

IN THE HIGH COURT OF JUSTICE  
CHANCERY DIVISION  
INTELLECTUAL PROPERTY ENTERPRISE COURT

Claim No. IP-2015-000204

BETWEEN:

SMART REAMER DRILLING SYSTEMS LIMITED

Claimant

- and -

(1) BAKER HUGHES INC.  
(2) BAKER HUGHES LIMITED  
(3) BAKER HUGHES INTEQ GmbH

Defendants

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AMENDED STATEMENT OF REASONS

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The following are the Claimant's reasons for seeking permission to amend the specification of United Kingdom Patent Nos. GB 2465504B and GB 2465505B in the form as shown in red ink on the copies served herewith.

UK Patent GB 2465504B ("the '504 patent")

1. Amendment is sought to claims 1 and 2 comprising the deletion of the words struck out, and insertion of the words underlined, below into those claims:

1 A tool (50) comprising a tool body, cutter blocks and sensors with means for attachment to a drilling support and rotation so as to permit the simultaneous underreaming and measurement of ~~the drilling dynamics of~~ vibration and stick/slip in a wellbore (especially in oil and gas drilling) characterized by:

(i) at least one radially extendable cutter block (62) incorporating positional sensors adapted to measure the relative position of the cutter block to the tool, at least one ~~sensor means (76) to measure vibration or stick/slip,~~ vibration sensor means (76) to detect a stick-slip condition and at least one calliper to measure wellbore diameter, all of which are inter-linked by a means of communication using receivers, sensors and microprocessors

(ii) a system that optimizes drilling dynamics (22) by simultaneously comparing and correlating vibration or stick/slip data (22) and underreaming parameters in real-time or in memory

2. The amendments are made by way of re-writing in order to limit the claims. The Claimant does not propose to contend that the claims prior to amendment is/are valid.
3. The purpose of the amendments is to provide a further ground of rebuttal to the allegations of added matter made in particular at paragraphs 48(i) and (ii) and (vi) of the Counterclaim herein, and further to distinguish those claims (and all of its/their dependent claims) from the prior art cited herein. The purpose of the deletion of the words "in part" and said "in part" is to correct an obvious error and to make clear (or the avoidance of doubt that claim 3 is an independent claim and is not dependent on any preceding claim)
4. The replacement of the words "the drilling dynamics of" with the words "vibration and stick/slip in" in claim 1 is a narrowing amendment. The skilled reader would know that vibration and stick slip are well-known specific aspects of drilling dynamics. The amendments to add the words "vibration and stick/slip in" and "vibration sensor means to detect a stick-slip condition" in claim 1 are supported in the application for the patent (application 2465504A) at at least paragraphs [0020]-[0022], [0034], and [0082] thereof, and are further supported in the application for the parent patent (application 2460096A) at at least paragraph [00108] ("Housing 76 may also be used for other types of sensor, especially a wellbore vibration sensor to detect a stick-slip condition") and figure 3 thereof.

5. In this regard, skilled readers would have been aware from their common general knowledge that stick/slip is a particular mode or species of vibration (which can be caused, as its name implies by a cutter momentarily sticking in a formation and then lurching forward - slipping - as it is released). This can be measured using a vibration sensor suitably configured and oriented to respond to that particular mode. (Other well-known modes of drillstring vibration are "bit bounce" and lateral vibration (bending or swaying)).

6. The amendment to add the words "and at least one calliper to measure wellbore diameter" in claim 1 is supported in the application for the patent (application 2465504A) at at least paragraphs [0001] ("The tool finds particular use as an underreamer capable of sensing vibration, but can also be configured with other sensors such as callipers to measure wellbore diameter"), [0047]-[0051], [0061]-[0065], [0082]-[0084], [0092], and claim 3 thereof, and is further supported in the application for the parent patent (application 2460096A) at at least the title ("Expansion and calliper tool"), paragraphs [0001], [0043]-[0048], [0056], [0066]-[0072], [00102]-[00103], [00105], [00107], [00115], [00129], and [00131], claims 1, 10, 15, 20, 21, 23-25, and 38, and Fig.15 thereof.

6A The amendment to add the words "at the uphole and downhole first and second elements respectively comprising expansion blocks and stabiliser blocks which in a deactivated condition may be withdrawn into the tool body, but in an activated condition may be extended against the wellbore" in claim 2 is supported in the application for the patent (application 2465504A) at at least paragraphs [0075], [0079], [0087], and figures 2a, 2b and 3, and is further supported in the application for the parent patent, application 2460096A, at at least the corresponding passages to those at [0085], [00102], [00109], and figures 2a, 2b, and 3.

6E The amendment to add the words "to provide a means of stabilization to underreaming applications" in claim 3 is supported in the application for the patent (application 2465504A) at at least paragraphs [0054] and [0037] and figure 3, and is further supported in the application for the parent patent (application 2460096A) at at least the corresponding passages at paragraphs [0057] and [00109] and figure 3.

6C The amendment to replace "element being adapted to measure drilling dynamics, with element being adapted to measure vibration" in claim 3 is supported in the application for the patent (application 2465504A) at at least paragraphs [0070]. The

the sensor also carries a vibration sensor (Fig. 1, 7, 25, 27). One or more sensors (shown in 7b, 64 or 65) are spaced within the tool body 52 in order to detect vibrations further down the wellbore 20, and to further support the application for the parent patent (application 2460096A) at at least paragraph 100 (66). Invising 7b may also be used for other types of sensor especially a wellbore vibration sensor to detect a stick-slip condition.

7. No other amendments to the description or dependent claims consequential on the above amendments to claim 1 and 2 appear to be necessary.
8. The amendments sought will not have the effect of disclosing any matter which extends beyond that disclosed in the application for the Patent as filed or of the application for the parent patent, or of extending the protection conferred by the Patent. Accordingly, it complies with the provisions of the Patents Act 1977 and in particular sections 75 and 76 thereof.
9. The Claimant knows of no reason why the amendments should not be permitted.

UK Patent GB 2465505B ("the '505 patent")

10. Amendment is sought to claim 1 comprising the insertion of the words underlined below into the claim (which is here set out in full, and formatted to divide it into separate integers):

1. An electronically activated integrated expansion and calliper tool that permits simultaneous underreaming and measurement of the diameter of a wellbore as drilled by an oil and gas rig, comprising at least one radially extendable cutter block to underream, at least one vibration sensor to detect a stick-slip condition, and at least one calliper to measure wellbore diameter housed within a tool body, and wherein the tool body is provided with an internal duct leading from a source of drilling fluid to at least one external nozzle adjacent to cutter elements on the cutter block.

11. The amendment is by way of re-writing in order to limit the claim (save that the deletion of the two commas is by way of correction of an obvious mistake and does not affect its scope). The Claimant does not propose to contend that the claim prior to amendment is valid.

12. The purpose of the amendment is to provide a further ground of rebuttal to the allegations of added matter made in particular at paragraphs 57(i) and (ii) of the Counterclaim herein, and further to distinguish the claim (and all of its dependent claims) from the prior art cited herein.
13. The amendment to add the words "electronically activated" is supported in the application for the patent (application 2465505A) at at least paragraphs [0001], [0007]-[0008], [0011], [0020], [0052] thereof. It is further supported in the application for the parent patent (application 2460096A) at at least paragraphs [0030] and [00115] thereof ("The tool may be activated by means of electronic signal sent by mud-pulse and decoded or by other means using fibre-optics or wireless transmission").
14. The amendment to add the words "at least one vibration sensor to detect a stick-slip condition" is supported in the application for the patent (application 2465505A) at at least paragraphs [0001], [0010], [0022]-[0024], [0036], [0043], [0045]-[0047], [0067], [0081], [0084] thereof, and is further supported in the application for the parent patent (application 2460096A) at at least paragraph [00108] ("Housing 76 may also be used for other types of sensor, especially a wellbore vibration sensor to detect a stick-slip condition") and figure 3 thereof. Paragraph 5 above is repeated.
15. The amendment to add the words "and wherein the tool body is provided with an internal duct leading from a source of drilling fluid to at least one external nozzle adjacent to cutter elements on the cutter block" is supported in the application for the patent (application 2465505A) at at least paragraphs [0037] and [0062] and claim 4 thereof, and is further supported in the application for the parent patent (application 2460096A) at at least paragraphs [0003], [0044], [0053], [0065], [0079]-[0080], [00118] ("the tool body may be provided with an internal duct 114 leading drilling fluid from passage 90 to an external nozzle 116 adjacent the set of cutters") and claim 19 thereof.
16. No other amendments to the description or dependent claims consequential on the above amendment to claim 1 appear to be necessary.
17. The amendment sought will not have the effect of disclosing any matter which extends beyond that disclosed in the application for the Patent as filed or of the application for the parent patent, or of extending the protection conferred by the

Patent. Accordingly, it complies with the provisions of the Patents Act 1977 and in particular sections 75 and 76 thereof.

18. The Claimant knows of no reason why the amendment should not be permitted.

**GUY BURKILL QC**

**STATEMENT OF TRUTH**

The Claimant believes that the facts stated in this Reply and Defence to Counterclaim are true. I am duly authorised by the Claimant to sign this statement.

Signed: \_\_\_\_\_ Dated: \_\_\_\_ July 2016

Wajid Rasheed – Director of the Claimant

Served this \_\_\_\_ day of July 2016 by Clarkslegal LLP, of One Forbury Square,  
The Forbury, Reading RG1 3EB; Solicitors for the Claimant.