

**OPINION UNDER SECTION 74A**

Patent	EP 2156014
Proprietor(s)	FMC Kongsberg Subsea AS
Exclusive Licensee	
Requester	Protector IP Consultants AS
Observer(s)	
Date Opinion issued	02 May 2018

**The request**

1. The comptroller has been requested to issue an opinion as to whether claims 1 to 4 and 9 of EP 2156014 ("the patent") are novel and inventive in light of a number of prior art patent documents.
2. Observations have been filed by Novagraaf UK on behalf of the proprietor and observations in reply have been filed by the requester.

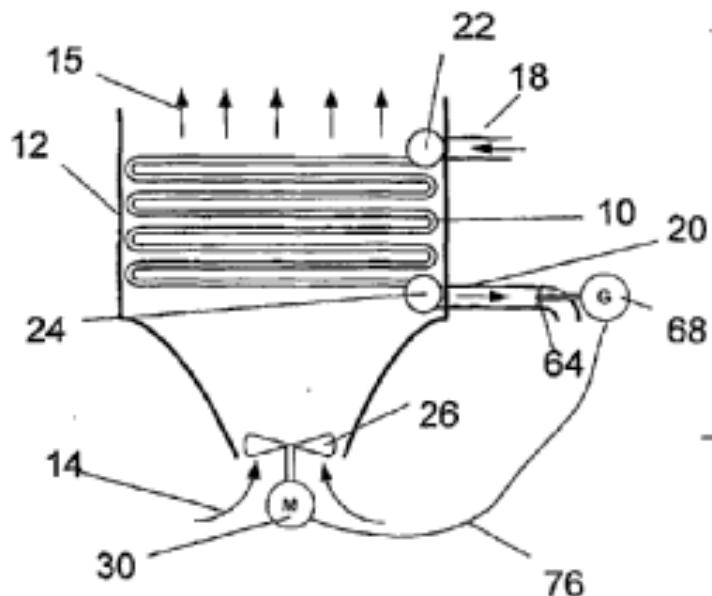
**Preliminary matters**

3. The request submits that, should I be of the opinion that any feature in any of claims 1 to 4 or 9 demonstrates novelty over the cited prior art, then "none of such features involve an inventive step". There is little or no argument in the request to support this submission and the observations and observations in reply do not touch upon inventive step. In the absence of an argument in the request I do not feel that I am in a position to provide an opinion on inventive step and I will restrict this opinion to novelty. Since documents D4 and D5 are only discussed in the request in the context of inventive step, it follows that I will not consider them in this opinion.
4. The request goes on to "respectfully request permission to discuss obviousness of such features later". The opinion process does not allow for such later discussion, beyond observations and observations strictly in reply. The requester is of course free to request a further opinion on the issue of obviousness.
5. In their observations in reply the requester includes a number of quotes from various documents brigaded together into what they term document D6. The quotes are intended to bolster an argument on the construction of the term coil. Whilst it is true that the quotes are provided in response to the observations from the proprietor it is

also true that the opinions process provides the proprietor with no opportunity to comment on observations in reply and hence on the relevance of these quotes. In the absence of such an opportunity it seems unreasonable for me to place much, if any, weight upon this document. I have however considered it below.

## The patent

6. Entitled "Subsea cooler" the patent results from an application under the Patent Cooperation Treaty filed on 2 June 2008 with a priority date of 1 June 2007 by virtue of a Norwegian patent application. It was granted with effect from 30 May 2012 and remains in force in the UK.
7. Quoting from the preamble of the patent, the invention is concerned with "cooling a hot fluid as a fluid stream produced from one or more subsea wells, flowing through a pipe by using the surrounding seawater as a cooling medium". Several embodiments are described and illustrated, the first of which is shown in figure 3:



**Fig. 3**

8. This embodiment includes a piping arrangement 10 with an inlet 18 for hot fluid, an outlet 20 for cooled fluid and a number of coils which are enclosed in a duct 12 and exposed to a flow of seawater generated by a propeller 26 driven by an actuator 30. Much of the discussion in the patent refers to the fluid being a gas stream, but it is made clear that it may be another fluid.

## **Claim construction**

9. Before considering the documents put forward in the request I will need to construe the claims of the patent following the well known authority on claim construction which is *Kirin-Amgen and others v Hoechst Marion Roussel Limited and others* [2005] RPC 9. This requires that I put a purposive construction on the claims, interpret it in the light of the description and drawings as instructed by Section 125(1) and take account of the Protocol to Article 69 of the EPC. Simply put, I must decide what a person skilled in the art would have understood the patentee to have used the language of the claim to mean.

10. Section 125(1) of the Act states that:

*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.*

11. The Protocol on the Interpretation of Article 69 of the EPC (which corresponds to section 125(1) ) states that:

*Article 69 should not be interpreted in the sense that the extent of the protection conferred by a European patent is to be understood as that defined by the strict, literal meaning of the wording used in the claims, the description and drawings being employed only for the purpose of resolving an ambiguity found in the claims. Neither should it be interpreted in the sense that the claims serve only as a guideline and that the actual protection conferred may extend to what, from a consideration of the description and drawings by a person skilled in the art, the patentee has contemplated. On the contrary, it is to be interpreted as defining a position between these extremes which combines a fair protection for the patentee with a reasonable degree of certainty for third parties.*

12. The patent includes independent apparatus and method claims which share an inventive concept.

13. Apparatus claim 1 reads as follows:

*1. A subsea cooling unit having a piping arrangement (10) with an inlet (18) for a hot fluid stream produced from one or more subsea wells, and an outlet (20) for cooled fluid, the piping arrangement comprising a number of coils exposed to seawater for cooling of the hot fluid, and means for generating a flow of seawater past the coils, wherein the means for generating the flow of seawater comprises a propeller (26, 27, 44) rotated by a rotatable actuator (30, 42, 29) and that the cooler is enclosed in a duct (12).*

14. Dependent claims 2 to 4 read as follows:

*2. Cooling unit according to claim 1, characterized in that the duct (12) has an inlet (11) with reduced diameter and the propeller (26, 27, 44) is located in the inlet.*

3. *Cooling unit according to claim 1, characterized in that it comprises a controller (34).*

4. *Cooling unit according to claim 1, characterized in that the actuator is an electric motor (30) and that it comprises a power cable (36) extending from a remote location.*

15. Independent method claim 9 reads as follows:

9. *Method for subsea cooling of at least a part of a fluid stream produced from one or more subsea wells, where at least a part of the fluid is guided into an inlet (18) and through a number of coils arranged in a duct (12), and then through an outlet (20), where the coils are exposed to seawater for heat exchanging with the fluid, where the seawater is driven past the coils arranged in a duct by a propeller (26, 27, 44).*

16. Unlike claim 1, claim 9 makes no reference to a piping arrangement or a rotatable actuator. However, this seems to me to be a distinction between the independent claims without any meaningful difference.
17. The opinion request does not formally construe the claims although a number of points of construction arise in the request and in the observations and observations in reply. The first such issue in the request is regarding “*a number of coils*” which the requester asserts must include one coil. This seems reasonable to me and is not explicitly disputed by the proprietor.
18. There also arises a question of how the term coil should be construed in this context. Implicit in the request is that coil can be taken to mean a straight length of pipe since this is what is shown in the first of the prior art documents upon which the request relies. The observations from the proprietor strongly deny this, referring to a definition from the Oxford dictionary online that a coil is a length of something wound in a joined sequence of concentric rings. The proprietor further points to the drawings in the patent which they say clearly do not show a straight length of pipe and still further to the term having an unspecified “general meaning” other than a straight pipe and that a skilled person would understand this. In response the requester argues that in fact the drawings show a serpentine configuration rather than concentric coils and that in the drawings parts of the coils are indeed straight pipes (see figure 3 above). They go on to argue that it is the wording of the claims with which we are concerned and not the drawings. Furthermore according to a “quick search on Internet” the requester asserts that “in this technical field, the term “coil” is used for any fluid conducting pipe that is used in heat exchangers, including “concentric rings”, but also including straight pipes”.
19. According to *Kirin-Amgen* I am cautioned against too heavy a reliance on dictionary definitions. It seems to me that I should exercise similar caution in relying on material found on the internet. To restate the issue: I must decide what a person skilled in the art would have understood the patentee to have used the language of the claim to mean. It seems to me that there is little in the patent to assist my construction of the term coils as used in the claims and relatively little detail is included regarding the coils in the embodiments. Indeed paragraph 0014 states “The piping arrangement of the cooler is not shown in detail since such coil systems

are well known to those skilled in the art and such persons will be able to determine the number and size of pipes necessary for maximum efficiency, i.e. the amount of cooling desired.". In the embodiments the piping arrangement is located in a duct 12 whose inlet 11 has a reduced diameter. This might imply that the duct itself has a diameter and hence a circular cross section. This however tells me nothing about the form of the piping arrangement within the duct and in any event only concerns embodiments of the invention. The drawings are of course figurative and not intended to define absolutely the form and dimensions of the embodiments. What is shown in e.g. figure 3 above could be a serpentine arrangement of straight pipes joined by tight bends, but could just as well be a rendition of a series of concentric circular coils closely conforming to the inside wall of a circular duct. I do note however that the patent refers to both coils and to pipes and piping, even doing so in claim 1. Had the patentee meant the piping arrangement to simply comprise a number of pipes it seems to me likely that he would have used exactly that term rather than to specify coils. It seems to me therefore that a skilled person would understand that the choice of the term coil is intended to convey some meaning over and above any pipe of a suitable form. To my mind that meaning is a curved or circular coil since I believe that is what a person skilled in the art would understand, absent any special meaning to be attached to the term in the particular context of the patent.

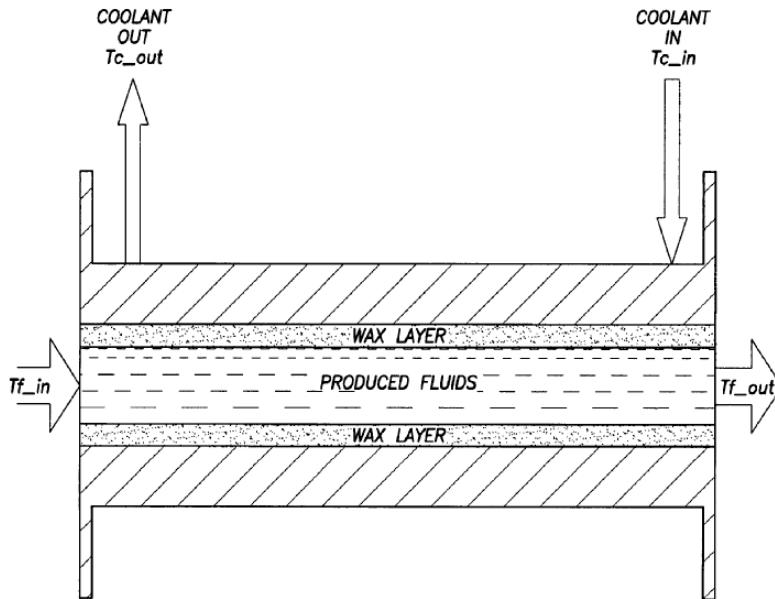
20. Despite my caution over considering the quotes provided by the requestor in document D6, for completeness I can say that my construction of the term coil does not change in their light. All of the quotes in D6 refer to "straight coils", "bend coils" (sic) or "helical coils". This suggests to me that in the art or arts from which these documents derive the term coil is qualified by straight, helical, etc. where a special meaning is intended. In fact most of the quotes seem to use both qualifying terms and in their own context they presumably have a need to distinguish between straight and helical forms. In the context of the patent by contrast there is no need to distinguish between different forms and I believe that no special meaning of coil is intended. Hence my view remains that coil in the claims should be taken to mean a curved or circular coil. I note that from the isolated quotes I am unable to gauge if indeed the quotes in D6 are concerned with the same technical field as the patent and as I noted before the proprietor has had no opportunity to comment on this or any other aspect of D6.
21. Where the claims require a propeller the request construes this broadly to encompass a rotary pump. Once again the proprietor resists this construction and again quotes from the Oxford dictionary online. I find the quote rather unhelpful since it refers to a device for propelling boats and aeroplanes. Whatever propeller might mean in the context of the patent, it is not concerned with propelling aircraft or watercraft. The patent provides relatively little guidance regarding the term propeller and consequently it seems to me that no special meaning should be attached to the term. I believe that the skilled man would understand it to mean a rotating body having a number of separate blades or vanes attached to a hub, which blades may or may not be joined at their outer extremities. I do not believe that the skilled man would understand the term to encompass any or all rotary pumps.
22. According to the request the term duct can be taken to mean an outer pipe within which coolant flows. The proprietor argues that a duct would be "more open" than

the request argues and would allow a flow of seawater even absent the propeller. It seems to me that the duct is essentially functionally defined as an enclosure for the piping arrangement through which encloses the flow of seawater generated by the propeller is guided. In some arrangements it seems to me that a pipe might meet this functional definition. I do not feel however that I can simply say that duct and pipe are synonymous in the context of the patent. I note that in paragraph 0016 it is stated that “the duct may form part of a closed system for the cooling fluid”, which might point towards a duct in the form of a pipe. However, paragraph 0016 goes on to state that “The cooling fluid may thereby be another fluid than seawater.”. This seems at odds with claim 1 in which the cooling fluid envisaged is clearly seawater and suggests that the closed system described may not embody the invention claimed.

23. One minor point made in the request is that claim 1 requires “the cooler” to be enclosed in a duct, but the claim makes no previous mention of a cooler. However, from the patent specification as a whole it seems that cooler and cooling unit are used interchangeably and indeed paragraph 0014 begins “*In Fig. 1 there is shown a cooling unit, or called a cooler, ...*”.

## Novelty

24. The request alleges that claims 1 to 4 and 9 are anticipated by documents D1 to D3 and I shall deal with each document in turn.
25. D1 or US 2006/0175063 concerns maintaining flow in a subsea pipeline and includes a heat exchanger arrangement as shown in figure 1:



*FIG. 1*

26. This represents a forced convection heat exchanger. Although not clearly shown in the figure the heat exchanger may comprise an inner pipe for the produced fluids surrounded by an outer pipe through which coolant flows. The coolant may be seawater and it may be pumped.

27. In terms of the requirements of claim 1, US 2006/0175063 discloses a subsea cooling unit having a piping arrangement with an inlet for a hot fluid stream and an outlet for cooled fluid. There is no suggestion that the piping arrangement is formed from coils as I have construed the term, although the coolant is seawater. Whilst the coolant may be pumped, as the request acknowledges, there is no disclosure of a propeller. The request however alleges that by virtue of the reference to a pump, a propeller is implicitly disclosed, as is a rotatable actuator. The term propeller as I have construed it is not synonymous with rotary pump and strictly speaking US 2006/0175063 only refers to a pump, remaining silent on whether it is a rotary pump. Consequently I do not accept that there is an implicit disclosure of a propeller and rotatable actuator in US 2006/0175063. The piping arrangement or inner pipe described in US 2006/0175063 is arranged in an outer pipe through which coolant flows, which forms a duct as I have construed the term. Since neither coils nor a propeller are disclosed in US 2006/0175063, claims 1 and 9 are not anticipated by US 2006/0175063 and it follows that dependent claims 2 to 4 cannot be anticipated.
28. D2 or US 2005/0220645 is concerned with a pumping system for a subsea production flow and figure 3 shows a cooling arrangement for a pump:

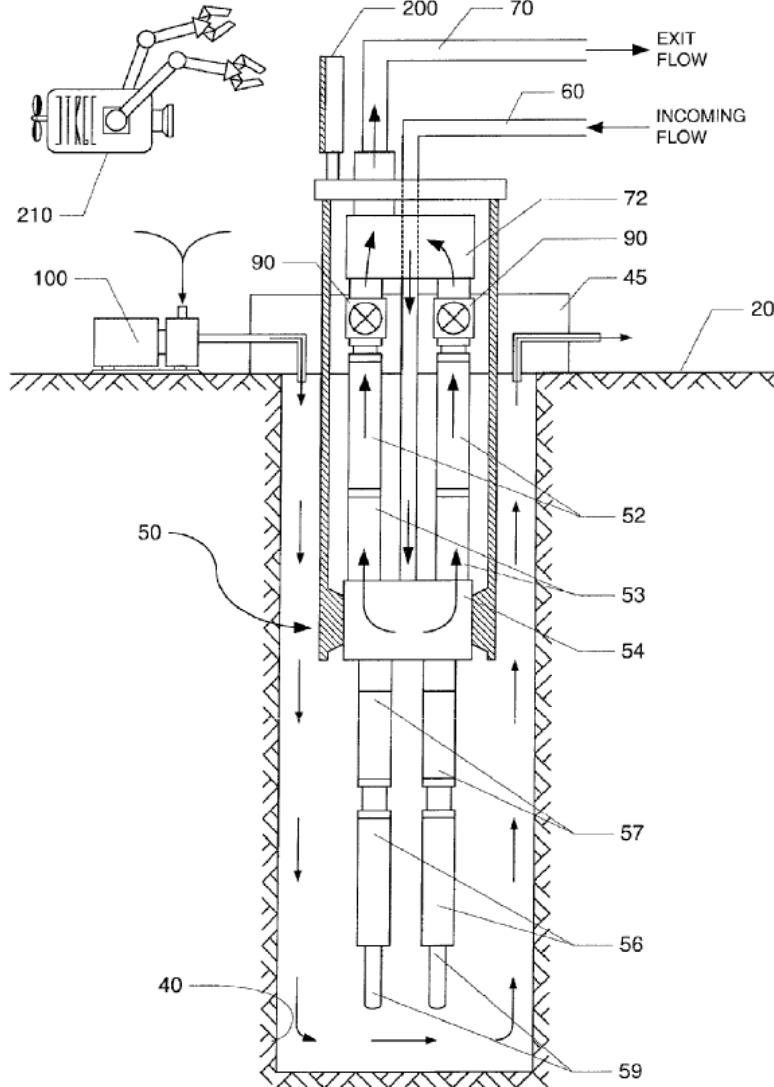
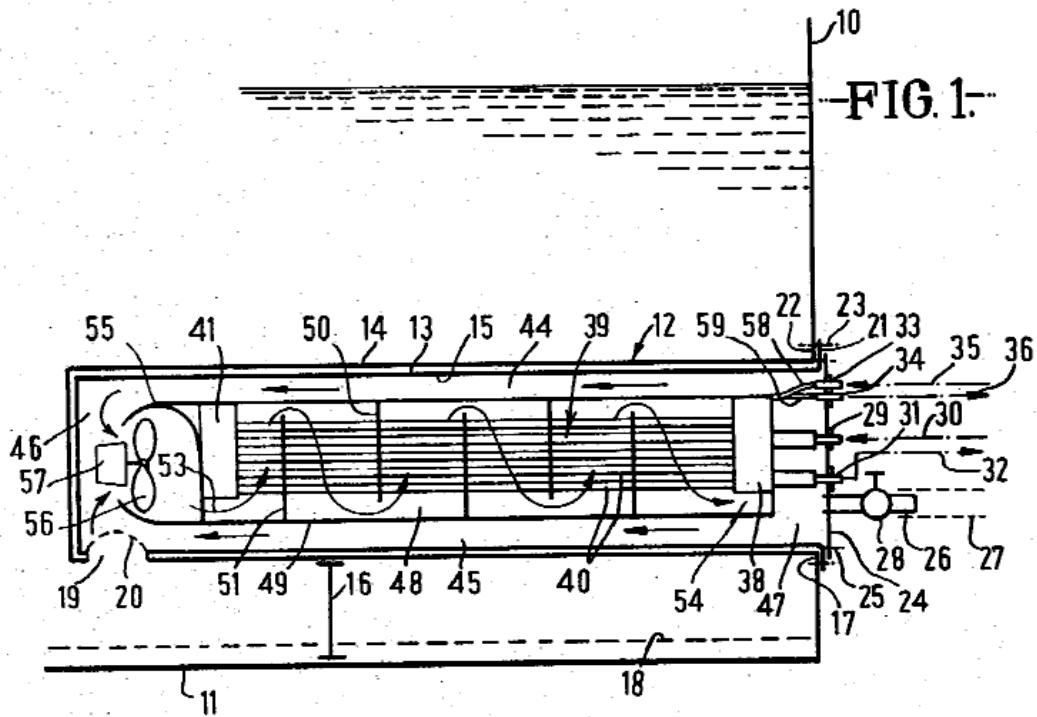


FIG. 3

29. This figure shows a dummy well 40 in which a motor 56 of a booster pumping system 50 is located. The dummy well 40 may be flooded with seawater which may be circulated by pump 100 for cooling the motor 56. The booster pumping system 50 has an outlet 70 and an inlet 60 connected to a production well, which is not shown in figure 3.
  30. In the language of the claims in the patent a subsea cooling unit is disclosed in US 2005/0220645. However, the disclosure is concerned with cooling a motor driving a pump rather than cooling the pumped fluid as in the patent. Whilst there is arguably a piping arrangement with an inlet and an outlet, it is questionable if there is a genuine disclosure of an inlet for hot fluid and an outlet for cooled fluid, since cooling of the fluid is not discussed. There is no disclosure of coils as I have construed the term, although the coolant for the motor is seawater and there is a means for generating a flow of seawater disclosed in the form of a pump. There is no detail of the pump shown in US 2005/0220645, not even that it might be a rotary pump, and hence there is no disclosure of a propeller or a rotatable actuator. In the absence of a disclosure of several of their essential features, claims 1 and 9 are not anticipated by US 2005/0220645 and nor are claims 2 to 4.
  31. D3 or US 3856078 is concerned with heating heavy oils stored within a stationary tank. Figure 1 shows a longitudinal section of a device within a tank:



32. A housing 12 is open to the tank at 19 and contains a heat exchanger 39 with an inlet 53, pump rotor 56, driven by hydraulic motor 57, and an outlet 54. Steam is fed through a series of branch pipes 40 via nipples 29 and 31 in order to heat the oil surrounding the pipes 40 within the heat exchanger.
  33. There is no suggestion in US 3856078 that the device disclosed is a cooling unit or is in any way associated with a subsea environment. According to the request in effect any heat exchanger forms both a heating unit and a cooling unit and the reference to

subsea in the claims "does not give any limiting meaning to the claimed scope". I am not confident that I can agree with these propositions, but in the event nothing turns on them. The device shown in US 3856078 has a piping arrangement with an inlet for hot fluid and an outlet for cooled fluid. The fluid in question is steam for heating oil in a tank and is not "produced from one or more subsea wells". One might argue that an inlet or outlet suitable for steam would also be suitable for fluid from a subsea well, especially given that the fluid is most likely to be gas, but the request seems to be silent on the point. The piping arrangement shown in US 3856078 comprises a series of parallel pipes leading from a distribution box 38 to a collecting box 41. The pipes do not form a number of coils as I have construed the term coil. The pipes are not exposed to seawater, although they are arguably suitable for such exposure. A flow of oil rather than seawater is generated by the pump rotor 56, which appears to be a propeller, driven by a motor or rotatable actuator 57 and the device is enclosed in a duct or outer jacket 49. It seems to me that even giving the requester the benefit of the doubt over cooling unit versus heating device, the significance of a subsea location, the suitability of steam pipes to carry fluid from a subsea well, etc. there is no disclosure of coils as I have construed the term. I should add that I do not mean that the requester should receive the benefit of the doubt, I offer no opinion on that question. In the absence of a disclosure of coils US 3856078 does not anticipate claims 1 or 9 and hence nor can it anticipate claims 2 to 4.

## Opinion

34. In my opinion the invention of claims 1 to 4 and 9 in the patent, EP 2156014, is novel over the disclosure in prior art documents US2006175063, US2005220645 and US3856078.

Karl Whitfield  
Examiner

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## 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.*