

PATENTS ACT 1977

APPLICANT Logined BV

ISSUE Whether Patent application GB0922596.2 is
excluded under section 1(2) of the Patents Act 1977

HEARING OFFICER A Bartlett

DECISION**Introduction**

- 1 This decision addresses the issue of whether Patent Application GB0922596.2 relates to subject matter that is excluded under the Patents Act 1977. The application was filed by Logined B.V. on 29 December 2009 claiming an earlier priority date of 20 January 2009. It was subsequently published as GB2467032 on 21 July 2010.
- 2 The application has undergone a number of rounds of examination and amendment, but the examiner and the Applicants have not been able to agree whether the invention is excluded or not. A hearing was appointed for 18 June to help me decide the matter where the Applicants were represented by Mr Martin Hyden of the patent attorney firm Finnegan LLP. The examiner Mr Michael Gooch also attended.

The application

- 3 The application concerns a method for deciding how best to develop an oil or gas field to optimise production given various constraints. During some of the earlier correspondence the examiner objected to the invention as being excluded as a method for performing a mental act and a method for doing business. Those objections were subsequently dropped, in the case of the mental act exclusion as a consequence of the guidance given by HHJ Birss QC in his decision in *Halliburton*¹ as to the scope of that exclusion. The examiner has though maintained an objection that the invention is excluded as relating to a program for a computer as such and it is that issue that I will focus on in this decision. I note that the examiner has reported that the search is not yet complete and that there is a question of added matter in claim 16 which has not been resolved to date but which is not material to the question of excluded matter.

¹Halliburton Energy Services v Comptroller General of Patents [2011] EWHC 2508 (Pat)

4 The specification was last amended with the Attorney's letter of 8 June 2012 and comprises 23 claims of which claim 1 is the only independent claim. Claim 16 is drafted as a system claim for performing the method of any preceding claim and sets out the means through which the various method steps are performed. There is though no hint in the specification that any of the hardware is anything other than conventional and indeed it is clear from the specification that the invention is implemented as software running on conventional hardware. Thus in my view the method and system claims will stand or fall together and I note that Mr Hyden has not sought to suggest there is any material difference between them. For the purpose of this decision I will focus on claim 1 which reads as follows:

1. A computer implemented method of generating a Field Development Plan for an oil and/or gas field comprising the steps of:

a) providing a Shared Earth Model for the geological subsurface of the oil and/or gas field based on the data;

b) determining a set of connected flow volumes from the Shared Earth Model, each connected flow volume corresponding to a distinct subsurface flow unit;

c) upscaling the set of connected flow volumes into a set of cuboid, analytical model elements suitable for use in a fast analytical reservoir simulator that dynamically models flow within respective cuboid elements, wherein each cuboid element is defined by its dimensions, position and orientation within the geological subsurface as well as physical parameter values of the cuboid;

d) determining a set of completions for the cuboid, analytical model elements, the completions being optimised for position, orientation and capacity;

e) determining a figure of merit related to production from the field for the field development plan;

f) providing an initial candidate Field Development Plan based on the set of completions from step d);

g) using a fast analytical reservoir simulator to forecast production from the set of cuboid, analytical model elements for the initial candidate Field Development Plan to provide an objective function for calculation of the value of the Figure of Merit;

h) proposing a new candidate Field Development Plan to optimise the Figure of Merit;

i) using the fast analytical reservoir simulator to forecast production from the set of cuboid, analytical model elements for the new Field Development Plan and calculating the value of the Figure of Merit;

j) testing the new Figure of Merit against convergence criteria for optimisation;

k) in the event that the convergence criteria are not met, repeating steps h) - j); and

l) in the event that the convergence criteria are met, using the optimised objective functions to generate an optimised Field Development Plan specifying the location of at least one platform, two or more borehole trajectories, and well completions.

- 5 That claim warrants some explanation. As regards terminology, a Shared Earth Model (SEM) is in effect a representation of the sub-surface geological structure and might include physical variables such as porosity, fault structures, permeability, hydrocarbon saturation pressures and hydrocarbon compositions. "Completions" is the term used in the art for the operations needed to convert the bore hole into a productive well. The Figure of Merit is a parameter related to the volume of oil/gas extracted – it could include the net present value of the formation or total hydrocarbon production for a given period of time.
- 6 Thus step a) provides information on the geological structure from which hydrocarbons are to be extracted. As explained in the description, steps b) and c) provide for modelling of the macroscopic flow of hydrocarbons from the formation without the need to perform computationally intensive finite element analysis, the flow being represented for each of a set of 3-dimensional "cuboid" volumes. At step d) optimised completions for each cuboid are determined. At step e) a particular Figure of Merit is determined eg Total Net Value. Steps f) through l) then set out an iterative process for optimising the selected Figure Of Merit by repeatedly running the simulator for different Field Development Plans (FDP) until convergence criteria are met. The result is the generation of an optimum FDP specifying the location of at least one platform, two or more borehole trajectories, and well completions.

The Law

- 7 Section 1(2) of the Patents Act 1977 sets out various things are not considered to be inventions for the purposes of the Act, as follows:

"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."
- 8 These provisions are designated in Section 130(7) as being so framed as to have, as nearly as practicable, the same effect as Article 52 of the European Patent Convention, to which they correspond. I must therefore also have regard to the decisions of the European Boards of Appeal that have been issued under this Article in deciding whether the present invention is patentable.
- 9 The approach to be adopted when deciding whether an invention relates to excluded matter has been considered by the UK courts on numerous occasions. In its

judgment in *Aerotel*² the Court of Appeal reviewed the case law on the interpretation of section 1(2) and approved the following four-step test for the assessment of excluded matter:

Step one: properly construe the claim

Step two: identify the actual contribution (although at the application stage this might have to be the alleged contribution)

Step three: ask whether it falls solely within the excluded matter

Step four: check whether the actual or alleged contribution is actually technical in nature.

- 10 In its subsequent judgment in *Symbian*³, the Court made clear that the *Aerotel* test is not intended to provide a departure from the requirement set out in the previous case law that the invention must provide a “technical contribution” if it is not to fall within excluded matter.
- 11 From that I take it that I should apply the *Aerotel* test but that in doing so I must ask the question “is the contribution technical?”. Mr Hyden accepted that to be the approach I should follow.

Step 1 : Construe the claim

- 12 Other than the issues of terminology to which I have already referred, claim 1 does not present any particular issues of construction - it sets out in detail the various steps involved in developing a Field Development Plan for an oil and or gas field. It is explicitly limited to a computer implemented method and consequently following the judgment in *Halliburton*, the mental act exclusion is not relevant.

Step 2 : Identify the contribution

- 13 At paragraph 43 of its judgment in *Aerotel* the Court of Appeal provided some guidance on how this step should be approached when it confirmed that identifying the contribution

“is an exercise in judgment probably involving the problem said to be solved, how the invention works, what its advantages are. What has the inventor really added to human knowledge perhaps best sums up the exercise. The formulation involves looking at substance not form – which is surely what the legislator intended.”
- 14 The first thing to note in identifying the contribution is that the fast analytical reservoir simulator is acknowledged in the description as being known and thus does not of itself provide the contribution. As outlined in the description, the problem that the invention defined in claim 1 seeks to overcome is how to use such a simulator to develop an optimised FDP. Similarly the description acknowledges that existing software packages already provide the features of steps a) and b) in claim 1, namely

² *Aerotel Ltd v Telco Holdings Ltd & Ors* Rev 1 [2006] EWCA Civ 1371 (27 October 2006)

³ *Symbian Ltd v Comptroller General of Patents* [2008] EWCA Civ 1066 (08 October 2008)

the SEM and the connected flow volume generator. Thus the description suggests on page 4 that the contribution the invention provides relates to the way that the FDP can be optimised by upscaling the connected flow volumes into a set of cuboid, analytical elements suitable for use in a fast analytical reservoir simulator. Thus the description suggests that step c) is a crucial part of the contribution.

- 15 At the hearing Mr Hyden proposed a further element to the contribution. He highlighted that according to the invention, and consistent with the description of figure 5 on page 13, the first step in optimising the field development plan is to determine the completions, followed by the other elements of the plans such as where to start drilling and in what direction. This he said was in contrast to the conventional process of developing FDPs where the drilling elements were determined first followed by the completions and itself formed part of the contribution. He said this was a significant difference to how FDPs are conventionally developed since it is the completions that ultimately have the greatest bearing on the effectiveness of the extraction process with the borehole itself merely being the means to put the completions in place.
- 16 I am content to proceed on the basis that both these elements form part of the contribution though I note that the significance of determining the completions as the first step in developing the FDP had not been brought out prior to the hearing and has not been searched specifically. Indeed as the examiner pointed out at the hearing the specification is silent as to how the completions are determined. For his part Mr Hyden did not think that led to a lack of sufficiency since he felt that the skilled man would know how to determine the most appropriate completions to deploy based on the Shared Earth Model information.
- 17 Thus the alleged contribution is in my view a computer implemented method of developing a field development plan for an oil and/or gas field where connected flow volumes from a shared earth model are upscaled into a set of cuboid model elements suitable for use in a fast analytical reservoir simulator that dynamically models flow within the respective cuboid elements and where a set of completions for the cuboid elements, a figure of merit and an initial candidate field development plan based on the completions are determined, production from the set of cuboid elements is forecast using the simulator to calculate a Figure of Merit and the FDP is iteratively adjusted until the Figure of Merit is optimised, the FDP specifying the location of a drilling platform, borehole trajectories and well completions.

Step 3: Does the contribution fall solely in excluded matter ?

- 18 What I must now do is decide whether that contribution falls wholly within excluded matter or whether conversely it is a technical contribution. There is no doubt that the invention is implemented as a computer program. That though is not the end of the matter and doesn't mean it is necessarily excluded – it is well established that a program for a computer that makes a technical contribution is not excluded as a program for a computer *as such*.
- 19 In seeking to convince me that the present invention does indeed provide the required technical contribution, Mr Hyden relied heavily on the reasoning in *Halliburton*. The attractions of doing so are self-evident, both in terms of the end result and the apparent similarity of the subject matter involved.

20 The invention in *Halliburton* concerned a method of designing a roller cone drill bit with optimum drill design parameters. In overturning the Hearing Officer's decision to refuse the application, HHJ Birss QC applied a narrow interpretation to the mental act exclusion which, as I have indicated above, led to a mental act objection against the present application being dropped. He also considered the invention to not be excluded as a program for a computer and it is his reasoning on that ground on which Mr Hyden sought to rely.

21 First, with reference to paragraph 37 of the *Halliburton* judgment, Mr Hyden acknowledged that the invention was not of the sort considered patentable in *Symbian* ie one which makes the computer work better. Instead he suggested the invention here was of the sort discussed in paragraph 38 of *Halliburton* where the program represents something external to the computer. In its entirety that paragraph reads:

“What if the task performed by the computer represents something specific and external to the computer and does not fall within one of the excluded areas? Although it is clear that that is not the end of the enquiry, in my judgment that circumstance is likely to indicate that the invention is patentable. Put in other language, when the task carried out by the computer program is not itself something within the excluded categories then it is likely that the technical contribution has been revealed and the invention is patentable. I emphasise the word “likely” rather than “necessarily” because there are no doubt cases in which the task carried out is not within the excluded areas but nevertheless there is no technical contribution at all”.

22 In Mr Hyden's opinion, the task performed by the program does indeed represent something specific and external to the computer and moreover that something – a computer implemented method of generating a Field Development Plan – is not itself excluded. I agree that the task performed does not appear to fall into one of the other excluded areas, including the business method exclusion. In that respect I note that whilst economic considerations are very much to the fore in the present invention, that is hardly unusual and in its entirety this is more than a method of doing business. I also agree that HHJ Birss QC seems to be saying that if none of the other exclusions applies it is unlikely that a program representing something external to the computer will be excluded as a computer program as such. The passage though clearly does not rule out that possibility altogether and what I must do is decide whether it applies here given the particular facts of the present case.

23 With that in mind, Mr Hyden sought to emphasise the similarity of the facts of *Halliburton* and the present case. In doing so he drew my attention to paragraphs 71 to 75 of the *Halliburton* judgment from which it is abundantly clear that HHJ Birss QC considered computer implemented methods of designing drill bits to be patentable, albeit that having disposed of the mental act issue he dealt with the computer program exclusion very briefly.

24 Mr Hyden argued that generating oil/gas field development plans is just as technical an activity as designing drill bits and therefore just as patentable. In arguing that point, he referred me specifically to paragraph 74 where HHJ Birss QC said (when applying the fourth step of the *Aerotel* test):

“This is not a case in which the cross-check at step 4 presents any difficulties. Designing drill bits is obviously a highly technical process, capable of being applied

industrially. Drill bit designers are, I am sure, highly skilled engineers. The detailed problems to be solved with wear and ability to cut rock and so on are technical problems with technical solutions. Accordingly finding a better way of designing drill bits in general is itself a technical problem. The invention is a better way of carrying that out. Moreover, the detailed way in which this method works – the use of finite element analysis – is also highly technical.”

- 25 He said that all the same arguments applied to the present case – in short if methods of designing drill bits are patentable (and *Halliburton* clearly teaches they are) then so are methods of generating oil/gas field development plans.
- 26 I do not agree. During the course of prosecuting the application, the applicants have done everything possible to emphasise the technical nature of the invention and its similarities with *Halliburton*. However the fact remains that the invention here is altogether more abstract than that found patentable in *Halliburton*. *Halliburton* was concerned with the design (by which I mean the technical specifications) of tangible, technical items – drill bits – and involved a simulator which took account of real technical factors associated with the drill bit such as its physical properties (eg size, number and configuration of cutting elements) and the drilling conditions (eg load, bit rotation, temperature, hardness of formation). The end result of performing the invention in *Halliburton* is a technical specification for intrinsically technical objects – drill bits.
- 27 By way of contrast, the present invention is concerned with how you go about developing a plan or proposal for drilling for, and extracting, oil or gas. That is as far as it goes, and it is a far less tangible end concept than was found to be patentable in *Halliburton*. The end result of performing the present invention is a plan and the steps of the invention are steps which tell the skilled person how to develop that plan. Whilst a method of extracting oil setting out various physical aspects of the drilling and extraction operation is unarguably technical and may well be patentable, I do not consider that a particular computer-implemented method of deciding how to create a plan to extract oil or gas is, in itself, patentable. That I think is entirely consistent with paragraph 38 of the *Halliburton* judgment I quoted earlier: I do not consider the computer program at the heart of the present invention to represent something “specific and external to the computer”. It represents a method of generating a plan, which in my view is neither sufficiently specific nor external to the computer (in comparison to a drill bit design).
- 28 That the present method may differ from previous methods for generating Field Development Plans (by starting with the completions and working backwards) is of no significance in deciding whether the invention is excluded – the exclusions are generic and a better excluded invention is still excluded.
- 29 In my view this is an example of a case where the computer program exclusion applies despite none of the other exclusions apparently being relevant. What the applicants have contributed is a better computer program for generating a Field Development Plan and I consider that to be too abstract a concept to provide a technical contribution.
- 30 In reaching that conclusion I am mindful that the courts have taken a consistent line that in assessing whether an invention is excluded it is the substance of the invention

that is important, as opposed to the form of claim employed. My conclusion that the contribution here is excluded is entirely consistent with that line: that the invention here is directed to a method of generating a Field Development Plan is a fundamental aspect of the invention, not an issue of form.

Step 4: is the contribution technical in nature ?

- 31 I have answered this question in step 3. The contribution made by the invention is not technical in nature.

Conclusion

- 32 I have decided that the invention defined in claim 1 is excluded as a program for a computer as such. I can see nothing in any of the remaining claims or the specification as a whole that could form the basis of a valid claim. I therefore refuse the application under section 18(3) for failure to comply with the requirements of section 1(2).

Other Matters

- 33 Should I be overturned on appeal I note that the application will need to be remitted for further examination including to ensure that the search is complete and to ensure that claim 16 is amended to address the added matter issue raised before and at the hearing and which Mr Hyden accepted.

Appeal

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

A BARTLETT
Deputy Director acting for the Comptroller