

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.

IPR2021-01032
Patent 9,410,410 B2

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

HOSKINS, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Granting-in-Part and Denying-in-Part
Patent Owner's Revised Non-Contingent Motion to Amend
35 U.S.C. § 318(a)

I. INTRODUCTION

Halliburton Energy Services, Inc. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) pursuant to 35 U.S.C. §§ 311–319 to institute an *inter partes* review of U.S. Patent No. 9,410,410 B2 (Ex. 1002, “the ’410 patent”), claims 1–14 and 17–21. We issued an Institution Decision (Paper 12) instituting the petitioned review.

U.S. Well Services, LLC (“Patent Owner”) then filed a Patent Owner Response (Paper 21) to the Petition, defending the challenged ’410 patent claims. Petitioner filed a Reply (Paper 38) to the Patent Owner Response. Patent Owner did not file a Sur-reply. *See, e.g.*, Paper 13, at 8, 10 (Scheduling Order permitting Sur-reply to be filed by Aug. 9, 2022).

Patent Owner also filed an initial *contingent* motion to amend the ’410 patent (Paper 22), to which Petitioner filed an opposition (Paper 33). We issued Preliminary Guidance (Paper 40) concerning the initial motion to amend. Following the Preliminary Guidance, Patent Owner filed a revised *non-contingent* motion to amend the ’410 patent (Paper 43, “Motion to Amend” or “Mot.”), replacing the initial motion to amend. Petitioner filed an Opposition to the Motion to Amend (Paper 46, “Mot. Opp.”). Patent Owner filed a Reply to Petitioner’s Opposition (Paper 54, “Mot. Reply”). Petitioner filed a Sur-reply to Patent Owner’s Reply (Paper 68, “Mot. Sur-reply”).¹

¹ Some of the papers relating to the Motion to Amend were filed in two versions: one that is under seal (*see* Papers 47, 53, and 67), and another that is publicly available but redacted to hide sealed information (*see* Papers 46, 54, and 68). In this Decision, for reasons discussed below, we do not reach any of the issues that turn on the sealed information. Therefore, we cite to the publicly available Papers.

Patent Owner also filed a Motion to Exclude Evidence (Papers 58 and 59). Petitioner filed an Opposition to this Motion (Papers 61 and 62). Patent Owner filed a Reply to the Opposition (Papers 64 and 65).

An oral hearing was held on December 7, 2022, for which the transcript was entered into the record (Paper 77, “Tr.”).

In summary, we *grant* the Motion to Amend as to cancelling original claims 1–14 and 17–21 of the ’410 patent. As a result, we do not reach the grounds of unpatentability asserted in the Petition against these original claims.

We also *deny* the Motion to Amend as to adding proposed substitute claims to the ’410 patent, because all of these claims seek to add new matter to the application that issued as the ’410 patent. As a result, we do not reach the grounds of unpatentability asserted in the Opposition against the proposed substitute claims. We further do not rule on Patent Owner’s Motion to Exclude Evidence, because it seeks to exclude evidence relating to the unpatentability grounds that we do not reach.

II. BACKGROUND

A. *Real Parties-in-Interest and Related Proceedings*

Petitioner identifies three companies as real parties-in-interest: itself; Halliburton Co.; and Halliburton Holdings LLC. *See* Pet. 1. Patent Owner identifies itself and ProFrac Holding Corporation as real parties-in-interest. *See* Paper 4, 1; Paper 76.

The parties identify three judicial matters as related to this proceeding. *See* Pet. 1; Paper 4, 1. They include *U.S. Well Services, Inc. v. Halliburton Co.*, Case No. 6:21-cv-00367-ADA (W.D. Tex.) (“the Halliburton

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Litigation”), in which Patent Owner has accused Petitioner of infringing the ‘410 patent and several other patents. *See* Pet. 1–2; Paper 4, 1–2. The Halliburton Litigation is still pending at this time.

Petitioner has also filed several other IPR proceedings to challenge patents owned by Patent Owner. They are:

Proceeding No.	U.S. Patent No.	Proceeding No.	U.S. Patent No.
IPR2021-01032	9,410,410 B2	IPR2021-01066	10,020,711 B2
IPR2021-01033	8,789,601 B2	IPR2021-01238	10,526,882 B2
IPR2021-01034	10,337,308 B2	IPR2021-01315	9,893,500 B2
IPR2021-01035	9,970,278 B2	IPR2021-01316	10,280,724 B2
IPR2021-01036	9,611,728 B2	IPR2021-01538	10,408,031 B2
IPR2021-01037	9,745,840 B2	IPR2021-01539	10,648,311 B2
IPR2021-01038	10,408,030 B2	IPR2022-00074	10,254,732 B2
IPR2021-01065	9,840,901 B2	IPR2022-00610	10,934,824 B2

B. Whether the Motion to Amend is Contingent or Non-Contingent

There was some confusion in the record concerning whether Patent Owner’s initial motion to amend (Paper 22) was *contingent* or *non-contingent*. This is an important distinction, because a contingent motion is considered by the Board only in the event that a petitioner’s challenge(s) to an original claim is or are first determined to be successful. A non-contingent motion, by contrast, cancels one or more original claims of the challenged patent, thereby mooted a petitioner’s challenges to the original claims. After a telephone conference between the Board and the parties, we considered the initial motion to be contingent. *See* Paper 23.

Patent Owner thereafter filed its revised Motion to Amend. The revised Motion to Amend is internally consistent in stating it is *non-contingent*. *See* Mot. Caption (“NON-CONTINGENT”), 1 (stating the

motion is “Non-Contingent”), 2 (“The claim listing cancels original claims 1–14 and 17–21 . . .”), App. A (pg. 1) (stating original claims 1–14 and 17–21 are “Cancelled”). Petitioner’s Opposition accordingly emphasizes the non-contingent nature of the Motion to Amend. *See* Mot. Opp. 1 (“In its Revised Non-Contingent Motion to Amend . . .”).

Due to the earlier confusion as to the initial motion to amend, we asked Patent Owner’s counsel during the hearing whether the revised Motion to Amend was intended to be contingent or non-contingent. *See* Tr. 5:6–6:9. Patent Owner’s counsel confirmed it is non-contingent. *See id.*

III. ORIGINAL CLAIMS 1–14 AND 17–21

The Petition relies on six prior art references to challenge original claims 1–14 and 17–21 of the ’410 patent. *See* Pet. 15. They are identified here, in alphabetical order:

Name	Reference	Exhibit No.
API Standard	American Petroleum Institute, Standard 541-2003, <i>Form-wound Squirrel-Cage Induction Motors—500 Horsepower and Larger</i> , 4th Ed. (June 2004)	1012
Coli	US 2012/0255734 A1	1009
Gardner	Gardner Denver, Inc., <i>Well Servicing Pump, Model GD-2500Q Quintuplex, Operating and Service Manual</i> , 300FWF996 Rev. C (Aug. 2005)	1013
Horikoshi	US 2011/0241590 A1	1010
Stark	US 6,116,040	1014

Name	Reference	Exhibit No.
Vliet ²	US 2011/0197988 A1	1011

The Petition relies on five grounds of unpatentability, all under 35 U.S.C. § 103, to challenge original claims 1–14 and 17–21 of the ’410 patent. *See* Pet. 15. They are identified here:

Ground	Claim(s) Challenged	References
1	1–8, 19–21	Coli, Horikoshi
2	7	Coli, Horikoshi, Vliet
3	9	Coli, Horikoshi, Stark
4	10–14, 17, 18	Coli, Horikoshi, API Standard
5	12 ³	Coli, Horikoshi, API Standard, Gardner

As discussed above, the Motion to Amend includes a non-contingent request to cancel original claims 1–14 and 17–21 of the ’410 patent, which are all of the claims challenged in the Petition. *See* Mot. 2, App. A (pg. 1); Pet. 3, 15. Petitioner does not oppose this portion of the Motion to Amend. *See generally* Mot. Opp. Therefore, we grant Patent Owner’s request to cancel original claims 1–14 and 17–21. As a result, we do not reach the

² Although the first-named inventor is “J. Todd Van Vliet” (Ex. 1011, code (75)), the parties refer to Exhibit 1011 as “Vliet” (*see, e.g.*, Pet. 9; Paper 21, 1). We adopt the parties’ nomenclature for consistency and ease of reference.

³ Petitioner acknowledges “the Petition inadvertently lists claim 13 within Ground 5.” Paper 38, 1 n.1.

grounds of unpatentability asserted in the Petition against these original claims.

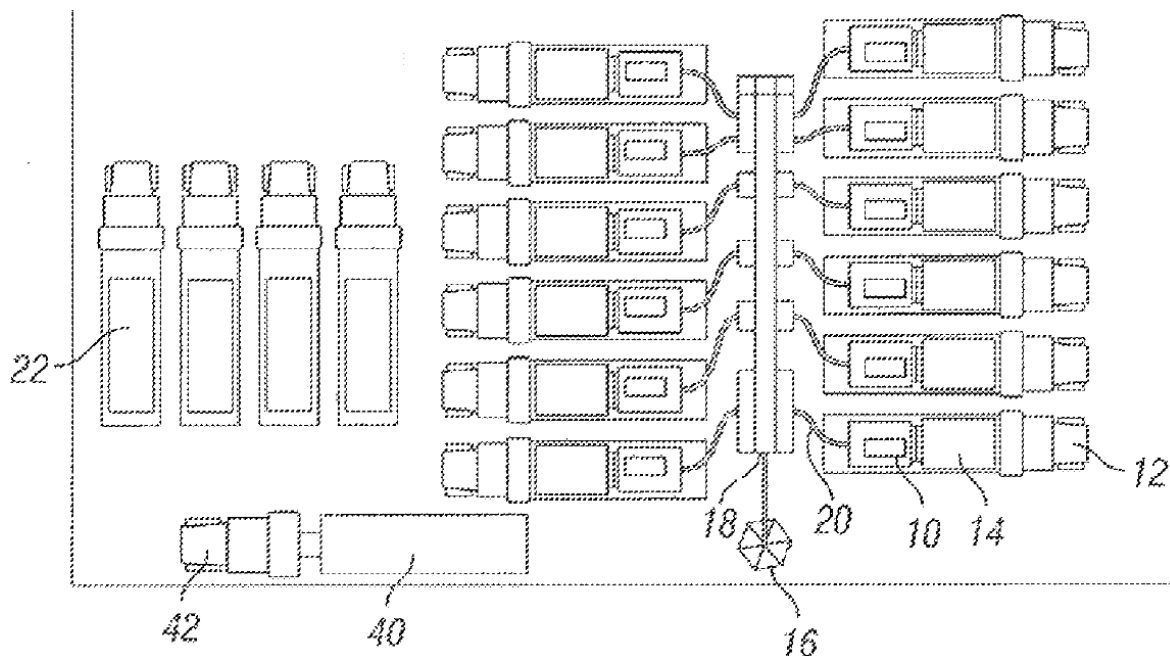
IV. PROPOSED SUBSTITUTE CLAIMS 22–40

A. Introduction

The Motion to Amend proposes to add substitute claims 22–40 to the '410 patent. *See* Mot. 2, App. A. We determine these claims all seek to add new matter to the application that issued as the '410 patent. We therefore deny the Motion to Amend as to these claims. As a result, we do not reach the grounds of unpatentability asserted in the Opposition against these claims.

B. The '410 Patent Disclosure

The '410 patent concerns a system for hydraulically fracturing an underground formation to extract oil or gas from the formation. *See* Ex. 1002, code (57). An excerpt from Figure 1 is reproduced below.



The '410 Patent, Figure 1 (Excerpt).

Figure 1 is a schematic plan view of equipment used in a hydraulic fracturing operation. *See id.* at 2:65–67, 3:19–20. The excerpt above focuses on twelve pump vehicles 12 (e.g., trucks) each carrying at least one pump 10 powered by electric motor 14, to pump fracturing fluid through lines 20 and missile 18 to be conveyed to wellhead 16. *See id.* at 3:20–30, 5:52–58. This fluid is pumped “at high pressure” or “at very high pressure” so the fluid fractures the formation in the well, which stimulates release of oil and gas from the formation. *Id.* at 1:13–23, 1:41–48, 1:64–67.

Electric motors 14 are powered with electricity from electric generators 22, and variable frequency drives (not shown in Figure 1) control the speed of motors 14, and hence the speed of pumps 10. *See id.* at 1:54–56, 2:2–4, 3:39–42, 4:26–32. The variable frequency drives “can frequently perform electric motor diagnostics to prevent damage to [an] electric motor if it becomes grounded or shorted.” *Id.* at 2:19–21, 3:63–4:1.

C. The Proposed Substitute Claims

Patent Owner proposes to amend the ’410 patent by adding new claims 22–40, as respective substitutes for original claims 1–14 and 17–21. *See* Mot. 2, App. A.

Illustrative claim 22, which is proposed as a substitute for original claim 1, is reproduced here. Underlined language reflects subject matter added to original claim 1, and struck-through language reflects subject matter omitted from original claim 1:

22. A system for hydraulically fracturing an underground formation in an oil or gas well to extract oil or gas from the formation, the oil or gas well having a wellbore that permits

passage of fluid from the wellbore into the formation, the system comprising:

a plurality of electric pumps fluidly connected to the well and powered by at least one electric motor, and configured to pump fluid into the wellbore at high pressure of greater than 8,000 psi so that the fluid passes from the wellbore into the formation through a designated orifice to cause cracks in the formation and to fracture the formation; and ~~and fractures the formation; and~~

a variable frequency drive connected to the electric motor to control the speed of the motor, wherein the variable frequency drive frequently performs electric motor diagnostics to prevent damage to the at least one electric motor.

Mot. App. A (pg. 2).

Proposed independent claim 31, which would substitute for original independent claim 10, would modify the original claim as follows: “the pump capable of pumping the hydraulic fracturing fluid at high pressure of between 5,000 psi and 15,000 psi through a designated orifice to cause cracks in the formation to fracture the formation; ~~to crack the formation;~~.”

Mot. App. A (pgs. 4–5).

Proposed independent claim 38, which would substitute for original independent claim 19, would modify the original claim as follows: “the electric pumps configured to pump fluid into the wellbore at high pressure of between 8,000 psi and 12,000 psi so that the fluid passes from the wellbore into the formation through a designated orifice to cause cracks in the formation and to fracture the formation; ~~and fractures the formation;~~.” Mot. App. A (pgs. 6–7). Proposed substitute claim 38 would also add a further “downhole sensor” limitation to the original claim. *See id.*

In short, as pertinent here, each of the proposed substitute claims seeks to add that the “high pressure” recited in the original ’410 patent claims corresponds to a specified numerical pressure range—greater than 8,000 psi in proposed substitute claim 22 and its dependent claims 23–30; or between 5,000 psi and 15,000 psi in proposed substitute claim 31 and its dependent claims 32–37; or between 8,000 psi and 12,000 psi in proposed substitute claim 38 and its dependent claims 39 and 40.⁴

D. The Pressure Ranges in the Proposed Substitute Claims Would Improperly Add New Matter to the ’410 Patent

For the following reasons, we determine proposed substitute claims 22–40 all seek to add new matter to the application that issued as the ’410 patent, so we deny the Motion to Amend as to adding these claims to the ’410 patent.

1. Statement of Law

A motion to amend “may not . . . introduce new matter.” 35 U.S.C. § 316(d)(3).

“*Before considering the patentability of any substitute claims . . . the Board first must determine whether the motion to amend meets the statutory and regulatory requirements set forth in § 316(d) and 37 C.F.R. § 42.121.*” *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 at 4 (PTAB Feb. 25, 2019) (precedential, “*Lectrosonics*”) (emphases added). This

⁴ Patent Owner does not rely on these numerical pressure ranges as a basis to distinguish the prior art cited in Petitioner’s Opposition. *See* Mot. 11–17; Mot. Reply 7–12. We are aware, however, that the court in the Halliburton Litigation has determined the “high pressure” term in original claim 1 of the ’410 patent is indefinite. *See* Ex. 2033, 1; Ex. 1069, 8–18.

includes the prohibition against new matter in § 316(d)(3). *See Lectrosonics*, at 7–8.

“[T]he patent owner must satisfy the Board that the statutory criteria in [35 U.S.C.] § 316(d)(3) are met and that any reasonable procedural obligations imposed by the Director are satisfied.” *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1305–06 (Fed. Cir. 2017) (emphasis added) (lead plurality opinion by J. O’Malley); *see also id.* at 1341 (“There is no disagreement that the patent owner bears a burden of production in accordance [with] 35 U.S.C. § 316(d).”) (majority opinion by J. Reyna).

Accordingly: “A motion to amend may be denied where . . . [t]he amendment seeks to . . . introduce new subject matter.” 37 C.F.R. § 42.121(a)(2)(ii); *see also* PTAB Consolidated Trial Practice Guide (Nov. 2019), 69, 71.⁵ Further: “A motion to amend claims must . . . set forth . . . [t]he support in the original disclosure of the patent for each claim that is added or amended.” 37 C.F.R. § 42.121(b)(1).

The test for new matter is whether the original application’s disclosure “reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter.” *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc); *see also Senju Pharm. Co. v. Apotex Inc.*, 746 F.3d 1344, 1352 (Fed. Cir. 2014) (citing *Ariad* as providing the test for determining new matter under 35 U.S.C. § 132(a)). We perform “an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art,” to determine

⁵ Available at <https://www.uspto.gov/TrialPracticeGuideConsolidated>.

whether it demonstrates possession of the claimed subject matter. *Ariad*, 598 F.3d at 1351.

2. *Level of Ordinary Skill in the Art*

Petitioner contends a person having ordinary skill in the art pertaining to the '410 patent would have either: “(1) a Bachelor of Science in Mechanical Engineering, Electrical Engineering, Petroleum Engineering or an equivalent field as well as at least two years of academic or industry experience in the oil and gas industry, including well drilling, completion, or production”; or (2) “at least four years of industry experience in the oil and gas industry, including well drilling, completion, or production.” Pet. 18.

Patent Owner utilizes the same formulation of ordinary skill. *See* Mot. 9.

The parties’ agreed-upon formulation of ordinary skill is consistent with the level of skill reflected in the '410 patent and the prior art of record. We therefore apply it in the present Decision.

3. *Testimonial Evidence*

In relation to the written description issues that are pertinent to the present Decision, Petitioner relies on the proffered expert testimony of Robert A. Durham, Ph.D. (Ex. 1079). Patent Owner relies on the proffered expert testimony of William Marscher, P.E. (Ex. 1059) and Mr. Robert Schaaf (Ex. 1061).⁶

⁶ During the hearing, Patent Owner’s counsel confirmed that the pertinent testimony of Patent Owner’s witnesses is found only in their depositions, not in their declarations. *See* Tr. 44:11–45:3.

4. *Proposed Substitute Independent Claims 22, 31, and 38*

Patent Owner asserts proposed substitute independent claims 22, 31, and 38 do not introduce new matter into the '410 patent. *See* Mot. 4–9. Patent Owner cites various disclosures of U.S. Patent Application No. 13/679,689 (“the '689 Application”), which issued as the '410 patent, that Patent Owner contends support the numerical pressure ranges recited in these claims. *See* Mot. 4, 6, 7 (collectively citing the '689 Application at Abstract, Figs. 1 and 2, ¶¶ 5, 7, 10, 11, 16–18, 20, 25–28, 31, 33, 35). The '689 Application can be found in the record as part of Exhibit 1005 (the prosecution history of the '410 patent), at pages 19–40.

Patent Owner additionally relies on the deposition testimony of Patent Owner’s witnesses, Mr. Marscher and Mr. Schaaf, concerning their understanding of the meaning of “high pressure” as recited in the original claims of the '410 patent. *See* Mot. 8–9. Specifically, Mr. Marscher testified as follows on June 21, 2022:

Q. In the context of hydraulic fracturing pumps, what does high pressure mean?

A. Well, *typically a person in the art would say it's between 5,000 and 15,000 psi. Maybe 10,000 psi would be a typical number these days.*

I've also done work from time to time in the waterjet industry where you cut wood and fiberglass and even metal with a very high-pressure waterjet. And they use reciprocating pumps in that industry, too. My old company made some of them. In that case you've got to be up to at least 20,000 psi, and 40,000 is better. So it's very application dependent.

And, you know, in the waterjet industry high pressure would be 20,000 to 40,000. Very high would be over 40,000. *In the fracking industry,*

high pressure would be 5,000 to 15,000 in my opinion. Very high would be over 15,000. I think even today that's unusual. Might be needed from time to time in certain formations.

In other industries, like in many chemical industries, we're using centrifugal pumps, single stage or, you know, two or three stages. High pressure would be considered anything over several hundred psi. So it depends on the application.

But somebody who's a [person of ordinary skill in the art ("POSITA")] in the fracking industry would definitely think *high pressure is 5,000 to 15,000 psi with an average value of 10 in my opinion.*

Ex. 1059, 2:1–3, 111:1–112:3 (emphases added).

One week later, on June 29, 2022, Mr. Schaaf testified as follows:

- Q. What rates of pressure would you consider high pressure?
- A. Well, it's well-known to a person in -- in the industry what "high pressure" would mean.
- Q. What does "high pressure" mean?
- A. Well, to a POSITA the pressure is what -- they would understand what the "high pressure" is.
- Q. I'm asking you was that understanding is.
- A. Well, I think, generally, *a POSITA would agree that 8,000 to 12,000 psi would be considered high pressure.*
- Q. Would pressure above 12,000 psi be considered high pressure?
- A. It could be considered, yes.

Q. Would pressure below 8,000 psi be considered high pressure?

A. To some people, you know, somewhat below it would be, you know, maybe the 7,500 psi, that would -- that would be considered high pressure. But, in general, it's -- ***it's agreed upon that 8,000 to 12,000 psi is high pressure.***

Q. Is it generally agreed upon that 5,000 to 15,000 psi is high pressure?

A. No.

Q. ***You would not consider 5,000 psi to be high pressure?***

A. ***Not when -- not when we're considering frac jobs, yeah. That is correct.***

...

Q. . . . [L]et me know if this is correct. You would consider high pressure to be about 8,000 to 12,000 psi, but that certain fracturing jobs can take place at pressures that are not high pressure.

A. Yes. And it's dependent on the formation itself, when the formation cracks or fractures. So the -- the hydraulic pressure or the pressure on the formations is what determines what it takes to fracture a well.

Ex. 1061, 1:12–14, 43:6–46:1 (emphases added).

Patent Owner argues the foregoing testimony of its witnesses establishes the pressure range recited in proposed substitute claim 22 (greater than 8,000 psi) is “a range that would be understood by a person of ordinary skill in the art (POSITA) as corresponding to high pressure,” as disclosed by the '689 Application. Mot. 8. Patent Owner also argues this

testimony similarly establishes “that high pressure may correspond to a pressure ‘of between 5,000 psi and 15,000 psi,’” as recited in proposed substitute claim 31, and “that high pressure may correspond[] to a pressure ‘between 8,000 psi and 12,000 psi’” as recited in proposed substitute claim 38. *Id.* at 8–9.

Petitioner argues the numerical pressure ranges specified in proposed substitute independent claims 22, 31, and 38 improperly introduce new matter into the ’410 patent. *See* Mot. Opp. 1–3. Petitioner asserts “no pressures (or pressure ranges) are disclosed in the specification” of the ’689 Application, because the specification “does not provide any range of measured pressures (e.g., in pounds per square inch, or psi), let alone the specific pressure ranges recited in” the proposed substitute claims. *Id.* at 1–2 (citing Ex. 1005, 20–40; Ex. 1079 ¶¶ 19–24; Ex. 1069, 13).

Concerning the ’689 Application’s disclosure of “high pressure” pumping, Petitioner asserts this “does not disclose any measured pressures (species) falling within the claimed pressure range (genus),” such as are recited in the proposed substitute claims. *Id.* at 2 (citing *Indivior UK Ltd. v. Dr. Reddy’s Labs. S.A.*, 18 F.4th 1323, 1328–1329 (Fed. Cir. 2021)). Petitioner adds that “where a specification discloses a broad range of values and a value within that range is claimed, the disclosure must allow one skilled in the art to ‘immediately discern the limitation at issue in the claims,’” which is not the case here. *Id.* (quoting *Gen. Hosp. Corp. v. Sienna Biopharms., Inc.*, 888 F.3d 1368, 1372 (Fed. Cir. 2018); citing Ex. 1079 ¶¶ 20, 22–23).

Concerning the deposition testimony of Mr. Marscher and Mr. Schaaf quoted above, Petitioner asserts “those experts cannot even agree with each

other as to the pressures possibly encompassed within the ‘high pressure’ term.” *Id.* at 2–3. Petitioner particularly cites, as being contradictory, Mr. Marscher’s testimony that “high pressure” means between 5,000 psi and 15,000 psi, and Mr. Schaaf’s testimony that “high pressure” means no less than 8,000 psi. *Id.* (citing Ex. 1059, 111:1–112:21; Ex. 1061, 44:7–13). In Petitioner’s view: “The inconsistency between [Patent Owner’s] own experts confirms that the ’410 Patent specification does not allow a POSITA to ‘immediately discern the limitation at issue in the claims.’” *Id.* at 3 (citing *Gen. Hosp.*, 888 F.3d at 1372–73). Petitioner moreover asserts that expert testimony “cannot manufacture written-description support, because the support must be ‘in the original disclosure (i.e., the application as originally filed).”” *Id.* (quoting *Lectrosonics*, at 7; citing *Indivior*, 18 F.4th at 1329).

Patent Owner replies that the deposition testimony of Mr. Marscher and Mr. Schaaf quoted above establishes that the numerical pressure ranges in proposed substitute claims 22, 31, and 38 “are an inherent property” of the “high pressure” disclosures in the ’689 Application, so they “are not prohibited new matter.” Mot. Reply 1–2 (citing *Yeda Research & Dev. Co. v. Abbott GMBH & Co. KG*, 837 F.3d 1341, 1345 (Fed. Cir. 2016); *Kennecott Corp. v. Kyocera Int’l, Inc.*, 835 F.2d 1419, 1423 (Fed. Cir. 1987)). In particular, according to Patent Owner, the “high pressure” disclosures of the ’689 Application make clear that the numerical pressure ranges are necessarily present in the ’689 Application, as would have been recognized by a person of ordinary skill in the art, according to Mr. Marscher and Mr. Schaaf. *See id.* at 2–3 (citing Ex. 1059, 111:3–5, 111:25–112:3; Ex. 1061, 43:17–18; *In re Robertson*, 169 F.3d 743, 745

(Fed. Cir. 1999); *Continental Can Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1268 (Fed. Cir. 1991)).

In response, Petitioner reiterates arguments previously made in the Opposition. *See* Mot. Sur-reply 1–2. Petitioner further contends the *Yeda* decision cited by Patent Owner is distinguished from the facts presented here, because in *Yeda* “inherency was undisputed.” *Id.* at 2 (citing *Yeda*, 837 F.3d at 1344–45). Petitioner further asserts Patent Owner has not established that the ’689 Application’s disclosure of “high pressure” necessarily discloses the numerical pressure ranges, as is required for inherency. *Id.* at 2–3 (citations omitted).

Upon review of the foregoing, we agree with Petitioner’s position that the numerical pressure ranges recited in proposed substitute claims 22, 31, and 38 each introduce new matter into the ’689 Application. We have reviewed the ’689 Application disclosures cited by Patent Owner. *See* Ex. 1005, 19–40 (¶¶ 5, 7, 10, 11, 16–18, 20, 25–28, 31, 33, 35, Abstract, Figs. 1–2). These disclosures pertinently demonstrate possession only of “a system for hydraulically fracturing an underground formation” that is “configured to pump fluid into the wellbore at high pressure so that the fluid passes from the wellbore into the formation, and fractures the formation.” Ex. 1005, 22 (¶ 5) (emphases added); *see also id.* at 22–23 (¶ 7) (“pumping the hydraulic fracturing fluid at *high pressure* to crack the formation” (emphasis added)); *id.* at 24 (¶ 11) (“pumping fracturing fluid into the well with an electrically powered pump at a *high pressure* so that the fracturing fluid enters and cracks the formation” (emphasis added)); *id.* at 32–33 (¶ 33) (“The fracturing fluid can be pumped into the wellbore at a *high enough pressure* that the fracturing fluid cracks the formation, and enters into the

cracks.” (emphasis added)). Thus, the ’689 Application demonstrates possession of pumping fluid at a “high pressure” to fracture an underground formation, but does not specify any particular numerical ranges of pressures that might correspond to the “high pressure,” including the three ranges specified in proposed substitute claims 22, 31, and 38. *See, e.g.*, Tr. 44:11–22.

Patent Owner’s attempt to leverage the “high pressure” disclosures of the ’689 Application into demonstrating possession of the numerical pressure ranges recited in proposed substitute claims 22, 31, and 38 is unavailing, for several reasons. First, as seen from the deposition testimony quoted above, Patent Owner’s own witnesses cannot agree on a numerical definition of “high pressure.” Mr. Marscher says high pressure is between 5,000 psi and 15,000 psi (*see* Ex. 1059, 111:1–112:3), whereas Mr. Schaaf says high pressure is between 8,000 psi and 12,000 psi and specifically disagrees with Mr. Marscher’s testimony that high pressure can be below 8,000 psi (*see* Ex. 1060, 43:6–44:13). Thus, the testimony of Patent Owner’s own witnesses is contrary to Patent Owner’s position that a person of ordinary skill in the art would have understood that the ’689 Application’s disclosure of “high pressure” pumping demonstrates possession of a specific numerical range of pumping pressures.

Second, neither Mr. Marscher nor Mr. Schaaf cites any objective evidence to support their respective notions of what “high pressure” might be, in the context of hydraulic fracturing. For example, neither cites to any published industry standards to support their respective opinions. This lack of objective evidentiary support weakens the persuasiveness of both witness’s testimony on this issue, especially because their opinions conflict

with each other. We are instead persuaded by the testimony of Petitioner's witness Dr. Durham that "[t]he mere disclosure of 'high pressure' in the ['689 Application] specification[] . . . does not allow a [person of ordinary skill in the art] to recognize the ranges of pressures in" proposed substitute claims 22, 31, and 38. Ex. 1079 ¶ 24. Further according to Dr. Durham: "What might be 'high' pressure according to one POSITA may *not* be 'high' pressure to another POSITA" and "[t]here is no universally accepted definition of 'high pressure,'" as demonstrated by the testimony of Mr. Marscher and Mr. Schaaf and the lack of objective evidentiary support for their respective opinions. *Id.*

Third is the fact that the three independent claims specify materially different numerical pressure ranges, each of which Patent Owner asserts is supported by the simple disclosure of "high pressure" in the '689 Application. Patent Owner's position appears to be that the "high pressure" disclosure in the '689 Application permits Patent Owner to claim *any* numerical range of pressures, so long as the range does not fall below 5,000 psi (Mr. Marscher's lower bound for high pressure). *See, e.g.*, Tr. 45:13–46:8. This is inconsistent with controlling authority cited by Petitioner and not discussed by Patent Owner. In particular, the Federal Circuit in the *Indivior* decision determined that a claim directed to a film comprising "about 40 wt % to about 60 wt % of a water-soluble polymeric matrix" did not have written description support in a specification that did not expressly claim that range, did not state either of the two end values (40% and 60%), and did not disclose the range (40–60%). *Indivior*, 18 F.4th at 1325 (claim 1), 1327–30 (discussing claim 1). In particular: "In the case of a claimed range, a skilled artisan must be able to reasonably discern a

disclosure of that range” in the specification at issue. *Id.* at 1328. We conclude Patent Owner’s reliance on the testimony of Mr. Marscher and Mr. Schaaf that a skilled artisan could reasonably discern each of the three numerical pressure ranges at issue here, based on the bare disclosure in the ’689 Application of “high pressure” pumping, is not persuasive for the reasons provided above.

The *Indivior* decision also considered a narrower claim directed to a film comprising “about 48.2 wt % to about 58.6 wt % of the water-soluble polymeric matrix,” and concluded that it also did not have written description support in the specification at issue, even though the specification provided examples of films having the two end point values of the range (48.2% and 58.6%). *See id.* at 1325 (claim 7), 1329–30 (discussing claim 7). The Court concluded that finding written description support on those facts would “amount[] to cobbling together numbers after the fact” whereas “[a] written description sufficient to satisfy the requirement of the law requires a statement of an invention, not an invitation to go on a hunting expedition to patch together after the fact a synthetic definition of an invention.” *Id.* at 1329. We conclude in the present case that Patent Owner’s witnesses went on a hunting expedition which conflicts with the *Indivior* decision.

We acknowledge the *Indivior* decision was a 2–1 panel decision, over a vigorous dissent. However, the principal disagreement between the majority and dissenting opinions was whether the disclosure of *specific numerical percentages* in the specification might demonstrate possession of *a range of percentages*. In this respect, the facts of the case before us present an easier issue to decide, because the ’689 Application demonstrates

possession of only the vaguely-stated “high pressure” or “very high pressure,” rather than specific numerical pressures. *See* Ex. 1005, 22 (¶ 5), 22–23 (¶ 7), 24 (¶ 11) (“high pressure”); *id.* at 20 (¶ 3) (“very high pressure”).

Fourth, when one looks at each claim separately, there are inconsistencies between the claim and Mr. Marscher’s or Mr. Schaaf’s testimony. For example, proposed substitute claim 22 recites a pressure of greater than 8,000 psi. This is inconsistent with Mr. Marscher’s testimony that high pressure can be as low as 5,000 psi, and that high pressure cannot be higher than 15,000 psi because such pressures are instead “very high.” Ex. 1059, 111:1–112:3. The range of proposed substitute claim 22 also is inconsistent with Mr. Schaaf’s testimony that high pressure cannot be very much higher than 12,000 psi, although he does recognize that high pressure “could” be above 12,000 psi. Ex. 1061, 43:6–44:3.

Proposed substitute claim 31 recites a pressure of between 5,000 psi and 15,000 psi. This is supported by Mr. Marscher’s testimony. *See* Ex. 1059, 111:1–112:3. However, it is inconsistent with Mr. Schaaf’s testimony that high pressure is between 8,000 psi and 12,000 psi, and that high pressure cannot be below 8,000 psi. *See* Ex. 1060, 43:6–44:13. Patent Owner does not explain persuasively how or why we should credit Mr. Marscher’s testimony over Mr. Schaaf’s testimony to conclude proposed substitute claim 31 has written description support in the ’689 Application.

Proposed substitute claim 38 recites a pressure between 8,000 psi and 12,000 psi. This is supported by Mr. Schaaf’s testimony. *See* Ex. 1060, 43:6–44:13. However, it is inconsistent with Mr. Marscher’s testimony that high pressure is between 5,000 psi and 15,000 psi. *See* Ex. 1059, 111:1–

112:3. Patent Owner does not explain persuasively how or why we should credit Mr. Schaaf's testimony over Mr. Marscher's testimony to conclude proposed substitute claim 38 has written description support in the '689 Application.

Fifth, we have considered Patent Owner's belated argument in reply to Petitioner's opposition, relying on an alleged *inherent* disclosure of pressure ranges in the '689 Application on the basis that "high pressure" *necessarily* demonstrates possession of the numerical pressure ranges recited in proposed substitute claims 22, 31, and 38. The *Yeda* and *Kennecott* decisions cited by Patent Owner stand for the proposition that written description support may be established by an inherent disclosure, as opposed to an express disclosure. *See Yeda*, 837 F.3d at 1344–45; *Kennecott*, 835 F.2d at 1422–23. We are not persuaded by Patent Owner's position that the '689 Application necessarily demonstrates possession of proposed substitute claims 22, 31, and 38, for all the reasons provided above. The *Robertson* and *Continental Can* decisions cited by Patent Owner stand for the proposition that inherency is determined from the viewpoint of a person of ordinary skill in the art, which may be established via witness testimony. *See Robertson*, 169 F.3d at 745; *Continental Can*, 948 F.2d at 1268–69. We conclude Patent Owner's witness testimony as to written description support is not persuasive, for all the reasons provided above.

Finally, we have reviewed the district court's opinion in the Halliburton Litigation, holding that the "high pressure" term in original claim 1 of the '410 patent (and, by extension, original claims 10 and 19) is fatally indefinite. *See Ex. 1069*, 8–18. Our determination that the disclosure of "high pressure" in the '689 Application fails to provide written

description support for the numerical pressure ranges recited in proposed substitute claims 22, 31, and 38 is not inconsistent with the district court's opinion.

For the foregoing reasons, we conclude that adding proposed substitute independent claims 22, 31, and 38 would introduce new matter to the application that issued as the '410 patent, and we accordingly deny the Motion to Amend the '410 patent as to these claims.

5. *Proposed Substitute Dependent Claims 23–30, 32–37, 39, and 40*

The remaining proposed substitute claims 23–30, 32–37, 39, and 40 each depend from one of the independent claims 22, 31, and 38, and therefore incorporate the numerical pressure ranges recited in those independent claims. *See* Mot. App. A. Therefore, for the reasons provided in Section IV.D.4 above, we conclude that adding the proposed substitute dependent claims would introduce new matter to the application that issued as the '410 patent, and we accordingly deny the Motion to Amend the '410 patent as to these claims.

E. *Petitioner's Unpatentability Grounds*

In light of our determination above that proposed substitute claims 22–40 lack written description support in the application that issued as the '410 patent, we do not reach the grounds of unpatentability set forth in Petitioner's Opposition for these claims. *See* Mot. Opp. 7–8 (listing the grounds).

V. PATENT OWNER’S MOTION TO EXCLUDE EVIDENCE

Patent Owner’s Motion to Exclude Evidence seeks to exclude evidence relating to Petitioner’s reliance on the S&S Proposal⁷ as a prior art reference to challenge the patentability of proposed substitute claims 22–40 under 35 U.S.C. § 103. *See* Papers 58 and 59 (moving to exclude Exs. 1071–1073). As discussed above, we do not reach these grounds of unpatentability, so we do not need to rule on the Motion to Exclude.

VI. SUMMARY OF CONCLUSIONS

We *grant* Patent Owner’s non-contingent request to cancel original claims 1–14 and 17–21 of the ’410 patent, and we *deny* Patent Owner’s request to add proposed substitute claims 22–40 to the ’410 patent.⁸ Thus, the result of this Decision is summarized by the following two tables.

⁷ Stewart & Stevenson, *Electric Fracturing Pump: Commercial Proposal*, Quotation No., Rev. 4 (July 31, 2012) (Ex. 1056).

⁸ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this Decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

Claim(s)	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–8, 19–21	103	Coli, Horikoshi ⁹		
7	103	Coli, Horikoshi, Vliet ⁹		
9	103	Coli, Horikoshi, Stark ⁹		
10–14, 17, 18	103	Coli, Horikoshi, API Standard ⁹		
12	103	Coli, Horikoshi, API Standard, Gardner ⁹		
Overall Outcome				

Motion to Amend Outcome	Claim(s)
Original Claims Canceled by Amendment	1–14, 17–21
Substitute Claims Proposed in the Amendment	22–40
Substitute Claims: Motion to Amend Granted	
Substitute Claims: Motion to Amend Denied	22–40
Substitute Claims: Not Reached	

⁹ We do not reach these asserted grounds because Patent Owner filed a non-contingent motion to amend in which these claims were cancelled. *See supra* Section III.

VII. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Patent Owner's Motion to Amend is *granted* as to the non-contingent request to cancel original claims 1–14 and 17–21 of the '410 patent;

FURTHER ORDERED that Patent Owner's Motion to Amend is *denied* as to the request to add proposed substitute claims 22–40 to the '410 patent; and

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

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