

United States Court of Appeals for the Federal Circuit

**TRANSOCEAN OFFSHORE DEEPWATER
DRILLING, INC.,**
Plaintiff-Appellant,

v.

MAERSK DRILLING USA, INC.,
Defendant-Appellee.

2011-1555

Appeal from the United States District Court for the Southern District of Texas in case no. 07-CV-2392, Judge Kenneth M. Hoyt.

Decided: November 15, 2012

CHARLES B. WALKER, JR., Fulbright & Jaworski L.L.P., of Houston, Texas, argued for plaintiff-appellant. With him on the brief was WARREN S. HUANG. Of counsel on the brief was JONATHAN S. FRANKLIN, of Washington, DC.

WILLIAM H. FRANKEL, Brinks Hofer Gilson & Lione, of Chicago, Illinois, argued for defendant-appellee. With him on the brief were ROY E. HOFER, DAVID H. BLUESTONE, DAVID P. LINDNER, and LAURA A. LYDIGSEN. Of counsel on

the brief was LEE L. KAPLAN, Smyser Kaplan & Veselka, L.L.P., of Houston, Texas.

Before PROST, MOORE, and WALLACH, *Circuit Judges*.
MOORE, *Circuit Judge*.

Transocean Offshore Deepwater Drilling, Inc. (Transocean) appeals from the decision of the U.S. District Court for the Southern District of Texas granting judgment as a matter of law (JMOL) that (1) the asserted claims of U.S. Patent Nos. 6,047,781 ('781 patent), 6,085,851 ('851 patent), and 6,068,069 ('069 patent) are invalid for obviousness and lack of enablement; (2) Maersk Drilling USA, Inc. (Maersk) did not infringe the asserted claims; and (3) Transocean was not entitled to damages. Transocean also appeals from the district court's conditional grant of a new trial. For the reasons set forth below, we *reverse*.

BACKGROUND

The patents-in-suit, which share a common specification, are directed to an improved apparatus for conducting offshore drilling. We described the process of offshore drilling in detail in our opinion resolving the first appeal in this case, and repeat this description only to the extent necessary for this appeal. *See Transocean Offshore Deepwater Drilling, Inc. v. Maersk Contractors USA, Inc.*, 617 F.3d 1296, 1301 (Fed. Cir. 2010) (*Transocean I*).

The process of creating a borehole in the seafloor requires lowering several components to the seabed from a derrick on the ocean surface. *Id.* These include the drill bit, the casings that form the wall of the borehole, and a device called a blowout preventer. *Id.* The components are lowered on a "drill string," which is made up of a series of pipe sections ("tubular members"). *Id.* The drill

string is assembled on the derrick, with pipe sections being added to the top of the string one by one to extend it to the seafloor. *Id.*

The drill bit is the first component to be lowered. *Id.* Once enough pipe sections have been added to the drill string to lower the drill bit to the seabed, a “top drive” on the derrick rotates the drill string to create a borehole. *Id.* Additional pipe sections are added to the drill string as the bit drills deeper into the seabed. *Id.* Once the drill creates a portion of the borehole, the derrick retracts the drill bit to the surface, removing each section of the drill string piece by piece. *Id.* A section of casing is then lowered into the borehole, with the drill string again being constructed on the derrick, one pipe section at a time. *Id.* The next step is lowering the blowout preventer to the seabed, again with the drill string being assembled piece by piece. The process of drilling and lowering casing into the borehole then repeats until the hole is the desired depth. *Id.* Each time a component is lowered to the seafloor, a drill string must be assembled and disassembled.

Conventional drilling rigs use a derrick with a single drawworks and thus can only raise or lower one component at a time. *Id.* Transocean sought to improve the efficiency of this time-consuming process using the “dual-activity” drilling apparatus disclosed in the patents-in-suit. The patents recite a derrick with both a main and an auxiliary advancing station, each of which can separately assemble drill strings and lower components to the seafloor. *See, e.g.,* ’781 patent col.3 ll.27-32, 58-67, col.7 ll.22-64. Each advancing station has a drawworks for raising and lowering the drill string and a top drive for rotating the drill string. *Id.* col.8 ll.16-24. While the auxiliary advancing station drills and cases the first portion of the borehole, the main advancing station lowers

the blowout preventer. *Id.* col.8 ll.66-col.9 l.2, col.9 ll.21-23. The auxiliary advancing station then retracts the drill string and supports the main advancing station by preparing lengths of drill string in advance. *Id.* col.9 ll.25-30. Transocean's patents disclose a pipe handling system, also called a transfer assembly, which allows the transfer of casing, drill string, and other components between the two advancing stations and from the advancing stations to storage areas. *Id.* col.7 ll.22-64.

Transocean asserted claims 10-13 and 30 of the '781 patent, claim 10 of the '851 patent, and claim 17 of the '069 patent against Maersk. Transocean alleged that Maersk infringed the claims by entering into a contract with Statoil Gulf of Mexico LLC (Statoil), which granted Statoil the right to use an allegedly infringing drilling rig. *Transocean I*, 617 F3d at 1307. In *Transocean I*, the district court granted Maersk's motion for summary judgment of obviousness, concluding that the asserted claims would have been obvious over the combination of two prior art references: U.K. patent application GB 2 041 836 (Horn) and U.S. Patent No. 4,850,439 (Lund). *Id.* at 1303. The district court also granted Maersk's motion for summary judgment that the asserted claims were not enabled because the specification does not adequately describe the claim limitations relating to the pipe transfer assembly. *Id.* at 1305-06. Finally, the court granted summary judgment of noninfringement in favor of Maersk. *Id.* at 1307-08.

On appeal, we vacated the district court's grant of summary judgment of noninfringement and reversed its grant of summary judgment of invalidity for obviousness and lack of enablement. *Transocean I*, 617 F.3d 1296. On remand, a jury found that Maersk failed to prove that the asserted claims would have been obvious or that they

were not enabled.¹ The jury made specific findings that the prior art failed to disclose every element of the asserted claims and that each of seven objective factors indicated nonobviousness. The jury also found that Maersk infringed and awarded \$15 million in compensatory damages. The district court, however, granted Maersk's motions for judgment as a matter of law (JMOL) that the asserted claims are invalid as obvious and not enabled, that Maersk did not infringe, and that Transocean is not entitled to damages. The court also conditionally granted Maersk's motion for a new trial under Federal Rule of Civil Procedure 59. Transocean now appeals from these rulings. We have jurisdiction under 28 U.S.C. § 1295(a)(1).

DISCUSSION

We review a district court's grant or denial of JMOL under the law of the regional circuit. *ACCO Brands, Inc. v. ABA Locks Mfr. Co.*, 501 F.3d 1307, 1311 (Fed. Cir. 2007) (citation omitted). The Fifth Circuit reviews the grant or denial of JMOL *de novo*. *Med. Care Am., Inc. v. Nat'l Union Fire Ins. Co.*, 341 F.3d 415, 420 (5th Cir. 2003). JMOL is appropriate only if "the facts and inferences point so strongly and overwhelmingly in favor of one party that the Court believes that reasonable men could not arrive at a contrary verdict." *Id.* (quotation omitted). We have interpreted the Fifth Circuit's JMOL standard to mean that the jury's determination must be supported by substantial evidence. *ACCO Brands*, 501 F.3d at 1312. Substantial evidence is "such evidence as a reasonable mind might accept as adequate to support a conclusion." *Consol. Edison Co. v. NLRB*, 305 U.S. 197, 229 (1938). In determining whether a jury's finding is

¹ Claim 17 of the '069 patent and claim 13 of the '781 patent were submitted to the jury.

supported by substantial evidence, “we must presume that the jury resolved all factual disputes in favor of the prevailing party.” *Cordis Corp. v. Boston Scientific Corp.*, 658 F.3d 1347, 1357 (Fed. Cir. 2011) (quoting *Akamai Techs., Inc. v. Cable & Wireless Internet Servs., Inc.*, 344 F.3d 1186, 1192 (Fed. Cir. 2003)).

I. Obviousness

A patent is invalid as obvious “if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” 35 U.S.C. § 103(a). Obviousness is a question of law with several underlying factual inquiries: (1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; (3) the level of ordinary skill in the field of the invention; and (4) objective considerations such as commercial success, long felt but unsolved need, and the failure of others. *Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 17-18 (1966); *see also KSR Int’l Co., v. Teleflex, Inc.*, 550 U.S. 398, 406 (2007). Patent invalidity must be established by clear and convincing evidence. *Microsoft Corp. v. i4i Ltd.*, 131 S. Ct. 2238, 2242 (2011).

A. Prima Facie Case

As an initial matter, Maersk argues that our opinion in *Transocean I* establishes that, as law of the case, the Horn and Lund references make out a prima facie case of obviousness. Maersk thus contends that the district court erred on remand by allowing the jury to consider whether Horn and Lund teach every limitation of the asserted claims. Transocean counters that, because it presented objective evidence of nonobviousness, the district court

was required to let the jury decide all the factual questions underlying the obviousness inquiry, including whether the prior art discloses every limitation of the asserted claims.

Under the law of the case doctrine, a court adheres to its decision in a prior appeal absent exceptional circumstances. *See, e.g., Ormco Corp. v. Align Tech., Inc.*, 498 F.3d 1307, 1319 (Fed. Cir. 2007). This doctrine “is limited to issues that were actually decided, either explicitly or by necessary implication.” *Toro Co. v. White Consol. Indus., Inc.*, 383 F.3d 1326, 1335 (Fed. Cir. 2004). The scope of the mandate includes those issues within the scope of the judgment appealed, minus those explicitly reserved or remanded. *Engel Indus., Inc. v. Lockformer Co.*, 166 F.3d 1379, 1383 (Fed. Cir. 1999). We review a district court’s interpretation of our mandate *de novo*. *Tronzo v. Biomet, Inc.*, 236 F.3d 1342, 1346 (Fed. Cir. 2001).

In *Transocean I*, we expressly held that the Horn and Lund references teach every limitation of the asserted claims. 617 F.3d at 1303. Claim 17 of the ’069 patent, which is exemplary of the claims at issue on appeal, recites:

A multi-activity drilling assembly operable to be supported from a position above the surface of a body of water for conducting drilling operations to the seabed and into the bed of the body of water, said multi-activity drilling assembly including:

a drilling superstructure operable to be mounted upon a drilling deck for simultaneously supporting drilling operations for a well and operations auxiliary to drilling operations for the well;

a first tubular advancing station connected to said drilling superstructure for advancing tubular members to the seabed and into the bed of body of water;

a second tubular advancing station connected to said drilling superstructure for advancing tubular members simultaneously with said first tubular advancing station to the seabed and into the body of water to the seabed; and

an assembly positioned adjacent to said first and second tubular advancing stations operable to transfer tubular assemblies between said first tubular advancing station and said second tubular advancing station to facilitate simultaneous drilling operations auxiliary to said drilling operations, wherein drilling activity can be conducted for the well from said drilling superstructure by said first or second tubular advancing stations and auxiliary drilling activity can be simultaneously conducted for the well from said drilling superstructure by the other of said first or second tubular advancing stations.

'069 patent claim 17 (emphases added).

As we explained in *Transocean I*, Horn discloses a drilling rig with a single derrick that supports two advancing stations, each of which can advance tubular members to the seabed. *Id.* Although Horn fails to disclose a pipe transfer assembly that can move tubular members between the two advancing stations, Lund teaches this limitation. *Id.* We also explained that Horn provides a motivation to combine the teachings of these two references to arrive at the claimed invention, stating

that “[o]f other obvious advantages, there is the possibility of concentrating common auxiliary equipment” Horn p. 1 ll.119-21. We concluded that these references “present a *prima facie* case of obviousness.” *Transocean I*, 617 F.3d at 1304. *Transocean I* thus establishes as law of the case that Horn and Lund teach every limitation of the asserted claims and provide a motivation to combine their respective teachings. It was thus erroneous for the district court to permit the jury to engage in fact finding regarding whether Lund and Horn disclose all of the claim elements.

The establishment of a *prima facie* case, however, is *not* a conclusion on the ultimate issue of obviousness. By definition, the existence of a *prima facie* case simply means that the party challenging a patent has presented evidence “sufficient to establish a fact or raise a presumption [of obviousness] unless disproved or rebutted.” Black’s Law Dictionary (9th ed. 2009). The *prima facie* inquiry is based on the first three *Graham* factors—the scope and content of the prior art, the differences between the prior art and the claims, and the level of ordinary skill in the art—which the Supreme Court described as the background against which the obviousness or nonobviousness of the subject matter is determined. 383 U.S. at 17. A party is also free to introduce evidence relevant to the fourth *Graham* factor, objective evidence of nonobviousness, which may be sufficient to disprove or rebut a *prima facie* case of obviousness. See *Mintz v. Dietz & Watson, Inc.*, 679 F.3d 1372, 1378-79 (Fed. Cir. 2012).

As we have repeatedly held, “evidence rising out of the so-called ‘secondary considerations’ must always when present be considered en route to a determination of obviousness.” *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538 (Fed. Cir. 1983). Objective evidence of nonobviousness is an important component of the obviousness

inquiry because “evidence of secondary considerations may often be the most probative and cogent evidence in the record. It may often establish that an invention appearing to have been obvious in light of the prior art was not.” *Id.* This objective evidence must be “considered as part of all the evidence, not just when the decisionmaker remains in doubt after reviewing the art.” *Id.* at 1538-39. Thus, in order to determine obviousness, the decisionmaker must be able to consider all four Graham factors. Although we held in *Transocean I* that Maersk presented a prima facie case of obviousness, it was not error to allow the jury to consider the strength of that prima facie case in making the ultimate determination of obviousness. When the ultimate question of obviousness is put to the jury, the jury must be able to review all of the evidence of obviousness. *Id.* Hence it was not error for the court to allow the jury to weigh the strength of the prima facie case together with the objective evidence in order to reach a conclusion on the ultimate question of obviousness.

B. Objective Evidence

Although we held in *Transocean I* that Horn and Lund establish a prima facie case that the asserted claims would have been obvious, we reversed the district court’s grant of summary judgment because the court failed to consider Transocean’s objective evidence of nonobviousness. 617 F.3d at 1304. On the summary judgment record, Transocean presented evidence of industry praise, commercial success, industry skepticism, and copying. *Id.* at 1305. We stated that, “[i]f all of the factual disputes regarding the objective evidence resolve in favor of Transocean, it has presented a strong basis for rebutting the *prima facie* case” of obviousness. *Id.*

On remand, the jury made express findings on seven types of objective evidence of nonobviousness: commercial success, industry praise, unexpected results, copying, industry skepticism, licensing, and long-felt but unsolved need. J.A. 8062. The jury found that each of these considerations supported the nonobviousness of Transocean's claims. *Id.* In granting Maersk's motion for JMOL of obviousness, however, the district court concluded that the record evidence fails to support these findings. J.A. 5-7. We disagree. As detailed below, Transocean presented substantial evidence from which a reasonable jury could find that each of the seven objective factors supports the nonobviousness of Transocean's claims.

1 Commercial Success

The district court rejected the jury's finding that commercial success supports nonobviousness. The court found that sales of Transocean's dual-activity rigs are "due primarily to various litigation[s]," and thus they "are not a result of a free market." J.A. 5-6. The court also found that, at the time Transocean's patents issued, the drilling industry was "fully aware of the possibilities of a dual string rig as prior art" and that Transocean's patent application on this technology had been rejected in Europe as lacking inventiveness. J.A. 5. Maersk contends that Transocean failed to tie its commercial success evidence to the claimed combination of two advancing stations with a pipe transfer assembly. Maersk also argues that unclaimed features of Transocean's rigs, such as increased size and capacity, are responsible for any commercial success.

As an initial matter, the district court erred by considering proceedings before the European Patent Office in its commercial success analysis. Transocean needed to show both commercial success and that a nexus exists

between that success and the merits of the claimed invention. *See Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1324 (Fed. Cir. 2004). It is irrelevant to the commercial success analysis, however, that a foreign patent office rejected Transocean's patent application on the dual-activity technology. The district court's analysis seems to have been clouded by its view that the asserted claims would have been obvious over the prior art. This is precisely the sort of hindsight bias that evaluation of objective evidence is intended to avoid. *See, e.g., Graham*, 383 U.S. at 36.

Transocean presented sufficient evidence of both commercial success and nexus to the features of the claimed invention. It showed, for example, that its dual-activity drilling rigs commanded a market premium over single-activity rigs. Transocean points to two contracts it signed on the same day with Anadarko Petroleum Corporation, one for a dual-activity drilling rig and one for a single-activity rig. J.A. 6632-35; J.A.11862-64; J.A. 11929-31. Transocean charged a roughly 12% premium for the dual-activity rig. Transocean introduced other contracts that provided for reduced daily rates if the dual-activity feature on the rig was not available. *See, e.g.*, J.A. 12087-88; J.A. 12284-85; J.A. 12458. Transocean's damages expert, Mr. Bratic, testified that the average reduction in this circumstance is 10%. J.A. 6639.

Transocean also presented evidence that some customers expressly require dual-activity rigs. For example, a Maersk employee testified at trial that Maersk added dual-activity to its new drilling rig design based on market surveys showing customer demand for this feature. J.A. 6329-30. Testimony by Maersk's own employee shows that customers request the dual-activity feature specifically based on the efficiency gains it provides by "involving two well centers in drilling the wells." J.A.

6330-31. The Maersk employee stated that “[m]any operators do require dual activity . . . for flexibility and for improved efficiency.” *Id.* Maersk sought to “incorporate the same efficiency improvement features as used by our competition” by incorporating Transocean’s “dual-activity” technology, which Maersk distinguished from the “dual drilling” disclosed in the prior art. J.A. 10016-17. Transocean also offered testimony that dual-activity rigs account for an increasing percentage of the rigs sold and that they have become the industry standard. J.A. 6202.

From this evidence, a reasonable jury could conclude that Transocean’s dual-activity rigs have been a commercial success and that this success has a nexus to the features claimed in the patents. We thus conclude that substantial evidence supports the jury’s finding that commercial success weighs in favor of nonobviousness.

2 Industry Praise and Unexpected Results

The jury found that Transocean’s dual-activity rigs received industry praise and achieved unexpectedly superior results, and that these factors supported nonobviousness. The district court rejected the jury’s findings, reasoning that Transocean presented no statistical data to support these conclusions.

Maersk contends that any praise or unexpected and superior results are due to unclaimed features of Transocean’s rig or elements from the prior art. Maersk argues that Transocean’s evidence of praise for dual-activity rigs is no different from praise for the dual-drilling technology taught in the prior art. With dual-activity rigs, only one of two advancing stations actually drills, whereas dual-drilling involves using both advancing stations to simultaneously drill two wells.

We conclude that substantial evidence supports the jury's findings on industry praise and unexpected results. Transocean presented numerous documents showing industry praise for the unexpected increase in drilling efficiency made possible using Transocean's patented dual-activity technology. For example, Transocean cited a position paper written by a competitor stating that its own deepwater rig:

must, at the least, include the most effective drilling cost reductions achieved by the new deepwater units. . . . Drilling cost reduction through technology advances pushed forward by the deepwater demands are *typified by innovations such as Transoceans [sic] dual-derrick concept*, designed to enable continuous drilling, potentially improving productive time by 25% to 40%.

J.A. 11505 (emphasis added).

Transocean also relied on an article in *Offshore Magazine* stating that multi-functionality (i.e., dual-activity) is "critical to [the] future." J.A. 13370. This article specifically describes the features of Transocean's dual-activity rigs: "a modified derrick and drill floor will allow for the makeup of drillstring and bottom hole assemblies separate from the drilling line where other functions such as casing installation may be underway." *Id.* The article states that the dual-activity operation will "allow for 20-40% faster tripping of drillstrings." *Id.* Transocean cites a second *Offshore Magazine* article, which praises the development of Transocean's dual-activity drillship as one of the fifty key events or technologies in history that shaped the offshore drilling industry. J.A. 11595-97. The article notes the ability of the rig to reduce drilling time and costs by "conduct[ing] drilling operations simultaneously rather than sequentially via

two full capability drilling rigs.” *Id.* This is quite an impressive accolade, and the jury was free to credit it as such.

Additionally, one of the named inventors of the patents-in-suit, Mr. Scott, testified that industry members doubted whether the claimed dual-activity feature would increase drilling efficiency. J.A. 6047-49. BP, for example, doubted whether dual-activity would cut costs so it had its own efficiency engineers analyze one of Transocean’s dual-activity drilling rigs. *Id.* BP concluded that the rig could lead to even greater efficiency and cost savings than Transocean suggested. *Id.*

This is substantial evidence from which the jury could reasonably conclude that Transocean’s claimed dual-activity apparatus produced unexpected efficiency gains and that this benefit garnered praise in the drilling industry. Transocean’s evidence also links both the industry praise and the unexpected efficiency gains directly to the claimed dual-activity feature. The first Offshore Magazine article, for example, expressly attributes improved efficiency to a derrick that can prepare drill string *separate from the drilling line*, as described in Transocean’s patents. *See* J.A. 13370. This description clearly distinguishes Transocean’s dual-activity technology from the dual-drilling technology described in the prior art. *Id.* We conclude that the district court erred by determining that the jury lacked substantial evidence to find that industry praise and unexpected results support nonobviousness.

3 Copying

The district court failed to address the jury’s finding that copying of the claimed invention supported nonobviousness. Maersk argues that Transocean’s copying evidence is not tied to the novel features of its invention. We

disagree. Transocean points to an internal Maersk document stating “we have to incorporate the same efficiency improvement features as used by our competition,” and that “[t]his feature is generally described as ‘dual-activity.’” J.A. 10016. The Maersk document describes the features of dual-activity drilling, which it distinguishes from the “dual drilling” disclosed by Horn. J.A. 10016-17. The document states that Transocean’s drillships are probably the “best known examples of dual activity vessels.” *Id.*

Transocean also presented evidence that Maersk was aware of Transocean’s patents during the time Maersk was designing its accused rig. For example, a Maersk employee testified that he became aware of Transocean’s patents “early on in the design development phase” of building the accused rig. J.A. 6331. Another Maersk employee stated that he became aware of the patents-in-suit during the design of the accused rig, but concluded that the patents were “not necessarily something that could be seen as protected” based on the prior art. J.A. 6825-26; *see also* J.A. 6872-76. A third Maersk employee stated that Maersk discussed Transocean’s patents with customers in the United States and told them that Maersk did not infringe because the patents are invalid in view of the prior art. J.A. 6346-47.

This evidence shows that Maersk was aware of Transocean’s patents and its drillships embodying the patents while Maersk designed its accused rig. The evidence also shows that Maersk decided to incorporate the claimed dual-activity feature anyway because it believed Transocean’s patents were invalid over the prior art. Moreover, Maersk’s internal document expressly ties its copying to the novel “dual-activity” features of Transocean’s invention, which it distinguishes from the “dual

drilling” taught in the prior art. This is substantial evidence that supports the jury’s finding of copying.

4 Industry Skepticism

The jury found that industry skepticism supports nonobviousness. Although the district court admitted that “[i]t may be argued that a few in the market were skeptical,” the court nonetheless concluded that Transocean presented insufficient evidence of industry skepticism to support the jury’s finding. The court did not credit Transocean’s evidence that people in the industry were skeptical of dual-activity rigs due to fears of “clashing,” which occurs when the two drill strings collide with one another. The court reasoned that literature predating the filing of the patents-in-suit stated that concerns over clashing were unfounded. Maersk echoes this argument, pointing to a brochure by Horn dismissing concerns about clashing.

We conclude that the jury’s fact finding was supported by substantial evidence. Transocean proffered testimony regarding skepticism by two named inventors of the patents-in-suit, Mr. Scott and Mr. Herrmann. They testified that even though they personally did not believe clashing was a concern, industry experts and Transocean’s customers were skeptical of the claimed dual-activity feature due to fears of clashing. Mr. Herrmann recounted several occasions when industry experts stated that clashing would prevent dual-activity drilling from working, J.A. 6203-04, and he stated that some people are still concerned with clashing even today, J.A. 6206. Mr. Scott recounted similar experiences. *See, e.g.*, J.A. 6044-45.

This evidence is sufficient for a reasonable jury to conclude that members of the drilling industry were skeptical of Transocean’s dual-activity rigs. Although

Maersk presented evidence that it contends dispels concerns over clashing, Transocean's evidence indicates that skepticism persists nonetheless. A reasonable jury could accept Transocean's evidence of skepticism even if the evidence could also support a contrary conclusion. We thus conclude that the district court erred by rejecting the jury's finding that skepticism supports nonobviousness.

5 Licensing

The jury found that Transocean established that its licenses to customers and competitors were due to the merits of the claimed invention and thus support nonobviousness. The district court did not directly address licensing, but found that Transocean's sales of its dual-activity technology were due primarily to litigation or threat of litigation, and thus seems not to have credited Transocean's licensing evidence. Maersk similarly contends that Transocean's licenses do not support nonobviousness because they are attributable to the threat of litigation. Maersk also argues that Transocean's licenses are not tied to the asserted claims because they convey rights not only to the patents-in-suit, but also to foreign counterparts and other patents that are not part of this case.

Transocean counters that the royalties paid under the licenses exceed any litigation costs, and thus are an accurate reflection of the value of the claimed invention. For example, Transocean introduced evidence at trial of a royalty payment by Noble Drilling (U.S.) Inc. totaling nearly \$500,000 for one month of operations for one dual-activity rig. Transocean contends that large, sophisticated companies would not pay royalties exceeding the cost of litigation if the royalty did not reflect the value of the licensed technology. Transocean also offered testimony that at least three companies licensed its dual-

activity drilling patents despite being under no threat of litigation. For example, Transocean's in-house counsel testified that both Shell and Pride Global, Limited, approached Transocean seeking to license its dual-activity technology. J.A. 6442-45.

We conclude that Transocean presented sufficient evidence for the jury to find that Transocean's licensing supports nonobviousness. From Transocean's testimony regarding the value of the licenses relative to litigation costs and regarding licenses with companies under no apparent threat of litigation, a reasonable jury could have found that the licenses reflect the value of the claimed invention and are not solely attributable to litigation. As a result, the district court erred by holding that the jury lacked substantial evidence to support its finding regarding licensing.

6 Long-Felt but Unsolved Need

The jury found that Transocean's invention provided a solution to a long-felt but unsolved need, and that this supports nonobviousness. The district court disagreed, finding that there was no long-felt but unresolved need because the prior art already disclosed dual string drilling technology. According to the court, no substantial demand existed for dual string drilling technology until deepwater drilling became more prevalent around the year 2000. On appeal, Maersk similarly argues that Transocean failed to present evidence linking any unmet need to the claimed features of the asserted claims.

We disagree. Transocean presented evidence at trial that its dual-activity technology satisfied a long-felt need for greater drilling efficiency. Transocean proffered testimony by two of the named inventors that the drilling industry had been operating in deepwater since the 1970s. One of Transocean's expert witnesses similarly

testified that companies began to move towards deepwater drilling in the 1970s and that the drilling industry is always seeking greater efficiency from its rigs. The expert concluded that Transocean's dual-activity technology thus fulfilled a long-felt but unsolved need for a drilling rig that could operate efficiently in deep water.

Two of the named inventors testified that, prior to the claimed invention, the industry had been searching for ways to increase efficiency by building sections of drill string "offline," out of the path of the well conducting the drilling. These efforts were unsuccessful, however, and left an unsolved need for an efficient method of building the long drill strings needed for deepwater drilling without interrupting operations on the drilling well.

We conclude that substantial evidence supports the jury's finding that long-felt but unsolved need supports nonobviousness. From this testimony, a reasonable jury could conclude that Transocean's patents fulfilled a need in the drilling industry for a more efficient way to drill in deep water by allowing offline building of drill string and also including an auxiliary advancing station capable of lowering drilling components to the seabed. The district court erred by concluding that the jury lacked substantial evidence to support its finding on long-felt need.

C. Conclusion

We held in *Transocean I* that Horn and Lund teach each limitation of the asserted claims, provide a motivation to combine their teachings, and thus make out a prima facie case of obviousness. 617 F.3d at 1303-04. In granting Maersk's motion for JMOL of obviousness, the district court concluded that the objective evidence of nonobviousness was "insufficient, as a matter of law, to

overcome Maersk[s] *prima facie* case of obviousness.” J.A. 5. We disagree.

On remand, Transocean presented compelling objective evidence of nonobviousness. We stated in *Transocean I* that, “[i]f all of the factual disputes regarding the objective evidence resolve in favor of Transocean, it has presented a strong basis for rebutting the *prima facie* case.” 617 F.3d at 1305. Not only did the jury find for Transocean on the objective factors we noted in *Transocean I*, but it also found that three additional objective factors weighed in favor of nonobviousness.

Few cases present such extensive objective evidence of nonobviousness, and thus we have rarely held that objective evidence is sufficient to overcome a *prima facie* case of obviousness. *But see Tec Air, Inc. v. Denso Mfg. Mich. Inc.*, 192 F.3d 1353, 1361 (Fed. Cir. 1999) (“Alternatively, even assuming that [the accused infringer] established a *prima facie* case of obviousness, [the patentee] presented sufficient objective evidence of nonobviousness to rebut it.”).

This, however, is precisely the sort of case where the objective evidence “establish[es] that an invention appearing to have been obvious in light of the prior art was not.” *Stratoflex*, 713 F.2d at 1538. The jury found that seven distinct objective factors support nonobviousness and, as discussed above, these findings are all supported by substantial evidence. Weighing this objective evidence along with all the other evidence relevant to obviousness, we conclude that Maersk failed to prove by clear and convincing evidence that the asserted claims would have been obvious. We therefore reverse the district court’s grant of JMOL of obviousness.

II. Enablement

A patent specification must “contain a written description of the invention . . . in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains . . . to make and use the same.” 35 U.S.C. 112, ¶ 1. Under the enablement requirement of § 112, “the specification must enable one of ordinary skill in the art to practice the claimed invention without undue experimentation.” *Nat’l Recovery Techs., Inc. v. Magnetic Separation Sys., Inc.*, 166 F.3d 1190, 1196 (Fed. Cir. 1999). “Although the ultimate determination of whether one skilled in the art could make and use the claimed invention without undue experimentation is a legal one, it is based on underlying findings of fact.” *Warner-Lambert Co. v. Teva Pharm. USA, Inc.*, 418 F.3d 1326, 1337 (Fed. Cir. 2005). We review the legal question of enablement without deference and the factual underpinnings for substantial evidence. *Martek Biosciences Corp. v. Nutri-nova, Inc.*, 579 F.3d 1363, 1378 (Fed. Cir. 2009).

In *Transocean I*, we reversed the district court’s grant of summary judgment of no enablement. 617 F.3d at 1305-07. We rejected its conclusion that the patents are not enabled because they do not allow a skilled artisan to practice the most optimized configuration of the claimed pipe transfer assembly. *Id.* at 1307. We explained that the pipe transfer limitations “may be enabled by simply disclosing the use of a crane or a rail-mounted system.” *Id.* We remanded for resolution of the issue of whether a person of ordinary skill in the art could practice the claims without undue experimentation. *Id.* On remand, the jury found that the claims are enabled.

The district court held to the contrary, granting JMOL of no enablement because it concluded that Transocean’s evidence failed to support the jury’s determina-

tion. The court held that a skilled artisan would not be able to make and use the invention without undue experimentation. The court stated that, alternatively, “the enablement protocol was so obvious that it failed to invent or enable the claimed invention.” J.A. 8. The court seems to have reasoned that the asserted claims are not enabled because they would have been obvious.

Maersk contends that the district court correctly granted JMOL of no enablement because a skilled artisan would not be able to practice the claimed pipe transfer assembly without undue experimentation. Maersk argues that no off-the-shelf pipe transfer equipment was available that could meet the claim limitations and that it took three years for a third-party engineering company to develop the equipment that Transocean put on its drillship.

Transocean counters that it presented sufficient evidence for a reasonable jury to conclude that the asserted claims are not invalid for lack of enablement. We agree. The ’781 patent specification states that the claimed pipe transfer could be accomplished using “rail supported pipe handling systems” or “a rugged overhead crane.” ’781 patent fig.7, col.7 ll.22-64. Transocean presented evidence at trial that the required modifications to existing pipe handling equipment, such as the systems disclosed in the specification, would not have required undue experimentation. For example, Mr. Scott testified that he did not believe such modifications would be overly complicated. J.A. 6117. He also testified that it took the third-party engineering company three years to design Transocean’s pipe handling system not because the design was difficult, but because an assembly for use in offshore drilling must be modeled on computer such that it is ready to use upon delivery without any field testing. J.A. 6149. Mr. Scott stated that the basic design of the system was quick and

that it was the computerized optimization took most of the time. *Id.* Moreover, Maersk's own invalidity expert testified that modifying an existing, rail-mounted pipe handler to use between two advancing stations, as in the claimed invention, would be a trivial modification that would not take a lot of time or engineering effort.

This is substantial evidence supporting the jury's verdict that Maersk failed to prove that undue experimentation would be required in order to operate the claimed invention. Transocean's patent specification discloses two systems that could be used to perform the pipe transfer function and testimony at trial confirmed that modifying these systems for use in the claimed invention would be trivial. As a result, we hold that the district court erred by granting Maersk's motion for JMOL that the asserted claims are not enabled. Because we reverse the district court's grant of JMOL of no enablement, we need not reach Transocean's argument that Maersk waived its enablement challenge.

III. Infringement

"To establish literal infringement, every limitation set forth in a claim must be found in an accused product, exactly." *Southwall Techs., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1575 (Fed. Cir. 1995). Infringement is a question of fact. *Id.* The district court had granted summary judgment of noninfringement and, in *Transocean I*, we vacated that holding. 617 F.3d at 1307-11. The jury found literal infringement by Maersk, and the district court granted JMOL of noninfringement. The district court held that there was no infringement because the contract between Statoil and Maersk expressly indicated that the final drill design could be modified based on the outcome of a pending district court litigation. J.A. 8-9. Hence, the district court concluded that Maersk

did not offer for sale or sell the use of a dual-activity drill which would infringe the patent claims at issue. *Id.* This argument, however, had been raised and rejected by this court in *Transocean I*:

Maersk USA's remaining arguments regarding the right to alter the final design and the fact that the rig was not complete at the time of contracting do not change the result. Maersk USA and Statoil signed a contract and the schematics that accompanied that contract could support a finding that the sale was of an infringing article under § 271(a). The fact that Maersk USA, after the execution of the contract, altered the rig in response to the GSF injunction is irrelevant to this infringement analysis. The potentially infringing article is the rig sold in the contract, not the altered rig that Maersk USA delivered to the U.S.

617 F.3d at 1310-11. The jury concluded that what was offered for sale and sold by Maersk to Statoil was the use of an infringing rig and that fact finding is supported by substantial evidence. The Statoil contract identifies the drilling unit as the "unit currently under construction at Keppel FELS Limited in Singapore." J.A. 10818. The Statoil contract further states that Statoil was entitled to access the schematics for the rig. J.A. 10867. Both the Statoil contract and the Keppel contract containing the schematics for the accused rig were introduced into evidence at trial. Maersk does not argue on appeal that the rig depicted in the schematics in the Keppel contract is missing any of the limitations of the asserted claims. Moreover, additional evidence at trial showed that Maersk did not instruct Keppel to install a casing around the auxiliary advancing station until several months after Maersk signed the Statoil contract. J.A. 12826.

Based on this evidence, a reasonable jury could conclude that the drilling rig offered for sale or sold in the Statoil contract, as depicted in the schematics in the Keppel contract, possessed every limitation of the asserted claims. We thus conclude that substantial evidence supports the jury's finding that Maersk literally infringed the asserted claims and reverse the district court's grant of JMOL of noninfringement.

IV. Damages

Upon a finding of infringement, the patentee is entitled to "damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer." 35 U.S.C. § 284. The patentee bears the burden of proving damages. *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1324 (Fed. Cir. 2009). Two alternative categories of infringement compensation are the patentee's lost profits and the reasonable royalty the patentee would have received through arms-length negotiation. *Id.* "The [reasonable] royalty may be based upon an established royalty, if there is one, or if not, upon the supposed result of hypothetical negotiations between the plaintiff and defendant." *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1554 (Fed. Cir. 1995) (en banc). The hypothetical negotiation seeks to determine the terms of the license agreement the parties would have reached had they negotiated at arms length when infringement began. *Id.*

On remand from our decision in *Transocean I*, Transocean presented evidence of the value of its past licenses for its dual-activity technology. The jury awarded \$15 million in compensatory damages. The district court granted JMOL that Transocean is not entitled to damages. The court reasoned that Transocean has no basis to claim damages because the asserted claims are invalid as

obvious and not enabled and because Maersk did not infringe because there was no sale or offer for sale of the accused rig. Given that we have reversed on all three points, JMOL on damages on these grounds is unwarranted. The court also erroneously stated that a reasonable royalty is an improper measure of damages because Transocean presented no evidence of actual harm or that it lost an opportunity to sell or use its patented invention due to losing the Statoil contract to Maersk.

On appeal, Maersk argues that the jury's damages award is not supported by substantial evidence. Maersk also contends that a reasonable royalty for its sale or offer for sale must necessarily be lower than if it had also made or used an infringing rig. In essence, Maersk argues that it never delivered an infringing rig to Statoil and would not have paid \$15 million solely for the right to offer for sale or sell a dual-activity rig when Transocean's past licenses also granted the right to make and use its patented invention. We are sympathetic to Maersk's arguments. It offered drilling services which would use an infringing drill, but expressly reserved the right to modify the drill to avoid infringement. It did then modify the drill prior to delivery to avoid infringement – hence never actually using an infringing dual-activity drill. And the jury awarded the full upfront licensing fee that a competitor who would be using the drill would pay. We may well not have awarded such a high royalty, but that decision is not ours to make. We review a damage award, which is a question of fact, for substantial evidence. *Lucent Techs.*, 580 F.3d at 1310. And, given the evidence presented, we cannot conclude that the jury lacked substantial evidence for the award.

At trial, Transocean's in-house counsel testified regarding Transocean's process for deciding the value of licenses for its dual-activity drilling patents. He stated

that Transocean considered the value of the patents to the licensee and also the fact that a license to a competitor would allow that company to compete with Transocean's own dual-activity rigs. J.A. 6436. Based on these considerations, Transocean's model license agreement includes an upfront fee of \$15 million and a five percent running royalty when the licensee operates the dual-activity rig in a jurisdiction where Transocean has patents on its technology. J.A. 6436-37. Transocean's licenses show that several companies, including its competitors, agreed to license the dual-activity patents on these terms. *See, e.g.*, J.A. 9912; J.A. 9924-25.

Transocean's in-house counsel also testified that Transocean tends to offer its customers more favorable license terms than it offers to its competitors. J.A. 6437-39. He further stated that Maersk is a direct competitor and that, in a hypothetical negotiation at the time of infringement, Transocean would have required Maersk to pay an upfront fee to license its dual-activity patents. J.A. 6447. Transocean's damages expert, Mr. Bratic, testified that Transocean would be entitled to an upfront payment of at least \$10 million from Maersk. According to Mr. Bratic, Transocean's upfront fee for competitors is always \$15 million, but Transocean sometimes discounts that fee if it receives something in return from the licensee. J.A. 6608-12. Mr. Bratic stated that, because Transocean would not receive anything from Maersk in return under the hypothetical negotiation other than royalty payments, Maersk would not be eligible for any discount. J.A. 6609-12.

This is substantial evidence supporting the jury's damage award. A reasonable royalty may be based on an existing royalty, and a jury could conclude from Transocean's past licenses for its dual-activity technology that a hypothetical negotiation between the parties would result

in a \$15 million upfront payment. Although Transocean's damages expert testified that the royalty would be at least \$10 million, he also stated that Maersk would not be entitled to any discount from the standard \$15 million figure. Indeed, several similarly situated competitors agreed to pay a \$15 million upfront fee. We thus conclude that the jury had substantial evidence upon which to conclude that a reasonable royalty under the circumstances would be \$15 million.

We reject Maersk's argument that the damages award was not supported by substantial evidence solely because Maersk only needed a license allowing it to sell or offer to sell a dual-activity rig. Although Maersk did not, in the end, deliver an infringing rig to Statoil, the hypothetical negotiation used to calculate a reasonable royalty seeks to determine the terms of the agreement the parties would have reached at the time infringement began. In this case, a reasonable jury could conclude that at the time Maersk first infringed by offering a dual-activity rig for sale, the parties would have negotiated a license granting Maersk the right not only to offer the rig for sale, but also to deliver a rig that uses Transocean's dual-activity technology. Indeed, Transocean's proposed royalty of a \$10-15 million upfront payment and a five percent running royalty assumes that the license grants Maersk "unfettered" future use of the licensed patents. J.A. 6653-55. Because the jury's damages award is supported by substantial evidence, we reverse the district court's grant of JMOL that Transocean is not entitled to reasonable royalty damages.

V. Conditional Grant of Maersk's Motion for New Trial

The Fifth Circuit reviews the grant of a motion for new trial for abuse of discretion, and generally scrutinizes a grant of a new trial more closely than a denial. *Cates v.*

Creamer, 431 F.3d 456, 460 (5th Cir. 2005). A district court can grant a motion for new trial if the jury verdict was against the great weight of the evidence. *Id.*

The district court in this case conditionally granted Maersk's motion for new trial. Among the several grounds the court gave for granting this motion, it concluded that the jury's verdict is against the great weight of the evidence on the issue of obviousness. We disagree. With regard to the objective evidence of nonobviousness, the court erred by concluding that the jury's verdict was not supported by substantial evidence. To the extent that the jury deviated from our *Transocean I* holding by finding that the prior art did not disclose each limitation of the asserted claims, this issue is law of the case and thus conducting a new trial would serve no purpose. Given that this is a question of law, which we review *de novo*, we accept the prior determinations of *Transocean I* that Lund and Horn disclose all of the claimed elements and that there exists a motivation to combine, and also consider the jury's fact findings on the objective considerations which are all supported by substantial evidence. Looking at all of this evidence, we conclude that Maersk has failed to prove the claims would have been obvious by clear and convincing evidence. There is no reason to conduct a new trial because the ultimate issue of obviousness is one of law.

We find no merit to the court's contention that a new trial is needed because the jury's findings on secondary considerations might somehow have been tainted by the court's failure to instruct the jury that the first three *Graham* factors were already resolved in *Transocean I*. These were discrete and separate fact questions on the special verdict. There is no reason to think that because the jury erred on one such fact finding, the other, unrelated fact findings are somehow tainted.

None of the alleged errors the district court highlights warrants a new trial. We have considered all of Maersk's arguments on appeal and find them to be without merit. We thus reverse the district court's grant of Maersk's motion for a new trial.

CONCLUSION

In view of the foregoing, we reverse the district court's grant of JMOL of invalidity and noninfringement, and its grant of JMOL that Transocean is not entitled to damages. We also reverse its conditional grant of a new trial.

REVERSED