDOUW GERRIT2500 UNIVERSITY DRIVE NWCALGARYA1T2N 1N4CA

Agent(s): ROBIC

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

3) Family number: 65322267 (US2018266223A)

© PatBase

Title: MICROBIALLY ENHANCED THERMAL OIL RECOVERY

Abstract: A method and a system for recovering oil from currently inaccessible oil containing geological units by activating the deep biosphere microbial seed bank. Nutrient and thermal enhancement of microorganisms in oil containing geological units allows for stimulation of inactive and/or dormant microorganisms such that they proliferate and produce gas. The oil viscosity that is decreased by heat, along with the gas pressure produced by activated microbes which allows previously inaccessible oil to flow toward production wells.

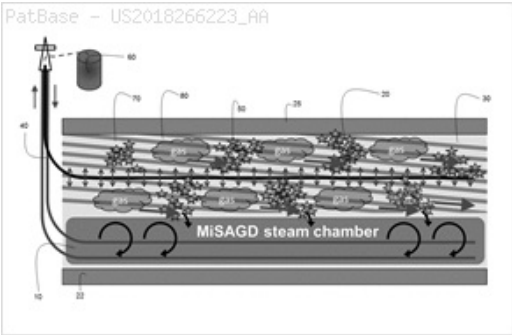
Classifications:

International (IPC 8-9): C09K8/582 C09K8/592 E21B43/16 E21B43/22 E21B43/24 (Advanced/Invention)

International (IPC 1-7): E21B43/22 E21B43/24

CPC: E21B43/2408 C09K8/582 C09K8/592 E21B43/26

US: 1/1 166/246



Family:

Publication number	Publication date	Application number	Application date
BR112018005678 A2	20181002	BR20181105678	20160922
CA2999599 AA	20180322	CA20162999599	20160922
CN108350733 A	20180731	CN201680065439	20160922
CO20180003510 A2	20180620	CO20180003510	20180402
EA201890544 A1	20180831	EA20180090544	20160922
EP3353376 A1	20180801	EP20160847691	20160922
EP3353376 A4	20190424	EP20160847691	20160922
IN201817010160 A	20180706	IN201817010160	20180320
MX2018003469 A1	20181109	MX20180003469	20160922
US2018266223 AA	20180920	US20180762557	20180322
WO17049404 A1	20170330	WO2016CA51114	20160922
WO19178700 A1	20190926	WO2019CA50358	20190322

Priority:

US20150221936P 20150922 WO2016CA51114 20160922 US20180762557 20180322

Probable Assignee: 9668241 CANADA INC

Assignee(s): (std): 9668241 CANADA INC

Assignee(s): FUSTIC MILOVAN ; HUBERT CASEY

Inventor(s): (std): FUSTIC MILOVAN ; HUBERT CASEY ; MILOVAN FUSTIC ; CASEY BERT

Inventor(s): CASEY HUBERT

Agent(s): BRION RAFFOUL; JOSE ANDRES RINCON USCATEGUI; MIDTTUN GISLE JOHAN

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DJ DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JO JP KE KG KH KM KN KP KR KW KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

4) Family number: 54077354 (US2013146280A)

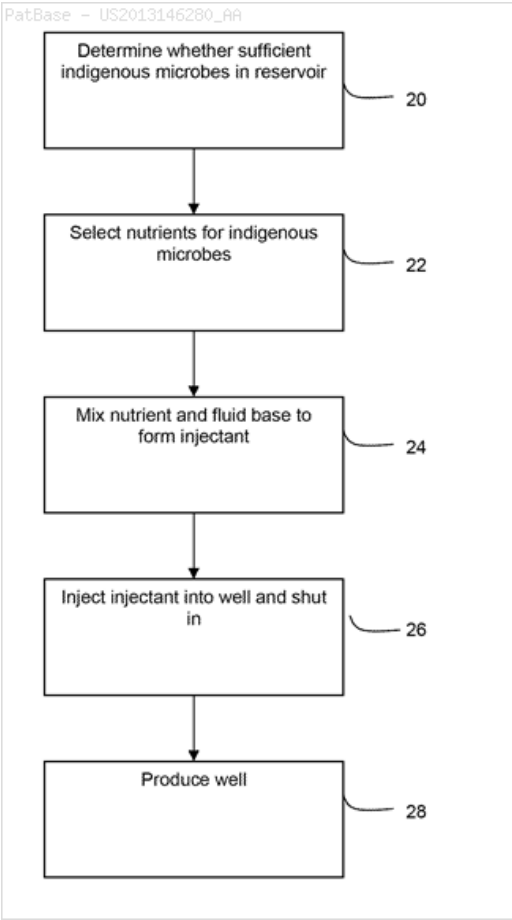
© PatBase

Title: MICROBIAL ENHANCED OIL RECOVERY PROCESS FOR HEAVY OIL ACCUMULATIONS

Abstract: A post cold heavy oil production with sand ("CHOPS") microbial enhanced oil recovery method comprises selecting a well having at least one wormhole and that has completed primary CHOPS production. When the reservoir does not contain enough of a gas producing indigenous microbe, an injectant is prepared comprising a gas-producing microbe, a nutrient suitable for the microbe, and a fluid base. The injectant is injected through the well and into the at least one wormhole in the reservoir; the well is shut in until pressure in the well reaches the target pressure; and then the well is produced.

Classifications:

International (IPC 8-9): E21B43/22 (Advanced/Invention)



Family:

Publication number	Publication date	Application number	Application date
US2013146280 AA	20130613	US20110313776	20111207
US8746334 BB	20140610	US20110313776	20111207

Priority:

US20110313776 20111207

Probable Assignee: HUSKY OIL OPERATIONS LTD
Assignee(s): (std): COSKUNER GOKHAN ; HUSKY OIL OPERATIONS LTD
Assignee(s): HUSKY OIL OPERATIONS LIMITED
Inventor(s): (std): COSKUNER GOKHAN
Agent(s): FROST BROWN TODD LLC

5) Family number: 56968448 (CN103939069B) © PatBase

Title: STEAM-GAS DISPLACEMENT AND GRAVITY OIL DRAIN COMPOSITE EXPLOITING METHOD

Abstract: The invention provides a steam-gas displacement and gravity oil drain composite exploiting method. According to the method, at least one horizontal well or a row of vertical wells close to the top of an oil pool are adopted as injection well sets, horizontal wells with the number same as that of wells in the injection well sets or with one more well are close to the bottom of the oil pool and are used as extraction well sets, the injection well sets and the extraction well sets are arranged in parallel in a non-direct-facing mode, and lower extraction wells are located in the middle portions of two upper injection wells. Steam huff and puff or steam and gas composite huff and puff are carried out on the injection wells and the extraction wells at the same time or in sequence, heat communication is built between the injection wells and the extraction wells to low the formation pressure, then high-temperature steam and non-condensation gas are injected into the injection wells at the same time or in an alternating mode, the injected steam seeps in the oil pool and heats the oil pool, the steam is condensed into hot water at the same time, and the gas expands a heating cavity, lowers heat loss and increases the pressure of the oil pool, so that crude oil flows to the extraction wells and is extracted under the composite effect of pressure displacement and gravity oil drain.

Classifications:
International (IPC 8-9): E21B43/24 (Advanced/Invention)

Publication number	Publication date	Application number	Application date
■ CN103939069 A	20140723	CN201410092762	20140313
■ CN103939069 B	20150701	CN201410092762	20140313

CN201410092762 20140313

Assignee(s): (std): UNIV CHINA PETROLEUM

Inventor(s): (std): SUN YUBAO ; LIN TAO ; LIU HAITAO ; YU DI ; ZHONG LIGUO ; WANG SHAOHUA ; SUN YONGTAO

Abstract: A method of microbial enhanced oil recovery from an oil-bearing formation that involves treating the water that is to be injected into the oil-bearing formation to enable microbial activity and adding oxygen to aid microbial activity. The treatment applied to the water is based, at least in part, upon establishing at least one condition in the oil-bearing formation favorable to microbial activity that enhances movement of oil from the oil-bearing formation.

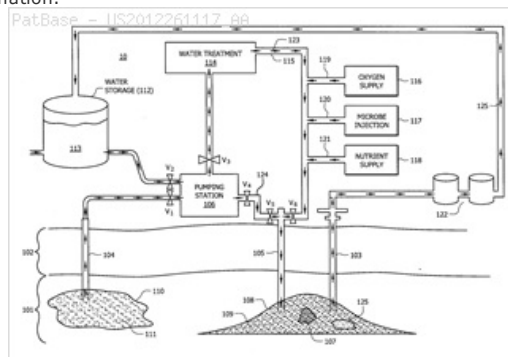
International (IPC 8-9): C09K8/582 C09K8/84 C12Q1/02 C9K8/84

E21B43/16 E21B43/22 (Advanced/Invention);

C02F3/00 (Advanced/Non-invention)

CPC: C09K8/582 E21B43/16 Y02W10/30 C09K8/84

US: 166/246 166/270



Publication number	Publication date	Application number	Application date
AR085873 AA	20131030	AR2012P101196	20120404
BR112013026061 A2	20190924	BR20131126061	20120215
CA2831591 AA	20130926	CA20122831591	20120215
CA2831591 C	20161108	CA20122831591	20120215
CN103534330 A	20140122	CN201280018074	20120215
GB201318159 A0	20131127	GB20130018159	20120215
GB2503400 A1	20131225	GB20130018159	20120215

GB2503400 B2	20161102	GB20130018159	20120215
MX2013011621 A1	20131025	MX20130011621	20120215
RU2013150205 A	20150520	RU20130150205	20120215
RU2559978 C2	20150820	RU20130150205	20120215
US2012261117 AA	20121018	US20110085308	20110412
US8826975 BB	20140909	US20110085308	20110412
WO13105983 A1	20130718	WO2012US25175	20120215

Priority:

US20110085308 20110412 WO2012US25175 20120215

Probable Assignee: NEW AERO TECHNOLOGY LLC

Assignee(s): (std): GLORI OIL LTD ; ISHOEY THOMAS ; PAGE STUARK MARK ; PAVIA MICHAEL RAYMOND ; SUNDE EGIL ; PAGE STUART MARK ; GLORI EHNERDZHI INK ; GLORI ENERGY INC

Assignee(s): GLORI OIL LIMITED ; NEW AERO TECHNOLOGY LLC

Inventor(s): (std): PAGE STUARK MARK ; PEHJDZH STJUARK MARK ; ISKHOOEHJU TOMAS ; PAVIJA MAJKL REHJMOND ; SUNNE EHGIL ; THOMAS ISHOEY ; STUARK MARK PAGE ; EGIL SUNDE ; MICHAEL RAYMOND PAVIA ; ISHOEY THOMAS ; PAGE STUART MARK ; SUNDE EGIL ; PAVIA MICHAEL RAYMOND

Agent(s): NORTON ROSE FULBRIGHT CANADA LLP SENCRL SRL; FULBRIGHT AND JAWORSKI LLP; TANNENBAUM DAVID H ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

7) Family number: 41935741 (US2010012331A)

© PatBase

Title: PRECONDITIONING AN OILFIELD RESERVOIR

Abstract: Techniques for preconditioning an oilfield reservoir including heavy oil and/or bitumen prior to production of a petroleum product are described. A preconditioning agent can be injected into a mobile water film included in the oilfield reservoir. The preconditioning agent preconditions the reservoir prior to production of the petroleum product.

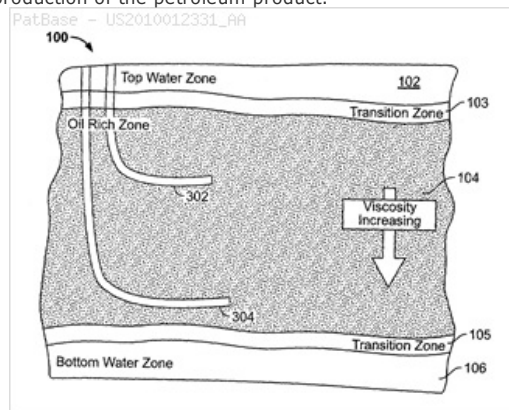
Classifications:

International (IPC 8-9): C09K8/58 E21B33/138 E21B43/16 E21B43/20 E21B43/22 E21B43/24 E21B47/00 E21B47/10 (Advanced/Invention); C09K8/58 E21B43/16 (Core/Invention)

CPC: Y02P90/70 E21B41/0064 C09K8/58 C09K8/592 E21B43/164 E21B43/243 Y02C10/14 E21B43/16 E21B43/2408

European: C09K8/58 C09K8/592 E21B41/00M2C E21B43/16E E21B43/243 E21B43/24S Y02C10/14

US: 166/250.01 166/263 166/270 166/272.1 166/272.3 166/275 166/294 166/300 166/303 166/305.1 166/400 166/401 507/260 507/261 507/267 507/268



Family:

Publication number	Publication date	Application number	Application date
CA2672487 AA	20090612	CA20072672487	20071212
CA2672487 C	20131231	CA20072672487	20071212
CN101611216 A	20091223	CN200780051254	20071212
CN101611216 B	20140319	CN200780051254	20071212
CN103821484 A	20140528	CN201410053403	20071212
CN103821484 B	20170524	CN201410053403	20071212
US2010012331 AA	20100121	US20070519131	20071212
US8235110 BB	20120807	US20070519131	20071212
WO08070990 A1	20080619	WO2007CA02249	20071212

Priority:

US20060869886P 20061213 US20060869888P 20061213 CN200780051254 20071212
WO2007CA02249 20071212 US20070519131 20071212

Probable Assignee: SCHLUMBERGER TECHNOLOGY CORP

Assignee(s): (std): ADAMS JENNIFER JANE ; BENNETT BARRY ; GATES IAN DONALD ; GUSHOR INC ; HUANG HAIPING ; LARTER STEPHEN RICHARD ; SNOWDON LLOYD ; JIANG CHUNQING ; SNOWDON LLOYD ROSS

Assignee(s): SCHLUMBERGER CANADA LTD ; SCHLUMBERGER TECHNOLOGY CORP

Inventor(s): (std): GATES IAN DONALD ; JIANG CHUNQING ; HUANG HAIPING ; ADAMS JENNIFER JANE ; SNOWDON LLOYD ; BENNETT BARRY ; LARTER STEPHEN RICHARD ; SNOWDON LLOYD ROSS ; ADAMS JENNIFER JANE ; RICHARD LARTER STEPHEN ; CHUNQING JIANG ; BARRY BENNETT ; HAIPING HUANG ; DONALD GATES IAN ; LLOYD SNOWDON ; JANE ADAMS JENNIFER ; IAN DONALD GATES ; JENNIFER JANE ADAMS ; STEPHEN RICHARD LARTER

Agent(s): BORDEN LADNER GERVAIS LLP; FISH AND RICHARDSON PC; COLLARD CHRISTINE J ET AL

Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE

8) Family number: 56340757 (US2014116682A)

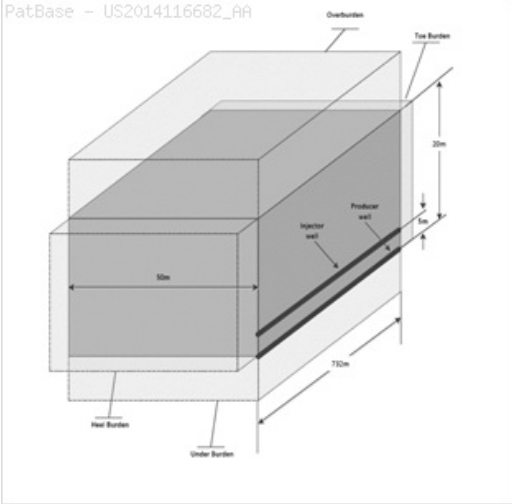
PatBase

Title: MICROBIAL PROCESSES FOR INCREASING FLUID MOBILITY IN A HEAVY OIL RESERVOIR

Abstract: Methods are provided for increasing overall fluid mobility in a near-wellbore region in an oil sands reservoir, for example in a reservoir having an inter-well region between a first well and a second well of a well pair in which at least a portion of the near-wellbore region is within the inter-well region. The methods may involve inoculating the near-wellbore region with a microorganism, wherein the near-wellbore region comprises a hydrocarbon phase and an aqueous phase, the viscosity of the hydrocarbon phase being greater than the viscosity of the aqueous phase. Conditions may be maintained in the near-wellbore region so that the microorganism metabolizes at least a portion of the hydrocarbon phase so that saturation of the near-wellbore region by the hydrocarbon phase decreases and saturation of the near-wellbore region by the aqueous phase increases.

Classifications:

International (IPC 8-9): E21B43/14 E21B43/22
E21B43/24 (Advanced/Invention)
CPC: C09K8/592 C09K8/582 E21B43/2408
US: 166/246



Family:

Publication number	Publication date	Application number	Application date
CA2831928 AA	20140501	CA20132831928	20131101
CA2831928 C	20161122	CA20132831928	20131101
US2014116682 AA	20140501	US20130070095	20131101

Priority:

US20120721452P 20121101 US20130070095 20131101

Probable Assignee: CENOVUS ENERGY INC

Assignee(s): (std): BEN ZVI AMOS ; BRACHO DOMINGUEZ ROSANA PATRICIA ; GUPTA SUBODH ; PUGH KIRSTEN AMY YEATES

Assignee(s): CENOVUS ENERGY INC

Inventor(s): (std): PUGH KIRSTEN AMY YEATES ; BRACHO DOMINGUEZ ROSANA PATRICIA ; GUPTA SUBODH ; BEN ZVI AMOS

Agent(s): BORDEN LADNER GERVAIS LLP