IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTELLIGENT WELLHEAD SYSTEMS, INC.,
Petitioner,

v.

DOWNING WELLHEAD EQUIPMENT, LLC,
Patent Owner.

IPR2024-00300
U.S. Patent 11,560,770

PATENT OWNER PRELIMINARY RESPONSE

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Patent Owner's Exhibit List

Exhibit	Description
Ex.2001	Wayback Machine - Downing Continuous Pumping Web Page
Ex.2002	Downing Continuous Pumping WordPress Page
Ex.2003	Tim Marvel Email RE Continuous Pumping Webpage with Attachment
Ex.2004	Marvel LinkedIn Post 1/12/2020
Ex.2005	Declaration of Tim Marvel
Ex.2006	Declaration of John Hughett
Ex.2007	CV of John Hughett

I. INTRODUCTION

None of the grounds in the Petition establish a reasonable likelihood of success. Petitioner's primary grounds rely upon a reference—Krupa—that is not prior art. Petitioner's backup grounds rely upon second-tier references that, on their face, fail to disclose every element of the claims.

Krupa is not prior art for two independent reasons. First, Petitioner failed to make the threshold showing that Krupa's provisional provides support for the relied-upon portions of Krupa. Second, even if Petitioner had made such a showing, many of those relied-upon portions would be disqualified as prior art under 35 U.S.C. § 102(b)(2)(B) because Downing had already publicly disclosed the same subject matter.

Petitioner was apparently (and rightfully) concerned about Krupa's prior art status and included backup grounds based upon much earlier references. *See* Petition, 13 n. 5 ("If '770 is afforded an earlier priority date, *Carr*, *Beuterbaugh*, *Tolman*, and *Jackson* are still § 102(a)(1) prior art."). All of these backup references, however, are directed to aspects of hydraulic fracturing unrelated to Downing's continuous pumping invention—but Petitioner nevertheless attempts to read them onto the claims. This predictably results in disclosure gaps that Petitioner fills with unsupported claims of inherency and obviousness.

For these reasons, and the many others below, Patent Owner respectfully requests that the Board deny institution.

II. KRUPA IS NOT PRIOR ART

The Petition relies upon U.S. Patent Publication No. 2022/0268141 to Krupa (Ex.1003) as the primary reference in Grounds 1 and 2 (the "Krupa Grounds"). Krupa, however, is not prior art because it was filed on February 18, 2022—*after* the '770 Patent's priority date of May 17, 2021. Although Krupa's provisional was filed prior to May 17, 2021, Petitioner does not make the required showing that the subject matter relied upon in Krupa is supported by its provisional. Moreover, even if Petitioner had made such a showing, key portions of Krupa relied upon in the Petition would be disqualified as prior art under 35 U.S.C. § 102(b)(2)(B) because Downing publicly disclosed those portions prior to the filing date of Krupa's provisional.

A. Petitioner fails to establish Krupa as prior art in the Petition, which is a non-correctable error.

Petitioner contends that "*Krupa* is 35 U.S.C. § 102(a)(2)-prior art" solely because Krupa claims priority to U.S. Provisional App. No. 63/153,607 (the "Krupa Provisional"), filed February 25, 2021, which is earlier than the '770 Patent's priority date of May 17, 2021. Petition, 4 ("Because *Krupa's* effective

filing date is February 25, 2021—before '770's priority date (May 17, 2021)—*Krupa* is 35 U.S.C. § 102(a)(2)-prior art.").

This assertion alone is insufficient to establish Krupa as prior art. Critically, Petitioner fails to establish that the subject matter relied upon in Krupa is supported by the Krupa Provisional. Without this threshold showing ***in the Petition***, Petitioner has not carried its burden to show that Krupa qualifies as prior art. This is a defect fatal to the Krupa Grounds, and one that cannot be corrected.

1. Legal Standard

Under 35 U.S.C. § 102(d)(2), a patent or patent application entitled to claim a right to priority to a provisional application "shall be considered to have been effectively filed, with respect to any subject matter described in the patent or application . . . as of the filing date of the earliest such application that describes the subject matter." The Federal Circuit and the Board have consistently held that a provisional application must provide sufficient support for the subject matter relied upon for prior art purposes in the reference patent or published patent application. *See In re Giacomini*, 612 F.3d 1380, 1383 (Fed. Cir. 2010) (requiring that the relied upon subject matter "was carried forward from an earlier U.S. provisional application or U.S. non-provisional application"); *Penumbra, Inc. v. RapidPulse, Inc.*, IPR2021-01466, Paper 34 at 32-34 (Mar. 10, 2023) (precedential as to § II.E.3) ("[U]nder the AIA, . . . the provisional or other earlier application(s) to

which the reference patent document claims a right of priority must 'describe[] the subject matter' relied upon in the reference patent document as prior art" (quoting 35 U.S.C. § 102(d)(2))); *see also Cox Commc'ns, Inc. v. AT&T Intell. Prop. I, L.P.*, IPR2015-01227, Paper 70 at 28-29 (Nov. 16, 2015) ("[T]he material relied upon as teaching the subject matter of the challenged claims must be carried through from that earlier filed application to the reference patent being used against the claim." (citing *Giacomini*, 612 F.3d at 1383)); *Ex parte Mann*, 2016 WL 7487271, at *5 (Dec. 21, 2016) (explaining that "absurd results would be reached if a subject matter test were not required"). The Office's Manual of Patent Examining Procedure also recognizes this requirement. MPEP § 2151 ("[A] U.S. patent document is effective as prior art as of the filing date of the earliest application to which benefit or priority is claimed and which describes the subject matter relied upon.").[1]

Accordingly, when a petitioner relies on a reference's provisional application date to establish the reference as prior art, the petitioner has the "initial burden" in the petition to show that the provisional supports the relied-upon

[1] For AIA cases, a petitioner is not required to also prove that at least one claim of the reference is supported in the provisional application. *Penumbra*, Paper 34 at 29-32.

subject matter in the reference. *Forescout Technologies, Inc. v. Fortinet, Inc.*, No. IPR2021-01328, Paper 12, at 9-10 (Jan. 27, 2022) ("[Petitioner] has *an initial burden* . . . to show that the subject matter that [Petitioner] relies on in [the reference] is also found in the [provisional]"); *Apple Inc. v. Telefonaktiebolaget LM Ericsson*, No. IPR2022-00348, Paper 9, at 4 (Sept. 21, 2022) ("Among other obligations, a petitioner carries a burden of production to show *in its petition* that the asserted references qualify as prior art." (citing *Dynamic Drinkware*, 800 F.3d at 1380)); *Apple Inc. v. R.N Nehusht An Trust Ltd.*, No. IPR2023-00230, Paper 8, at 9 n.2 (June 14, 2023) ("Petitioner is attempting to establish, *and thus bears the burden to establish*, that [the reference] is prior art that can be used against the [challenged] patent based on its earlier priority claim") (all emphases added). The panel in *Securus* explained this burden succinctly: "When the qualification of a reference as prior art depends on the existence of adequate support in another reference, this mandate requires that Petitioner explain where such support for its challenge can be found." *Securus Techs., Inc. v. Glob. Tel*Link Corp.*, No. IPR2015-00153, Paper 12, at 8 (May 1, 2015). A petitioner must make this showing in the petition because "[i]n an [*inter partes* review], the petitioner has the burden *from the onset* to show with particularity why the patent it challenges is unpatentable." *Penumbra*, Paper 34 at 8 (emphasis added).

The Board routinely finds petitions fatally defective when a petitioner fails to show that the relied-upon portions of a reference are supported by its provisional, when the provisional filing date is needed for priority. For example, in *Ericsson*, the Board denied institution because the petition failed to show such support:

> Fatal to the Petition, though, Petitioner did not establish that the subject matter relied upon for prior art was effectively filed in the provisional applications. 35 U.S.C. §§ 102(a)(2), 102(d). Under the AIA, a provisional application must "describe[] the subject matter" relied upon as prior art in the reference patent. 35 U.S.C. §102(d); see also MPEP § 2154.01(b). Petitioner does not assert, much less show, that the provisional applications satisfy the subject-matter requirement.

Ericsson, Paper 9, at 4–6. Similarly, in *Forescout*, the Board denied institution, explaining that:

> [Petitioner] Forescout has an initial burden … to show that the subject matter that Forescout relies on in Thomas is also found in the Thomas Provisional. Because Forescout has not met that burden, we determine that Forescout has not adequately shown that it is reasonably likely to prevail on the issue of whether Thomas is prior art to the challenged claims of the '421 patent under 35 U.S.C. § 102(a)(2).

Forescout, Paper 12, at 9-11; *see also Securus*, Paper 12, at 5-8 (denying institution where petitioner failed to show ***in the petition*** that the subject matter relied upon in the prior art was described in the provisional application); *Ironridge, Inc. v. Pegasus Solar, Inc.*, PGR2022-00024, Paper 9, at 28-32 (Aug. 10, 2022) (determining that petitioner failed to show more likely than not that it would prevail on grounds where it did not establish ***in the petition*** that a reference publication was entitled to the benefit of its provisional filing date).

The only circumstance in which a petitioner can establish priority to a reference's provisional filing date *after* it submits its petition is when the reference is facially prior art based on its filing date, but the patent owner subsequently raises an argument requiring the petitioner to rely on the earlier provisional filing date. *See Dynamic Drinkware*, 800 F.3d at 1379-80 (explaining that under the shifting burdens of production, petitioner has an initial burden of production by arguing that the reference anticipated the challenged claims, but after patent owner subsequently produced evidence that the challenged patent was entitled to an earlier filing date, the burden returned to petitioner to show that the reference was entitled to the benefit of the its provisional filing date); *K/S HIMPP v. BRAGI GmbH*, No. IPR2023-00901, Paper 14 at 2, 10-12 (Nov. 13, 2023) (allowing petitioner to claim priority to parent applications in a preliminary reply where the petition established that the reference was filed prior to the challenged patent's

effective filing date but patent owner's preliminary response provided evidence of a public disclosure date prior to the reference's filing date). Accordingly, where a petitioner *does not* need to rely on the provisional application's priority date at the time of filing the petition, the petitioner *does not* have an initial burden of proving entitlement to the provisional priority date. *Dynamic Drinkware*, 800 F.3d at 1379-80. In contrast, where a petitioner *does* rely on the provisional application's priority date at the time of filing the petition, the petitioner *does* have an initial burden of proving entitlement to that priority date. *Motorola Mobility LLC v. Maxell, LTD*, No. IPR2023-00110, Paper 7, at 28 (June 15, 2023) ("On its face, [the reference] does not qualify as prior art to the [challenged] patent, so when Petitioner filed its Petition, it was clear that Petitioner needed to rely on the [provisional] to establish that [the reference] was prior art.").

2. Petitioner was required to—but did not—establish priority to the Krupa Provisional in the Petition

Here, Krupa does not qualify as prior art on its face. Petitioner thus had the initial burden in the Petition to show that Krupa was in fact prior art based on disclosure in the Krupa Provisional. Petitioner failed to make that threshold showing.

Petitioner does not even allege—much less show—that the Krupa Provisional provides §112 support for the portions of Krupa it relies upon in

Grounds 1 and 2. The Petition merely asserts that "*Krupa* is 35 U.S.C. § 102(a)(2)-prior art" because the date of the Krupa Provisional is before the '770 Patent's priority date. Petition, 4. The Petition does not, for example, map the relevant portions of Krupa to portions of the Krupa Provisional. *See generally* Petition, 17-47. The Petition does not cite to or discuss the contents of the Krupa Provisional ***at all***—nor could it, the Krupa Provisional is not even an exhibit. *See* Petition, vi-ix. Thus, even if the Board felt compelled to "play archaeologist with the record"—which it is under no obligation to do—the proverbial tomb would be empty. *DeSilva v. DiLeonardi*, 181 F.3d 865, 867 (7th Cir. 1999).

Because the Petition does not show that the subject matter relied upon in Krupa is supported by the Krupa Provisional, Petitioner has failed to establish that Krupa is prior art. Petitioner therefore cannot show a reasonable likelihood of prevailing on the Krupa Grounds.

B. Even if given priority to its provisional filing date, Krupa is not prior art due to Downing's public disclosures under § 102(b)(2).

Even if the Petition had established that Krupa is entitled to the Krupa Provisional's effective filing date (which it does not), the Krupa Grounds would still fail for another, independent reason—key portions of Krupa are disqualified as prior art under 35 U.S.C. § 102(b)(2)(B). Specifically, before the Krupa Provisional was filed, Patent Owner's own website publicly disclosed portions of

Krupa that Petitioner relies upon for its Krupa Grounds, which removes those portions as prior art under the § 102(b)(2)(B) exception. Without those portions of Krupa, Petitioner cannot show a reasonable likelihood of prevailing on the Krupa Grounds.

As explained above, Petitioner contends that Krupa is prior art only under 35 U.S.C. § 102(a)(2). Petition, 4. Section 102(b)(2), however, provides three exceptions that eliminate certain disclosures as § 102(a)(2) prior art. 35 U.S.C. § 102(b)(2)(A)–(C). Relevant here, the exception under § 102(b)(2)(B) eliminates a disclosure as prior art if the same subject matter had previously been publicly disclosed by another who obtained the subject matter directly from a joint inventor:

> (2) Disclosures appearing in applications and patents.—A disclosure shall not be prior art to a claimed invention under subsection (a)(2) if— . . .
>
> > (B) the subject matter disclosed had, before such subject matter was effectively filed under subsection (a)(2), been publicly disclosed by the inventor or a joint inventor or another who obtained the subject matter disclosed directly or indirectly from the inventor or a joint inventor[.]

35 U.S.C. § 102(b)(2)(B).

The § 102(b)(2)(B) exception applies when the subject matter in a reference disclosure and the earlier inventor-originated public disclosure are the same. MPEP § 717.01(b)(2) ("The [§ 102(b)(2)(B) exception is] only applicable when the

subject matter of the intervening disclosure is the same as the subject matter of the earlier inventor-originated prior public disclosure"). Though, "there is no requirement that the disclosure by the inventor or a joint inventor be a verbatim or *ipsissimis verbis* disclosure of [a reference] disclosure in order for the exception based on a previous public disclosure of subject matter by the inventor or a joint inventor to apply." *Id.*

The earlier inventor-originated public disclosure need not disclose everything in the reference disclosure to disqualify the reference disclosure as prior art. Instead, the § 102(b)(2)(B) exception permits *portions* of the reference to be removed as prior art. MPEP § 717.01(b)(2) ("[T]he portion of the [reference] third party's intervening disclosure that was previously in an inventor-originated disclosure (i.e., the same subject matter) is excepted as prior art under 35 U.S.C. 102(a)."). The MPEP provides one example of partial disqualification:

> [I]f the inventor or a joint inventor had publicly disclosed elements A, B, and C, and a subsequent [reference] U.S. patent, U.S. patent application publication, or WIPO published application discloses elements A, B, C, and D, then element D of the [reference] U.S. patent, U.S. patent application publication, or WIPO published application is still available as prior art under 35 U.S.C. 102(a)(2).

MPEP § 717.01(b)(2). In this example, elements A, B, and C are disqualified from the reference disclosure because they were previously publicly disclosed, and only element D is available as § 102(a)(2) prior art.

1. Patent Owner publicly disclosed continuous pumping before the Krupa Provisional was filed.

The claims of the '770 patent are directed to continuous pumping. The claims recite limitations directed to pumping a second well while a first well is open, and, while pumping in the second well, closing the first well. *See*, e.g., limitations 1.3 and 1.4. On October 12, 2020, Patent Owner published a webpage describing continuous pumping on its public-facing website. Ex.2002; Ex.2005, ¶¶5, 11. The Internet Archive Wayback Machine archived a copy of this webpage on October 20, 2020, eight days after it was originally published. Ex.2001; Ex.2005, ¶5.[2] Patent Owner thus publicly disclosed continuous pumping on October 12, 2020, and no later than October 20, 2020.

Given its October 2020 publication date, Patent Owner's continuous pumping webpage was published four months before the Krupa Provisional was

[2] The Internet Archive Wayback Machine archived copy is captured in Ex.2001 and accessible at https://web.archive.org/web/20201020115107/https://downingusa.com/freedomseries/continuouspumping.

filed (February 25, 2021) and over one year before Krupa was filed (February 18, 2022). Accordingly, Patent Owner publicly disclosed continuous pumping before either the Krupa Provisional or Krupa had been filed.

2. The information on the continuous pumping webpage was obtained directly from a joint inventor of the '770 Patent.

Timothy Marvel, Vice President of Business Development and Technology at SEF Energy,[3] drafted and published the continuous pumping webpage on Patent Owner's public-facing website. Ex.2005, ¶¶4, 6. Mr. Marvel learned about continuous pumping directly from Austin Johnson, a joint inventor of the '770 patent. *Id.*, ¶¶6-10.

In September 2020, Mr. Marvel learned about Patent Owner's team successfully performing continuous pumping via Patent Owner's commercial fracking system, the Freedom Series Completion System. Ex.2005, ¶8. Mr. Marvel learned this directly from Mr. Johnson. *Id.* Mr. Marvel subsequently began preparing materials to promote Patent Owner's continuous pumping capability. *Id.* One of the materials Mr. Marvel prepared was the continuous pumping webpage that would be published on Patent Owner's public-facing website. *Id.*, ¶¶5-6, 9; Ex.2001; Ex.2002. Using the information obtained from

[3] Patent Owner is a subsidiary of SEF Energy. Ex.2005, ¶4.

Mr. Johnson, Mr. Marvel drafted the webpage on continuous pumping. Ex.2005, ¶9.

On October 9, 2020, Mr. Marvel sent a preliminary draft of the continuous pumping webpage to Mr. Johnson to confirm he had accurately represented the information on continuous pumping he obtained from Mr. Johnson. Ex.2005, ¶10; Ex.2003. Mr. Johnson provided Mr. Marvel feedback on the draft webpage, which Mr. Marvel incorporated into the final version of the webpage. Ex.2005, ¶10. On October 12, Mr. Marvel published the webpage describing continuous pumping on Patent Owner's public facing website. Ex.2005, ¶¶5, 11; Ex.2001; Ex.2002. Accordingly, Patent Owner—through Mr. Marvel—publicly disclosed information regarding continuous pumping that was obtained directly from a joint inventor of the '770 patent.

3. The continuous pumping webpage discloses the same subject matter relied on in Krupa.

The limitations related to continuous pumping include limitations [1.3]/[14.4], [1.4]/[14.5], [27.4], and [27.5] which recite the process of opening a second well while a first well is still open, and subsequently closing the first well. The Petition relies entirely on Krupa for these limitations. *See* Petition, 23–25. Patent Owner's continuous pumping webpage, however, discloses the same subject matter relied upon in Krupa related to continuous pumping.

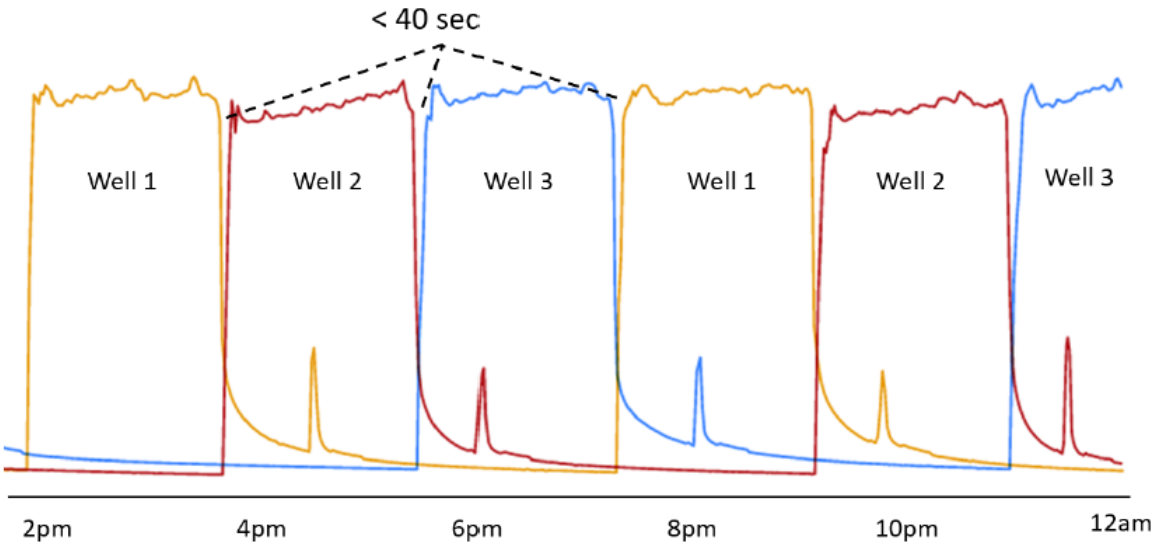
The Petition groups limitations [1.3]/[14.4] and [27.4] together. Petition 23–24. Limitations [1.3]/[14.4] recite "opening a second valve; [and] communicating fluid to a second well via the second valve," and limitation [27.4] recites "open the second valve to thereby communicate fluid to the second well via the second valve[.]" The Petition asserts that:

> Methods "include pumping the fluids into a second well via the… manifold while continuously pumping the fluids into the first well by opening a second set of valves." [0005]. In an example, the second valves are opened after determining a frac stage of the first well is at an end, e.g., when the flow rate is reduced to 5-15 bbl/min and the pressure has stabilized at the reduced pump rate. [0042]-[0043]. This set of valve operations is shown in Figure 2B, where second "valves 223, 224 may be opened while the first…valves 221, 222 remain open during" pumping to allow fluid flow 233 into the second well 201b ([0043]) . . . . The Claims do not specify the "fluid." Nevertheless, Krupa uses fluids for hydraulic fracturing operations, including fracturing fluid with proppant and flush fluid. [0018].

Petition, 24 (citing Ex.1003, [0005], [0018], [0042]-[0043], Fig. 2B). Patent Owner's continuous pumping webpage discloses the same subject matter: "FS iControl's proprietary algorithms integrated with the Freedom Series Completion System ***transition the zipper valves from one well to the other, opening the***

second well and subsequently shutting-in the first well, all while pumping."

Ex.2001, 1 (emphasis added); Ex.2006, ¶¶120-24. The continuous pumping webpage explains that the FS iControl "automat[es] the hydraulic gate valves" and shows a graph depicting the operation of the wells during continuous pumping, including the opening a second well (in red) while a first well (in orange) is still open:

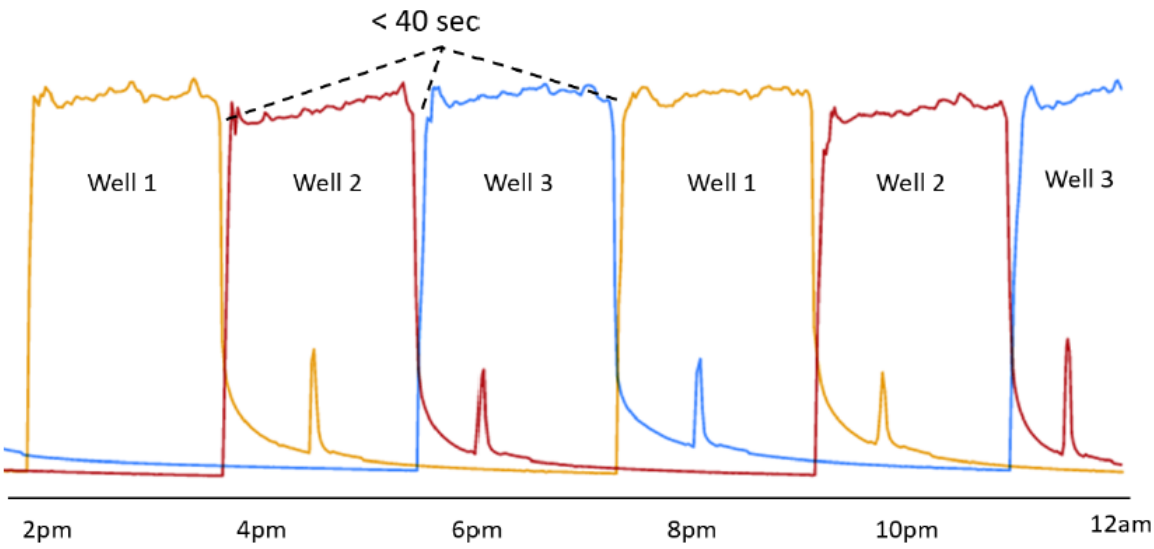


Ex.2001, 2; Ex.2006, ¶¶120-24. Patent Owner's continuous pumping webpage thus discloses opening a valve associated with a second well as cited in Krupa.

The Petition also groups limitations [1.4]/[14.5] and [27.5] together. Limitations [1.4]/[14.5] recite "closing the first valve after opening the second valve," while limitation [27.5] recites "close the first valve after opening the second valve[.]" The Petition contends that:

> Krupa's methods include opening second valves to pump fluid into a second well while fluid is being pumped through open first valves into a first well. [0043]. After fluid flow into the two wells has stabilized, Figure 2C shows the first valves to the first well 201a are closed after the second valve (223 or 224) of the second well 201b is opened ([0005], [0043])[.]

Petition, 24–25 (citing Ex.1003, [0005], [0043], Fig. 2C). Patent Owner's continuous pumping webpage, however, also discloses this subject matter. Specifically, "FS iControl's proprietary algorithms integrated with the Freedom Series Completion System transition the zipper valves from one well to the other, ***opening the second well and subsequently shutting-in the first well, all while pumping***." Ex.2001 at 1 (emphasis added); Ex.2006, ¶¶120-24. The continuous pumping webpage explains that the FS iControl "automat[es] the hydraulic gate valves," and the graph depicts the opening of well 2 (in red) and the subsequent closing of well 1 (in orange):



Ex.2001 at 2; Ex.2006, ¶¶120-24. Patent Owner's continuous pumping webpage thus discloses closing a valve of a first well while pumping in a second well as relied on in Krupa.

Accordingly, Patent Owner's continuous pumping webpage discloses the same subject matter the Petition relies on in Krupa.

4. Without Krupa's continuous pumping disclosure, Petitioner fails to carry its burden.

Each independent claim in the Krupa Grounds recites limitations related to continuous pumping. Because (i) Patent Owner publicly disclosed continuous pumping—via information obtained from an inventor—before any filing date associated with Krupa, and (ii) the publicly-disclosed subject matter is the same subject matter relied upon in Krupa by the Petition, the continuous pumping disclosure of Krupa is disqualified as prior art under § 102(b)(2)(B). Without this

disclosure, the Petition fails to address all the claim limitations of the independent claims and Petitioner cannot establish a reasonable likelihood of prevailing on the Krupa Grounds.

III. THE '770 PATENT

A. Technological background

Hydraulic fracturing is a technique employed in the oil-and-gas industry to enhance the extraction of hydrocarbons from drilled wells. Ex.2006, ¶33. Hydraulic fracturing is used to fracture the geology in the formation by pumping high pressure fluid into the well, allowing oil and gas to flow out of the fractures into the well. *Id*., ¶¶61-63. In many operations where hydraulic fracturing is employed, numerous wells are spaced closely apart on the same "pad" or wellsite to increase extraction from the reservoir. *Id*., ¶51.

One relatively recent improvement to the hydraulic fracturing process is known as "zipper fracturing." *Id*., ¶¶12, 99-100. Originally, hydraulic fracturing was accomplished one stage at a time in a single well before moving on to the next well. *Id*., ¶¶67,106. Zipper fracturing improved this process through use of a hydraulic fracturing manifold or "zipper manifold." *Id*., ¶¶12, 94-95. In this method, the pressure pumps are connected to a common manifold that distributes fluid to each of a series of connected wells. *Id*. Each well's connection to the zipper manifold includes valves that can be closed to isolate the well. *Id*., ¶94.

Thus, pumping into a given well may be accomplished by closing the valves to all but one well, so that fluid is directed to the desired well. *Id*.

Hydraulic fracturing and perforating operations on a particular well may take hours to perform, resulting in significant idle time for pumping and wireline personnel while one crew waits for the other to finish. *Id*., ¶95. Zipper fracturing reduced this downtime by allowing one well to be fractured while the next well in the series is perforated. *Id*. When both operations are complete, the newly fractured well can be isolated, fluid may be rerouted through the zipper manifold to the newly perforated well for fracturing, and wireline operations can begin immediately in the next well in the series. *Id*. In this manner, operations move through a series of wells in assembly-line fashion, cutting the time to complete wells nearly in half.

Figure 1A of the ’779 Patent shows a diagram of a conventional zipper fracturing setup:

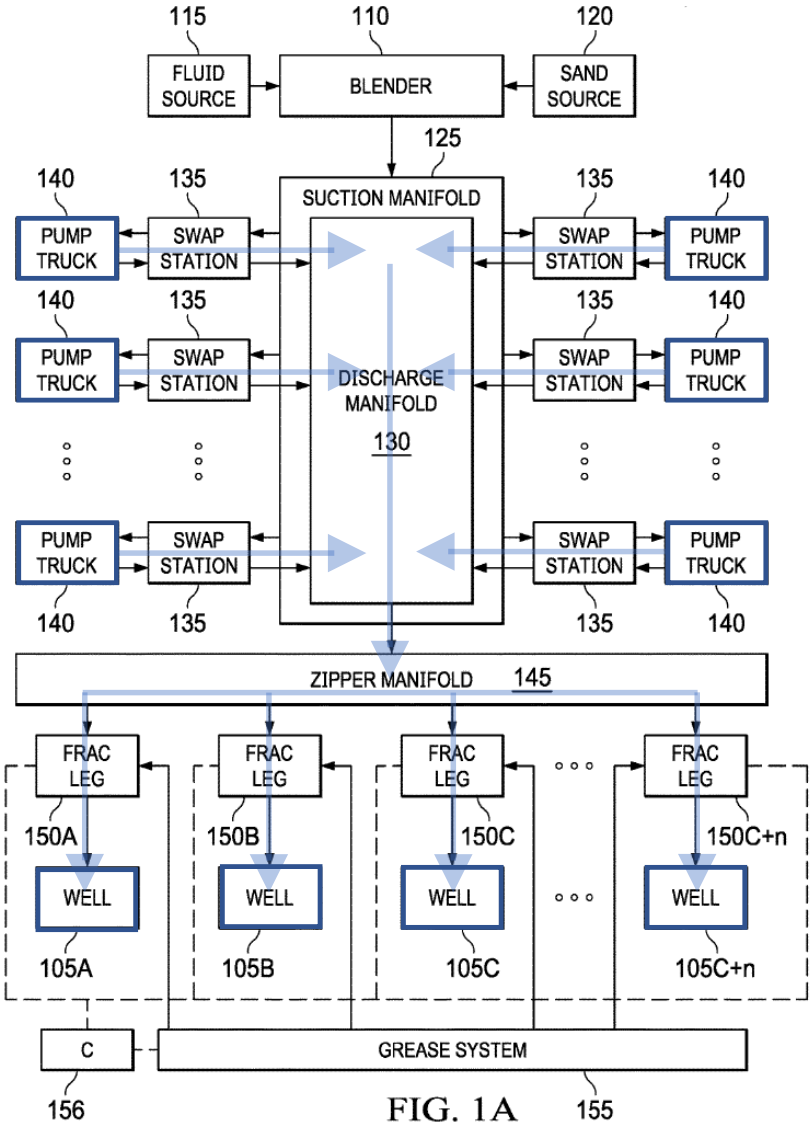


FIG. 1A

Ex.1001, Fig. 1A (annotated).

The dramatic reduction in non-productive time enabled by zipper fracturing resulted in its widespread adoption in the industry. *See, e.g.*, Ex.1008, 1. But operators accustomed to significant downtime between pumping operations had to adapt to the relatively fast-paced pumping schedule in zipper fracturing operations. *Id.*, 2. One Journal of Petroleum Technology article from 2014 described this

quicker schedule as "continuous" because of the little downtime between pumping operations—and noted these pumping operations resulted in increased wear on pumps and left little time for maintenance. *See id*.

But the description of these previous zipper-based pumping operations as "continuous" was a misnomer—these operations were not truly continuous because they still required at least a 15-minute break in stimulation operations during the transition between wells. Ex.1008, 2 ("[W]hen doing zipper fracturing the break in stimulation operations may only last 15 minutes as workers switch from one well to another."); Ex.2006, ¶¶95,107. This delay was due to the time it took to shut down the pumps, close the valve to the first well, open the valve to the second well, and start the pumps back up to begin fracturing. Ex.2006, ¶95. One of the reasons this conventional sequence still involved downtime—despite the industry's focus on efficiency—was because of safety concerns. *Id*., ¶¶105-07. The traditional understanding was that this transition downtime was necessary to safely operate the valves. *Id*. Downing's novel continuous pumping system and method described in the '770 Patent upended this traditional understanding.

B. Summary of the '770 Patent

The '770 Patent was issued by the United States Patent Office on January 24, 2023, and is entitled "Hydraulic Fracturing Plan and Execution of Same." It describes and claims a novel process for transitioning between fracturing different

wells attached to the same zipper manifold, called a continuous pumping swap or "CP swap." As described in the specification, a CP swap allows for non-stop pumping throughout such a transition by opening a valve to the second well while still pumping into a first well, and then closing the valve to the first well:

> As shown in FIGS. 16D and 16E, executing the CP swap from hydraulically fracturing (at the step 262) the n_1 well (e.g., well 105D) to hydraulically fracturing (at the step 262) the n_1+1 well (e.g., well 105B) transitions the zipper valves from one well to the other, opening the second well and subsequently shutting-in the first well, all while pumping.

Ex.1001, 14:43-48.

As shown below in '770 Patent Figure 16D, during the CP swap "[t]he transition [between wells] is instantaneous and the total time between stages measured at treatment pressure is less than 20 seconds (as fast as 19 seconds in some instances)." Ex.1001, 14:49-51.

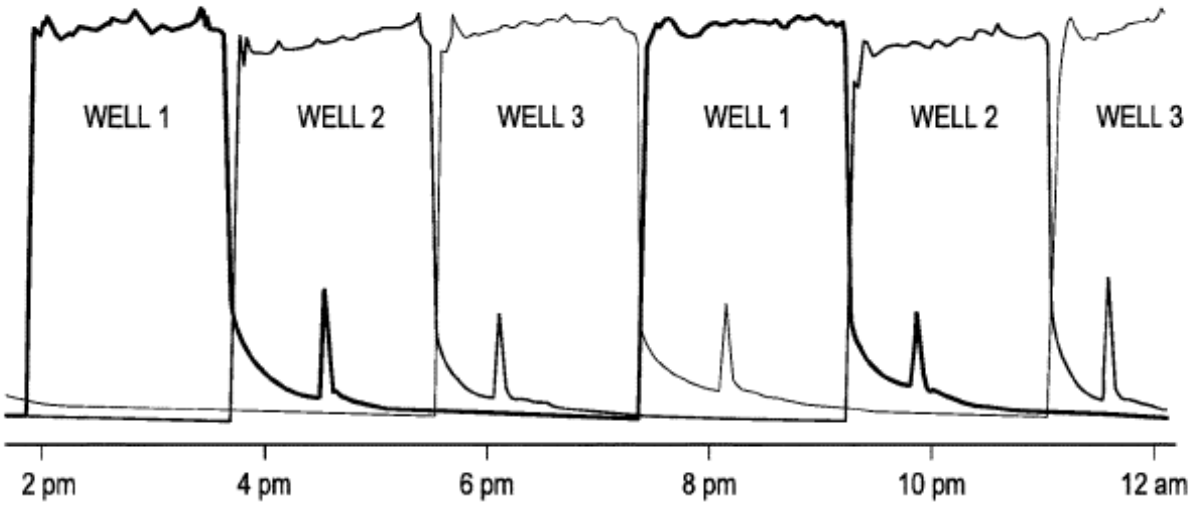


FIG. 16D

The ’770 Patent distinguishes this inventive CP swap process from a conventional “regular swap.” *See, e.g.*, *id.* at 13:33 (“determining whether to permit a ***regular swap*** or a ***CP swap***”). Conventional swap methods begin by closing the valve on one well before opening the valve on the next well. With both valves closed, pumping operations must cease. When the valve on the second well is opened, pumping resumes, but a delay occurs while the pumps are primed (in some instances) and brought back up to operating pressure.

The ’770 Patent’s claimed CP swap method thus beneficially enables hydraulic fracturing pressure pumps to run continuously during multi-well zipper fracturing stimulations, thereby avoiding downtime in pumping operations associated with conventional methods.

IV. CLAIM CONSTRUCTION

No claim construction is necessary to deny institution. Patent Owner's arguments for denial do not hinge on the outcome of an actual controversy about construction of a claim term. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999). As explained throughout this Preliminary Reply, the defects in the Petition are readily identifiable without defining any specific claim term.

V. THE PETITION FAILS TO SHOW A REASONABLE LIKELIHOOD OF SUCCESS ON THE MERITS

A. The Krupa Grounds do not establish a reasonable likelihood of success.

As discussed in Section II, the Krupa Grounds are dead on arrival because Krupa is not prior art. Petitioner cannot show a reasonable likelihood of success because the Petition does not show—or even allege—that the subject matter relied upon in Krupa is supported by the Krupa Provisional. *See, e.g.*, *Ironridge, Inc.*, Paper 9, at 28-32 (determining that petitioner failed to show more likely than not that it would prevail on grounds where it did not establish in the petition that a reference publication was entitled to the benefit of its provisional filing date). And, as discussed in Section II.B, even if Krupa was prior art, key portions of Krupa that Petitioner relies upon in every Krupa Ground would be disqualified as prior art under § 102(b)(2)(B).

For each of these independent reasons, the Krupa Grounds do not establish a reasonable likelihood of success.

B. The Carr Grounds do not establish a reasonable likelihood of success.

1. Ground 3: Carr does not anticipate the Challenged Claims.

Petitioner fails to establish that it is likely to prevail in showing that Carr anticipates the Challenged Claims. Although Carr discloses a multi-well system in which valves control the fluid flow to each well, it does not discuss or contemplate swapping pumping from one well to another, let alone doing so by opening and closing valves ***in the particular sequence*** required by the claims. Likewise, although Carr discloses that its system may include flow meters that can output information for use in opening and closing valves to control desired fluid properties, it does not disclose performing any particular method of swapping between wells "***in response to***" information from those flow meters.

Unable to show that Carr expressly discloses the Challenged Claims' novel methods and systems for swapping between two wells in a particular manner based on fluid conditions, Petitioner attempts to invoke inherency by broadly asserting that "[a] POSITA would find it necessary and at least obvious" to both (i) swap between wells by manipulating the valves in the particular sequence recited in the Challenged Claims and (ii) to do so based on fluid-flow targets. Petition, 52–53.

But the Petition fails to explain ***why*** Carr's system would necessarily perform the specific steps of the Challenged Claims or cite any evidence in support of that contention. Petitioner's conclusory statements fall far short of meeting its burden for establishing inherency.

Because Petitioner fails to show that Carr discloses the Challenged Claims either expressly or inherently, Petitioner cannot establish that it is likely to prevail on Ground 3.

i. Carr does not disclose closing a first valve after opening a second valve (Limitations 1.4, 14.5, and 27.5).

Carr does not disclose or discuss swapping from pumping into a first well to pumping into a second well at all, much less doing so by opening the second well's valves before closing the first well's valves, as limitations 1.4, 14.5, and 27.5 require:

> *opening a second valve;*
>
> *communicating fluid to a second well via the second valve; and*
>
> *closing the first valve after opening the second valve.*

Ex.1001, claim 1; *see also id*., claims 14, 27.

The only disclosures from Carr the Petition points to for these limitations state generally that first and second valves for controlling fluid flow from a manifold to first and second wells, respectively, can permit operators to stimulate

the wells "alternatingly and/or simultaneously." Petition, 52 (citing Ex.1004, [0033]). Critically, these portions of Carr are silent as to any ***transition*** from treating the first well individually to treating the second well individually, much less the claimed transition that requires the specific sequence of "*opening a second valve; communicating fluid to a second well via the second valve; and closing the first valve after opening the second valve*." *See id.*

Petitioner nevertheless asserts that Carr either discloses this step inherently or renders it obvious. *See id.* But it fails to prove either. Its entire analysis consists of a single sentence asserting that "[a] POSITA would understand that operating the first and second valves to direct fluid into the associated first and second wells 'individually' and/or 'simultaneously,' as taught by Carr, includes closing the valve to one well (e.g., to the first well) after opening the valve to the other well (e.g., to the second well)." *Id.*

Petitioner's bare assertion does not meet the strict requirements for showing inherency. "Inherency . . . may not be established by probabilities or possibilities." *PersonalWeb Techs., LLC v. Apple, Inc*., 917 F.3d 1376, 1382 (Fed. Cir. 2019) (quoting *PAR Pharm., Inc. v. TWI Pharm., Inc*., 773 F.3d 1186, 1195 (Fed. Cir. 2014)). Instead, it requires a showing that the "prior art ***necessarily*** functions in accordance with, or includes, the claimed limitations." *Bettcher Indus., Inc. v.*

Bunzl USA, Inc., 661 F.3d 629, 639 (Fed. Cir. 2011) (quoting *In re Cruciferous Sprout Litig*., 301 F.3d 1343, 1349 (Fed. Cir. 2002) (emphasis added).

Petitioner does not even attempt to establish that pumping to Carr's first and second wells either simultaneously or individually ***necessarily*** requires closing the first valve after opening the second valve. *See* Petition, 52. Its sole support for its statement that a POSITA would understand that treating multiple wells individually or simultaneously would "include" this specific valve operation is the testimony of its expert. Petition, 52 (citing Ex.1002, ¶¶331–332). But Dr. Durham's declaration also lacks any explanation of why Carr ***necessarily*** performs this step. Ex.1002, ¶¶331–332. Dr. Durham instead quotes the same portions of Carr and provides the following unsupported opinion:

> During simultaneous flow of fluid to both well 470 and 472, as taught by Carr, both valves 470 and 472 would be open. During this operation, Carr teaches control system 112 would close valve 470 (at least partially) in response to flow conditions such as the flow rate being higher than the fluid flow targets. Accordingly, the first valve would be closed after opening the second valve.

Ex.1002, ¶331. This paragraph does not establish inherency for at least two reasons. First, as a baseline, Dr. Durham fails to even allege that Carr ***must*** or ***necessarily*** performs this hypothetical closing during simultaneous pumping. Without that threshold showing, supported by evidence, Petitioner cannot establish

inherency. In fact, such a showing is ***not*** possible for the simple fact that Carr's limited disclosure does not foreclose the possibility that valves 470 and 472 always open simultaneously and close simultaneously to accomplish simultaneous pumping. Ex.2006, ¶144. Likewise, Carr's disclosure of sequential pumping does not require closing the first valve after opening the second valve because Carr does not foreclose the possibility that a conventional well swap may be performed—closing the first valve prior to opening the second valve to begin pumping. *Id.*, ¶145.

Second, Dr. Durham's characterization of Carr is not correct. Carr does not actually "teach" that its control system 112 would "close" valve 470 in response to flow conditions. Carr instead says that "the control system 112 can be utilized to ***control the position*** of the first valve 470." Ex.1004, [0033]. Controlling the position of a valve during treatment ***necessarily does <u>not</u>*** mean closing. Both valves must be open—and remain open—during treatment because fluid is being pumped into both wells. Ex.2006, ¶¶146-47 (explaining that flow would not be stopped (i.e., a valve would not be closed) during treatment). Thus, a POSITA reading Carr would understand that valve 470 remains "open" even after its position is adjusted during treatment. *Id*.

Given the above, the only plausible explanation as to why Petitioner reads Carr's generalized disclosure as disclosing the specific valve sequence claimed by

the ’770 Patent is the disclosure of the ’770 Patent itself. Petitioner’s use of the ’770 Patent as a roadmap is improper. *Zoltek Corp. v. United States,* 815 F.3d 1302, 1313 (Fed. Cir. 2016) (“Hindsight reconstruction for litigation ends is not of probative value.”).

Because Petitioner fails to present evidence that Carr discloses the recited sequence either expressly or inherently, it cannot establish that Carr satisfies limitations 1.4, 14.5, and 27.5.

ii. Carr does not disclose closing a first valve after opening a second valve *in response to* determining that the fluid communicated via the manifold has satisfied one or more conditions (Limitations 1.2–1.4, 14.3–14.5, 27.4–27.6).

Even if Carr disclosed closing the first valve after opening the second valve, it does not disclose doing so “***in response to*** *determining the fluid communicated via the manifold has satisfied one or more conditions*.” The Petition improperly treats the claimed valve sequence recited after “*determining the fluid communicated via the manifold has satisfied one or more conditions*” as separate from and unrelated to the “*determining*.” Specifically, the claim mapping on pages 51–52 of the Petition fails to even allege that the functions it maps to the claimed valve operations in 1.3–1.4, 14.3–14.4, and 27.4–27.5 are “*in response to*” Carr’s discussion of flow meters. Petition, 51–52. But the claims require that the claimed

valve sequence be performed "***in response to***" determining that the fluid has satisfied one or more conditions.

More specifically, to show that Carr discloses these limitations, the Petition relies on independent statements that (i) Carr's control system can use input from flow meters to adjust valves and control the production and output of fluid to the wells "in light of fluid flow targets," and (ii) Carr's valves can be used to control flow to the first well, the second well, or to both wells simultaneously. Petition, 51 (citing Ex.1004, [0023]-[0025], [0036]). But even if these portions of Carr disclose what Petitioner says they disclose, the alleged disclosure is insufficient to meet the Challenged Claims because Petitioner fails to link them as required. The Petition points to no actual disclosure in Carr of using fluid conditions to determine whether or how to switch from pumping into a first well to pumping into a second well, much less using the specific method claimed.

Despite asserting that "[a] POSITA would understand that operating the first and second valves to direct fluid into the associated first and second wells 'individually' and/or 'simultaneously,' as taught by Carr, includes closing the valve to one well (e.g., to the first well) after opening the valve to the other well (e.g., to the second well)," the Petition makes no effort to show how this action would be responsive to any determination related to fluid-flow conditions. Petition, 24–25. Nor does the Petition argue or present evidence that Carr's system

inherently performs the recited sequence in response to any determination that any fluid-flow condition is satisfied. *See id.* Accordingly, Petitioner cannot show that it is likely to prevail in showing that Carr anticipates the Challenged Claim.

2. Ground 4: Carr does not render the Challenged Claims obvious.

Petitioner also fails to meet its burden of showing that Carr renders the Challenged Claims obvious. Petitioner's obviousness analysis consists of a single sentence: "A POSITA would find it necessary and at least obvious to close a first valve to a first well after opening a second valve to a second well based on the fluid flow targets to stimulate the first and second wells 'individually' and 'simultaneously.'" Petition, 52–53. The Petition is devoid of any explanation either of why a POSITA would find it obvious to close the first valve after opening the second valve or why it would be obvious to do so "based on the fluid flow targets."

Petitioner cannot satisfy its burden of proving obviousness by employing "mere conclusory arguments." *In re Magnum Oil Tools Int'l, Ltd*., 829 F.3d 1364, 1380 (Fed. Cir. 2016). Instead, it must articulate a reason why a person of ordinary skill in the art would have combined or modified the prior art references. *In re Nuvasive, Inc.,* 842 F.3d 1376, 1382 (Fed. Cir. 2016). Petitioner does not suggest ***any*** specific modifications to Carr, much less provide a reasoned analysis of why a

POSITA would make those modifications. Accordingly, Petitioner cannot satisfy its burden with respect to Ground 4.

Although Petitioner cites its expert declaration, Dr. Durham's analysis is just as lacking as the Petition's. Dr. Durham offers only a single sentence in support of Ground 4: "To the extent the Board finds that Carr does not explicitly disclose closing the first valve after opening the second valve, such as during simultaneous flow to both wells, taking such an action would have been obvious to a POSITA in light of the teachings of Carr regarding simultaneous flow to both wells, as well as Carr's disclosure of controlling the position of the first valve and second valve." Ex.1002, ¶332. Like the Petition, Dr. Durham's declaration provides no explanation or evidence in support of his conclusory opinion that Carr renders closing the first valve after opening the second valve obvious. *See id.* Such explanation and evidence are especially needed to support that opinion because it imposes on Carr a valve transition sequence contrary to the conventional thinking in the fracturing industry, as noted above. Ex.2006, ¶156 (explaining that conventionally a first well is closed ***prior*** to opening a second well). Dr. Durham's conclusory opinion that is contrary to a POSITA's background knowledge is entitled to no weight. *See Xerox Corp.*, Paper 9 at 15-16. Dr. Durham similarly provides ***no support whatsoever*** for Petitioner's assertion that it would have been obvious to perform the recited valve sequence "*in response to*" a determination

that the fluid communicated via the manifold satisfies one or more conditions. *See* Ex.1002, ¶¶ 331–332.

Accordingly, Petitioner cannot establish that it is likely to succeed on Ground 4.

3. <u>Ground 5</u>: The combination of Carr and Beuterbaugh does not render the Challenged Claims obvious.

Petitioner fails to meet its burden of showing that the combination of Carr and Beuterbaugh renders the Challenged Claims obvious. Beuterbaugh does not cure Carr's deficiencies, and even if it did, Petitioner fails to establish that a POSITA would be motivated to combine Carr with Beuterbaugh, which has a distinctly different goal than Carr—treating a plurality of wells by delivering pulses of fluid "in an alternating fashion solely to a single well [at a time] to increase efficiency and reduce wear." Ex.1005, ¶0015.

i. Beuterbaugh does not cure Carr's failure to disclose closing a first valve after opening a second valve in response to one or more fluid conditions being satisfied.

For the reasons discussed in connection with Grounds 3 and 4, Carr does not disclose or suggest the requirements of limitations 1.2–1.4, 14.3–14.5, and 27.4–27.6 of performing a specific valve sequence ***in response to*** determining that the fluid communicated via the manifold has satisfied one or more conditions. Beuterbaugh also does not disclose these limitations. In fact, the Petition ***does not***

even allege that it does. Instead, the Petition relies on Beuterbaugh ***only*** for (i) the one or more controllers or processors recited in limitations 14.1 and 27.3 and (ii) the step of "closing the first valve after opening the second valve" recited in limitations 1.4, 14.5, and 27.5. *See* Petition, 62–67. It does not cite to Beuterbaugh for determining whether the fluid communicated via the manifold has met any condition or make any argument that Beuterbaugh would have made it obvious to perform the recited valve sequence ***in response to*** any such condition. Ground 5 thus necessarily fails for the same reasons as Grounds 3 and 4.

Even if Petitioner had attempted to remedy Carr's lack of disclosure of performing the claimed valve sequence "in response to" fluid conditions using Beuterbaugh, it could not do so because Beuterbaugh does not disclose determining whether the "fluid communicated via the manifold" satisfies any conditions. *See* Ex.1005. It also does not disclose performing any valve sequence in response to any such determination. *See id*. Instead, Beuterbaugh focuses on alternating between wells based on ***time*** to deliver alternating pulses of fracturing fluid of about 100 milliseconds to 10 seconds to each well. *See id.* at [0022], [0026]-[0027]. Beuterbaugh thus lacks any suggestion of using fluid conditions to determine when or how to switch between wells.

Because Petitioner does not—and cannot—show that either Beuterbaugh or Carr discloses or suggests performing the required valve sequence in response to

any such conditions, it cannot establish a *prima facie* case that the combination renders the Challenged claims obvious. *See K/S Himpp v. Hear-Wear Techs., LLC,* 751 F.3d 1362, 1365 (Fed. Cir. 2014).

ii. A POSITA would not have been motivated to combine Carr and Beuterbaugh

Even if the combination of Carr and Beuterbaugh disclosed all of the elements of the Challenged Claims, Ground 5 would still fail because Petitioner does not establish that a POSITA would have been motivated to combine Carr and Beuterbaugh. Although Petitioner asserts that a POSITA would have "found it obvious to use Beuterbaugh's alternating valve sequences" in Carr's system, Petitioner provides no explanation of ***why*** a POSITA would have been so motivated and therefore fails to meet its burden. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015).

Indeed, Petitioner ***could not*** have shown that a POSITA would have been motivated to use Beuterbaugh's time-based pulsing system in Carr's flow rate-based system because no such motivation exists. Ex.2006, ¶¶165-169. As noted above, Beuterbaugh focuses on manipulating valves at specific times to deliver pulses of fracturing fluid to a plurality of wells in alternating fashion. Ex.1005, [0015]. Carr, on the other hand, discloses a multi-well system in which valves may

be controlled using feedback from flow meters based on flow limits. *See* Ex.1004, [0025].

Petitioner asserts that "[a] POSITA would have found it obvious as a simple substitution to use Beuterbaugh's valve sequencing in Carr's system to perform the same function (opening/closing valves to selectively divert fluid to a well) with predictable results." Petition, 66–67. But Carr and Beuterbaugh disclose manipulating valves on different bases—Beuterbaugh's valves open and close at specified time intervals to create pulses of a desired length, while Carr's system manipulates valves based on flow rates. *See* Ex.1004, ¶0025; Ex.1005, ¶0015.

Petitioner fails to explain why a POSITA looking for techniques for manipulating valves in Carr's system would have looked to Beuterbaugh or how a POSITA would apply Beuterbaugh's time-based system for creating pulses to Carr's flow rate-based system. For example, Carr's flow rate meters would be of little use in determining when or how to swap from one well to the next in executing Beuterbaugh's pulsing method. *See* Ex.2006, ¶¶165-169 (explaining the references' incompatible operation). The two references describe different ways to pump fluid to a plurality of wells, and Petitioner fails to articulate any reason why a POSITA would attempt to combine them or have a reasonable expectation of success in doing so. *Id.* Indeed, as Dr. Hughett explains, applying Beuterbaugh's teachings to Carr's incompatible valve and flow meter system would result in an

ineffective and likely inoperable system that rapidly switches between supplying fluid to two different pumps. *Id*.

Therefore, Petitioner has not met its burden of showing that a POSITA would have been motivated to combine Carr and Beuterbaugh to arrive at the Challenged Claims.

4. Ground 6: The combination of Carr, Beuterbaugh, and Jackson does not render the Challenged Claims obvious.

Petitioner does not assert that Jackson cures any of the deficiencies of Carr and Beuterbaugh discussed above in connection with Grounds 4 and 5. Instead, Petitioner cites Jackson only for the flowrate thresholds recited in certain dependent claims. Petition, 69–70. Because the Petition fails to create a *prima facie* case that the combination of Carr and Beuterbaugh renders any of the independent claims obvious, it also does not create a *prima facie* case that the combination of Carr, Beuterbaugh, and Jackson renders any dependent claims obvious.

C. The Tolman Grounds do not establish a reasonable likelihood of success.

1. Ground 7: Tolman does not anticipate the Challenged Claims.

Petitioner fails to establish that it is likely to prevail in showing that Tolman anticipates the Challenged Claims. Tolman discloses methods and systems for reducing non-pumping time between multiple wells being sequentially fractured from a single location by simultaneously fracturing one well and beginning

preparations on the next well to be fractured. *See* Ex.1006, 4:5–17, 9:17–37. Tolman does not address swapping between wells while continuously pumping fracturing fluid. *See id.* On the contrary, Tolman repeatedly emphasizes that ***only one well*** connected to each pumping system is treated at a time, while other wells connected to the same system are "***hydraulically isolated*** from the pressure and energy created by the stimulation fluid pumping system" so that operators may perform other operations, such as preparations for fracturing, on those wells. *See* Ex.1006, 4:8–15, 9:8-15.

Petitioner nevertheless asserts that Tolman discloses the recited valve sequence because it discloses performing flowback in a first well while pumping fracturing fluid into a second well, which Petitioner asserts necessarily requires valves to both wells to be open for some period of time until the first well is shut in. *See* Petition, 75–76. But Petitioner ignores Tolman's express statement that during pumping into the second well, the manifold's valve to the first well is ***closed***. *See* Ex.1006, 11:16–21.

Even if Petitioner could show that Tolman disclosed performing the required valve sequence, Petitioner also fails to show that Tolman discloses performing that sequence "***in response to***" determining that the fluid communicated via the manifold satisfies one or more conditions. Although Petitioner asserts (without support) that Tolman's system necessarily evaluates fluid conditions to determine

whether stimulation of a well is complete, Petitioner fails to point to any evidence that Tolman discloses opening a second valve ***and*** closing the first valve after opening a second valve ***in response to*** any such determination, as the claims require.

Accordingly, Petitioner fails to meet its burden of establishing that Tolman anticipates any Challenged Claim.

i. Tolman does not disclose closing a first valve after opening a second valve (Limitations 1.4, 14.5, and 27.5).

Tolman does not disclose closing a first valve ***after*** opening a second valve. On the contrary, Tolman repeatedly emphasizes stimulating wells sequentially while isolating wells that are not currently being fractured. *See, e.g.*, Ex.1006, 4:5-17, 7:21–27, 8:53–56.

(i) Tolman expressly contradicts Petitioner's assertion that Tolman discloses the required valve sequence during concurrent flowback and fracturing operations.

Petitioner does not point to any express disclosure of opening a valve associated with a second well, communicating fluid to the second well, and then closing a valve associated with both a manifold and a first well. *See* Petition, 75–77. Instead, Petitioner points to the scenario in which Tolman discloses a first well being flowed back while a second well is fractured concurrently. *Id.* (citing Ex.1006, 11:15–30). According to Petitioner, a POSITA would understand that

during this operation, valves between the manifold and the first well would need to be open "to allow fluid into/out of the well," and valves between the manifold and the second valve would also be open to permit fracturing fluid to flow into the well. *Id.* Petitioner further asserts that Tolman discloses shutting in the first well after flowback, which necessarily includes closing the first well's valves, meaning that they would be shut after opening the second well's valves. *Id.* at 77.

But not only does Tolman lack any express disclosure of these alleged valve operations, it ***directly contradicts*** Petitioner's assertion that the first well's valves would be open during fracturing of the second well. The disclosure Petitioner cites expressly states that during pumping into the second well, the first well is "***closed***":

> However, in FIG. 5, the first well 104 a is being flowed back after the placement of proppant fractures . . . . Concurrently, the second well 104 b may be receiving the five-stage JITP hydraulic proppant fracture treatment. It should be noted that for this stimulation operation, ***the main manifold valve 210 and second manifold well valve 216 are in the open position, while the first manifold well valve 214 and third manifold well valve 218 are in the closed position*** to create a second well flow path.

Ex.1006, 11:8–21. That statement is consistent with Tolman's repeated statements that during pumping of one well, the valves between the manifold and the other wells are closed. *Id.*, 8:50–62, 10:29–35, 12:4–12; *see also id.*, 7:21–30.

In fact, Tolman expressly touts its manifold's valves' ability to isolate wells that are not currently being fractured as a ***key feature*** of its invention, explaining that isolating those wells "from the pressure and energy created by the stimulation fluid pumping system" is what allows operators to perform "other operations or activities" on them to prepare them for fracturing. *Id.* at 4:8–17. In other words, Petitioner's interpretation would read out the express benefits of Tolman's system and thus cannot possibly be correct.

Tolman further explains that simultaneously fracturing one well while performing other actions on other wells may "***reduce*** 'non-pumping time' time between the first stimulation treatment of the first well and a second stimulation treatment of another well." *Id.* at 9:11–16. But importantly, Tolman never mentions eliminating non-pumping time altogether—just reducing it. That is, Tolman clearly contemplates that ***some*** non-pumping time will still exist. *See id.* Thus, not only does Tolman directly contradict Petitioner's attempt to read Tolman onto the claims, but it also specifically teaches away from having valves on two wells open simultaneously.

(ii) To the extent that Petitioner asserts that the "first valve" is a valve on the well tree 106a, it fails to show that the valve satisfies the claim elements.

Despite pointing to Tolman's "first manifold well valve 214" for the "*first valve . . .associated with both the manifold and the first well*" recited in limitations 1.1, 14.2, and 27.1, Petitioner shifts gears in its mapping of later limitations and points to a ***different***, hypothetical "tree valve." *See* Petition, 71–77. Neither the "first manifold well valve 214" or Petitioner's hypothetical tree valve, however, meets all of the claims' requirements for the recited "first valve." As already shown, Tolman expressly states that the first manifold valve would be ***closed*** during pumping into other wells, and Petitioner has not shown that any "tree valve" is associated the manifold, as required. Therefore, the Petition fails to point to a first valve that meets all of the claims' requirements.

In more detail, in its analysis of limitations 1.1, 14.2, and 27.1, Petitioner points to "valve 214":

Tolman discloses a multi-well system including a manifold "configured to provide a flow path from the stimulation fluid pumping system into at least one selected well." 2:46-50. The flow paths are selected/managed by operating valves, such as manifold well valves 214, 216, 218 associated with each well's tree 106a-106c:

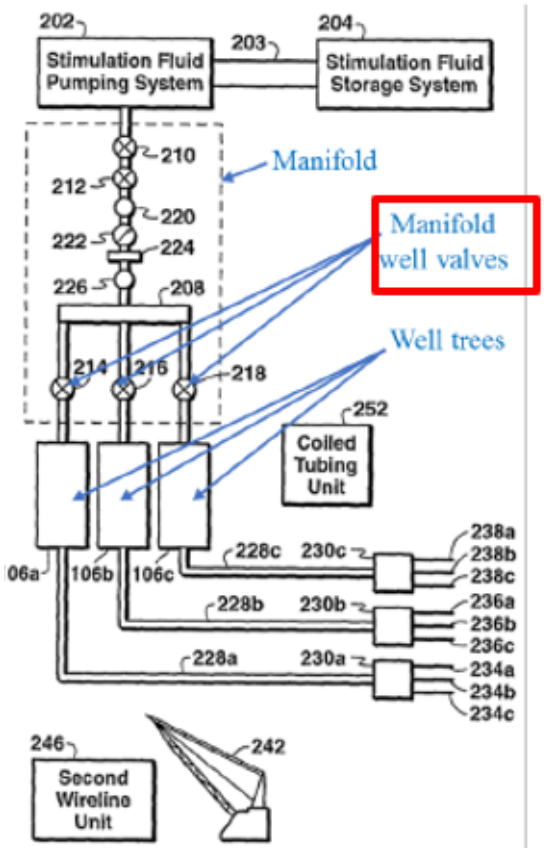


FIG. 2
(annotated)

Petition, 71–72 (annotated).

But because Tolman expressly states that the "first manifold valve 214" would be ***closed*** during fracturing of a second well, Petitioner is forced to shift the focus of its analysis of limitations 1.3, 14.4, and 27.4 to a hypothetical and

unshown "first well tree valve," which Petitioner asserts would be open during the concurrent flowback of the second well and fracturing of the first:

well. Ex. 1002, ¶¶ 554, 631, 669. Thus, during flowback from the first well, while a first well tree valve is open, a second well valve is opened to allow stimulation fluid to be pumped into the second well. 11:15-30.

Tolman discloses when a main manifold valve 210 and a second manifold well valve 214 are open "to create a second well flow path," "stimulation fluid [may be] pumped down the [second] well" to fracture the second well:

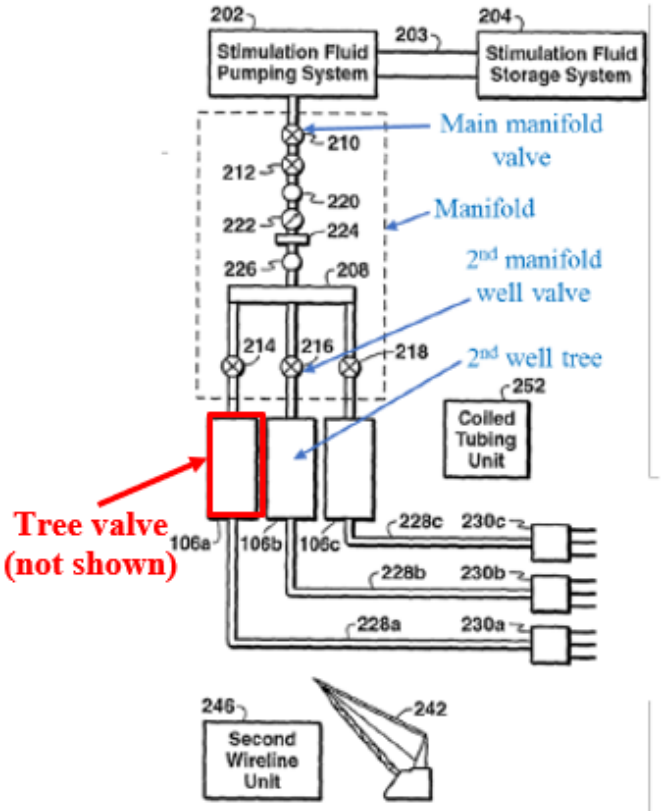


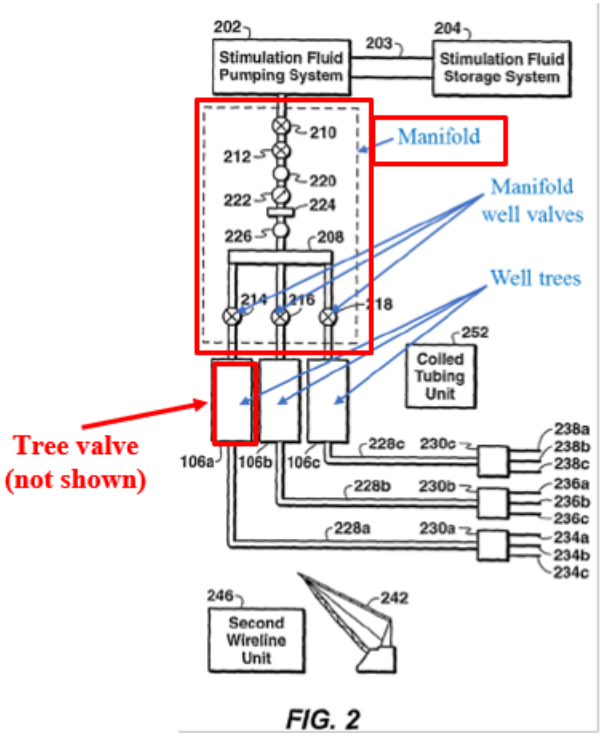
FIG. 2
(annotated)

11:15-30.

Petition, 76 (annotated with red text). Petitioner then asserts in connection with limitations 1.4, 14.5, and 27.5 that shutting in the first well necessarily includes closing all of the hypothetical "first well's valves." Petition, 77.

Petitioner's shift in focus is understandable because Petitioner cannot show that the "first manifold valve" would be closed after opening a second well valve and therefore cannot show that it satisfies limitations 1.4, 14.5, and 27.5. Tolman simply does not disclose that more than one of the manifold valves 214, 216, and 218 would be open at once and in fact expressly teaches otherwise. *See, e.g.*, Ex.1006, 8:50–62, 10:29–35, 11:8–21, 12:4–12.

Moreover, a hypothetical valve on the well tree 106a ***also*** cannot be the recited "first valve" because it is not "***associated with both the manifold*** and the first well," as the Challenged Claims require. In fact, as Petitioner's own annotations confirm, Tolman's Figure 2 indicates that the well trees 106 are ***not*** part of the manifold 206:



Petition, 72. Accordingly, because the hypothetical well tree valve cannot be the claimed "*first valve*," the Petition's assertion that "[a] POSITA would understand that a well tree valve would also need to be open while fluid is being flowed back to allow fluid into/out of the well" is entirely irrelevant. *See* Petition, 75–76; Ex.1006, 11:16–21.

Petitioner also does not show that a valve on tree 106a would ***necessarily*** be closed after the second valve is open, as limitations 1.4, 14.5, and 27.5 require. On the contrary, Tolman indicates that "it may be preferred that two valves, such as a manifold well valve 214-218 and a valve (not shown) on the tree 106a-106c, are ***closed*** during any given isolation from the other wells." Ex.1006, 7:27–30. As

already noted, Tolman further explains that during pumping into one well, other wells not currently being fractured are isolated. *See, e.g., id.* at 4:7–15. Thus, far from supporting Petitioner's argument that valves on the first well tree would necessarily be open during concurrent flowback operations in the first well and fracturing in the second well, Tolman indicates that they would preferably be closed.

Therefore, to the extent that Petitioner relies on a valve in well tree 106a as disclosing the Challenged Claims' "first valve," Petitioner fails to show that the valve is (1) associated with a manifold or (2) closed after opening a second valve, as required. Because Petitioner cannot identify a single valve that meets all of the claims' requirements for the recited "first valve," it cannot satisfy its burden of showing that Tolman anticipates the Challenged Claims.

ii. Tolman does not disclose closing a first valve after opening a second valve in response to determining that the fluid communicated via the manifold has satisfied one or more conditions (Limitations 1.2–1.4, 14.3–14.5, 27.4–27.6).

Even if Petitioner had established that Tolman discloses closing a first valve after opening a second valve, Ground 7 would still fail because Petitioner has not shown that Tolman discloses doing so ***in response to*** determining that the fluid communicated via the manifold has satisfied one or more conditions.

(i) Tolman does not disclose determining that the fluid communicated via the manifold has satisfied one or more conditions.

Petitioner has not shown that Tolman discloses determining that the fluid communicated via the manifold has satisfied one or more conditions. The sole "condition" the Petition asserts Tolman's system determines in its analysis of limitations 1.2, 14.3, and 27.6 is "whether the planned stimulation treatments…are completed." Petition, 75 (citing Ex.1006, 9:17–19). But whether a planned stimulation treatment is complete is ***not*** a condition of fluid being communicated to a manifold, and Petitioner does not assert that it is. *See id.*

Instead, Petitioner attempts to invoke inherency by asserting that "[a] POSITA would have understood that determining if a stimulation treatment is complete would necessarily include determining a fluid condition of the treatment fluid to the well." Petition, 75. But Petitioner fails to meet its burden of showing that determining that a planned treatment is complete "necessarily" includes determining that the fluid communicated via the manifold has satisfied a condition. *See In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999). In fact, the Petition does not even identify what "fluid condition of the treatment fluid" an operator would necessarily have to determine to verify completion of a simulation treatment, much less explain ***why*** an operator would need to determine whether the fluid satisfies that condition. *See id.* Petitioner's inherency position is deficient on its face.

Although Petition cites its expert's declaration, Dr. Durham similarly fails to explain or provide any evidence to support his conclusion that a "POSITA would have immediately understood" that a "fluid condition" would be the basis for determining that treatment is complete. *See* Ex.1002, ¶549. Thus, without any evidence to support its position or its expert's opinion, Petitioner has not satisfied its burden of showing that Tolman inherently discloses determining whether the fluid communicated via the manifold has satisfied any condition.

In fact, a POSITA would ***not*** understand that determining whether a planned treatment is complete would necessarily require determining that fluid communicated via a manifold has satisfied any condition. Ex.2006, ¶193. There are many ways to determine whether a stimulation treatment is complete, many of which do not require determining any fluid condition. *Id*. For example, an operator could determine that the planned fracturing operation has completed simply by walking up to the pumps and observing that they are no longer running. *Id*. Likewise, a fracturing treatment is commonly determined to be complete when a total amount of time has elapsed—which is not a fluid condition. *Id.*

Thus, the Petition fails to meet its burden of showing that Tolman discloses determining whether the fluid being communicated via a manifold has satisfied one or more conditions either expressly or inherently.

(ii) Tolman does not disclose closing a first valve after opening a second valve based on any determination that a planned treatment is or is not complete.

Even if Petitioner had shown that determining whether a planned stimulation has completed necessarily involves making a determination about a fluid condition, Petitioner fails to show that Tolman discloses opening the second valve and closing the first valve ***in response*** to any such determination.

As discussed above, Petitioner's primary theory for how Tolman discloses closing a first valve after opening a second valve is that performing flowback on a first well while fracturing a second—as Tolman discloses—necessarily requires leaving the first well's valves open after beginning fracturing of the second. But the Petition fails to explain how any particular valve sequence performed in this scenario would be "*in response to*" any determination about whether a planned treatment has completed.

Petitioner asserts that (i) the second well's valves are opened in response to stimulation fluid being delivered to the first well and (ii) the first well's valves being closed in response to completion of flowback in the first well. Petition, 77. But the claims require performing the ***specific ordered sequence*** of closing the first valve after opening the second valve in response to a ***single set*** of one or more ***fluid conditions***. At most, Petitioner alleges that Tolman's system opens the

second valve in response to one condition—fracturing being complete in the first well—and later, independently closes the first valve in response to a ***different***, later-occurring condition—completion of flowback in the first well. But Petitioner fails to show that Tolman discloses any ***single*** fluid condition or set of fluid conditions that triggers performance of the recited sequence, as the claims require.

Petitioner similarly fails to show that Tolman discloses closing a first valve after opening a second valve in response to any fluid condition under its alternative theory—that simultaneously fracturing two different wells not connected to the same manifold necessarily requires opening a second valve before closing a first valve associated with a well on a different manifold. *See* Petition, 77. Even if Petitioner is correct that the claims do not require that the recited first and second wells be connected to the same manifold, Petitioner does not even attempt to explain how Tolman discloses performing the particular sequence of closing a first well valve on one manifold after opening a second well valve on a ***different*** manifold in response to any determination that any single fluid condition or set of fluid conditions is satisfied.

Because Petitioner cannot show that Tolman discloses performing the recited sequence in response to determining that the fluid communicated via the manifold has satisfied one or more conditions, it cannot show that it is likely to prevail on Ground 7.

2. <u>Ground 8</u>: Tolman does not render obvious the Challenged Claims.

Petitioner fails to set out a *prima facie* case that Tolman renders the Challenged claims obvious. Petitioner identifies three allegedly obvious modifications to Tolman for the '770 Patent's independent claims: (i) determining whether high-pressure fluid is flowing to a first well before opening other wells' valves, (ii) using flow-measuring devices to measure flow rate, and (iii) opening a second well's valves during the first well's treatment to prepare the second well for fracturing by "injecting fluids." Petition, 78–79. But Tolman's system would not meet the Challenged Claims even with all three modifications.

First, even if, as Petitioner asserts, a POSITA would have found it obvious to measure either pressure or flow rate in the first well before operating any valves, neither modification would cure Tolman's failure to disclose performing the claimed valve sequencing ***in response to*** these measurements. Petitioner does not point to any disclosure in Tolman that teaches or suggests closing a first valve after opening a second valve in response to either flow rate or pressure measurements. *See* Petition, 78. If anything, Tolman's cited statement that "if the operations on the first well involve high pressure pumping . . . the manipulating the manifold well valves and wellhead tree valves should not be concurrently performed" teaches away from opening the second valve before finishing pumping and closing the first

valve because it suggests that an operator should ***not*** manipulate valves to other wells during high-pressure pumping to a first well. *See* Ex.1006, 13:36–40; Ex.2006, ¶202. And Petitioner makes no argument and presents no evidence that either this statement or Tolman's general statement that the pumping manifold may include flow meters would have made it obvious to open a valve on a second well before closing a valve on a first well based on a fluid condition.

Petitioner also asserts that Tolman's alleged disclosure of injecting fluids into second well while a first well is being treated would have made it obvious to open second well's valves during the first well's treatment. *See* Petition, 78 (citing Ex.1006, 8:63-65; 9:2-6). But Petitioner fails to explain how this sequencing would be ***in response*** to any determination that the fluid communicated via the manifold has met one or more conditions, as the claims require. *See id.* As discussed above, the only fluid condition Petitioner alleges Tolman discloses is determining is whether the first well's treatment is complete. But in Petitioner's cited scenario, the second well's valves would be opened for "fluid injections" ***during*** fracturing of the first well, *i.e.*, ***before*** the first well's treatment is complete. Ex.2006, ¶¶204-05. Thus, opening the second valve could not be "*in response*" to determining that the first well's treatment is complete, and Petitioner does not identify any other fluid condition that would trigger performing injections on a second well while still fracturing a first. *Id.*

Accordingly, none of the allegedly obvious modifications to Tolman Petitioner identifies would render the Challenged Claims obvious, and Petitioner cannot meet its burden of showing that it is likely to prevail on Ground 8

III. CONCLUSION

For the foregoing reasons, Patent Owner requests that institution be denied.

Respectfully submitted,

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), Patent Owner hereby certifies, in accordance with and reliance on the word count provided by the word-processing system used to prepare this Preliminary Response, that the number of words in this paper is 11,187. This word count excludes the table of contents, table of authorities, mandatory notices under §42.8, certificate of service, certificate of word count, signature block, and appendix of exhibits. *See* 37 C.F.R. §42.24(c).

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Certificate of Service

The undersigned certifies that, in accordance with 37 C.F.R. § 42.6(e), service was made on Petitioner as detailed below.

Date of service March 11, 2024

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Documents served **Patent Owner Preliminary Response; Exhibit List and Exhibits Ex.2001 – Ex.2007**

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