Trials@uspto.gov
571-272-7822

Paper 41
Entered: January 18, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HALLIBURTON ENERGY SERVICES, INC., AND
CIMAREX ENERGY CO.,
Petitioner,

v.

U.S. WELL SERVICES, LLC,
Patent Owner.

IPR2021-01037
Patent 9,745,840 B2

Before LYNNE H. BROWNE, GEORGE R. HOSKINS, and
SEAN P. O'HANLON, *Administrative Patent Judges*.

BROWNE, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determing All Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

Halliburton Energy Services and Cimarex Energy Co. ("Petitioner"), on June 21, 2021, filed a Petition requesting *inter partes* review of claims 1–20 of U.S. Patent No. 9,745,840 B2 ("the '840 patent"). Paper 3 ("Pet."). We issued a Decision to Institute an *inter partes* review (Paper 12, "Dec.") of all challenged claims under all grounds.

After institution of trial, U.S. Well Services, LLC ("Patent Owner") filed a Patent Owner Response (Paper 18, "PO Resp."). Thereafter, Petitioner filed a Petitioner's Reply to Patent Owner's Response (Paper 28, "Pet. Reply") and Patent Owner filed a Patent Owner's Sur-Reply (Paper 33, "PO Sur-Reply").

Oral argument was conducted on October 20, 2022, for this proceeding and the transcript of the hearing has been entered as Paper 39 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6 and issue this decision under 35 U.S.C. § 318(a). After considering the evidence and arguments of both parties, and for the reasons set forth below, we determine that Petitioner has met its burden of showing, by a preponderance of the evidence, that claims 1–20 are unpatentable.

II. BACKGROUND

A. Real Parties-in-Interest and Related Proceedings

Petitioner identifies itself, Halliburton Co., Halliburton Holdings LLC, Key Production Company Inc., Cimarex Energy Co. of Colorado, Magnum Hunter Production Inc., Prize Energy Resources Inc., Cimarex Resolute LLC, Resolute Natural Resources Company, LLC, and Resolute

Natural Resources Southwest, LLC as real parties-in-interest. Pet. 1. Patent Owner identifies itself and ProFrac Holding Corporation as real parties-in-interest. Paper 37, 2.

The parties state that the '840 patent is currently being asserted in *U.S. Well Services, Inc. v. Halliburton Company*, Case No. 6:21-cv-00367 (W.D. Tex.). Pet. 1; Paper 5, 1.

The parties state that Petitioner filed petitions for *inter partes* review against other patents held by Patent Owner, including: IPR2021-01032 against U.S. Pat. No. 9,410,410 ("the '410 patent"); IPR2021-01033 against U.S. Pat. No. 9,789,601; IPR2021-01034 against U.S. Pat. No. 10,337,308; IPR2021-01035 against U.S. Pat. No. 9,970,278; IPR2021-01036 against U.S. Pat. No. 9,611,728; IPR2021-01038 against U.S. Pat. No. 10,408,030; IPR2021-01065 against U.S. Pat. No. 9,840,901; and IPR2021-01066 against U.S. Pat. No. 10,020,711.[1] Pet. 1; Paper 5, 1.

B. The '840 Patent

The '840 patent is for an "Electric Powered Pump Down" and issued August 29, 2017. Ex. 1001, codes (45), (54). It "relates to a system that uses fluid pressurized by electrically powered pumps for fracturing and for pump down operations." *Id.* at 1:21–23. Figure 1A of the '840 patent is reproduced below.

[1] The '030 patent is a continuation of the '840 patent, which is a continuation-in-part of the '410 patent.

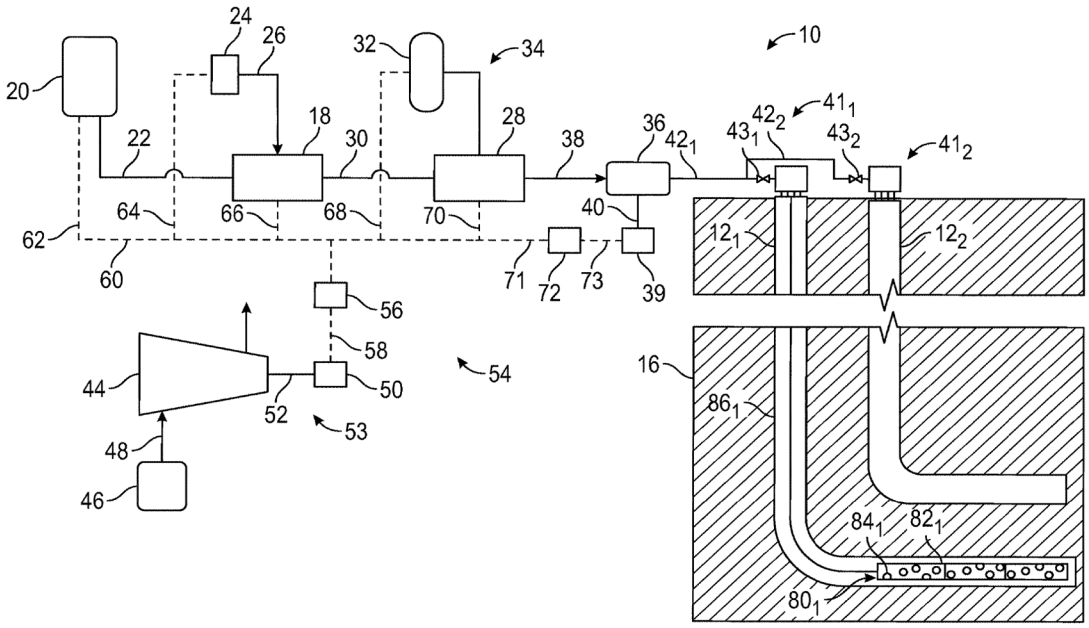

FIG. 1A

Figure 1A shows a schematic of system 10 that provides pressurized fluid to wellbores. *Id.* at 3:60–61. As shown in Figure 1A, system 10 includes fluid source 20 (represented by a large chamfered rectangle) in the upper left corner of the figure. *Id.* at Fig. 1A, 3:66. To the right of fluid source 20 is additive source 24 (represented by a small rectangle). *Id.* at Fig. 1A, 3:67–4:1. Below and to the right of additive source 24 is hydration unit 18 (represented by a large rectangle). *Id.* at Fig. 1A, 3:65–66. Above and to the right of hydration unit 18 is proppant source 32 (represented by a pill shape). *Id.* at Fig. 1A, 4:10. Below and to the right of proppant source 32 is blender unit 28 (represented by a large rectangle). *Id.* at Fig. 1A, 4:17. To the right of blender unit 28 is pump assembly 36 (represented by a small chamfered rectangle). *Id.* at Fig. 1A, 4:16. To the right of pump assembly 36 is wellhead assembly 41_1, 41_2 (represented by a pair of small rectangles)

and below pump assembly 36 is motor 39 (represented by a small rectangle). *Id* at Fig. 1A, 4:25, 29. To the left of motor 39 is variable frequency drive 72 (represented by a small rectangle). *Id.* at Fig. 1A, 5:14–15. Below wellhead assembly 41 are wellbores 12_1, 12_2 (shown as vertical tunnel shafts that turn to the right near the bottom to form horizontal shafts in subterranean formation 16 (represented by a large rectangle filled with cross-hatching)). *Id.* at Fig. 1A, 3:65. Figure 1A also shows perforating string 80_1 (represented by a rectangle located inside the horizontal portion of shaft 12_1). *Id.* at Fig. 1A; 5:30–31. Perforating string 80_1 includes perforating guns 82_1 (represented by small circles inside perforating string 80_1) stacked in series and coaxial with one another. *Id.* at Fig. 1A, 5:37–38.

Shown in Figure 1A below and between hydration unit 18 and blender unit 28 is transformer 56 (represented by a small rectangle) and below it is generator 50 (also represented by a small rectangle). Ex. 1001, Fig. 1A, 4:55, 61. To the left of generator 50 is turbine 44 (represented by a truncated cone) and below it is fuel source 46 (represented by a chamfered square). *Id.* at Fig. 1A, 4:47–49. "Electricity generated in generator 50 is conveyed to transformer 56 via line 58" (represented by a dashed line extending between generator 50 and transformer 56). *Id.* at Fig. 1A, 5:2–3. Transformer 56 is also connected to power bus 60 (represented by a dashed horizontal line extending from a point below the left half of fluid source 20 to the side of variable frequency drive 72) having lines 62, 64, 66, 68, and 70 (each of these lines is represented by a dashed vertical line extending from bus 60 as described below) connected thereto. *Id.* at Fig. 1A, 5:23–24. "[L]ine 62 connects fluid source 20 to bus 60, line 64 connects additive

source 24 to bus 60, line 66 connects hydration unit 18 to bus 60, line 68 connects proppant source 32 to bus 60, and line 70 connects blender unit 28 to bus 60." *Id.* Fig. at 1A, 5:26–30. The portion of bus 60 extending past line 70 is labeled 71 and line 73 (represented by a horizontal dashed line) connects variable frequency drive 72 to electric motor 39. *Id.* at Fig. 1A, 5:16–17.

In operation, hydration unit 18 receives fluid from fluid source 20 via line 22 (represented by a solid line extending from the bottom of fluid source 20 to the left side of hydration unit 18). Ex. 1001, Fig. 1A, 3:65–67. Hydration unit 18 also selectively receives additives from additive source 24 via line 26 (represented by a solid arrow extending from the right side of additive source 24 to the top of hydration unit 18). *Id.* at Fig. 1A, 3:67–4:1. The fluid and additives are transferred from hydration unit 18 to blender unit 28 via line 30 (represented by a solid line extending from the right side of hydraulic unit 18 to the left side of blender unit 28) where they are mixed. *Id.* at Fig. 1A, 4:8–9. Proppant source 32 delivers proppant to blender unit 28 via line 34 (represented by a solid line extending from the right side of proppant source 32 to the top of blender unit 28) where the proppant is mixed with the fluid and additives to form a fracturing slurry. *Id.* at Fig. 1A, 4:10–13. The fracturing slurry is delivered to fracturing pumping system 36 via line 38 (represented by a solid arrow extending from the right side of blender unit 28 to the left side of fracturing pumping system 36). *Id.* at Fig. 1A, 4:13. Perforating string 80_1 is pumped down within wellbore 12_1 by pressurized fluid from pump system 36. *Id.* at Fig. 1A, 4:29–32.

C. Challenged Claims

Petitioner challenges claims 1–20. Pet. 11. Claims 1, 10, and 16 are independent claims. Ex. 1001, 9:2–11, 9:38–10:2, 10:17–29. Claims 2–9 depend from claim 1, claims 11–15 depend from claim 10, and claims 17–20 depend from claim 16. *Id.* at 9:12–9:35, 10:3–16; 10:30–42.

Illustrative claim 1 is reproduced below.

> 1. A method of operations in a subterranean formation, the method comprising:
>
> driving a pump with an electrically powered motor to pressurize fluid;
>
> inserting a tool into a wellbore that intersects the formation;
>
> pressurizing fluid with a boost pump to form a boost fluid;
>
> directing the boost fluid to the pump; and
>
> directing the pressurized fluid into the wellbore above the tool to push the tool into the wellbore.

Ex. 1001, 9:2–11.

D. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–4, 7, 8, 10, 12–18, 20	103(a)	Conrad,[2] Neal,[3] Coli[4]

[2] Conrad et al., U.S. Patent No. 9,903,190 B2, issued February 27, 2018 (Ex. 1008) ("Conrad").
[3] Neal, U.S. Patent No. 8,146,665 B2, issued April 3, 2012 (Ex. 1009) ("Neal").
[4] Coli et al., U.S. Patent Application Publication No. 2012/0255734 A1, published Oct. 11, 2012 (Ex. 1010) ("Coli").

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
4–6, 15, 20	103(a)	Conrad, Neal, Coli, Tolman[5]
9, 19	103(a)	Conrad, Neal, Coli, Teurlay[6]
11	103(a)	Conrad, Neal, Coli, Broussard-601[7]
13	103(a)	Conrad, Neal, Coli, Broussard-079[8]

Pet. 11. In addition to the references listed above, Petitioner relies on the declaration of L. Brun Hilbert, PhD (Ex. 1005). Patent Owner submits declarations of Mr. Robert Schaaf (Ex. 2008) and Mr. Joel Broussard (Ex. 2009).

III. ANALYSIS

A petition must show how the construed claims are unpatentable under the statutory ground it identifies. 37 C.F.R. § 42.104(b)(4). Petitioner bears the burden of proving unpatentability of the challenged claims, and the burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To

[5] Tolman et al., U.S. Patent Application Publication No. 2009/0114392 A1, published May 7, 2009 (Ex. 1011) ("Tolman").
[6] Teurlay et al., U.S. Patent No. 7,900,893 B2, issued March 8, 2011 (Ex. 1012) ("Teurlay").
[7] Broussard et al., U.S. Patent No. 8,789,601 B2, issued July 29, 2014 (Ex. 1013) ("Broussard-601").
[8] Broussard et al., U.S. Patent Application Publication No. 2014/0138079 A1, published May 22, 2014 (Ex. 1014) ("Broussard-079").

prevail, Petitioner must establish the facts supporting its challenge by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d).

A. Level of Ordinary Skill in the Art

In determining the level of skill in the art, we consider the type of problems encountered in the art, the prior art solutions to those problems, the rapidity with which innovations are made, the sophistication of the technology, and the educational level of active workers in the field. *Custom Accessories, Inc. v. Jeffrey-Allan Indus. Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986); *Orthopedic Equip. Co. v. U.S.*, 702 F.2d 1005, 1011 (Fed. Cir. 1983).

Petitioner contends that a person of ordinary skill in the art at the time of the invention of the '840 patent would have had the following education and experience:

> either (1) a Bachelor of Science in Mechanical Engineering, Electrical Engineering, Petroleum Engineering or an equivalent field as well as at least [two] years of academic or industry experience in the oil and gas industry, including well drilling, completion, or production; or (2) at least four years of industry experience in the oil and gas industry, including well drilling, completion, or production.

Pet. 12 (citing Ex. 1005 ¶¶ 29–30). Patent Owner adopts this definition of the level of skill. PO Resp. 65.

We adopt Petitioner's proposal as reasonable and consistent with the prior art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (the prior art may reflect an appropriate level of skill in the art).

B. Claim Construction

For petitions filed on or after November 13, 2018, the "broadest reasonable interpretation" standard has been replaced with the federal court

claim construction standard that is used to construe a claim in a civil action under 35 U.S.C. § 282(b). This is the same claim construction standard articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc), and its progeny.

Petitioner does not provide any explicit construction of any claim terms. Pet. 12. Patent Owner asserts that "[i]n the related [Western District of Texas] litigation, [Patent Owner] and Petitioners agreed that the term 'the pressurized fluid' should be afforded its plain and ordinary meaning, which is 'the fluid from the pump driven by an electrically powered motor'" and that in this related litigation Patent Owner and Petitioners agreed that "the term 'the pump' should be afforded its plain and ordinary meaning, which is '[a] pump driven by an electrically powered motor.'" PO Resp. 5 (citing Ex. 2033, 3).

We do not expressly construe any claims terms, except to the extent we explain how we interpret the claims in the analysis below. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (only terms that are in controversy need to be construed, and then only to the extent necessary to resolve the controversy); *see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs* in the context of an *inter partes* review).

C. Overview of Certain Ones of the Asserted Prior Art[9]

1. Conrad

Conrad is a U.S. Patent for a "Modular Fracturing System" that issued February 27, 2018. Ex. 1008, codes (45), (54).

Conrad describes a fracturing system that facilitates extraction of natural resources such as oil or natural gas from a reservoir. Ex. 1008, 3:7–9. Figure 1, reproduced below, shows Conrad's system:

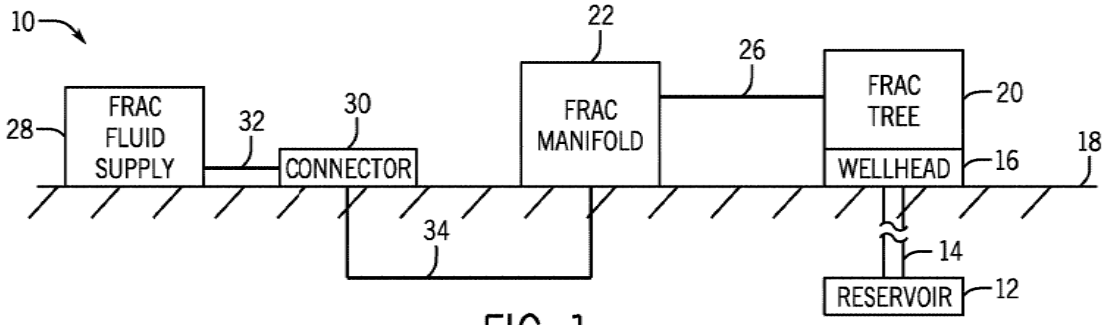

FIG. 1

Id. Fig. 1. Figure 1 shows fracturing system 10 (depicted as a block diagram) which includes fracturing tree 20 (represented by the upper approximately two thirds of a bifurcated rectangle on the right side of Fig. 1) and fracturing manifold system 22 (represented by a rectangle to the left of fracturing tree 20). *Id.* Fig. 1, 3:21–22. Wellhead 16 is depicted as approximately the bottom third of the bifurcated rectangle encompassing fracturing tree 20. *Id.* Fig. 1. Directly below wellhead 16 is well 14 (depicted as a split channel) leading to reservoir 12 (depicted by a rectangle

[9] In the interest of brevity, we only discuss Conrad, Neal, and Coli which together are the basis for all of Petitioner's challenges.

approximately the same size as the rectangle representing wellhead 16). *Id.* To the left of fracturing manifold 22 is connector 30 (also represented by a rectangle approximately the same size as the rectangle representing wellhead 16) and to the left of connector 30 is fracturing fluid supply 28 (represented by a rectangle). *Id.* All of the components of fracturing system 10 except for well 14 and reservoir 12 are shown as resting on ground 18 (depicted as a horizontal line with hash marks extending from right to left below the line). *Id.*

Figure 1 also shows fluid connection (i.e. pipe) 26 (depicted as a line extending between the left side of fracturing tree 20 and fracturing manifold 22), fluid connection 34 (depicted as a vertical line extending from the bottom of fracturing manifold 22 into ground 18 where it turns left to become a horizontal line extending to a point below connector 30 where it turns up to become a vertical line extending to the bottom of connector 30), and fluid connection 32 (depicted as a line extending from the left side of connector 30 to the right side of fracturing fluid supply 28). *Id.* Conrad describes injecting fracturing fluid down to well 14 in order to increase the number and size of fractures in a formation. *Id.* at 3:10–13. Conrad

describes a further embodiment shown in Figure 5, reproduced below.

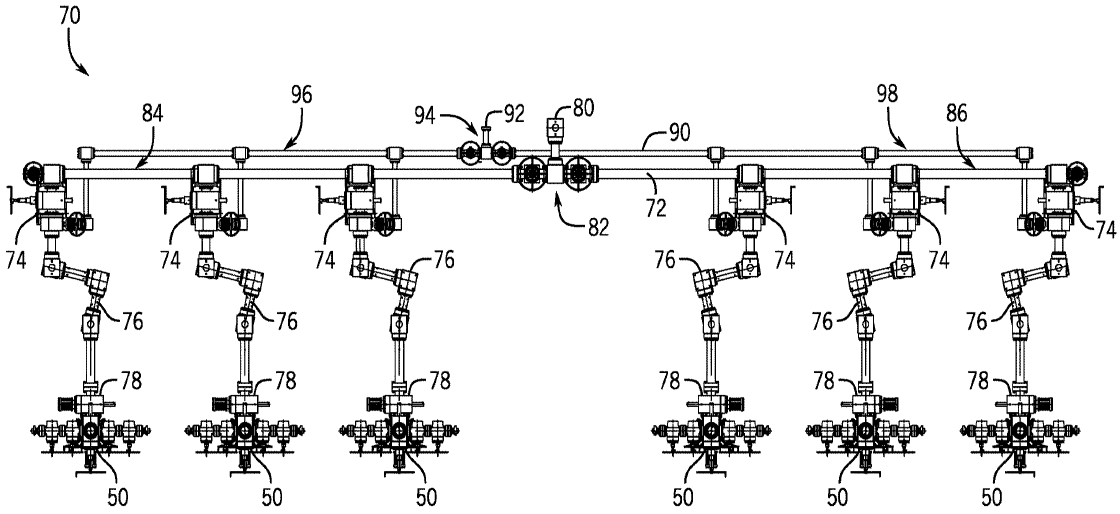

FIG. 5

Ex. 1008, Fig. 5. Figure 5 shows a plan view of a fracturing system with skid assemblies each coupled by a single fluid conduit to a respective fracturing tree of a wellhead assembly. *Id.* at 2:37–40. In particular, Figure 5 shows fracturing system 70 including fracturing fluid manifold 72 coupled to skid apparatuses or assemblies 74. *Id.* at 4:62–63. Skid assemblies 74 are connected by fluid lines or conduits 76 to fracturing trees 78 of wellhead assemblies 50**,** with a one-to-one ratio of skid assemblies 74 to fracturing trees 78. *Id.* at 4:63–66; Fig. 5. Fluid conduits 76 include pipes and elbow joints to facilitate connection between skid assemblies 74 and the fracturing trees 78. *Id.* at 5:2–4, Fig. 5).

Fracturing fluid is supplied to fracturing fluid manifold 72 through inlet 80. Ex. 1008, 5:6–7; Fig. 5. Fracturing fluid manifold 72 also includes splitter 82 with valves for controlling flow of fracturing fluid into branch lines 84 and 86 to the left and right of splitter 82. *Id.* at 5:13–15; Fig. 5.

Additional manifold 90 is coupled to skid assemblies 74. *Id.* at 5:31–32; Fig. 5. Additional manifold 90 includes fluid inlet 92 and splitter 94 for controlling flow of fluid into branch lines 96 and 98 coupled to the skid assemblies 74. *Id.* at 5:36–39. Manifold 90 is "a pump-down manifold for routing fluid to wellhead assemblies 50 to pump a downhole tool (e.g., a wireline tool having a plug or a perforating gun) down the well." *Id.* at 5:32–36; Fig. 5.

2. Neal

Neal is a U.S. Patent for an "Apparatus and Method for Maintaining Boost Pressure to High-Pressure Pumps During Wellbore Servicing Operations" that issued April 3, 2012. Ex. 1009, codes (45), (54).

Neal describes "a wellbore services manifold trailer and a method of using the same to maintain boost pressure to high-pressure pumps." Ex. 1009, 1:23–25. Neal utilizes high-pressure pumps to increase fluid pressure to a high-pressure suitable for injection into a wellbore. *Id.* at 5:14–16. Neal also describes the use of boost pumps to provide sufficient pressure for the high-pressure pumps. *Id.* at 9:20–23.

3. Coli

Coli is a U.S. Patent Application Publication for a "Mobile, Modular, Electrically Powered System for Use in Fracturing Underground Formations" that published on October 11, 2012. Ex. 1010, codes (43), (54).

Coli describes an electrically powered fracturing system and a system and method for providing on-site electrical power and delivering fracturing fluid to a wellbore at a fracturing operation. Ex. 1010 ¶ 34. Coli further describes that natural gas (either supplied to the site or produced on-site) is

used to drive a dedicated source of electrical power, such as a turbine generator, for hydrocarbon-producing wellbore completions. *Id.* ¶ 36.

Coli's Figure 3 is reproduced below.

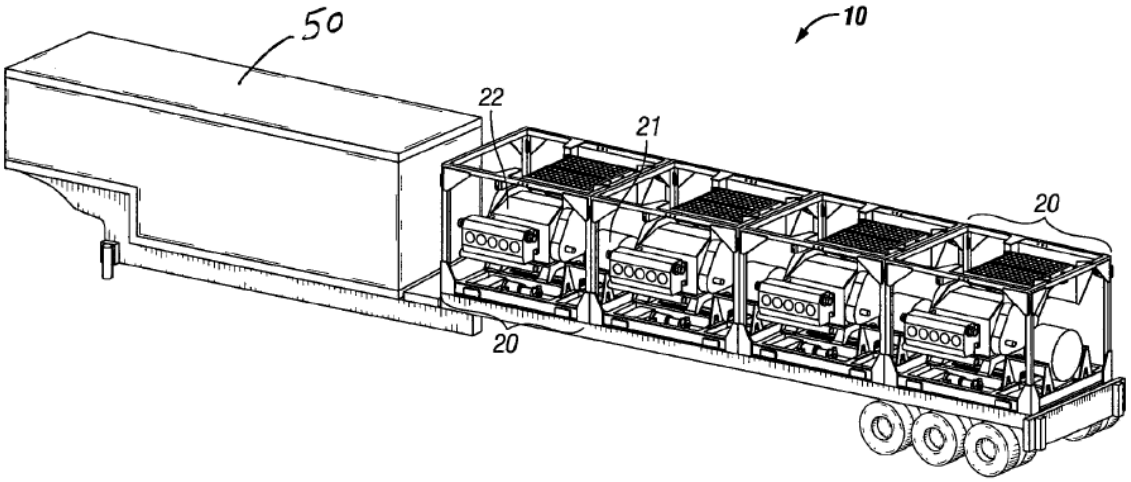

FIG. 3

Ex. 1010, Fig. 3. Figure 3 depicts a schematic perspective view of a fracturing trailer 10 for housing fracturing modules 20 along with a transformer and driver unit 50. *Id.* ¶¶ 24, 40, 49. Each fracturing module 20 includes an electric motor 21 and a fluid pump 22 coupled thereto. *Id.* ¶ 40. "Fracturing modules 20 utilize electric power from turbine generator 30 (not shown) to pump fracturing fluid directly to a wellbore." *Id.* Coli further describes that the system can deliver 2500 horsepower ("hp") directly to each pump because pump 22 is directly coupled to electric motor 21. *Id.* ¶ 49. Coli additionally describes that each fracturing module 20 weighs approximately 28,000 pounds ("lbs."), which allows for placement of four pumps 22 in the same physical dimension (*i.e.*, size and weight) as the spacing needed for a simple pump in conventional diesel systems, as well as allowing for up to 10,000 hp total to the pumps. *Id.*

D. Obviousness under 35 U.S.C. § 103

1. Principles of Law

A claim is unpatentable under § 103(a) if the differences between the claimed subject matter 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. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) when in evidence, objective indicia of non-obviousness (i.e., secondary considerations).[10] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). "While the sequence of these questions might be reordered in any particular case," *KSR*, 550 U.S. at 407, the Federal Circuit has explained that an obviousness determination can be made only after consideration of all of the *Graham* factors. *See, e.g.*, *Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1360 (Fed. Cir. 2012).

2. Ground One: Obviousness of Claims 1–4, 7, 8, 10, 12–18 and 20 Over Conrad, Neal, and Coli

The Petition maps elements from Conrad, Neal, and Coli to each limitation of independent claims 1, 10, and 16. Pet. 14–30, 35–37, 46–48. Patent Owner contests Petitioner's reasoning in support of the proposed

[10] Secondary considerations may include longfelt but unsolved need, failure of others, unexpected results, commercial success, copying, licensing, and praise. *See Graham*, 383 U.S. at 17–18; *Leapfrog Enters., Inc. v. Fisher–Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007).

combination, before contesting individual elements of some of the claims included in Ground One. PO Resp. 5–23. We have reviewed Petitioner's contentions and Dr. Hilbert's supporting testimony regarding independent claims 1, 10, and 16. Pet. 14–30, 35–37, 46–48; Ex. 1005 ¶¶ 186–193, 199–208, 216–223. For those limitations we do not address in Section III.D.2.b below, we are persuaded, by the reasons stated by Petitioner, that Conrad, Neal, and, Coli collectively teach these limitations and that a person of ordinary skill in the art would have had reason to combine the reference's teaching with a reasonable expectation of success. *Id.*

a. Alleged Lack of Motivation to Combine Conrad, Neal, and Coli

For Ground One, Petitioner discusses its reasoning in support of the proposed combination in Section VIII.A of the Petition. Pet. 15–25. First, Petitioner provides reasons in support of its position that it would have been obvious to combined Conrad and Neal. *Id.* at 15–23. Then, Petitioner provides reasons in support of its position that it would have been obvious to combine Coli with the Conrad-Neal combination. *Id.* at 23–25.

For the Conrad-Neal combination, Petitioner asserts that "*Conrad* teaches that a fracturing manifold 72 receives fracturing fluid through an inlet 80 and supplies fracturing fluid to ski[d] assemblies 74, which are associated with each wellhead assembly 50" and that Conrad "explains that 'an additional manifold 90' can be 'coupled to the skid assemblies 74.'" Pet. 15 (citing Ex. 1008, 4:63–66; 5:6–32). Petitioner asserts further that in Conrad, '"[T]he additional manifold 90 is a pump-down manifold for routing fluid to wellhead assemblies 50 to pump a downhole tool (e.g., a

wireline tool having a plug or a perforating gun) down the wells."' *Id.* (citing Ex. 1008, 5:32–36) (alteration by Petitioner). Petitioner asserts that "[i]n operation, *Conrad* teaches that 'additional fluid from manifold 90 can be used to pump a downhole tool (e.g., a tool for plugging and perforating a casing in the well) to a desired position in a well.'" Pet. 17 (citing Ex. 1008, 6:23–25). Thus, according to Petitioner, "*Conrad* teaches a system for first pumping down a tool for perforating the formation, and then performing fracturing on that formation." *Id.* (citing Ex. 1008, 5:6–51).

Petitioner admits that "*Conrad* does not disclose specifics regarding the pumping system used with its manifolds 72 and 90 for its respective pump down and fracturing operations," but asserts that a person of ordinary skill in the art "would have understood the need for pumping systems to provide pressurized fluid to implement the dual well operations (pump down and fracturing) taught by *Conrad*." Pet. 17–18 (citing Ex. 1005 ¶ 79). Petitioner submits that "[t]he use of pumps to provide pressurized fluid at well sites, including hydraulic fracturing sites, was well known in the art at the time the '840 Patent was filed (and much earlier)" and that "[o]ut of the numerous prior art pumps used at fracturing sites, a [person of ordinary skill in the art] would have been motivated to look specifically to *Neal* because *Neal* discloses high-pressure pumps that are generally applicable to 'many phases of wellbore servicing operations,' specifically including 'fracturing operations.'" *Id.* at 18 (citing Ex. 1005 ¶ 80; Ex. 1009, 1:26–27, 3:44–47). Petitioner asserts that a person of ordinary skill in the art "would have recognized that *Neal's* high-pressure pumps are well-suited for both fracturing and pump down operations" and "would have looked specifically

to *Neal* because *Neal* discloses techniques to prevent 'excessive wear and damage to pump components,' which is desirable in any wellbore servicing operation, including both the fracturing operation and the pump down operation disclosed by *Conrad*." *Id.* (citing Ex. 1008 ¶ 80; Ex. 1009, 1:30–33). Petitioner provides further support for its reasoning which we do not reproduce. Pet. 20–23.

Petitioner then turns to the reasons for modifying the Conrad-Neal combination in view of the teachings of Coli. Pet. 23–25. Petitioner asserts that "*Coli* replaces 'traditional diesel powered fracturing trailers' with an electrically powered operation to 'obviat[e] the need for a constant supply of diesel fuel to the site and reduc[e] the site footprint and infrastructure required for the fracturing operation.'" Pet. 23–24 (citing Ex. 1010 ¶¶ 36, 38). According to Petitioner, "*Neal's* diesel-powered pump is precisely the type of pump that *Coli* seeks to improve." *Id.* at 23 (citing Ex. 1010 ¶¶ 36, 38). Petitioner asserts that "[a]mong the benefits of *Coli* is the 'modular nature' of its electric powered fracturing operation which 'provides significant operational advantages and efficiencies,' over traditional diesel operations." *Id.* at 24 (citing Ex. 1010 ¶ 77). Petitioner asserts further that "*Coli's* electric-powered operation also 'resolves or mitigates environmental impacts of traditional diesel-powered operations' by providing a 'significant reduction in carbon dioxide emissions as compared to diesel-powered operations.'" *Id.* (citing Ex. 1010 ¶ 80). Given these benefits, Petitioner reasons that a person of ordinary skill in the art "would have been motivated to use the electric generator and motor of *Coli* to power the pumping system (i.e., the boost pump 126 and high-pressure pump 142)

of the *Conrad-Neal* combination to obtain the modularity benefits and reduced costs and environmental footprint by replacing traditional diesel prime movers with electric components." *Id.* at 24–25 (citing Ex. 1005 ¶ 92). Petitioner reasons further that "[s]uch a combination represents the use of a known technique (i.e., the electrification of pumps taught by *Coli*) to predictably improve a similar system (i.e., the high-pressure pumping system of the *Conrad-Neal* combination) in the same way (i.e., the electrification of the pumping system in the *Conrad-Neal* combination)." *Id.* at 25 (citing *KSR,* 550 at 401; Ex. 1005 ¶ 93).

Patent Owner contends that "Petitioners fail to provide any demonstrated motivation to combine *Conrad*, *Neal*, and *Coli*, and instead resort to unreasonably vague, broad, and conclusory statements to support Petitioners' motivation to combine the references." PO Resp. 5. Specifically, Patent Owner contends that "Petitioners['] overall basis for combining *Conrad*, *Neal*, and *Coli* is flawed because the problems that *Conrad*, *Neal*, and *Coli* each seek to address are not aligned." *Id.* at 6. As an example, Patent Owner asserts that "*Conrad* teaches and discloses a dual manifold system with a single outlet, enabling *Conrad* to selectively distribute the fluids from the first or second manifold, depending on the current operational needs," whereas "*Neal* teaches and discloses boost pumps for boosting 'the inlet pressure to high-pressure pumps.'" *Id.* (citing Ex. 1009, 3:29–31). According to Patent Owner, "[t]he boost pumps of *Neal* are directed to improved methods for preventing 'cavitation of the high-pressure pumps' in wellbore servicing operations," but "the boost[] pump of

Neal does not further improve the dual manifold concept put forth by *Conrad*." *Id.* at 6–7 (citing Ex. 1009, 3:34–39). Patent Owner asserts that

> as *Conrad* is focused on the distribution of fluids for both hydraulic fracturing operations from a first manifold and pump down operations from a second manifold, the booster pump of Neal only addresses fluids from one of the two *Conrad* manifolds and there would be a lack of motivation to use such a combination.

Id. at 7–8. In addition, Patent Owner argues that Dr. Hilbert's testimony in support of Petitioner's reasoning "is a conclusory statement without any evidentiary support." *Id.* at 8.

Patent Owner also contends that "[e]ven if there were some motivation to combine *Conrad* and *Neal* (which there is not), there is a lack of motivation to further combine the electrically powered fracturing system of *Coli*." PO Resp. 9 (citing Ex. 2034).[11] Patent Owner contends that there is no problem with cavitation in Coli and that

> there is no teaching or suggestion in *Coli* that the pressurized fluids can be used to both hydraulically fracture the formation and pump down tools, and accordingly, there would have been no motivation to adapt the electrically powered fracturing system of *Coli* with the system of *Conrad* directed to the selective control of pressurized fluids through a single outlet.

Id. Finally, Patent Owner contends that "there is no suggestion in *Conrad* nor *Neal* of the need for electrically powered pumps, and there is no suggestion in *Conrad* nor *Coli* of the need for booster pumps." *Id.*

[11] Ex. 2034 is the 77-page declaration of Mr. Robert Schaaf. Patent Owner's repeated citation to the entire declaration throughout its Response does not apprise of where Mr. Schaaf's testimony supports Patent Owner's positions.

Petitioner replies that Patent Owner "repeatedly concludes, without providing any explanation or supporting case law, that '[e]ach of *Conrad*, *Neal*, and *Coli* are directed to different solutions and there would be no motivation to combine.'" Pet. Reply 3–4 (citing PO Resp. 7–8). Petitioner asserts that Patent Owner "ignores [the] specific motivations in the Petition and incorrectly states that 'the booster pump of Neal only addressed fluids from one of the two *Conrad* manifolds and there would be a lack of motivation to use such a combination.'" *Id.* at 4 (citing PO Resp. 7–8). Specifically, Petitioner asserts that Patent Owner ignores that "*Neal* does not limit its pumping system to a single application, and instead, expressly contemplates its use in a variety of 'wellbore servicing operations.'" *Id.* (citing Pet. 20–21; Ex. 1009, 1:26–27; 3:44–47). Petitioner asserts further that "the Petition does address how the combination of *Conrad* and *Neal* includes coupling a first pumping system of *Neal* to the fracturing manifold of *Conrad* and a second pumping system of *Neal* to the pump-down manifold of *Conrad*." *Id.* at 5 (citing Pet. 20–23). Thus, according to Petitioner, "the combination includes a separate pumping system for each of *Conrad's* two manifolds, and there is nothing incompatible about the combination of *Neal's* pumping systems with *Conrad's* dual-manifolds." *Id.*

Petitioner replies further that Patent Owner "incorrectly summarizes Dr. Hilbert's conclusions" by treating Conrad as an anticipation reference and disregarding Dr. Hilbert's explanations of what a person of ordinary skill in the art would have understood from Conrad's teachings. Pet. Reply 5. Considering Patent Owner's argument that '"there is no teaching or

suggestion in *Coli* that the pressurized fluids can be used to both hydraulically fracture the formation and pump down tools,'" Petitioner replies that Patent Owner's argument is based on "the 'rigid approach' to motivation to combine rejected by the Supreme Court." *Id.* at 6 (citing *KSR*, 550 U.S. at 415). Petitioner replies further that Patent Owner's "remaining arguments . . . improperly attack the references individually. For example, [Patent Owner] argues that (1) *Conrad* and *Neal* do not state a need for electrically powered pumps; (2) *Conrad* and *Coli* do not state a need for boost pumps; (3) *Neal* does not teach pump down operations." *Id.* at 7 (citing PO Resp. 9, 11). Thus, according to Petitioner, Patent Owner "essentially criticizes the references for not being anticipatory and fails to address the specific motivations to combine laid out in the Petition." *Id.*

Responding to Patent Owner's criticism of Dr. Hilbert's testimony that a person of ordinary skill in the art "would have recognized that *Neal's* high-pressure pumps are well-suited for both fracturing and pump down operations," Petitioner asserts that "[a]s explained in his declaration, Dr. Hilbert's opinion is based on *Neal's* application to 'many phases of wellbore servicing operations,' of which a [person of ordinary skill in the art] would have understood to include fracturing operations and pump down operations." Pet. Reply 8 (citing PO Resp. 11; Ex. 1005 ¶ 80). Petitioner asserts that Patent Owner "fails to explain why a pump down operation would *not* be considered a 'wellbore servicing operation' such that a [person of ordinary skill in the art] would not have been motivated to use *Neal's* pumping system in a pump down operation." *Id.* Petitioner asserts that "even [Patent Owner's] expert Mr. Schaaf agreed that 'pump down

operations' are one phase of 'wellbore servicing operations.'" *Id.* at 8–9 (citing Ex. 1032, 73:5–10).

Turning to Patent Owner's argument "that '*Neal* does not teach high-pressure pumps suited for both fracturing and pump down operations,'" Petitioner asserts that this argument "lacks basis, especially when *Neal* teaches that its pumping system can be used at the exact pressures that [Patent Owner] states would be appropriate for a pump down operation." Pet. Reply 9 (citing PO Resp. 11). According to Petitioner, "*Neal* teaches a pumping system that uses the pressures that [Patent Owner] identifies in a different proceeding [IPR2021-01038] as being appropriate for pump down operations" and "[e]ven Mr. Marscher [Patent Owner's expert] contradicted [Patent Owner's] position and opined that *Neal's* high-pressure pumps 'could be used' with *Conrad's* pump-down manifold." *Id.* (citing Ex. 1033, 79:9–13). Petitioner asserts further that Patent Owner's "other expert Mr. Schaaf agreed that *Neal's* high-pressure pump 142 rated at 2,000 or 5,000 psi would be 'safe' to use with *Conrad's* 10,000 psi pump-down manifold." *Id.* (citing Ex. 1032, 71:2–72:8).

Responding to Patent Owner's argument that "Hilbert's opinion that a [person of ordinary skill in the art's] understanding of 'the need for pumping systems to provide pressurized fluid' for a manifold system (like in *Conrad*) represents a 'high' level of skill in the art that is inappropriate for motivation to combine," Petitioner asserts that Patent Owner's position is unsupported attorney argument. Pet. Reply 9–10 (citing PO Resp. 13–14; Ex. 1005 ¶ 79). "Petitioner submits that no 'high' level of skill is necessary to recognize that *Conrad's* manifold system—and any manifold system— would require a

pumping system to provide delivery of fluid to and through the manifold." *Id.* at 10. Thus, according to Petitioner, "the motivation to combine is based on a [person of ordinary skill in the art's] knowledge in view of reading the *Conrad* reference." *Id.* (citing Ex. 1005 ¶¶ 75–87).

Patent Owner responds by reiterating its position that '"Petitioners fail[ed] to provide any demonstrated motivation to combine *Conrad*, *Neal*, and *Coli*, and instead resort to unreasonably vague, broad, and conclusory statements to support Petitioners' motivation to combine the references.'" PO Sur-Reply 4 (quoting PO Resp. 5) (alterations by Patent Owner). Patent Owner further reiterates its arguments that the "only thing motivating Petitioners and Hilbert to assert that a [person of ordinary skill in the art] would have been motivated to combine *Conrad* and *Neal* is improper hindsight bias" and that

> there is no showing of a problem in *Conrad* that would motivate a [person of ordinary skill in the art] to look to the boost pumps in *Neal* or a problem in *Neal* that would lead a [person of ordinary skill in the art] to implement the boost pumps in *Neal* into the system for positioning a tool in *Conrad*.

Id. at 6–7.

We see no hindsight bias in Petitioner's reasoning in support of the proposed combination. Rather, Petitioner and its expert articulate several reasons why a person of ordinary skill in the art would look to Neal's teachings including reasons specifically directed to the anti-cavitation properties of Neal's boost pump. Pet. 15–25 (a person of ordinary skill in the art "would have been motivated to include the boost pump that is already part of *Neal*'s pumping system to avoid the 'undesirable condition' of

cavitation that is common to high-pressure pumps and increase the efficiency of the pumping operations." *Id.* at 21 (citing Ex. 1009, 1:26–35; Ex. 1005 ¶ 85).

We agree with Petitioner that Patent Owner's arguments attack the references individually and rely a rigid approach to motivation that is rejected in *KSR*. Pet. Reply 6–7. Specifically, Patent Owner's arguments are premised on the idea that the references themselves must state a need for a modification in order for Petitioner's reasoning to be supported by the record (i.e., to have rational underpinning). PO Resp. 9, 11; PO Sur-Reply 6–7. However, "[t]he obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion and motivation." *KSR*, 550 U.S. at 418. Rather, "the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claims, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *Id.* We determine that Dr. Hilbert's unrebutted testimony regarding what a person of ordinary skill in the art would have understood from the teachings of Conrad, Neal, and Coli takes into account such inferences and creative steps that a person of ordinary skill would employ when considering these references. Ex. 1005 ¶¶ 83–93.

b. Claims 1–3, 7, 8, 10, 12–18, and 20

The following limitations from claim 1 are in dispute: "pressuring fluid with a boost pump to form a boost fluid," "directing the boost fluid to the pump," and "directing the pressurized fluid into the wellbore above the tool to push the tool into the wellbore." PO Resp. 16–17; Ex. 1001, 9:8–11.

Patent Owner contends that a person of ordinary skill in the art "would understand that 'the pump' referred to in claim 1 is a pump for performing pump down operations, and neither *Conrad*, *Neal*, nor *Coli* teach using a boost pump to pressurize fluid performed in a pump down operation." PO Resp. 17 (citing Ex. 2034). Patent Owner contends that "*Conrad's* system requires selection between a pump-down operation and a fracturing operation, as two distinct pumping operations resulting from fluid supplied from either a hydraulic fracturing manifold or the additional manifold" and that "*Neal* teaches maintaining boost pressure to high-pressure pumps during a wellbore servicing operation." *Id.* at 17–18 (citing Ex. 2034; Ex. 1008, Fig. 8; Ex. 1009, 3:25–31). Therefore, according to Patent Owner, a person of ordinary skill in the art "would understand that: (i) *Conrad* teaches that pump down operations are performed with the additional manifold 90, and not the fracturing manifold 72; and (ii) *Neal* teaches boosting the pressure to high-pressure pumps during wellbore servicing operations, not boosting pressures of a pump used in a pump down operation." *Id.* at 18 (citing Ex. 2034). With this understanding in mind, Patent Owner asserts that "the combination of *Conrad's* dual manifold system with a single outlet and *Neal's* 'boost pump for high-pressure pumps' does not teach boosting the fluid to the pump used in a pump down operation to push a tool down a wellbore, as recited in claim 1." *Id.* Patent Owner makes similar arguments regarding claim 10. *Id.* at 22. For claim 16, Patent refers to its arguments regarding claim 1. *Id.* at 23.

Petitioner replies that "it is the combination of *Conrad* and *Neal* (and not the individual references in isolation) that discloses the use of *Neal's*

boost pump with *Conrad's* pump down manifold for a pump down operation." Pet. Reply 10. Petitioner argues that Patent Owner improperly attacks the individual references. *Id.* at 11 (citing *Hulu LLC v. SITO Mobile R&D IP, LLC*, IPR2021-00158, Paper 34 at 41 (PTAB Apr. 15, 2022)).

Patent Owner responds that it "properly analyzed the 'scope and content' of *Conrad* and *Neal* before reaching the motivation to combine and the prior art as a whole." PO Sur-Reply 10.

Patent Owner's arguments are unavailing. In its Response, Patent Owner does not couch its discussion of the individual references as analysis of the scope of content of Conrad and Neal. PO Resp. 16–18, 23. Rather, Patent Owner discusses each reference separately and then concludes that the combined teachings of the references do not meet the requirements of claim 1. PO Resp. 18. We agree with Petitioner that such arguments improperly attack the references individually. *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) ("Non-obviousness cannot be established by attacking references individually where the [grounds of unpatentability] is based upon the teachings of a combination of references."). As discussed in Section III.D.2 above, we find Petitioner's contentions to be fully supported by the record.

Patent Owner does not present separate arguments for claims 2, 3, 7, 8, 12–15, 17, 18, and 20. PO Resp. 18, 23. Instead, Patent Owner argues that for the same reasons Petitioner fails to show that claim 1 is obvious, it fails to show that claims 2, 3, 7, and 8 are obvious. *See id.* at 18–19. Patent Owner also argues that for the same reasons Petitioner fails to show that claim 10 is obvious, it fails to show that claims 12–15 are obvious. *See id.*

at 23. Finally, Patent Owner argues that for the same reasons Petitioner fails to show that claim 16 is obvious, it fails to show that claims 17, 18, and 20 are obvious. *Id.* As discussed in Section III.D.2 above, we find Petitioner's contentions to be fully supported by the record.

c. Claim 4

Claim 4 requires a method "wherein the wellbore comprises a first wellbore, and wherein the pressurized fluid is simultaneously directed to a second wellbore that also intersects the subterranean formation." Ex. 1001, 9:17–20.

Patent Owner contends that "the combination of *Conrad* in view of *Neal* and *Coli* fails to teach, 'wherein the pressurized fluid [that is directed to push the tool into the wellbore] is simultaneously directed to a second wellbore that also intersects the subterranean formation'" as required by claim 4. PO Resp. 19 (citing Ex. 1001, 9:17–20; Ex. 2034). In support of its contention, Patent Owner reiterates its argument that "[t]he combination of *Conrad's* dual manifold system with a single outlet and *Neal's* 'boost pump for high-pressure pumps' does not teach directing the boosted pressurized fluid in manifold 72 (fracturing manifold) to push the tool into the wellbore." *Id.* at 20 (citing Ex. 2034). With this understanding of the teachings of Conrad and Neal in mind, Patent Owner contends that "the combination of *Conrad* and *Neal* fails to teach the limitation 'wherein the pressurized fluid [that is directed to push the tool into the wellbore] is **simultaneously** directed to a second wellbore that also intersects the subterranean formation.'" *Id.* at 21 (citing Ex. 1001, 9:17–20; Ex. 2034).

Petitioner replies that Patent Owner "misunderstands its own claims." Pet. Reply 11. Petitioner asserts that claim 4 "requires 'simultaneous' operations in *different* wellbores, not the same wellbore." *Id.* at 12 (citing Ex. 1001, 9:17–20). According to Petitioner, "it is unclear how pump down operations and fracturing operations could simultaneously occur in the same wellbore, and neither the [Patent Owner Response] nor the '840 Patent provides any explanation" of how this could occur. *Id.* Petitioner asserts that "[t]he fact that a given skid assembly 74 has a single outlet for routing fluids from the fracturing manifold 72 and pump down manifold 90 is of no import, because *Conrad* teaches that there is a separate skid assembly 74 for each wellbore" and that, "as explained in the Petition, it would have been obvious to a [person of ordinary skill in the art] to operate the valves of *Conrad* such that fluid is directed to multiple wellbores simultaneously." *Id.* (citing Ex. 1008, Figs. 5–6; Pet. 31–32).

Patent Owner responds that "*Conrad's* system requires selection between a pump-down operation and a fracturing operation, as two distinct pumping operations resulting from fluid supplied from either a hydraulic fracturing manifold or the additional manifold." PO Sur-Reply 12 (citing PO Resp. 17 (citing Ex. 1008, 6:13–17)). Patent Owner responds further that

> there is no showing of a problem in *Conrad* that would motivate a [person of ordinary skill in the art] to look to the boost pumps in *Neal* or a problem in *Neal* that would lead a [person of ordinary skill in the art] to implement the boost pumps of *Neal* into the system for positioning a tool in *Conrad*. Further, *Conrad* specifically teaches away from simultaneous operations as

> *Conrad* selectively controls the flow of fluid through a single outlet.

Id.

We agree with Petitioner that claim 4 does not require simultaneous operations in the same wellbore. Pet. Reply 11. Thus, Patent Owner's teaching away argument is inapposite. Further, as discussed in Section III.D.2.a above, we are not aware of any requirement that a reference identify a problem to motivate a person of ordinary skill in the art to look to another reference as argued by Patent Owner. In accordance with *KSR*, "the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claims, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR*, 550 U.S. at 418.

3. Ground Two: Obviousness of Claims 4–6, 15, and 20 Over Conrad, Neal, Coli, and Tolman

Ground Two challenges claims 4–6, 15, and 20 based on the combined teachings of Conrad, Neal, Coli, and Tolman. Pet. 11. Having considered claims 4, 15, and 20 in view of the combined teachings of Conrad, Neal, and Coli in Sections III.D.2.b and c above, we do not further discuss them here.

Claim 5 depends from claim 4 and requires a method "wherein hydraulic fracturing is performed in the second wellbore." Ex. 1001, 9:21–22.

Patent Owner contends that "Petitioners' arguments related to Ground 2 fail because Petitioners fatally rely on their flawed motivation to combine *Conrad*, *Neal*, and *Coli*," "Petitioners failed to show that a [person of

ordinary skill in the art] would be motivated to combine the disparate dual manifold system of *Conrad* with the single manifold system of *Tolman*," and "Ground 2 is flawed with respect to claim 5 because the combination of *Conrad* in view of *Neal*, *Coli*, and *Tolman* fails to teach, 'wherein hydraulic fracturing is performed in the second wellbore.'" PO Resp. 29.

As discussed in Sections III.D.2.a–c, we do not see any flaw in Petitioner's reasons for combining the teachings of Conrad, Neal, and Coli. Patent Owner argues that "[s]ince claim 5 depends from claim 4, a [person of ordinary skill in the art] would understand that the method of claim 5 also uses a single manifold system." PO Resp. 29 (citing Ex. 1001, 9:18–20). With this understanding in mind, Patent Owner essentially reiterates its argument regarding claim 4 discussed in Section III.D.2.c. *Id.* at 29–30. Patent Owner's arguments are no more convincing for claim 5 than they are for claim 4.

Patent Owner further contends that "Petitioners' combination of *Conrad*, *Neal*, *Coli*, and *Tolman* would render the manifold system of *Conrad* unsuitable for its intended purpose (*i.e.*, a dual manifold system with a single outlet to perform pump down operations then fracturing operations)." PO Resp. 30. According to Patent Owner, Conrad and Tolman's systems are not combinable because "*Conrad* selectively controls operations through a single outlet, whereas, *Tolman* is directed to a single manifold able to distribute fluids to multiple wells for stimulation operations." *Id.* (citing *DePuy Spine*, 567 F.3d at1326 (combination not

obvious "if the prior art indicated that the invention would not have worked for its intended purpose")).

Petitioner replies that "the Petition does not suggest bodily incorporating *Tolman's* manifold system or any other physical component of *Tolman*" with the Conrad-Neal-Coli combination. Pet. Reply 13. Specifically, Petitioner asserts that "Ground 2 relies on the physical system already in place in the *Conrad-Neal-Coli* combination as disclosing all limitations of claim 4, and improves the physical system with the 'simultaneous operations' teachings of *Tolman*." *Id.* Petitioner references our note "in a parallel proceeding, 'the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference . . . Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.'" *Id.* (citing IPR2021-01032, Paper 12 at 28 (citing *In re Keller*, 642 F.2d 413, 425 (CCPA 1981))).

Petitioner replies further that Patent Owner is reading extraneous limitations into claim 5. Pet. Reply 14. Petitioner challenges Patent Owner's contention that a "[person of ordinary skill in the art] would understand that claim 5 requires using a single manifold system that simultaneously conducts a pump-down operation and a fracturing operation using the same 'pressurized fluid,'" asserting that Patent Owner "offers no basis for this statement as there is no mention in the claims of any 'manifold,' much less a 'single manifold system' in the claims of the '840 Patent." *Id.* (citing PO Resp. 30; Ex. 1001, 9:2–11, 9:17–22). Petitioner asserts that "[w]hile claim 4 requires that the same 'pressurized fluid' be

simultaneously directed to multiple wellbores, claim 5 simply adds that hydraulic fracturing is performed in the second wellbore. Claim 5 does not limit 'the pressurized fluid' to a hydraulic fracturing operation, and . . . does not specify when that hydraulic fracturing occurs." *Id.* Petitioner asserts further that "[e]ven assuming there is such a temporal requirement in claim 5, as discussed above, *Tolman* applied to the *Conrad-Neal-Coli* combination teaches simultaneous fracturing and pump down operations." *Id.* (citing Pet. 49–61).

Patent Owner responds by reiterating its teaching away argument and reiterating its argument that in Tolman "the simultaneous operations are not conducted through use of the single manifold system." PO Sur-Reply 13–14. Thus, according to Patent Owner, Petitioner fails to show that a person of ordinary skill in the art "could have or would have been motivated to combine[] *Tolman* with *Conrad*, *Neal*, and *Coli* to reach the claimed invention in Ground 2." *Id.* (citing *Belden Inc. v. Berk-Tec LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015).

Patent Owner responds further that "Petitioners still fail to address their faulty hindsight-based motivation to combine *Conrad*, *Neal*, *Coli*, and *Tolman*" and reiterates its arguments regarding Petitioner's reasoning. PO Sur-Reply 14.

We agree with Petitioner that Patent Owner's arguments are based on bodily incorporation of Tolman's manifold system into the Conrad-Neal-Coli combination. As such, they are unavailing. In addition, Patent

Owner's hindsight argument is unconvincing for the reasons discussed in Sections III.D.2.a and b above.

For claim 6, Patent Owner again reiterates its arguments that "the combination of *Conrad* in view of *Neal* and *Coli* lack evidentiary support" and that a person of ordinary skill in the art "would not have been motivated to combine the references." PO Resp. 33 (citing *id.* at 4–15). Patent Owner also reiterates it argument that "the combination of *Conrad*, *Neal*, and *Tolman* would render the intended purpose of *Conrad's* dual manifold system inoperable." *Id.* at 34 (citing *Id.* at 30). Patent Owner present no further arguments for claim 6.

Patent Owner's arguments concerning claim 6 are unconvincing for the reasons discussed above regarding claim 5.

4. Grounds Three–Five: Obviousness of Claims 9 and 19 Over Conrad, Neal, Coli, and Teurlay; Obviousness of Claim 11 Over Conrad, Neal, Coli, and Broussard-061; and Obviousness of Claim 13 Over Conrad, Neal, Coli, and Broussard-079

Ground Three challenges claims 9 and 19 based on the combined teachings of Conrad, Neal, Coli, and Teurlay. Pet. 11. Ground Four challenges claim 11 based on the combined teachings of Conrad, Neal, Coli, and Broussard-601. *Id.* Ground Five challenges claim 13 based on the combined teachings of Conrad, Neal, Coli, and Broussard-079. *Id.* Patent Owner does not present arguments for claims 9, 11, 13, and 19 other than reiterating its contentions that "the combination of *Conrad* in view of *Neal*, *Coli*, and *Teurlay* lack evidentiary support" and that "Petitioners fatally rely on their flawed motivation to combine *Conrad*, *Neal*, and *Coli*." PO Resp.

34–36. Patent Owner's arguments are unconvincing for the reasons discussed in Sections II.D.2. a and b, above.

5. Alleged Objective Evidence of Nonobviousness

Notwithstanding what the teachings of the prior art would have suggested to one skilled in the art, objective evidence of nonobviousness (so called "secondary considerations") may lead to a conclusion that the challenged claims would not have been obvious. *In re Piasecki*, 745 F.2d 1468, 1471–72 (Fed. Cir. 1984). Objective evidence of nonobviousness "may often be the most probative and cogent evidence in the record" and "may often establish that an invention appearing to have been obvious in light of the prior art was not." *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.*, 699 F.3d 1340, 1349 (Fed. Cir. 2012) (citing *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538 (Fed. Cir. 1983)).

"In order to accord substantial weight to secondary considerations in an obviousness analysis, 'the evidence of secondary considerations must have a "nexus" to the claims, i.e., there must be "a legally and factually sufficient connection" between the evidence and the patented invention.'" *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019) (citing *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1332 (Fed. Cir. 2019)). "The patentee bears the burden of showing that a nexus exists . . . ." *WMS Gaming Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1359 (Fed. Cir. 1999). Nexus is a legally and factually sufficient connection between the objective evidence and the claimed invention, such that the objective evidence should be considered in determining nonobviousness.

Demaco Corp. v. F. Von Langsdorff Licensing Ltd., 851 F.2d 1387, 1392 (Fed. Cir. 1988). A nexus is presumed when "the patentee shows that the asserted objective evidence is tied to a specific product and that product 'embodies the claimed features, and is coextensive with them.'" *Fox Factory*, 944 F.3d at 1373 (quoting *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1072 (Fed. Cir. 2018)). "A finding that a presumption of nexus is inappropriate does not end the inquiry into secondary considerations," because "the patent owner is still afforded an opportunity to prove nexus by showing that the evidence of secondary considerations is the 'direct result of the unique characteristics of the claimed invention.'" *Id.* at 1373–74 (citing *In re Huang*, 100 F.3d 135, 140 (Fed. Cir. 1996)).

a. Petitioner's Alleged Failure to Rebut the Objective Evidence of Nonobviousness in the Prosecution History of a Parent Patent

Patent Owner asserts that "Petitioners' failure to address any of [its] evidence of secondary considerations—even if the evidence is not dispositive—of which Petitioner . . . was clearly aware at the time of filing its Petition, is an error that cannot be cured." PO Resp. 38. Thus, according to Patent Owner, "Petitioners have failed to state a *prima facie* case of obviousness." *Id.*

In this case, where the evidence of secondary considerations appears in the prosecution history of a parent patent of the patent at issue (the '840 patent), we do not fault Petitioner for not addressing this evidence in the Petition. Patent Owner raised the issue of secondary considerations in its Response to the Petition. PO Resp. 41–65. Petitioner responded by addressing secondary considerations in its Reply. Pet. Reply 15–24. After

which, Patent Owner was afforded another opportunity to discuss secondary considerations. PO Sur-Reply 16–18

b. Alleged Nexus Between the Evidence and the Claimed Invention

Patent Owner asserts its Clean Fleet® products "embody the claims of the '840 Patent." PO Resp. 41. In support of this assertion, Patent Owner asserts that the Clean Fleet® products include "(i) a Frac Pump trailer; (ii) electric pumpdown pumps; (iii) a blender; and (iv) generators" and that "the 'Frac Pump Trailers' have 'electric powered frac pumps' on a single trailer that are fluidly connected to a well." *Id.* at 42. Patent Owner specifically addresses how the Clean Fleet® products allegedly embody claims 1, 7–9, 10, 12, 13, and 16–19. *Id.* at 44–54. For claim 1, Patent Owner asserts that "[t]he Clean Fleet® system practices a method of operation in a subterranean formation as disclosed and claimed in independent claim 1." *Id.* at 44 (citing Ex. 2034). Specifically, Patent Owner asserts that

> the Clean Fleet® system practices a method of operation in a subterranean formation, the method comprising: driving a pump with an electrically powered motor to pressurize fluid; inserting a tool into a wellbore that intersects the formation; pressurizing fluid with a boost pump to form a boost fluid; directing the boost fluid to the pump; and directing the pressurized fluid into the wellbore above the tool to push the tool into the wellbore.

Id. Patent Owner asserts that its "Clean Fleet® system is a system for 'hydraulic fracturing' and [it] uses its 'electric Clean Fleet®' system and products to provide fracturing services." *Id.* at 45 (citing Ex. 2047, 1). Thus, according to Patent Owner, Patent Owner's "fracturing services associated with the Clean Fleet® system are a method of operations in a

subterranean formation. The claimed process and the claimed Clean Fleet® system comprises electric pumps powered by electric motors." *Id.* (citing Ex. 2034; Ex. 2011, 5; Ex. 2026, 151).

In addition, Patent Owner asserts that "[t]he claimed system and process are directed to operations for use in a subterranean formation comprising a pump down pump, a hydraulic fracturing pump, and an electric motor that drives the pump down pump." *Id.* at 45–46 (citing Ex. 1001, 9:2–10, 9:36–10:2, 10:17–29). Patent Owner asserts that the "Clean Fleet® system includes the step of driving a pump with an electrically powered motor to pressurize fluid. For example, Frac Pump Trailers[] have 'electric powered frac pumps . . . capable of pumping . . . stimulation fluids . . . and is remotely operated from the datavan.'" *Id.* at 46 (citing Ex. 2031, 2). Patent Owner asserts further that "[t]he frac pump trailers have pumps driven by electric motors," "[t]he frac pump trailers pressurize fluid," and the '"Frac Pump Trailers' can deliver 'proppant laden stimulation fluid.'" *Id.*

Patent Owner further asserts that

> Operation of [Patent Owner's] Clean Fleet® system includes the steps of inserting a tool into a wellbore that intersects the formation; . . . pressurizing fluid with a boost pump to form a boost fluid; directing the boost fluid to the pump; and directing the pressurized fluid into the wellbore above the tool to push the tool into the wellbore.

Id. at 46–47. As an example, Patent Owner asserts that "the Clean Fleet® system includes a wireline and crane system which is used to insert a tool into a wellbore that intersects the formation," "[t]he blender may boost the fluid to a fleet of frac pumps at rates up to 130 bpm," and "the frac pump trailers are fluidly connected to the wellbore and may push the tool into the

wellbore." *Id.* at 47. Thus, according to Patent Owner, "the Clean Fleet® system embodies claim 1." *Id.* Patent Owner provides further argument regarding nexus on pages 63–65 of its Response. We do not reproduce these arguments as they are discussed below in Petitioner's response to them. We also note that Patent Owner does address nexus in its Sur-Reply. *See generally*, PO Sur-Reply.

Petitioner replies that Patent Owner "fails to address coextensiveness meaningfully in its [Response], and instead offers a conclusory assertion for the purported secondary indicia . . . using only the same Clean Fleet product presented in the prosecution history of the . . . parent '410 Patent." Pet. Reply 16–18 (citing PO Resp. 36–38). Petitioner also notes that Patent Owner "points to the ***same*** Clean Fleet product for non-obviousness across ***sixteen*** patents." *Id.* at 17 (citation omitted). Petitioner asserts that Patent Owner "cannot demonstrate nexus merely by asserting that one product somehow embodies a multitude of different claims in different patents." *Id.*

Turning to claim 1, Petitioner notes that it requires '"inserting a tool into a wellbore,' 'pressurizing fluid with a boost pump to form a boost fluid,' and 'directing the pressurized fluid into the wellbore above the tool to push the tool into the wellbore'—all features that are not recited in the claims of the '410 Patent (or the specification)." Pet. Reply 18. Petitioner asserts: '"[T]he same evidence of secondary considerations cannot be presumed to be attributable to two different features,' much less the dozens of features recited by [Patent Owner's] sixteen different patents." *Id.* at 20 (citing *Unified Patents*, IPR2019-01379, Paper 52, at 51; *Apple, Inc. v. Corephotonics, Ltd.*, IPR2020-00862, Paper 35, at 53–54 (PTAB Dec. 7,

2021; *Intel Corp. v. FG SRC LLC*, IPR2020-01449, Paper 53, at 73–74 (PTAB Mar. 1, 2022)).

Petitioner further responds that Patent Owner has not shown that the evidence of secondary considerations is the result of the unique characteristics of the claimed invention. *See* Pet. Reply 20. According to Petitioner, Patent Owner "repeatedly asserts that the purported secondary considerations evidence 'is due to the electrically powered pumps.'" *Id.* at 21 (citing PO Resp. 55–57, 60, 65). Petitioner asserts, however, that "pumps driven by electric motors are not unique to the '840 Patent, as such features are also found in other of [Patent Owner's] patents." *Id.* (citing IPR2021-01032 ('410 Patent) claim 1; IPR2021-01035 ('278 Patent) claims 1, 9). Petitioner asserts further that such features are not novel "as pumps driven by electric motors and electric generators were indisputably disclosed in the prior art." *Id.* (citing Ex. 1033, 15:11–15, 17:15–18; Ex. 1010 ¶¶ 40–52, 65–66; *Norvatis AG v. Torrent Pharmas. Ltd.*, 853 F3d 1316, 1331 (Fed. Cir. 2017).

In addition, Petitioner responds that Patent Owner's "inability to identify any such 'unique characteristics' of the '840 Patent is highlighted by its 'alternative' position that there is a nexus based on 'the claimed invention as a whole.'" Pet. Reply 21 (citing PO Resp. 64–65 (citing *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1329–32 (Fed. Cir. 2016)). Petitioner asserts that Patent Owner "does not present any evidence attributable to 'the claimed invention as a whole,' and instead attributes the purported evidence to the use of electric motors and electric pumps." *Id.* at 21–22 (citing PO Resp. 65). Thus, according to Petitioner, there is no nexus because Patent

Owner's "purported evidence regarding nexus 'exclusively relates to a feature that was "known in the prior art.'"" *Id.* at 22 (citing *WBIP*, 829 F.3d at 1330).

We agree with Petitioner that Patent Owner has not demonstrated the requisite coextensive requirement to be afforded a presumption of nexus or, absent the presumption, shown that evidence of secondary considerations is the "direct result of the unique characteristics of the claimed invention." Pet. Reply 15 (citing *Fox Factory*, 944 F.3d at 1373–74).

For example, claim 1 of the '840 patent requires "inserting a tool into a wellbore that intersects the formation" and "directing the pressurized fluid into the wellbore above the tool to push the tool into the wellbore." Ex. 1001, 9:6–7, 10–11. Patent Owner asserts that its Clean Fleet® system performs these steps, but Patent Owner provides no evidence to support this assertion. PO Resp. 44. Instead, Patent Owner provides evidence allegedly supporting its assertions about how Clean Fleet®'s electric pumps and motors operate. *Id.* at 45.

We also agree with Petitioner that Patent Owner fails to show that the evidence of secondary considerations is a direct result of the unique characteristics of the claimed invention, because Clean Fleet®'s electric pumps and motors are not unique given Coli's disclosure of the use of such devices. Pet. Reply 21. We further agree with Petitioner that Patent Owner has not presented any evidence attributable to "the claimed invention as a whole." *Id.* Moreover, we agree with Petitioner that Patent Owner's assertion that its Clean Fleet® product is coextensive with the claims of sixteen patents is problematic.

For these reasons, we determine that Patent Owner is not entitled to the presumption of nexus. For these same reasons, we further determine that Patent Owner has not directly demonstrated nexus.

c. Alleged Commercial Success

Although we do not find nexus for the reasons discussed above, in the interest of full and complete consideration of the record, we discuss Patent Owner's evidence of commercial success.

"When a patentee can demonstrate commercial success, usually shown by significant sales in a relevant market, and that the successful product is the invention disclosed and claimed in the patent, it is presumed that the commercial success is due to the patented invention." *J.T. Eaton & Co. v. Atl. Paste & Glue Co.*, 106 F.3d 1563, 1571 (Fed. Cir. 1997) (citing *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392–93 (Fed. Cir. 1988)). However, "the asserted commercial success of the product must be due to the merits of the claimed invention beyond what was readily available in the prior art." *Id.* (citing *Richdel, Inc. v. Sunspool Corp.*, 714 F.2d 1573, 1580 (Fed. Cir. 1983)).

Patent Owner argues that its Clean Fleet® products have achieved commercial success. PO Resp. 54–57. Patent Owner relies predominantly on the declaration of Joel N. Broussard (Ex. 2009) in support of its contention that the Clean Fleet® product drove a 22% growth in its business and on a Yahoo News article (Ex. 2010) in support of its contention that it entered a license agreement for its Clean Fleet® products. *Id.* at 54, 56.

Petitioner notes correctly that Patent Owner relies on the declaration of Mr. Schaaf (Ex. 2008) in support of its assertions of commercial success

and argues that Mr. Schaaf merely relied upon Mr. Broussard's declaration and the prosecution history of the '410 patent, but "did not do any independent analysis to verify any of the facts." Pet. Reply 23 (citing Ex. 1041, 12:13–13:2, 14:9–15; Ex. 1040, 117:9–119:14, 218:25–220:22).

Mr. Broussard is Patent Owner's President and Chief Executive Officer. Ex. 2009 ¶ 2. Thus, Mr. Broussard is not an unbiased declarant, and it is not clear that his declaration qualifies as *objective* evidence. *See In re Huang*, 100 F.3d at 140 ("[The inventor's affidavit] merely represents the inventor's opinion as to the purchaser's reason for buying the product, and, alone, is insufficient. Instead, the applicant must submit some factual evidence that demonstrates the nexus between the sales and the claimed invention—for example, an affidavit from the purchaser explaining that the product was purchased due to the claimed features."). For the contentions relied upon by Patent Owner, Mr. Broussard cites to the prosecution history of the '410 patent for support. Ex. 2009, 4 (citing Ex. 2026, 143–99). The arguments regarding objective indicia of nonobviousness presented during prosecution of the '410 patent consist mainly of conclusory assertions. For example, regarding the contention asserting 22% growth, the applicant cites to "Exhibit A at ¶ 9." Ex. 2026, 150–51. Exhibit A is the declaration of Jared Oehring, Patent Owner's Vice President of Technology. *Id.* at 166. Thus, the declarant is not unbiased and, therefore, his declaration is not objective. Moreover, Mr. Oehring does not discuss "22% growth" in paragraph nine or elsewhere in his declaration. *See id.* at 166–68. We do not find such evidence to be objective or persuasive of nonobviousness of the challenged claims.

Exhibit 2010 is a Yahoo News press release that purports that Patent Owner sold PIK Notes that ProFrac converted into licenses. Ex. 2010, 1–2. However, Patent Owner has not entered the asserted license(s) into the record in this proceeding. Therefore, we are unable to evaluate the veracity of Exhibit 2010 or determine if the '840 patent is included in the asserted license. Moreover, Patent Owner's attempt to establish that the purported license includes the '840 patent without making the license of record in this proceeding violates the best evidence rule. *See* Fed. R. Evid. 1002 ("An original writing, recording, or photograph is required in order to prove its content unless these rules or a federal statute provides otherwise."); 37 C.F.R. § 41.152(a) ("Except as otherwise provided in this subpart, the Federal Rules of Evidence shall apply to contested cases."). For at least these reasons, we do not find Exhibit 2010 persuasive of commercial success.

We additionally note that Patent Owner does not define the relevant market or present sales figures in support of its assertions of commercial success. *See J.T. Eaton & Co.*, 106 F.3d at 1571 (noting that commercial success is "usually shown by significant sales in a relevant market, and that the successful product is the invention disclosed and claimed in the patent").

Finally, we note that the use of electric motors in place of diesel engines in hydraulic fracturing systems was known prior to the '840 patent. *See, e.g.*, Ex. 1010 ¶¶ 9–11, 38–39, 66–71. For this additional reason, Patent Owner's assertions of commercial success are unpersuasive. *See Ormco Corp. v. Align Tech., Inc.,* 463 F.3d 1299, 1312 (Fed. Cir. 2006) ("if the feature that creates the commercial success was known in the prior art, the

success is not pertinent"); *In re Kao,* 639 F.3d at 1057, 1070 (Fed. Cir. 2011) (requiring a determination of "whether the commercial success of the embodying product resulted from the merits of the claimed invention as opposed to the prior art or other extrinsic factors").

Accordingly, for at least the foregoing reasons, we find Patent Owner's evidence of commercial success to be weak evidence of non-obviousness.

d. Alleged Industry-Wide Praise

Although we do not find nexus for the reasons discussed above, in the interest of full and complete consideration of the record, we discuss Patent Owner's evidence of industry-wide praise.

"Evidence that the industry praised a claimed invention or a product that embodies the patent claims weighs against an assertion that the same claimed invention would have been obvious. Industry participants, especially competitors, are not likely to praise an obvious advance over the known art." *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1053 (Fed. Cir. 2016) (en banc).

Patent Owner argues that its Clean Fleet® products have been praised by the industry. PO Resp. 58–60. Patent Owner argues that its Clean Fleet® products have received praise from professionals in the industry, recognition from industry publications, and industry awards. *Id.* at 58–59.

Petitioner argues that, in large part, Patent Owner's arguments "relies solely on a string-cite from its CEO Broussard, absent further explanation of the awards." Pet. Reply 24 (citing PO Resp. 59–60). Petitioner argues that

Mr. Schaaf "did not review the awards, know who else received them, or know the criteria for the awards." *Id.* (citing Ex. 1041, 18:20–19:20).

Patent Owner relies for the most part on the Broussard and Schaff declarations. *See* PO Resp. 58–60 (citing Ex. 2009; Ex. 2034). As explained above, however, Patent Owner has failed to establish that these documents are objective evidence. Although Patent Owner touts several awards (*see, e.g.*, PO Resp. 58–59), Patent Owner presents no evidence regarding the basis on which such awards are granted. We do not find such evidence persuasive to establish that the industry praised the method and system claimed in the '840 patent.

Accordingly, for at least the foregoing reasons, we find Patent Owner's evidence of industry praise to be weak evidence of non-obviousness.

e. Alleged Copying By Others

Although we do not find nexus for the reasons discussed above, in the interest of full and complete consideration of the record, we discuss Patent Owner's evidence of copying.

"Copying may indeed be another form of flattering praise for inventive features." *Crocs, Inc. v. ITC*, 598 F.3d 1294, 1311 (Fed. Cir. 2010). Copying "requires evidence of efforts to replicate a specific product." *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010). "This may be demonstrated either through internal documents; direct evidence such as disassembling a patented prototype, photographing its features, and using the photograph as a blueprint to build a virtually identical replica; or access to, and substantial similarity to, the patented product (as

opposed to the patent)." *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004) (internal citations omitted). "We note, however, that a showing of copying is only equivocal evidence of nonobviousness in the absence of more compelling objective indicia of other secondary considerations." *Ecolochem, Inc. v. S. Cal. Edison Co.*, 227 F.3d 1361, 1380 (Fed. Cir. 2000); *see also In re GPAC*, 57 F.3d at 1580 ("[M]ore than the mere fact of copying by an accused infringer is needed to make that action significant to a determination of the obviousness issue." (quoting *Cable Elec. Prods. v. Genmark, Inc.*, 770 F.2d 1015, 1028 (Fed. Cir. 1985))).

Patent Owner argues that it disclosed its Clean Fleet® product at various events and that certain of its competitors, including Petitioner, copied the product. PO Resp. 61–64.

Petitioner notes that Patent Owner relies on the declaration of Mr. Schaaf in support of its assertions of copying and argues that Mr. Schaaf "did not know any of the brands, models, ratings, number of units, or other specifics of the alleged copiers." Pet. Reply 24 (citing Ex. 1040, 123:8–127:15, 130:14–22, 131:21–136:18).

Patent Owner relies predominantly on Mr. Schaaf's declaration and arguments. *See* PO Resp. 61–64 (citing Ex. 2008). As explained above, however, Patent Owner has failed to establish that this document is objective evidence. In arguing that Petitioner copied its Clean Fleet® system, Patent Owner asserts that Petitioner had access to its system because Patent Owner's "product had been in the market since 2014." PO Resp. 61. Patent Owner does not identify any evidence that Petitioner actually did have access to Patent Owner's Clean Fleet® product. Rather, Patent Owner

merely surmises that Petitioner had access because Patent Owner's product had been used in public. Such a mere assertion is not evidence of copying. *See Iron Grip Barbell Co.*, 392 F.3d at 1325.

Accordingly, for at least the foregoing reasons, we find Patent Owner's evidence of copying to be weak evidence of non-obviousness.

6. Determination For Claims 1–20

Petitioner has shown that the individual limitations of claims 1–20 of the '840 patent are disclosed by various combinations of Conrad, Neal, and Coli with Tolman, Teurlay, Broussard-601, or Broussard-079, and Petitioner provides persuasive arguments regarding why a person of ordinary skill in the art would have combined the teachings of these references. Patent Owner's objective indicia is comparatively weak. When considering all of the evidence of obviousness and nonobviousness together (*see In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063, 1079 (Fed. Cir. 2012)), we conclude Petitioner has demonstrated by a preponderance of the evidence that the challenged claims would have been obvious over the prior art in each of the Petition's challenges.

7. Summary[12]

For the reasons discussed above, we find that Petitioner has demonstrated, by a preponderance of the evidence that claims 1–20 are unpatentable as set forth in the table below:

[12] Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this

Claims	35 U.S.C. §	References	Claims Shown Unpatentable	Claims Not shown Unpatentable
1–4, 7, 8, 10, 12–18, 20	103	Conrad, Neal, Coli	1–4, 7, 8, 10, 12–18, 20	
4–6, 15, 20	103	Conrad, Neal, Coli, Tolman	4–6, 15, 20	
9, 19	103	Conrad, Neal, Coli, Teurlay	9, 19	
11	103	Conrad, Neal, Coli, Broussard-601	11	
13	103	Conrad, Neal, Coli, Broussard-079	13	
Overall Outcome			1–20	

IV. ORDER

After due consideration of the record before us, and for the foregoing reasons, it is:

---

decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

ORDERED that claims 1–20 of the '840 patent are held unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

For PETITIONER:

Chad C. Walters
David J. Tobin
Brandon Chen
Brian C. Nash
Steven P. Tepera
Clarke Stavinoha
BAKER BOTTS L.L.P.
chad.walters@bakerbotts.com
david.tobin@bakerbotts.com
brandon.chen@bakerbotts.com
bnash@mofo.com
DLHalliburtonUS8789601IPR@bakerbotts.com
clarke.stavinoha@bakerbotts.com

For PATENT OWNER:

B. Todd Patterson
John Allen Yates
Edgar N. Gonzalez
Kyrie K. Cameron
PATTERSON + SHERIDAN, LLP
tpatterson@pattersonsheridan.com
jyates@pattersonsheridan.com
egonzalez@pattersonsheridan.com
kcameron@pattersonsheridan.com