PatBase - Search results 02 July 2020

Search query (2): [SP]: A method comprising: receiving, by a processing device and from a first gas-detecting device, isotopic data associated with a stream of a mud gas sample from a wellbore as the mud gas sample exits the wellbore, the isotopic data indicating a type and an amount of a gas in the mud gas sample; generating, by the processing device, a plurality of isotopic data points indicating a hydrocarbon composition of the mud gas sample based on the isotopic data; determining, by the processing device, depths associated with the plurality of isotopic data points; determining, by the processing device, a relationship between the plurality of isotopic data points and depths associated with the plurality of isotopic data points; and outputting, by the processing device, data indicating the plurality of isotopic data points, depths associated with the plurality of isotopic data points, and the relationship between the plurality of isotopic data points and the depths associated with the plurality of data points for determining geological information about the wellbore. 2. The method of claim 1 , wherein determining the relationship between the plurality of isotopic data points and depths associated with the plurality of isotopic data points includes applying, by the processing device, a regression analysis to the plurality of isotopic data points and depths associated with the plurality of isotopic data points to determine the relationship. 3. The method of claim 1 , further comprising: determining, by the processing device, a boundary of the wellbore based at least in part on the plurality of isotopic data points, the boundary indicating a shape of the wellbore. 4. The method of claim 3, wherein determining the boundary of the wellbore includes: determining, by the processing device, a slope or an inflection point of the relationship between the plurality of isotopic data points and depths associated with the plurality of isotopic data points; and determining the boundary based at least in part on the slope or the inflection point. 5. The method of claim 4, wherein determining the slope or the inflection point of the relationship between the plurality of isotopic data points and depths associated with the plurality of isotopic data points includes: determining, by the processing device, a first derivative of the relationship between the plurality of isotopic data points and depths associated with the plurality of isotopic data points; and determining, by the processing device, a second derivative of the relationship between the plurality of isotopic data points and depths associated with the plurality of isotopic data points. 6. The method of claim 1 , further comprising determining isotopic data associated with the stream of the mud gas sample using chromatography isotope- ratio mass spectrometry. 7. The method of claim 1 , wherein determining the geological information about the wellbore includes determining information about a seal, a barrier, a good communication zone, or gas diffusion within the wellbore. 8. The method of claim 1 , further comprising: receiving, by the processing device, isotopic data indicating an amount and a type of a first gas in the mud gas sample from the first gas-detecting device, the first gas including a first carbon isotope or a first hydrogen isotope; receiving, by the processing device, isotopic data indicating an amount and a type of a second gas in the mud gas sample from the first gas-detecting device, the second gas including a second carbon isotope or a second hydrogen isotope; determining, by the processing device, a ratio between the amount of the first gas and the amount of the second gas by comparing the amount of the first gas and the amount of the second gas; and outputting, by the processing device, data indicating the ratio between the amount of the first gas and the amount of the second gas. 9. The method of claim 1 , further comprising: receiving, by the processing device and from a second gas-detecting device, isotopic data indicating an amount and a type of a first gas in a first mud gas sample entering the wellbore; receiving, by the processing device, isotopic data indicating an amount and a type of a second gas in a second mud gas sample exiting the wellbore from the first gas-detecting device; determining, by the processing device, a ratio between the amount of the first gas entering the wellbore and the amount of the second gas exiting the wellbore; and outputting, by the processing device, data indicating the ratio between the amount of the first gas and the amount of the second gas. 10. The method of claim 1 , further comprising: receiving, by the processing device, isotopic data associated with a plurality of streams of mud gas samples from a plurality of wellbores as each stream of mud gas sample exits a wellbore of the plurality of wellbores; generating, by the processing device, a plurality of isotopic data points indicating hydrocarbon compositions of each mud gas sample based on the isotopic data; determining, by the processing device, depths within the plurality of wellbores associated with the plurality of isotopic data points of each mud gas sample; determining, by the processing device, the relationship between the plurality of isotopic data points of each mud gas sample and depths associated with the plurality of isotopic data points of each mud gas sample; and outputting, by the processing device, data associated with a mud gas sample exiting each wellbore of the plurality of wellbores, the data corresponding to isotopic data points associated with the wellbore, depths associated with the isotopic data points, and the relationship between the isotopic data points and depths within the wellbore associated with the isotopic data points for determining geological information about the plurality of wellbores. 1 1 . A system comprising: a first gas-detecting device positionable proximate to a wellbore for detecting a gas in a mud gas sample from the wellbore at a surface of the wellbore as the mud gas sample exits the wellbore; and a processing module communicatively coupled to the first gas-detecting device to receive isotopic data from the first gas-detecting device and use the isotopic data to determine geological information about the wellbore, the isotopic data representing an amount of gas and a type of gas detected by the first gas- detecting device. 12. The system of claim 1 1 , wherein the first gas-detecting device is positionable proximate to the wellbore to detect a type and an amount of a carbon isotope or a hydrogen isotope in the mud gas sample detected at the surface of the wellbore. 13. The system of claim 1 1 , wherein the first gas-detecting device includes at least one of a mass spectrometer or a cavity ring-down spectrometer. 14. The system of claim 1 1 , wherein the first gas-detecting device is positionable proximate to the wellbore to detect a concentration level of a carbon isotope or a hydrogen isotope in the mud gas sample detected at the surface of the wellbore. 15. The system of claim 1 1 , further comprising: a second gas-detecting device positionable proximate to the wellbore for detecting a gas in a fluid and gas mixture entering the wellbore and wherein the processing module is communicatively coupled to the second gas-detecting device for receiving data indicating an amount of gas and a type of gas entering the wellbore from the second gas-detecting device. 16. A non-transitory computer-readable storage medium having program code that is executable by a processor device to cause a computing device to perform operations, the operations comprising: receiving isotopic data associated with a stream of a mud gas sample from a first gas-detecting device as the mud gas sample exits a wellbore, the isotopic data indicating an amount and a type of a gas in the mud gas sample; generating a plurality of isotopic data points indicating a hydrocarbon composition of the mud gas sample based on the isotopic data; determining depths associated with the plurality of isotopic data points; determining a relationship between the plurality of isotopic data points and depths associated with the plurality of isotopic data points; and outputting data indicating the plurality of isotopic data points, depths associated with the plurality of isotopic data points, and the relationship between the plurality of isotopic data points and the depths associated with the plurality of data points for determining geological information about the wellbore. 17. The non-transitory computer-readable storage medium of claim 16, further comprising program code to cause the computing device to perform the operation of: receiving isotopic data indicating an amount and a type of a first gas in a first mud gas sample entering the wellbore from a second gas-detecting device; receiving isotopic data indicating an amount and a type of a second gas in a second mud gas exiting the wellbore from the first gas-detecting device; determining a ratio between the amount of the first gas and the amount of the second gas; and outputting data indicating the ratio between the amount of the first gas and the amount of the second gas. 18. The non-transitory computer-readable storage medium of claim 16, further comprising program code to cause the computing device to perform the operation of: determining a boundary of the wellbore based at least in part on the plurality of isotopic data points, the boundary indicating a shape of the wellbore. 19. The non-transitory computer-readable storage medium of claim 18, wherein the operation of determining the boundary of the wellbore includes: determining a first derivative of the relationship between the plurality of isotopic data points and depths associated with the plurality of isotopic data points; determining a second derivative of the relationship between the plurality of isotopic data points and depths associated with the plurality of isotopic data points; determining a slope or an inflection point of the relationship between the plurality of isotopic data points and depths associated with the plurality of isotopic data points based at least in part on the first derivative or the second derivative; and determining the boundary based at least in part on the slope or the inflection point. 20. The non-transitory computer-readable storage medium of claim 16, wherein the operation of determining the relationship between the plurality of isotopic data points and depths associated with the plurality of isotopic data points includes applying a regression analysis to the plurality of isotopic data points and the depths associated with the plurality of isotopic data points to determine the relationship.

Results: 6

1) Family number: 50957222 (US2013233057A)

Title: DEVICE FOR ANALYZING AT LEAST ONE HYDROCARBON CONTAINED IN A DRILLING FLUID AND ASSOCIATED METHOD

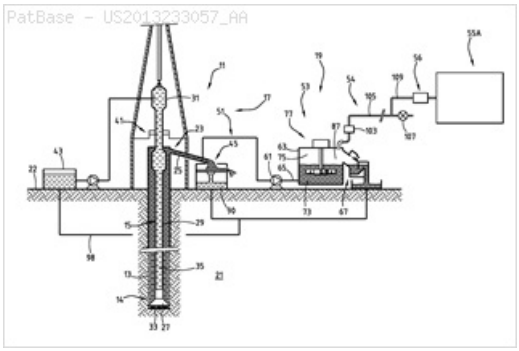
Abstract: The device comprises an extractor (53) having an outlet (71) at which a gas stream is sampled. The gas stream contains at least one hydrocarbon to be analyzed and at least one interfering compound. A transport line (54), is connected to the outlet (71) of the extractor (53) to transport the gas stream to an analyzer (55A) comprising a detector being able to measure at least N one of the hydrocarbons to be analyzed contained in this gas stream. The device comprises a chemical reactor (141) located between the extractor (53) and the detector. At least a portion of the extracted gases is transported through the chemical reactor (141) where a selective catalytic reaction of at least one interfering compound is carried out without any substantial reaction of at least one of the hydrocarbons to be analyzed.

Classifications:

International (IPC 8-9): B01D53/22 C10G70/00 C10L3/02 C10L3/10 G01N1/22 G01N1/34 G01N1/40 G01N1/44 G01N21/72 G01N30/14 G01N30/88 G01N33/00 G01N33/28 (Advanced/Invention); G01N1/20 G01N30/02 G01N30/06 (Advanced/Non-invention)

CPC: G01N33/0013 G01N21/72 B01D53/22 C10G2300/1033 G01N1/2035 G01N1/2294 G01N1/4044 G01N30/88 G01N33/2823

G01N2030/025 G01N2030/067 G01N2030/8854 G01N2030/8868
European: B01D53/22 G01N1/22S G01N1/40G G01N30/88 G01N33/28E S01N1/20B S01N30/02A2 S01N30/06C S01N30/88C3Y S01N30/88C7
US: 73/31.07



Family:

Publication number	Publication date	Application number	Application date
BR112013009808 A2	20161004	BR20131109808	20111020
CN103229051 A	20130731	CN201180056912	20111020
DE602011020392 D1	20151119	DE201160020392T	20111020
DK2630485 T3	20160118	DK20110785111T	20111020
EP2444802 A1	20120425	EP20100306151	20101022
EP2630485 A1	20130828	EP20110785111	20111020
EP2630485 B1	20151007	EP20110785111	20111020
US2013233057 AA	20130912	US20110880978	20111020
US9671381 BB	20170606	US20110880978	20111020
WO12052962 A1	20120426	WO2011IB54699	20111020

Priority:

EP20100306151 20101022 US20100407589P 20101028 EP20110785111 20111020
WO2011IB54699 20111020 US20110880978 20111020

Probable Assignee: GEOSERVICES EQUIPEMENTS

Assignee(s): (std): BANIK PATRICK ; BREVIERE JEROME ; GEOSERVICES EQUIPEMENTS ; GEOSERVICES EQUIPMENTS ; KAROUM REDA

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Inventor(s): PATRICK BANIK ; REDA KAROUM ; JEROME BREVIERE

Agent(s): RZANIAK MARTIN; MICHAEL; RZANIAK MARCIN

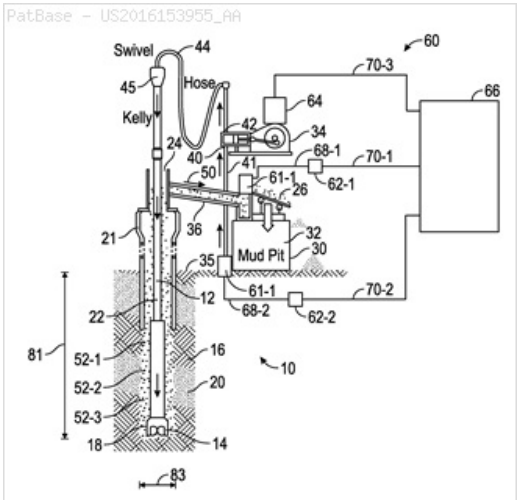
Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM 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

2) Family number: 58283349 (US2016153955A)

Title: SYSTEM AND METHOD FOR LOGGING ISOTOPE FRACTIONATION EFFECTS DURING MUD GAS LOGGING

Abstract: A mud gas analyzer and a well-site system using the mud gas analyzer are described. The mud gas analyzer includes at least one degasser adapted to extract gas from drilling mud passing through a flow path formed at least partially by a drill string within a well and an annulus positioned between an exterior surface of the drill string and a formation surrounding the well at a well-site, at least one gas analyzer adapted to interact with the gas extracted from the drilling mud. The gas analyzer determines an isotopic composition of a gas liberated from the drilling mud and generates a sequence of signals indicative of ratios of isotopes of a gas species liberated from the drilling mud. The computer system includes a processor adapted to execute logic to cause the processor to access information indicative of the well's and drilling tools geometry and mud flow rates or access information from any other source providing particular locations of the well at which mixing of fractions of a gas species occurred including formation gas and recycled gas, receive the sequence of signals, and to calculate and log isotopic characteristics of the gas species entering the drilling mud at particular locations of the well within a geological formation.

Classifications:
International (IPC 8-9): E21B21/06 E21B27/00 E21B47/10 E21B49/00 E21B49/08 G01N1/10 G01N33/00 G01N33/24 G01N33/28 (Advanced/Invention)
CPC: E21B21/067 E21B47/10 E21B49/005 G01N33/0047 G01N33/2823
US: 175/40 702/24 73/152.19



Family:

Publication number	Publication date	Application number	Application date
AR096872 AA	20160203	AR2014P102556	20140710

BR112016000449 A2	20170725	BR20161100449	20140710
CA2918068 AA	20160111	CA20142918068	20140710
EP2824455 A1	20150114	EP20130305982	20130710
EP3019698 A1	20160518	EP20140823054	20140710
EP3019698 A4	20170517	EP20140823054	20140710
US2016153955 AA	20160602	US20140903388	20140710
US10371691 BB	20190806	US20140903388	20140710
WO15006552 A1	20150115	WO2014US46134	20140710

Priority:

EP20130305982 20130710 EP20140823054 20140710 WO2014US46134 20140710
US20140903388 20140710

Probable Assignee: GEOSERVICES EQUIPEMENTS

Assignee(s): (std): GEOSERVICES EQUIPEMENTS ; GEOSERVICES EQUIPEMENTS SAS ; SCHLUMBERGER TECH BV ; SCHLUMBERGER TECHNOLOGY BV ; SCHLUMBERGER TECHNOLOGY CORP ; SERVICE PETROLIERS SCHLUMBERGER ; SCHLUMBERGER HOLDINGS

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Agent(s): SMART AND BIGGAR; RZANIAK MARTIN; LEONORI CELINE; CHI STEPHANIE ET AL

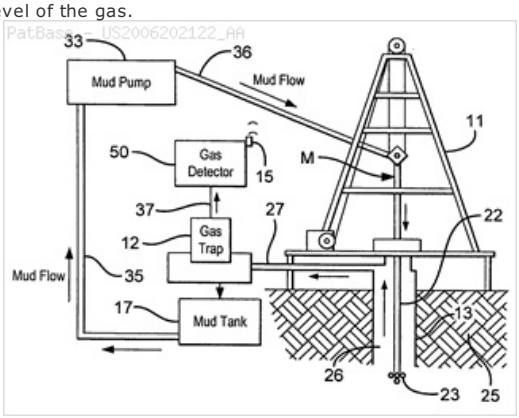
Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW 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

3) Family number: 33343390 (US2006202122A)

Title: DETECTING GAS IN FLUIDS

Abstract: A method for detecting gas in a fluid, the system including flowing fluid bearing gas through a gas trap apparatus, flowing gas trapped by the gas trap apparatus to and through an infra-red gas detection system for detecting the gas, the infrared gas detection system having apparatus for isolating absorption spectra of the gas, producing with the infra-red gas detection system analog signals indicative of levels of the gas, transmitting the analog signals to a first processor for converting the analog signals to digital signals, transmitting the digital signals from the first processor to a second processor, producing with the second processor digital signals indicative of the level of the gas.

Classifications:
International (IPC 8-9): A47J43/044 A47J43/07 G01J5/02 G01N21/35 G01N21/3504 G01N21/3581 G01V8/00 (Advanced/Invention); G01J3/42 (Advanced/Non-invention); A47J43/04 G01J5/02 G01N21/31 G01V8/00 (Core/Invention)
CPC: G01N21/3504 E21B21/01
European: A47J43/044 A47J43/07S2 G01N21/35B K47J43/044K6
US: 250/269.1 250/339.13 250/343



Family:

Publication number	Publication date	Application number	Application date
CA2600290 AA	20070906	CA20052600290	20050719
CA2600290 C	20110419	CA20052600290	20050719
GB200716165 A0	20070926	GB20070016165	20050719
GB2438127 A1	20071114	GB20070016165	20050719
GB2438127 B2	20100428	GB20070016165	20050719
NO20074306 A	20071101	NO20070004306	20070822
NO20074306 L	20071101	NO20070004306	20070822
NO340293 B1	20170327	NO20070004306	20070822
US2006202122 AA	20060914	US20050079921	20050314
US2009008560 AA	20090108	US20050664892	20050719
US7741605 BB	20100622	US20050664892	20050719
WO06097670 A1	20060921	WO2005GB50113	20050719

Priority:

US20050079921 20050314 US20050664892 20050719 WO2005GB50113 20050719

Probable Assignee: VARCO I P INC

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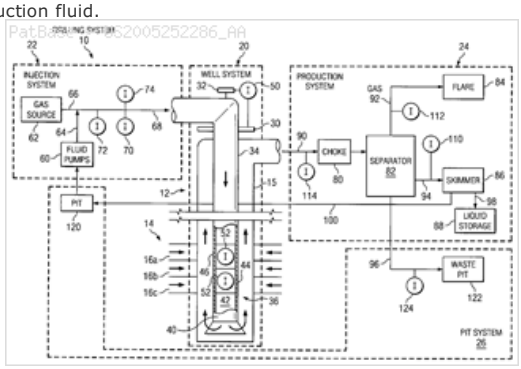
Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GW HR HU ID IE IL IN IS IT JP KE KG KM KP KR KZ LC LK LR LS LT LU LV MA MC MD MG MK ML MN MR MW MX MZ NA NE NG NI NL NO NZ OM PG PH PL PT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

4) Family number: 32398537 (US2005252286A)

Title: METHOD AND SYSTEM FOR RESERVOIR CHARACTERIZATION IN CONNECTION WITH DRILLING OPERATIONS

Abstract: A method for analyzing reservoir fluids in connection with a drilling operation includes determining composition and isotopes of injection fluids injected into a wellbore during a drilling operation and production fluids recovered from the wellbore during the drilling operation. Reservoir fluids from a reservoir intersected by the wellbore are characterized based on the composition and isotopes of the injection fluid and of the production fluid.

Classifications:
International (IPC 8-9): E21B37/08 E21B43/00 E21B43/24 E21B44/00 E21B47/00 E21B47/08 E21B49/00 E21B49/08 E21B7/00 G01N33/28 G01V9/00 G06G7/57 (Advanced/Invention); E21B37/00 E21B43/00 E21B47/00 E21B49/00 G01N33/26 G01V9/00 G06G7/00 (Core/Invention)
International (IPC 1-7): E21B37/08 E21B43/00 E21B49/08 G01V9/00
CPC: E21B49/005 G01N33/2823
European: E21B49/00G G01N33/28E
US: 166/257 175/40 175/40P 703/10 703/10P 73/152.39 73/152.55 73/152.550P



Family:

Publication number	Publication date	Application number	Application date
CA2506991 AA	20051112	CA20052506991	20050510
CA2506991 C	20130625	CA20052506991	20050510
CA2811046 AA	20051112	CA20052811046	20050510
CA2811046 C	20141125	CA20052811046	20050510
MXPA05005054 A1	20051117	MX2005PA05054	20050511
US2005252286 AA	20051117	US20040844725	20040512
US2008097735 AA	20080424	US20070960621	20071219
US2008099241 AA	20080501	US20070960572	20071219
US7337660 BB	20080304	US20040844725	20040512
US7571644 BB	20090811	US20070960572	20071219
US7762131 BB	20100727	US20070960621	20071219

Priority:

US20040844725 20040512 CA20052506991 20050510 CA20052811046 20050510
US20070960621 20071219 US20070960572 20071219 CA20132506991 20130412

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Inventor(s): SCHULTZ ROGER ; ELROD LOUIS ; WIEMERS TIMOTHY OUS ; SHAYEGI SARAUS ; SCHULTZ ROGER LUS ; JONES CHRISTOPHER MUS ; IBRAHIM EMAD BUS ; GODFREY CRAIGUS ; ELROD LOUIS WUS ; WIEMERS TIMOTHY ; JONES CHRISTOPHER ; IBRAHIM EMAD

Agent(s): OGILVY RENAULT LLP SENCRL SRL; NORTON ROSE FULBRIGHT CANADA LLP SENCRL SRL; NORTON ROSE CANADA SENCRL SRL LLP; FISH AND RICHARDSON PC

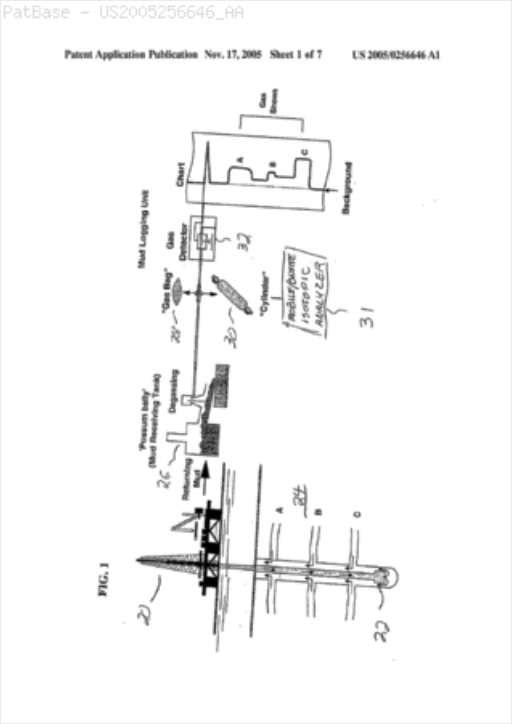
5) Family number: 32400634 (US2005256646A)

Title: MUD GAS ISOTOPE LOGGING INTERPRETIVE METHOD IN OIL AND GAS DRILLING OPERATIONS

Abstract: A method of interpreting mud gas samples in a drilling operation of a target area. The method starts with obtaining a plurality of mud gas samples at a plurality of incremental depths of the target area. The plurality of mud gas samples are analyzed to find various isotopic data at each depth. The isotopic data of the mud gas samples are plotting on several charts to provide a visual representation of the isotopic data trends. The charts may include: depth versus ethane/methane; depth versus delta^{13}C per mil; and depth versus delta^{13}C and gas show. In addition, the percentage methane versus delta^{13}C is provided on a separate chart. This percentage methane versus delta^{13}C chart provides engineering and geological information such as the location of lithological hydrocarbon seals, barriers, and zones of good hydrocarbon communication (e.g., compartments). This engineering and geological information is then correlated with the other charts to assist in the analysis of the target area.

Classifications:
International (IPC 8-9): E21B49/08 G01N33/24 G01N33/28 G01V1/40 G01V5/04 G01V9/00 (Advanced/Invention); E21B49/00 G01N33/24 G01N33/26 G01V1/40 G01V5/00 G01V9/00 (Core/Invention)
International (IPC 1-7): G01V1/40 G01V5/04
CPC: G01V9/007 G01N33/241 G01N33/2823 E21B49/005
European: G01N33/24A G01N33/28E G01V9/00C

US: 702/13 702/9 702/9P



Family:

Publication number	Publication date	Application number	Application date
US2005256646 AA	20051117	US20040845743	20040514
US2005256647 AA	20051117	US20040952136	20040928
US2008147326 AA	20080619	US20070931207	20071031
US7124030 BB	20061017	US20040845743	20040514
US7174254 BB	20070206	US20040952136	20040928
US7529626 BA	20090505	US20070671043	20070205
WO09059132 A1	20090507	WO2008US81989	20081031

Priority:

US20040845743 20040513 US20040845743 20040514 US20040952136 20040928
US20070671043 20070205 US20070931207 20071031

Probable Assignee: ELLIS LEROY

Assignee(s): (std)**:** ELLIS LEROY

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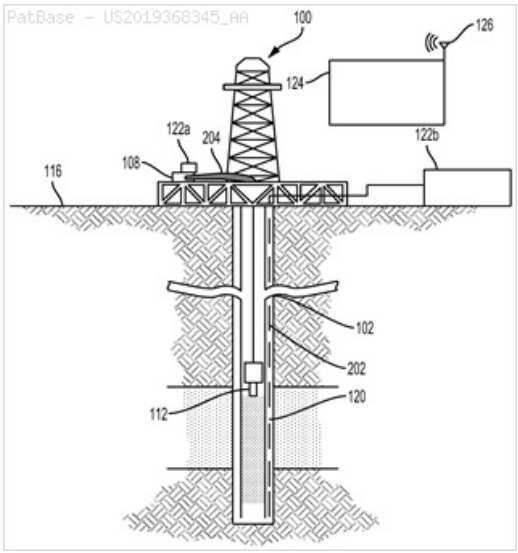
Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MW MX MY MZ NA NE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

6) Family number: 69340761 (US2019368345A)

Title: GAS ISOTOPE ANALYSIS

Abstract: Systems and methods are provided for analyzing isotopes of a gas from a wellbore to determine geological information associated with the wellbore. A drill device can be used to drill rocks or particles in a wellbore, which can cause a gas to be released within the wellbore. Fluid can be pumped into the wellbore as the drill bit drills the rocks or particles and the fluid, along with the gas released, can flow through the wellbore and to a surface of the wellbore. A gas detector can be positioned near the wellbore for detecting an amount of gas and a type of gas in the fluid and gas mixture and transmitting data about the amount and type of the gas to a computing device. The computing device can output data based on the amount and type of gas in the mixture for determining geological information about the wellbore.

Classifications:
International (IPC 8-9): E21B21/01 E21B49/00 E21B49/08 G01N30/72 G01N30/88 G01N33/00 G01N33/28 G01V5/06 (Advanced/Invention);
G01N30/88 G01N33/28 (Advanced/Non-invention)
International (IPC 1-7): E21B49/08 G01N30/72 G01N30/88 G01N33/00
CPC: E21B49/08 E21B21/01 E21B49/005 G01N30/7206 G01N33/2823 G01N2030/8854 G01N2030/8868 G01N30/72 G01N30/88 G01V5/06



Family:

Publication number	Publication date	Application number	Application date
AU2016425994 AA	20190307	AU20160425994	20161013
BR112019004797 A2	20190604	BR20191104797	20161013
CO20190002203 A2	20190531	CO20190002203	20190308
GB201901979 A0	20190403	GB20190001979	20161013
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NO20190259 A	20190225	NO20190000259	20190225
US2019368345 AA	20191205	US20160332163	20161013
WO18071029 A1	20180419	WO2016US56848	20161013

Priority:

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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 JP KE KG KM KN KP KR KW 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 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