



**PATENTS ACT 1977**

APPLICANT                      Halliburton Energy Services Inc

ISSUE                              Whether patent application  
GB 0802302.0 complies with Section  
1(2)

HEARING OFFICER              Phil Thorpe

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**DECISION**

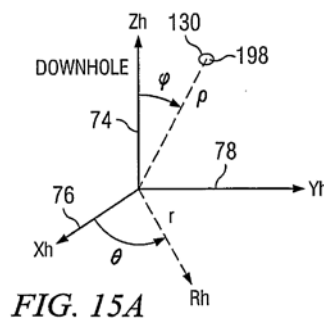
**Introduction**

- 1        This decision concerns whether the invention defined in patent application GB 0802302.0 relates to excluded matter. The application has been filed by Halliburton Energy Services Ltd (“Halliburton”) and relates to a method of designing drill bits.
- 2        The examiner has argued that the invention claimed in the application is excluded from patentability as a mental act and as a computer program under section 1(2)(c) of the Patents Act 1977. The applicant has not been able to overcome these objections, despite amendments to the applications.
- 3        In a letter dated 15 April 2011 the applicant requested that the application be forwarded to a Hearing Officer for a decision on the basis of the papers already filed. The letter went on to note that the question of whether the subject matter of the claim in the application falls within the exclusion of section 1(2) is the same as that considered in decision O/080/11. In that decision dated 25 February 2011 I decided that three other applications by the same applicant were excluded under section 1(2).

**GB0802302.0**

- 4        GB0802302.0 is derived from PCT/US2006/030834 which was filed on 8 August 2006. It was published initially as WO2007/019472 A1 and subsequently republished as GB2443127A on entering the national phase

- 5 The invention here like those in the inventions considered in my earlier decision relates to a method of simulating drilling portions of a wellbore. It differs from the inventions in my earlier decision in that it uses a spherical coordinate system in the simulation. The spherical coordinate system defines location in terms of a single value which is a function of angle phi ( $\phi$ ), angle theta ( $\theta$ ) and radius rho ( $P$ ) in three dimensions relative to the Z axis.
- 6 The method, in its broadest embodiment starts by inputting the design parameters for the drilling equipment that will be simulated and selecting the operating parameters for this drilling equipment. The method proceeds with inputting formation data for the wellbore which will be drilled in the simulation. Then a simulation of the rotation of the drilling equipment without penetration is performed. All the points of interest on the drilling equipment and the bottom hole of the wellbore are then converted into a spherical coordinate system (as shown in fig 15A for example). The method proceeds to simulate further revolutions of the drilling equipment, this time with penetration of the formation. All the calculations are performed using the same spherical coordinate system for each point of interest on the drilling equipment.



- 7 According to the description, the use of spherical a coordinate system to simulate drilling allows the use of bit tilting motion and associated parameters. This it is claimed enhances the accuracy and reliability of the simulation and overcomes limitations of Cartesian or cylindrical coordinate systems.
- 8 There is a single independent claim, claim 1, which reads:
- A method of simulating drilling portions of a wellbore comprising:  
 selecting a first set of drilling equipment for use in simulating drilling at least one portion of the wellbore;  
 inputting design parameters for the first set of drilling equipment;  
 selecting operating parameters for the drilling equipment from the group consisting at least of: rate of penetration, weight on bit, bit rotation speed and a desired bit tilt rate;  
 inputting formation data at a first location in the at least one portion of the wellbore;  
 inputting formation data at a second location in the at least one portion of the wellbore;  
 simulating forming a bottom hole of the wellbore by rotating the drilling

equipment one full revolution without any penetration of the adjacent formation;  
calculating spherical coordinates for the simulated bottom hole in a hole coordinate system;  
calculating spherical coordinates in the same hole coordinate for all points of interest on the drilling equipment at a specified time;  
simulating drilling the bottom hole, by calculating a three dimensional interaction of all points of interest on the drilling equipment with adjacent portions of the bottom hole in the same spherical coordinate system;  
wherein the method further comprises:  
calculating the spherical coordinates, in the hole coordinate system, for all points of the bottom hole,  $\varphi_H$ ,  $\theta_H$  and  $P_H$ ;  
calculating spherical coordinates of  $\varphi_C$ ,  $\theta_C$  and  $P_C$ , in the same hole coordinate system, at a specific time, based on bit operating data, for all interest points on an associated rotary drill bit;  
calculating an interpolated radius coordinate,  $\rho_{CH}$  of the spherical coordinates in the same hole coordinate system, for all points on the drilling equipment, by using two dimensional data interpolation technique and the bottom hole spherical coordinates,  $\varphi_H$ ,  $\theta_H$  and  $P_H$ , and  $\rho_{CH} = f(\varphi_H, \theta_H, P_H, \varphi_C, \theta_C)$ ;  
calculating the cutting depth of each interest point on the drilling equipment by

$$\Delta = P_C - \rho_{CH} \quad \text{if } P_C > \rho_{CH}$$

$$\Delta = 0; \quad \text{if } P_C \leq \rho_{CH}$$

updating the bottom hole by replacing  $\rho_{CH}$  with  $P_C$  if  $P_C > \rho_{CH}$ ;  
repeating the above steps for all other points of interest on the drilling equipment; and outputting to a resource the results of the method.

## The Law

- 9 The examiner has raised an objection under section 1(2)(c) of the Patents Act 1977 that the invention is not patentable because it relates to a method for performing a mental act as such; the relevant provisions of this section of the Act are shown in bold below:

**1(2) It is hereby declared that the following (amongst other things) are not inventions for the purpose of the Act, that is to say, anything which consists of –**

(a) .....

(b) .....

(c) a scheme, rule, or **method for performing a mental act**, playing a game or doing business, or a program for a computer;

(d) .....

*but the foregoing provisions shall prevent anything from being treated as an invention for the purposes of the Act only to the extent that a patent or application for a patent relates to that thing as such.*

- 10 As explained in the notice published by the UK Intellectual Property Office

on 8 December 2008<sup>1</sup>, the starting point for determining whether an invention falls within the exclusions of section 1(2) is the judgment of the Court of Appeal in *Aerotel/Macrossan*<sup>2</sup>.

- 11 The interpretation of section 1(2) has been considered by the Court of Appeal in *Symbian Ltd's Application*<sup>3</sup>. *Symbian* arose under the computer program exclusion, but as with its previous decision in *Aerotel*, the Court gave general guidance on section 1(2). Although the Court approached the question of excluded matter primarily on the basis of whether there was a technical contribution, it nevertheless (at paragraph 59) considered its conclusion in the light of the *Aerotel* approach. The Court was quite clear (see paragraphs 8-15) that the structured four-step approach to the question in *Aerotel* was never intended to be a new departure in domestic law; that it remained bound by its previous decisions, particularly *Merrill Lynch*<sup>4</sup> which rested on whether the contribution was technical; and that any differences in the two approaches should affect neither the applicable principles nor the outcome in any particular case.
- 12 Subject to the clarification provided by *Symbian*, it is therefore still appropriate for me to proceed on the basis of the four-step approach explained at paragraphs 40-48 of *Aerotel* namely:
- 1) Properly construe the claim
  - 2) Identify the actual contribution (although at the application stage this might have to be the alleged contribution).
  - 3) Ask whether it falls solely within the excluded matter, which (see paragraph 45) is merely an expression of the “as such” qualification of section 1(2).
  - 4) If the third step has not covered it, check whether the actual or alleged contribution is actually technical.
- 13 Mr Davis accepted that this is the right approach to take.

### **Properly Construe the Claims**

- 14 No issues of claim construction arise. The claims are sufficiently clear.

### **Identify the actual contribution**

- 15 The examiner considers the contribution to be a method of simulating drilling portions of a wellbore using spherical coordinates. The latest claims also include outputting the results of the design method to a resource. I

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<sup>1</sup> <http://www.ipo.gov.uk/pro-types/pro-patent/p-law/p-pn/p-pn-computer.htm>

<sup>2</sup> *Aerotel Ltd v Telco Holdings Ltd and Macrossan's Application* [2006] EWCA Civ 1371; [2007] RPC 7

<sup>3</sup> *Symbian Ltd v Comptroller-General of Patents*, [2009] RPC 1

<sup>4</sup> *Merrill Lynch's Application* [1989] RPC 561

considered at some length in paragraphs 46-50 of decision O/080/11 whether adding an output added anything significant to the contribution of the inventions there. I decided that it did not and I reach the same conclusion here. Hence I believe that the contribution in its broadest form is as the examiner suggested a method of simulating drilling portions of a wellbore using spherical coordinates.

### **Does the contribution fall solely within excluded matter**

- 16 I set out in paragraphs 31-74 of my earlier decision why I considered the contributions of the inventions there to fall solely within excluded matter. I have carefully considered whether there is anything significantly different in the contribution of this invention to that of the inventions considered in that earlier decision. I do not believe there is and hence for the reasons given there, I find that the contribution here falls solely within excluded matter. Specifically it is excluded as a method or scheme of performing a mental act and as a computer program.

### **Check whether the contribution is actually technical in nature**

- 17 This is dealt with in the paragraphs 31-74 of my earlier decision.

### **Conclusion**

- 18 I find the invention in GB 0802302.0 to be excluded from patentability as a scheme or method for performing a mental act and as a computer program. Having read the specification I do not think that any saving amendment is possible. I therefore refuse the application under section 18(3).

### **Appeal**

- 19 Under the Practice Direction to Part 52 of the Civil Procedure Rules, any Appeal must be lodged within 28 days.

**P Thorpe**

Deputy Director acting for the Comptroller