



*(a) The invention is new;*

*(b) It involves an inventive step*

- 7 Sections 2 and 3 of the Act are also relevant to the determination of novelty and inventive step, the following subsections being pertinent in the present case:

*2(1) An invention shall be taken to be new if it does not form part of the state of the art.*

*2(2) The state of the art in the case of an invention shall be taken to comprise all matter (whether a product, a process, information about either, or anything else) which has at any time before the priority date of that invention been made available to the public (whether in the United Kingdom or elsewhere) by written or oral description, by use or in any other way.*

*3. An invention shall be taken to involve an inventive step if it is not obvious to a person skilled in the art having regard to any matter which forms part of the state of the art by virtue only of section 2(2) above (and disregarding section 2(3) above).*

### **The Application**

- 8 The application concerns a method for cleaning and rehabilitating boreholes, wells or shafts (boreholes etc hereafter) using hydrogen peroxide. The description as filed is very brief comprising a single page setting out the general problem to be solved and (with reference to 3 drawings) how that problem is solved.

- 9 As regards the problem to be solved, the description sets this out very clearly:

“Boreholes, wells and shafts are man made vertical holes in the ground, predominantly circular. The depths of these can vary from a few feet to many thousands of feet. These are constructed for the removal of liquids and gases from the ground. Due to the natural build up of minerals and bacterial and fungal growth in the cracks or fissures in the ground, that allow these liquids and gases to flow into the borehole, well or shaft, these become clogged so reducing the flow.

- 10 The same section then goes on to outline the principle behind the solution provided by the invention :

“The use of Hydrogen Peroxide ( $H_2O_2$ ) will react with and dissolve these minerals, bacterial and fungal growths, thus producing pressure to force the solution into the fissures and cracks and then breaking down to water ( $H_2O$ ) and oxygen (O) when used in a water supply borehole, well or shaft.”

- 11 So in summary the invention proposes the use of hydrogen peroxide to remove mineral, bacterial and/or fungal deposits that build up in the cracks and fissures of boreholes and which would otherwise reduce the output of the borehole.

- 12 The remainder of the description briefly describes three arrangements for delivering the  $H_2O_2$  to the area of the borehole to be treated variously employing one or two expandable packers or a sealing cap to contain the hydrogen peroxide and reaction products. Furthermore, the passage I have quoted also outlines why hydrogen peroxide is attractive for rehabilitating a water borehole, namely the by-products of its use do not contaminate the water.
- 13 An amended specification, including 5 claims, was filed on 15 June 2012 as part of the applicant's attempts to deal with the issues reported by the examiner. Those claims read as follows:

*1 Hydrogen Peroxide ( $H_2O_2$ ) is a method for cleaning and rehabilitating boreholes, water wells and shafts for potable water*

*2 Hydrogen Peroxide ( $H_2O_2$ ) is introduced into a borehole, well or shaft for potable water. A controlled pressure is created by the reaction with the mineral, bacterial and fungal growth present.*

*3 On reacting with the mineral, bacterial and fungal growth the pressure produced forces the solution further into the cracks or fissures.*

*4 The pressure is controlled and is dependent upon the amount of Hydrogen Peroxide ( $H_2O_2$ ) introduced into the borehole, water well or shaft and the level of mineral, bacteria and fungal growth present.*

*5 This method using Hydrogen Peroxide ( $H_2O_2$ ) substantially as described herein with reference to figures 1,2 and 3.*

### **Interpretation**

- 14 In his reports the examiner focussed on the issues of novelty and inventive step of the claims and deferred consideration of clarity and possible lack of unity pending resolution of those primary issues. Deciding whether they are indeed novel and inventive will however require me to subject the claims to a significant amount of interpretation. The approach to be followed in interpreting a claim is that set out by the House of Lords in its judgment in *Kirin-Amgen*<sup>1</sup>, namely "what would a person skilled in the art have understood the patentee to have used the language of the claim to mean".
- 15 Starting with claim 1, as requested by the applicant in his letter of 20 November 2012 I have disregarded the word "potable" from the claim. The examiner correctly in my view objected to this as adding matter beyond that contained in the application as originally filed (contrary to section 76); whilst one of the benefits of using hydrogen peroxide as opposed to some other cleaning agent is that it breaks down to non-contaminating by-products, there is nothing in the application as filed to suggest the invention is used in a well for drinking water and that amendment was not allowable. There is though ample support in the specification as filed for the limitation that the borehole etc is for water.

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<sup>1</sup> *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2005] RPC 9

- 16 As for the form of claim 1, it is clear that a composition (hydrogen peroxide) cannot be a method (as is currently stated). It is clear to me however that what the skilled man would understand the inventor to be intending is a method for cleaning and rehabilitating boreholes, wells and shafts for water using hydrogen peroxide.
- 17 As for the expression “cleaning and rehabilitating boreholes”, it is clear from the description that this has a very specific meaning: – it is removing deposits that have built up in the cracks and fissures of the borehole (rather than simply removing deposits from the surface of the borehole wall) and which would impede flow from the borehole if allowed to build up.
- 18 Claim 2 comprises two separate sentences, a format that is invariably objected to as introducing a lack of clarity and on the face of it appears to be independent of claim 1. However the second sentence implicitly refers to aspects of claim 1 – it is mineral, bacterial and fungal growth that the invention seeks to remove from the borehole etc of claim 1. I therefore take claim 2 to be dependent on claim 1 and to relate to a method of cleaning and rehabilitating water boreholes etc where a controlled pressure is created by the reaction of the hydrogen peroxide with the mineral, bacterial and fungal growth.
- 19 I interpret claim 3 as being further dependent on claim 2 such that the pressure created by the reaction in claim 2 forces the hydrogen peroxide solution further into the cracks and fissures of the rock formation around the water borehole etc.
- 20 Likewise I interpret claim 4 as being dependent on claim 2 or claim 3; the pressure produced being dependent upon the amount of hydrogen peroxide introduced in to the water borehole etc and the level of mineral, bacterial and fungal growth present.
- 21 I interpret claim 5 as a standard omnibus claim.
- 22 I would add that this interpretation of the claims is consistent with the discussion at the hearing as to what Mr Whitter considered to be the invention and that significant amendment of the claims to address issues including clarity of the claims and unity of invention would be necessary before any patent could be granted.

### **Novelty**

- 23 The examiner has consistently reported that the invention claimed is not novel over various pieces of prior art. Before considering the prior art in detail however I will address Mr Whitter’s misconception that novelty and inventive step is judged only against GB patent documents. Section 2(2) of the Act addresses this issue and makes it perfectly clear that the state of the art extends well beyond GB patent documents – indeed with the exception of the circumstances covered in section 2(4) the pool of prior art includes any public disclosure made before the priority date of an application. The pool of prior art is not limited geographically or even to documentary disclosure and all the

documents the examiner has cited fall within section 2(2) and are potentially relevant to novelty and inventive step.

- 24 So is claim 1 (as I have interpreted it above) novel? It is clearly very widely known that hydrogen peroxide can be used to clean mineral, bacterial and fungal deposits in water installations such as tanks, pipes and other vessels and that it is particularly suited for this purpose because it breaks down into non-contaminating by-products. Claim 1 as amended however is limited to cleaning and rehabilitating boreholes for water, and “cleaning and rehabilitating” has a specific meaning in this context as I have explained above ie removing deposits that have built up in the cracks and fissures of the borehole. Of the documents cited by the examiner GB2393464 (BJ Services), US4934457 (Wallender), US 4464268 (Schievelbein), WO85/04213 (Marathon), are concerned with petroleum rather than water boreholes and do not demonstrate a lack of novelty in claim 1 as amended. US2900026 addresses the issue of freeing a stuck drill bit rather than rehabilitating a borehole and again does not demonstrate a lack of novelty in claim 1 and neither does US4591443 which is concerned with decontaminating a rock formation rather than rehabilitating a borehole as I have interpreted that phrase.
- 25 WO00/72684 (Water Whole) requires closer consideration. It discloses the use of a composition containing hydrogen peroxide to clean deposits from the surfaces of installations such as water tanks, filtration systems, distribution pipes and water wells. It is primarily directed to the composition of the cleaning solution and gives very little practical information as to how the cleaning process is carried out. The hydrogen peroxide component of the solution is stated to be used for disinfecting the surfaces though I think it is inevitable that it will have a cleaning effect too. Crucially however whilst cleaning of water wells is mentioned in this document, this seems to be nothing more than a passing reference and in the context of a document that seems to be exclusively concerned with cleaning surfaces, I do not consider it to provide an enabling disclosure of rehabilitating boreholes in the sense that term is used in the present application. Thus again I do not think this document demonstrates a lack of novelty in claim 1. The same argument applies to WO 84/02125 (Spane) which again mentions water wells but is directed at surface cleaning rather than unclogging cracks or fissures in a formation.
- 26 The final documents which I need to consider are a pair of PCT publications WO 01/02698 and WO 00/57022 by the company Cleansorb. These disclose a method for increasing the production rate from water or hydrocarbon wells drilled into underground reservoirs by introducing a fluid that removes “damage” which can clearly include biofilms and mineral scales in the pores, cracks and fissures of the surrounding reservoir. The fluid contains a number of components including a peroxide which breaks down in situ to generate hydrogen peroxide. This hydrogen peroxide acts to break down some of the material blocking the cracks and fissures of the reservoir. Claim 1 does not specify that the hydrogen peroxide must be introduced directly into the borehole and in my view the Cleansorb disclosures constitute using hydrogen peroxide to clean and rehabilitate a water well or borehole and indicates a lack of novelty in claim 1 as amended.

27 Claims 2-4 are concerned with the generation of what is called a “controlled pressure”. In claims 2 and 4 this is created by and dependent on the amount of hydrogen peroxide introduced and the level of contamination. According to claim 3 the pressure produced forces the hydrogen peroxide solution further into the formation though the specification includes very little in the way of disclosure of how the pressure is controlled. It is self evident that the greater the quantities of reacting material present (hydrogen peroxide and contaminants), the more reaction products will be generated resulting in a higher pressure. That would be equally true in the Cleansorb arrangements (which documents disclose using different concentrations of the hydrogen peroxide-forming component) and I consider it to be an inevitable consequence of performing the inventions disclosed in these documents that the effects recited in claims 2-4 will occur . Thus I consider claims 2-4 to be anticipated by the Cleansorb disclosures.

### **Inventive step**

- 28 Section 1 also requires an invention to involve an inventive step for a patent to be granted. The approach to be followed in assessing whether an invention provides such an inventive step is that laid down by the Court of Appeal in *Pozzoli*<sup>2</sup>. That test comprises the following steps:
- (1) (a) Identify the notional “person skilled in the art”  
(b) Identify the relevant common general knowledge of that person;
  - (2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it
  - (3) Identify what, if any, differences exist between the matter cited as forming part of the “state of the art” and the inventive concept of the claim or the claim as construed;
  - (4) Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention.
- 29 The first step requires me to identify the skilled person and the relevant common general knowledge of that person. In my view the skilled person is a water borehole drilling engineer. The Manual of Patent Practice provides useful guidance as to the qualities that the skilled person possesses drawing together as it does guidance from various court judgments where this has been considered. For example at paragraph 3.20 the Manual makes it clear that the skilled person “is not a highly skilled expert or Nobel prize winner, nor is he some form of lowest common denominator. Instead he is best seen as someone who is good at their job, a fully competent worker”. And at paragraph 3.21 the Manual suggests “He should be taken to be a person who has the skill to make routine workshop developments but not to exercise inventive ingenuity

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<sup>2</sup> Pozzoli SPA vs BDMO SA [2007] EWCA Civ 588

or think laterally". I will endeavour to assess the invention through the eyes of a person having those qualities.

- 30 As regards common general knowledge, I consider (s)he would be aware of the tools and techniques commonly used in the drilling of boreholes for water.
- 31 The second step in the test requires me to identify the inventive concept of the claims in question, construing the claims as necessary. I have already done that above and in relation to claim 1 (which is the logical place to start) the inventive concept is the use of hydrogen peroxide to rehabilitate a water borehole (ie remove mineral or fungal/bacterial deposits from the cracks or fissures of the surrounding formation).
- 32 As for step 3, the examiner has again cited a number of pieces of prior art in reporting that the claimed invention is not inventive which I will again consider in turn. I will start however with Mr Whitter's primary argument against them which is that the field of water borehole drilling is very specialised and solutions from other fields would not be considered by a water borehole engineer. In my view the inventiveness or otherwise of the invention turns on this point.
- 33 Starting with WO 00/72684 (Water Whole) and WO 84/02125 (Spane), as mentioned above these are concerned with cleaning the surfaces of water installations such as pipes and tanks with hydrogen peroxide. Whilst water wells are mentioned, this is only a passing reference and there is no hint that they are directed to removing deposits from fractures or fissures in the rock formation (rather than a surface). Thus as regards these two documents I find Mr Whitter's arguments persuasive – I do not think the water borehole engineer would consider these documents when seeking a solution to the problem of rehabilitating water boreholes.
- 34 The bulk of the remaining documents cited by the examiner are directed to increasing production flow from hydrocarbon wells ie rehabilitating hydrocarbon wells. Mr Whitter's view is that the water borehole engineer would not consider solutions from this field when seeking solutions to the problem of rehabilitating water boreholes and thus that the skilled man would not consider the present invention to be obvious in light of the disclosures of these documents.
- 35 Whilst I very much appreciate that there are differences between the two types of borehole and consequently in the problems encountered in the two fields, I do not think the situation is as simple as Mr Whitter suggests. The Cleansorb documents which I consider to anticipate claims 1 to 4 are explicitly directed to the treatment of underground reservoirs for hydrocarbons or water and in my view demonstrate an appreciation in the industry that solutions from the oil extraction industry could equally well be applicable in water extraction too. US2722279 (Collins) and US 3012611 (Haines) which are referred to in the examiner's final report are further examples albeit they are mentioned for a different purpose. Furthermore in my view the present specification itself acknowledges that the problem of blocked boreholes is common to different sorts of borehole, not just ones for water, when it refers (in the passage I identified above) to the cracks or fissures that allow "liquids **or gases**" to flow into the borehole.

- 36 That is not to say however that the skilled water borehole engineer would consider all techniques used in the oil extraction industry to be relevant. Far from it. Indeed in my opinion he would not consider all the prior art cited by the examiner as being likely to provide a solution to his problem of rehabilitating a water borehole. For example, US 3896879 (Sareen) and US 4548252 (Stowe) both concern improving hydrocarbon flow rate by fracturing a rock formation by injecting hydrogen peroxide at high pressure. It seems to me that the sort of pressures involved in generating additional fractures are very different to the sort of conditions required to remove mineral, fungal or bacterial deposits from the existing fractures in a water borehole and these documents would not be considered by the water borehole engineer when addressing the current problem and thus do not demonstrate a lack of inventive step in claim 1.
- 37 On the other hand I consider that he would appreciate the relevance of the disclosures in GB2393464 (BJ Services), US4934457 (Wallender) and US4464268 (Schivelbein) to the problem of rehabilitating a water borehole. All three of these documents disclose the use of hydrogen peroxide to improve the permeability of hydrocarbon wells that have become plugged by mineral and/or biological deposits. In my view the skilled water borehole engineer would appreciate that a solution to the problem of removing this sort of material from the pores, cracks and fissures of a hydrocarbon well could equally well be used for the same purpose in a water borehole. I do not consider it would take any degree of invention to apply that same technique to a water borehole and thus consider claim 1 to be obvious in light of these documents.
- 38 As I have interpreted it, claim 2 adds the feature that that the reaction between the hydrogen peroxide and the deposits produces a controlled pressure. There is very little in the way of disclosure of how this pressure is controlled save for it being self evident that it will be dependent upon the amount of hydrogen peroxide introduced and the level of mineral, fungal or bacterial material present in the formation (claim 4) and that a cap or packers can be used to confine the reaction (figures 1-3). In my view it is an inevitable consequence of implementing the inventions in the Cleansorb, BJ Services, Wallender and Schivelbein documents that the pressure generated will be dependent on the quantities of hydrogen peroxide introduced and clogging material present and thus that claims 2 and 4 also lack an inventive step over these documents. Indeed the pressure generating effect of different concentrations and quantities of hydrogen peroxide is specifically discussed in the passage beginning at column 3 line 22 in Wallender as is the desirability of "closing in" the well for the duration of the treatment in BJ Services. Likewise, whilst not specifically mentioned in any of these documents, I consider it to be an inevitable consequence of performing the methods disclosed in them that the pressure generated will push the hydrogen peroxide further into the cracks or fissures and that claim 3 does not provide the required inventive step.

## **Conclusion**

- 39 I have found that claims 1 to 4 as amended lack novelty and an inventive step as required by sections 1(1)(a) and (b) of the Act. I therefore refuse the application under section 18(3).



### **Other matters**

- 40 From our discussions at the hearing it was clear that Mr Whitter considered the key element of his invention to be the specific concentration of hydrogen peroxide that was most effective in the rehabilitation process. Whilst that may well be the case, as I pointed out at the hearing, the specification is completely silent as to the concentrations to be used and section 76 prevents that being introduced at this stage. There is however nothing to prevent him filing a new application including that additional information should he wish to do so.

### **Appeal**

- 41 Any appeal must be lodged within 28 days

**A BARTLETT**