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2009

PATENTS ACT 1977

APPLICANT Schlumberger Holdings Limited

ISSUE Whether patent application number GB
0618558.1 complies with section 1(2)

HEARING OFFICER R C Kennell

DECISION

- 1 This application results from the entry into the national phase in the UK of international application no. PCT/IB2005/000372, which was filed on 11 February 2005 claiming a priority of 27 February 2004 an earlier US application. It was published under serial no. WO 2005/085910 A1 on 15 September 2005 and reprinted under serial no. GB 2429287 A on entry to the national phase.
- 2 Despite amendment of the claims during substantive examination, the applicant has been unable to persuade the examiner that this is a patentable invention within the meaning of section 1(2) of the Act. This matter therefore came before me at a hearing on 25 November 2008. The applicant was represented by its patent attorney, Dr Andrew Suckling of Marks & Clerk. In the absence of the examiner who had dealt with the case up to that point, we were assisted from the Intellectual Property Office via videolink by Mr Nigel Hanley.
- 3 Specification US 5278805 was cited by the examiner to show lack of novelty of claims which have now been superseded. The issues of novelty and inventive step were not before me at the hearing.

The invention

- 4 The invention is concerned with the display of sonic well logging information from the earth formation surrounding a borehole. In known logging methods a sonic source is placed in the borehole and the energy which it emits is picked up as a trace at each of a series of receivers, the arrival time at a receiver increasing as the distance of the receiver from the source increases. From these traces the velocity of propagation of sonic energy through the borehole can be determined and converted to a slowness/time plot, "slowness" being the reciprocal of velocity. The process is repeated at different depths, allowing a log of slowness against depth to be generated. Information about the formations through which the waves have propagated can thus be obtained.

5 This technique does not take account of the fact that the sonic source will generally emit energy over a range of frequencies. Where the formation is dispersive, i.e. the velocity of propagation is frequency-dependent, the different components will arrive at a receiver at slightly different times and the assigned arrival time is an average of these. Hitherto this has been regarded as a problem, to be minimized by using sources having only a limited frequency range. However, the invention recognizes that the dispersive effect is capable of providing information about the formation which is lost by averaging out the arrival times of the different frequencies. It therefore generates a slowness/frequency plot or “dispersion curve” from which a log of slowness against depth can be projected which retains all the information in the dispersion curve.

6 The advantage of the invention is stated at paragraphs [0025] and [0027] to be the provision of “highly reliable, quality-control (QC) indicators which are superior to previous QC indicators”. The ambit of the term “quality-control indicator” is not explained, but the specification goes on to describe a number of ways in which useful information can be obtained from the projection log, all of which appear to be intended to facilitate quality control analysis.

7 The claims in the international application as published related to methods, systems and computer program products for facilitating quality control analysis of sonic logging data and methods for generating a slowness frequency analysis projection log. At the hearing Dr Suckling proposed a more limited set of claims restricted to methods of performing quality control analysis and presented two alternative sets of claims for my consideration. Claim 1 of set A (essentially the same as the previous amended version considered by the examiner) reads:

“A method of performing a quality control analysis of sonic logging data associated with an earth formation surrounding a borehole, the method comprising:
acquiring sonic data at a plurality of depths in a borehole;
processing the acquired sonic data to generate a slowness versus frequency dispersion curve for each depth;
displaying a projection log of dispersion curve data for each depth versus depth including homogeneous and inhomogeneous characteristics of the dispersion curve data; and
using said displayed projection log to perform a quality control analysis of the sonic logging data.”;

whilst in claim 1 of set B “displaying” is replaced by “generating” in the penultimate step and “displayed” is deleted in the final step.

8 Each set includes identical claims 2-4:

“2. A method as claimed in claim 1, wherein performing the quality control analysis ... comprises comparing the projection log with estimates of the shear slowness values, at the depths, of zero frequency.

3. A method as claimed in claim 1 or 2, and further comprising obtaining, from the projection log, information about one or more properties and/or characteristics of the earth formation surrounding the borehole.
4. A method as claimed in claim 3 wherein obtaining information about one or more properties and/or characteristics ... comprises identifying, in the projection log, depths at which the formation surrounding the borehole is inhomogeneous.”

The law and its interpretation

9 Section 1(2) reads:

“It is hereby declared that the following (among other things) are not inventions for the purposes of this Act, that is to say, anything which consists of –

- (a) a discovery, scientific theory or **mathematical method**;
- (b) a literary, dramatic, musical or artistic work or any other aesthetic creation whatsoever;
- (c) a scheme, rule or method for performing a mental act, playing a game or doing business, or a **program for a computer**;
- (d) the **presentation of information**;

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

the added emphasis indicates the categories under which the examiner has raised objection.

10 The interpretation of section 1(2) has recently been considered by the Court of Appeal in *Symbian Ltd's Application* [2008] EWHC Civ 1066, decided on 8 October 2008. *Symbian* arose under the computer program exclusion, but as with its previous decision in *Aerotel*¹, 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 was quite clear (see paragraphs 8-15 of the decision) 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*² 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.

11 Indeed the Court at paragraph 59 considered its conclusion in the light of the *Aerotel* approach. I therefore agree with Dr Suckling that the *Aerotel* test must be carried out in the light of the clarification provided by *Symbian*, and will proceed on the basis of the four-step approach explained at paragraphs 40-48 of *Aerotel*, namely:

- 1) Properly construe the claim

¹ *Aerotel Ltd v Telco Holdings Ltd and Macrossan's Application* [2006] EWCA Civ 1371, [2007] RPC 7

² *Merrill Lynch's Application* [1989] RPC 561

- 2) Identify the actual contribution (although at the application stage this might have to be the alleged contribution); as explained at paragraph 43 this is “an exercise in judgment probably involving the problem said to be solved, how the invention works, what its advantages are”; it is essentially a matter of determining what it is the inventor has really added to human knowledge, and involves looking at substance, not form.
- 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.

12 I bear in mind the Court’s belief that it was possible, at least in principle, to reconcile the test with the decision of the European Patent Office Board (EPO) in *Duns Licensing Associates* (T 0154/04) - which was critical of the *Aerotel* approach - by conflating the third and fourth *Aerotel* steps. The Court was fortified in its view by the approach taken in a more recent decision of the Board in *Gameaccount Ltd* (T 1543/06) holding that patent protection should not be conferred “where the only identifiable contribution of the claimed technical implementation to the state of the art is the excluded subject-matter itself”. The Court stated at paragraph 15 that the *Gameaccount* approach:

“.... plainly requires one to identify the contribution (which equates to stage 2 in *Aerotel*) in order to decide whether that contribution is solely “the excluded subject-matter itself” (equating to stage 3 in *Aerotel*), while emphasising that the contribution must be “technical” (effectively stage 4 in *Aerotel*). The order in which the stages are dealt with is different, but that should affect neither the applicable principles nor the outcome in any particular case.”

Construction of the claims

13 Dr Suckling did not think that this presented any real difficulty. However, the wording of the claims does to my mind raise a question as to the scope intended by “a method of performing a quality control analysis” which is how the invention is now defined in claim 1 of both sets A and B. This bears on what exactly the contribution of the invention is, to which I shall now turn.

Identification of the contribution

14 At paragraph 7 of his last report (of 8 September 2008) the examiner considered that as a matter of substance the contribution appeared to be in the way that the slowness/frequency information was displayed and used to quality control the logging data. However he appeared to qualify this somewhat at paragraph 9, saying that in the absence of any detail about how the log could be used to carry out quality control that could not form part of the contribution. Dr Suckling thought

that the examiner had defined the contribution too narrowly and had ignored the technical background of the invention and the technical effects arising from it. He argued that the contribution was in fact an improved method of acquiring and processing sonic logging data relating to the earth formation surrounding the borehole.

- 15 However at the hearing Dr Suckling accepted that the claims did not define any novel acquisition feature and that the invention came in after the data had been obtained, the processing of the invention allowing different and better information to be obtained from the sonic data. I therefore sought to establish what exactly the processing consisted of and whether the contribution involved any further separate quality control step, bearing in mind that claim 1 limits the “processing” to the generation of the slowness/frequency curves for each depth and adds further steps of displaying (set A) or generating (step B) the projection log and using it to perform a quality control analysis.
- 16 At this point it is helpful to refer back to Dr Suckling’s submission for the hearing where he said that the advantages provided by the invention included:
- improved quality control of processed sonic logging data (paragraphs [0025], [0027]);
 - improved identification of properties/characteristics of the formation (paragraph [0043]);
 - improved verification of estimated data characteristics (paragraph [0044]);
 - greater choice of sources.
- 17 I have to say that the presentation of the first three of these as separate advantages seems difficult to square with the description of the advantages of invention, including the advantages in paragraphs [0043] and [0044], as ways of providing improved quality control indicators. It also points to a possible ambiguity in the claims, which Mr Hanley flagged up at the hearing, in that it was difficult to see how obtaining information about the properties of the formation in claims 3-4 actually coincided with quality control of the logging data in claim 1 to which it was appended. Dr Suckling suggested that the aspects of quality control and obtaining information were separate “applications”.
- 18 I think this raises the question of whether the invention is really a method of performing a quality control analysis and in my view it is not. As the examiner rightly pointed out, the specification does not actually say how the information in the projection log is analysed. As I read it the specification contains no description of any new method of analysing the data and does not, as regards the final step in claim 1 of “using” the projection log, contemplate anything more than inspection of the log, generally visually, to see what information it contains. Indeed at the hearing Dr Suckling said that in his understanding the quality control related primarily to the processing of the data.
- 19 I fully accept Dr Suckling’s argument that in identifying the contribution I should consider the invention as a whole and that (as suggested in the EPO *Gameaccount* decision mentioned above) it should encompass both the tangible

features of the implementation and the effects resulting from it. That seems to me to be in accord with the approach in paragraph 43 of *Aerotel*. However I am uneasy at his contention that *Symbian* shows that identifying the contribution is “an exercise in identifying what the features of the claim contribute technically to the sum of human knowledge, e.g. whether and to what extent they solve a technical problem in the prior art.” Paragraph 17 of *Symbian* states (emphasis added) that

“In the instant case, the only real issue is, to use the formulation in *Gameaccount*, whether the claimed technical contribution to the state of the art can be said to be the excluded subject-matter itself, or, to invoke the *Aerotel* approach, whether the claim fails at stage 3 or 4.”

and I do not doubt that the contribution has to be technical if it is to be patentable. However it seems to me that in the light of paragraph 15 of *Symbian* quoted above, the correct approach in accordance with *Aerotel* remains first to determine what the contribution is and then in steps 3 and 4 of the test to determine whether it is technical.

- 20 I therefore return to paragraph 43 of *Aerotel* to ask what it is the invention has added to human knowledge as a matter of substance, rather than concentrate on the particular form in which the invention is claimed. In the light of the above I do not think there is any contribution in the method by which the data is acquired or in any method of performing a quality control analysis. At the hearing Dr Suckling said that

“The ultimate aim is to get information about the structure of the ground down there. If you are going to drill an oil well in there, you want some degree of confidence that what you have got corresponds to reality. If the QC results are not good, you will not want to go further with that data. So you will want a reliable data set, or reliable processing.”

and this in my view squares with the way the invention is described in the specification as providing indicators about the accuracy and reliability of the logging data and the properties and characteristics of the formation which facilitate quality control (see paragraph [009]).

- 21 Accordingly, I consider the contribution to be the processing of acquired sonic logging data to generate slowness/frequency dispersion curves for each depth and presenting this information in the form of a projection log, with the advantages over previously known techniques (i) that more reliable quality control indicators (including indicators as to the properties of the formation and the accuracy and/or quality of the logging data) can be obtained and (ii) that the range of sources that can be used is increased by making it feasible to use sources emitting over a range of frequencies. I note that the two sets of claims refer to “displaying” or “generating” the log, but I consider the underlying reality to be the presentation of the information in a way which allows useful information to be obtained from it.

Does the contribution relate solely to excluded matter?

- 22 The examiner raised objection that the invention was excluded as a computer program, a mathematical method and the presentation of information. As I foreshadowed at the hearing, I do not consider that the contribution can be said to relate solely to a computer program. It seems to me that this is merely one way of implementing the invention, and indeed the use of non-electronic paper displays is specifically mentioned at page 8 lines 19-21 and page 20 lines 1-4.
- 23 Turning to the mathematical method objection, Dr Suckling accepted at the hearing that the processing involved in the invention was mathematical in that the dispersion curve was projected on to an axis and the projection log was assembled by repeating that operation at different depths. However he did not accept the examiner's objection in view of the decision of the EPO Board in *Vicom* (T 0208/84; headnote I) that "even if the idea underlying an invention may be considered to reside in a mathematical method a claim directed to a technical process in which the method is used does not seek protection for the mathematical method as such". He also sought to draw a distinction between the present invention and the claims which were disallowed by the comptroller in *WesternGeco Ltd* (BL O/135/07).
- 24 Decisions of the EPO Boards and of the comptroller are of course not binding on me, but on the question of whether the contribution is technical clearly I can rely on *Vicom* given its approval by the Court of Appeal in *Symbian* at paragraphs 49 and 51. Also, *WesternGeco* is of value in that it explores the boundaries of the mathematical method objection in the light of both *Vicom* and an earlier decision of the comptroller in *Institut du Francais Petrol & Elf* (BL O/201/03) ("*Elf*").
- 25 The distinction between a mathematical method and a technical process is explained at paragraphs 5-7 of *Vicom*. In the view of the Board, a mathematical method or algorithm is carried out on numbers (whatever they may represent) and provides a result also in numerical form: the method or algorithm is merely an abstract concept prescribing how to operate on the numbers and produces no direct technical result as such. In contrast, if the method is used in a technical process, the process will be carried out on a physical entity (which might be an electrical signal) by some technical means and will result in a certain change in that entity. On this basis the Board held that a "method for digitally filtering data" remained an abstract notion so long as it was not specified what physical entity was represented by the data and did not form the subject of a technical process, but it allowed claims to a method for digitally processing images in the form of a two-dimensional array which improved the resolution of the image.
- 26 The hearing officer in *WesternGeco* saw a distinction between this situation and *Elf*, where claims relating to a method for building a stochastic model of the permeability of an underground zone for use in locating sub-surface oil-bearing strata were disallowed. Accordingly he disallowed claims to a method of processing geophysical data which set out a series of mathematical operations in order to determine an integral of the function of the geophysical data over an n-dimensional integration domain. He saw (paragraph 29) the contribution as bearing "a striking similarity to *Elf* in that it comprises nothing more than a method of processing real world data set out in terms of specified functions and specified

parameters”, but would have reached a different conclusion if the claim “had addressed the end result of the mathematical method and that end result had involved a change in a physical entity.” The hearing officer therefore allowed claims which tied the method to the determination of parameters relating to the earth’s interior.

27 In reaching his decision the hearing officer at paragraphs 24-25 quoted from the decision in *Elf*, from which I would emphasise the following:

“ In the present case, the results of the mathematical modelling are produced as an image. This provides the engineer with statistical information about the permeability or other parameter of the zone of interest. ... These [*statements concerning the eventual use of the information*] do not in my view link the method to a physical process in the way the Board of Appeal [*in Vicom*] found to be patentable.”

“Mr Black emphasised the point that the optimised realisation resulting from the method produces a result that is consistent with the production data and thus is representative of the zone. It seems to me that this point cannot determine whether a method such as the present one is or is not patentable. A system which manipulates data and presents information resulting from manipulation to an operator does not appear to me to become patentable because the data represents data from the real world. Consequently, unless there is a functional link to a physical system, or conceivably some internal technical feature, such systems will be unpatentable.”

28 In my view the contribution of the invention is on all fours with those in the claims in *WesternGeco* and *Elf* which were disallowed as mathematical methods. As I have identified it above, the contribution is essentially a method of manipulating sonic data, in a way which Dr Suckling accepts is mathematical, so as to obtain a projection log which improves the information available to an operator. However, even though the contribution increases the range of sonic emitters which can reliably be used, I do not think that - referring to the earlier decisions - it produces any change in a physical entity, has any functional link to a physical system or has any internal technical feature. I agree with the hearing officer’s view in *Elf* (paragraph 26 thereof) that a mathematical method which results in a new representation of information about a zone of interest is concerned with the information content of an image rather than its physical properties as in *Vicom*.

29 I accept that, unlike *Vicom*, *Elf* and *WesternGeco*, the claims do not set forth a precise series of mathematical steps, but I do not think that stops the method from being mathematical as Dr Suckling argued in seeking to distinguish *WesternGeco*.

30 At the hearing Dr Suckling argued that the claims included a step of quality control analysis which went beyond excluded matter. My conclusion might indeed have been different if the contribution had included some link to a physical method for carrying out a quality control operation, or (having regard to claims 3-4) for determining information about the properties or characteristics of the

formation. However I do not think the contribution includes any such link and I do not therefore need to consider the point further.

- 31 I would however add that even if (which I do not accept) the visual inspection of the log was part of the contribution I find it difficult to see how this could be anything other than a mental act. However that ground of exclusion was not argued either at the hearing or during the earlier prosecution of the application and I make no finding on it.
- 32 The contribution which I have identified includes a step of presenting the information. Arguably this is part and parcel of the mathematical method since it is at bottom nothing more than a record of the result. However, the question of whether the contribution is excluded as the presentation of information was fully argued at the hearing and I should consider this also.
- 33 Dr Suckling argued that in the light of *Crawford's Application* [2005] EWHC 2417 (Pat), [2006] RPC 11 this exclusion applied only to the specific content of the information and not to the way in which it was processed. He did not see anything in the present claims which defined a format for displaying information. I do not think that gets round the objection, in respect of which I referred Dr Suckling to a number of other decisions: *Raytheon Co's Application* [2007] EWHC 1230 (Pat), [2008] RPC 3; *Townsend's Application* [2004] EWHC 482 (Pat); and *Autonomy Corp. Ltd's Application* [2008] EWHC 146 (Pat), [2008] RPC 16.
- 34 I have accepted Dr Suckling's argument that the contribution has to be determined by considering the invention as a whole, but once the contribution is established I consider it permissible to consider whether the individual aspects of it each relate to excluded matter. This approach was adopted in *Raytheon* where the contribution was excluded as a combination of a computer program and (as regards the representation of inventory information in pictorial form) the presentation of information and a business method. Accordingly, in the present case I need to consider whether the aspect of the contribution which might fall outside a mathematical method - the presentation of information as a projection log - relates solely to the presentation of information.
- 35 Indeed, although it predated *Aerotel*, a similar approach was adopted in *Crawford* (paragraph 14) where that aspect of the invention relating to the presentation of information was excluded because it related only to the nature of the information. In the present case, likewise I do not consider that there is anything to the presentation of the information other than the nature of the information which is recorded. I do not think that there has to be any specific format for the display of information for the exclusion to bite. In my view this is supported by *Townsend* (paragraphs 8-11: "presentation" covers both the provision and the expression of information) and *Autonomy* (paragraph 45: choosing how and where to display information is still the presentation of information).
- 36 I therefore consider that the contribution relates solely to a mathematical method, or, if I am wrong in that, then solely to a mathematical method and the presentation of information. In either case it relates solely to excluded matter.

Is the contribution technical?

- 37 As I have explained above, Dr Suckling thought that the examiner in defining the contribution had ignored the technical background of the invention and the technical effects arising from it. However, the question is whether the invention makes a technical contribution and I have considered this as part of the third step. I do not therefore need to go on to the fourth step, but for the avoidance of doubt, whilst I accept that the invention operates on “real world” data of a technical nature and may have implications for carrying out technical processes, I do not think that of itself it makes a technical contribution.

Conclusion

- 38 I therefore consider that the invention of claim 1 in both set A and set B is excluded from patentability under section 1(2), and that my reasoning would apply also to claims 2-4. Having read the specification, I do not think that any saving amendment is possible. In particular, I do not think that there is anything in the original disclosure which could take the invention beyond the presentation of information and tie it to a physical method for determining a physical parameter such as was allowed in *WesternGeco*.
- 39 I therefore refuse the application under section 18(3).

Appeal

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

R C KENNELL

Deputy Director acting for the Comptroller