Patents Act 1977 **Opinion Number** **04/23**

OPINION UNDER SECTION 74A

Patent	GB 2553155 B
Proprietor(s)	Expro North Sea Limited
Exclusive Licensee	
Requester	Cleveland Scott York (CSY London)
Observer(s)	Expro North Sea Limited (represented by Marks & Clerk LLP)
Date Opinion issued	21 September 2023

The request

1. The comptroller has been requested to issue a validity opinion in respect of patent GB 2553155 B (the patent). The request asks whether the invention for which the patent has been granted is not new, does not involve an inventive step and/or lacks sufficiency. The prior art documents referred to in the request are as follows:

Reference 1 – WO 2014/044995 A2 (EXPRO NORTH SEA LTD), published 27 March 2014

Reference 2 - "Clair Field: Reducing Uncertainty in Reservoir Connectivity During Reservoir Appraisal - A First Time Application of a New Wireless Pressure Monitoring Technology in an Abandoned Subsea Appraisal Well", Champion et al, prepared for presentation 4-7 September 2007

Reference 3 - "Reducing Reservoir Uncertainty During Appraisal and Development - Novel Applications of a new Wireless Reservoir Monitoring Technology in Santos Basin Pre-Salt", Champion et al, prepared for presentation 28-30 September 2015

Reference 4 - WO 2012/080692 A2 (EXPRO NORTH SEA LTD), published 21 June 2012

Reference 5 - WO 2013/001262 A2 (EXPRO NORTH SEA LTD), published 03 January 2013

Observations

2. Observations were received on 26 July 2023 and observations in reply were received

on 28 July 2023.

Matters to be considered by this Opinion

3. Section 74A of the Patents Act provides for the procedure where the Comptroller can issue, on request, non-binding opinions on questions of validity relating to novelty and inventive step, and on questions of infringement.

4. Section 74A(3) of the Patents Act states:

> *The comptroller shall issue an opinion if requested to do so under subsection (1) above, but shall not do so –*
>
> *(a) in such circumstances as may be prescribed, or*
>
> *(b) if for any reason he considers it inappropriate in all the circumstances to do so.*

5. It is the practice of the IPO to not issue an opinion in the circumstance where the request relies on a document that has been considered during the examination of the patent and therefore where the opinion request does not raise a new question. Reference 3 and Reference 2 were cited by the European Patent Office (EPO) as International Searching Authority (ISA) for the proprietor's corresponding PCT application published under number WO 2018/078356 A1. The International Search Report and Written Opinion of the ISA were brought to the attention of the UK examiner by the proprietor's attorney in their letter dated 28 March 2018 and the UK examiner confirmed in a minute of 25 January 2019 that the Written Opinion had been considered against the amended claims of the UK application. Therefore, I consider that the question of novelty and inventiveness of the patent in the light of Reference 3 and Reference 2 has already been considered in the pre-grant proceedings of the UKIPO. Hence, I will not consider Reference 3 and Reference 2 in this opinion.

The patent

6. The patent is entitled "A communication system utilising a metallic well structure" and was filed on 25 October 2016 with no earlier declaration of priority. The patent was granted on 02 October 2019 and remains in force in the UK.

7. The patent relates to a communication system within a well infrastructure that comprises "open hole" sections that are uncased or without liner. For example, when an appraisal process has been completed, steps may be taken to permanently abandon an appraisal well. The abandonment process may include pumping a first cement plug 212 into an open hole section 210 and positioning a second cement plug 214 in the metallic well structure section 202. However, after abandonment, more data can be extracted from an appraisal well, e.g. pressure and temperature within the appraisal well could be monitored post-abandonment to provide additional information about connectivity / compartmentalisation of a reservoir 220 with follow-on appraisal wells or nearby production wells. Therefore, the patent outlines a communication system to wirelessly provide downhole data to a surface from an open hole section of an abandoned well. This is illustrated in figure 2 of the patent,

reproduced below.

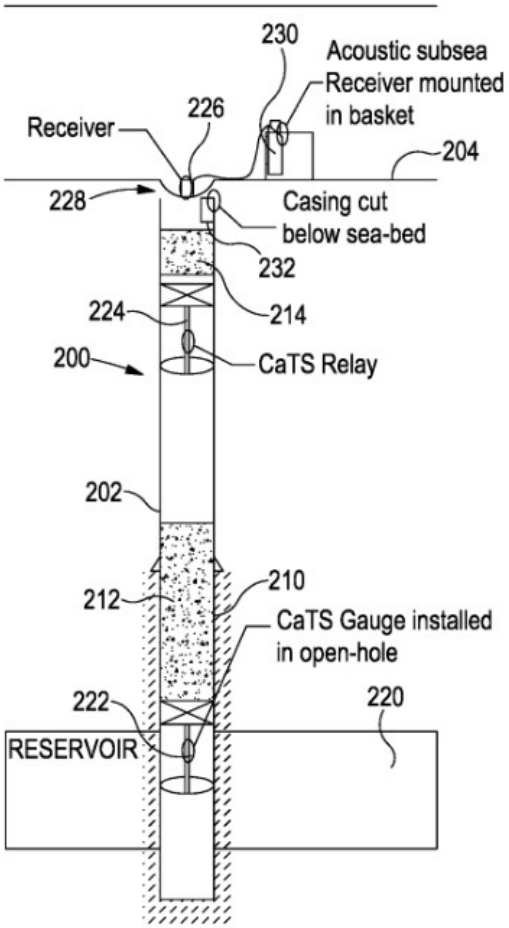

Fig. 2

8. The communication system comprises a downhole apparatus 222, which may comprise a sensor, a downhole communications device 224 and a receiver 226 at the surface 204. The downhole apparatus 222 wirelessly transmits a data signal, e.g. indicative of sensed temperature and/or pressure, for receipt by the communications device 224. The communications device 224 receives the wirelessly transmitted data signal and injects corresponding data signals into the metallic well structure 202, thereby using the metallic well structure 202 as a signal path, for transmission to the receiver 226.

9. After abandonment of the well 200, some of the metallic well structure 202 may be severed and removed at a depth below the surface 204. Hence, a discontinuity in signal path provided by the metallic well structure 202 is apparent. So, the receiver 226 receives electromagnetic (EM) data signals from the metallic well structure 202 via a ground region 228, e.g. roughly 1 to 20 metres of seabed, or other such material, that is used to cover the severed metallic well structure 202.

10. The patent includes two independent claims – a communication system defined by claim 1 and a communication method defined by claim 30. Claim 25 is a further method claim incorporating the system of claim 1, whilst there are also computer program claims for performing the claimed method and a claim to an abandoned well

comprising the claimed system. Claims 1 and 30 are reproduced below with claim integers labelled as in the request:

1. (a) A communication system for use in conjunction with a well having a metallic well structure therein, the system comprising:

(b) a downhole apparatus configured to be positioned in an open-hole section within the well below the metallic well structure,

(c) the downhole apparatus being further configured to wirelessly transmit data signals from or through the open hole section, through surrounding formation, for receipt at the metallic well structure itself for propagation via that metallic well structure; and

(d) at least one receiver configured to be deployed at a top of the well, and further configured to receive the data signals from the metallic well structure.

30. (a) A method for deploying a system for monitoring abandonment of a well comprising a metallic well structure section and an open hole section, the method comprising:

(b) positioning a downhole apparatus in the open hole section,

(c) wherein the downhole apparatus is configured to wirelessly transmit data signals from or through the open hole section, through surrounding formation,

(d) for receipt at the metallic well structure section itself for transmission via a metallic well structure of that metallic well structure section; and

(e) deploying at least one receiver at a top of the well,

(f) the at least one receiver configured to receive the data signals from the metallic well structure.

Claim construction and sufficiency

11. Before I can determine an opinion as to the validity of the patent, I must first construe the claims. This means interpreting the claims in light of the description and drawings as instructed by section 125(1) of the Patents Act:

> *For the purposes of this Act an invention for a patent for which an application has been made or for which a patent has been granted shall, unless the context otherwise requires, be taken to be that specified in a claim of the specification of the application or patent, as the case may be, as interpreted by the description and any drawings contained in that specification, and the extent of the protection conferred by a patent or application for a patent shall be determined accordingly.*

12. I must interpret the claims in context through the eyes of the person skilled in the art. Ultimately, the question is what the person skilled in the art would have understood

the patentee to be using the language of the claims to mean. This approach has been confirmed in the decisions of the High Court in *Mylan v Yeda*[1] and the Court of Appeal in *Actavis v ICOS*[2].

13. Additionally, section 14(3) of the Patents Act reads:

> *The specification of an application shall disclose the invention in a manner which is clear enough and complete enough for the invention to be performed by a person skilled in the art.*

14. The requester submits that the person skilled in the art is an engineer engaged in the design and production of downhole telemetry systems. This identification of the skilled person seems appropriate and would indicate that their common general knowledge would include the different communication techniques used for communicating signals between devices provided downhole and the surface, such as using the downhole metallic structure as a signal path.

15. The requester contends that the expressions "*configured to be positioned in an open-hole section*" in integer *(b)* of claim 1 and "*configured to wirelessly transmit data signals*" in integer *(c)* of claim 1 and integer *(c)* of claim 30 are meaningless as there is no description in the patent as to how the "*downhole apparatus*" is actually "*configured*" for positioning with an "*open-hole section*". Alternatively, if these features are intended to be meaningful, then claim 1 and claim 30 (and all dependent claims) lack sufficiency as there is insufficient description in the patent as to what makes the apparatus "*configured*" for '*wirelessly transmitting*' when "*positioned*" in an "*open-hole section*" rather than when within the "*metallic well structure*".

16. The observer has countered that the expression "*configured to*" is clear, meaning that the apparatus is adapted / arranged to "*wirelessly transmit data signals from or through the open hole section*" in which it is positioned. The observer also provides references to passages of the description that provide specific exemplary configurations for the claimed arrangement. These passages read:

> "*For example, an EM gauge or sensor in the open hole section may be configured to create a dipole antenna that wirelessly transmits data signals through the surrounding formation.*" (page 12 lines 5 to 7)

> "*As used herein, the term "wireless" when applied to communications encompasses all transmission that is not through a guided transmission medium, such as a wire, other metallic structure or a material having high EM conductivity relative to a surrounding medium. Wireless communications may, for example, be through air, water, ground (or formation) or another medium that has substantially isotropic EM conductivity.*" (page 12 lines 13 to 17)

> "*The downhole apparatus may further comprise a transmitter configured to wirelessly transmit a data signal indicative of the sensed parameter for receipt by a communications device 224.*" (page 13 lines 21 to 23)

17. I do believe that there is sufficiency of disclosure in the patent specification to enable the person skilled in the art to perform the invention. The passages of the

1 *Generics UK Ltd (t/a Mylan) v Yeda Research and Dev. Co. Ltd & Others [2017] EWHC 2629 (Pat)*
2 *Actavis Group PTC EHF v ICOS Corporation & Ors [2017] EWCA Civ 1671*

description identified by the observer provide enabling disclosure for the feature of '*wirelessly transmitting data signals from or through the open hole section*' and a person skilled in the art of downhole telemetry systems would understand how the "*downhole apparatus*" would be "*positioned in an open-hole section*" based on the patent specification (e.g. from figure 2 above where the "*downhole apparatus 222*" is a downhole tool – see also page 15 lines 8 to 11 of the description) together with their common general knowledge.

18. I also agree that the expression "*configured to*" carries the same meaning as adapted / arranged to, as suggested by the observer. However, I note that in *FH Brundle v Perry*[3], the judge held that:

> "*I accept that as a matter of ordinary English usage, 'adapted' carries a connotation of adaption or modification in design to achieve the purpose stated in the feature. However in my view... these [features] are to be construed such that they contain no subjective element. To my mind it is irrelevant where the designer started and what adaptations were made in the design process. Because these features must be assessed objectively, it seems to me that 'adapted to' and 'adapted in use to' mean the same thing as 'suitable for'*"

19. Hence, I believe that, in this case, the expression "*configured to*" should be understood to mean "*suitable for*". So, whilst this does not render integers *(b)* and *(c)* of claim 1 and integer *(c)* of claim 30 meaningless, as argued by the requester, it does affect the scope of the independent claims (and, possibly, the clarity of the claims since, as a general rule, claims which attempt to define a feature of the invention by a result to be achieved should not be allowed – however, this is not a question that has been raised in this particular opinion request and so will not be explored any further). For example, the scope of integer *(b)* of claim 1 is limited only to "*a downhole apparatus <u>suitable for positioning</u> in an open-hole section*" whereas, corresponding integer *(b)* of claim 30 requires that the "*downhole apparatus*" is actually '*<u>positioned</u>… in the open hole section'*. To me, integer *(b)* of claim 30 is narrower in scope.

Validity – novelty and inventive step

20. Section 1(1) of the Patents Act reads:

> *A patent may be granted only for an invention in respect of the following conditions are satisfied, that is to say –*
>
> *(a) the invention is new;*
>
> *(b) it involves an inventive step…*

21. The requester has argued that independent claims 1 and 30 are not novel over each of Reference 1 and Reference 3. However, as indicated above, the question of validity of the patent based on Reference 3 has already been sufficiently considered during the pre-grant examination of the patent application.

3 *FH Brundle v Perry [2014] EWHC 475 (IPEC)*

22. Reference 1 was cited by the EPO as anticipating an independent claim of very similar scope to that of claim 1 of the granted patent. The only difference between that independent claim of the EP equivalent application and claim 1 of the granted patent is in integer *(b)*. The independent claim of the EP equivalent application read:

> *(b) a downhole apparatus configured to be positioned in electrical contact with an open-hole section within the well below the metallic well structure,*

23. The passage of Reference 1 cited by the EPO as anticipating this feature is at page 7 lines 29-30, which reads:

> "*Further the downhole tool 3 may be disposed in an open hole location and signal from there.*"

24. Hence, it is apparent that this passage would also anticipate the broader scope of integer *(b)* in claim 1 of the granted patent. Having considered the arguments raised by the EPO, I am of the opinion that the conclusions reached and reported in the Communication from their Examining Division dated 18 March 2022 with regard to the lack of novelty of the independent claim of the EP equivalent application on that date also apply equally to claim 1 of the granted patent. Therefore, I believe that claim 1 of the patent is not new in the light of Reference 1.

25. However, in their Communication from the Examining Division dated 18 March 2022, the EPO did not comment on the novelty or inventiveness of any other equivalent claims in the light of Reference 1 and so I will now consider the other claims of the patent starting with the other independent claim, method claim 30.

26. The requester suggests that independent claim 30 recites a corresponding method to the system of claim 1 and so the conclusions regarding claim 1 apply equally to claim 30.

27. I have noted a few of the features defined in claim 30 are slightly narrower in scope than the equivalent features of claim 1:

    integer *(a)* - The "*system*" deployed is *"[suitable] for monitoring abandonment of a well*"

    integer *(b)* - The "*positioning a downhole apparatus in the open hole section*" (rather than being "*configured to be positioned*", i.e. *suitable for positioning*, in claim 1)

    integer *(e)* - The "*deploying at least one receiver at a top of the well*" (rather than being "*configured to be deployed*", i.e. *suitable for deployment*, in claim 1)

28. Figure 1 and page 7 line 21 to page 8 line 2 of Reference 1 were identified by the EPO as anticipating the broader features of claim 1. These are reproduced below:

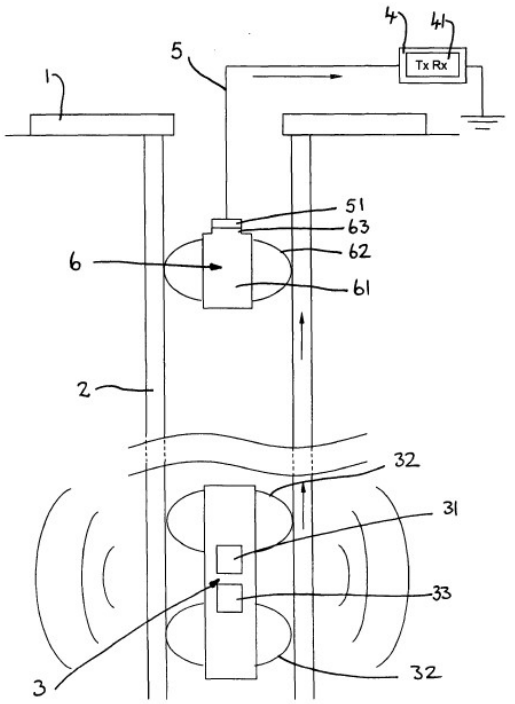

Fig.1

"*Note that in the present embodiment, the downhole tool 3 is arranged as an electrical dipole tool for applying an electrical signal to the metallic structure 2 which will propagate away from the tool 3 towards the surface. An example of such an electric dipole 2 is a "CaTs" tool commercially available from the applicants. However other forms of downhole device for signalling and/or picking up signals from the downhole metallic structure may be used in the present techniques. Thus, for example, a system may be used where downhole signals are transmitted across and picked up across an isolation (or insulation) joint provided in the metallic structure 2. Further the downhole tool 3 may be disposed in an open hole location and signal from there. That is the tool 3 may be located further down in the well than the metallic structure 2 extends. In such a case signals will still travel into and along the metallic structure for transmission towards the surface once the metallic structure is reached.*"

29. This passage clearly discloses integer *(b)* of claim 30, i.e. "*positioning a downhole apparatus in the open hole section*", and in figure 1, "*surface unit 4*" is "*provided at the surface*" (see page 7 lines 10-11) and is identified in the description as including "*a transceiver unit 41 for receiving signals from the downhole tool 3*" (see page 8 lines 4-5). Hence, integer *(e)* of claim 30 is disclosed. Finally, page 13 lines 25 to 26 of Reference 1 discloses the additional details in integer *(a)* of claim 30:

"*The present technique might most typically be used in producing wells, dormant/temporarily shut down wells, or abandoned wells.*"

30. The remaining features of claim 30 are equivalent to the corresponding features of claim 1 and so the conclusions of the EPO apply equally to these features. Therefore, I am of the opinion that claim 30 also lacks novelty over Reference 1.

31. Regarding the remaining dependent claims, the request suggests that claims 3, 20

and 22 are not novel over Reference 1. However, I notice that the request is silent on the applicability of Reference 1 to claim 2. As such, it seems that the requester does not believe that the features of claim 2 are disclosed in Reference 1 and I am also of this opinion. Therefore, it follows that claim 3 is also novel over Reference 1 since it is appended to claim 2.

32. Claim 20 defines "*electromagnetic (EM) data signals*". Page 1 lines 20-21 of Reference 1 discloses "*wireless systems where electrical signals are transmitted without the use of dedicated cables*". A person skilled in the art would recognise that such "*wireless… electrical signals*" would be "*electromagnetic*" signals. Therefore, I agree that claim 20 is not new.

33. Page 7 lines 11-19 of Reference 1 discloses "*The tool 3 in the present embodiment is arranged for taking measurements of downhole parameters, such as pressure and temperature… The downhole tool 3 also comprises other components 33 such as sensors and associated electronics for taking the desired parameter measurements.*" Therefore, claim 22 defining a "*sensor configured to sense one or more of temperature and pressure*" is not new.

34. The requester has argued that each of the remaining features of claims 2 to 19, 21, 23, 24, and 31 to 36 lack an inventive step over Reference 1 as these features would reside in the common general knowledge of the skilled person. For some of the dependent claims, the requester has suggested that the common general knowledge is exemplified by Reference 2, Reference 4 or Reference 5, but I do not believe that these further references are required to reach an opinion on inventive step. I note that the requester's arguments relating to claim 25 are in relation to Reference 3 only, which is not being considered in this opinion. Claims 26 to 29 are all appended to claim 25 and so the inventive step of these claims will also not be considered.

35. In my opinion, claim 2 and claim 31 involve an inventive step over Reference 1. Whereas Reference 1 teaches that when "*the downhole tool 3*" is "*disposed in an open hole location… located further down in the well than the metallic structure 2 extends*", then "*signals will still travel into and along the metallic structure for transmission towards the surface once the metallic structure is reached*", claim 2 and claim 31 require an additional "*communications device configured to receive the wirelessly transmitted data signals from the downhole apparatus and to inject the data signals into the metallic well structure*". The requester suggests that this type of relay device resides in the common general knowledge of the skilled person and it would have been obvious to provide this feature if additional range is required. However, in Reference 1, a complete communication system is described made up of the "*downhole tool 3*", the "*connection device 6*" and the "*surface unit 4*". There is no indication or suggestion in Reference 1 that an additional "*communications device*" may be needed to "*inject the data signals into the metallic well structure*" or that additional range might be required. I do not believe that a skilled person would be motivated to make such an addition to an already complete communication system. Therefore, I am of the opinion that claim 2 and claim 31 (as well as claims 3 and 4 appended to claim 2, and claim 32 appended to claim 31) involve an inventive step over Reference 1.

36. Claim 5 defines that "*the downhole apparatus is configured to wirelessly transmit the data signals up to 500 metres.*" There is nothing in the patent specification to

suggest any significance to this choice of transmission distance and so it would seem obvious to a person skilled in the art to design a system based on Reference 1 to achieve this distance. Therefore, I believe that claim 5 lacks an inventive step.

37. Claim 6 defines positioning "*the downhole apparatus*" below a "*first plug*" within "*an abandoned well*" and "*to wirelessly transmit the data signal through the first plug*". As indicated above, there is only passing reference to "*abandoned wells*" in Reference 1 and, whilst the requester may be correct to suggest that such plugs are well known in the art, there is nothing to suggest that a skilled person would consider positioning the "*downhole tool 3*" of Reference 1 below such a plug. In my opinion, this would require an inventive step, so claim 6 (and claims 7 to 17, which are appended to claim 6) is not obvious over Reference 1.

38. It is my opinion that each of dependent claims 18, 19, 21, 23 and 24 lacks an inventive step over Reference 1 as they define features that would have been obvious to the person skilled in the art.

Opinion

39. I am of the opinion that the patent specification does disclose the invention in a manner which is sufficiently clear and complete for the invention to be performed by a person skilled in the art.

40. I consider that independent claims 1 and 30 are invalid as the invention defined by them is not novel in the light of Reference 1.

41. I am also of the opinion that dependent claims 20 and 22 are invalid as the invention defined by them is not new in the light of Reference 1.

42. Furthermore, I am of the opinion that dependent claims 5, 18, 19, 21, 23 and 24 are invalid as they lack an inventive step over Reference 1.

Application for review

43. Under section 74B and rule 98, the proprietor may, within three months of the date of issue of this opinion, apply to the comptroller for a review of the opinion.

Dan Hickery
Examiner

NOTE

This opinion is not based on the outcome of fully litigated proceedings. Rather, it is based on whatever material the persons requesting the opinion and filing observations have chosen to put before the Office.