

PATENT COOPERATION TREATY


From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To: HUNZIKER, Robin Baker Hughes, a GE company, LLC 14990 Yorktown Plaza Drive Houston, Texas 77040 USA		Date of mailing (day/month/year) 14 November 2018 (14.11.2018)	
Applicant's or agent's file reference WLM4-63439WO		FOR FURTHER ACTION See paragraph 2 below	
International application No. PCT/US2018/044376	International filing date (day/month/year) 30 July 2018 (30.07.2018)	Priority date(day/month/year) 04 August 2017 (04.08.2017)	
International Patent Classification (IPC) or both national classification and IPC E21B 47/12(2006.01)i, H04B 5/00(2006.01)i			
Applicant BAKER HUGHES, A GE COMPANY, LLC			
<p>1. This opinion contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p> <p>2. FURTHER ACTION</p> <p>If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.</p> <p>If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.</p> <p>For further options, see Form PCT/ISA/220.</p>			

Name and mailing address of the ISA/KR International Application Division Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea Facsimile No. +82-42-481-8578	Date of completion of this opinion 13 November 2018 (13.11.2018)	Authorized officer LEE, Jong Kyung Telephone No. +82-42-481-3360	
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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US2018/044376

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of :
 - the international application in the language in which it was filed
 - a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
2. This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. forming part of the international application as filed:
 - in the form of an Annex C/ST.25 text file.
 - on paper or in the form of an image file.
 - b. furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. furnished subsequent to the international filing date for the purposes of international search only:
 - in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 - on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE
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Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1-15</u>	YES
	Claims	<u>NONE</u>	NO
Inventive step (IS)	Claims	<u>NONE</u>	YES
	Claims	<u>1-15</u>	NO
Industrial applicability (IA)	Claims	<u>1-15</u>	YES
	Claims	<u>NONE</u>	NO

2. Citations and explanations :

Reference is made to the following documents:

D1: US 2016-0369622 A1 (WHEELER et al.) 22 December 2016

D2: US 2014-0048286 A1 (ROJAS et al.) 20 February 2014

D3: US 2005-0056418 A1 (NGUYEN, PHILIP D.) 17 March 2005

1. Novelty and Inventive Step

1.1 Independent Claim 1

D1, which is considered to be the closest prior art to the subject matter of claim 1, discloses a system (10) for deploying one or more downhole components of a borehole (12), the system (10) comprising a conductor assembly including one or more tools (28) connected along a length of a power and communication link (30), each tool (28) being configured to wirelessly communicate data or power, wherein the power and communication link (30) is configured to transmit the data or the power through the borehole (12) in an earth formation (14) (see paragraphs [0013], [0016]; and figure 1).

The subject matter of claim 1 differs from D1 in that an apparatus comprises a deployment device configured to transport and support a length of a conductor including one or more communication devices connected along the length of the conductor and deploy the length of the conductor in a borehole.

However, this feature would be easily conceived from the disclosure of D1 considering that the downhole components, which include the tools (28) connected to a wellhead (22) by the power and communication link (30), are connected to a surface facility (20) via one or more risers (24) (see paragraphs [0014], [0016]; and figure 1).

Accordingly, claim 1 would have been obvious over D1. Therefore, claim 1 does not involve an inventive step under PCT Article 33(3).

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1.2 Dependent Claims 2-12

1.2.1 Concerning Claim 2

The additional feature of claim 2, characterized in that the deployment device includes a spool, is not explicitly disclosed in D1. However, D2 discloses that a wireline drum (102) raises and lowers logging tools (108) by spooling and unspooling a wireline using a winch (110) (see paragraph [0013]; and figure 1). Accordingly, it would be obvious to a person skilled in the art to apply the feature of D2 to the system of D1 to arrive at the apparatus of claim 2. Therefore, claim 2 does not involve an inventive step under PCT Article 33(3).

1.2.2 Concerning Claim 3

The additional feature of claim 3 is identical to the disclosure of D2 in that the wireline drum (102) raises and lowers the logging tools (108) by spooling and unspooling the wireline using the winch (110) (see paragraph [0013]; and figure 1). Accordingly, claim 3 would have been obvious over D1 in view of D2. Therefore, claim 3 does not involve an inventive step under PCT Article 33(3).

1.2.3 Concerning Claim 4

The additional feature of claim 4, characterized in that each of the one or more communication devices is spaced along the length of the conductor such that a location of each communication device corresponds to a selected location on a borehole string deployed in the borehole, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that the system (10) includes a tool string (16) configured to deploy the downhole components which include tools (28) connected to the wellhead (22) by the power and communication link (30) in the borehole (12) (see paragraphs [0013], [0016]; and figure 1). Accordingly, claim 4 would have been obvious over D1. Therefore, claim 4 does not involve an inventive step under PCT Article 33(3).

1.2.4 Concerning Claim 5

The additional feature of claim 5, characterized in that one or more carriers are fixed to the borehole string, each of the carriers being configured to have at least one of the communication devices attached thereto, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that the downhole

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components, which include tools (28) connected to the wellhead (22) by the power and communication link (30), may be deployed using any suitable carrier (see paragraphs [0013], [0016]; and figure 1). Accordingly, claim 5 would have been obvious over D1. Therefore, claim 5 does not involve an inventive step under PCT Article 33(3).

1.2.5 Concerning Claim 6

The additional feature of claim 6, characterized in that the one or more carriers are spaced along the borehole string to correspond with the location of each communication device, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that the downhole components, which include tools (28) connected to the wellhead (22) by the power and communication link (30), may be deployed using any suitable carrier (see paragraphs [0013], [0016]; and figure 1). Accordingly, claim 6 would have been obvious over D1. Therefore, claim 6 does not involve an inventive step under PCT Article 33(3).

1.2.6 Concerning Claim 7

The additional features of claim 7, characterized in that at least one carrier is configured to have at least one downhole device attached thereto, wherein the at least one downhole device is configured to communicate the data or the power with a corresponding communication device attached to the at least one carrier, are not explicitly disclosed in D1. However, these features would be easily conceived from the disclosure of D1 considering that the downhole components, which include tools (28) connected to the wellhead (22) by the power and communication link (30) and connected to electronic units (38), may be deployed using any suitable carrier (see paragraphs [0013], [0016], [0018]; and figure 1). Accordingly, claim 7 would have been obvious over D1. Therefore, claim 7 does not involve an inventive step under PCT Article 33(3).

1.2.7 Concerning Claim 8

The additional feature of claim 8, characterized in that one or more downhole devices are configured to communicate the data or the power with one or more corresponding communication devices, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that the electronic units (38) are connected to the tools (28) (see paragraph [0018]; and figure 1). Accordingly, claim 8 would have been obvious over D1. Therefore, claim 8 does not involve an inventive step under

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PCT Article 33(3).

1.2.8 Concerning Claim 9

The additional feature of claim 9, characterized in that at least one of the one or more downhole devices is secured to a casing lining the borehole, is not explicitly disclosed in D1. However, D3 discloses that a module (30) is secured to a casing (20) lining a wellbore (10) (see figure 2). Accordingly, it would be obvious to a person skilled in the art to apply the feature of D3 to the system of D1 to arrive at the apparatus of claim 9. Therefore, claim 9 does not involve an inventive step under PCT Article 33(3).

1.2.9 Concerning Claim 10

The additional feature of claim 10 is identical to the disclosure of D1 in that at least one of the electronic units (38) is secured to the tool string (16) deployed in the borehole (12) (see figure 1). Accordingly, claim 10 would have been obvious over D1. Therefore, claim 10 does not involve an inventive step under PCT Article 33(3).

1.2.10 Concerning Claim 11

The additional feature of claim 11 is identical to the disclosure of D1 in that the power and communication link (30) is a cable or other conduit such as tubing encapsulated conductor (TEC) that connects electrical conductors to the wellhead (22) via a wireline (18) (see paragraph [0016]; and figure 1). Accordingly, claim 11 would have been obvious over D1. Therefore, claim 11 does not involve an inventive step under PCT Article 33(3).

1.2.11 Concerning Claim 12

The additional feature of claim 12 is identical to the disclosure of D1 in that tools (28) may be deployed in the borehole (12), and include a number of sensors for measuring acoustic velocity and acoustic travel time (see paragraph [0015]; and figure 1). Accordingly, claim 12 would have been obvious over D1. Therefore, claim 12 does not involve an inventive step under PCT Article 33(3).

1.3 Independent Claim 13

D1, which is considered to be the closest prior art to the subject matter of claim 13, discloses a method for deploying one or more downhole components of a borehole (12), the method comprising the step of connecting one or more tools (28) along a length of a power

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and communication link (30) in a controlled environment to form a conductor assembly, each tool (28) being configured to wirelessly communicate data or power, wherein the power and communication link (30) is configured to transmit the data or the power through the borehole (12) in an earth formation (14) (see paragraphs [0003], [0013], [0016]; and figure 1).

The subject matter of claim 13 differs from D1 in that a method comprises the steps of: loading a conductor assembly onto a deployment device configured to transport and support a length of a conductor including one or more communication devices connected along the length of the conductor and deploy the length of the conductor in a borehole; and deploying the conductor assembly from the deployment device into the borehole.

However, these features would be easily conceived from the disclosure of D1 considering that the downhole components, which include the tools (28) connected to a wellhead (22) by the power and communication link (30), are connected to a surface facility (20) via one or more risers (24) (see paragraphs [0014], [0016]; and figure 1).

Accordingly, claim 13 would have been obvious over D1. Therefore, claim 13 does not involve an inventive step under PCT Article 33(3).

1.4 Dependent Claims 14 and 15

1.4.1 Concerning Claim 14

The additional features of claim 14, characterized in that deploying the conductor assembly comprises: attaching a first length of the conductor assembly to a first length of a borehole string; deploying the first length of the borehole string into the borehole; attaching a following length of the conductor assembly to a following length of the borehole string; deploying the following length of the borehole string into the borehole; and iterating the attaching a following length of the conductor assembly and the deploying the following length of the borehole string until a selected length of the conductor assembly is deployed into the borehole, are not explicitly disclosed in D1. However, these features would be easily conceived from the disclosure of D1 considering that a system (10) includes a tool string (16) configured to deploy the downhole components which include tools (28) connected to the wellhead (22) by the power and communication link (30), and connected to the surface facility (20) via the one or more risers (24) in the borehole (12) (see paragraphs [0013]-[0014], [0016]; and figure 1). Accordingly, claim 14 would have been obvious over D1. Therefore, claim 14 does not involve an inventive step under PCT Article 33(3).

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1.4.2 Concerning Claim 15

The additional feature of claim 15, characterized in that connecting one or more communication devices along a length of a conductor comprises welding or pressure testing the connections of the one or more communication devices along the length of the conductor, is not explicitly disclosed in D1. However, this feature would be easily conceived from the disclosure of D1 considering that the tools (28) are connected to the wellhead (22) by the power and communication link (30) (see paragraph [0016]; and figure 1). Accordingly, claim 15 would have been obvious over D1. Therefore, claim 15 does not involve an inventive step under PCT Article 33(3).

2. Industrial Applicability

Claims 1-15 are industrially applicable under PCT Article 33(4).