Patents Act 1977 **Opinion Number** **21/22**

OPINION UNDER SECTION 74A

Patent	GB 2458592 B
Proprietor(s)	Weatherford Technology Holdings, LLC
Exclusive Licensee	
Requester	Lucas & Co.
Observer(s)	
Date Opinion issued	19 October 2022

The request

1. The comptroller has been requested to issue an opinion as to whether patent GB 2458592 B is invalid on the grounds of:

a) Either lack of novelty or lack of an inventive step according to Section 1(1)(a) and 1(1)(b) of the Act in the light of prior art document GB 2423817 A;

b) Independent claims 1 and 9 include added subject matter extending beyond that disclosed in the application as filed.

The Patent GB 2423817 A is derived from the PCT international patent application PCT/US2008/05628 filed on 22 January 2008 and initially published as WO 2008/091849 A1 on 31 July 2008. It was granted in the UK on 22 June 2011.

Observations

2. No observations were received from the proprietor. The deadline for observations was 19 August 2022.

The Patent

3. The invention is an optical sensing system for detecting the presence of water in a flow stream from a hydrocarbon well. The system passes infra-red light through a sample of the stream and looks for absorption of the light at various spectral positions. The preferred embodiment uses a broad band IR source and has multiple optical filters to select discrete pass-bands that are fed to a set of optical detectors. The layout of a preferred embodiment is shown in figure 3 below with the flow stream 116 directed to pass through the sampling region 204, between IR source 211 and

receiving collimator 206. Light from the collimator is split and routed, preferably using optical fibres, from the optical output to the band-pass filters 311 and photo diode detectors 313.

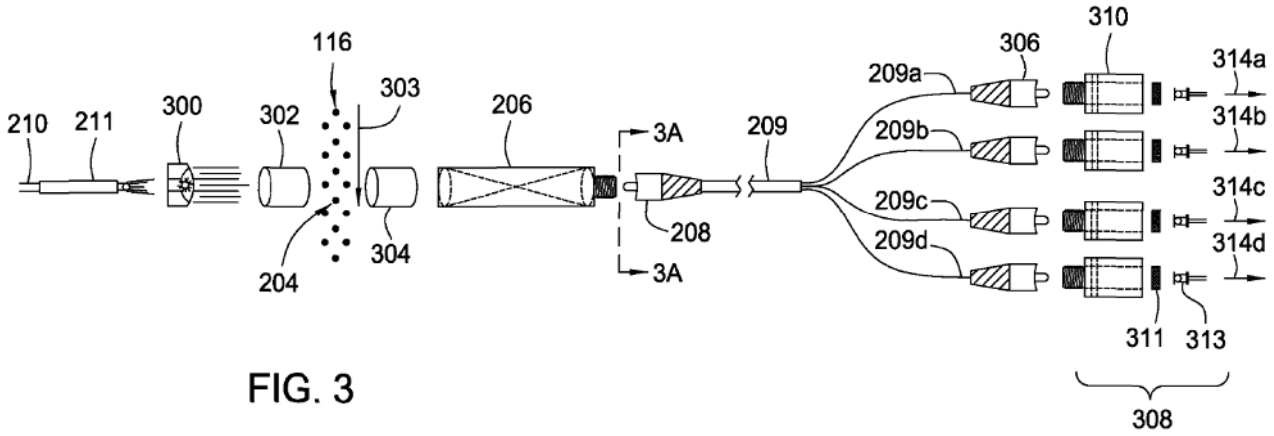

FIG. 3

4. The patent describes how the set of measurement bands can be selected so that different constituents of the flow stream will cause different amounts of light absorption. The set of measurements allow for a set of simultaneous equations that can be solved for discriminating the amount of absorption due to each constituent and thus the amount of each constituent present. A correction for a non-wavelength dependant absorption term (which may include scattering effects) is present for each equation. Thus for n constituents, providing for n+1 measurement bands allows for the correction term to also be determined.

5. Figure 6 below shows a set of potential wavelength measurement bands as thick black lines. Absorption spectrum lines 601 and 602 are typical of oils, 603 is for water and 604 is for condensate. When detecting presence of both oil and water the band 607 is noted as being suitable for providing a correction measurement as there is a relative 'trough' in absorption for all the lines. Wavelength band 605 is dominated by oil absorption, and bands 606 and 609 are dominated by water absorption.

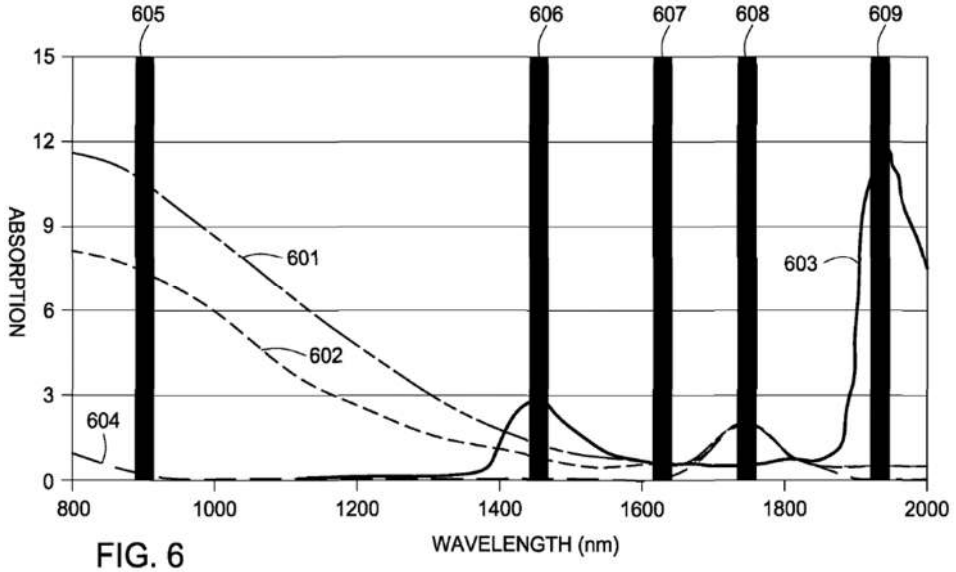

FIG. 6

6. When looking for the presence of water, the patent says that band 606 and/or band 609 enable sensitive water presence detection as there is relative high absorption. It is said that methanol (which might be injected into the well flow stream to inhibit hydrate formation) can also cause absorption in the 606 band, but not in the 609 band and so use of band 609 allows water to be differentiated from methanol. When considering water detection, measurements at wavelengths off these two water absorption peaks (eg measurement bands with relative low absorption by water) can be used to correct for the non-wavelength dependant attenuation.

Matters to be considered by this Opinion

7. After filing of the request, both the requestor and proprietor were advised that part a) of the request might not be considered because the prior art had effectively already been considered by the UK Examiner during the pre-grant prosecution of the Patent.

8. The Requestor subsequently filed a letter on 25 August 2022 giving reasons as to why part a) should be considered in this opinion. This subsequent letter contains further arguments that were not present in the original request, and I will therefore not consider those further arguments here.

9. The original request notes that the prior art document GB 2423817 A, was not cited during prosecution of the Patent. However, an equivalent document to this was cited during prosecution as US family member US 2006/0186340 A1. I have considered these two prior art documents and they appear to comprise substantially the same disclosure. Thus I need to decide if I should refuse to consider part a) of the request.

10. Section 74A(3) of the Patents Act 1977 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.*

and Rules 94(1) and 94(3) of the Patents Rules 2007 state:

> *(1) The comptroller shall not issue an opinion if—*
> *(a) the request appears to him to be frivolous or vexatious; or*
> *(b) the question upon which the opinion is sought appears to him to have been sufficiently considered in any relevant proceedings.*
> *…*
> *(3) If the comptroller intends at any time—*
> *(a) to refuse the request because the condition in paragraph (1)(a) or (b) is satisfied; or*
> *(b) to refuse the request because, in accordance with section 74A(3)(b), he considers it inappropriate in all the circumstances to issue an opinion, he shall notify the requester accordingly.*

11. The IPO's own Opinions Manual[1] in Section 3.4 states the following:

> *1. The Office will not issue an opinion if for any reason it considers it inappropriate in all the circumstances to do so (by virtue of section 74A(3)(b)). This provision is used to refuse requests which did no more than repeat arguments already considered pre-grant. In decision BL O/298/07 refusing an opinion request, the hearing officer noted that the request relied on prior art that had clearly been considered pre-grant and therefore did not raise a new question. In decision BL O/370/07, the hearing officer concluded that a request for an opinion on validity which argues on the basis of prior art that was cited as category "X" or "Y" in the search report, or as part of a substantive objection at any other time in the examination procedure, is, other than in exceptional circumstances, unlikely to clear the hurdle of raising a new question or argument.*
>
> *2. However Opinion 21/07 did consider 4 documents cited as category A in the search report, together with a number of new documents, when assessing validity.*
>
> *3. It is therefore likely that any request that merely repeats an argument that was clearly raised by the examiner and answered by the applicant to the satisfaction of the examiner will be refused though each case will of course be considered on its merits.*

12. From reviewing the prosecution history, it can be seen that the equivalent US document was cited for both novelty and inventive step against the claims in the first examination report. I note that this report considered a form of wording different to that granted. No objection was raised against the final granted form of the claims.

13. I note that parts of the office decision *BL O/370/07* are of help here. Firstly, the Hearing officer notes at paragraph 30 that pre-grant examination does not provide a fully reasoned decision, and rarely is there an explanation as to why an argument or objection has been dropped. The Hearing officer at the end of paragraph 32 says:

> *'I think it reasonable to suppose in general that the examiner will have done his or her job properly in the absence of indication to the contrary, and I see no reason why this assumption should not apply even if the examiner has decided not to raise objection on the basis of any of the citations at substantive examination.'*

Paragraph 33 then continues:

> *'Having said that, I have to acknowledge the possibility that a decision by an examiner to discount a citation might be shown to have been clearly perverse, in the sense that no reasonable person could have reached it. Only in such a case might it be appropriate to reconsider the citation in an opinion as there could be said to be a new argument.'*

[1] As updated on 1st October 2014, available at https://www.gov.uk/government/publications/opinions-manual/opinions-manual

14. I note that the equivalent citation does not refer to measuring a 'hydrate inhibitor', nor does it make reference to providing a measurement at a wavelength band covering 1950nm, nor to problems of methanol having a significant absorption 'peak' coinciding with a water absorption peak at 1450nm. The citation does mention in the background section that if water is detected in subsea flowlines the response may be to inject hydrate and/or corrosion inhibitors; There is no further mention in the citation and nothing about methanol or alcohols.

15. I also note that paragraphs 44 to 46 of the patent suggest use of only two out of the five bands in figure 6, those at 1450nm and 1950nm for the water sensitive measurements. Given that the problems of methane interference, and their solution are a clear teaching of the patent, a teaching absent from the citation, it does not seem to me to be **clearly perverse** for the examiner to have dropped the novelty and obviousness objections. Thus I conclude that part a) of the request does not make a new argument, and thus it will not be considered in this opinion.

16. To avoid doubt, I note that I find that part b) of the request was not an argument raised during the pre-grant prosecution and thus it will be considered in this opinion.

Added Matter

17. Section 76 of the Act states:

> *...*
> *(2) No amendment of an application for a patent shall be allowed under section 15A(6), 18(3) or 19(1) if it results in the application disclosing matter extending beyond that disclosed in the application as filed.*
> *...*

18. The current test for added matter was outlined in Bonzel and Schneider (Europe) AG v Intervention Ltd [1991] RPC 553. When deciding whether an amendment to the description had the result that a patent as granted disclosed matter which extended beyond that disclosed in the application, Aldous J described his task as -

> *(1) to ascertain through the eyes of the skilled addressee what is disclosed, both explicitly and implicitly in the application;*
>
> *(2) to do the same in respect of the patent as granted;*
>
> *(3) to compare the two disclosures and decide whether any subject matter relevant to the invention has been added whether by deletion or addition.*
>
> *The comparison is strict in the sense that subject matter will be added unless such matter is clearly and unambiguously disclosed in the application either explicitly or implicitly.*

This was summarised by Jacob J. in Richardson-Vicks Inc.'s Patent [1995] RPC 568, as :

> *"the test of added matter is whether a skilled man would, upon looking at the amended specification, learn anything about the invention which he could*

not learn from the unamended specification."

19. The request makes two arguments on added matter. The first is that the phrase '*the water absorbent wavelength bands ensure different absorption coefficients for water and a hydrate inhibitor'*, which was introduced to claims 1 and 9 during prosecution, adds matter. Their argument is that this phrase adds matter in two distinct ways.

20. I firstly reproduce both claims in full, highlighting the above phrase in bold :

> *1. An infrared water detector arranged to monitor a hydrocarbon well, comprising:*
> *a source for emitting into a flow stream infrared light that includes first and second water absorbent wavelength bands and a substantially transmissive wavelength band with respect to water, wherein* ***the water absorbent wavelength bands ensure different absorption coefficients for water and a hydrate inhibitor****;*
> *a detector for detecting attenuation of the wavelength bands upon the infrared light passing through at least a portion of the flow stream; and*
> *an output indicative of a presence of water as determined based on the attenuation of the wavelength bands.*
>
> *9. A method of detecting water within a flow stream of a hydrocarbon well, comprising:*
> *emitting infrared light into the flow stream, the infrared light including first and second water absorbent wavelength bands and a substantially transmissive wavelength band with respect to water,* ***wherein the water absorbent wavelength bands ensure different absorption coefficients for water and a hydrate inhibitor****;*
> *detecting attenuation of the first and second water absorbent wavelength bands upon the infrared light passing through at least a portion of the flow stream;*
> *correcting the attenuation of the first and second water absorbent wavelength bands detected based on detection of attenuation of the transmissive wavelength band; and*
> *determining a presence of water based on the attenuation of the first and second water absorbent wavelength bands after being corrected.*

21. I consider there are some implicit features of the invention not explicitly evident from these claims. Firstly, I consider that both claims implicitly discriminate between the presence of water and the presence of the hydrate inhibitor as part of the output determination. Secondly, I consider that claim 1 implicitly includes the correction step of claim 9. This is because I consider claim 1 requires the use of all three bands as part of the output determination.

22. In particular the request discusses paragraph 40 of the original application, which the applicant had asserted during prosecution as providing support for that phrase. I reproduce below paragraphs 39 and 40 of the description as I believe both should be read together:

> *[0039] As described heretofore, embodiments of the invention enable three phase fraction measurements (oil, water, gas) when the flow stream is gas*

continuous with dispersed liquid (flow regime iii). Furthermore, the flow stream can contain an injected chemical such as methanol to act as a hydrate inhibitor. The chemical may be miscible in both the hydrocarbon and aqueous phases.

[0040] Using n+1 wavelengths or more enables calculating the concentrations of n components even if one or more of the components are not in separate phases, such as the methanol. Based on the teachings herein, the absorption coefficients must not be identical for any two components over the n+1 wavelengths. For water and methanol (or other alcohols), selection of 1450nm and 1950nm for analysis insures different absorption coefficient sets.

23. The request firstly argues that paragraph 40 requires, at each wavelength band, the absorption coefficient must be different for each component and for each component, the absorption coefficient be different at each band. They say this is different to the phrase in the claim, that only requires the absorption coefficients for two components (water and a hydrate inhibitor) are different at each of two water absorbent wavelength bands; Therefore the claim says something different.

24. I consider that the teaching of paragraph 40 is that to discriminate components, there needs to be sufficiently different absorption coefficients at each band to provide the required selectivity and sensitivity. This seems to me to be consistent with the rest of the description as filed. I note that it is also consistently said in the description of the various embodiments that the extra measurement band is there to provide for correction for non-wavelength dependant absorption. Thus I think the skilled reader would understand that the extra corrective band should not strongly select for any of the components being measured. I do not think the skilled reader would understand paragraph 40 to be saying the corrective band should also have significantly different absorption coefficients for each component. The skilled reader is taught in general that the corrective band should have relatively low absorption for all of the components being measured.

25. The patent is directed to detecting water, a single component, and (implicitly) to discriminating water from a hydrate inhibitor, effectively a second component. This is described in more detail later in paragraphs 42 onwards of the application. I consider the skilled reader would understand that the corrective measurement band is the water transmissive band of the claims. Thus the claims refer to 3 bands which is consistent with at least the requirement for having n+1 bands, where n=2 here.

26. I agree that the claim does not explicitly mention what the absorbance of this third corrective band is for the hydrate inhibitor. I consider that the skilled reader understands that the water transmissive band of the claims should be useable for the non-wavelength dependant correction and I think it is implicit that they would need to select it to also be substantially transmissive for the hydrate inhibitor. From the application as filed, it is implicit that, when considering both water and methanol, that the water transmissive measurement band would also need to be relatively transmissive for methanol.

27. I conclude that the claimed invention is not inconsistent with the teaching of paragraph 40. I do not think that the skilled reader of the granted claims is therefore

told anything new over that of the application as filed with regard to the wavelength bands.

28. Secondly, the request argues that the use of the term '*a hydrate inhibitor*' itself is unacceptably broader than the disclosure of paragraph 40, which is directed to '*methanol (or other alcohols)'* . The request makes two points: firstly not all alcohols would act to inhibit the formation of hydrates; Secondly, hydrate inhibition can be achieved in ways other than by use of alcohols. The request notes some salts can inhibit hydrate formation, *'..as well as anti-agglomerants or kinetic inhibitors'*.

29. I agree that the phrase 'a hydrate inhibitor' must at least be construed as broader than just the use of methanol. I also agree that no other specific examples are given in the application as filed. The only other relevant part of the patent appears to be paragraph 0004 which says :

> *[0004] …Therefore, injection of methanol as an exemplary hydrate inhibitor…*

Thus, the skilled reader of the application as filed is told methanol is only an example hydrate inhibitor and that at least some alcohols other than methanol might be used. There is no guidance given as to which alcohols might or might not be suitable. I also note the end of paragraph 44 which says :

> *Absorption characteristics associated with H-O-H molecular bending occur at around 1950 nm such that water absorbs light in the fifth wavelength band 609. In addition, absorption characteristics due to O-H stretching occur at around 1450 nm such that both water and methanol absorb light in the second wavelength band 605.*

The skilled reader would understand from this that similar O-H bonds in other alcohols might also produce a similar absorption in the 1450mn band, and thus produce a similar problem to the presence of methanol, and that this might be mitigated in the same way.

30. I do not think the original application teaches any type of hydrate inhibitor other than alcohols. Nor does the application teach of any measurement problems with regard to water, other that that with the 1450mn band.

31. The key question here is not just, is the amended claim broader, but does the broader claim result in the skilled reader being told something new ? This issue has been addressed a number of times in the courts. In *A.C. Edwards v Acme Signs and Displays*[2] the Court of Appeal found that, while a granted claim had been broadened to have a scope which would cover alternative arrangements not disclosed in the original application, the claim did not disclose those arrangements and thus there was no added information.

32. The request does not go into more detail, but I think the argument is in part that the broader, more general term used in the claim discloses either, the use of any type of alcohol or the use of non-alcohol inhibitors.

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[2] A.C. Edwards v Acme Signs and Displays, 1992 , RPC No.7 p131

33. However, in my opinion the skilled reader of the patent is not told anything new about what type of alcohols are or are not suitable for use as a hydrate inhibitor, nor are they told what other compounds might be suitable. Further, I do not think the skilled reader is told anything new about other possible 'interference effects' that might disrupt the water absorption measurement.

34. Therefore I am of the opinion that the use of 'a hydrate inhibitor' in claims 1 or 9 does not disclose anything new and thus does not add matter.

35. The request finally argues that there was no support for the removal of '*both of*' from claim 1, which had previously stated *'…based on attenuation of both of the wavelength bands.'*. The request notes that during prosecution, the applicant did not explicitly state how this was supported. The request also notes that paragraph 0029 states *'…a minimum of two frequencies are therefore required to solve for Cw…'*.

36. It is unclear to me what the requestor thinks the amended claim actually means now. It maybe that they consider that a feature has now been omitted from the claim, however it is my opinion that this is not the situation here. Rather claim 1 should be construed to mean that all three of the wavelength bands are used to determine the presence of water, that is both of the absorbent water bands and the transmissive band. I think the skilled reader would construe the above passage as meaning ''…based on attenuation **of each** of the **three** wavelength bands.". Given this construction, I do not find that removal of the words 'both of' from claim 1 adds matter.

Conclusion

37. It is my opinion that the granted claims do not comprise added matter and are not invalid on that basis.

38. I decline to issue an opinion on the lack of Novelty or Inventive Step in the light of the prior art document GB 2423817 A.

Application for review

39. 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.

Gareth Lewis
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.