

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.

IPR2021-01038
Patent 10,408,030 B2

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

BROWNE, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
Denying Patent Owner's Revised Motion to Amend
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 1–14 of U.S. Patent No. 10,408,030 B2 (“the ’030 patent”). Paper 3 (“Pet.”). We issued a Decision to Institute an *inter partes* review (Paper 11, “Inst. 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 20, “PO Resp.”) and a Patent Owner’s Contingent Motion to Amend (Paper 21). Thereafter, Petitioner filed a Petitioner’s Reply to Patent Owner’s Response (Paper 31, “Pet. Reply”).

We issued Preliminary Guidance (Paper 33, “Prelim. Guid.”) concerning the initial motion amend. Following the Preliminary Guidance, Patent Owner filed a Revised Contingent Motion to Amend (Paper 34, “Motion to Amend” or “Mot.”) and a Patent Owner’s Sur-Reply to Petitioner’s Reply (Paper 36, “PO Sur-Reply”). Thereafter, Petitioner filed a Petitioner’s Opposition to Patent Owner’s Revised Contingent Motion to Amend (Paper 38, “Mot. Opp.”).¹ Patent Owner then filed Patent Owner’s Reply in Support of Motion to Amend (Paper 46, “Mot. Reply”). Petitioner subsequently filed a Petitioner’s Sur-reply to Patent Owner’s Reply to Opposition to Motion to Amend (Paper 60, “Mot. Sur-Reply”).

¹ Some of the papers relating to the Revised Contingent Motion to Amend were filed in two versions: one that is under seal (*see* Papers 39, 45, 50, 53, 56, 59), and another that is publicly available but redacted to hide sealed information (*see* Papers 38, 46, 51, 54, 57, 60). In this Decision, for the reasons discussed below, we do not reach any of the issues that turn on the sealed information. Therefore, we cite to the publicly available Papers.

Patent Owner also filed a Motion to Exclude Evidence (Paper 51). Petitioner filed an Opposition to this Motion (Paper 54). Patent Owner filed a Reply to the Opposition (Paper 57).

Oral argument was conducted on December 8, 2022, for this proceeding and the transcript of the hearing has been entered as Paper 68.

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 1–14 are unpatentable. We further determine that Patent Owner has met its burden of production for proposed substitute claims 15–28, but that Petitioner has also met its burden of showing, by a preponderance of evidence, that these claims are unpatentable as well. We do not rule on Patent Owner’s Motion to Exclude Evidence, because it seeks to exclude evidence relating to unpatentability grounds that we do not reach.

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 67, 2.

The parties state that the '030 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; IPR2021-01037 against U.S. Pat. No. 9,745,840 (“the ’840 patent”); IPR2021-01065 against U.S. Pat. No. 9,840,901; and IPR2021-01066 against U.S. Pat. No. 10,020,711.² Pet. 1; Paper 5, 1.

B. The '030 Patent

The '030 patent for an “Electric Powered Pump Down,” issued September 10, 2019. Ex. 1002, 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 1:24–26. Figure 1A of the '030 patent is reproduced below.

² The '030 patent is a continuation of the '840 patent, which is a continuation-in-part of the '410 patent.

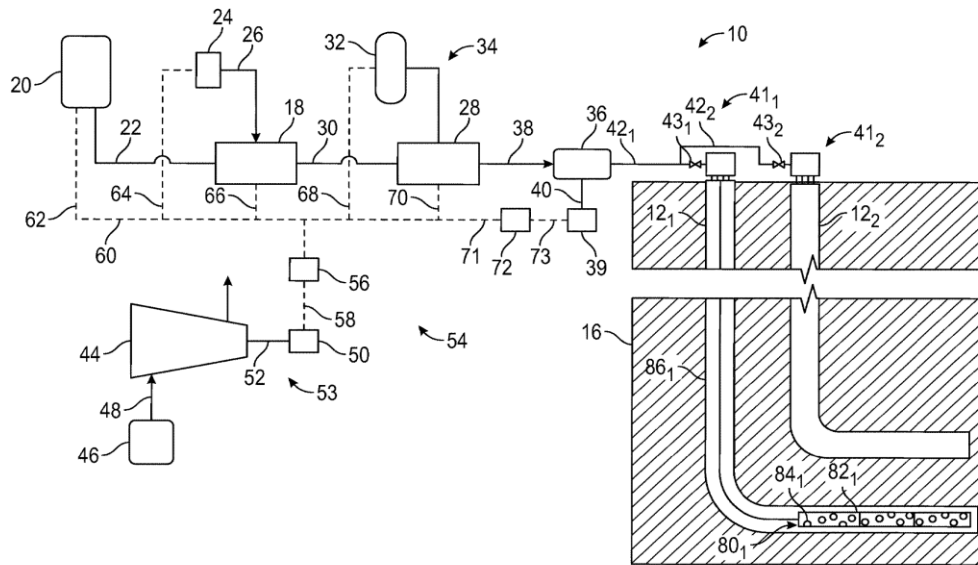


FIG. 1A

Figure 1A shows a schematic of system 10 that provides pressurized fluid to wellbores. *Id.* at 3:65–66. 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, 4:4. To the right of fluid source 20 is additive source 24 (represented by a small rectangle). *Id.* at Fig. 1A, 4:5–6. Below and to the right of additive source 24 is hydration unit 18 (represented by a large rectangle). *Id.* at Fig. 1A, 4:3–4. Above and to the right of hydration unit 18 is proppant source 32 (represented by a pill shape). *Id.* at Fig. 1A, 4:15. Below and to the right of proppant source 32 is blender unit 28 (represented by a large rectangle). *Id.* at Fig. 1A, 4:14. To the right of blender unit 28 is pump assembly 36 (represented by a small chamfered rectangle). *Id.* at Fig. 1A, 4:31. To the right of pump assembly 36 is wellhead assembly 41₁, 41₂ (represented by a pair of small rectangles) and below pump assembly 36 is motor 39 (represented by a small rectangle). *Id.*

at Fig. 1A, 4:30, 34. To the left of motor 39 is variable frequency drive 72 (represented by a small rectangle). *Id.* at Fig. 1A, 5:20–21. Below wellhead assembly 41 are wellbores 12₁, 12₂ (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, 4:3. Figure 1A also shows perforating string 80₁ (represented by a rectangle located inside the horizontal portion of shaft 12₁). *Id.* at Fig. 1A; 5:41–42. Perforating string 80₁ includes perforating guns 82₁ (represented by small circles inside perforating string 80₁) stacked in series and coaxial with one another. *Id.* at Fig. 1A, 5:43.

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. 1002, Fig. 1A, 4:60, 66. 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, 4:52, 54. “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, 5:7–8. 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, 5:11–13. “[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, line 70 connects blender unit 28 to bus 60.” *Id.* at Fig. 1A, 5:16–19. 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, 5:19–21.

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. 1002, Fig. 1A, 4:3–5.

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, 4:5–6.

The fluid and additives are transferred from hydration unit 18 to blender unit 28 via line 30 (represented by a solid arrow 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, 4:13–14. Proppant source 32 delivers proppant to blender unit 28 via line 34 (represented by a solid arrow 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, 4:15–16. 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, 4:18–20. Perforating string 80₁ is pumped down within wellbore 12₁ by pressurized fluid from pump system 36. *Id.* at Fig. 1A, 5:37–38.

C. Challenged Claims

Petitioner challenges claims 1–14. Pet. 11. Claims 1 and 10 are independent claims. Ex. 1002, 9:9–20, 10:10–20. Claims 2–9 depend from claim 1 and claims 11–14 depend from claim 10. *Id.* at 9:21–10:9, 10:21–33.

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 upstream of the pump to form a boost fluid;

directing the boost fluid to the pump; and

directing the pressurized fluid downstream of the pump and into the wellbore upstream of the tool to push the tool into the wellbore.

Ex. 1002, 9:9–20.

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, 10–14	103(a)	Conrad, ³ Neal, ⁴ Coli ⁵
4–6, 14	103(a)	Conrad, Neal, Coli, Tolman ⁶
9	103(a)	Conrad, Neal, Coli, Teurlay ⁷
12	103(a)	Conrad, Neal, Coli, Broussard 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 grounds 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.

³ Conrad et al., U.S. Patent No. 9,903,190 B2, issued February 27, 2018 (Ex. 1008) (“Conrad”).

⁴ Neal, U.S. Patent No. 8,146,665 B2, issued April 3, 2012 (Ex. 1009) (“Neal”).

⁵ Coli et al., U.S. Patent Application Publication No. 2012/0255734 A1, published Oct. 11, 2012 (Ex. 1010) (“Coli”).

⁶ Tolman et al., U.S. Patent Application Publication No. 2009/0114392 A1, published May 7, 2009 (Ex. 1011) (“Tolman”).

⁷ Teurlay et al., U.S. Patent No. 7,900,893 B2, issued March 8, 2011 (Ex. 1012) (“Teurlay”).

⁸ Broussard et al., U.S. Patent Application Publication No. 2014/0138079 A1, published May 22, 2014 (Ex. 1014) (“Broussard”).

2015). To 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 '030 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. 11–12 (citing Ex. 1005 ¶¶ 29–30). Patent Owner adopts this definition of the level of skill. PO Resp. 2–3.

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.

Neither Petitioner nor Patent Owner provide any explicit construction of any claim terms. Pet. 12, PO Resp. 3. Except to the extent we explain how we interpret the claims in the analysis below, we decline to otherwise expressly construe any claim terms. *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 Art⁹

1. Conrad

Conrad is a U.S. Patent for a “Modular Fracturing System” 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:

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

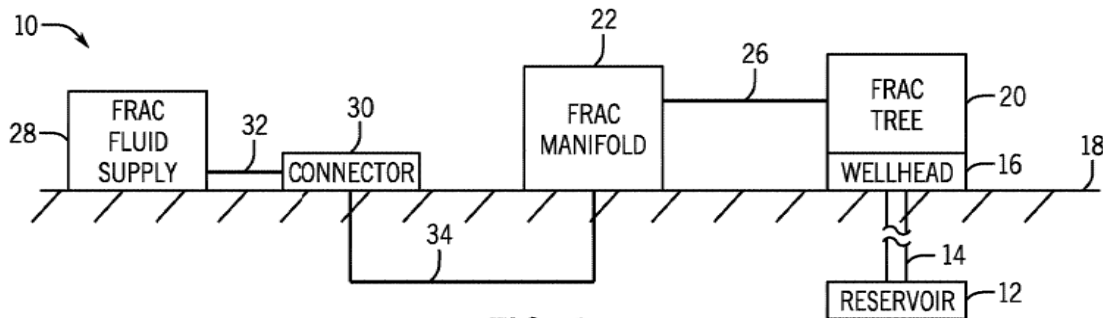


FIG. 1

Id. at Fig. 1. Figure 1 shows fracturing system 10 (depicted as a block diagram) including 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.* at Fig. 1, 3:21–22. Wellhead 16 is depicted as approximately the bottom third of the bifurcated rectangle encompassing fracturing tree 20. *Id.* at Fig. 1. Directly below wellhead 16 is well 14 (depicted as a split channel) leading to reservoir 12 (depicted by a rectangle approximately the same size 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 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:

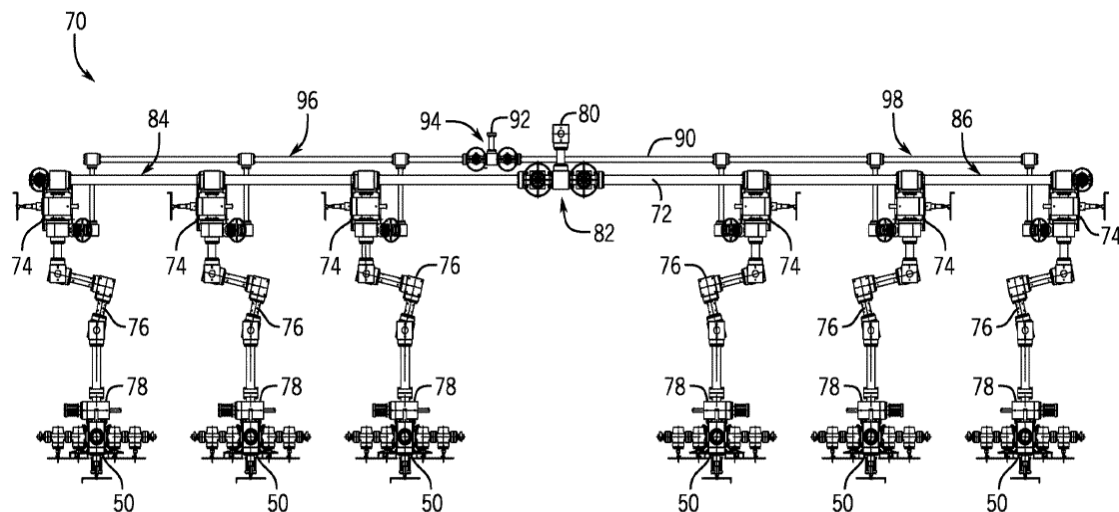


FIG. 5

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” 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 titled, “Mobile, Modular, Electrically Powered System for Use in Fracturing Underground Formations,” 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.

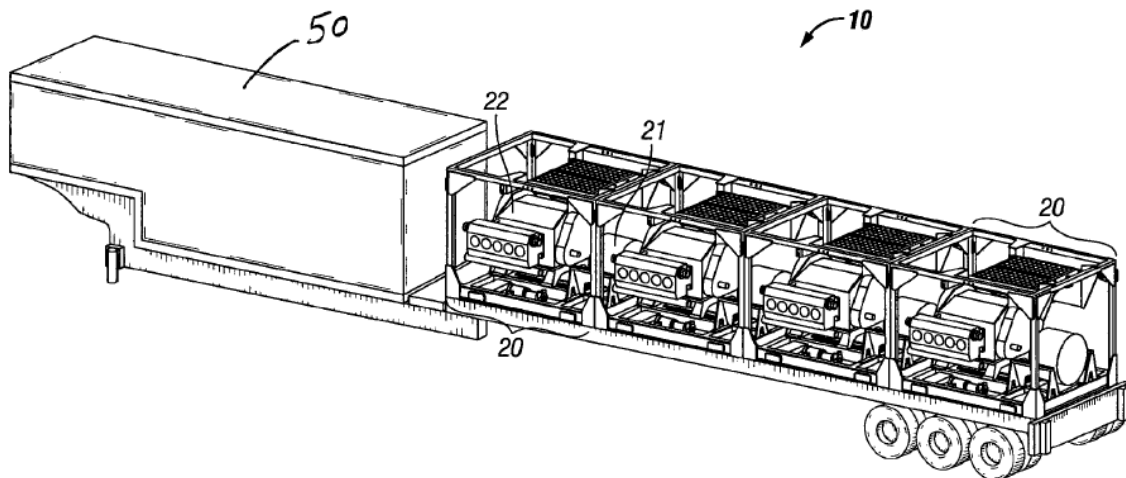


FIG. 3

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

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).

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. Independent Claims 1 and 10

The Petition maps elements from Conrad, Neal, and Coli to each limitation of independent claims 1 and 10. Pet. 26–31, 37–42. Patent Owner does not contest Petitioner’s mapping.¹¹ PO Resp. 7–15. We have reviewed Petitioner’s contentions and Dr. Hilbert’s supporting testimony regarding independent claims 1 and 10 and are persuaded, by the reasons stated by Petitioner, that Conrad, Neal, and Coli collectively teach the limitations of claims 1 and 10. Pet. 14–31, 37–42; Ex. 1005 ¶¶ 74–108, 123–134. We focus our discussion on the issues disputed by the parties, namely, Patent Owner’s contentions that Petitioner misrepresents or misinterprets Conrad and that it similarly misrepresents or misinterprets Neal such that the combination proposed in the Petition is based on impermissible hindsight. We then discuss Patent Owner’s argument that the Petition’s reliance on common sense is misplaced, before considering Patent Owner’s alleged objective evidence of nonobviousness. PO Resp. 7–15.

a. Alleged Misrepresentation or Misinterpretation of Conrad

¹¹ In other words, Patent Owner essentially concedes that one of Conrad, Neal, or Coli discloses each of the limitations of claims 1 and 10, and Patent Owner focuses its arguments instead on Petitioner’s reasoning in support of the proposed combination.

Patent Owner contends that Conrad is “misrepresented or misinterpreted in each asserted ground by Petitioner.” PO Resp. 7–8. Specifically, Patent Owner contends that Conrad “does not disclose a requirement for a high-pressure pump or a specific pressure required to pump a downhole tool.” *Id.* at 8 (citing Ex. 2034 ¶¶ 31–33). According to Patent Owner, “[i]n the state of the art at the time of filing of the ‘030 patent . . . pressures of up to 3000 psi were considered sufficient for conveyance of a tool downhole using a wireline by opening valves at pressures up to 3000 psi.” *Id.* at 8–9 (quoting Ex. 2032,¹² 6:1–17, 10:3–7). Thus, Patent Owner contends, “Petitioner has not set forth any basis for why a [person of ordinary skill in the art] would understand *Conrad* to require a high-pressure pump (such as 10,0000 or 15,000 psi) for placement of a downhole tool.” *Id.* at 9.

Petitioner disagrees, noting that Patent Owner’s argument “relies upon an unrelated patent—not incorporated in *Conrad* or even mentioned in *Conrad*—to contradict the express teachings of *Conrad*.” Pet. Reply 2. Petitioner further notes that Exhibit 2032, the unrelated patent, “claims priority to January 2007, whereas the ‘030 Patent’s priority date is no earlier than 2015.” *Id.* at 3. Petitioner asserts that “given the difference in time of nearly a decade, an exemplary embodiment from an unrelated patent (Ex. 2032) that ‘pressure of up to 3000 psi’ is ‘sufficient’ for a pump down operation cannot be used to limit the teachings of *Conrad* to only a pump down pressure of up to 3,000 psi.” *Id.* (citing PO Resp. 9). Petitioner

¹² U.S. Patent No. 8,893,787 B2, iss. Nov. 25, 2014 (Ex. 2032, “Tips”).

asserts further that Patent Owner’s “unsupported statement directly contradicts *Conrad*’s teachings, because *Conrad*’s pump down manifold 90 has a 10,000 psi rating.” *Id.* (citing Ex. 1008, 5:32–36, 6:35–37; Ex. 1033, 77:16–78:12 (Patent Owner’s expert Mr. Marscher agreeing that pumps and manifolds “should be capable of operating to the max pressure that they’re rated for”)). Petitioner also asserts that Patent Owner’s expert “Mr. Schaaf agreed that pump down operations with pressures higher than 3,000 psi (up to 10,000 psi) could be required.” *Id.* at 3–4 (quoting Ex. 1032, 13:14–20).

In addition, Petitioner asserts that Patent Owner’s “argument that ‘Petitioner has not set forth any basis for why a [person of ordinary skill in the art] would understand *Conrad* to require a high-pressure pump (such as 10,000 or 15,000 psi) for placement of a downhole tool’ is a red herring.” Pet. Reply 4 (citing PO Resp. 9). Petitioner asserts that combining “*Conrad* and *Neal* would not require a ‘10,000 or 15,000 psi’ pump as [Patent Owner] suggests because *Neal* expressly teaches ‘high-pressure pumps’ that range from ‘equal to or greater than about 2,000 psi.’” *Id.* (citing Ex. 1009, 6:57–61). Thus, according to Petitioner, “*Neal*’s ‘high-pressure pumps’ are suitable for both *Conrad*’s pump down manifold 90 with a 10,000 psi rating (i.e., a maximum pressure) and [Patent Owner’s] proposed pump down operation range of ‘up to 3,000 psi.’” *Id.* (citing PO Resp. 8–9).

Patent Owner responds that it cited “Ex. 2032 (Tips) to provide the state of the art as to pressures used in pump down operations” as understood by a person of ordinary skill in the art “to disprove Petitioner’s contention that *Conrad*’s reporting of a 10,000 psi manifold would be readily understood by a [person of ordinary skill in the art] to require a 10,000 psi

pump for pump down operations and to require a secondary reference (*Neal* –Ex. 1009 in Ground (1)) to provide boost fluid.” PO Sur-Reply 2 (citing PO Resp. 8–9; Pet. 3). Patent Owner responds further that

Petitioner is wrong that *Conrad*’s reporting of a 10,000 psi manifold would be readily understood by a [person of ordinary skill in the art] to require a 10,000 psi pump for pump down operations because the state of the art informs a [person of ordinary skill in the art] that up to 3,000 psi may be sufficient for pump down operations.

Id. at 3. Patent Owner summarizes its arguments stating that its “dispute is that the combination in Ground (1) is arbitrary and based on hindsight of [sic] [Patent Owner’s] patent.” *Id.* (citing PO Resp. 10).

We see no evidence of improper hindsight. *Conrad* discloses a 10,000 psi manifold for pump down operations. Ex. 1008, 6:23–37, Fig. 5. *Conrad*, however, does not address the pumping system that provides pressurized fluid to the 10,000 psi manifold. *See generally id.* Petitioner asserts that a person of ordinary skill in the art at the time of the invention “would have understood the need for pumping systems to provide pressurized fluid to implement” the pump down operation taught by *Conrad* and proffers *Neal* for its teachings of such systems. Pet. 18 (citing Ex. 1005 ¶ 79). Petitioner asserts that one of ordinary skill in the art would have looked to *Neal* “because *Neal* discloses high-pressure pumps that are generally applicable to ‘many phases of wellbore servicing operations’ specifically including ‘fracturing operations’” and *Neal*’s pumps would be suitable to provide

pressurized fluid to Conrad's 10,000 psi manifold. *Id.* (citing Ex. 1009, 1:26–27, 4:44–47).

Patent Owner does not contest Petitioner's assertions regarding Conrad and Neal directly. Instead, Patent Owner would have us substitute Tips' teaching for Neal's teaching because Tips allegedly better represents the state of the art. Patent Owner's argument is unavailing. Presumably, one could always argue that a different reference should have been applied in the challenge, but such arguments do not address the challenge presented.

b. Alleged Misrepresentation or Misinterpretation of Neal

"Patent Owner submits that *Neal* is similarly misrepresented or misinterpreted." PO Resp. 9. Specifically, Patent Owner contends that "*Neal* teaches 'sufficient boost pressure' to specifically address cavitation not merely 'sufficient pressure' that can be used in any application." *Id.* at 10 (quoting Ex. 1009, 3:24–39). Patent Owner contends that "[t]his bears relevance at least because the boost pump pressure described in *Neal* is significantly less than the pressure of its high-pressure pump." *Id.* at 10–11 (quoting Ex. 1009, 5:58–65, 6:57–61). According to Patent Owner, a person of ordinary skill in the art "would not seek to arbitrarily add a boost pump that is intended to address cavitation to a system for positioning a tool (in *Conrad*) that does not even require high pressure equipment to position the tool." *Id.* at 11.

Petitioner replies that Patent Owner "ignores that *Neal* discloses using its boost pump with high-pressure pumps 142 that output pressure at the very pressure ('up to 3,000 psi') [Patent Owner] believes to be suitable for

pump down operations.” Pet. Reply 4 (citing PO Resp. 9, Ex. 1009, 6:57–61).

Patent Owner responds “that Petitioner’s Reply only demonstrates that Petitioner’s only reason to add *Neal* into Ground (1) is based on after-the-fact hindsight analysis from [Patent Owner’s] Response and its patents.” PO Sur-Reply. 6.

We see no evidence of improper hindsight. Petitioner articulates 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. 18 (“a [person of ordinary skill in the art] 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*.”).

c. Alleged Impermissible Hindsight

Contending that the challenge is based on improper hindsight, Patent Owner reiterates its argument that the Petition mischaracterizes *Neal*’s teachings. PO Resp. 11–12. Patent Owner also reiterates its argument that “there is no reason to address issues of cavitation and wear and tear when reviewing *Conrad* because . . . *Conrad* does not disclose a requirement for high-pressure equipment to pump a downhole tool and Petitioner’s own patent suggests much lower pressures may be used than the pumps in *Neal*.” *Id.* at 12. Then, Patent Owner reiterates its argument that “[i]t is only with

improper hindsight that a [person of ordinary skill in the art] would look to *Neal* to add the boost pumps in the manner Petitioner proposes.” *Id.* at 13.

Patent Owner’s reiteration of these arguments is no more convincing than its original contentions.

d. Alleged Reliance on Common Sense

Patent Owner contends that it is “improper to rely on common sense in this case.” PO Resp. 13. Quoting the Institution Decision, Patent Owner notes our reliance on “common sense along with Petitioner’s representations from [Conrad] and *Neal*.” *Id.* at 14 (quoting Inst. Dec. 29). According to Patent Owner, our inclusion of common sense “must mean that the limitation in question is being viewed as unusually simple and the technology particularly straightforward.” *Id.* (citing *Perfect Web Technologies, Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1326 (Fed. Cir. 2009)). Patent Owner asserts, however, that “the technology of the ‘030 patent involves charges for detonations and high-pressure fluids to fracture formations” and, thus, “is not unusually simple and straightforward so as to invoke common sense in the absence of disclosure from the cited combination of references.” *Id.* at 15 (quoting Ex. 1002, 5:44–52).

Petitioner replies that the Board properly applied a person of ordinary skill in the art’s common sense to a claim limitation, “which recites nothing more than the mechanics of a pump down operation that is disclosed in *Conrad*.” Pet. Reply 7. Petitioner notes that Patent Owner “provides no alternative way of ‘push[ing] a tool into the wellbore’ other than ‘directing the pressurized fluid downstream of the pump and into the wellbore upstream of the tool to push the tool into the wellbore’” and that Patent

Owner's expert, "Mr. Schaaf agreed that in order to do a pump down operation, 'you would need pressurized fluid above the tool to get it into the wellbore,' and further agreed that it was 'routine and conventional' to 'use a pressurized fluid to push a tool down a wellbore' prior to 2015." *Id.* (citing Ex. 1032, 39:24–40:6, 44:16–45:11). Petitioner further notes that "Mr. Marscher also agreed that *Conrad* discloses this claim limitation." *Id.* (citing Ex. 1033, 62:19–63:3).

Patent Owner responds that "common sense cannot substitute for missing facts and that [Patent Owner's] expert did not agree to this, as asserted in Petitioner's Reply." PO Sur-Reply 10–11 (citing Pet. Reply 7). As an example, Patent Owner states that, "to reach the limitations for 'pressurizing fluid upstream of the pump to form a boost fluid' and for 'directing the pressurized fluid downstream of the pump,' a combination properly made under section 103 must find the *boost fluid*. That is not the case in the combination in ground (1)." *Id.* at 11.

First, to the extent that our Institution Decision indicates that this challenge relies on common sense, we indicated that it relies on it for the proposition that pressurized fluid would have to be directed into the wellbore above the tool to push the tool into the wellbore. Inst. Dec. 29. As noted by Petitioner, this fact is not in dispute, as Patent Owner's expert "Mr. Schaff agreed that 'you would need pressurized fluid above the tool to get it into the wellbore.'" Pet. Reply 7 (quoting Ex. 1032, 39:24–40:6). Second, the Petition does not rely on common sense to meet the boost fluid limitation. The Petition identifies the fluid from Neal's boost pump as corresponding to

the claimed boost fluid. Pet. 28. Thus, Patent Owner’s argument is inapposite.

3. *Dependent Claims*

For its discussion of the dependent claims Patent Owner addresses each instituted Ground. PO Resp. 15–16. Patent Owner contends that all of the dependent claims (2–9 and 11–14) are valid for being dependent on an allowable independent claim. *Id.* at 16–21. We are not persuaded by that contention, as discussed above. Patent Owner makes no further contentions for claims 2, 3, and 11–13. *Id.* at 21. We have reviewed Petitioner’s contentions and Dr. Hilbert’s supporting testimony regarding claims 2, 3, and 11–13, and are persuaded, by the reasons stated by Petitioner, that Conrad, Neal, and Coli collectively teach the limitations of these claims and that a person of ordinary skill in the art would have had reason to combine the reference’s teachings with a reasonable expectation of success. Pet. 31–32, 42–48; Ex. 1005 ¶¶ 109–113, 135–146.

Patent Owner addresses claims 4–9 and 14 separately from their parent claims. *Id.* at 16–20. We do so as well.

a. Claim 4

Claim 4 recites “[t]he method of claim 1, 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. 1002, 9:26–29.

Patent Owner contends that

Petitioner has not set forth any basis for why a [person of ordinary skill in the art] would take the presence of multiple valves in *Conrad* or in *Tolman*, summarily, as disclosing “the

pressurized fluid is simultaneously directed to a second wellbore”; at least because a [person of ordinary skill in the art] would understand, instead, that loss in intended pressure will occur for the first wellbore making this theory unworkable.

PO Resp. 16. Patent Owner contends that “[m]erely providing a capability of allowing fluid into different wellbores is not a disclosure of ‘the pressurized fluid is simultaneously directed to a second wellbore,’ as recited in claim 4.” *Id.* at 16–17. Patent Owner asserts that

Absent a teaching to enable a system to address multiple wellbores using the same fluid, as described in the ‘030 patent, which relies on proximity of the wellbores, Petitioner has not set forth any basis for why a [person of ordinary skill in the art] would understand the disclosure in *Conrad* to support a feature for “the pressurized fluid is simultaneously directed to a second wellbore.”

Id. at 17 (citing Ex. 1002, 6:4–6) (internal citation omitted).

Petitioner replies that “*Conrad* expressly teaches a manifold system to provide fracturing fluid and pump down fluid to multiple wellheads.” Pet. Reply 8 (citing Ex. 1008, 3:35–37, 5:29–36, claim 19, Figs. 2, 5, 6).

Petitioner asserts that “it would have been obvious to a [person of ordinary skill in the art] to operate the valves of *Conrad* such that fluid is simultaneously directed to the multiple wellheads, which *Conrad*’s manifolds are already configured to do.” *Id.* (citing Pet. 32–34). Petitioner asserts that, “[w]hen considered in further view of *Tolman*, which specifically teaches the benefits of simultaneous or concurrent well

operations, claim 4 is expressly taught by the prior art combination.” *Id.* at 8–9 (citing Pet. 50–60).

Petitioner further replies that Patent Owner “merely states that ‘a [person of ordinary skill in the art] would understand, instead, that loss in intended pressure will occur for the first wellbore making this theory unworkable.’” Pet. Reply 9 (citing PO Resp. 16). Yet, according to Petitioner, Patent Owner “provides no reasoning why a loss of pressure would occur, does not cite to any expert testimony (or other evidence) supporting this argument, and does not explain how the ’030 Patent addresses that made-up problem.” *Id.* (citing PO Resp. 16, 20). Petitioner asserts that “[s]uch unsupported, conclusory arguments should be rejected.” *Id.*

Patent Owner responds that Petitioner’s response “still does not address why the illustration and existence of a capability to allow fluid into different wellbores must necessarily teach that the pressurized fluid is simultaneously directed to a second wellbore, as required in the claim.” PO Sur-Reply 11–12. Patent Owner responds further that “claim 4 requires more than simultaneous or concurrent operations, also reciting an application of *the pressurized fluid*, which is not found in the first case in Ground (1) and is not addressed merely by adding *Tolman* to Ground (1).” *Id.* at 12.

In addition, Patent Owner contends that a person of ordinary skill in the art “would understand that loss in the intended pressure will occur for the first wellbore making this theory unworkable.” PO Sur-Reply 12 (citing PO Resp. 16). As an example, Patent Owner contends that “there is no

discussion in the references themselves of such pressurized fluid being simultaneously directed, whereas [the '030 patent] specification explains the operation using proximity of the wellbores.” *Id.* (citing PO Resp. 17 (citing Ex. 1002)).

Petitioner has the better position. Conrad’s disclosure of a manifold system providing fracturing fluid and pump down fluid to multiple wellheads at least suggests simultaneous direction of pressurized fluid to a second wellbore as required by claim 4. We credit Dr. Hilbert’s unrebutted testimony that a person of ordinary skill in the art “would have understood that operating the valves 128 of two or more skid assemblies 74 would cause the same pump-down fluid (i.e., ‘the pressurized fluid’) from pump-down manifold 90 to be routed to multiple wellhead assemblies 50 at the same time” and note that Patent Owner’s argument is unsupported by expert testimony. Ex. 1005 ¶ 114; *see also id.* ¶ 115 (“[i]n my opinion, a [person of ordinary skill in the art] would have known that at least since the mid-2000s, hydraulic fracturing operations have frequently included simultaneous well operations” and “it would have been obvious to route pump-down fluid so that preparation operations (i.e., perforation) would have been performed on multiple wellbores simultaneously to improve efficiency by saving time and

costs associated with operations involving multiple wells” (citing Ex. 1016 ¶¶ 3, 27; Ex. 1011 ¶¶ 6, 41)).

b. Claim 7

Claim 7 recites “[t]he method of claim 1, wherein the boost fluid is pressurized via an electric blender.” Ex. 1002, 10:4–5.

Patent Owner contends that “the blender of *Neal*, being behind the boost pump, cannot support a disclosure of ‘the boost fluid is pressurized via an electric blender,’ because such an interpretation would conflict with claim 1’s requirement for ‘directing the boost fluid to the pump.’” PO Resp. 18. Patent Owner contends further that “[t]he fluid from *Neal*’s blender enters its boost pump and cannot be a disclosure of a ‘boost fluid.’” *Id.*

Petitioner replies that Patent Owner ignores “the plain language of *Neal* that states ‘[a]lternatively, the boost pressure may be provided by placing a centrifugal pump on the blender 110 unit.’” Pet. Reply 10 (citing Ex. 1009, 9:23–25). Petitioner asserts that “in such embodiments, the centrifugal pump on the blender 110 unit provides the ‘boost pressure,’ (i.e., the ‘boost fluid’ in claim 7), and the ‘boost fluid’ is provided to the high-pressure pump 142.” *Id.* (citing Pet. 35–36).

Patent Owner responds that even in an arrangement where boost pressure is provided by placing a centrifugal pump on the blender unit, on the high-pressure pump 142 unit, “it is still the case that the fluid from *Neal*’s centrifugal pump cannot be a disclosure of a ‘boost fluid.’” PO Sur-Reply 13. Patent Owner responds further that “Petitioner has not set forth a basis as to why a [person of ordinary skill in the art] would have understood

from *Neal* that the boost fluid is pressurized via an electric blender and not the centrifugal pump.” *Id.*

Petitioner has the better position. We credit Dr. Hilbert’s un rebutted testimony that a person of ordinary skill in the art “would have understood that in certain embodiments of *Neal*, the blender may pressurize the boost fluid” and note that Patent Owner’s argument amounts to little more than unsupported attorney assertions rather than evidence. Ex. 1005 ¶ 116.

c. *Claim 8*

Claim 8 recites “[t]he method of claim 1, wherein electricity that powers the motor is generated with a generator that is proximate the electric motor.” Ex. 1002, 10:6–8.

Patent Owner contends that the cited combination “fails to disclose a feature for ‘electricity that powers the motor is generated with a generator that is proximate the electric motor.’” PO Resp. 19. According to Patent Owner, *Coli* does not disclose a generator that is proximate the electric motor because “*Coli* explains that ‘[o]ne or more natural gas-powered turbine generators 30 are located in region C on the site, which is located a remote distance D from region B where the trailers 10 and fracturing modules 20 are located, for safety reasons.’” *Id.* at 18 (citing Ex. 1010 ¶ 38). Patent Owner asserts further that “proximity is at least interpreted as *being within a microgrid* in the ‘030 Specification.” *Id.*

Petitioner replies that Patent Owner is improperly importing limitations into the claims. Pet. Reply. 10. Petitioner replies further that it would have been obvious to a person of ordinary skill in the art “to place the

generator ‘proximate’ the electric motors to reduce costs and simplify connections.” *Id.* at 11.

Patent Owner responds that “the plain and ordinary meaning of ‘proximate’ in claim 8 . . . should be read consistently with the Specification because a *microgrid* is at least a term of art readily understood by a” person of ordinary skill in the art. PO Sur-Reply 14. Patent Owner responds further that “Petitioner fails to provide factual basis to dispute the express requirement, in at least *Coli*, that reports remote generators from the trailers for safety reasons.” *Id.* (citing PO Resp. 18).

We do not agree with Patent Owner that “proximity” should be interpreted as being within a microgrid. The ’030 patent uses the term “proximate” as describing the location of a turbine with respect to its combustible fuel source (Ex. 1002, 4:52–57) and as describing the location of wellbores (Ex. 1002, 6:5). The ’030 patent does not use this term in describing the location of various components making up the micro-grid. Ex. 1002, 4:63–5:25.

Petitioner interprets components of the system to be “proximate” if they are on the same well site. *See* Pet. 36. Petitioner’s understanding is consistent with the ’030 patent Specification, and we adopt it as our own. Although, *Coli* describes its natural gas-powered turbine generators 30 as located in region C, which is located a remote distance from region B where the trailers 10 and fracturing modules 20 are located, both region C and

region B are on the same site, and thus are proximate one another. Ex. 1010 ¶ 38.

d. Claim 9

Claim 9 recites “[t]he method of claim 8, wherein a wireline system is powered by the electricity.” Ex. 1002, 10:8–9.

Patent Owner contends that “*Coli* is improperly asserted (at least as discussed above with respect to claim 8), [and] the combination with *Coli* fails as *Teurlay* does not cure the identified deficiency in a combination using *Coli*.” PO Resp. 19. As we do not find *Coli* to be “improperly asserted” for claim 8 for the reasons discussed above, Patent Owner’s argument is unconvincing.

e. Claims 4–6 and 14

Claim 4 is reproduced above. Claim 5 recites “[t]he method of claim 4, wherein hydraulic fracturing is performed in the second wellbore.” Ex. 1002, 9:30–31. Claim 6 recites “[t]he method of claim 5, wherein the pump comprises a first pump and a second pump, and wherein fluid pressurized by the first pump is directed into the first wellbore to push the tool into the first wellbore, and fluid pressurized by the second pump is directed into the second wellbore to use in hydraulic fracturing.” *Id.* at 9:32–10:3. Claim 14 recites “[t]he method of claim 13, wherein the first fluid is directed to a first wellbore that intersects the formation, and the second fluid is directed to a second wellbore that intersects the formation.” *Id.* at 10:30–33.

Patent Owner contends that in combining Tolman with the Conrad-Neal system, the Petition “fails to consider the change in pressure [caused] by running simultaneous operations.” PO Resp. 20 (citing *id.* at 16–17).

Specifically, Patent Owner contends that “*Tolman* expressly agrees that simultaneous operations with wirelines to set plug are ‘not possible.’” *Id.* (quoting Ex. 1011 ¶ 24). Patent Owner contends further that “[a]t best, *Tolman* teaches away from the claims and from *Conrad* which teaches the use of wirelines for placement of tools.” *Id.*

Petitioner does not reply to this argument. *See generally* Pet. Reply. To the extent that Patent Owner’s argument is based on its argument regarding claim 4, it is not convincing for the reasons discussed above.

In challenging claims 5 and 6, the Petition relies on *Tolman*’s teaching of hydraulic fracturing operations being simultaneously performed in different wellbores. Pet. 60–61. *Tolman* does indeed disclose such simultaneous operations, and benefits achieved by them. Ex. 1011 ¶ 6. The *Tolman* disclosure cited by Patent Owner is instead directed to operations occurring in the same wellbore, in some limited circumstances. Ex. 1011 ¶ 24. Thus, Patent Owner’s argument is not on point.

It is not clear how Patent Owner’s argument pertains to the challenge to claim 14. Thus, it is unconvincing.

4. *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,” however, 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)).

Patent Owner asserts that it is entitled to a presumption of nexus because its CleanFleet® technology includes features of the ’030 patent to address the problem of producing the pressures required for hydraulic fracturing without the need for heavy duty trailers, skids, or trucks to transport large and heavy pumps and engines to sites where wellbores are being fractured. PO Resp. 21–22 (citing Ex. 1002, 1:49–53). As an example, Patent Owner states that its “Clean Fleet® technology includes a ‘WHISPERFRAC® electric blender with removed engines, reduced turbulent air blowers and noise insulation has an estimated 7dBA and 6dBC unit noise reduction.”” *Id.* at 22 (citing Ex. 2033, 2). Patent Owner states that its CleanFleet® technology also “includes a ‘WHISPERFRAC® twin 1750 HHP electric hydraulic fracturing pump unit [that] creates a smaller environmental footprint and [that] has an estimated 7dBA and 6dBC unit noise reduction.”” *Id.*

Patent Owner asserts further that “[t]he nexus for claim 1 and the rest of the claims is shown by the whole combination.” PO Resp. 22. According to Patent Owner,

the objective evidence (i) corresponds to the Clean Fleet® product, which embodies the challenged claimed features and is coextensive with the challenged claims; and (ii) strongly supports the nonobviousness of the challenged claims, including meeting a long-felt, unmet need; failure of others to meet this need; industry praise; copying of the claimed invention; and commercial success of the claimed invention.

Id. at 23.

In support of these assertions, Patent Owner contends that Petitioner failed to rebut the evidence of nonobviousness in the Petition and that secondary considerations strongly support nonobviousness. PO Resp. 23–45. We address each of Patent Owner’s contentions in turn.

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

Patent Owner asserts that “Petitioner failed to present evidence regarding the critical ‘objective indicia’ of nonobviousness presented during prosecution of the parent ‘410 patent that led to the subsequent ‘030 Patent.” PO Resp. 23. Specifically, Patent Owner asserts that “Petitioner failed to address all of the evidence of copying, industry praise, long-felt need, and commercial success related to the claimed invention even though for purposes of obviousness, it admits such a need for purposes of invalidity.” *Id.* at 24 (citing Pet. 18, 20, 25). According to Patent Owner, “Petitioner appears to casually dismiss this evidence by failing to consider it [in the] Petition.” *Id.* at 24–25.

Petitioner responds that Patent Owner “attempts to shift the burden on secondary considerations to Petitioner.” Pet. Reply 12 (citing PO Resp. 23). Petitioner asserts that “[t]his is improper, because ‘[w]hile the burden of persuasion remains with the challenger, *a patentee bears the burden of production* with respect to evidence of secondary considerations of nonobviousness.’” *Id.* (quoting *Zup LLC v. Nash Mfg. Inc.*, 896 F.3d 1365, 1373 (Fed. Cir. 2018) (alterations by Petitioner); citing *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 33 at 32 (PTAB Jan. 24, 2020) (precedential); *Fox Factory*, 944 F.3d at 1373).

In this case, where the evidence of secondary considerations appears in the prosecution history of a parent patent of the patent at issue (the '030 patent), we do not fault Petitioner for not addressing this evidence in the Petition. Patent Owner raised the issue in its Response to the Petition. PO Resp. 21–45. Petitioner responded by addressing secondary considerations in its Reply. Pet. Reply 11–23. After which, Patent Owner was afforded another opportunity to discuss secondary considerations. PO Sur-Reply 15–16.

b. Allegation That Secondary Considerations Strongly Support Nonobviousness

i. Nexus Between the Evidence and the Claimed Invention

Patent Owner asserts that “[b]ased at least in part on its discussion in the prosecution of the ‘410 patent, Patent Owner has shown that it is entitled to the nexus presumption and has shown that it has proved a nexus because the secondary considerations are the direct result of the unique characteristics of the claimed invention.” PO Resp. 25–26 (emphasis added). Petitioner responds that Patent Owner “fails to put forth evidence of secondary considerations specific to the ‘030 Patent, and instead merely relies upon evidence presented in US 9,410,410, to which it is related by [a] . . . CIP.” Pet. Reply 13 (citing PO Resp. 23–26).

We agree with Petitioner that evidence presented in a related proceeding (i.e., the prosecution history of the ‘410 patent), even if we assume that that evidence has nexus to the invention claimed in the ‘410 patent, does not automatically constitute evidence directed to the claims of the ‘030 patent at issue in this proceeding, as Patent Owner seems to

suggest. Thus, we turn to Patent Owner’s other arguments concerning the alleged nexus.

ii. *Presumption of Nexus Between the Evidence and the Merits of the Claimed Invention*

Patent Owner asserts that “[h]ere, the objective evidence corresponds to the Clean Fleet® product, which embodies the challenged claimed features and is coextensive with the challenged claims. For instance, the Clean Fleet® product comprises an electric blender and an electric pump to achieve claim 1 and claim 10.” PO Resp. 26 (citing Ex. 2034 ¶ 37; Ex. 2026, 151; Ex. 2011, 5; Ex. 2008 ¶¶ 96–110; Ex. 2033, *passim.*). Noting that “during the prosecution of the ’410 Patent, [it] submitted evidence of secondary considerations,” Patent Owner asserts that “[t]he Examiner considered that evidence and ultimately found that the [’410 patent] claims were not obvious, stating that ‘[t]he prior art of record does not disclose or suggest all the claimed subject matter.’” *Id.* (citing Ex. 2026, 143–199, 210). Patent Owner asserts further that it “provided evidence that the asserted objective evidence was tied to a specific product—‘Clean Fleet®’—and that specific product embodied the claimed features.” *Id.* at 26–27 (citing Ex. 2026, 143–199; Ex. 2011, 5; Ex. 2008 ¶¶ 96–110; Ex. 2033, *passim.*). Thus, according to Patent Owner, “the Clean Fleet® product embodies the claimed invention and is coextensive with the Challenged Claims.” *Id.* at 27 (citing Ex. 2008 ¶¶ 96–110; Ex. 2034 ¶ 37).

Noting Patent Owner’s position that “it should be entitled to a presumption because ‘Clean Fleet®[’] product comprises an electric blender

and an electric pump to achieve claim 1 and claim 10,” Petitioner responds that Patent Owner

fails to provide any evidence regarding other claim limitations—including the limitations it uses in an attempt to distinguish prior art—such as “inserting a tool into a wellbore that intersects the formation” and “directing the pressurized fluid downstream of the pump and into the wellbore upstream of the tool to push the tool into the wellbore.”

Pet. Reply 13 (citing PO Resp. 26, 30). Instead, according to Petitioner, Patent Owner “cites to irrelevant exhibits—for example, Exhibits 2011 and 2022—which are an investor update and an aerial photograph, respectively, and make no mention of these limitations.” *Id.* at 13–14. Petitioner asserts further that Patent Owner’s “expert declarations are conclusory and rely on the same deficient Exhibits 2011 and 2022.” *Id.* (citing Ex. 2008 ¶ 97; Ex. 2034 ¶ 37). Thus, Petitioner asserts that Patent Owner “has not come forward with evidence that the Clean Fleet [product] embodies the ’030 Patent claims.” *Id.*

The claims of the ’030 patent challenged in this proceeding are not the claims of the ’410 patent. Nor are they co-extensive with the claims of the ’410 patent. There are significant differences between the claims of the ’030 patent and the claims of the ’410 patent. *Compare* Ex. 1002, 9:9–10:33, *with* Ex. 2026, 144–147. For example, the claims of the ’410 patent are system claims, whereas the claims of the ’030 patent are method claims; the claims of the ’410 patent require a variable frequency drive, whereas the claims of the ’030 patent do not; and the claims of the ’030 patent require a boost fluid, whereas the claims of the ’410 patent do not. Ex. 2026, 144–147; Ex. 1002, 9:9–10:33. Thus, even if we were to assume that the

evidence of nonobviousness submitted during prosecution of the '410 patent is coextensive with the claims of the '410 patent, such that there is a presumption of nexus between the claims of the '410 patent and the evidence, that presumption would not extend to the claims of the '030 patent at issue in this proceeding. For this reason, as well as the reasons enumerated by Petitioner, we agree with Petitioner that the presumption of nexus does not apply.

iii. Nexus to the Claimed Invention as a Whole

Patent Owner asserts that it “presents evidence that there is a nexus to the secondary considerations and the claimed invention as a whole.” PO Resp. 27. Patent Owner gives as example “the commercial success of the present invention is due to the ‘pumps’ that are powered by the electric motor.” *Id.* at 28 (citing Ex. 2026, 150–151).

Petitioner responds that “pumps driven by electric motors powered by generators are not unique to the '030 Patent, as such features are also found in other of [Patent Owner's] patents.” Pet. Reply 19 (citing IPR2021-01032 ('410 Patent) claim 1; IPR2021-01035 ('278 Patent) claims 1, 9). Petitioner responds further that “[n]or are such features novel, as electric pumps and electric generators were indisputably disclosed in the prior art.” *Id.* (citing Ex. 1040, 131:7–12; Ex. 1010 ¶¶ 40, 41–52, 65–66; *Norvatis AG v. Torrent Pharms. Ltd.*, 853 F3d 1316, 1331 (Fed. Cir. 2017)).

Petitioner contends that Patent Owner's “inability to identify any such ‘unique characteristics’ of the '030 Patent is highlighted by its ‘alternative’ position that there is a nexus based on ‘the claimed invention as a whole.’” Pet. Reply 19 (citing PO Resp. 27–28 (citing *WBIP, LLC v. Kohler Co.*, 829

F.3d 1317, 1329–32 (Fed. Cir. 2016)). Petitioner contends further 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 19–20 (citing PO Resp. 28; *id.* at 30–31). Thus, Petitioner contends that “[b]ecause [Patent Owner’s] purported evidence regarding nexus ‘exclusively relates to a feature that was ‘known in the prior art,’” there is no nexus. *Id.* at 20 (citing *WBIP*, 829 F.3d at 1330).

We agree with Petitioner that the evidence proffered by Patent Owner does not pertain to the claimed invention as a whole, but rather pertains to certain features such as the electric motors and pumps. For these reasons, Patent Owner fails to establish nexus between the evidence and the claimed invention as a whole.

iv. Alleged Commercial Success

Although we find a lack of 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. 29–33. 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 31–32.

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 20–21 (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. 1005, 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 '030 patent is included in the asserted license. Moreover, Patent Owner’s attempt to establish that the purported license includes the '030 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 '030 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 1070 (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.

v. *Alleged Copying By Others*

Although we find a lack of 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. 33–38.

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 21 (citing Ex. 1040, 123:8–127:15, 130:14–22, 131:21–136:18).

Patent Owner again relies predominantly on Mr. Broussard’s declaration and arguments made during prosecution of the ’410 patent. *See* PO Resp. 33–38 (citing Ex. 2009, 1–3; Ex. 2026, 143–199). As explained

above, however, Patent Owner has failed to establish that these documents are objective evidence. Additionally, Patent Owner cites to pages 158–159 of Exhibit 2026 in support of its assertion of copying by “an employee of one of [Patent Owner’s] competitor’s partners.” *Id.* at 34. Pages 158–159, however, fail to cite to any evidence and, thus, amount to unsupported attorney assertions rather than evidence. *See Icon Health & Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1043 (Fed. Cir. 2017) (“Attorney argument is not evidence.”).

Finally, 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. 37. 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.

vi. *Alleged Industry-Wide Praise*

Although we find a lack of 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. 38–42. 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 39.

Petitioner argues that, in large part, Patent Owner’s argument “relies solely on a string-cite from its CEO Broussard, absent further explanation of the awards.” Pet. Reply 22 (citing PO Resp. 40–41). 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 again relies predominantly on arguments made during prosecution of the ’410 patent. *See* PO Resp. 40–42 (citing Ex. 2026, 143–99). As explained above, however, Patent Owner has failed to establish that this document is objective evidence. Although Patent Owner touts several awards (*see, e.g.*, PO Resp. 39), 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 system claimed in the ’030 patent.

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

vii. *Alleged Long-felt Need*

Although we find a lack of nexus for the reasons discussed above, in the interest of full and complete consideration of the record, we discuss Patent Owner’s evidence of long-felt need.

“The existence of a long-felt but unsolved need that is met by the claimed invention is . . . objective evidence of non-obviousness.”

Millennium Pharms., Inc. v. Sandoz Inc., 862 F.3d 1356, 1369 (Fed. Cir. 2017) (citing *In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063, 1081–83 (Fed. Cir. 2012)).

“Long[-]felt need is closely related to the failure of others. Evidence is particularly probative of obviousness when it demonstrates both that a demand existed for the patented invention, and that others tried but failed to satisfy that demand.” *Cyclobenzaprine*, 676 F.3d at 1082.

Patent Owner argues that, prior to the ’030 patent, “there was a long-felt need to power equipment in the hydraulic fracturing industry without using diesel engines and to improve operational efficiency.” PO Resp. 43 (citing Ex. 2026, 155; Ex. 2008 ¶¶ 96–110). Patent Owner argues that others tried but failed to satisfy this need. *Id.* at 43–44.

Petitioner argues that Coli identified and solved the same need identified by Patent Owner. Pet. Reply 22.

In support of its assertion of a long-felt need, Patent Owner cites to: page 155 of Exhibit 2026 (PO Resp. 43), which cites only the declaration of

Mr. Oehring, and paragraphs 96–110 of Mr. Schaaf’s declaration, the relevant portion of which (Ex. 2008 ¶ 120) cites to the aforementioned prosecution history of the ’410 patent and Mr. Broussard’s declaration. As explained above, however, Patent Owner has failed to establish that these documents are objective evidence. Patent Owner’s arguments fail to apprise us of a long-felt need in the relevant industry.

Patent Owner also relies on the prosecution history of the ’410 patent to support its assertion that others tried but failed to develop an electric hydraulic fracturing system. PO Resp. 43 (citing Ex. 2026, 155–56, 170). As explained above, however, Patent Owner has failed to establish this document is objective evidence and, therefore, Patent Owner fails to apprise us of the failure of others.

Moreover, as noted by Petitioner (*see* Pet. Reply 22), Coli discloses an electrically-powered fracturing system for delivering fracturing fluid to a wellbore at a fracturing operation that uses electric motors and generators powered by natural gas to drive the pumps. Ex. 1010 ¶¶ 9–11, 34, 38. Thus, Patent Owner has not persuasively established the existence of an *unsolved* need.

Accordingly, for at least the foregoing reasons, we find Patent Owner’s evidence of a long-felt but unsolved need to be weak evidence of non-obviousness.

5. *Determination For Claims 1–14*

Petitioner has shown that the individual limitations of claims 1–14 of the ’030 patent are disclosed by various combinations of Conrad, Neal, and Coli with Tolman, Teurlay, or Broussard, 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 Cyclobenzaprine*, 676 F.3d at 1079), 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.

E. Summary

For the reasons discussed above, we find that Petitioner has demonstrated, by a preponderance of the evidence, that claims 1–14 are unpatentable.

IV. CONTINGENT REVISED MOTION TO AMEND

“Patent Owner respectfully requests that the Board grant this Revised Contingent Motion to Amend (‘the Revised Motion to Amend’) and issue the corresponding substitute claims presented herein should the original claims [1–14] of the ’030 Patent be found unpatentable.” Mot. 1. Specifically, Patent Owner requests that claims 1–14 be replaced with claims 15–28. *Id.* at 2. The proposed substitute claims read as follows:

15. A method of operations in a subterranean formation, the method comprising:
driving a pump with an electrically powered motor to pressurize fluid, the motor being powered by a mobile power grid configured to

generate power for the pump such that the power is not diverted from an associated pump for fracturing;

inserting a tool into a wellbore that intersects the formation;
pressurizing fluid upstream of the pump to form a boost fluid;
directing the boost fluid to the pump; and
directing the pressurized fluid downstream of the pump and into the wellbore upstream of the tool to push the tool into the wellbore.

16. The method of claim 15 [[1]], further comprising urging the tool into the wellbore with the pressurized fluid until the tool reaches a predetermined location in the formation.

17. The method of claim 15 [[1]], wherein the tool comprises a perforating gun.

18. The method of claim 15 [[1]], 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.

19. The method of claim 18 [[4]], wherein hydraulic fracturing is performed in the second wellbore.

20. The method of claim 19 [[5]], wherein the pump comprises a first pump and a second pump, and wherein fluid pressurized by the first pump is directed into the first wellbore to push the tool into the first wellbore, and fluid pressurized by the second pump is directed into the second wellbore to use in hydraulic fracturing.

21. The method of claim 15 [[1]], wherein the boost fluid is pressurized via an electric blender.

22. The method of claim 15 [[1]], wherein electricity that powers the motor is generated with a generator that is proximate the electric motor.

23. The method of claim 22 [[8]], wherein a wireline system is powered by the electricity.

24. A method of inserting a tool in a subterranean formation, the method comprising:

positioning a trailer having a pump driven by an electric motor at a well site;

positioning a second trailer having a boost pump driven by a second electric motor at the well site;

positioning a third trailer having an auxiliary transformer to condition and to provide power to the second electric motor, the auxiliary transformer being used by the second electric motor and associated equipment for a pump down system, and the power provided by the auxiliary transformer is independent from one or more fracturing transformers to be used by one or more fracturing pumps;

pressurizing fluid with the boost pump to form a boost fluid;
directing the boost fluid to the pump; and
driving the tool into the subterranean formation via the pump.

25. The method of claim 24 [[10]], further comprising generating electricity by a turbine generator to power the electric motor.

26. The method of claim 24 [[10]], further comprising positioning a sand conveyor and hydration unit at the well site.

27. The method of claim 24 [[10]], further comprising using a first fluid pressurized by the pump to fracture the formation, and using a second fluid that is pressurized by the pump in a pump down operation.

28. The method of claim 27 [[13]], wherein the first fluid is directed to a first wellbore that intersects the formation, and the second fluid is pressurized by the pump in a pump down operation.

A. *Procedural Requirements*

“Before considering the patentability of any substitute claims . . . the Board first must determine whether the motion to amend meets the statutory and regulatory requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121.” *Lectrosonics*, Paper 15 at 4.

The first requirement is that the Motion to Amend propose a reasonable number of substitute claims. 35 U.S.C. § 316(d)(1)(B). “There is a rebuttable presumption that a reasonable number of substitute claims per challenged claim is one (1) substitute claim.” *Lectrosonics*, Paper 15 at 4 (citing 37 C.F.R. § 42.121(a)(3)). The Petition challenges fourteen (14)

claims. The Motion to Amend proposes fourteen (14) substitute claims. As Patent Owner proposes the same number of substitute claims as challenged claims, we determine that Patent Owner has demonstrated that the number of proposed substitute claims is reasonable. Petitioner does not argue otherwise.

The second requirement is determining whether the proposed substitute claims respond to a ground of unpatentability involved in this trial. *Lectrosonics*, Paper 15 at 5. Patent Owner asserts that “[t]he proposed substitute claims are responsive to the grounds of unpatentability at issue in this proceeding.” Mot. 1. Petitioner does not contest Patent Owner’s assertion. *See generally* Mot. Opp.

We agree with Patent Owner that the Motion to Amend responds to the grounds of unpatentability by further limiting the recitations pertaining to the motor(s). Specifically, for substitute claim 15 (which corresponds to original claim 1) the Motion to Amend adds a limitation requiring that the motor be powered by a mobile power grid configured to generate power for the pump such that the power is not diverted from an associated pump for fracturing, and for claim 24 (which corresponds to original claim 10) the Motion to Amend adds limitations pertaining to a second electric motor and a third trailer having an auxiliary transformer. Mot. App. A, 4–7.

The third requirement is that “[a] motion to amend may not present substitute claims that enlarge the scope of the claims of the challenged patent or introduce new subject matter.” *Lectrosonics*, Paper 15 at 6 (citing 35 U.S.C. § 316(d)(3); 37 C.F.R. § 41.121(a)(2)(ii)).

Petitioner asserts that “[t]he Substitute Claims improperly recite new subject matter not present in the originally filed application.” Mot. Opp. 1 (citing *Lectrosonics*, Paper 15 at 6). Specifically, Petitioner asserts that “the ‘mobile power grid’ of Substitute Claim 15 (and dependent claims 16–23) lacks written description support” and that there is “no written description support for a ‘third trailer having an auxiliary transformer’ to power an electric motor that drives such a **boost pump**” as recited in proposed substitute claim 24. *Id.* at 1, 3 (citing Paper 27, 1–3; *Synthes USA, LLC v. Spinal Kinetics, Inc.*, 734 F.3d 1332, 1341–45 (Fed. Cir. 2013)).

Regarding the mobile power grid limitation of proposed substitute claim 15, Petitioner asserts that “[a]lthough the Board identified one example from the ’030 Patent involving the use of independent power sources (see Paper 33 at 7–8), the unrebutted testimony from Dr. Hilbert demonstrates that even considering the disclosure of one example (species) in the specification, that does not provide support for the full scope of the claims (genus).” Mot. Opp. 2 (citing *Synthes USA*, 734 F.3d at 1341–45). Petitioner asserts that “[o]ther undisclosed species could include, for example, a single power source generating more than enough power for all loads.” *Id.* (citing Ex. 1029 ¶ 8). Thus, according to Petitioner, “[t]he claim ‘exceed[s] in scope the subject matter ... disclose[d] to the public in the written description’ and therefore, lacks sufficient written description support.” *Id.* (citing *Atl. Rsch. Mktg. Sys., Inc. v. Troy*, 659 F.3d 1345, 1355 (Fed. Cir. 2011)).

Patent Owner responds that the ’030 patent does not “need to recite ‘mobile power grid’ in *haec verba* to support the term in the claims.” Mot.

Reply 1 (citing *Novartis Pharms. Corp. v. Accord Healthcare, Inc.*, No. 21-1070, 2022 WL 2204163, at 11 (Fed. Cir. Jan. 3, 2022)). In reply, Petitioner reiterates its arguments from its Opposition to the Motion to Amend. Mot. Sur-Reply 1–2.

For claim 15, we agree with Patent Owner and determine that the original disclosure of the '030 patent explicitly discloses at least two power grids that are 'mobile' and fully supports the proposed amendment. First, the original disclosure of the '030 patent provides sufficient description and details explaining how a mobile power grid is "configured to generate power for the pump such that power is not diverted from an associated pump for fracturing" as recited in proposed substitute claim 15. Specifically, the original specification of the '030 patent explains that "micro-grid 54 . . . distributes electricity generated by the turbine generator" using "a transformer 56 [included in micro-grid 54] for stepping down voltage of the electricity generated by the generator 50 to a voltage more compatible for use by electrical powered devices in the system 10." Ex. 1004, 389 (¶ 27), 371 (Fig. 1A). The original specification of the '030 patent application further explains that micro-grid 54 is part of system 10 having elements that are mobile which can be readily transported to a wellsite adjacent a wellbore by trailers or other platforms equipped with wheels or tracks. *Id.* at 390 (¶ 28). Thus, we determine that the original specification of '030 patent discloses that micro-grid 54 is a "mobile power grid" that generates power for a pump down pump by powering a motor that drives the pump, as recited in proposed substitute claim 15. *See id.* at 390 (¶ 27), 371 (Fig. 1A).

Second, as shown in Figure 8, the original specification of the '030 patent application discloses auxiliary unit 94G mounted on trailer 128G (that is thus mobile) that “provides a separate power grid” that “can be used to power and control the desired equipment, such as, for example, the blender, the hydration unit, the conveyor, and/or the datavan.” Ex. 1004, 378 (Fig. 8), 396 (¶¶ 40–41). The original specification of the '030 patent application also discloses that this mobile power grid provides power for a pump down pump “such that power is not diverted from an associated pump for fracturing” (as recited in proposed substitute claim 15). In particular, with respect to Figure 3, the original specification of the '030 patent application explains that some of “transformers 56B_{1-n} have outputs at designated voltages (e.g., 600V, 480V, or step up transformers) that communicate with pump down pumps 96B_{1-n} that are schematically illustrated provided on trailers and within the pump down system 108B” such that “electricity is generated specifically for the pump down pumps and is not diverted from that being used to drive pumps used for fracturing.” *Id.* at 374 (Fig. 3), 393–94 (¶ 35).

Given these two examples, we determine that the original disclosure of the '030 patent provides written description support for “the motor being powered by a mobile power grid configured to generate power for the pump such that the power is not diverted from an associated pump for fracturing” as recited in proposed substitute claim 15 and for proposed substitute claims 16–23 which depend from claim 15.

Turning to proposed substitute claim 24, Petitioner notes that Patent Owner revises “[s]ubstitute Claim 24 to add: ‘a third trailer having an

auxiliary transformer to condition and to provide power to the second electric motor, the auxiliary transformer being used by the second electric motor and associated equipment for a pump down system”” and that “[a]nother limitation [of proposed substitute claim 24] requires that the ‘second electric motor’ drives the **boost pump** that is positioned on a second trailer, meaning the ‘third trailer having an auxiliary transformer’ must also power the boost pump.” Mot. Opp. 2–3 (citing Mot. 10–11) (alteration by Petitioner). Petitioner asserts that “[i]n arguing for written description support, [Patent Owner] points to two embodiments from the ’030 Patent specification; each of these passages expressly refers to powering a ‘blender,’ and say nothing about a boost pump.” *Id.* at 3 (citing Petitioner asserts further that “[a] boost pump and a blender are not coextensive.” *Id.* (citing Ex. 1070 ¶ 8). Thus, according to Petitioner, “[s]ubstitute Claim 24 is written to capture such boost pumps despite there being no written description support for a ‘third trailer having an auxiliary transformer’ to power an electric motor that drives such a **boost pump**.” *Id.* (citing *Synthes USA*, 734 F.3d at 1341–45) (alteration by Petitioner).

Patent Owner responds that “[t]he Opposition cites to sections of the ’030 Patent that recite the presence of a blender, and then claims that the blender and pump are not coextensive.” Mot. Reply 2 (citing Mot. Opp. 3). Patent Owner contends that “[s]ubstitute Claim 24 does not recite the presence of a blender, and the ’030 Patent provides support for the pump without the blender.” *Id.* at 2–3 (citing Ex. Patent Owner contends further that the ’030 Patent “provides support for a coextensive blender and pump by reciting ‘within blender 98E is a pump (not shown).’” *Id.* at 3 (citing Ex.

1002, 8:6). Therefore, according to Patent Owner, “[s]ubstitute Claim 24 is properly supported by the specification.” *Id.* In reply, Petitioner reiterates its arguments from its Opposition to the Motion to Amend. Mot. Sur-Reply 2.

For claim 24, we do not agree with Patent Owner’s characterization of pump down unit 96F in that we do not agree that the original disclosure says that “the pump down unit 96F can include a small boost pump . . . instead of . . . a blender.” Mot. Reply 3. Nonetheless, we agree with Patent Owner that the original disclosure of the ’030 patent supports the amendment. Proposed substitute claim 24 requires “a boost pump driven by a second electric motor” wherein power is provided to the second electric motor by an auxiliary transformer on a third trailer. Mot. App. A 7. Proposed substitute claim 24 does not preclude a boost pump in a blender such as blender 98E (Ex. 1004, 395 (¶ 38)), so long as that boost pump is driven by a second electric motor. *Id.* The original disclosure of the ’030 patent describes auxiliary unit 94G on trailer 128G with transformer 130G to power a blender, such as blender 98E which includes a boost pump. Ex. 1004, 396 (¶ 40), 378 (Fig. 8). Thus, the original disclosure of the ’030 patent provides support for the amendment to claim 24, and its dependent claims 25–28.

Finally, the Motion to Amend includes a claim listing, as required by 37 C.F.R. § 42.121(b). *Lectrosonics*, Paper 15 at 8; Mot. App. A.

In view of the above, we determine that the Motion to Amend meets the statutory and regulatory requirements of 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121. We turn now to whether Petitioner has met the burden of persuasion with respect to unpatentability.

B. Patentability of Substitute Claims 15–28

1. Alleged Indefiniteness of Claims 15–28

a. Claim 15

Petitioner asserts that “[s]ubstitute Claim 15 is indefinite, because the intrinsic evidence does not clarify what constitutes a ‘mobile power grid’ (and Patent Owner has not provided any explanation).” Mot. Opp. 4. Noting that in our Preliminary Guidance we identified at least two mobile power grids, Petitioner further notes that the two identified embodiments describe different components. *Id.* Based on this observation, Petitioner asserts that “[w]hile a transformer is included in both embodiments, it is unclear from the specification what constitutes a ‘power grid.’” *Id.* Petitioner further asserts that Patent Owner “injects further ambiguity into the claim term by arguing that the ‘mobile power grid’ must be ‘separate’ from ‘multiple other components.’” *Id.* (citing Mot. 17). Petitioner asserts that this alleged ambiguity makes “it is unclear which components must be included in the ‘mobile power grid’ and also which ‘other’ components must be excluded.” *Id.*

Patent Owner responds that a person of ordinary skill in the art “would understand, with reasonable certainty from the Specification, that elements in FIG. 1A are mobile and that such elements include a micro-grid 54 that provides power, corresponding to the claimed mobile power grid.” Mot. Reply 3 (citing Ex. 1002, 4:63–5:25). Patent Owner responds to Petitioner’s assertion that requiring the mobile power grid to be separate adds further ambiguity by contending that a person of ordinary skill in the art “would understand that a pump receiving power for pump down

operations can receive separately generated power, which is not diverted from any pump for fracturing, and that is also coupled to the same mobile power grid as the pump down pumps, such as illustrated in Fig. 2.” *Id.* at 4. Thus, according to Patent Owner, “the term ‘associated pump for fracturing’ is definite from the context of the ’030 patent.” *Id.* Petitioner replies by reiterating its arguments from its Opposition to the Revised Motion to Amend. Mot. Sur-Reply 2–3.

A claim is indefinite and therefore unpatentable if it, “read in light of the specification delineating the patent, and the prosecution history, fail[s] to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014); *see id.* at 908 (“[D]efiniteness is to be evaluated from the perspective of someone skilled in the relevant art.”). Petitioner is essentially alleging that the claim term “mobile power grid” is indefinite because it is broad (i.e., has scope large enough to encompasses two or more embodiments). Although, the term “mobile power grid” is broad, claims are not indefinite based on breadth alone. *In re Gardner*, 427 F.2d 786, 788 (CCPA 1970) (“Breadth is not indefiniteness.”). We determine that a skilled artisan would be able to determine, with reasonable certainty, the scope of claim 15.

For proposed substitute claim 24, Petitioner asserts that

The added “the auxiliary transformer being used by the second electric motor and associated equipment for a pump down system” is indefinite, because it is unclear . . . which components are included in a “pump down system” (as the ’030 Patent uses the term), and what “associated equipment for a pump down system” would need to be “used” by the transformer to meet this claim.

Mot. Opp. 5–6 (citing Mot. App. A 7). In support, Petitioner asserts that “the specification states with respect to a ‘pump down system 108B’ depicted in Figure 3 that ‘*other equipment* 110B [] can include, for example, glycol heaters, light plants, a company man trailer, water transfer pumps, a crane, wellsite tools, etc.’” *Id.* at 6 (citing Ex. 1002, 7:16–18) (alterations by Petitioner). Thus, according to Petitioner, “[i]t is unclear which, if any, of the various equipment mentioned by the ’030 Patent would be considered (1) ‘associated equipment of a pump down system,’ (2) part of the ‘pump down system’ itself, or (3) neither.” *Id.* (citing Ex. 1070 ¶¶ 11–12).

Patent Owner responds that the claim language “pump down system” “is defined by the ’030 Patent with regards to Figures 3 and 6.” Mot. Reply 4–5 (citing Ex. 1002, 7:7–32, 7:59–64, 8:4–5). Thus, according to Patent Owner a person of ordinary skill in the art “would understand the pump down system such that Substitute Claim 24 is not indefinite.” *Id.* at 5. Petitioner replies by reiterating its arguments from its Opposition to the Revised Motion to Amend. Mot. Sur-Reply 4.

Again, Petitioner appears to have mistaken breadth for indefiniteness. Thus, its arguments are unpersuasive. We determine that a skilled artisan would be able to determine, with reasonable certainty, the scope of claim 24.

2. *Alleged Obviousness of Proposed Substitute Claims 15–28*¹³

a. *Ground 1: Obviousness of Proposed Substitute Claims 15–18, 21, 22, and 24–28 Over Conrad, Neal and Coli*

Petitioner asserts that proposed substitute claims 15–18, 21, 22, and 24–28 are unpatentable over the combined teachings of Conrad, Neal, and Coli. Mot. Opp. 8–12.

i. *Proposed Substitute Claim 15*

Proposed substitute claim 15 adds the limitation “the motor being powered by a mobile power grid configured to generate power for the pump such that the power is not diverted from an associated pump for fracturing” to original claim 1. Mot. App. A 4. As discussed in Section III.D above, we determined that the combined teachings of Conrad, Neal, and Coli render original claim 1 unpatentable.

For proposed substitute claim 15, Patent Owner contends that “*Conrad* is directed toward piping configurations without reference to power systems associated with pump down systems” and “*Neal* describes a boost pump 126 that uses a diesel engine, and as a result, cannot be interpreted as describing a ‘power grid’ for an electric motor.” Mot. 16 (citing Ex 1008, 3:35–44; Ex. 2034 ¶¶ 33–34; Ex. 1009, 6:1–6). Patent Owner contends further that the Board erred by provisionally finding as persuasive Petitioner’s argument that the disclosure of an electrical transformer and drive unit 50 in Coli supports a teaching of a mobile power grid. *Id.* at 17

¹³ We note that Patent Owner does not rely on evidence of nonobviousness in support of the patentability of the proposed substitute claims.

(citing Prelim. Guid. 13). Specifically, Patent Owner contends that “the alleged mobile power grid (e.g., the drive unit 50 and electrical transformer) is no longer mobile with respect to the equipment being powered by the unit.” *Id.* at 17–18.

In addition, Patent Owner contends that the Board’s provisional “finding of a ‘mobile power grid’ [i]s improper because the phrase is divorced from the remainder of the claim and context is removed.” Mot. 18. According to Patent Owner, “a mobile power grid is only found if the combination of references also disclose that it is ‘configured to generate power for the [pump down operations] pump such that the power is not diverted from an associated pump for fracturing,’ which is not found in the combination alleged in Ground (1).” *Id.*

Petitioner responds that Patent Owner “attempts to distinguish the added limitations of Substitute Claim 15 by improperly reading in further additional elements from the specification that are not in the claims.” Mot. Opp. 8. Specifically, Petitioner asserts that “*Coli* teaches a ‘mobile power grid’ through its disclosure of an ‘electrical transformer and drive unit 50 (see FIG. 3) to step down the voltage of the power from turbine generator 30 to a voltage appropriate for electric motor 21.’” *Id.* at 9 (quoting Ex. 1010 ¶ 40). Petitioner asserts that in *Coli* “[t]he electrical transformer and drive unit 50 are mounted on a trailer, and therefore, is ‘mobile’” and that *Coli* “teaches that its turbine generators 30 generate ‘sufficient power’ for the pumping systems of the *Conrad-Neal* combination.” *Id.* (citing Ex. 1010 ¶ 40; Ex. 1029 ¶ 20, Prelim. Guid. 14). Therefore, according to Petitioner, a person of ordinary skill in the art “would have understood that power is ‘not

diverted’ from the pumping system for fracturing to the pumping system for pump down.” *Id.* Petitioner asserts further that “*Coli* teaches that its transformer provides power for the pumps located on the same trailer, and thus, power is ‘not diverted’ from other pumps located on other trailers.” *Id.* (citing Prelim. Guid. 14 (citing Ex. 1010 ¶¶ 38, 47, 49)).

Petitioner responds further that Patent Owner “attempts to distinguish the added limitations of substitute claim 15 over *Coli* by reading in limitations that are not present in the claims it presently seeks to amend.” Mot. Opp. 9. Specifically, Petitioner argues that “[t]here is no requirement in the proposed substitute claim that the ‘mobile power grid’ be ‘separate’ from other equipment. The claim simply requires that the ‘power grid’ be ‘mobile.’” *Id.* at 9 (citing Mot., Appendix A at 4). Petitioner argues further that Patent Owner’s “criticism of *Coli* is misplaced because, similar to the original [motion to amend], [Patent Owner] ignores the *Conrad-Neal-Coli* combination presented in the Petition and Petitioner’s Opposition (Paper 27) and improperly attacks *Coli* individually.” *Id.* at 10–11 (citing *Hulu LLC v. SITO Mobile R&D IP*, IPR2021-00158, Paper 34 at 41 (PTAB Apr. 15, 2022)). Petitioner explains that “the combination presented in the Grounds includes using the electric power components of *Coli* to power a pump down pump and a fracturing pump of the *Conrad-Neal* pumping and manifold system.” *Id.* (citing Pet. 14–26; Paper 27, 7–8). Petitioner asserts that

Although *Coli* teaches a “mobile power grid” that powers fracturing pumps, applying *Coli*’s teachings to the *Conrad-Neal* combination involves using *Coli*’s electric motors and transformers to power both the fracturing and pump-down pumps of the *Conrad-Neal* combination. [Patent Owner’s]

criticism of *Coli* for relating to fracturing pumps is a red herring and should be rejected.

Id. at 11.

Patent Owner responds that “Petitioner mischaracterizes [its] discussion of *Coli* to require a mobile power grid separate from other equipment.” Mot. Reply 5 (citing Mot. Opp. 9–10). Patent Owner contends that “[t]his is an incorrect interpretation of the [Motion to Amend], which contends that the addition of other components to the drive unit further immobilizes the alleged mobile power grid, and that Petitioner has not alleged the presence of a mobile power grid separate [from] the drive unit.” *Id.* (citing Mot. 17). Patent Owner contends further that: “In *Coli*, additional equipment can only be added when the transformer and drive unit are permanently fixed, therefore a [person of ordinary skill in the art] would understand that the transformer and drive unit must also be fixed in such an arrangement.” *Id.*

Patent Owner contends that it “is not attacking *Coli* individually but instead highlight[ing] the improper interpretation of *Coli*. For example, Petitioner repeats that *Coli*’s power (intended for fracturing) may be applied to pump down aspects from *Conrad-Neal*, but [Patent Owner] challenges this very point in the [Motion to Amend] (pp. 18, 19), which Petitioner fails to address.” *Id.* at 6. Patent Owner contends further that “[t]he combined teaching does not disclose ‘a mobile power grid configured to generate power for the [pump down operation] pump such that the power is not diverted from an associated pump for fracturing.’” *Id.* (alteration by Patent Owner). In addition, Patent Owner contends that by “Petitioner’s own

admission, the combination of *Coli* with *Conrad* and *Neal* results in powering both the fracturing and pump-down systems from the *Coli* power grid such that power is necessarily diverted from one pumping system to the other” and that “Petitioner concedes that ‘applying *Coli*’s teachings to the *Conrad-Neal* combination involves using *Coli*’s electric motors and transformers to power both the fracturing and pump-down pumps of the *Conrad-Neal* combination.” *Id.* at 6–7 (Mot. Opp. 11) (alterations by Patent Owner). Therefore, according to Patent Owner, “the combination of *Coli* with *Conrad* and *Neal* would teach a [person of ordinary skill in the art] to divert power from fracturing pumps to pump-down pumps and vice versa.” *Id.* at 7.

Petitioner replies that Patent Owner’s “distinctions over the prior art are based on added limitations to the claims that are simply not present” and that Patent Owner “continues to make the same errors in Reply.” Mot. Sur-Reply 4 (citing Mot. Opp. 9–12). Petitioner asserts that Patent Owner fails to cite any support for its position “that ‘[i]n *Coli*, additional equipment can only be added when the transformer and drive unit are permanently fixed, therefore a [person of ordinary skill in the art] would understand that the transformer and drive unit must also be fixed in such an arrangement.’” *Id.* at 5 (citing Mot. Reply 5). Petitioner asserts further that even if Patent Owner’s “unsupported argument were taken as true, [Patent Owner] fails to explain why *Coli*’s ‘permanently fixed’ transformer and drive unit to a trailer fails to disclose a ‘mobile power grid,’ particularly when the ’030 Patent describes those same components as constituting a ‘separate power grid.’” *Id.* (citing Ex. 1002, 8:37–57; Prelim. Guid. at 12–15).

In addition, Petitioner asserts that Patent Owner “rehashes its argument that *Coli* cannot disclose a mobile power grid configured to generator power for the [pump down] pump’ because *Coli*’s power is ‘intended for fracturing,’” but “does not otherwise explain why *Coli*’s power system could not also (or alternatively) be applied to a pump down operation other than refer to its [Motion to Amend].” Mot. Sur-Reply 5 (citing Mot. Reply 6 (citing Mot. 18–19)). Petitioner reiterates its position that “the **combination** of references discloses the added claim limitations and the claimed subject matter as a whole, because a [person of ordinary skill in the art] would have reasons to apply *Coli*’s teachings to the fracturing and pump down pumping systems of the *Conrad-Neal* combination.” *Id.* (citing Pet. 14–26; Mot. Opp. 10–11).

Finally, Petitioner asserts that Patent Owner “mischaracterizes ‘Petitioner’s own admission’ and bases its argument on an incorrect premise that if the power system of the *Conrad-Neal-Coli* combination powers both the fracturing and pump-down systems, ‘power is necessarily diverted from one pumping system to the other.’” Mot. Sur-Reply 5–6 (citing Mot. Reply 6). Petitioner asserts further that “[t]here is no requirement in Substitute Claim 15 that structurally separate power sources must be used for the pump down pump and fracturing pump . . . but merely that power is ‘not diverted’ between the two.” *Id.* at 6 (citing Mot. App. A 4). In addition, Petitioner asserts that “Dr. Hilbert provides unrebutted testimony that generating sufficient power to supply several electric motors, as taught by *Coli*, would mean that power is ‘not diverted’ between those electric motors.” *Id.* (citing Ex. 1029 ¶¶ 20–21). Petitioner asserts that Patent Owner “does not

otherwise dispute the Preliminary Guidance’s finding that *Coli* teaches separate transformer and drive units 50 for powering pumps on each trailer 10, or that *Coli* teaches the use of multiple turbine generators 30.” *Id.* (citing Prelim. Guid. 14; Ex. 1010 ¶ 38, Fig. 2).

We agree with Petitioner that Patent Owner’s arguments are premised on reading limitations into the claims. Mot. Opp. 8; Mot. Sur-Reply 4. We determine that proposed substitute claim 15 is unpatentable over the combined teachings of Conrad, Neal, and *Coli*. In particular, we determine that *Coli* teaches the limitation added to original claim 1, that is, “the motor being powered by a mobile power grid configured to generate power for the pump such that the power is not diverted from an associated pump for fracturing.” Mot. App. A 4. *Coli* discloses an electrical transformer and drive unit 50 mounted on a trailer (thereby making the electrical transformer and drive unit mobile) that is used “to step down the voltage of the power from turbine generator 30 to a voltage appropriate for electric motor 21” that, in turn, drives pump 22. See Ex. 1010 ¶¶ 40, 47, 49, Fig. 3.

Specifically, *Coli* discloses a “fracturing operation [that] includes one or more trailers 10, each housing one or more fracturing modules 20.” Ex. 1010 ¶ 38 (citing *id.* Fig. 3). *Coli* discloses that “each fracturing module 20 [is] associated with a drive housing for controlling electric motor 21 and pumps 22, as well as an electrical transformer and drive unit 50 (see FIG. 3) to step down the voltage of the power from turbine generator 30 to a voltage appropriate for electric motor 21.” *Id.* ¶ 47. *Coli* discloses that “electrical transformer and drive unit 50 can be provided as an independent unit for association with fracturing module 20, or can be permanently fixed to the

trailer 10.” *Id.* Coli discloses that if electrical transformer and drive unit 50 is permanently fixed, then it “can be scalable to allow addition or subtraction of pumps 22 or other components to accommodate any operational requirements.” *Id.* Coli further discloses that “[i]n the illustrative embodiment of FIG. 3, trailer 10 can house four fracturing modules 20, along with a transformer and drive unit 50” and that “[i]n this particular configuration, each single trailer 10 provides more pumping capacity than four of the traditional diesel powered fracturing trailers 5 of FIG. 1, as parasitic losses are minimal in the electric fracturing system compared to the parasitic losses typical of diesel fueled systems.” *Id.* ¶ 49.

In view of these disclosures in Coli, we credit Dr. Hilbert’s unrebutted testimony that a person of ordinary skill in the art considering these disclosures in Coli “would have understood that power is ‘not diverted’ from the pumping system for fracturing to the pumping system for pump down operations.” Ex. 1029 ¶ 20. We further credit Dr. Hilbert’s unrebutted testimony that

given that *Coli* teaches that a single turbine generator 30 can generate “sufficient power” to supply several electric motors 21, it would have been obvious to a [person of ordinary skill in the art] to size the generator properly such that there is sufficient power to the electric motors for both pump down and fracturing, without leaving any one electric motor short of its required power to operate.

Id. (citing Ex. 1010 ¶¶ 44, 49).

For these reasons, we determine that Petitioner has shown, by a preponderance of the evidence, that proposed substitute claim 15 is unpatentable over the combined teachings of Conrad, Neal, and Coli.

ii. Proposed Substitute Claim 24

In addition to the limitations set forth in original claim 10, proposed substitute claim 24 requires “positioning a second trailer having a boost pump driven by a second electric motor at the well site” and

positioning a third trailer having an auxiliary transformer to condition and to provide power to the second electric motor, the auxiliary transformer being used by the second electric motor and associated equipment for a pump down system, and the power provided by the auxiliary transformer is independent from one or more fracturing transformers to be used by one or more fracturing pumps.

Mot. App. A 7. As discussed in Section III.D.2 above, we determined that the combined teachings of Conrad, Neal, and Coli render original claim 10 unpatentable.

Patent Owner contends that “[t]he Board has rightly determined that Petitioner has not shown a reasonable likelihood that proposed substitute claims 24–28 are unpatentable as obvious over the cited references.” Mot. 19 (citing Prelim. Guid. 11–12). Patent Owner notes that “the Board has found that *Coli* does not ‘render obvious the positioning of an auxiliary transformer on a third trailer that is different from the trailer carrying the pump and electric motor that receive power from the auxiliary transformer, as recited in proposed substitute claim 24’ and that “[t]his feature of the third trailer is present in both previously submitted substitute claim 24 and presently proposed substitute claim 24.” *Id.* at 19–20 (citing Prelim. Guid. 18). Patent Owner further notes that “the Board has found that the reference to *Coli*’s coiled tubing system does not support the use of the ‘independent unit’ of *Coli* exclusively for the pumping system of *Neal*.” *Id.* at 20 (citing

Prelim. Guid. 20). Patent Owner contends that “[t]he additions of *Conrad* and [*Neal*] fail to cure these deficiencies” and that Conrad and Neal “even in combination with *Coli*, do not teach each feature of substitute claim 24 at least because *Coli* describes transformers that are individually associated with fracturing modules and not an independent, separate trailer with a separately useable transformer.” *Id.* (citing Ex. 1010 ¶¶ 47, 49, Fig. 3; Ex. 2034 ¶ 34). Thus, according to Patent Owner, “substitute claim 24 is patentable over Ground 1.” *Id.*

Petitioner responds that it “respectfully disagree[s] with the Board’s Preliminary Guidance regarding *Coli*’s disclosure of an ‘electrical transformer and drive unit 50 [that] can be provided as an independent unit for association with fracturing module 20, or can be permanently fixed to the trailer 10.” Mot. Opp. 11 (citing Prelim. Guid. 19). Petitioner asserts that “[t]he embodiments from *Coli* relied upon by the Board do not teach away from an electrical transformer and drive unit 50 being provided on separate trailers.” *Id.* (citing Prelim. Guid. at 18–19). Petitioner asserts further that

as Dr. Hilbert explains in his un rebutted declaration, a [person of ordinary skill in the art] would have understood *Coli*’s disclosure of “an electrical transformer and drive unit 50 can be provided as an independent unit” to mean that it could be mounted on a separate trailer, and that [Patent Owner’s] expert agreed that doing so would have been a matter of routine design choice and routine optimization.

Id. at 12 (citing Paper 27, 11).

Petitioner responds further that a person of ordinary skill in the art “would have been motivated to use the electric motors and generators of *Coli* to power the pump-down pump and associated boost pump of *Neal*”

and “would have likewise been motivated to use *Coli*’s electrical transformer and drive unit 50 to power the pump-down pump and associated boost pump as it would have been understood that a transformer is often a necessary component to provide the appropriate voltage for electrically-driven equipment.” Mot. Opp. 12 (citing Pet. 14–23; Ex. 1070 ¶ 15).

Patent Owner replies that “[t]he Board has rightly determined that Petitioner has not shown a reasonable likelihood that proposed Substitute Claim 24 is unpatentable as obvious over the cited references.” Mot. Reply 7 (citing Prelim. Guid. 11–12). Patent Owner contends that “Petitioner’s expert testimony is unsupported by any further evidence other than supporting attorney argument with discussions of ‘routine design choice and routine optimization,’ which should not be weighed more than the teachings in the references themselves.” *Id.* (citing Mot. Opp. 11–12).

Coli describes the advantages of using a dedicated power source, such as natural gas turbine generator 30 to provide power for a fracturing operation. Ex. 1010 ¶¶ 43–44. In addition to powering such a system, *Coli* states that “a dedicated on-site operation can be used to provide power to operate other local equipment, including coiled tubing systems, service rigs, etc.” *Id.* ¶ 43. Given these disclosures in *Coli*, we credit Dr. Hilbert’s un rebutted testimony that “*Coli* teaches using a separate transformer for each separate piece of equipment in view of its express disclosure of providing its electrical transformer and drive unit 50 as ‘an independent unit for association with fracturing module 20’” and that “*Coli* does not limit its transformers to use with fracturing modules, but also contemplates powering ‘coiled tubing systems’” and other local equipment and service rigs. Ex.

1029, 18–19 (citing Ex. 1010 ¶¶ 43, 47). We further credit Dr. Hilbert’s un rebutted testimony that

Such coiled tubing systems are similar to wireline systems used for pump down operations discussed by the ’030 Patent, as both coiled tubing systems and wireline systems are commonly used to position tools in a wellbore, for example, for perforation operations. For example, coiled tubing systems include dedicated pumps for pumping workover and stimulation fluids. Therefore, in my opinion, it would have at least been obvious to use the “independent unit” of *Coli* exclusively for the pumping system of *Neal* for pump down operations, and independent from another transformer used for the pumping system of *Neal* for fracturing operations. Indeed, it is a matter of general engineering knowledge to use separate transformers to provide power to separate systems.

Id. at 19 (citing Ex. 1036, 7).

In describing its fracturing module 20, *Coli* states that such modules “can include an electric motor 21 coupled to one or more electric pumps” and that “electric motor 20 is operatively associated with turbine generator 30, in some embodiments.” Ex. 1010 ¶¶ 46–47. *Coli* states that “[t]ypically, each fracturing module 20 will be associated with a drive housing for controlling electric motor 21 and pumps 22, as well as an electrical transformer and drive unit 50 (see FIG. 3) to step down the voltage of the power from turbine generator 30 to a voltage appropriate for electric motor 21.” *Id.* ¶ 47. *Coli* describes its electrical transformer and drive unit 50 as either being provided as an independent unit or as being permanently fixed to the trailer. *Id.* In our Preliminary Guidance, we emphasized *Coli*’s latter disclosure. Although it is true that *Coli* describes some advantages of a transformer and drive unit 50 that is permanently fixed to the trailer, such

discussion does not obviate Coli's disclosure of a transformer and drive unit 50 being provided as an independent unit.

Given these disclosures in Coli, we credit Dr. Hilbert's unrebutted testimony that "*Coli* teaches or at least renders obvious 'an independent, separate [i.e. third] trailer with a separately useable transformer'" because "*Coli* explicitly teaches that 'electrical transformer and drive unit 50 can be provided as an independent unit for association with fracturing module 20.'" Ex. 1029 ¶¶ 23–24 (citing Paper 21, 21; Ex. 1010 ¶ 47). We further credit Dr. Hilbert's unrebutted testimony that

it would have at least been obvious to a [person of ordinary skill in the art] to position the transformer and drive unit 50 on an "independent" trailer 10 based on "operational requirements" of a given fracturing job, particularly in view of the stated benefits of *Coli*'s "modular" and "scalable" fracturing system

and that "it would have been a simple matter of design choice to a [person of ordinary skill in the art] to have a transformer positioned on a separate trailer." *Id.* at 18 (citing Ex. 1010 ¶¶ 36, 47, 54, and 76–77). Dr. Hilbert's testimony is supported by the testimony of Mr. Marscher agreeing that it was known since before 2015 that transformers are one type of equipment that could be mounted on a trailer and agreeing that the decision to have a transformer on the same trailer versus a separate trailer would have been a matter of design choice. Ex. 1033, 34:35–35:3, 38:9–39:11.

For these reasons, we determine that Petitioner has shown, by a preponderance of the evidence, that proposed substitute claim 24 is unpatentable over the combined teachings of Conrad, Neal, and Coli.

iii. Dependent Proposed Substitute Claims 16–18, 21, 22 and 25–28

Proposed substitute claims 16–18 are original claims 2–4 rewritten to depend from proposed substitute claim 15. Mot. App. A 5. Proposed substitute claims 21 and 22 are original claims 7 and 8 rewritten to depend from proposed substitute claim 15. *Id.* at 6. Proposed substitute claims 25–28 are original claims 11–14 rewritten to depend from proposed substitute claim 24. *Id.* at 7–8. Original claims 2–4, 7, 8, and 11–14 are unpatentable over the combined teachings of Conrad, Neal, and Coli for the reasons discussed in Section III.D above.

Patent Owner does not advance arguments in support of the patentability of proposed substitute claims 16–18, 21, 22, and 25–28. *See generally* Mot.; *see also generally* Mot. Sur-Reply. Given that we have determined that proposed substitute claims 15 and 24 are unpatentable over the combined teachings of Conrad, Neal, and Coli, and that original claims 2–4, 7, 8, and 11–14 are unpatentable over the combined teachings of these references, we determine that proposed substitute claims 16–18, 21, 22, and 25–28 are also unpatentable over this combination of references.

iv. Summary For Ground One

Having considered Patent Owner’s assertions, Petitioner’s arguments, and the full record developed during trial, we determine Petitioner has shown by a preponderance of the evidence that proposed substitute claims 15–18, 21, 22, and 24–28 are unpatentable for the reasons discussed above.

b. Grounds Two–Four: Obviousness of Proposed Substitute Claims 18–20 and 28 Over Conrad, Neal, Coli, and Tolman; Obviousness of Proposed Substitute

*Claim 23 Over Conrad, Neal, Coli, and Teurlay;
Obviousness of Proposed Substitute Claim 26 Over
Conrad, Neal, Coli, and Broussard*

In Ground Two, Petitioner asserts that proposed substitute claims 18–20 and 28 are unpatentable over Conrad, Neal, Coli, and Tolman. Mot. Opp. 7. In Ground Three, Petitioner asserts that proposed substitute claim 23 is unpatentable over Conrad, Neal, Coli, and Teurlay. *Id.* In Ground Four, Petitioner asserts that claim 26 is unpatentable over Conrad, Neal, Coli, and Broussard. *Id.*

Neither Patent Owner nor Petitioner address Grounds Two–Four. *See generally* Mot.; *see also generally* Mot. Opp. Proposed substitute claims 18–20 are original claims 4–6 rewritten to depend from proposed substitute claim 15. Mot. App. A 5–6. Proposed substitute claim 23 is original claim 9 rewritten to depend from proposed substitute claim 22, which depends from proposed substitute claim 15. *Id.* at 6. Proposed substitute claims 26 and 28 are original claims 12 and 14 rewritten to depend from proposed substitute claim 24. *Id.* at 7–8.

As discussed above we determined that proposed substitute claims 15 and 24 are unpatentable over the combined teachings of Conrad, Neal, and Coli. We further determined that original claims 4, 12, and 14 are unpatentable over this combination of references, original claims 4–6 and 14 are unpatentable over the combined teachings of Conrad, Neal, Coli, and Tolman, original claim 9 is unpatentable over the combined teachings of Conrad, Neal, Coli, and Teurlay, and that original claim 12 is unpatentable over the combined teachings of Conrad, Neal, Coli, and Broussard as discussed in Section III above. Given that proposed substitute claims 18–20,

23, 26, and 28 recite the same limitations as original claims 4–6, 9, 12, and 14 and that the various combinations of Conrad, Neal, Coli, Tolman, Teurlay, and Broussard render original claims 4–6, 9, 12, and 14 unpatentable, we determine that these combinations of references also render proposed substitute claims 18–20, 23, 26, and 28 unpatentable.

c. Ground Five: Obviousness of Proposed Substitute Claims 15–18, 21, 22, and 24–28

Petitioner asserts that proposed substitute claims 15–18, 21, 22, and 24–28 are unpatentable over the combined teachings of Conrad, Neal, Coli, and Kaarstad.¹⁴ Mot. Opp. 7.

Patent Owner contends that “[t]he addition of *Kaarstad* in Ground 5 does not change that *Coli* is improperly asserted” in Ground One. Mot. 21. Patent Owner asserts further that “because *Kaarstad* only reports redundant switchgear, tie breaker, and such equipment to supply power from separate generators,” Kaarstad “does not fix the deficiency in Ground 1 and fails for this reason.” *Id.* Patent Owner also asserts “*Kaarstad* does not cure the deficiencies of *Coli* with respect to the ‘third trailer’ also described above.” *Id.*

For proposed substitute claims 15–18, 21, 22, and 24–28, because we have determined that Coli was not improperly asserted and that Petitioner has demonstrated that these claims are unpatentable over the combined teachings of Conrad, Neal, and Coli, Patent Owner’s argument is unconvincing. Having demonstrated that claims 15–18, 21, 22, and 24–28

¹⁴ Kaarstad, Int’l Application Publication WO 2014/177346 A1, published November 6, 2014 (Ex. 1028) (“Kaarstad”).

are unpatentable over the combined teachings of Conrad, Neal, and Coli, Petitioner also demonstrates that these claims are unpatentable over the combined teachings of Conrad, Neal, Coli, and Kaarstad.

d. Grounds Six–Sixteen: Obviousness of Proposed Substitute Claims 18–20 and 28 Over Conrad, Neal, Coli, Kaarstad, and Tolman; Obviousness of Proposed Substitute Claim 23 Over Conrad, Neal, Coli, Kaarstad, and Teurlay; Obviousness of Proposed Substitute Claim 26 Over Conrad, Neal, Coli, Kaarstad, and Broussard; Obviousness of Proposed Substitute Claims 15–18, 21, 22, and 24–28 Over Conrad, Neal, Coli, and Lestz; Obviousness of Proposed Substitute Claims 18–20 and 28 Over Conrad, Neal, Coli, Lestz, and Tolman; Obviousness of Proposed Substitute Claim 23 Over Conrad, Neal, Coli, Lestz, and Teurlay; Obviousness of Proposed Substitute Claim 26 Over Conrad, Neal, Coli, Lestz, and Broussard; Obviousness of Proposed Substitute Claims 15–18, 21, 22, and 24–28 Over Conrad, Neal, Coli, and S&S Proposal; Obviousness of Proposed Substitute Claims 18–20 and 28 Over Conrad, Neal, Coli, S&S Proposal, and Tolman; Obviousness of Proposed Substitute Claim 23 Over Conrad, Neal, Coli, S&S Proposal, and Teurlay; Obviousness of Claim 26 Over Conrad, Neal, Coli, S&S Proposal, and Broussard

Neither Patent Owner nor Petitioner discuss the merits of Grounds six–sixteen. *See generally* Mot.; *see also generally* Mot. Opp. In light of our determination that all proposed substitute claims (i.e. proposed substitute claims 15–28) are unpatentable based on Grounds One–Five, we do not reach the remaining grounds of unpatentability set forth in Petitioner’s Opposition to the Revised Motion to Amend. Mot. Opp. 7–8.

10. Summary

For the reasons discussed above, we find that Petitioner has demonstrated, by a preponderance of the evidence, that proposed substitute claims 15–28 are unpatentable.

V. CONCLUSION¹⁵

For the reasons discussed above, we find Petitioner has demonstrated by a preponderance of the evidence that claims 1–14 are unpatentable as summarized in the following table:

Claims	35 U.S.C. §	References	Claims Shown Unpatentable	Claims Not shown Unpatentable
1–4, 7, 8, 10–14	103	Conrad, Neal, Coli	1–4, 7, 8, 10–14	
4–6, 14	103	Conrad, Neal, Coli, Tolman	4–6, 14	
9	103	Conrad, Neal, Coli, Teurlay	9	
12	103	Conrad, Neal, Coli, Broussard	12	
Overall Outcome			1–14	

¹⁵ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this 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). 25 As explained above, because we determine that the challenged claims are unpatentable on other grounds, we decline to address the remaining grounds.

For the reasons discussed above, we deny Patent Owner’s revised motion to amend as to proposed substitute claims 15–28, as summarized in the following table:

Revised Motion to Amend Outcome	Claim(s)
Original Claims Cancelled by Amendment	
Substitute Claims Proposed in the Amendment	15–28
Substitute Claims: Revised Motion to Amend Granted	
Substitute Claims: Revised Motion to Amend Denied	15–28
Substitute Claims: Not Reached	

VI. ORDER

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

ORDERED that claims 1–14 of the '030 patent are held unpatentable;

FURTHER ORDERED that Patent Owner's Revised Motion to Amend is denied with respect to substitute claims 15–28; 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
Brandon Chen
Clarke Stavinoha
BAKER BOTTS L.L.P.
chad.walters@bakerbotts.com
brandon.chen@bakerbotts.com
clarke.stavinoha@bakerbotts.com

David J. Tobin
MCDERMOTT WILL & EMERY LLP
dtobin@mwe.com

Brian C. Nash
MORRISON & FOERSTER
bnash@mofo.com

For PATENT OWNER:

Taylor Evans
Gurtej Singh
Scott Hughes
Corey Leggett
Melissa Schwaller
Joe Grdinovac
HOGAN LOVELLS US LLP
taylor.evans@hoganlovells.com
tej.singh@hoganlovells.com
scott.hughes@hoganlovells.com
corey.leggett@hoganlovells.com
melissa.schwaller@hoganlovells.com
joe.grdinovac@hoganlovells.com