UK Intellectual Property Office □□□□

For Creativity and Innovation

BL O/342/07

20 November 2007

PATENTS ACT 1977

APPLICANT Schlumberger Technology Corporation

ISSUE Whether patent application number GB0707668.0 complies with section 1(2)

HEARING OFFICER P R Slater

DECISION

Introduction

1 Patent application GB0707668.0 entitled "Method and system of black oil delumping" was lodged on 20 April 2007. It is a divisional application of GB0510250.4 which is itself derived from the corresponding PCT application filed by Schlumberger Technology Corporation on the 23 November 2002 and which was published as WO2004/049216. The current application was republished on 18 July 2007 as GB2434235.

2 Throughout the examination process, the examiner has reported that the invention is excluded from patentability under section 1(2) of the Patents Act 1977 as it appears to relate to a mathematical method and program for a computer as such. Despite numerous rounds of amendment and re-examination, the applicant and the examiner were unable to resolve this issue. The matter therefore came before me at a hearing on 20 July 2007 where the applicant was represented by Dr Andrew Suckling of Marks and Clerk. Also in attendance were Ms Jennie Salazar of Schlumberger Technology Corporation and the examiner, Mr Ben Widdows.

3 An amended set of claims were filed prior to the hearing on the 19 July 2007 for my consideration. Amongst other issues, the amendments disposed of the outstanding novelty and inventive step objections.

The application

4 The application relates to the oil industry and in particular to the simulation of oil reservoirs and surface distribution facilities. The invention itself is all to do with the coupling of multiple reservoir and surface facility models, the conversion between different types of model and the exchange of data there between.

5 The application deals specifically with the use of black oil simulators and compositional models. The invention essentially provides a new method of converting between black oil and compositional models using, for example, look tables associating well pressure with liquid and vapor component mole fractions.

6 The most recent set of claims were filed on the 19 July 2007, the day before the hearing. There are two independent claims which relate to a method (claim 1) and a system (claim 10) for black oil delumping of a fluid in a black oil reservoir. Claims 1 and 10 share the same inventive concept, and for the purpose of this decision I need only recite one of them. Claim 1 reads as follows:

"1. A method for black oil delumping of a fluid in a black oil reservoir *of a subterranean formation, comprising:*

converting a black oil wellstream of the black oil reservoir into a compositional wellstream by determining a set of component mole fractions and component molar rates of vapour and liquid phases of a production well in the black oil reservoir."

7 Other claims of note are Claims 9 and 12 which relate to "a program storage device" and "a computer program" respectively. Claims 15 and 16 which whilst dependant upon claim 1 include the additional step of adjusting production based on the determined composition of the well stream. Claim 17 is again dependant on claim 1 but includes the additional steps of obtaining a sample from the well stream, determining a set of component mole fractions of vapour and liquid phases therefrom and using these components to convert from a black oil wellstream into a compositional wellstream.

The Law and its interpretation

8 The examiner has reported that the application is excluded from patentability under section 1(2) of the Act, as relating to a mathematical method and a program for a computer as such. The relevant parts of section 1(2) read:

> *1(2) 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;

9 As regards the interpretation of section 1(2), my approach will be governed by the judgment of the Court of Appeal in *Aerotel/Macrossan*[1] and the Practice Notice issued by the Patent Office on 2 November 2006[2]. In Aerotel/Macrossan the court reviewed the case law on the interpretation of section 1(2) and approved a new four-step test for the assessment of patentability, namely:

1) Properly construe the claim

2) Identify the actual contribution

3) Ask whether it falls solely within the excluded matter

4) Check whether the actual contribution is technical in nature.

10 However, the fourth step of checking whether the contribution is technical in nature may not be necessary because the third step – asking whether the contribution is solely of excluded matter – should have covered that point (see paragraphs 45 – 47 of the judgment).

11 Finally, I note that by virtue of section 130(7) of the Act section 1(2) is so framed as to have, as nearly as practicable, the same effects as the corresponding provisions of the European Patent Convention. However, the reliance that I can place on decisions of the Boards of Appeal of the European Patent Office under the corresponding Article 52 of the EPC must now be limited in view of the contradictions in these noted by the Court of Appeal in *Aerotel/Macrossan* and its express refusal to follow EPO practice.

Arguments and analysis

12 The first step in the *Aerotel/Macrossan* test requires me to construe the claims, or as the court put it, "to decide what the monopoly is before going on [to] the question of whether it is excluded".

13 The wording of the claims as amended is somewhat obscure, suggesting as it does that the delumping process is somehow linked to the actual fluid in the reservoir, when by its very definition delumping is a technique used to manipulate data in order to convert a model having a limited number of components into one which has many more components. What the applicant is seeking to do here, I think is, to show that the method is in some way tied to a "real world" physical system involving the measurement and manipulation of real data from a well, in an attempt to avoid the invention as claimed being excluded as a mathematical method or a computer program. However, there is no disguising what we have here, which is essentially a series of claims relating to a method and/or a system for "black oil delumping", that is to say, converting a simplified model of an oil reservoir, known as "*a black oil wellstream"* model into a more complex one, often referred to as "*a compositional wellstream"* model wherein the method involves a determination of the component molar fractions and molar rates of the

[1] Aerotel Ltd vs Telco Holdings Ltd & Macrossan's Patent Application [2007] RPC 7
[2] Patents Act 1977: Patentable subject matter [2007] RPC 8

various liquid and vapour phases required to convert a particular black oil model into the corresponding compositional model.

14 For the second step, it is necessary to identify the contribution made by the invention. Paragraph 43 of *Aerotel/Macrossan* explains that this is to be determined by asking what it is - as a matter of substance not form - that the invention has really added to human knowledge having regard to the problem to be solved, how the invention works and what its advantages are.

15 Dr Sucking never really identifies what he thinks the contribution to be, the closest he gets is in his letter of 19 July 2007, where he says that "the contribution made by amended claim 1 is a method performed on a physical system (the reservoir)".

16 However, in my opinion, the contribution, as a matter of substance, resides in a new method for converting a black oil model of a reservoir into a compositional one using data from a look-up table to determine the composition of the oil within the model at a particular pressure.

17 What I must now do is decide whether that contribution resides solely within excluded subject matter.

18 Dr Suckling in his submissions refers to the case in *Vicom*[3]. He argues that whilst the contribution may lie in a new method of black oil delumping, the method is performed on a physical system (the reservoir) and uses real data derived from the reservoir in the determination of the component molar fractions and molar rates required to create the compositional model and as such does not relate to a mathematical method per se but to a physical process and as such does not constitute excluded subject matter. I disagree, the contribution made by the invention is a method of converting one model of a reservoir into another, and this amounts to no more than a mathematical method implemented via a computer program. The fact that the model is used to represent an oil reservoir makes no difference it is a model all the same.

19 In *Vicom*, the Board of Appeal said that a mathematical method used in a technical process carried out on a physical entity was not excluded. However, in this case there is no apparent technical process as such merely a method of converting from one model to another. I therefore consider the contribution as defined in claims 1 and 10 to fall solely within excluded subject matter as a mathematical method and a program for a computer as such.

20 Having found the contribution to reside solely in excluded subject matter, I do not now need to consider step 4 of the test.

21 Turning now to the dependent claims, I do not think that any of the features contained in claims 2-8 and 11 provide anything which could form the basis of a patentable invention as the contribution would still seem to fall solely within the meaning of a mathematical method.

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[3] T208/84

22 Claims 15 and 16 refer to adjusting the production based on the composition of the well stream, a feature for which I can find no support in the application as filed and in my view adds matter contrary to the requirements of section 76(2) of the Act, an even if the other claims were patentable, these would have to be deleted.

23 Claim 17 specifies that the method as defined in claim 1 uses data obtained from a sample from the reservoir in converting from one model to the other. At the hearing, when I asked him if this was supported, Dr Suckling said it was “just about” and pointed to a number of disjointed references dispersed throughout the body of the description referring to a sample, a depletion process, and pressure intervals in an attempt to convince me that this was the case. However, I am no persuaded by his arguments, when read as a whole, I do not think the application sufficient to support such a claim. Thus this claim would also appear to add matter contrary to section 76(2) and as such I do not need to consider whether the claim would be excluded, as it too would need to be deleted had I found the application to be patentable.

24 Finally, the application contains two claims which relate to a computer program (claim 12) and a program storage device (claim 9). Patent Office practice as set out in its Practice notice date 2 November 2006 is to regard such claims as defining a monopoly to a computer per se and for the contribution to be similarly limited to being a program for a computer. I therefore find these claims to be excluded both in their form and substance. Mr Suckling offered no arguments on this matter.

Conclusion

25 I therefore conclude that the invention is excluded under section 1(2) as it relates to a mathematical method and a program for a computer as such.

26 Having read the specification in its entirety, I cannot identify anything that could form the basis of a patentable invention. I therefore refuse the application under section 18(3).

Appeal

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

P R SLATER
Deputy Director acting for the Comptroller