

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference BR094213/PVE/ALA	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/IB2017/000212	International filing date (<i>day/month/year</i>) 2 February 2017 (02-02-2017)	(Earliest) Priority Date (<i>day/month/year</i>)
Applicant SCHLUMBERGER TECHNOLOGY CORPORATION		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out 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))

b. This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).

c. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. **Certain claims were found unsearchable** (See Box No. II)

3. **Unity of invention is lacking** (see Box No III)

4. With regard to the **title**,

- the text is approved as submitted by the applicant
 the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

- the text is approved as submitted by the applicant
 the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

6. With regard to the **drawings**,

- a. the figure of the **drawings** to be published with the abstract is Figure No. 1
 as suggested by the applicant
 as selected by this Authority, because the applicant failed to suggest a figure
 as selected by this Authority, because this figure better characterizes the invention
- b. none of the figures is to be published with the abstract

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2017/000212

A. CLASSIFICATION OF SUBJECT MATTER
INV. E21B44/00 E21B47/12
ADD.
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)
E21B
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)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2013/000981 A1 (GRIMMER HARALD [DE] ET AL) 3 January 2013 (2013-01-03) paragraph [0017]; claim 1; figure 1 -----	1-20
X	US 2015/053483 A1 (MEBANE III ROBERT EUGENE [US]) 26 February 2015 (2015-02-26) paragraph [0030] - paragraph [0033]; claim 1; figures 1,2 -----	1,8,14
X	US 2011/280104 A1 (MCCLUNG III GUY L [US]) 17 November 2011 (2011-11-17) paragraphs [0229], [0308]; figures 1-5 -----	1,8,14
X	US 2016/194950 A1 (ZHENG SHUNFENG [US] ET AL) 7 July 2016 (2016-07-07) paragraphs [0049], [0091], [0092]; figure 1 ----- -/--	1,8,14

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
- "E" earlier application or patent but published on or after the international filing date
- "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)
- "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

- "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
- "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
- "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
- "&" document member of the same patent family

Date of the actual completion of the international search 5 October 2017	Date of mailing of the international search report 13/10/2017
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Strømme, Henrik
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INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2017/000212

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2015/337652 A1 (RODNEY PAUL F [US]) 26 November 2015 (2015-11-26) paragraph [0019] - paragraph [0020]; figures 1-3 paragraph [0068] - paragraph [0076]; figure 7 -----	1,8,14

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/IB2017/000212

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
US 2013000981	A1	03-01-2013	BR 112013032805 A2	31-01-2017
			GB 2507423 A	30-04-2014
			US 2013000981 A1	03-01-2013
			WO 2013003151 A2	03-01-2013
US 2015053483	A1	26-02-2015	CA 2869592 A1	10-10-2013
			EP 2834455 A2	11-02-2015
			EP 2834458 A2	11-02-2015
			EP 2834459 A2	11-02-2015
			EP 2834460 A2	11-02-2015
			EP 2834461 A2	11-02-2015
			US 2015053483 A1	26-02-2015
			WO 2013152072 A2	10-10-2013
			WO 2013152073 A2	10-10-2013
			WO 2013152074 A2	10-10-2013
			WO 2013152075 A2	10-10-2013
			WO 2013152078 A2	10-10-2013
US 2011280104	A1	17-11-2011	US 2011214919 A1	08-09-2011
			US 2011280104 A1	17-11-2011
			WO 2011109075 A2	09-09-2011
US 2016194950	A1	07-07-2016	US 2016194950 A1	07-07-2016
			WO 2016112069 A1	14-07-2016
US 2015337652	A1	26-11-2015	AU 2012394943 A1	07-05-2015
			CA 2891162 A1	30-05-2014
			CN 104797780 A	22-07-2015
			EP 2923039 A1	30-09-2015
			US 2015337652 A1	26-11-2015
			WO 2014081416 A1	30-05-2014