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Paper 9
Date: February 16, 2022

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HALLIBURTON ENERGY SERVICES, INC.,
Petitioner,

v.

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

IPR2021-01238
Patent 10,526,882 B2

Before MEREDITH C. PETRAVICK, LYNNE H. BROWNE, and SEAN P. O'HANLON, *Administrative Patent Judges*.

O'HANLON, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. Background

Halliburton Energy Services, Inc. ("Petitioner") filed a Petition for *inter partes* review of claims 1–14 ("the challenged claims") of U.S. Patent No. 10,526,882 B2 (Ex. 1001, "the '882 patent"). Paper 2 ("Pet."). U.S. Well Services, LLC ("Patent Owner") filed a Preliminary Response. Paper 6 ("Prelim. Resp."). With our authorization (*see* Ex. 1031), Petitioner filed a Preliminary Reply (Paper 7, "Prelim. Reply") and Patent Owner filed a Preliminary Sur-reply (Paper 8, "Prelim. Sur-reply").

Institution of an *inter partes* review is authorized by statute only when "the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314(a) (2018). A decision to institute may not institute on fewer than all claims challenged in the petition. *SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1354, 1359–60 (2018). If the PTAB institutes a trial, the PTAB will institute on all challenges raised in the petition. *See* Patent Trial and Appeal Board Consolidated Trial Practice Guide ("CTPG") 64 (Nov. 2019) ("The Board will not institute on fewer than all claims or all challenges in a petition.");[1] *see also AC Techs. S.A. v. Amazon.com, Inc.*, 912 F.3d 1358, 1364 (Fed. Cir. 2019) ("[I]f the Board institutes an IPR, it must . . . address all grounds of unpatentability raised by the petitioner.").

We have authority, acting on the designation of the Director, to determine whether to institute an *inter partes* review under 35 U.S.C. § 314

[1] *Available at* https://www.uspto.gov/TrialPracticeGuideConsolidated.

and 37 C.F.R. § 42.4(a). For the reasons set forth below, upon considering the Petition, Preliminary Response, Preliminary Reply, Preliminary Sur-reply, and evidence of record, we conclude that the information presented shows that there is a reasonable likelihood that Petitioner would prevail in establishing the unpatentability of at least one of the challenged claims. Thus, we institute *inter partes* review of all challenged claims based on all asserted grounds.

B. Real Parties in Interest

Petitioner identifies itself, Halliburton Co., and Halliburton Holdings LLC as the real parties in interest. Pet. 1.

Patent Owner identifies itself as the sole real party in interest. Paper 4, 1.

C. Related Matters

The parties indicate that the '882 patent has not been the subject of any district court proceeding. Pet. 1; Paper 4, 1. However, the parties note that the '882 patent claims priority as a continuation-in-part to the application resulting in U.S. Patent No. 9,410,410 ("the '410 patent"), which Patent Owner has asserted against Petitioner in a district court litigation. Pet. 1; Prelim. Resp. 5; Paper 4, 1. The parties also note other petitions for *inter partes* review filed by Petitioner and challenging patents owned by Patent Owner. Pet. 2; Paper 4, 2.

D. The Challenged Patent

1. Summary

The '882 patent relates to hydraulic fracturing in oil and gas wells, which entails pumping fluid into underground formations at high pressure. Ex. 1001, 1:20–43. Typically, this pumping is performed by large diesel-powered pumps and associated engines and other equipment located at the well site. *Id.* at 1:44–2:5. This conventional equipment causes large amounts of harmful vibrations. *Id.* The '882 patent acknowledges that "electrical motors have been introduced to replace the diesel motors, which greatly reduces the noise generated by the equipment during operation." *Id.* at 2:5–8. However, due to the high pressures generated by reciprocating pumps, harmful vibrations are still present. *Id.* at 2:8–16.

The '882 patent discloses a hydraulic fracturing system, an embodiment of which is illustrated in Figure 1, reproduced below.

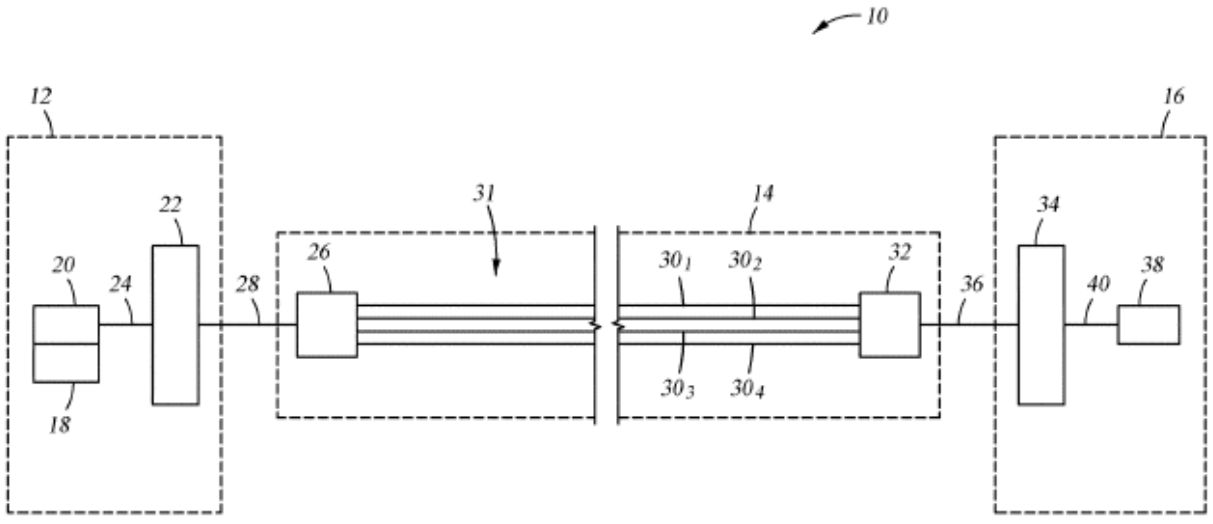

Fig. 1

Figure 1 is a schematic diagram of hydraulic fracturing system 10, which includes power generation section 12, transmission section 14, and equipment load section 16. Ex. 1001, 4:29–32. The power generation section includes an electricity source 18 that provides electricity to the equipment load section. *Id.* at 4:32–34. The electricity source can be a utility outlet, generator, natural gas-powered turbine generator, or a diesel-powered motor coupled with a generator. *Id.* at 4:34–41, 5:46–57, Fig. 2. The transmission section includes transmission line set 31 comprising several transmission lines $30_{1–4}$ spanning the distance between two cutouts 26, 32. *Id.* at 4:61–5:2. "Cutout 26 . . . is selectively opened to electrically isolate power generation section 12 from transmission section 14," and "[t]ransmission section 14 can be selectively isolated from equipment load section 16 by activating switching components in cutout 32." *Id.* at 4:58–61, 5:2–4. The equipment load section includes a motor that drives a pump that pumps fracturing fluid to create fractures in a subterranean formation. *Id.* at 6:21–29, Fig. 3. The motor can be controlled by a variable frequency drive ("VFD"). *Id.* at 6:31–33. "Switch gear 22 provides electrical isolation between the electrical output of electricity source 18 and transmission section 14," and "[s]witch gear 34 provides electrical isolation between line 36 and equipment load 38." *Id.* at 4:54–56, 5:6–7.

The generation section is positioned a long distance from the equipment load section. Ex. 1001, 5:13–26. The '882 patent purports that this spacing of the components advantageously overcomes physical conditions that are present at the fracturing site, such as insufficient space, noise and emissions restrictions local to the area being fractured, and other

restrictions. *Id.* at 5:26–38. Additionally, a single generation section can be used with multiple equipment load sections by moving the transmission section. *Id.* at 8:8–12, Fig. 5. A transformer can be positioned between the power generation section and the transmission section to increase the transmitted voltage to reduce electrical losses across the long distance of the transmission section. *Id.* at 7:12–28, Fig. 4. A transformer positioned between the transmission section and the equipment load section reduces the voltage as needed by the equipment in the equipment load section. *Id.* at 7:28–36, Fig. 4.

2. Effective Filing Date

The '882 patent claims priority as a continuation-in-part ("CIP") to application no. 13/679,689 ("the '689 application"), which issued as the '410 patent, and claims priority to provisional patent application no. 62/802,289 filed on June 16, 2015. Ex. 1001, code (63); Ex. 1003, 810. Petitioner argues that "[t]he '882 Patent has priority to no earlier than June 16, 2015," because "the '689 Application fails to provide written-description support for the Challenged Claims." Pet. 5. Petitioner argues that the '689 application does not provide support for the switch gear recitations of independent claims 1 and 8 or the transformer recitations of dependent claims 2, 3, 6, and 11. *Id.* at 6. Petitioner also argues that "the '882 Patent is not a proper CIP, as it *does not share any* common inventors with the '689 Application." *Id.* at 6.

Patent Owner does not contest Petitioner's arguments, but "reserves the right to present evidence of an earlier priority date for claims of the '882 Patent if this IPR is instituted." Prelim. Resp. 8.

In order to claim priority to an early-filed U.S. patent application, the earlier-filed application must disclose the invention claimed in the later-filed application "in the manner provided by section 112(a) (other than the requirement to disclose the best mode)" and the later-filed application must "name[] an inventor or joint inventor in the previously filed application." 35 U.S.C. § 120. For the reasons discussed below, we agree with Petitioner that, on this preliminary record, the '882 patent is not entitled to claim priority to the filing date of the '689 application.

Each of the independent claims of the '882 patent recites a first switch gear positioned between a source of electricity and a transmission line and a second switch gear positioned between the transmission line and an electric motor. Ex. 1001, 8:55–57, 9:19–22. "Switchgear" is "[a] general term covering switching and interrupting devices and their combination with associated control, instrumentation, metering, protective and regulating devices." Ex. 1029, 7. The '689 application does not disclose a switch gear. *See generally* Ex. 1004.[2] Nor does the '689 application disclose any switching or interrupting devices or any transformers. *See generally id.* Therefore, we agree that, on this preliminary record, the '689 application does not disclose the invention claimed in the '882 patent in the manner provided by 35 U.S.C. § 112(a).

Additionally, the '689 application lists Joel N. Broussard, Jeff McPherson, and Robert Kurtz as inventors. Ex. 1004, code (72). The '882 patent lists Jared Oehring and Brandon Neil Hinderliter as inventors. Ex. 1001, code (72); Ex. 1003, 808. Therefore, we agree that, on this

[2] Exhibit 1004 is the publication of the '689 application. Ex. 1004, code (21).

preliminary record, the '882 patent does not name an inventor or joint inventor of the '689 application.

Accordingly, for the foregoing reasons and on this preliminary record, we agree with Petitioner that the '882 patent is not entitled to claim priority to the filing date of the '689 application.

E. The Challenged Claims

Petitioner challenges claims 1–14 of the '882 patent. Pet. 34. Claims 1 and 8 are independent. Claim 1 is illustrative of the challenged claims and is reproduced below.

> 1. A hydraulic fracturing system for fracturing a subterranean formation comprising:
>
> an electric motor;
>
> a pump coupled to the motor, and that has a discharge in fluid communication with a wellbore that intersects the formation, so that when the motor is activated and drives the pump, pressurized fluid from the pump pressurizes the wellbore to fracture the formation;
>
> a variable frequency drive in communication with the electric motor, and that controls the speed of the motor, and performs electric motor diagnostics to prevent damage to the electric motor;
>
> a source of electricity that is disposed a long distance from the electric motor[;]
>
> transmission lines that connect the source of electricity to the electric motor and that span the long distance between the source of electricity and the electric motor; and
>
> a switch gear between the transmission line and the source of electricity, and another switch gear between the transmission line and the electric motor.

Ex. 1001, 8:37–57.

F. Asserted Grounds of Unpatentability

The Petition relies on the following prior art references:

Name	Reference	Exhibit
Broussard	US 2014/0138079 A1, published May 22, 2014	1004
Sanborn	US 2013/0306322 A1, published November 21, 2013	1006
Clarke	US 2014/0077607 A1, published March 20, 2014	1007
Cryer	US 8,997,904 B2, issued April 7, 2015	1008
EE Reference	John A. Camara, PE, *Electrical Engineering Reference Manual for the Electrical and Computer PE Exam* (6th ed. 2002)	1009

Petitioner asserts the following grounds of unpatentability:

Claim(s) Challenged	35 U.S.C. §	Reference(s)
1–14	103	Sanborn
1–14	103	Sanborn, Clarke
1–14	103	Sanborn, EE Reference
1–14	103	Cryer, Clarke
1–14	103	Cryer, EE Reference
1–7, 9, 10	103	Sanborn, Broussard
1–7, 9, 10	103	Sanborn, Clarke, Broussard
1–7, 9, 10	103	Sanborn, EE Reference, Broussard
1–7, 9, 10	103	Cryer, Clarke, Broussard
1–7, 9, 10	103	Cryer, EE Reference, Broussard

Pet. 34. Petitioner submits a declaration of Robert A. Durham, Ph.D. (Ex. 1002, "the Durham Declaration") in support of its contentions. Patent

Owner submits a declaration of Mr. Robert Schaaf (Ex. 2001) in support of its preliminary responses.

II. ANALYSIS

A. Discretionary Denial Under 35 U.S.C. § 314(a)

Petitioner argues that "[t]he '882 Patent has not been asserted in litigation, so institution should not be denied under 35 U.S.C. §314(a)." Pet. 6.

Patent Owner argues that "Petitioner is using the IPR process as a weapon to coordinate an attack against [Patent Owner's] patent portfolio." Prelim. Resp. 15. Patent Owner notes that Petitioner has filed 15 petitions for *inter partes* review of Patent Owner's patents, including eight petitions that challenge patents (including the '882 patent) that have not been asserted against Petitioner. *Id.* at 16–23. Patent Owner argues that we should exercise our "broad discretion" under § 314 to deny institution. *E.g.*, *id.* at 22–23; *see also* Prelim. Sur-reply 1–2.

Petitioner replies that it has filed only a single petition against each of Patent Owner's patents that it challenges. Prelim. Reply 1. Noting that Patent Owner issued a press release regarding the litigation it filed against Petitioner, Petitioner argues that it "should not need to sit idle against a looming cloud of other patents." *Id.* at 2 (citing Ex. 1033).

Unlike the covered business method patent review provisions of the AIA,[3] neither the statute nor our rules require that Petitioner have been sued

[3] Leahy-Smith American Invents Act ("AIA"), Pub. L. No. 112–29, 125 Stat. 284 (2011).

for infringement of the challenged patent in order to be able to file a petition for *inter partes* review. *See* 35 U.S.C. § 311; AIA § 18(a)(1)(B); 37 C.F.R. §§ 42.101, 42.302. Institution of an *inter partes* review, however, is discretionary, even if the statutory requirements are satisfied. *See SAS*, 138 S. Ct. at 1356 ("§ 314(a) invests the Director with discretion on the question *whether* to institute review"); *see also* CTPG 55–61 (discussing considerations in instituting a review). "The Board will also take into account whether various considerations . . . warrant the exercise of the Director's discretion to decline to institute review," and our exercise of "discretion is informed by 35 U.S.C. §[] 316(b) . . ., which require[s] the Director to 'consider the effect of any such regulation [under this section] on the economy, the integrity of the patent system, the efficient administration of the Office, and the ability of the Office to timely complete proceedings instituted under this chapter.'" CTPG 55–56.

The Board has exercised its § 314(a) discretion to deny institution due to the advanced state of a district court proceeding in which the challenged patent is asserted. *See, e.g.*, *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 15 (PTAB May 13, 2020) (designated informative). We have exercised our discretion to deny institution of a later-filed petition after having considered a previously-filed petition challenging the same patent. *See, e.g.*, *Valve Corp. v. Elec. Scripting Prods., Inc.*, IPR2019-00062, Paper 11 (PTAB Apr. 2, 2019) (designated precedential). And we have exercised our discretion to deny institution when a petition demonstrates a reasonable likelihood of prevailing as to some, but not all, challenged claims (*see, e.g.*, *Chevron Oronite Co. LLC v. Infineum USA L.P.*, IPR2018-00923, Paper 9 (PTAB Nov. 7, 2018) (designated informative)) and when a petition

suffers from a lack of particularity that results in voluminous and excessive grounds (*see, e.g.*, *Adaptics Limited v. Perfect Co.*, IPR2018-01596, Paper 20 at 17–18 (PTAB Mar. 6, 2019) (designated informative)).

This case is unlike other situations in which the Board has exercised its discretion to deny institution. Instead, Patent Owner asks us to deny institution because Petitioner has filed petitions challenging several of Patent Owner's patents that are not asserted in district court litigation, arguing that the filing of this many petitions by one petitioner against one patent owner is contrary to the purposes of the AIA. Prelim. Resp. 12–23. Patent Owner's arguments fail to persuade us to exercise our discretion to deny institution in this case. For each of Patent Owner's patents, Petitioner has filed only one petition. We do not see this action as being contrary to the purposes of the AIA. *See, e.g.*, *Gen. Plastic Indus. Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 at 16 (PTAB Sept. 6, 2017) (designated precedential) (citing H.R. Rep. No. 112-98, pt. 1, at 48 (2011)) (noting that the AIA is "not to be used as [a] tool[] for harassment or a means to prevent market entry through repeated litigation and administrative attacks on the validity of a patent. Doing so would frustrate the purpose of the section as providing quick and cost effective alternatives to litigation."). Moreover, it is undisputed that Patent Owner has asserted seven of its patents against Petitioner in district court litigation, and Petitioner expresses reasonable concern that Patent Owner may initiate additional litigation regarding its as-yet unasserted patents. *See* Prelim. Reply 2.

Accordingly, for the foregoing reasons, we decline to exercise our discretion under 35 U.S.C. § 314(a) to deny institution.

B. Discretionary Denial Under 35 U.S.C. § 325(d)

Patent Owner argues that we should exercise our discretion under 35 U.S.C. § 325(d) to deny institution of *inter partes* review because substantially the same prior art and arguments advanced by Petitioner were presented during prosecution of the application resulting in the '882 patent. Prelim. Resp. 23–39; Prelim. Sur-reply 2–5. Petitioner argues that discretionary denial is not warranted. Pet. 6; Prelim. Reply 3–5. For the reasons discussed below, we decline to exercise our discretion to deny institution.

1. Legal Framework

Institution of *inter partes* review is discretionary. *See Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1367 (Fed. Cir. 2016) ("[T]he PTO is permitted, but never compelled, to institute an IPR proceeding."); 35 U.S.C. § 314(a). Pursuant to 35 U.S.C. § 325(d), in determining whether to institute an *inter partes* review, "the Director may take into account whether, and reject the petition or request because, the same or substantially the same prior art or arguments previously were presented to the Office."[4] In evaluating whether to exercise our discretion to deny institution under § 325(d), we weigh the following non-exclusive factors:

> (a) the similarities and material differences between the asserted art and the prior art involved during examination;
>
> (b) the cumulative nature of the asserted art and the prior art evaluated during examination;

[4] The Board institutes trial on behalf of the Director. 37 C.F.R. § 42.4(a).

> (c) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection;
>
> (d) the extent of the overlap between the arguments made during examination and the manner in which Petitioner relies on the prior art or Patent Owner distinguishes the prior art;
>
> (e) whether Petitioner has pointed out sufficiently how the Examiner erred in its evaluation of the asserted prior art; and
>
> (f) the extent to which additional evidence and facts presented in the Petition warrant reconsideration of the prior art or arguments.

Becton, Dickinson & Co. v. B. Braun Melsungen AG, IPR2017-01586, Paper 8 at 17–18 (PTAB Dec. 15, 2017) (designated precedential in relevant part). Although *Becton, Dickinson* involved prior art or arguments that were presented during examination of the patent application, the enumerated factors "should be read broadly . . . to apply to any situation in which a petition relies on the same or substantially the same art or arguments previously presented to the Office during a proceeding pertaining to the challenged patent." *Advanced Bionics, LLC v. Med-El Electromedizinishe Geräte GMBH,* IPR2019-01469, Paper 6 at 10 (Feb. 13, 2020) (designated precedential). Factors (a), (b), and (d) relate to whether the art and arguments presented in the petition are the same or substantially the same as those previously presented to the Office. *Id.* Factors (c), (e), and (f) "relate to whether the petitioner has demonstrated a material error by the Office" in its prior consideration of that art or arguments. *Id.*

> Thus, under § 325(d), the Board uses the following two-part framework: (1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and (2) if either condition of [the] first part of the

> framework is satisfied, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of [the] challenged claims.

Id. at 8.

2. Background

The '882 patent was filed as application number 15/183,387 on June 15, 2016, as a continuation in part of application number 13/679,689.[5] Ex. 1003, 799, 810, 817. The application included 20 claims, of which claims 1, 9, and 14 were independent. *Id.* at 833–37. Subsequent to filing the application, Petitioner filed several Information Disclosure Statements ("IDSs"), including one filed on January 25, 2017, disclosing Cryer, the patented version of Broussard, and Sanborn, and one filed on September 14, 2017, disclosing Broussard. *Id.* at 736, 764–65, 770.

On April 2, 2018, the Examiner issued a Non-Final Office Action rejecting claims 1–5, 8–12, and 14–16 as being obvious in view of Cryer and Rusnak,[6] and claims 14 and 17–20 as being anticipated by Cryer. Ex. 1003, 698–702. The Examiner found claims 6, 7, and 13 to contain allowable subject matter. *Id.* at 702. Notably, claim 6 recited, "The hydraulic fracturing system of Claim 1, further comprising a switch gear between the transmission line and the source of electricity, and another switch gear between the transmission line and the electric motor." *Id.* at 834. The Examiner also indicated that the submitted Cryer, Broussard, and Sanborn references were considered. *Id.* at 684, 686, 709–10, 715, 717, 719. The Applicant responded on July 2, 2018, by, *inter alia*, amending claims 1

[5] Application number 13/679,689 issued as the '410 patent.
[6] US 8,774,972 B2, issued July 8, 2014.

and 14 to contain the switchgear recitations of claim 6, which was canceled. *Id.* at 597–606.

On September 14, 2018, the Examiner issued a Final Office Action rejecting claims 9, 11, and 12 as being anticipated by Cryer, and claim 10 as being obvious in view of Cryer and Rusnak. Ex. 1003, 579–82. The Examiner indicated that claims 1–5, 8, and 14–20 were allowed and claim 7 contained allowable subject matter. *Id.* at 582. The Applicant responded on February 14, 2019, by, *inter alia*, making additional amendments to claim 9. *Id.* at 356–66.

On March 6, 2019, the Examiner issued a Non-Final Office Action rejecting claims 9, 11, and 12 as being obvious in view of Cryer and Kume,[7] and claim 10 as being obvious in view of Cryer, Kume, and Rusnak. Ex. 1003, 329–332. The Examiner indicated that claims 1–5, 7, 8, and 14–20 were allowed. *Id.* at 332. The Applicant responded on September 5, 2019, by canceling claims 9–12. *Id.* at 63–69.

On September 20, 2019, the Examiner allowed all the pending claims and issued a Notice of Allowance. Ex. 1003, 44–48. Independent claims 1 and 14 issued as claims 1 and 8, respectively. *Id.* at 51.

3. Analysis

a. Whether the Same or Substantially the Same Art Was Presented to the Office

Applying the *Advanced Bionics* framework, we first determine whether the same or substantially the same art or arguments were presented previously to the Office. Petitioner asserts five references in challenging the

[7] US 6,208,098 B1, issued March 27, 2001.

claims of the '882 patent here: Broussard, Sanborn, Clarke, Cryer, and EE Reference. *E.g.*, Pet. 34. Patent Owner argues that each of these references is the same or substantially the same as art that previously was before the Office. Prelim. Resp. 26–34. For the reasons discussed below, we agree in part with Patent Owner.

i. Broussard

Petitioner acknowledges that Broussard is cited on the face of the '882 patent, but argues that this reference was not used in any substantive rejection. Pet. 7; Prelim. Reply 3–4.

Patent Owner argues that Broussard was considered previously by the Office. Prelim. Resp. 31; Prelim. Sur-reply 2–4.

As noted above, Broussard was disclosed via IDS, and the Examiner indicated that Broussard was considered during prosecution of the application resulting in the '882 patent by initialing and signing the submitted IDS. Ex. 1003, 684, 686. Our precedent establishes that "[p]reviously presented art includes . . . art provided to the Office by an applicant, such as on an Information Disclosure Statement (IDS), in the prosecution history of the challenged patent." *Advanced Bionics*, Paper 6 at 7–8. Accordingly, we agree with Patent Owner that Broussard previously was presented to the Office.

However, the Petition does not assert Broussard alone; rather, the Petition asserts Broussard in combination with Sanborn, Sanborn and Clarke, Sanborn and EE Reference, Cryer and Clarke, and Cryer and EE Reference. *See* Pet. 34. For the reasons provided below, Clarke and EE Reference are not the same or substantially the same as art presented

previously to the Office. Thus, the combinations of Broussard with Clarke or EE Reference were not presented previously to the Office.

ii. Sanborn

Petitioner acknowledges that Sanborn is cited on the face of the '882 patent, but argues that this reference was not used in any substantive rejection. Pet. 7; Prelim. Reply 3–4.

Patent Owner argues that Sanborn was considered previously by the Office. Prelim. Resp. 26–27; Prelim. Sur-reply 2–4.

As noted above, Sanborn was disclosed via IDS, and the Examiner indicated that Sanborn was considered during prosecution of the application resulting in the '882 patent by initialing and signing the submitted IDS. Ex. 1003, 715, 717.

Accordingly, we agree with Patent Owner that Sanborn was presented previously to the Office. *See Advanced Bionics*, Paper 6 at 7–8.

iii. Clarke

Petitioner argues that Clarke was not presented previously to the Office. Pet. 7.

Patent Owner argues that Clarke is "substantially the same as and cumulative of *Kristensen*[8] and *Seiver*,[9] which were considered during the examination of the '882 Patent," because these references disclose switchgear. Prelim. Resp. 28–30 (citing Ex. 2001, 54, 56).

Petitioner replies that Clarke is not substantially the same as Kristensen and Seiver because, "unlike *Kristensen* and *Seiver*, *Clarke* . . .

[8] US 9,450,385 B2, issued September 20, 2016 (Ex. 2002).
[9] US 2005/0116541 A1, published June 2, 2005 (Ex. 2003).

discloses ***two*** switchgear at the locations recited by the '882 Patent claims." Prelim. Reply 5.

Kristensen discloses a subsea switchgear. Ex. 2002, 1:16–19. The switchgear includes a first circuit breaker coupled between a first power input and a power distribution bus and a second circuit breaker coupled between a second power input and the power distribution bus. *Id.* at 2:56–3:2. "The subsea switchgear is configured to selectively supply electric power to the power output from the first power input or the second power input." *Id.* at 3:4–7.

Seiver discloses a power distribution system. Ex. 2003 ¶ 2. The system includes a plurality of generators connected to a primary bus and a plurality of loads connected to the primary bus. *Id.* ¶ 32. The generators are connected to the primary bus at input points distributed along the bus, and the loads are likewise distributed along the bus. *Id.* ¶¶ 36–37, Fig. 1. In this arrangement, the total power input to the system does not flow through any one point of the primary bus, and, thus, a lower-rated bus can be used. *Id.* ¶¶ 37, 47. In an embodiment, the system includes a secondary bus that is connected to the primary bus through one or more variable frequency drives to allow the loads, such as motors, to be slowly ramped up to operating speed. *Id.* ¶ 45, Fig. 7. The motors are selectively connected to the primary and secondary buses through "a conventional make-before-break switchgear." *Id.*

As discussed in more detail below, Clarke discloses a power distribution system having two busbars, in which each of the busbars can be provided with protective switchgear including circuit breakers and associated controls. Ex. 1007 ¶¶ 17–18, 56–58. Thus, we agree with

Petitioner that Clarke discloses a system with two switchgear and, therefore, Clarke is not substantially the same as Kristensen or Seiver.

iv. EE Reference

Petitioner argues that EE Reference was not presented previously to the Office. Pet. 7.

Patent Owner argues that EE Reference is "substantially the same as and cumulative of *Kristensen* and *Seiver*, which were considered during the examination of the '882 Patent" because these references disclose switchgear. Prelim. Resp. 28–30 (citing Ex. 2001, 54, 56).

Petitioner replies that EE Reference is not substantially the same as Kristensen and Seiver because, "unlike *Kristensen* and *Seiver*, . . . *EE-Reference* . . . discloses ***two*** switchgear at the locations recited by the '882 Patent claims." Prelim. Reply 5.

As noted above, each of Kristensen and Seiver disclose systems with a single switchgear. As discussed in more detail below, EE Reference discloses an electrical distribution system with switchgear positioned in multiple locations. Ex. 1009, 26–28, Fig. 35.1. Thus, we agree with Petitioner that EE Reference discloses a system with multiple switchgear and, therefore, EE Reference is not substantially the same as Kristensen or Seiver.

v. Cryer

Petitioner acknowledges that the Examiner rejected claims over Cryer during examination. Pet. 8. However, Petitioner argues that Clarke and EE Reference disclose the limitation the Examiner found to be missing from Cryer during examination, so "the Petition therefore presents different prior

art than the Office was aware of." *Id.* at 9 (citing *Oticon Med. AB v. Cochlear Ltd.*, IPR2019-00975, Paper 15 at 19–20 (PTAB Oct. 16, 2019) (designated precedential in relevant part)); *see also* Prelim. Reply 5.

Patent Owner argues that Cryer was considered previously by the Office, and that Clarke and EE Reference are substantially the same as art considered by the Examiner. Prelim. Resp. 27–28.

It is undisputed that the Examiner considered Cryer during examination. *See, e.g.*, Ex. 1003, 698–702 (the Examiner rejecting claims as being anticipated by Cryer or obvious in view of Cryer and Rusnak). However, the Petition does not assert Cryer alone; rather, the Petition asserts Cryer in combination with Clarke or EE Reference. *See* Pet. 34. For the reasons provided above, Clarke and EE Reference are not the same or substantially the same as art presented previously to the Office. Thus, the combination of Cryer with these references was not presented previously to the Office.

vi. Conclusion

For the foregoing reasons, Petitioner presents challenges based on combinations of references that were not presented previously to the Office. We find that § 325(d) is not sufficiently implicated under the circumstances here, and we determine that denying the Petition under § 325(d) is unwarranted.

b. Whether the Office Erred in a Manner Material to Patentability

Nonetheless, we also consider the second part of the *Advanced Bionics* framework for the two grounds for which the first part of the

framework is satisfied: the challenges based on Sanborn alone and Sanborn in view of Broussard. In the second part of the framework we consider whether Petitioner has demonstrated that the Office erred in a manner material to the patentability of the challenged claims. Petitioner argues that the Examiner erred in two manners. Pet. 7–8. First, Petitioner argues that the Examiner erred by adopting the applicant's claim of priority to the application resulting in the '410 patent. *Id.* at 7–8; Prelim. Reply 4. Petitioner argues that this error is material to the patentability of the challenged claims because it precluded consideration of Sanborn and Broussard. Pet. 7–8; Prelim. Reply 4. Second, referencing Sanborn, Petitioner argues that the Examiner erred in a material manner "by 'overlooking specific teachings of the relevant prior art' and not rejecting claims over Sanborn." Pet. 8; *see also* Prelim. Reply 5 (presenting similar arguments regarding Clarke and EE Reference).

Patent Owner argues that we must presume the Examiner used the correct priority date when examining the application resulting in the '882 patent. Prelim. Resp. 35 (citing *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1327 (Fed. Cir. 2003)); Prelim. Sur-reply 5 (citing same). Patent Owner argues that the Examiner's citation to Broussard evidences that the Examiner applied the correct priority date. Prelim. Resp. 36–37.

As noted above, the Examiner found the independent claims to be patentable due to the recitation, "a switch gear between the transmission line and the source of electricity, and another switch gear between the transmission line and the electric motor." *See* Ex. 1003, 582, 597–606, 702, 834. Sanborn discloses that its fracturing system can include other

equipment such as switchgear and that "[t]hose familiar with drilling and fracturing operations understand the purpose of this other equipment, as well as the way in which it is deployed at the site." Ex. 1006 ¶ 31. Petitioner argues that it would have been obvious to include switchgear in the locations recited in the independent claims, and this argument is supported by the testimony of Petitioner's declarant. Pet. 48–49; Ex. 1002 ¶ 187. For the reasons discussed in detail below, on this preliminary record, we are persuaded by Petitioner's arguments.

Accordingly, by not fully considering Sanborn's disclosure and how it would be interpreted by persons of ordinary skill in the art, we determine that the Examiner erred in a manner material to patentability during prosecution of the application resulting in the '882 patent.

c. Conclusion

After considering the framework set forth in *Advanced Bionics* and the underlying *Becton, Dickinson* factors, we determine that discretionary denial under § 325(d) is not appropriate under the facts before us.

We further note that, had we determined both parts of the *Advanced Bionics* framework to be satisfied with respect to the challenges based on Sanborn alone and the combination of Sanborn and Broussard, we still would not exercise our discretion to deny institution under § 325(d) because the framework would be satisfied with respect to only two of Petitioner's ten challenges, and the remaining eight challenges address all of the challenged claims.

C. Principles of Law

1. Inter Partes *Review*

"In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim")). Petitioner bears the burden of persuasion to prove unpatentability of each challenged claim by a preponderance of the evidence. 35 U.S.C. § 316(e). This burden never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). The Board may authorize an *inter partes* review if we determine that the information presented in the Petition and Patent Owner's Preliminary Response shows that there is a reasonable likelihood that Petitioner will prevail with respect to at least one of the claims challenged in the petition. 35 U.S.C. § 314(a).

2. Obviousness

A patent claim is unpatentable under 35 U.S.C. § 103 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 the 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, any objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

D. Level of Ordinary Skill in the Art

The level of ordinary skill in the art is "a prism or lens" through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). The person of ordinary skill in the art is a hypothetical person presumed to have known the relevant art at the time of the invention. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In determining the level of ordinary skill in the art, we may consider certain factors, including the "type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field." *Id.* (internal quotation marks and citation omitted).

Petitioner contends that a person having ordinary skill in the art at the time of the invention ("POSITA") would have either "a Bachelor of Science in Mechanical Engineering, Electrical Engineering, Petroleum Engineering or an equivalent field as well as at least 2 years of academic or industry experience in the oil and gas industry, including well drilling, completion, or production," or "at least four years of industry experience in the oil and gas industry, including well drilling, completion, or production." Pet. 15–16 (citing Ex. 1002 ¶ 61).

Patent Owner asserts that it "has used Petitioner's proposed definition of a person of ordinary skill in the art." Prelim. Resp. 8.

Based on the arguments presented and the cited references, we find Petitioner's definition of the level of ordinary skill reasonable and for purposes of this Decision adopt it as our own.

E. Claim Construction

In an *inter partes* review, claims are construed using the same claim construction standard that would be used to construe the claims in a civil action under 35 U.S.C. § 282(b), including construing the claims in accordance with the ordinary and customary meaning of such claims as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. 37 C.F.R. § 42.100(b). Thus, we apply the claim construction standard as set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). In addition to the specification and prosecution history, we also consider use of the terms in other claims and extrinsic evidence including expert and inventor testimony, dictionaries, and learned treatises, although extrinsic evidence is less significant than the intrinsic record. *Id.* at 1312–17. Usually, the specification is dispositive, and it is the single best guide to the meaning of a disputed term. *Id.* at 1315.

The specification may reveal a special definition given to a claim term by the patentee, or the specification may reveal an intentional disclaimer or disavowal of claim scope by the inventor. *Phillips*, 415 F.3d at 1316. If an inventor acts as his or her own lexicographer, the definition must be set forth in the specification with reasonable clarity, deliberateness, and precision. *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998).

Only those terms that are in controversy need be construed, and only to the extent necessary to resolve the controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Petitioner argues that "long distance," as used in claims 1 and 8 should be interpreted to mean "at least one half of a mile." Pet. 16 (citing Ex. 1001, 5:24–26).

Patent Owner asserts that "no construction is necessary beyond the plain and ordinary meaning," but asserts that it "has used Petitioner's construction at this stage in the proceeding." Prelim. Resp. 9.

Claim 1 recites "a source of electricity that is disposed a long distance from the electric motor." Ex. 1001, 8:49–50. Claim 8 similarly recites "a power source that is a long distance from the electric motor." *Id.* at 9:18–19. The '882 patent states,

> Example distances between power generation system 12 and equipment load section 16 include up to about one mile, up to about five miles, up to about 20 miles, up to about 50 miles, up to about 100 miles, up to about 300 miles, up to about all distances between the cited distances, and about one mile, five miles, 20 miles, 50 miles, 100 miles, 300 miles, and all distances there between. For the purposes of discussion herein, a long distance between a power generation system 12 and equipment load section 16 is at least one half of a mile.

Id. at 5:17–26. The '882 patent discloses that the equipment load section includes a motor powering a hydraulic fracturing pump. *Id.* at 5:58–6:29, Fig. 2.

Accordingly, for purposes of institution and on this preliminary record, we interpret "long distance" as used in the claims to mean "at least one half of a mile."

Claim construction, in general, is an issue to be addressed at trial. A final determination as to claim construction will be made at the close of the proceeding, after any hearing, based on all the evidence of record. The parties are expected to assert all of their claim construction arguments and evidence in the Petition, Patent Owner's Response, Petitioner's Reply, or otherwise during trial, as permitted by our rules.

F. Overview of the Asserted Prior Art

1. Broussard

Broussard relates to hydraulic fracturing in oil and gas wells. Ex. 1004 ¶2. The system includes pumps powered by electric motors. *Id.* ¶ 18. Generators, such as natural gas turbine generators, are used to power the motors. *Id.* ¶ 24. A control system controls the speed of the motor via a variable frequency drive. *Id.* ¶ 27. The variable frequency drive also provides protection by frequently preforming motor diagnostics to prevent damage to a grounded or shorted motor. *Id.* ¶ 21. Broussard purports that its system provides several advantages over systems that use diesel-powered pumps, including lighter weight, increased efficiency, lower cost, and reduced emissions. *Id.* ¶¶ 33–34.

2. Sanborn

Sanborn discloses a system for hydraulically fracturing a rock formation to extract hydrocarbons. Ex. 1006 ¶ 2. Sanborn recognizes that

traditional hydraulic fracturing systems comprising diesel engines to power fracturing pumps can be inefficient, can require extra safeguards to address potential safety, noise, and environmental issues, and can have an undesirably large footprint. *Id.* ¶¶ 4–7. Sanborn purports to improve upon such known systems by using electric motors to power the pumps. *Id.* ¶¶ 10–11. Figure 1 is a schematic representation of the hydraulic fracturing system and is reproduced below.

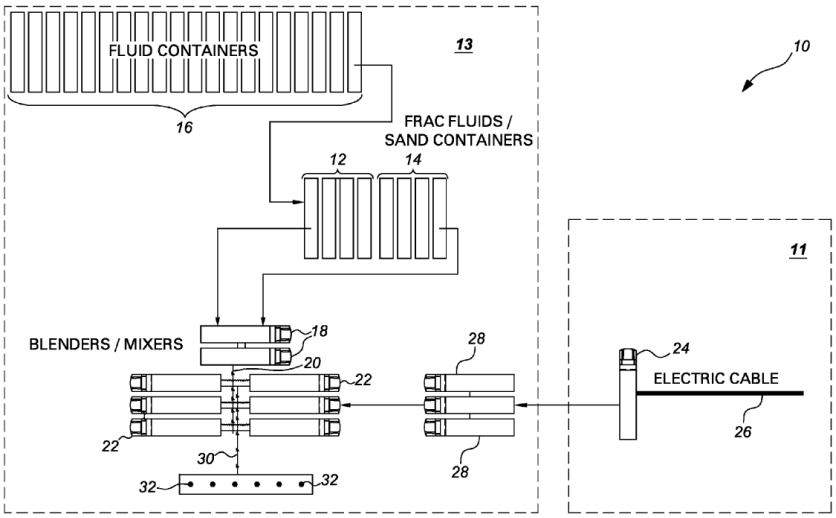

Fig. 1

Figure 1 is a schematic representation of the hydraulic fracturing system, including pumping sub-system 13 and power sub-system 11 that provides energy to the pumping sub-system. *Id.* ¶¶ 17, 33. The power sub-system includes electrical feed source 24, which may include a natural gas turbine engine and which may "be situated in a location remote from the pumping system." *Id.* ¶¶ 19, 39. The feed source includes a power distribution unit that may use a transformer to reduce the supplied voltage. *Id.* ¶ 39. Switchgears may be provided to "control multiple lines of power flow, such that faults or failures in individual components or units do not cause secondary damage to other components or units." *Id.* ¶ 32. The pumping

sub-system includes a plurality of pumpers 22, each pumper including at least one pump and one or more electric motors to drive the pump(s). *Id.* ¶¶ 21, 38. The pumping sub-system includes variable frequency drives 28 to control the current supplied to the pumps. *Id.* ¶¶ 40–41.

3. Clarke

Clarke discloses a power distribution system with a backup generator. Ex. 1007 ¶ 1. Clarke describes typical power generation systems as including a plurality of generators connected to a busbar to provide power to electrical loads, such as the propulsion motors of a marine vessel. *Id.* ¶¶ 3–4, Fig. 1. The motors are connected to the busbar via power converters. *Id.* ¶ 4, Fig. 1. A second busbar, carrying a lower voltage, can be connected to the main busbar to provide power to distribution equipment such as pumps, motors, and fans. *Id.* ¶ 18. The main and secondary busbars can be provided with protective switchgear including circuit breakers and associated controls. *Id.* ¶¶ 17–18, 56–58. Clarke purports to improve upon known power distribution systems by providing a variety of power sources to selectively provide power to the busbar. *Id.* ¶¶ 12, 15, Fig. 2. The additional power sources provide redundancy, which is important for marine vessels. *Id.* ¶ 19.

4. Cryer

Cryer discloses a system for powering a pump used in hydraulic fracturing operations. Ex. 1008, 1:6–7, 1:11–15, 2:11–13. Figure 1 is a schematic view of the system and is reproduced below.

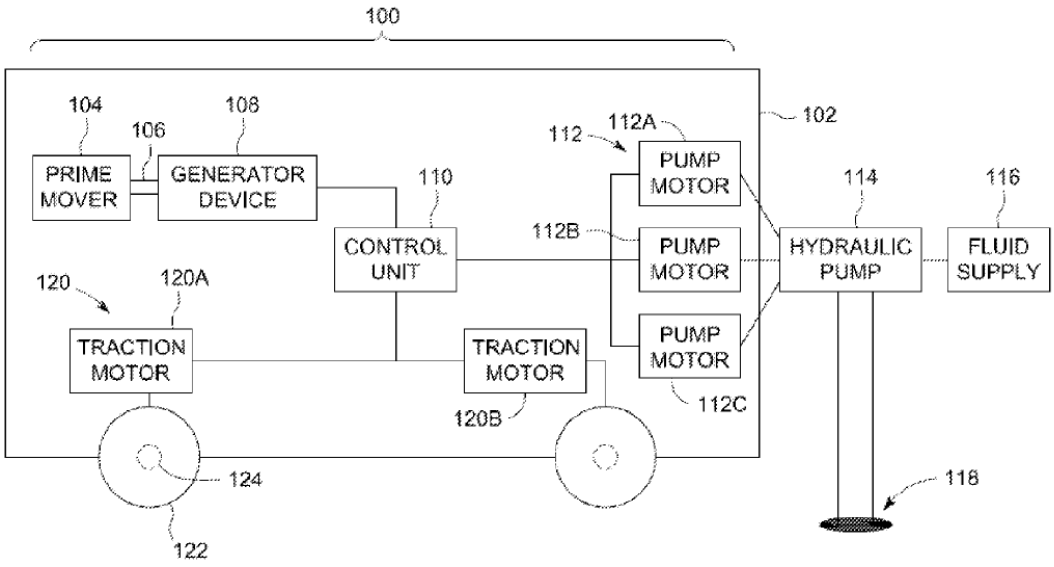

FIG. 1

Figure 1 is a schematic view of hydraulic pump powering system 100, which may be disposed onboard mobile vehicle 102. *Id.* at 5:1–5. The system includes prime mover 104, which may be a turbine powered by natural gas. *Id.* at 5:20–26. The prime mover drives electric current generator device 108. *Id.* at 5:38–45. The current produced by the generator is supplied to control unit 110, which modifies the current. *Id.* at 5:53–54, 5:63–64. The modified current is supplied to pump motors 112, which power hydraulic pumps 114. *Id.* at 7:10–16. The control unit may include a variable frequency drive to control the speed at which the motor operates. *Id.* at 7:5–9, 9:24–32, 9:50–58, 16:46–48.

5. EE Reference

EE Reference is excerpts from a reference book for use in preparing for the Principles and Practice of Engineering (PE) examination in electrical and computer engineering, as well as for practicing engineers.

Ex. 1009, 7.[10] It includes excerpted information regarding alternating current circuit fundamentals (*id.* at 13–14), transformers (*id.* at 15–20), generation systems (*id.* at 21–23), three-phase electricity and power (*id.* at 24–25), power distribution (*id.* at 26–37), and power transmission lines (*id.* at 38–49).

G. Asserted Obviousness Based on Sanborn

Petitioner argues that claims 1–14 would have been obvious over Sanborn. Pet. 34–58. In support of its showing, Petitioner relies upon the Durham Declaration. *Id.* (citing Ex. 1002). We have reviewed Petitioner's assertions and supporting evidence. For the reasons discussed below, and based on the record before us, we determine that Petitioner demonstrates a reasonable likelihood of prevailing in showing that at least one challenged claim would have been obvious over Sanborn.

1. Independent Claim 1

a. Analysis of Petitioner's Showing and Patent Owner's Responses

i. The Preamble

Claim 1 recites "[a] hydraulic fracturing system for fracturing a subterranean formation." Ex. 1001, 8:37–38. Petitioner argues that Sanborn discloses such a system. Pet. 35 (citing Ex. 1006, code (57), ¶ 12; Ex. 1002 ¶ 154).

[10] We note that Exhibit 1009 contains two sets of pagination: the exhibit pagination added by Petitioner and the pagination of the reference itself. We refer to the exhibit pagination.

Patent Owner does not contest this aspect of the Petition. *See generally* Prelim. Resp.

Sanborn discloses a system for hydraulically fracturing a rock formation to extract hydrocarbons. Ex. 1006 ¶ 2.

Accordingly, for the foregoing reasons and on this preliminary record, to the extent the preamble is limiting, Sanborn supports Petitioner's contentions.

ii. The Motor Recitation

Claim 1 recites "an electric motor." Ex. 1001, 8:39. Petitioner argues that Sanborn's pumping sub-system includes "a multitude of *electric motors*." Pet. 35 (citing Ex. 1006 ¶¶ 11, 18; Ex. 1002 ¶ 155).

Patent Owner does not contest this aspect of the Petition. *See generally* Prelim. Resp.

Sanborn discloses that its system includes a pumping sub-system that includes a plurality of pumpers, each pumper including at least one pump and one or more electric motors to drive the pump(s). Ex. 1006 ¶¶ 21, 33, 38.

According, for the foregoing reasons and on this preliminary record, Sanborn supports Petitioner's contentions.

iii. The Pump Recitation

Claim 1 recites "a pump coupled to the motor, and that has a discharge in fluid communication with a wellbore that intersects the formation, so that when the motor is activated and drives the pump, pressurized fluid from the pump pressurizes the wellbore to fracture the formation." Ex. 1001, 8:40–44. Petitioner argues that each of Sanborn's

pumpers includes one or more pumps. Pet. 35–36 (citing Ex. 1006 ¶¶ 12, 17, 21, 37–38, 42, Figs. 1, 2; Ex. 1002 ¶¶ 156–157). Petitioner argues that Sanborn's pumps pump pressurized fracturing fluid into a wellbore to fracture a subterranean formation. *Id.* at 37 (citing Ex. 1006, code (57), ¶¶ 10, 17, 44, Figs. 1, 2; Ex. 1002 ¶ 158).

Patent Owner does not contest this aspect of the Petition. *See generally* Prelim. Resp.

Sanborn discloses that its system includes a pumping sub-system that includes a plurality of pumpers, each pumper including at least one pump and one or more electric motors to drive the pump(s). Ex. 1006 ¶¶ 21, 33, 38. Sanborn discloses that its pumping sub-system is configured to pump pressurized fracturing fluid into a wellbore to fracture solid matter surrounding the wellbore. *Id.* ¶ 10.

According, for the foregoing reasons and on this preliminary record, Sanborn supports Petitioner's contentions.

iv. The Variable Frequency Drive Recitation

Claim 1 recites "a variable frequency drive in communication with the electric motor, and that controls the speed of the motor, and performs electric motor diagnostics to prevent damage to the electric motor." Ex. 1001, 8:45–48. Petitioner argues that Sanborn's system includes variable frequency drives. Pet. 38–39 (citing Ex. 1006 ¶¶ 40–41, 51, Figs. 1, 2; Ex. 1002 ¶¶ 159–160). Petitioner argues that by controlling the electrical power supplied to the motor "according to desired parameters," Sanborn's variable frequency drives perform "electric-motor diagnostics to reduce strain and prevent motor damage." *Id.* at 39 (citing Ex. 1006 ¶ 40; Ex. 1002 ¶ 161). Petitioner further argues that it would have been obvious

for Sanborn's variable frequency drives to perform electric motor diagnostics to ensure the desired parameters were achieved. *Id.* Petitioner argues that "standards existing more than a decade before the '882 Patent directed VFDs to perform electric-motor diagnostics to prevent damage to electric motors" and performing such diagnostics using Sanborn's variable frequency drive would "merely [be] using known techniques to yield predictable results." *Id.* at 39–40 (citing Ex. 1006 ¶ 40; Ex. 1002 ¶¶ 162–163; Ex. 1012, 73–74).

Patent Owner does not contest this aspect of the Petition. *See generally* Prelim. Resp.

Sanborn discloses,

> In some embodiments, at least one variable-frequency drive (VFD) 28 is employed to control the current from electrical feed source 24, according to desired parameters. . . . As those skilled in the art understand, the VFD's control the frequency of the electrical power supplied to motors, as well as controlling current and voltage. This "controllability" allows energy savings, and reduced strain on each motor, during variable demand in pumping power. The general design and use of VFD's for an application like that described herein can be carried out by those familiar with electric motor technology and electric power system technology, without undue effort.

Ex. 1006 ¶ 40. Petitioner's declarant testifies that this control of motor input according to desired parameters "is an example of performing electric motor diagnostics to prevent damage to the motor." Ex. 1002 ¶ 161. Petitioner's declarant also supports Petitioner's assertions of obviousness. *Id.* ¶¶ 162–163.

According, for the foregoing reasons and on this preliminary record, Sanborn and Dr. Durham's testimony support Petitioner's contentions. We

further determine that, based on this preliminary record, Petitioner has set forth reasoning with rational underpinning explaining why it would have been obvious to use Sanborn's variable frequency drive to perform electric motor diagnostics. *See, e.g.*, Pet. 39–40; Ex. 1002 ¶¶ 162–163.

v. The Source Recitation

Claim 1 recites "a source of electricity that is disposed a long distance from the electric motor." Ex. 1001, 8:49–50. Petitioner argues Sanborn discloses that its electrical feed source 24 may be fed by an electrical transmission cable 26 originating from a power sub-station, a power generation facility, or a dedicated power generation subsystem, all of which, Petitioner argues, are exemplary sources of electricity. Pet. 40 (citing Ex. 1006 ¶ 39, claims 5, 16). Petitioner argues that Sanborn discloses that the source of electricity can also be a gas turbine engine located off-site. *Id.* at 41 (citing Ex. 1006 ¶¶ 18–19; Ex. 1002 ¶¶ 164–165). Petitioner argues that an ordinarily skilled artisan would have recognized that a power substation would be several miles from the electric motors. *Id.* at 42.

Patent Owner does not contest this aspect of the Petition. *See generally* Prelim. Resp.

Sanborn discloses that its motors can be powered by "a transmission line, sub-station, power generation facility, or a dedicated power generation sub-system," and that "the power generation system or sub-system may be located on-site or off-site." Ex. 1006 ¶ 18. Sanborn also discloses that "the electrical feed source may comprise at least one gas turbine engine" that is fueled by natural gas and that "could be situated in a location remote from the pumping system." *Id.* ¶ 19.

According, for the foregoing reasons and on this preliminary record, Sanborn supports Petitioner's contentions.

vi. The Transmission Lines Recitation

Claim 1 recites "transmission lines that connect the source of electricity to the electric motor and that span the long distance between the source of electricity and the electric motor." Ex. 1001, 8:51–54. Petitioner argues that Sanborn discloses electrical transmission cable 26 and a high-voltage transmission line, and argues that "[i]t was general engineering knowledge that the purpose of high-voltage transmission lines 'is to span long distances.'" Pet. 43 (citing Ex. 1006 ¶ 39; Ex. 1010, 11–12). Petitioner also maps lines between Sanborn's electrical feed source and the variable frequency drives and lines between the variable frequency drives and the pumpers to the recited transmission lines. *Id.* Petitioner argues that Sanborn distributes 15–30 MW of power and an ordinarily skilled artisan would have recognized that such a system would be a three-phase system. *Id.* at 45 (citing Ex. 1006 ¶ 46; Ex. 1002 ¶¶ 177–178). Petitioner argues that the '882 patent refers to each wire in a three-phase system as a transmission line. *Id.* (citing Ex. 1001, 3:1–9).

Patent Owner does not contest this aspect of the Petition. *See generally* Prelim. Resp.

Sanborn discloses that its large generator unit 50 "can be one capable of providing about 15 MW to about 30 MW of power." Ex. 1006 ¶ 46. Petitioner's declarant testifies that "such a power system would be a three-phase system (with multiple conductors), due to the inherent efficiencies and advantages of a three-phase system over single-phase systems at such levels

of power." Ex. 1002 ¶ 178. The '882 patent refers to each line within a three-phase transmission system as a separate line. Ex. 1001, 3:6–9.

According, for the foregoing reasons and on this preliminary record, Sanborn supports Petitioner's contentions.

vii. The Switch Gear Recitation

Claim 1 recites "a switch gear between the transmission line and the source of electricity, and another switch gear between the transmission line and the electric motor." Ex. 1001, 8:55–57. Petitioner argues that Sanborn discloses the use of switchgear and indicates that skilled artisans would know the way in which it should be deployed. Pet. 46 (citing Ex. 1006 ¶¶ 31–32). Petitioner argues that "Sanborn teaches that switchgear would be located in electrical feed source 24 . . ., which is between the transmission line . . . and electric motors." *Id.* (citing Ex. 1006 Figs. 1, 2). Petitioner argues that "Sanborn also teaches switchgear located between the transmission line and sources of electricity." *Id.* at 48. According to Petitioner, "[s]uch switchgear would allow operators to connect and disconnect individual generators and motors, such as in response to fault or to perform maintenance or relocate the component." *Id.* at 49 (citing Ex. 1009, Fig. 35.1; Ex. 1010, Fig. 2.1; Ex. 1002 ¶ 186–187).

Patent Owner argues that Sanborn does not disclose placement of a switchgear located between the power-generation units and the transmission line, and Petitioner relies only on the conclusory assertions of its declarant. Prelim. Resp. 41–42 (citing Pet. 48; Ex. 1006 ¶ 32; Ex. 1002 ¶¶ 180–185; Ex. 2001, 60–61).

Sanborn discloses that its fracturing system can include other equipment such as switchgear and that "[t]hose familiar with drilling and

fracturing operations understand the purpose of this other equipment, as well as the way in which it is deployed at the site." Ex. 1006 ¶ 31. Petitioner argues,

> it was general engineering knowledge to place switchgear between the transmission line and the source of electricity (e.g., generators), and to place switchgear between the transmission line and electric motors. Such switchgear would allow operators to connect and disconnect individual generators and motors, such as in response to fault or to perform maintenance or relocate the component.

Pet. 48–49 (citing Ex. 1002 ¶¶ 186–187; Ex. 1009, Fig. 35.1; Ex. 1010, Fig. 2.1). Petitioner's declarant testifies,

> a POSITA would have known to place switchgear in multiple locations in the power distribution system, particularly at locations where portions of the power system need to be disconnected either manually or automatically. For example, a POSITA would have known to deploy switchgear between the transmission line and the source of electricity (e.g., generators) in order to disconnect individual generators, such as if there were a fault or to relocate or test the generator. A POSITA would have also known to deploy switchgear between the transmission line and the electric motors, such as to disconnect motors in case of a fault or in case the motors needed to be moved to another location or tested.

Ex. 1002 ¶ 187.

According, for the foregoing reasons and on this preliminary record, Sanborn and Dr. Durham's testimony support Petitioner's contentions. We further determine that, based on this preliminary record, Petitioner has set forth reasoning with rational underpinning explaining why it would have been obvious to place switchgear between the source of electricity and the transmission lines and between the electric motors and the transmission lines. *See, e.g.*, Pet. 48–49; Ex. 1002 ¶¶ 187–188.

b. 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," as "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 argues that objective evidence regarding its Clean Fleet product supports the nonobviousness of the challenged claims. Prelim. Resp. 50–60. Patent Owner puts forth evidence of copying and commercial success. *Id.* Patent Owner argues that a nexus should be presumed because its "Clean Fleet® technology embodies the features of the Challenged Claims of the '882 Patent including, but not limited to pumps driven by electric motors." *Id.* at 60. Continuing, Patent Owner argues that there is a nexus between the asserted evidence of copying and the invention claimed in the '882 patent "because there is evidence that VoltaGrid copied the claimed invention." *Id.* at 57. Patent Owner also argues that "the claimed combination as a whole serves as a nexus for the objective evidence of commercial success." *Id.* at 60. Patent Owner cites to the prosecution history of the '410 patent in support of its contentions. *Id.* at 50–60 (citing Ex. 2005).

Patent Owner argues that "[d]uring the examination of the '410 Patent, [Patent Owner] submitted evidence of secondary considerations," which included "evidence of copying, industry praise, long-

felt need, and commercial success related to the claimed technology." Prelim. Resp. 51–52 (citing Ex. 2005, 7–57).

Petitioner argues that a presumption of nexus is not warranted in this proceeding because Patent Owner submits the same Clean Fleet product to support its contentions of secondary considerations in other *inter partes* review proceedings that challenge different patents with non-overlapping inventors. Prelim. Reply 7 (citing *Fox Factory*, 944 F.3d at 1375). Petitioner argues that the Clean Fleet product cannot be coextensive with the '882 patent claims because Patent Owner's other patents include features not recited in the '822 patent claims, including a boost pump, a heater, a blender, and an auger. *Id.* at 7–8. Continuing, Petitioner argues that "[Patent Owner] asserts that the pumps and electric motors provide nexus, yet the copying allegations say nothing about the pumps and motors." *Id.* at 10. Petitioner argues that "a showing of copying is only equivocal evidence of non-obviousness in the absence of more compelling objective indicia of other secondary considerations." *Id.* (quoting *Ecolochem, Inc. v. S. Cal. Edison Co.*, 227 F.3d 1361, 1380 (Fed. Cir. 2000)).

Petitioner also argues that, because the '882 patent is not entitled to priority to the '410 patent, "[a]ny secondary considerations are *not* attributable to the claimed invention of the '882 Patent, but instead to the prior art." Prelim. Reply 8 (citing Pet. 5–6).

Patent Owner replies that "Petitioner attempts to improperly shift the burden" to Patent Owner to prove a nexus to support secondary considerations. Prelim. Sur-reply 6–10. Patent Owner relies heavily on alleged evidence of secondary considerations of nonobviousness presented during the prosecution of the '410 patent. *Id.* (citing Ex. 2005, 1–57).

Patent Owner bears the burden of showing that a nexus exists. *WMS Gaming*, 184 F.3d at 1359. On this record, Patent Owner does not sufficiently demonstrate that it is entitled to a presumption of nexus. To establish nexus with respect to commercial success, Patent Owner argues that its "Clean Fleet® technology embodies the features of the Challenged Claims of the '882 Patent including, but not limited to pumps driven by electric motors." Prelim. Resp. 60. However, Patent Owner does not provide details regarding its Clean Fleet product, and, thus, fails to establish persuasively that the Clean Fleet product "embodies the claimed features, and is coextensive with them." *Fox Factory*, 944 F.3d at 1373 (quoting *Polaris*, 882 F.3d at 1072). Thus, on this record, Patent Owner has not shown sufficiently that it is entitled to a presumption of nexus. For the same reasons, on this record, Patent Owner has not sufficiently shown that the alleged commercial success is a "direct result of the unique characteristics of the claimed invention." *See Fox Factory*, 944 F.3d at 1373–74.

Further, in as much as Patent Owner relies upon the declaration of Mr. Oehring (Ex. 2008, 34–37), a named inventor of the '882 patent, to show a nexus with respect to copying, we do not find this testimony sufficient to establish nexus as it is untested at this stage of the proceeding. A final determination as to the veracity of Patent Owner's evidence and arguments is best reserved for trial.

At this stage of the proceeding, and on this record, Patent Owner has not sufficiently established a nexus between the asserted objective indicia of nonobviousness and the claimed invention of the '882 patent.

c. Conclusion

As set forth above, we have considered the scope and content of the prior art (§ II.F above), the differences between the claimed subject matter and the prior art (§ II.G.1.a above), the level of skill in the art (§ II.D above), and the objective evidence of nonobviousness (§ II.G.1.b above). Based on our findings, at this stage of the proceeding, we determine that Petitioner has established a reasonable likelihood of prevailing on its assertion that claim 1 would have been obvious over Sanborn.

2. Dependent Claims 2–7

Each of claims 2–7 depends, directly or indirectly, from claim 1. Ex. 1001, 8:58–9:13. The Petition maps these challenged dependent claims to Sanborn. Pet. 49–53. Patent Owner does not challenge separately the arguments and evidence presented for the dependent claims. *See generally* Prelim. Resp. Based on our review of the current record before us, we determine that the information presented in the Petition establishes that there is a reasonable likelihood that Petitioner would prevail in challenging these dependent claims.

3. Independent Claim 8

Claim 8 recites a method comprising driving a pump with an electric motor, transmitting electricity to the motor from a power source spaced from the motor via a transmission line with switchgear positioned between the transmission line and the source of electricity and between the transmission line and the motor, pressurizing a fluid with the pump, and fracturing a subterranean formation with the pressurized fluid. Ex. 1001, 9:14–27. In

large part, Petitioner refers to its contentions regarding claim 1 in arguing that claim 8 would have been obvious over Sanborn. *See* Pet. 54–55.

Patent Owner does not contest Petitioner's contentions regarding claim 8 apart from its arguments discussed in § II.G.1 above. *See generally* Prelim. Resp.

For the above reasons and those set forth in § II.G.1 above, at this stage of the proceeding, we determine that Petitioner has established a reasonable likelihood of prevailing on its assertion that claim 8 would have been obvious over Sanborn.

4. Dependent Claims 9–14

Each of claim 9–14 depends, directly or indirectly, from claim 8. Ex. 1001, 9:28–10:30. The Petition maps these challenged dependent claims to Sanborn. Pet. 55–58. Patent Owner does not challenge separately the arguments and evidence presented for the dependent claims. *See generally* Prelim. Resp. Based on our review of the current record before us, we determine that the information presented in the Petition establishes that there is a reasonable likelihood that Petitioner would prevail in challenging these dependent claims.

H. Asserted Obvious Based on Sanborn and Clarke

Petitioner argues that claims 1–14 would have been obvious over Sanborn and Clarke. Pet. 58–77. In support of its showing, Petitioner relies upon the Durham Declaration. *Id.* (citing Ex. 1002). We have reviewed Petitioner's assertions and supporting evidence. For the reasons discussed below, and based on the record before us, we determine that Petitioner

demonstrates a reasonable likelihood of prevailing in showing that at least one challenged claim would have been obvious over Sanborn and Clarke.

1. Independent Claims 1 and 8

Petitioner relies on Sanborn as set forth in § II.G.1 above and relies on Clarke to teach locations where switchgear would be positioned. Pet. 62–63. Petitioner argues that Clarke discloses two busbars, each of which being equipped with protective switchgear. *Id.* (citing Ex. 1007 ¶¶ 8, 17–19, 56, 58; Ex. 1002 ¶¶ 233–236). Petitioner argues that Sanborn discloses "an 'islanded operation'" and that an ordinarily skilled artisan would "look to other islanded power systems in the oil-and-gas space to provide load-sharing among generators, increase reliability through redundancy, and operate motors at a desired voltage." *Id.* at 60 (citing Ex. 1006 ¶ 18; Ex. 1029, 591; Ex. 1002 ¶ 226). Petitioner argues that Clarke discloses such a system. *Id.* (citing Ex. 1007 ¶¶ 1–2; Ex. 1002 ¶ 227).

Patent Owner argues that an ordinarily skilled artisan would not have combined the teachings of Sanborn and Clarke because "*Sanborn* relates to a system for extracting oil and gas by hydraulic fracturing" and "*Clarke* relates to a marine power distribution and propulsion system." Prelim. Resp. 44–45 (citing Ex. 1006 ¶¶ 1,[11] 9–11; Ex. 1007 ¶¶ 1,[12] 56–57; Ex. 2001, 61–63).

Sanborn states that its system may include other equipment, such as power distribution equipment and switchgear, and that an ordinarily skilled

[11] We understand Patent Owner's citation to "Ex. 1006, 1" (*see* Prelim. Resp. 44) to refer to Exhibit 1006 ¶ 1.
[12] We understand Patent Owner's citation to "Ex. 1007, 1" (*see* Prelim. Resp. 44) to refer to Exhibit 1007 ¶ 1.

artisan would understand the purpose of this equipment and the way in which it is deployed. Ex. 1006 ¶ 31. Clarke discusses power distribution equipment that may be used in drilling rigs. Ex. 1007 ¶¶ 1–2. We further note that both Sanborn (*see, e.g.*, Ex. 1006, Fig. 2) and Clarke (*see, e.g.*, Ex. 1007, Figs. 1, 2) disclose the use of multiple generators. Petitioner's declarant testifies that "[t]he arrangement of switchgear, transformers and loads disclosed by Clarke is a well-known arrangement of such equipment" and that "[i]t would have been obvious for a POSITA to improve the power distribution system of Sanborn according to the arrangement of equipment disclosed by Clarke in order to provide for load sharing among generators, increase reliability through redundancy and allow for operation of motors at a desired voltage." Ex. 1002 ¶ 228.

According, for the foregoing reasons and on this preliminary record, Sanborn, Clarke, and Dr. Durham's testimony support Petitioner's contentions. We further determine that, based on this preliminary record, Petitioner has set forth reasoning with rational underpinning explaining why it would have been obvious to position switchgear in Sanborn's system as described in Clarke. *See, e.g.*, Pet. 60; *see also* Ex. 1002 ¶ 228.

As set forth above, we have considered the scope and content of the prior art (§ II.F above), the differences between the claimed subject matter and the prior art (immediately above), the level of skill in the art (§ II.D above), and the objective evidence of nonobviousness (§ II.G.1.b above). Based on our findings, at this stage of the proceeding, we determine that Petitioner has established a reasonable likelihood of prevailing on its assertion that claims 1 and 8 would have been obvious over the combination of Sanborn and Clarke.

2. Dependent Claims 2, 3, 6, and 11

Claims 2, 3, and 6 depend directly from claim 1, and claim 11 depends directly from claim 8. Ex. 1001, 8:58–63, 9:5–7, 10:1–4. The Petition maps these challenged dependent claims to Clarke. Pet. 66–71.

Patent Owner presents arguments regarding dependent claims 2, 3, 6, and 11. Prelim. Resp. 45–46 (presenting arguments regarding the recited transformers). For example, Patent Owner argues that "Petitioner fails to explain why a POSITA would modify *Sanborn's* single cable 26 connected between a transmission line and the feed source 24 with *Clarke's* step down transformer connected between two busbars 2, 26." *Id.* at 45 (citing Ex. 1006 ¶ 39; Ex. 1007 ¶ 58; Ex. 2001, 64–66).

Whether the Petition sets forth adequate reasoning for the challenges of these dependent claims based on the combination of Sanborn and Clarke is an issue to be decided at trial.

3. Dependent Claims 4, 5, 7–10, and 12–14

Petitioner does not rely on Clarke in its challenges to claims 4, 5, 7–10, and 12–14, instead relying on its arguments presented above regarding the challenge based on Sanborn alone. *See* Pet. 58 ("Elements and claims not mentioned below are disclosed or rendered obvious for the reasons stated in Ground 1, incorporated herein by reference in its entirety."). For the reasons set forth in §§ II.G.2 and II.G.4 above and on this preliminary record, we determine that the information presented in the Petition establishes that there is a reasonable likelihood that Petitioner would prevail in challenging these dependent claims.

I. Asserted Obviousness Based on Sanborn and EE Reference

Petitioner argues that claims 1–14 would have been obvious over Sanborn and EE Reference. Pet. 58–77. In support of its showing, Petitioner relies upon the Durham Declaration. *Id.* (citing Ex. 1002). We have reviewed Petitioner's assertions and supporting evidence. For the reasons discussed below, and based on the record before us, we determine that Petitioner demonstrates a reasonable likelihood of prevailing in showing that at least one challenged claim would have been obvious over Sanborn and EE Reference.

1. Independent Claims 1 and 8

Petitioner relies on Sanborn as set forth in § II.G.1 above and relies on EE Reference to teach locations where switchgear would be positioned. Pet. 64–65. Petitioner argues that Sanborn discloses use of a conventional distribution circuit that includes switchgear and transformers, and an ordinarily skilled artisan would place the switchgear at the locations disclosed by EE Reference. *Id.* at 60–61 (citing Ex. 1006 ¶¶ 31–32, 39). Petitioner argues that EE Reference discloses conventional locations for switchgear, including between a transmission line and a source of electricity and between the transmission line and electric loads. *Id.* (citing Ex. 1009, 26–27,[13] Fig. 35-1). Petitioner argues that an ordinarily skilled artisan would have relied upon the teachings of EE Reference regarding switchgear and transformer placement because "EE-Reference 'presents a thorough

[13] When referencing EE Reference, Petitioner cites to the pagination of the reference itself. *See, e.g.*, Pet. 65. We convert Petitioner's citations to the exhibit pagination.

review of the fundamentals of electrical engineering' to 'PE candidates, practicing engineers, and engineering students.'" *Id.* at 61 (citing Ex. 1009, Preface); *see also id.* at 32 ("EE-Reference provides 'a broad review of electrical engineering design, analysis, and operational fundamentals.'" (citing Ex. 1009, Preface)).

Patent Owner acknowledges that EE Reference discloses "multiple switchgears," but argues that "Petitioner fails to explain *why* a POSITA would have been motivated to select a particular switchgear of [EE Reference] Figure 35.1 for placement between the transmission line and the source of electricity of *Sanborn*." Prelim. Resp. 47 (citing Ex. 2001, 70).

Sanborn states that its system may include other equipment, such as power distribution equipment and switchgear, and that an ordinarily skilled artisan would understand the purpose of this equipment and the way in which it is deployed. Ex. 1006 ¶ 31. EE Reference is a reference manual for electrical engineers and describes a typical electrical distribution system from an electric utility to a consumer that includes generators, transmission lines, circuit breaker switchgear, and transformers. Ex. 1009, 26–28, Fig. 35.1; *see also* Ex. 1029, 7 (defining "switchgear" as "[a] general term covering switching and interrupting devices and their combination with associated control, instrumentation, metering, protective and regulating devices"). Thus, we are persuaded on this preliminary record that an ordinarily skilled artisan would look to EE Reference when modifying Sanborn's power distribution equipment. *See* Pet. 60–61.

According, for the foregoing reasons and on this preliminary record, Sanborn and EE Reference support Petitioner's contentions. We further determine that, based on this preliminary record, Petitioner has set forth

reasoning with rational underpinning explaining why it would have been obvious to position switchgear in Sanborn's system as described in EE Reference. *See, e.g.*, Pet. 61; Ex. 1002 ¶¶ 252–253.

As set forth above, we have considered the scope and content of the prior art (§ II.F above), the differences between the claimed subject matter and the prior art (immediately above), the level of skill in the art (§ II.D above), and the objective evidence of nonobviousness (§ II.G.1.b above). Based on our findings, at this stage of the proceeding, we determine that Petitioner has established a reasonable likelihood of prevailing on its assertion that claims 1 and 8 would have been obvious over the combination of Sanborn and EE Reference.

2. Dependent Claims 2, 3, 6, and 11

Claims 2, 3, and 6 depend directly from claim 1, and claim 11 depends directly from claim 8. Ex. 1001, 8:58–63, 9:5–7, 10:1–4. The Petition maps these challenged dependent claims to EE Reference. Pet. 71–77. Patent Owner does not challenge separately the arguments and evidence presented for the dependent claims. *See generally* Prelim. Resp. Based on our review of the current record before us, we determine that the information presented in the Petition establishes that there is a reasonable likelihood that Petitioner would prevail in challenging these dependent claims.

3. Dependent Claims 4, 5, 7–10, and 12–14

Petitioner does not rely on EE Reference in its challenges to claims 4, 5, 7–10, and 12–14, instead relying on its arguments presented above regarding the challenge based on Sanborn alone. *See* Pet. 58 ("Elements and

claims not mentioned below are disclosed or rendered obvious for the reasons stated in Ground 1, incorporated herein by reference in its entirety."). For the reasons set forth in §§ II.G.2 and II.G.4 above and on this preliminary record, we determine that the information presented in the Petition establishes that there is a reasonable likelihood that Petitioner would prevail in challenging these dependent claims.

J. Asserted Obviousness Based on Cryer and Clarke

Petitioner argues that claims 1–14 would have been obvious over Cryer and Clarke. Pet. 77–101. In support of its showing, Petitioner relies upon the Durham Declaration. *Id.* (citing Ex. 1002). We have reviewed Petitioner's assertions and supporting evidence. For the reasons discussed below, and based on the record before us, we determine that Petitioner demonstrates a reasonable likelihood of prevailing in showing that at least one challenged claim would have been obvious over Cryer and Clarke.

1. Independent Claim 1

a. The Preamble

Claim 1 recites "A hydraulic fracturing system for fracturing a subterranean formation." Ex. 1001, 8:37–38. Petitioner argues that Cryer discloses such a system. Pet. 77–78 (citing Ex. 1008, 3:65–67, Fig. 3; Ex. 1003, 580; Ex. 1002 ¶¶ 273–274).

Patent Owner does not contest this aspect of the Petition. *See generally* Prelim. Resp.

Cryer discloses a hydraulic pump powering system for powering a pump used in hydraulic fracturing operations. Ex. 1008, 1:6–7, 1:11–15, 2:11–13, Fig. 1.

Accordingly, for the foregoing reasons and on this preliminary record, to the extent the preamble is limiting, Cryer supports Petitioner's contentions.

b. The Motor Recitation

Claim 1 recites "an electric motor." Ex. 1001, 8:39. Petitioner argues that Cryer discloses multiple electric pump motors. Pet. 78–81 (citing Ex. 1008, 2:61–66, 5:41–42, Figs. 1–4, 6–8; Ex. 1003, 580; Ex. 1002 ¶¶ 275–276).

Patent Owner does not contest this aspect of the Petition. *See generally* Prelim. Resp.

Cryer discloses that its system includes one or more electric pump motors. Ex. 1008, 5:38–42, 7:10–11.

According, for the foregoing reasons and on this preliminary record, Cryer supports Petitioner's contentions.

c. The Pump Recitation

Claim 1 recites "a pump coupled to the motor, and that has a discharge in fluid communication with a wellbore that intersects the formation, so that when the motor is activated and drives the pump, pressurized fluid from the pump pressurizes the wellbore to fracture the formation." Ex. 1001, 8:40–44. Petitioner argues that Cryer's pump motors are coupled to hydraulic pumps. Pet. 81–82 (citing Ex. 1008, 2:62–66, 16:56–59, 17:7–11, 17:38–40, 20:41–44, code (57), Figs. 1, 3, 4–8;

Ex. 1003, 580; Ex. 1002 ¶ 277). Petitioner argues that Cryer's pumps pump pressurized fracturing fluid into a wellbore to fracture a subterranean formation. *Id.* at 82–83 (citing Ex. 1008, 3:65–67, Figs. 1, 3, 5, 6, 8; Ex. 1003, 580–81; Ex. 1002 ¶ 278).

Patent Owner does not contest this aspect of the Petition. *See generally* Prelim. Resp.

Cryer discloses that its electric pump motors power a hydraulic pump to pump a fluid into a pumping location for hydraulic fracturing and well stimulation. Ex. 1008, 2:62–66, 3:57–67.

According, for the foregoing reasons and on this preliminary record, Cryer supports Petitioner's contentions.

d. The Variable Frequency Drive Recitation

Claim 1 recites "a variable frequency drive in communication with the electric motor, and that controls the speed of the motor, and performs electric motor diagnostics to prevent damage to the electric motor." Ex. 1001, 8:45–48. Petitioner argues that Cryer's system includes a variable frequency drive that controls the speed of the electric pump motor. Pet. 83–84 (citing Ex. 1008, 7:7–9, 9:50–58, 18:7–13, Figs. 2, 7; Ex. 1003, 580–81; Ex. 1002 ¶ 279). Petitioner argues that by controlling the speed of the electric pump motor, Cryer's variable frequency drives perform motor diagnostics. *Id.* at 85. Petitioner also argues that it would have been obvious "to perform additional motor diagnostics to ensure that speed was in fact being controlled and to check other electrical parameters." *Id.* (citing Ex. 1002 ¶¶ 280–283).

Patent Owner does not contest this aspect of the Petition. *See generally* Prelim. Resp.

Cryer discloses that its control unit may include a variable frequency drive to control the speed at which the motor operates. Ex. 1008, 7:5–9, 9:24–32, 9:50–58, 16:46–48. Petitioner's declarant testifies that this control of motor speed is an example of performing electric motor diagnostics to prevent damage to the motor. Ex. 1002 ¶ 282. Petitioner's declarant also supports Petitioner's assertions of obviousness. *Id.* ¶¶ 283–284.

According, for the foregoing reasons and on this preliminary record, Cryer and Dr. Durham's testimony support Petitioner's contentions. We further determine that, based on this preliminary record, Petitioner has set forth reasoning with rational underpinning explaining why it would have been obvious to use Cryer's variable frequency drive to perform electric motor diagnostics. *See, e.g.*, Pet. 85; Ex. 1002 ¶¶ 283–284.

e. The Source Recitation

Claim 1 recites "a source of electricity that is disposed a long distance from the electric motor." Ex. 1001, 8:49–50. Petitioner argues that Cryer discloses a generator as the source of electricity and the generator may be on a vehicle that is separated by a significant distance from the vehicle on which the pump motors are located. Pet. 85–86 (citing Ex. 1008, 14:33–62, Fig. 6; Ex. 1003, 581; Ex. 1002 ¶ 285).

Patent Owner does not contest this aspect of the Petition. *See generally* Prelim. Resp.

Cryer discloses that its hydraulic pump powering system includes an electric current generator device that converts movement of a prime mover

into electric current. Ex. 1008, 5:38–45. Cryer discloses that its hydraulic pump powering system can be a distributed system in which the components are positioned on separate vehicles. *Id.* at 14:19–32. Cryer discloses that the generator may be disposed on a first vehicle, the control unit may be disposed on a second vehicle, and the pump motors may be disposed on a third vehicle. *Id.* at 14:33–50. The vehicles "may be located relatively far from" each other, with the first vehicle "located between two or more pumping locations separated by a significant distance, such as a mile (or 1.6 kilometers) or more from each other" and the second and third vehicles "located at [one of] these separated pumping locations." *Id.* at 14:51–61.

According, for the foregoing reasons and on this preliminary record, Cryer supports Petitioner's contentions.

f. The Transmission Lines Recitation

Claim 1 recites "transmission lines that connect the source of electricity to the electric motor and that span the long distance between the source of electricity and the electric motor." Ex. 1001, 8:51–54. Petitioner argues that, in addition to its mapping for the Source Recitation, Cryer discloses that its variable frequency drive supplies multi-phase electricity to the motors, which requires the use of multiple transmission lines. Pet. 87 (citing Ex. 1008, 6:1–10; Ex. 1003, 581; Ex. 1002 ¶¶ 286–287). Petitioner argues that the '882 patent refers to each wire in a three-phase system as a transmission line. *Id.* (citing Ex. 1001, 3:1–9).

Patent Owner does not contest this aspect of the Petition. *See generally* Prelim. Resp.

Cryer discloses that "the control unit 110 may receive a direct current (e.g., having zero frequency) from the generator device 108" and may "convert the direct current into an alternating current having a designated number of phases, a designated frequency, and/or a designated power." Ex. 1008, 6:1–7. Petitioner's declarant testifies that supplying multi-phase electricity to electric motors would require the use of multiple transmission lines. Ex. 1002 ¶ 286. By referring to its mapping regarding the Source Recitation (Pet. 87), we understand Petitioner to include the transmission line(s) spanning the distance between the generator and the motors in this mapping.

According, for the foregoing reasons and on this preliminary record, Cryer supports Petitioner's contentions.

g. The Switch Gear Recitation

Claim 1 recites "a switch gear between the transmission line and the source of electricity, and another switch gear between the transmission line and the electric motor." Ex. 1001, 8:55–57. Relying on its showing made regarding the challenge based on Sanborn and Clarke, Petitioner argues that "Clarke describes locations where conventional switchgear would be placed, including between a generator and transmission lines, and between transmission lines and electric motors." Pet. 89 (citing Ex. 1002 ¶¶ 289–292). Petitioner argues that Cryer discloses "an 'islanded operation'" and that an ordinarily skilled artisan would "look to other islanded power systems in the oil-and-gas space to provide load-sharing among generators, increase reliability through redundancy, and operate motors at a desired voltage." *Id.* at 88–89 (citing Ex. 1008, 14:35–62;

Ex. 1029, 591). Petitioner argues that Clarke discloses such a system. *Id.* (citing Ex. 1007 ¶¶ 1–2; Ex. 1002 ¶¶ 269–271).

Patent Owner argues that "Petitioner fails to explain . . . *why* a POSITA would look to modify *Cryer* to include *Clarke's* switchgears based only on *Cryer's* 'vehicle containing the generator [being] separated by a significant distance from other vehicles,' when *Cryer* does not even mention a switchgear." Prelim. Resp. 49 (alteration in original) (citing Pet. 88; Ex. 1008, 14:35–62; Ex. 2001, 76).

Cryer discloses that its generator and motors may be located "relatively far" from each other. Ex. 1008, 14:51–61. Clarke discusses power distribution equipment that may be used in drilling rigs. Ex. 1007 ¶¶ 1–2. We further note that both Cryer (*see, e.g.*, Ex. 1008, 4:6–12) and Clarke (*see, e.g.*, Ex. 1007, Figs. 1, 2) disclose the use of multiple generators. Petitioner's declarant testifies that "[t]he arrangement of switchgear, transformers and loads disclosed by Clarke is a well-known arrangement of such equipment" and that "[i]t would have been obvious for a POSITA to improve the power distribution system of Cryer according to the arrangement of equipment disclosed by Clarke in order to provide for load sharing among generators, increase reliability through redundancy and allow for operation of motors at a desired voltage." Ex. 1002 ¶ 271.

According, for the foregoing reasons and on this preliminary record, Cryer, Clarke, and Dr. Durham's testimony support Petitioner's contentions. We further determine that, based on this preliminary record, Petitioner has set forth reasoning with rational underpinning explaining why it would have been obvious to position switchgear in Cryer's system as described in Clarke. *See, e.g.*, Pet. 89; *see also* Ex. 1002 ¶ 271.

h. Conclusion

As set forth above, we have considered the scope and content of the prior art (§ II.F above), the differences between the claimed subject matter and the prior art (immediately above), the level of skill in the art (§ II.D above), and the objective evidence of nonobviousness (§ II.G.1.b above). Based on our findings, at this stage of the proceeding, we determine that Petitioner has established a reasonable likelihood of prevailing on its assertion that claims 1 and 8 would have been obvious over the combination of Cryer and Clarke.

2. Dependent Claims 2–7

Each of claims 2–7 depends, directly or indirectly, from claim 1. Ex. 1001, 8:58–9:13. The Petition maps these challenged dependent claims to Cryer and Clarke. Pet. 91–97. Patent Owner does not challenge separately the arguments and evidence presented for the dependent claims. *See generally* Prelim. Resp. Based on our review of the current record before us, we determine that the information presented in the Petition establishes that there is a reasonable likelihood that Petitioner would prevail in challenging these dependent claims.

3. Independent Claim 8

Claim 8 recites a method comprising driving a pump with an electric motor, transmitting electricity to the motor from a power source spaced from the motor via a transmission line with switchgears positioned between the transmission line and the source of electricity and between the transmission line and the motor, pressurizing a fluid with the pump, and fracturing a subterranean formation with the pressurized fluid. Ex. 1001, 9:14–27. In

large part, Petitioner refers to its contentions regarding claim 1 in arguing that claim 8 would have been obvious over Cryer and Clarke. *See* Pet. 97–98.

Patent Owner does not contest Petitioner's contentions regarding claim 8 apart from its arguments discussed in § II.J.1 above. *See generally* Prelim. Resp.

For the above reasons and those set forth in § § II.J.1 above, at this stage of the proceeding, we determine that Petitioner has established a reasonable likelihood of prevailing on its assertion that claim 8 would have been obvious over Cryer and Clarke.

4. Dependent Claims 9–14

Each of claim 9–14 depends, directly or indirectly, from claim 8. Ex. 1001, 9:28–10:30. The Petition maps these challenged dependent claims to Cryer and Clarke. Pet. 55–58. Patent Owner does not challenge separately the arguments and evidence presented for the dependent claims. *See generally* Prelim. Resp. Based on our review of the current record before us, we determine that the information presented in the Petition establishes that there is a reasonable likelihood that Petitioner would prevail in challenging these dependent claims.

K. Asserted Obviousness Based on Cryer and EE Reference

Petitioner argues that claims 1–14 would have been obvious over Cryer and EE Reference. Pet. 77–101. In support of its showing, Petitioner relies upon the Durham Declaration. *Id.* (citing Ex. 1002). We have reviewed Petitioner's assertions and supporting evidence. For the reasons discussed below, and based on the record before us, we determine that

Petitioner demonstrates a reasonable likelihood of prevailing in showing that at least one challenged claim would have been obvious over Cryer and EE Reference.

1. Independent Claims 1 and 8

Petitioner relies on Cryer as set forth in § II.J.1 above and relies on EE Reference to teach locations where switchgear would be positioned. Pet. 77–90. Relying on its showing made regarding the challenge based on Sanborn and EE Reference, Petitioner argues that "EE-Reference describes locations where conventional switchgear would be placed, including between a generator and transmission lines, and between transmission lines and electric motors." *Id.* at 90 (citing Ex. 1002 ¶¶ 337–339). Petitioner argues that Cryer discloses "a 'distributed hydraulic pump powering system,' with generators and motors on separate vehicles separated by a long distance," and an ordinarily skilled artisan would place the switchgear at the locations disclosed by EE Reference. *Id.* at 89–90 (citing Ex. 1008, 14:19–15:7, Fig. 6). Petitioner argues that an ordinarily skilled artisan would have relied upon the teachings of EE Reference regarding switchgear placement because "EE-Reference 'presents a thorough review of the fundamentals of electrical engineering' to 'PE candidates, practicing engineers, and engineering students.'" *Id.* at 90 (citing Ex. 1009, Preface); *see also id.* at 32 ("EE-Reference provides 'a broad review of electrical engineering design, analysis, and operational fundamentals.'" (citing Ex. 1009, Preface)).

Patent Owner argues that Petitioner relies on "broad conclusory statements [that] cannot support an obviousness ground of invalidity." Prelim. Resp. 50 (citing Pet. 89–90).

Cryer discloses a hydraulic pump powering system that includes an electric current generator device that converts movement of a prime mover into electric current. Ex. 1008, 5:38–45. The current produced by the generator is supplied to control unit 110, which modifies the current. *Id.* at 5:53–55, 5:63–64. The modified current is supplied to pump motors 112, which power hydraulic pumps 114. *Id.* at 7:10–16. Cryer discloses that its hydraulic pump powering system can be a distributed system in which the components are positioned on separate vehicles that "may be located relatively far from" each other. *Id.* at 14:19–61. EE Reference is a reference manual for electrical engineers and describes a typical electrical distribution system from an electric utility to a consumer that includes generators, transmission lines, circuit breaker switchgear, and transformers. Ex. 1009, 26–28, Fig. 35.1; *see also* Ex. 1029, 7 (defining "switchgear" as "[a] general term covering switching and interrupting devices and their combination with associated control, instrumentation, metering, protective and regulating devices"). Thus, we are persuaded on this preliminary record that an ordinarily skilled artisan would look to EE Reference when modifying Cryer's power distribution equipment. *See* Pet. 89–90; Ex. 1002 ¶¶ 333–334.

According, for the foregoing reasons and on this preliminary record, Cryer and EE Reference support Petitioner's contentions. We further determine that, based on this preliminary record, Petitioner has set forth reasoning with rational underpinning explaining why it would have been

obvious to position switchgear in Cryer's system as described in EE Reference. *See, e.g.*, Pet. 89–90; Ex. 1002 ¶¶ 334–335.

As set forth above, we have considered the scope and content of the prior art (§ II.F above), the differences between the claimed subject matter and the prior art (immediately above), the level of skill in the art (§ II.D above), and the objective evidence of nonobviousness (§ II.G.1.b above). Based on our findings, at this stage of the proceeding, we determine that Petitioner has established a reasonable likelihood of prevailing on its assertion that claims 1 and 8 would have been obvious over the combination of Cryer and EE Reference.

2. Dependent Claims 2–7 and 9–14.

Each of claims 2–7 depends, directly or indirectly, from claim 1 (Ex. 1001, 8:58–9:13), and each of claims 9–14 depends, directly or indirectly, from claim 8 (*id.* at 9:28–10:30). The Petition maps these challenged dependent claims to Cryer and EE Reference. Pet. 91–97, 99–101. Patent Owner does not challenge separately the arguments and evidence presented for the dependent claims. *See generally* Prelim. Resp. Based on our review of the current record before us, we determine that the information presented in the Petition establishes that there is a reasonable likelihood that Petitioner would prevail in challenging these dependent claims.

L. Asserted Obviousness Based on Combinations Including Broussard

Petitioner argues that the main references (Sanborn and Cryer) used in the previously discussed challenge grounds each disclose a variable frequency drive that modifies power provided to electric motors.

Pet. 101–02. Petitioner relies on Broussard to provide additional disclosure that the variable frequency drives of Sanborn and Cryer would control the speed of the electric motor and perform motor diagnostics. *Id.* at 102. Petitioner argues that Broussard discloses a variable frequency drive that controls the speed of a motor and performs motor diagnostics to prevent damage to a grounded or shorted electric motor. *Id.* (citing Ex. 1004 ¶¶ 9, 21; Ex. 1002 ¶¶ 345–346). Petitioner argues that it would have been obvious to incorporate these features into Sanborn's and Cryer's variable frequency drives "to control speed of the motor and perform motor diagnostics in order to test that current, voltage, and frequency were, in fact, being properly controlled." *Id.* at 103. Continuing, Petitioner argues that "[p]roper control would help prevent damage from overspeed and save wear and tear on the motor and on the pump." *Id.* (citing Ex. 1004 ¶ 19; Ex. 1002 ¶¶ 349–350).

Patent Owner does not present arguments separate from those advanced for the previously discussed challenge grounds and discussed above. *See* Prelim. Resp. 40–50.

Broussard discloses a system for hydraulic fracturing in oil and gas wells, the system including a control system that controls the speed of the motor via a variable frequency drive. Ex. 1004 ¶¶ 9, 27. The variable frequency drive also provides protection by frequently preforming motor diagnostics to prevent damage to a grounded or shorted motor. *Id.* ¶ 21.

According, for the foregoing reasons and on this preliminary record, Broussard supports Petitioner's contentions. We further determine that, based on this preliminary record, Petitioner has set forth reasoning with rational underpinning explaining why it would have been obvious to include

Broussard's teachings in the variable frequency drives of Sanborn and Cryer. *See, e.g.*, Pet. 103; Ex. 1002 ¶¶ 350–351.

As set forth above, we have considered the scope and content of the prior art (§ II.F above), the differences between the claimed subject matter and the prior art (immediately above), the level of skill in the art (§ II.D above), and the objective evidence of nonobviousness (§ II.G.1.b above). Based on our findings, at this stage of the proceeding, we determine that Petitioner has established a reasonable likelihood of prevailing on its assertion that claims 1–7, 9, and 10 would have been obvious over the asserted combinations including Broussard.

III. CONCLUSION

For the foregoing reasons, we determine that the information presented establishes a reasonable likelihood that Petitioner would prevail in showing that at least one of the challenged claims of the '882 patent is unpatentable. At this preliminary stage, we have not made a final determination with respect to the patentability of the challenged claims or any underlying factual and legal issues. *See TriVascular, Inc. v. Samuels*, 812 F.3d 1056, 1068 (Fed. Cir. 2016) (noting that "there is a significant difference between a petitioner's burden to establish a 'reasonable likelihood of success' at institution, and actually proving invalidity by a preponderance of the evidence at trial").

Accordingly, *inter partes* review is instituted as to all challenged claims and all proposed grounds of unpatentability. *See SAS*, 138 S. Ct. at 1359–60; *see also PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018) (interpreting the statute to require "a simple yes-or-no

institution choice respecting a petition, embracing all challenges included in the petition"); CTPG 64 ("The Board will not institute on fewer than all claims or all challenges in a petition.").

IV. ORDER

Accordingly, it is:

ORDERED that pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–14 of the '882 patent is instituted with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial, which commences on the entry date of this decision.

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