

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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INTELLIGENT WELLHEAD SYSTEMS, INC.,  
Petitioner,

v.

DOWNING WELLHEAD EQUIPMENT, LLC,  
Patent Owner.

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PGR2025-00002  
U.S. Patent 12,134,952

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**PATENT OWNER PRELIMINARY RESPONSE**

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**Patent Owner's Exhibit List**

| <b>Exhibit</b> | <b>Description</b>                                                                                                                                                                                                                                                                                 |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ex.2001        | Email from Trials dated 01-10-25                                                                                                                                                                                                                                                                   |
| 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 Harold E. McGowen III, P.E.                                                                                                                                                                                                                                                         |
| Ex.2007        | CV of Harold E. McGowen III, P.E.                                                                                                                                                                                                                                                                  |
| Ex.2008        | Appendix A, as-filed with U.S. Provisional Application 63/189,663, downloaded from <a href="https://patentcenter.uspto.gov/applications/63189663/supplementalContent?application=">https://patentcenter.uspto.gov/applications/63189663/supplementalContent?application=</a>                       |
| Ex.2009        | Petition for <i>Inter Partes</i> Review, IPR2024-00256                                                                                                                                                                                                                                             |
| Ex.2010        | Petition for <i>Inter Partes</i> Review, IPR2024-00583                                                                                                                                                                                                                                             |
| Ex.2011        | Preliminary Response, IPR2024-00256                                                                                                                                                                                                                                                                |
| Ex.2012        | Preliminary Response, IPR2024-00583                                                                                                                                                                                                                                                                |
| Ex.2013        | Institution Decision, IPR2024-00256                                                                                                                                                                                                                                                                |
| Ex.2014        | Institution Decision, IPR2024-00583                                                                                                                                                                                                                                                                |
| Ex.2015        | Wayback Machine - Downing Continuous Pumping Web Page, archived Oct. 20, 2020, <a href="https://web.archive.org/web/20201020115107/https://downingusa.com/freedomseries/continuouspumping/">https://web.archive.org/web/20201020115107/https://downingusa.com/freedomseries/continuouspumping/</a> |

## I. INTRODUCTION

None of the grounds in the Petition meet the higher “more likely than not” standard for institution required for post grant review. 35 U.S.C. § 324(a).

Congress explained that the purpose of this higher standard is “to ensure that petitioners raising such issues present a complete case at the outset.” 112 Cong. Rec. S1375 (daily ed. March 8, 2011) (Senator Kyl Remarks). For at least the following reasons, Petitioner has failed to present a “complete case” in each of its ten grounds:

- **Ground 1 (§ 101):** Petitioner’s abstract idea analysis is predicated upon a limitation (“determining”) that is not recited in claim 1.
- **Grounds 2-4 (§ 112):** Petitioner fails to meet its initial burden because the Petition itself demonstrates that the specification includes the allegedly missing written description.
- **Ground 5 (§ 112(d)):** Petitioner ignores that each challenged dependent claims recites a limitation not recited in its respective independent claim, thus narrowing it.
- **Grounds 6-7 (§ 103, Christie):** Petitioner fails to address the “*in response to*” limitation with particularity and instead incorporates by reference a large swath of Dr. Durham’s declaration.

- **Ground 7 (§ 103, Pitcher/Al-Salmani):** Petitioner reasserts prior art cumulative to art the Board previously considered and rejected in related IPR proceedings.
- **Grounds 8-10 (§ 103, Krupa):** Petitioner fails to establish Krupa is prior art in the Petition; and, independently, portions of Krupa are disqualified as prior art due to Downing's prior public disclosure of the CP swap.
- **Ground 10 (§ 103, FS-Video):** Petitioner ignores that FS-Video both predates the invention of the claimed CP swap and is an unrealistic marketing video that does not enable a skilled artisan to make and use the claimed CP swap.

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

## **II. THE '952 PATENT**

The '952 Patent was issued on November 5, 2024, 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 '952 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.

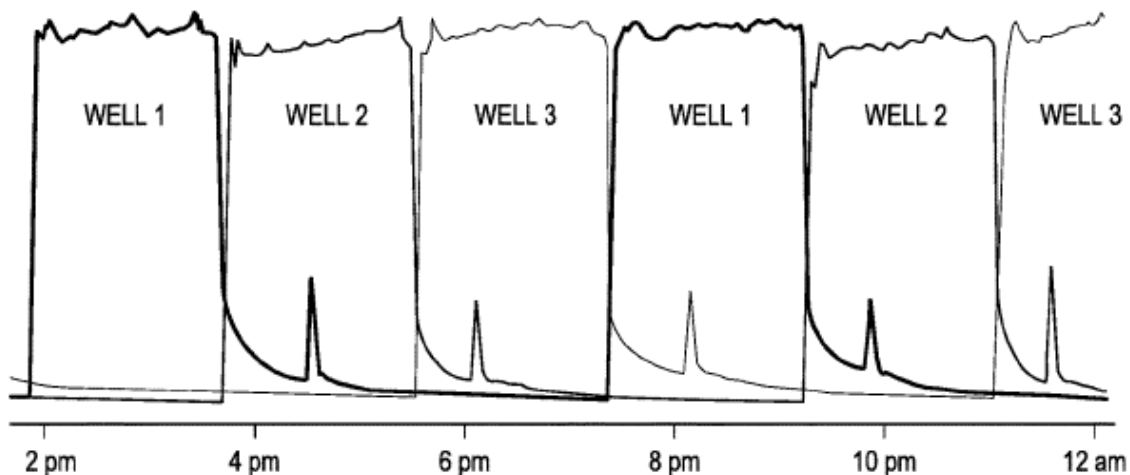


FIG. 16D

The '952 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 '952 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.

### **III. 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 Response, the defects in the Petition are readily identifiable without defining any specific claim term.

### **IV. PRIORITY**

As Petitioner recognizes, the '952 Patent properly claims priority to U.S. Provisional 63/189,663 (“'663”), filed May 17, 2021, via its parent, U.S. Patent 11,560,770 (“'770”), and its grandparent, U.S. Patent No. 11,401,779 (“'779”).

Petition, 13. The only reason Petitioner asserts that the '952 Patent is not entitled its May 17, 2021 priority date is allegedly because the "'952's claims include new matter not found in the specifications of '952, '770, '779, or '663." Petition, 15. Petitioner notes that this priority argument is the "same" as its § 112 arguments in Grounds 2-4. *Id.* at 15, n.5. As explained below in Section V.B, however, Petitioner's § 112 arguments are facially deficient, and thus Petitioner has no legitimate basis upon which to challenge the May 17, 2021 priority date of the '952 Patent.

**V. PETITIONER HAS NOT SHOWN THAT IT IS MORE LIKELY THAN NOT THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE**

**A. Ground 1: Petitioner fails to show the Challenged Claims are more likely than not patent-ineligible under § 101**

Determining whether claims are patent eligible requires applying the *Alice/Mayo* two step test. First, the Board must "determine whether the claims at issue are directed to a patent-ineligible concept," such as an abstract idea. *Alice Corp. Pty. v. CLS Bank Int'l*, 573 U.S. 208, 218 (2014). Second, if the claims are directed to a patent-ineligible concept, the Board must "examine the elements of the claim to determine whether it contains an inventive concept sufficient to transform the claimed abstract idea into a patent-eligible application." *Id.* at 221

(internal quotation marks omitted) (*quoting Mayo Collaborative Servs. v. Prometheus Lab 'ys, Inc.*, 566 U.S. 66, 80 (2012)).

The Challenged Claims are patentable under 35 U.S.C. § 101. First, Petitioner improperly treats claim 1 as representative when the remaining 77 Challenged Claims recite additional limitations that have distinctive significance. Second, notwithstanding the improper analysis of claim 1, Petitioner's challenge is fatally flawed. At *Alice/Mayo* step one, Petitioner asserts that claim 1 is directed to an abstract idea based on a limitation ("determining" fluid conditions) that is ***not present in the claim***. Petitioner further relies upon an oversimplification of the claims that ignores the claimed advance of the novel CP swap process over the prior art. At *Alice/Mayo* step two, Petitioner fails to recognize that claim 1's limitations, considered as an ordered combination, provides an inventive concept.

For these reasons, Petitioner fails to show that it is more likely than not that the Challenged Claims are patent-ineligible under § 101.

### **1. Claim 1 is not representative**

Claim 1 is not representative of the 78 Challenged Claims of the '952 Patent. Petitioner relies on an incomplete quotation from *Electric Power Group, LLC v. Alstom S.A.*, to suggest that a "claim may be treated as representative where there is no 'distinctive significance' of any limitation found in any other allegedly infringed claims." Petition, 29. But the full quotation explains that a claim may be

representative only if the patentee *does not “present[] any meaningful argument* for the distinctive significance of any claim limitation *other than those included in the representative claim.”* *Alstom*, 830 F.3d at 1352 (emphasis added); *see also Berkheimer v. HP Inc.*, 881 F.3d 1360, 1365 (Fed. Cir. 2018). Here, Patent Owner explicitly explains that the remaining 77 claims recite additional limitations that have distinctive significance:

- Independent claim 1 is a method claim, whereas independent claims 20 and 39 are apparatus and system claims;
- Independent claims 58/65/72 recite additional limitations related to a “dashboard” which provides visual references for the first and second valves, which is not abstract idea. Their dependent claims incorporate this limitation and have distinctive significance for the same reason;
- Dependent claims 16-19, 35-38, and 54-57 additionally provide a dashboard, and have distinctive significance for the same reason as claims 58/65/72;
- Dependent claims 2/21/40 further require “zipper valves,” which are specialized valves known to a POSITA and apply the improvements of the claimed CP swap to zipper valves;
- Dependent claims 3/13/22/32/41/51 include limitations for a third and fourth well and their respective valves, and thus apply the claimed CP swap to additional wells;

- Dependent claims 4/23/42/60/67/74 require an affirmative step of determining that the fluid satisfies “one or more conditions,” which improves safety by ensuring that the CP swap is only performed under certain conditions;
- Dependent claims 5/24/43/61/68/75 require that the “one or more conditions” includes flowrate and dependent claims 9/28/47/62/69/76 require that the “one or more conditions” include pressure, which improve safety in the hydraulic fracturing system by ensuring that the CP swap is only performed under certain conditions and further specify the conditions in which the claimed CP swap is executed;
- Dependent claims 6/25/44 and 10/29/48 require the flowrate or pressure to be below an upper threshold, respectively; dependent claims 7/26/45 and 11/30/49 require the flowrate or pressure to be above a lower threshold, respectively; and dependent claims 8/27/46 and 12/31/50 require the flowrate or pressure to be between the thresholds, respectively—all of which improve safety in the hydraulic fracturing system by ensuring that the CP swap is only performed under certain conditions and further specify the conditions in which the claimed CP swap is executed; and
- Dependent claims 14/33/52/63/70/77 require that the fluid is “hydraulic fracturing fluid” that in dependent claims 15/34/53/64/71/78 “comprises

sand,” which further limit the type of fracturing the claimed CP swap is implemented in.

Thus, each of the 78 claims stand on their own—they are not representative and should not be categorically swept into the scope of claim 1.

Because the Petition primarily addresses claim 1 and asserts that claims 2-78 are “directed to the same abstract idea” and “do not provide an inventive concept,” Petition, 38-39, Patent Owner’s § 101 analysis is limited to the patent eligibility of claim 1 for purposes of this Preliminary Response only.<sup>1</sup> As shown below, that analysis is also flawed.

**2. Claim 1 is not directed to an abstract idea under *Alice/Mayo* step one**

**i. The alleged “abstract idea” of “determining” conditions is not recited in claim 1**

Petitioner repeatedly alleges that claim 1 is directed to the abstract idea of “determining” conditions in a well. *See, e.g.,* Petition, 24, 29-30, 34-35, 37-38. But Petitioner’s § 101 challenge suffers from a fatal flaw—claim 1 ***does not require “determining” conditions in a well***. Claim 1 does not recite any “determining” limitation at all—it only requires opening a second valve “*in response to*”

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<sup>1</sup> Patent Owner does not concede that claims 2-78 are directed to the same abstract idea and do not provide an inventive concept.

communicated fluid “*satisfying one or more conditions.*” Thus, Petitioner’s *entire* § 101 challenge is based on a limitation ***that is not present in the claims.***

The Board should reject the § 101 challenge based on this error alone. The Petition itself acknowledges that “[t]he § 101 inquiry must focus on the language of the Asserted Claims themselves’.” Petition, 34 (quoting *ChargePoint*, 920 F.3d at 769). If claim 1 does not recite “determining” conditions in a well, then claim 1 cannot be “directed to” determining conditions in a well for the *Alice/Mayo* analysis.

**ii. Claim 1 is “directed to” an improvement in hydraulic fracturing technology through the claimed “CP swap”**

As the Federal Circuit has explained, the “directed to” inquiry “cannot simply ask whether the claims *involve* a patent-ineligible concept.” *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016) (emphasis in original) (citation omitted). Instead, the relevant inquiry is whether the claim’s “character as a whole is directed to excluded subject matter.” *Id.* (citation omitted). This requires identifying what the patents assert to be the “focus of the claimed advance over the prior art.” *Affinity Labs of Texas, LLC v. DirecTV, LLC*, 838 F.3d 1253, 1257 (Fed. Cir. 2016).

Claim 1 is not directed to an abstract idea—rather, it recites a specific improvement to hydraulic fracturing technology in the field of zipper fracturing for

multi-well stimulations, referred to as a “CP swap.” While Petitioner argues that claim 1 is directed to “the abstract idea of determining whether to open/close valves using standard criteria a POSITA would have considered in fracking operations,” Petition, 29, that generalization ignores the remaining *forty-five lines* of claim limitations that comprises claim 1. These remaining limitations recite specific structures for communicating fluid to two different wells, as well as a specific sequence of operating those structures to execute the claimed CP swap. It is this specific combination of elements—and in the specified order—that gives meaning to the claim.” *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1313 (Fed. Cir. 2016) (“Whether at step one or step two of the Alice test, in determining the patentability of a method, a court must look to the claims as an ordered combination, without ignoring the requirements of the individual steps.”).

Specifically, claim 1 requires “*executing a continuous pumping (‘CP’) swap to transition from hydraulically fracturing the first well to hydraulically fracturing the second well*” by (i) “*opening a second valve while fluid is communicated from the one or more pumps to the first well via the first valve and the manifold,*” (ii) “*wherein opening the second valve causes fluid to be communicated from the one or more pumps to the second well via the manifold and the second valve,*” and (iii) “*closing the first valve,*” to be executed in response to “*at least a portion of fluid communicated via the manifold satisfying one or more conditions.*” Claim 1 further

requires specific arrangements of pumps, valves, and a manifold to communicate fluid to first and second wells.

Contrary to Petitioner's assertions, the satisfaction of any random "condition" is not sufficient. As recited in the claim, the opening of the second valve while fluid is being communicated to the first well may only be executed "*in response...satisfying one or more conditions, which one or more conditions include a flow rate, and/or a pressure, of the at least a portion of fluid communicated via the manifold.*" As described in the specification, these steps may only be executed in response to meeting one or more fluid conditions necessary for continuous pumping operations to occur. Indeed, performing the claimed steps without meeting such conditions would not achieve continuous pumping and could present a serious life-threatening safety hazard. *See* Ex.1001, Fig. 16D-E. And, if any one of recited steps did not occur in the specified order, neither continuous pumping—nor the distinct advantages it provides over the prior art—would occur.

Taken as a whole, claim 1 is undoubtedly "directed to" Patent Owner's innovative CP swap method, which cannot be achieved unless each and every claim limitation is performed, and done so in the sequence specified. Stated differently, Patent Owner's CP swap method is embodied in the claims as a whole, and not any single limitation. And because the claims, as a whole, are directed to Patent Owner's innovative CP swap method, as opposed to an imaginary

“determining” limitation, claim 1 is not directed to an abstract idea. As such, claim 1 satisfies *Alice/Mayo* step one, and is patent eligible.

**iii. Petitioner fails to analyze the claim as a whole and oversimplifies the claims**

Despite the clear, tangible, and non-abstract nature of the claims, Petitioner argues that claim 1 is nonetheless directed to an “abstract idea.” It is not. Even assuming that claim 1 includes a “determining” limitation (it does not), the only way Petitioner arrives at this conclusion is by oversimplifying the claim and answering the wrong question—both of which the Federal Circuit has provided clear guidance on. *See McRO*, 837 F.3d at 1313 (quoting *In re TLI*, 823 F.3d at 611) (“[C]ourts ‘must be careful to avoid oversimplifying the claims’ by looking at them generally and failing to account for the specific requirements of the claims.”); *Enfish*, 822 F.3d at 1335 (“‘directed to’ inquiry...cannot simply ask whether the claims *involve* a patent-ineligible concept”) (emphasis in original) (citing *Internet Patents Corp. v. Active Network, Inc.*, 790 F.3d 1343, 1346 (Fed. Cir. 2015) (the question is whether the claims’ “character as a whole is directed to excluded subject matter”)).

Ignoring these fundamental principles, Petitioner identifies the “determining” step as the center point of their abstract idea argument, seemingly because it can (allegedly) “be performed entirely in a human well operator’s

mind.” *See, e.g.*, Petition, 33 (“[T]he ‘one or more conditions’ in Claim 1’s determining/’executing’ step may be kept in the operator’s head.”), 34 (Claim 1 recites “only a determining method that can be performed entirely in a human’s mind”). This is simply untrue.

For example, as shown and described in reference to Figures 16D and 16E (below), 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.

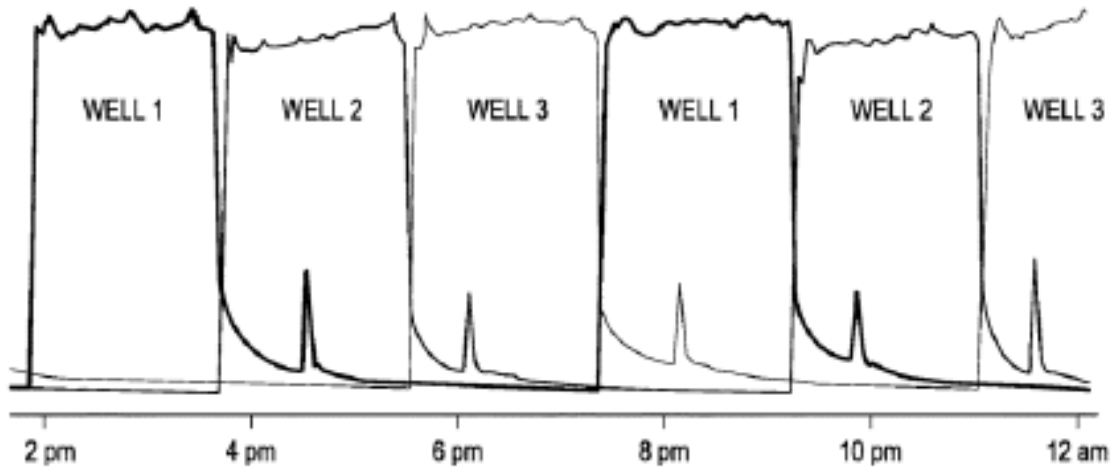
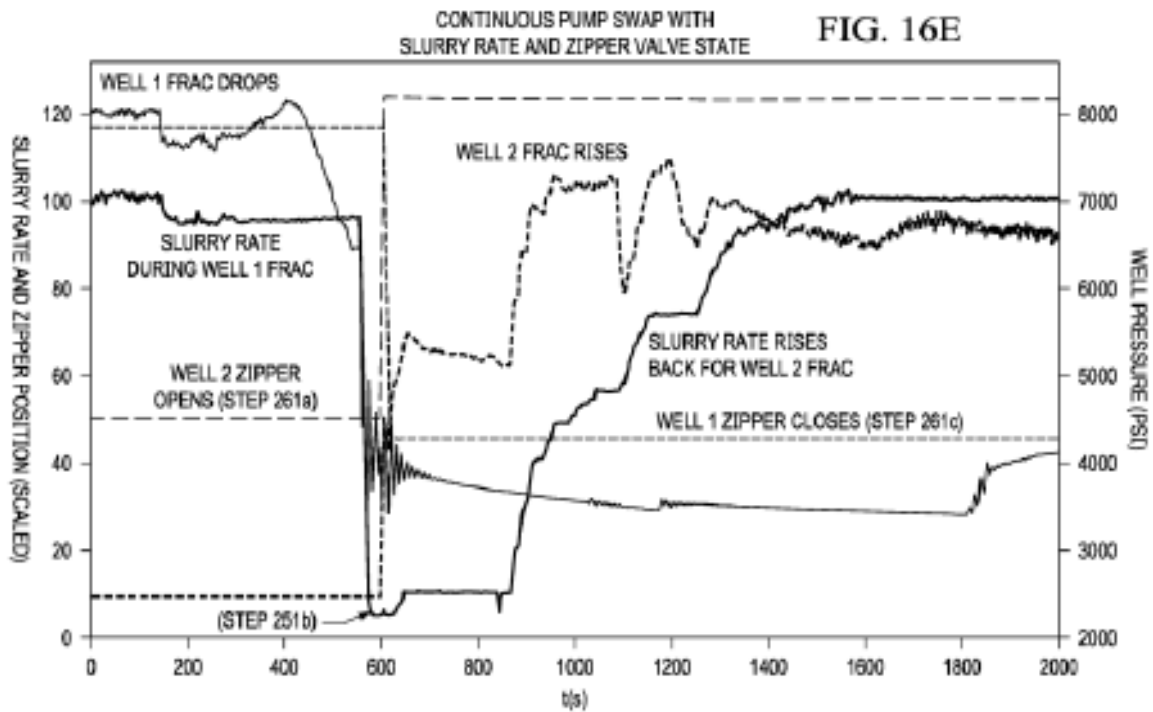


FIG. 16D

Ex.1001, Fig. 16D.



Ex.1001, Fig. 16E.

As shown above, the CP swap involves various steps in addition to the alleged “determining” step, namely communicating fluid to a first well via a manifold and a first valve, and (i) “*opening a second valve while fluid is communicated from the one or more pumps to the first well via the first valve and the manifold,*” (ii) “*wherein opening the second valve causes fluid to be communicated from the one or more pumps to the second well via the manifold and the second valve,*” and (iii) “*closing the first valve,*” ((i)-(iii) are executed in response to the alleged “determining” step), in addition to a specific arrangements of pumps, valves, and a manifold to communicate fluid to first and second wells. None of which can be executed entirely in a human well operator’s mind. Rather, these steps require real-world physical manipulation of a hydraulic fracturing system.

Additionally, the alleged “determining” step is but *one* limitation representing, at most, six lines of claim limitations in a claim that spans *over fifty lines*. Even if the alleged “determining” step were “abstract,” which it is not, the most one could conclude would be that claim 1 *involves* a patent-ineligible concept. Such an unreasonable conclusion is insufficient under the § 101 analysis. *See Enfish*, 822 F.3d at 1335 (“‘directed to’ inquiry...cannot simply ask whether the claims *involve* a patent-ineligible concept”) (emphasis in original) (citing

*Internet Patents Corp.*, 790 F.3d at 1346 (the question is whether the claims’ “character as a whole is directed to excluded subject matter”)).

**iv. Petitioner improperly assesses novelty at step one**

Petitioner misapplies *Alice* and improperly assesses novelty at step one. Petitioner argues that claim is directed to an “abstract idea” simply because “[p]umping fluid through a manifold is thousands of years old,” Petition, 29-30, and “human well operators have long watched gauges to determine ‘one or more conditions’ of fluid flowing via a manifold to a well in order to make decisions about opening and closing valves,” Petition, 30. But claim 1 is not directed to the simple task of pumping fluid and opening and closing valves—as described above, it is directed to a specific “CP swap.” Regardless, Petitioner’s “novelty” arguments are irrelevant to whether a claim recites an abstract idea, they should be ignored. *Ultramercial*, 772 F.3d at 715 (“[A]ny novelty in implementation of the idea is a factor to be considered only in the second step of the *Alice* analysis.”).

**v. The claims in the cases cited by Petitioner are not analogous to the Challenged Claims**

While courts often compare the claims at issue to claims from past cases to determine what constitutes an “abstract idea,” Petitioner takes this concept too far. *See Enfish*, 822 F.3d at 1334. Instead of engaging in an analysis of each claim at issue in analogous cases and comparing them to claim 1, Petitioner relies on a

handful of cases for the meritless conclusion that any claims with “determining” method steps” are presumptively directed to an abstract idea. Petition, 30-32.

Such a conclusion is plainly incorrect.

No court has ever suggested that the presence of a “determining” step alone renders a patent claim “abstract” and patent-ineligible. And for every case Petitioner found holding a claim with a “determining” step to be patent-ineligible, there are at least as many Federal Circuit decisions holding the opposite. *See e.g. McRO*, 837 F.3d at 1304 (holding claim including “determining the displacement of each vertex from the neutral model” was not directed to an abstract idea); *Thales Visionix Inc. v. United States*, 850 F.3d 1343, 1345 (Fed. Cir. 2017) (holding claim including “determin[ing] an orientation of the object” was not directed to an abstract idea); *Visual Memory LLC v. NVIDIA Corp.*, 867 F.3d 1253, 1257 (Fed. Cir. 2017) (holding “determin[ing] a type of data” was not directed to an abstract idea); *Packet Intel. LLC v. NetScout Sys., Inc.*, 965 F.3d 1299, 1304 (Fed. Cir. 2020) (holding “determining if the packet is of an existing flow” was not directed to an abstract idea).

Regardless, the cases Petitioner relies on are distinguishable:

*Intellectual Ventures I LLC v. Symantec Corp.* Petitioner incorrectly argues that the court in *Intellectual Ventures* held the claim ineligible based on the “determining” step alone. *See* Petition, 30. It did not. Instead, the court identified

the abstract idea as “receiving e-mail..., characterizing email..., and communicating the characterization,” which comprised *all* elements of the claim at issue. 838 F.3d 1307, 1313 (Fed. Cir. 2016).

In addition, the claim in *Intellectual Ventures* is not analogous to those at issue here. The claim in *Intellectual Ventures* was directed to “identifying characteristics of data files” and “each step does no more than require a generic computer to perform generic computer functions.” *Id.* at 1313-14 (quoting *Alice*, 134 S. Ct. at 2359-60). Conversely, the claims here are directed to the various intricacies of performing the CP swap method for hydraulic fracturing and are comprised primarily of physical steps that have nothing to do with generic computer equipment. *See, e.g.*, Ex.1001, 22:37-38 (“*communicating fluid from one or more pumps to the first well via a manifold and a first valve*”), 22:44-46 (“*executing a continuous pumping (‘CP’) swap to transition from hydraulically fracturing the first well to hydraulically fracturing the second well*”), 22:48-50 (“*opening a second valve while fluid is communicated from the one or more pumps to the first well via the first valve and the manifold*”), 22:59-62 (“*wherein opening the second valve causes fluid to be communicated from the one or more pumps to the second well via the manifold and the second valve*”), 23:5-7 (“*closing the first valve: after the at least a portion of fluid communicated via the manifold has*

*satisfied one or more conditions*”). Thus, *Intellectual Ventures* has no applicability here.

*Ericsson Inc. v. TCL Commc’n Tech. Holdings Ltd.* The Court in *Ericsson* determined that the claim was directed to an abstract idea after finding that “all four components” of the claim “collapse into simply ‘an access controller for controlling access.’” 955 F.3d 1317, 1326 (Fed. Cir. 2020). Unlike Petitioner’s approach here, the court in *Ericsson* did not focus exclusively on the “determining” step but instead evaluated the claim as a whole to determine that it was directed to the abstract idea of granting access to a computer platform. *Id.*

The claim in *Ericsson* is also not analogous to the claims at issue here. The claim in *Ericsson* was directed to “controlling access to...software services” using a generic computer that decided whether application requests had permission to access the software. *Id.* at 1325, 1328 (the claims “make generic functional recitations that requests are made and then granted...without limiting them to technical means for performing the functions”). Here, again, the steps of claim 1—and the other 77 claims—are not performed solely by generic computers. Rather, claim 1 recites “technical means for performing the functions” of a CP swap, including the specific arrangement of components, steps, and conditions dictating when fluid is communicated and valves are opened or closed. *See id.* at 1328; *see* Ex.1001, claim 1.

*ChargePoint, Inc. v. SemaConnect, Inc.* Petitioner cites *ChargePoint* to suggest that claims are necessarily directed to an abstract idea if they do not improve the specific components or systems of a method claim. See Petition, 31. Not so. The court in *ChargePoint* held that the abstract idea of a “network for interacting with a device” was merely “applied to the context of electric vehicle charging stations.” In so holding, the court observed that “the charging station itself was [not] improved from any technical perspective.” 920 F.3d 759, 767 (Fed. Cir. 2019). However, that observation was only one of many factors considered “to determine whether the focus of claim 1, as a whole, is the abstract idea.” *Id.* at 767. And only after performing a review of all claim elements and the specification, the *ChargePoint* court concluded that the claim was directed to the abstract idea of “communication over a network for interacting with a device.” *Id.* at 768.

The *ChargePoint* court also held that the claim was directed to an abstract idea because it would “preempt the use of” the abstract idea, namely “networked charging stations.” In contrast, claim 1 does not prevent competitors from performing the alleged “determining” step, the allegedly abstract idea, or opening/closing wells or pumping fluid. Rather, it is the alleged “determining” step, in combination with each of the other claimed steps (and in the specified order), that defines the CP swap invention.

*TDE Petroleum Data Sol'ns, Inc. v. AKM Enter., Inc.* Petitioner again attempts to draw similarities with a case evaluating a claim having a “determining” step. 657 F. App’x. 991. While the technology in *TDE*—oil drilling—is at least similar to the technology at issue here, the claim in *TDE* was “directed to processing sensor data on an oil well drill.” In finding that the claim was directed to an abstract idea, the *TDE* court analyzed every step of the claim and found that each claim element (“receiving,” “determining,” and “selecting”) could be “performed by any general-purpose computer” and equated those elements to the steps of “collecting information, analyzing it, and displaying certain results” that has repeatedly been held ineligible. *Id.* at 992-993.

But, again, unlike the claim in *TDE*, the elements of the claims at issue here, including claim 1, cannot not all be performed by a generic computer and, thus, cannot be equated to the “collecting,” “analyzing,” and “displaying” steps typically deemed patent-ineligible.

*Yu v. Apple, Inc.* Petitioner relies on *Yu* to suggest that claims reciting “image sensors, lenses, and specific mounting arrangements” can be considered an abstract idea. 1 F.4th 1040 (Fed. Cir. 2021); Petition, 31. While Petitioner never explains the relevance of the case or any alleged similarity to the claims at issue here, *Yu* is nonetheless inapplicable.

First, the court in *Contour IP Holding, LLC v. GoPro, Inc.* addressed *Yu* in evaluating claims directed to a “point-of-view video camera” that recited functional components similar to those in *Yu*, such as “a lens,” “an image sensor,” and “a camera processor.” No. 3:17-CV-04738-WHO, 2021 WL 4148651, at \*1 (N.D. Cal. Sept. 13, 2021). However, the court determined that the *Contour IP* claims were *not* directed to an abstract idea at *Alice* step one. In so holding, the court determined that, unlike the camera in *Yu*, the specific use of the components in the *Contour IP* claim “embodied a functional improvement” and solved “a concrete functional problem” of not being able to control a video camera during its intended use. *Id.* at \*8. Similarly, to the extent claim 1 of the ’952 Patent (and the other 77 claims), involve conventional hydraulic fracturing components, the claims are nonetheless directed to specific uses of those components to provide a functional improvement to the hydraulic fracturing process—namely, the CP swap method.<sup>2</sup>

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<sup>2</sup> The court in *United Servs. Auto. Ass’n v. PNC Bank N.A.* also found that claims directed to a camera were patent eligible at *Alice* step one because, “unlike the claims in *Yu*,” the claims “specifically claim[ed] the asserted advance over the prior art.” No. 220-cv-00319-JRG-RSP, 2022 WL 1465017, at \*8 (E.D. Tex. May

*Second*, the court in *Yu* found that the physical components recited in the claim did not render it eligible because they merely “effectuated” the final result of combining two images into one enhanced image, which was itself an abstract idea. *Yu*, 1 F.4th at 1043. Unlike *Yu*, the allegedly abstract idea here—the “determining” step—is not the “final result” of the claim, nor do the physical components of the claims merely effectuate it.

*Nabors Drilling Techs. USA Inc. v. Helmerich & Payne Int’l Drilling Co.* In *Nabors*, the court found that the claim was directed to “collecting and analyzing information,” referring to the “receiving,” “converting,” “assessing,” and “associating” steps. 631 F. Supp. 3d 404, 410 (N.D. Tex. 2022). While the final step recited “controlling a well drilling operation in accordance with the responses associated with each identified action item from the well prog,” a step that alluded to physical tools or components used for drilling, the court held that this recitation of physical components did not render the claim non-abstract because it was simply “functional, results-oriented language that does not explain how that purpose is achieved.” *Id.* Such is not the case here.

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3, 2022), report and recommendation adopted, 2022 WL 1463771 (E.D. Tex. May 9, 2022).

Unlike the claim in *Nabors*, claim 1 of the '952 Patent (and the other 77 claims) provides the specific, ordered steps and the physical and functional components necessary to perform a CP swap. *See* Ex.1001, claim 1. And, as described in more detail in Sections V.B.1-3 [112 sections] *infra*, the specification details specific fluid conditions (e.g., flow rate and/or pressure conditions) that would be necessary to perform any “determining” step to achieve a CP swap.

In contrast to Petitioner’s cases, numerous Federal Circuit cases have found that claims similar to those at issue here do not recite an abstract idea:

*CardioNet, LLC v. InfoBionic, Inc.* The Federal Circuit reversed the district court’s holding that the claim (below) was directed to an abstract idea:

1. A device, comprising:

a beat detector to **identify** a beat-to-beat timing of cardiac activity;

a ventricular beat detector to **identify** ventricular beats in the cardiac activity;

variability **determination logic** to determine a variability in the beat-to-beat timing of a collection of beats;

relevance **determination logic** to identify a relevance of the variability in the beat-to-beat timing to at least one of atrial fibrillation and atrial flutter; and

an event generator to **generate an event** when the variability in the beat-to-beat timing is identified as relevant to the at least one of atrial fibrillation and atrial flutter in light of the variability in the beat-to-beat timing caused by ventricular beats identified by the ventricular beat detector.

955 F.3d 1358, 1365 (Fed. Cir. 2020) (emphasis added).

As shown above, the *CardioNet* claim (1) ***identified*** heart beats, (2) ***determined*** “a variability in beat-to-beat timing,” and (3) ***generated*** an event if the beat-to-beat timing was related to atrial fibrillation. *Id.* In reversing the district court, the Federal Circuit determined that “[w]hen read as a whole, and in light of the written description,” the claims were directed to “an improved cardiac monitoring device and not to an abstract idea.” *Id.* at 1368. The Court explained that the asserted claims were “directed to a *specific technological improvement*—an improved medical device that achieves speedier, more accurate, and clinically significant detection of two specific medical conditions out of a host of possible heart conditions.” *Id.* at 1371 (emphasis added). The claims at issue here are analogous to those in *CardioNet* in the sense that they are directed to an improved method of hydraulic fracturing and not an abstract idea. *See, e.g.,* Ex.1001, claim 1. The claimed invention provides an improved hydraulic fracturing method (and resulting improved hydraulic fracturing system) with a specific technological

improvement of performing a CP swap that allows for instantaneous transitions between wells while pumping.

*Thales Visionix Inc. v. United States*. The claim at issue in *Thales* is shown below.

1. A system for tracking the motion of an object relative to a moving reference frame, comprising:

a first inertial sensor mounted on the tracked object;

a second inertial sensor mounted on the moving reference frame;

and

an element adapted to **receive signals** from said first and second inertial sensors and configured to **determine an orientation** of the object relative to the moving reference frame based on the signals received from the first and second inertial sensors.

850 F.3d at 1345 (emphasis added).

The claim in *Thales* recited “*receiv[ing]* signals” and “*determin[ing]* an orientation of the object” via mathematical equations described in the specification.

*Id.* The Federal Circuit held that “[t]hese claims are not merely directed to the abstract idea of using mathematical equations” because “[t]he mathematical equations are a consequence of the arrangement of the sensors and the unconventional choice of reference frame.” *Id.* at 1348-49. Here, the claims at issue are also directed to an unconventional arrangement of equipment and steps,

to be performed only at the precise moment, which is to be determined based the one or more fluid conditions, to achieve a CP swap.

Notwithstanding the extensive case law on both sides of the “abstract idea” spectrum, one thing is certain: courts must carefully evaluate an *entire claim* in light of the specification before determining if the claim *as a whole* seeks a patent on that abstract idea alone. The use of similar words—e.g., “determining”—or analogous technology—e.g., “drilling”—without more, does not render a claim patent ineligible. When properly analyzed, claim 1 of the ’952 Patent, along with each of the 77 additional claims, are clearly directed to Patent Owner’s non-abstract CP swap method. They are not directed to an abstract idea. The Court’s inquiry should stop here. *Enfish*, 822 F.3d at 1339 (“Because the claims are not directed to an abstract idea under step one of the *Alice* analysis, we do not need to proceed to step two of that analysis.”)

### **3. The claims recite an inventive concept under *Alice/Mayo* step two**

To the extent the Board even makes it this far, *Alice/Mayo* step two is the death knell to Petitioner’s challenge. Petitioner largely repeats the same arguments it made for *Alice* step one: namely, that “[e]verything in Claim 1 is tied to the abstract concept of determining whether one or more conditions has been satisfied to decide whether to ‘execute’ a ‘CP swap.’” Petition, 35. Petitioner also concludes

that because “[a]ll the claimed elements, including the wells, pumps, valves, and well equipment, are connected and used as they have always been in hydraulic fracturing operations, are connected and used as they have always been in hydraulic fracturing operations,” the claims do not recite an inventive concept. Petition, 37. Petitioner is wrong as to both.

*Alice/Mayo* step two requires “a search for an ‘inventive concept’—*i.e.*, an element or combination of elements that is ‘sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.’ ” *Alice*, 573 U.S. at 217-18 (alteration in original) (quoting *Mayo*, 566 U.S. at 72-73). This requires considering “the elements of each claim both individually and ‘as an ordered combination’ to determine whether the additional elements ‘transform the nature of the claim’ into a patent-eligible application.” *Id.* at 217 (quoting *Mayo*, 566 U.S. at 78-79).

Here, the inventive concept can be found in the arrangement of hydraulic fracturing components, together with the ordered steps to perform the claimed “CP swap.” In particular, claim 1 requires the arrangement of a “*first valve*” “*associated with both the first well and the manifold*” and “*fluidically positioned between the first well and the one or more pumps*.” Ex.1001, 22:37-43. Claim 1 also requires a “*second valve*” “*associated with both the second well and the manifold*” and “*fluidically positioned between the second well and the one or more pumps from*

*which fluid is communicated to the first well via the manifold and the first valve.”*

Ex.1001, 22:48-58.

Performing the ordered combination recited in the claim is required to execute a “CP swap”: (i) “*communicating fluid from one or more pumps to the first well via a manifold and a first valve,*” (ii) “*opening a second valve while fluid is communicated from the one or more pumps to the first well via the first valve and the manifold*” “*in response to at least a portion of fluid communicated via the manifold satisfying one or more conditions,*” and (iii) “*closing the first valve,*” “*after the at least a portion of fluid communicated via the manifold has satisfied the one or more conditions.*” Ex.1001, claim 1. Indeed, performing the claimed steps without meeting such conditions would not achieve continuous pumping and could present a serious life-threatening safety hazard. *See* Ex.1001, Fig. 16D-E. And, if any one of recited steps did not occur in the specified order, neither continuous pumping—nor the distinct advantages it provides over the prior art—would occur.

The inventive concept is supported by the specification. The specification explains that executing the CP swap “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; *see also id.* 14:16-42 (explaining detailed execution of CP swaps). The specification highlights that with a CP swap, “[t]he

transition 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. In other words, the CP swap allows hydraulic fracturing operators to keep the pumps running while switching from one well to another.

This allows an “instantaneous” transition between one well to another.

The inventive CP swap claimed in the '952 Patent can be contrasted with the “regular swap” that is described in the specification but *not* the subject of any claims in the '952 Patent, shown in Figure 13:

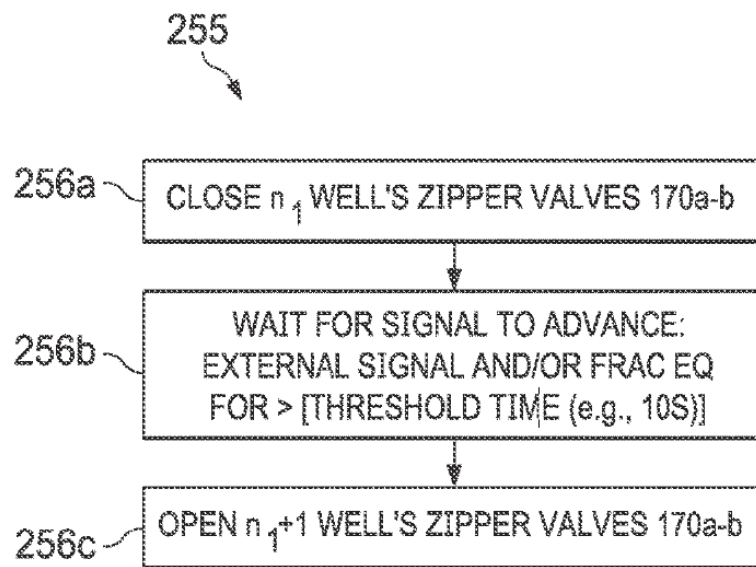


FIG. 13

Ex.1001, Fig. 13.

The specification explains that for a regular swap, at step 256a, a first well's ( $n_1$ ) valves are closed. Ex.1001, 13:61-64. At step 256b, a signal to advance is

received, either through an external signal from a frac operator or determining that “pressure equalization has been achieved to within a threshold amount between the hydraulic fracturing pressure in the zipper manifold 145 and the fluid pressure in the [second]  $n_1 + 1$  well (e.g., well 105B) for a threshold amount of time.” Ex.1001, 13:65-14:8. Then, at step 256c, the zipper valves for the second well ( $n_1 + 1$ ) are opened “so that hydraulic fracturing fluid is communicated from the zipper manifold 145 to the [second]  $n_1 + 1$  well.” Ex.1001, 14:8-15.

Unlike with the CP swap, during the regular swap, fluid is only communicated to the second well after the zipper valves to the first well have been closed for a duration. Thus, unlike with the CP swap, during the regular swap, the pumps do not continuously run, and the transitions are not “instantaneous.”

*Compare*, 13:55-14:15 (regular swap), *with* 14:16-51 (CP swap).

Petitioner asserts that the claimed CP swap is a routine and conventional valve opening and closing sequence. Petition, 37. But the CP swap being non-conventional is evident from the different swaps described in the specification. A “regular swap” closes valves to a first well, opens valves to a second well, and then communicates fluid to a second well. Ex.1001, 13:55-14:15. In contrast, the non-conventional and non-routine CP swap communicates fluid to a first well through a first valve, opens a second valve to a second well and communicates fluid to the second well once a condition has been satisfied, and then closes first valve of the

first well. If the CP swap were routine and conventional, it would operate the same as the “regular swap.”

Petitioner argues that “[o]pening one valve before closing another was nothing new” and that “pumping fluid through a manifold to two or more wells, which necessarily required opening/closing valves in various sequences, was well known by ’952’s EEf date.” Petition, 36. But this argument fails because it does not address the claimed and ordered combination of components and valve opening/closing sequence occurring in response to conditions of the well.

Accordingly, the ordered combination of claim elements amounts to “significantly more” than the alleged abstract idea of determining conditions of a well and opening/closing valves based on those conditions. *See* Petition, 29. Claim 1 (and the remaining 77 claims) are eligible under step two of *Alice/Mayo*.

#### **4. USPTO Guidance**

For purposes of this Preliminary Response, Patent Owner does not dispute that the patent-eligibility determination would be the same under the *Alice/Mayo* framework or the Office’s § 101 Guidance. As explained above, the claims are eligible under § 101 under the *Alice/Mayo* framework, and are likewise eligible under the Office’s § 101 Guidance.

**B. Grounds 2-4: Petitioner fails to show that is it more likely than not that the Challenged Claims lack written description support**

**1. Ground 2: “Conditions” (Claims 1-78)**

The Petition alleges that the “‘conditions’ limitations are new matter added to the claims by amendment with no support in the original specification, [and] all claims are unpatentable under §§ 112(a) and 132(a) for lack of written description and new matter.” Petition, 48-49 (referring to limitations 1.3.2, 1.3.3, 20.3.2, 20.3.3, 39.5.2, 39.5.3, 58.4.2, 58.4.3, 65.4.2, 65.4.3, 72.6.2, and 72.6.4 as “the ‘Conditions’ Limitations”). Petitioner then spends five pages analyzing why the specifications of the ’952 Patent and its family (’770/’779/’663) allegedly lack support for the “conditions” limitation. Petition, 48-53. Petitioner’s analysis, however, fails to satisfy even Petitioner’s “initial burden of production.” *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1379 (Fed. Cir. 2015) (petitioner has initial burden of production).

Specifically, despite alleging that the ’952 Patent family’s specifications do not disclose any “conditions,” the Petition *itself* illustrates that the specifications do in fact disclose conditions. For example, the Petition states that the specifications do not include “any mention of anything that could be interpreted as a ‘condition’ *other than a solitary example of flowrate thresholds*.” Petition, 49 (emphasis added). There is no dispute flowrate is a fluid condition. Indeed,

Petitioner repeatedly recognizes that the '952/'770/'779/'663 specifications at least disclose flowrate as a condition:

- noting that "'952 refers to opening/closing valves based on fluid meeting one or more undefined flowrate thresholds" (Petition, 49-50);
- pointing out "embodiments" teaching "'measuring' and 'determining' flowrate thresholds" (*id.* at 50);
- discussing an "example of flowrate thresholds" (*id.* at 51); and
- recognizing that the "specifications of '952/'770/'779/'663" refer to "flow rate," "frac rate," and "idle rate" conditions (*id.* at 51).

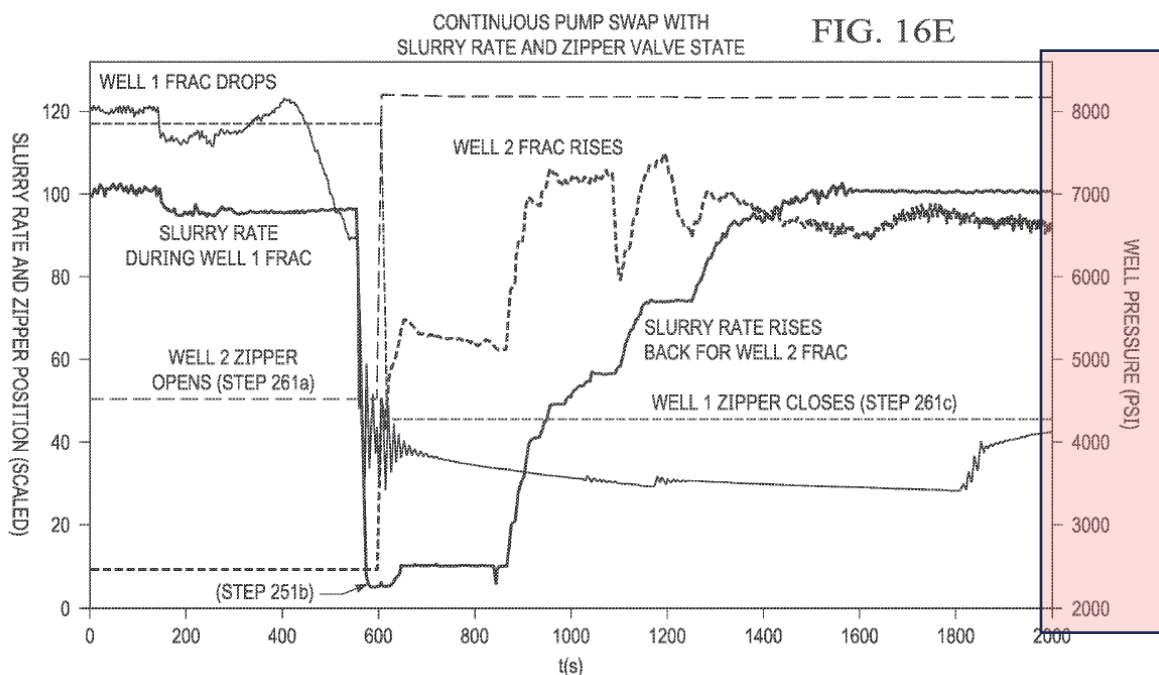
Thus, in the same breath, Petitioner states that the '952/'770/'779/'663 specifications both do and do not disclose satisfying fluid conditions. This facially deficient showing does not shift burden of production to Patent Owner. Petitioner therefore cannot show that it is "more likely than not" that any claim lacks written description support for the "conditions" limitations.

## **2. Ground 3: "Pressure [Conditions]" (Claims 1-57/62/69/76)**

The Petition also fails to show that it is "more likely than not" that any claim lacks written description support for the "pressure [conditions]" limitation.

Petitioner alleges the "'952 never mentions a 'pressure' 'condition' for 'executing a CP swap.'" Petition, 53. But "the written description requirement is satisfied by the patentee's disclosure of 'such descriptive means as words, structures, *figures*,

*diagrams*, formulas, etc., that fully set forth the claimed invention.” *Enzo Biochem, Inc. v. Gen-Probe Inc.*, 323 F. 3d 956, 969 (Fed. Cir. 2002) (emphasis added). Petitioner blatantly ignores Figure 16E, which illustrates a “CONTINUOUS PUMP SWAP” with respect to “WELL PRESSURE (PSI),” highlighted in red below:



Ex.1001, Fig. 16E; *see also* Ex.1005 at 42, Fig. 16E.

Petitioner similarly ignores the '952 specification's discussion of Fig. 16E that discloses “executing the CP swap” in view of “treatment pressure.” Ex.1001, 14:43-51 (“The transition 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).”); *see also* Ex.1005 at 59; Ex.1006, 77.

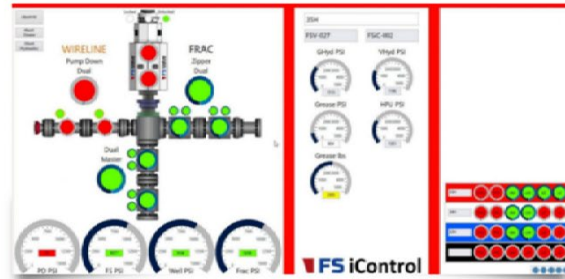
Petitioner cannot meet its initial burden of production by ignoring explicit disclosures in the '952 Patent supporting the “pressure [conditions]” limitations. The Petition thus fails to show “more likely than not” that any claim lacks written description support for the “pressure [conditions]” limitations.

**3. Ground 4: “Dashboard” (Claims 16-19, 35-38, 54-78)**

The Petition fails to show it is “more likely than not” that any claim lacks written description support for the “dashboard” limitations. As an initial matter, Petitioner analyzes the wrong version of the provisional application. Exhibit 1006 is *not* the version of the appendix filed with the Office as part of the '663 provisional application. The figures contained within Exhibit 1006 are significantly degraded compared to the as-filed version, which may be downloaded from <https://patentcenter.uspto.gov/applications/63189663/supplementalContent?application=> and accessed under “Supplemental Content.” The as-filed version, included as Ex.2008, includes the following high-resolution figure illustrating the “operational dashboard”:

## Simul-Frac Made Easy

Downing's Freedom Series Completion System integrates your surface systems into a single operational dashboard. The control system algorithms know the state of your surface equipment and the process sequence – so you can focus on what really matters, frac'ing rock.



Ex.2008, 21.

Because Petitioner failed to produce and analyze the as-filed version of the provisional application, Petitioner has not met its initial burden of production.

Moreover, Petitioner is again contradictory in its assertions regarding the lack of support for the “dashboard” claims. Petitioner alleges that that the ’952 family is “*completely silent*” as to the ‘dashboard’ limitations.” Petition, 17. Yet, *immediately prior to this statement*, Petitioner recognizes that the ’952 Patent’s provisional application, the ’663 Provisional, discloses a “dashboard.” Petition, 16-17; *see also id.* at 57-58. The ’952 Patent expressly claims the benefit of the ’663 Provisional and its “entire disclosure[]” is “incorporated herein by reference.” Ex.1001, 1:7-14. Petitioner does not explain why this dashboard disclosure in the ’663 Provisional does not provide written description support for the “dashboard” limitations. Petition 16-17, 57-58. Without more, the burden does not shift to the Patent Owner. *See Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363

(Fed. Cir. 2016) (“the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable”).

Accordingly, the Petition fails to show that it is “more likely than not” any Challenged Claims lack written description support in Grounds 2-4.

**C. Ground 5: Petitioner fails to show that it is more likely than not that certain dependent claims are unpatentable under § 112(d).**

The Petition alleges that “[d]ependent claims 4-5, 23-24, 42-43, 60-61, 67-68, and 74-75 are invalid because they fail to specify further limitations of their respective independent claims.” Petition, 58. This challenge is meritless for a very simple reason: each of the identified dependent claims recites a limitation that does not appear in its respective independent claim. The dependent claims thus “specify a further limitation of the subject matter claimed” in the independent claims, as required by 35 U.S.C. § 112(d).

Claims 4, 23, 42, 60, 67, and 74 recite “*determining that the at least a portion of fluid communicated via the manifold has satisfied the one or more conditions.*” The independent claims, however, do not include this limitation. At most, the independent claims recite “*in response to at least a portion of fluid communicated via the manifold satisfying one or more conditions*” and do not expressly require “*determining*” that the fluid has “*satisfied the one or more*

*conditions.*” Because the independent claims do not require the “*determining*” step, this explicitly recited limitation in the dependent claims satisfies § 112(d).

Likewise, claims 5, 24, 43, 61, 68, and 75 recite “*wherein the one or more conditions include...flow rate...*,” but the independent claims do not **require** this limitation. On the contrary, the independent claims recite that the “*one or more conditions include a flow rate, and/or a pressure.*” Because the independent claims do not require flow rate and the dependent claims do, the dependent claims properly “specify a further limitation” under § 112(d).

Accordingly, Petitioner fails to show that it is “more likely than not” dependent claims 4-5, 23-24, 42-43, 60-61, 67-68, and 74-75 are unpatentable under § 112(d).

**D. Grounds 6-7: The Petition fails to address the “*in response to*” limitation with particularity**

Every independent claim requires opening a second valve “*in response to at least a portion of fluid communicated via the manifold satisfying one or more conditions.*” Claims 1, 20, 39, 58, 65, 72. The Petition fails to address this limitation “with particularity” and thus cannot establish that it is more likely than not that Christie discloses or renders obvious the Challenged Claims. *See Harmonic*, 815 F.3d at 1363 (citing 35 U.S.C. § 312(a)(3)); *see also Dynamic Drinkware*, 800 F.3d at 1378 (explaining that burden of persuasion never shifts to

Patent Owner). For at least the “*in response to*” element, the Petition lacks the required “detailed explanation of the significance of the evidence.” 37 C.F.R. § 42.22(a)(2).

The Petition’s sole explanation of how Christie allegedly discloses the “*in response to*” element is found in a claim chart that addresses element [1.3.2] of claim 1. Petition, 81-83. The Petition refers back to the mapping of claim 1 for the remainder of the independent claims. Petition, 85. As shown below, Petitioner’s mapping of element [1.3.2] lacks the required particularity because it consists of conclusory statements followed by string citations. *See Novartis AG v. Torrent Pharms.*, 853 F.3d 1316, 1326 n.2 (Fed. Cir. 2017) (finding that conclusory sentences and string cites are “far from sufficient to raise a meaningful challenge”).

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>[1.3.2]</b>-"wherein the second valve is opened in response to at least a portion of fluid</p>                                                                                                                | <p><i>Christie's</i> second valve is opened in response to fluid satisfying one or more conditions, as claimed.</p> <p><i>Christie's</i> fracturing operations include moving to a next well's fracturing stage using an overlapping valve sequence (opening the second well's valve(s) before closing the first well's valve(s)) in response to monitored flowrate/pressure</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p>Conclusory statement</p>                                                                                                                                     |
| <p>communicated via the manifold satisfying one or more conditions, which one or more conditions include a flow rate, and/or a pressure, of the at least a portion of fluid communicated via the manifold; and"</p> | <p>conditions of the pumped fluid. [0029], [0094], [0100], [0108], [0126], [0161]-[0162].</p> <p><i>Christie's</i> controller 410 determines when stimulation/fracturing on one wellbore is ending and if the next wellbore is ready for fracturing "based at least in part on feedback from sensors relating to any and all of the operational parameters," including downhole "pressures" and "flow rates" and "pressures"/"flow rates" exiting the pump units (<i>i.e.</i>, fluid being communicated to the wells via the fracturing/zipper manifold). [0087], [0094], [0099], [0107]-[0108].</p> <p><i>Christie's</i> controller executes commands to control parameters of the wellsite system "based at least in part on feedback from sensors," (<i>i.e.</i>, "in response to...one or more conditions") including "automatically coordinat[ing] a well swap process, such as by automatically opening and closing flow control wellhead valves 444" (<i>e.g.</i> 174). [0009], [0067], [0094], [0100]-[0101].</p> <p>For example, if sensor feedback indicates "the next wellbore...is ready for stimulation operations, the controller...may operate (<i>i.e.</i>, open) the corresponding fluid access valve...to inject the treatment fluid (<i>e.g.</i>, fracturing fluid) into the next wellbore." [0099]. <i>Christie's</i> controller also includes a program "to determine whether a particular operational parameter is within an acceptable operating range." [0110]. Using sensors and monitoring operational parameters (<i>i.e.</i>, "conditions"), <i>Christie's</i> controller may "implement optimal...wellsite equipment coordination...with the goal of performing continuous pumping downhole." [0098].</p> <p>In Figure 9, when the first well's fracturing stage is ending, <i>e.g.</i>, via measured fluid pressure/flowrate indicative of a fracturing stage's end, the next well's valves are opened to initiate the next well's fracturing stage, and afterwards, the first well's valves are closed to end the first well's fracturing stage. [0087]-[0108], [0161]-[0162], Figures 4 and 9.</p> | <p>String cite</p> <p>Conclusory statement</p> <p>String cite</p> <p>Conclusory statement</p> <p>String cite</p> <p>Conclusory statement</p> <p>String cite</p> |

Petition, 81-82.

Critically, Petitioner’s conclusory statements are not linked in any meaningful way to their associated string cites. The reader is left to guess as to the “significance of the evidence” contained in the numerous cites. And for the conclusory statements containing snippets of quoted text, the reader has no way of discerning which snippets are associated with which citation and whether their contexts are compatible. Petitioner appears to have pulled every passage that may be vaguely connected with some aspect of the claim limitations and aggregated them into long lists. “At best, this is an invitation for the Board to sift through the cited material to discern support for Petitioner’s conclusory statements.” *Shenzhen Jimuyida Tech. Co., Ltd. v. Artec Europe S.A.R.L.*, IPR2023-01148, Paper 6 at 29 (Jan. 16, 2024).

With respect to the one quote in the mapping above that actually refers opening a “valve” (citing to paragraph [0099]), Petitioner incorrectly states that the valve is opened based on “sensor feedback.” Petition, 82. Paragraph [0099] does **not** state that a valve is opened in response to sensor feedback, but rather that the controller “will know the **well service status** of the next wellbore” and “[i]f the next wellbore 102 is ready for stimulation operations,” the controller may operate the valve. Ex.1004, [0099]. This disclosure of opening valves based on a wellbore’s “service status” (rather than fluid conditions) is consist with other portions of Christie variously cited by Petitioner in the mapping. For example,

paragraph [0100] explains that the controller “orchestrat[es] opening and closing of the wellhead fluid control valves 444 (e.g., fluid flow control valves 206) ***based at least in part on the stimulation crew progress or readiness.***” Ex.1004, [0100].

Christie again teaches opening and closing valves based on something other than fluid conditions.

Petitioner attempts to buttress its inadequate mapping of element [1.3.2] with a catchall obviousness statement at the end:

| Claim | Christie                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | Further, a POSITA would have understood that fluid conditions, such as those measured/monitored by <i>Christie</i> , correspond with different events in a fracturing stage, including the end of a fracturing stage, where flowrate and/or pressure may drop. Ex. 1002, ¶¶ 205-221. Accordingly, it would have been obvious, based on <i>Christie</i> and a POSITA’s general knowledge, to open the second valve in response to operational parameters ( <i>i.e.</i> , “conditions”), including flow/rate and pressure of fluid pumped via the manifold to swap hydraulic fracturing from the first to second well. <i>Id.</i> |

Petition, 83. This cursory assertion of obviousness is deficient on its face because it lacks the required “reasoned explanation”—*i.e.*, the ***why***. *In re Nuvasive, Inc.*, 842 F.3d 1376, 1382-83 (Fed. Cir. 2016) (for obviousness, “‘conclusory statements’ alone are insufficient”). To the extent Petitioner argues that the missing reasoned explanation is contained in the ***seventeen paragraphs*** cited from Dr. Durham’s declaration (Ex.1002, ¶¶205-221), such usage of a declaration violates the Board’s

rule against incorporation by reference.<sup>3</sup> 37 C.F.R. § 42.6(a)(3). Citing “large portions of another document, without sufficient explanation of those portions, amounts to incorporation by reference.” *Cisco Systems, Inc. v. C-Cation Tech., LLC*, IPR2014-00454, Paper 12 at 8 (August 29, 2014) (informative). Petitioner’s “self-help increase in the length” of the Petition is especially egregious here as the Board already granted Petitioner an additional 4,320 words. *Id.* at 10; Paper 13, 6.

Accordingly, for at least the reasons above, Petitioner fails to establish that it is “more likely than not” the Christie grounds render the Challenged Claims unpatentable.

**E. Ground 7: Under § 325(d), Pitcher and Al-Salmani are cumulative to prior art the Board previously considered and rejected**

Petitioner relies upon Pitcher and Al-Salmani “[i]f any dispute exists that *Christie* discloses moving to a next well’s fracturing stage (by opening an associated valve) ‘in response to’ ‘conditions.’” Petition, 99. Pitcher and Al-Salmani, however, are “substantially the same” as prior art the Board already rejected in related IPRs for this same limitation, and Petitioner fails to demonstrate

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<sup>3</sup> In general, Dr. Durham’s declaration is a massive 484-page, 1,063-paragraph document that Petitioner uses to present the substantive legal arguments missing from the Petition.

“that the Office erred in a manner material to the patentability of the challenged claims.” *Advanced Bionics, LLC v. Med-El Electromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8 (Feb. 3, 2020) (precedential) (“*Advanced Bionics*”).

The ’952 Patent’s grandparent, the ’779 Patent, was challenged by Petitioner in IPR2024-00256 and IPR2024-00583. *See* Ex.2009 (-00256 petition); Ex.2010 (-00583 petition). The ’779 Patent, like the ’952 Patent, includes a substantially similar “*in response to*” limitation associated with “swapping” between two wells. Ex.1005 (’779 Patent), claim 15 (“*swapping...in response to determining that the flow rate measured at step (a) has satisfied one or more flow rate conditions...*”); Ex.1001, claim 1 (“*executing a continuous pumping (‘CP’) swap...wherein the second valve is opened in response to at least a portion of fluid communicated via the manifold satisfying one or more conditions...*”); *see also* Ex.1003, 349 (’952 file history) (double patenting rejection over ’779 Patent).

In the two previous IPRs, Petitioner alleged that Jackson (US 2007/0023184), in combination with a primary reference, rendered obvious the “*in response to*” limitation of claim 15. Ex.2010, 87; Ex.2009, 75. Specifically, Petitioner relied upon Jackson for teaching the concept of “determin[ing] next steps in response to flowrate conditions.” Ex.2010, 87; Ex.2009, 75. In response, Patent Owner pointed out that Jackson relates to “adjusting the flow rate into a *single* well” and thus fails to disclose using fluid conditions “to determine how to

swap from pumping into one well to pumping into a different well.” Ex.2011 (-00256 POPR), 57 (emphasis in original); Ex.2012, (-00583 POPR), 43. The Board agreed and denied institution in both proceedings:

Jackson teaches adjusting fluid flow into a single well to meet certain pressure thresholds, but neither Petitioner nor Mr. Durham explains how this teaching is relevant to determining when to switch fracturing one well to another.

Ex.2013 (-00256 ID), 21; Ex.2014, (-00583 ID), 36.

Despite this, Petitioner again challenges the “*in response to*” limitations of the ’952 Patent with art substantially similar to Jackson. Both Pitcher and Al-Salmani teach operations associated with a *single* well in response to conditions in *that* well. For example, although Pitcher describes multiple wells, it teaches only “control[ling] the fracturing fluid entering *each* of the wells connected to the manifold (block 96) based on fluid parameters monitored for *each* well.” Ex.1021, [0030]. Pitcher is clear that even when “simultaneously” fracturing two wells, the volume of fluid entering each well is “independently control[led].” Ex.1021, Abstract. Similarly, Al-Salmani references multiple wells but teaches evaluating conditions to “identify[] different operational stages of *the wellhead*.” Ex.1020, [0007], [0030] (“the output from the position sensor may be indicative *of what*

*stage of operation the wellbore is in*”), [0024] (“an indication of low pressure or no pressure *within a portion of the well* may illustrate a well that is blocked in”).

Petitioner relies upon the substantially similar disclosure of Pitcher and Al-Salmani in the same way it relied upon Jackson in the previous petitions—by alleging that a POSITA would find it obvious, based on their disclosures, to “trigger a subsequent fracturing stage.” Petition, 100-101; Ex.2010 (-00583 petition), 87 (“determine next steps in response to flowrate conditions”); Ex.2009 (-00256 petition), 75. Petitioner’s use of Pitcher and Al-Salmani is thus “cumulative.” *See Motorola Mobility LLC v. Maxell, LTD*, IPR2022-01287, Paper 11 at 18-19 (Feb. 2, 2023) (“Petitioner is therefore relying on [the second reference] to teach the same thing as [the first reference], making Petitioner’s use of [the second reference] for this purpose cumulative to [the first reference].”).

Because Petitioner’s use of Pitcher and Al-Salmani is cumulative to its previous use of Jackson, Petitioner was required to explain why the Board materially erred in the previous IPRs, but it did not. *Advanced Bionics*, 8. The Petition contains no explanation of why the Board was wrong in finding that a teaching of adjusting fluid flow into a single well is not relevant to determining when to switch fracturing one well to another. Petition, 143-144 (addressing only the Examiner’s treatment of Pitcher during *prosecution*).

Accordingly, under §325(d), the Board should reject Petitioner’s attempt to relitigate an issue previously decided in the related IPRs. Ground 7 thus fails.

**F. Grounds 8-10: Krupa is not prior art for multiple reasons**

The Petition relies upon U.S. Patent Publication No. 2022/0268141 to Krupa (Ex.1022) as the primary reference in Grounds 8-10 (the “Krupa Grounds”).

Krupa, however, is not prior art because it was filed on February 18, 2022—*after* the ’952 Patent’s priority date of May 17, 2021—and Petitioner does make the required showing *in the petition* 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 are 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.

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

Petitioner alleges that “*Krupa* would be § 102(a)(2) prior art” 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 ’952 Patent’s provisional priority date of May 17, 2021. *See* Petition, 66 & n.12. Petitioner’s *only* support for Krupa’s status as §102(a)(2) art is a single statement that Krupa’s provisional “is identical and entirely supports *Krupa*.” Petition, 66 (citing Ex.1022-1024). This

blanket assertion is insufficient to establish Krupa as prior art without a corresponding showing *in the Petition* that the subject matter relied upon in Krupa is supported by the Krupa Provisional. This is a defect fatal to the Krupa Grounds, and one that cannot be corrected.

Because Krupa’s filing date of February 18, 2022 is after the priority date for the Challenged Claims of the ’770 Patent (May 17, 2021), Petitioner had the initial burden “in its petition” to qualify Krupa as prior art. 35 U.S.C. § 102(d)(2); *Apple Inc. v. Telefonaktiebolaget LM Ericsson*, 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). To meet that initial burden, Petitioner was required to show in the Petition that the Krupa Provisional “describes the subject matter” relied upon in Krupa. 35 U.S.C. § 102(d)(2); *see also 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)); *Forescout Techs., Inc. v. Fortinet, Inc.*, 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]”).

To fulfill this burden, the Board has suggested Petitioners provide “parallel citations” to corresponding disclosures in the provisional application—even “in cases where a provisional application is shown to have *identical or nearly identical disclosure*.” *Google LLC v. Ikorongo Tech. LLC*, IPR2021-00127, Paper 14 at 16 (May 10, 2021) (“Although parallel citations may be sufficient in cases where a provisional application is shown to have identical or nearly identical disclosure to the portions of an application or patent relied upon, in this case, Petitioner has not shown any such identity”); *see also Unified Patents, Inc. v. Longhorn HD LLC*, IPR2020-00879, Paper 10 at 15-16 (Nov. 12, 2020) (“adequate showing” to support priority where Petitioner “provides parallel citations”).

Here, the Petition does not, for example, map the relevant portions of Krupa to portions of the Krupa Provisional in the Petition, or provide “parallel citations” to the provisional as the petitioner did in *Unified*. *Unified*, Paper 10 at 15-16; *see generally* Petition, 109-140. In fact, other than the bare assertion that the Krupa Provisional “is identical and entirely supports *Krupa*,” the Petition does not cite to or discuss the contents of the Krupa Provisional *at all*. *See generally* Petition. Petitioner’s attempted use of an exhibit to satisfy a requirement of the petition further violates the rule against incorporation by reference. *See* 37 C.F.R. §

42.6(a)(3); *see also* § 42.104(b)(5) (“The Board may exclude or give no weight to the evidence where a party has *failed to ... identify specific portions of the evidence* that support the challenge.”).

Because Petitioner does not make the required showing in the Petition that the subject matter relied upon in Krupa is supported by the Krupa Provisional, Petitioner fails to establish Krupa as prior art. Petitioner therefore cannot show that the Challenged Claims are “more likely than not” unpatentable over the Krupa Grounds.

**2. 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 it is more likely than not that the Challenged Claims are unpatentable based on the Krupa Grounds.

As explained above, because the '952 Patent's priority date is May 17, 2021, Krupa is, at best, only prior art under §102(a)(2). Section 102(b)(2) 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. MPEP § 717.01(b)(1) (citing *In re Kao*, 639 F.3d 1057, 1066 (Fed. Cir. 2011) (subject matter does not change as a function of how one chooses to describe it)). Petitioner fails to acknowledge that there is no “verbatim” requirement, incorrectly arguing that “[i]f there are *any* differences, even insubstantial changes or only trivial or obvious variations, the exceptions do not apply.” Petition, 70-71 (citing MPEP § 717.01(b)(2)) (emphasis in original). The portion of the MPEP cited by Petitioner instead states that the “character and weight” of the disclosure should be evaluated to determine if it is the same subject matter. MPEP § 717.01(b)(2). As explained below, Patent Owner’s expert evaluated the character and weight of the disclosure on Patent Owner’s website and determined that it is the same subject matter as portions of Krupa relied upon by Petitioner. *See* Ex.2006, ¶¶14-17.

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)(II) (“[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)(II). 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. Again, Petitioner misinterprets the MPEP, incorrectly arguing that Krupa and Downing’s Webpage are not the “same” because Krupa discloses additional material over and above the webpage. Petition, 71 (“...§ 102(b)(2)(B) does not apply because *Krupa* and *Downing’s Webpage*’s subject matters are not the same. *Downing’s Webpage* does not disclose, for example, *Krupa*’s manifold connection to multiple wells, opening valves in response to operational conditions (including flowrate), and other features discussed below.”) (emphasis in original). The portions of Krupa that are the same as Downing’s Webpage are disqualified as prior art regardless of whether Krupa contains additional disclosures. MPEP § 717.01(b)(2)(II).

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

The claims of the '952 Patent are directed to executing a CP swap and continuously pumping during this swap. The claims recite limitations directed to the valve sequence required for a CP swap: communicating fluid to a first well via an open first valve, opening a second valve associated with a second well while fluid is communicated to the first well, and closing the first valve while fluid is communicated to the second well, where fluid is continuously communicated from the one or more pumps ("CP swap sequence"). *See, e.g.*, limitations 1.3.1, 1.3.3, 1.3.4, and 1.4. On October 12, 2020, Downing published a webpage describing continuous pumping using this CP swap sequence 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.2015; Ex.2005, ¶5.<sup>4</sup> Downing thus publicly disclosed the CP swap sequence and continuously pumping during this swap on October 12, 2020, and no later than October 20, 2020.

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

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<sup>4</sup> The Internet Archive Wayback Machine archived copy is captured in Ex.2015 and accessible at <https://web.archive.org/web/20201020115107/https://downingusa.com/freedomseries/continuouspumping>.

(February 25, 2021) and over one year before Krupa was filed (February 18, 2022). Accordingly, Downing publicly disclosed the CP swap sequence before either the Krupa Provisional or Krupa had been filed.

**ii. The information on the continuous pumping webpage was obtained directly from a joint inventor of the '952 Patent.**

Timothy Marvel, Vice President of Business Development and Technology at SEF Energy,<sup>5</sup> drafted and published the continuous pumping webpage on Downing's public-facing website. Ex.2005, ¶¶4, 6. Mr. Marvel learned about continuous pumping directly from Austin Johnson, a joint inventor of the '952 Patent. *Id.*, ¶¶6-10.

In September 2020, Mr. Marvel learned about Downing's team successfully performing continuous pumping via Downing'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;

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<sup>5</sup> Patent Owner is a subsidiary of SEF Energy. Ex.2005, ¶4.

Ex.2015; Ex.2002. Using the information obtained from 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.2015; Ex.2002. Accordingly, Patent Owner—through Mr. Marvel—publicly disclosed information regarding continuous pumping that was obtained directly from a joint inventor of the '952 Patent.

**iii. The continuous pumping webpage discloses the same CP swap sequence relied upon in Krupa.**

The limitations related to the CP swap sequence include the following:

- [1.3.1]/[20.3.1]/[39.5.1]/[58.4.1]/[65.4.1]/[72.6.1]/[72.6.3]: opening a second valve and communicating fluid to a second well while communicating fluid to a first well

- [1.3.3]-[1.3.4]/[20.3.3]-[20.3.4]/[39.5.3]-[39.5.4]/[58.4.3]/[65.4.3]/[72.6.4]: subsequently closing the first valve of the well while fluid is communicated to the second well via the second valve
- [1.4]/[20.4]/[39.5]/[58.6]/[65.6]/[72.6]: continuously communicate fluid from the pump during the CP swap

The Petition relies on Krupa for these limitations. *See* Petition, 114-118. Patent Owner's continuous pumping webpage, however, discloses the same subject matter relied upon in Krupa related to the CP swap sequence.

The Petition groups [1.3.1]/[20.3.1]/[39.5.1]/[58.4.1]/[65.4.1]/[72.6.1]/[72.6.3] together. Petition, 114-115. Limitation [1.3.1] recites “*opening a second valve while fluid is communicated from the one or more pumps to the first well...wherein opening the second valve causes fluid to be communicated from the one or more pumps to the second well.*” Ex.1001, claim 1. Limitations [20.3.1]/[39.5.1]/[58.4.1]/[65.4.1]/[72.6.1]/[72.6.3] recite substantially similar limitations. The Petition asserts that:

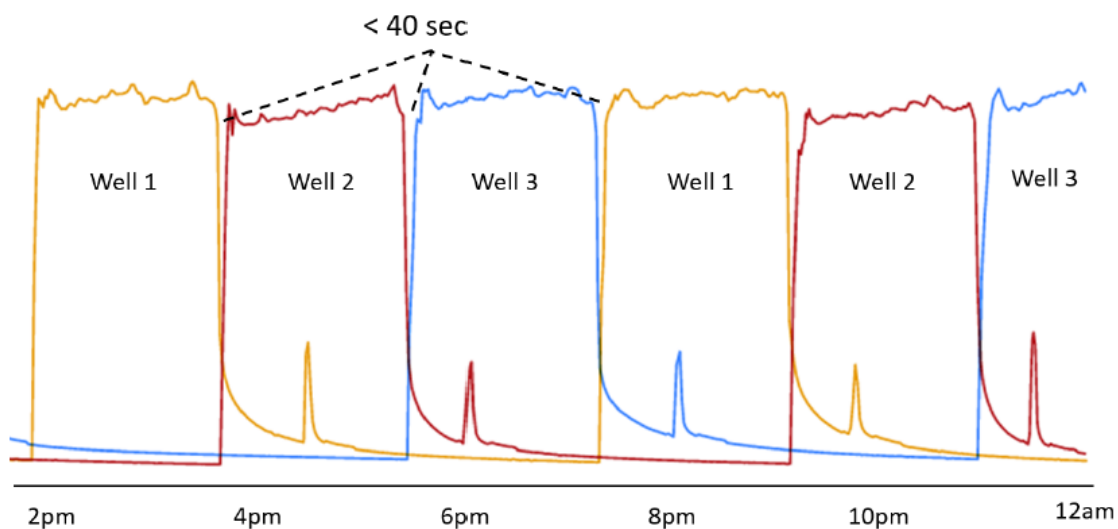
In Figure 2B, fluid is pumped into a second well “while continuously pumping the fluids into the first well by opening a second set of valves” fluidically positioned between the second well and the manifold (via manifold connections 210a-b), where the manifold is fluidically connected to and receives pressurized fluid from pumps. [0005], [0019]. As shown, the second valves

are opened while the first valves remain open during the pumping of fluid through the shared manifold such that the fluid is communicated from the pumps through both first/second sets of open valves to their respective first/second wellheads[.]

Petition, 114-115 (citing Ex.1022, [0042]-[0043], [0058], 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.2015, 1 (emphasis added); Ex.2006, ¶16. 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.2015, 2; Ex.2006, ¶16. Patent Owner's continuous pumping webpage thus discloses opening a valve associated with a second well as cited in Krupa.

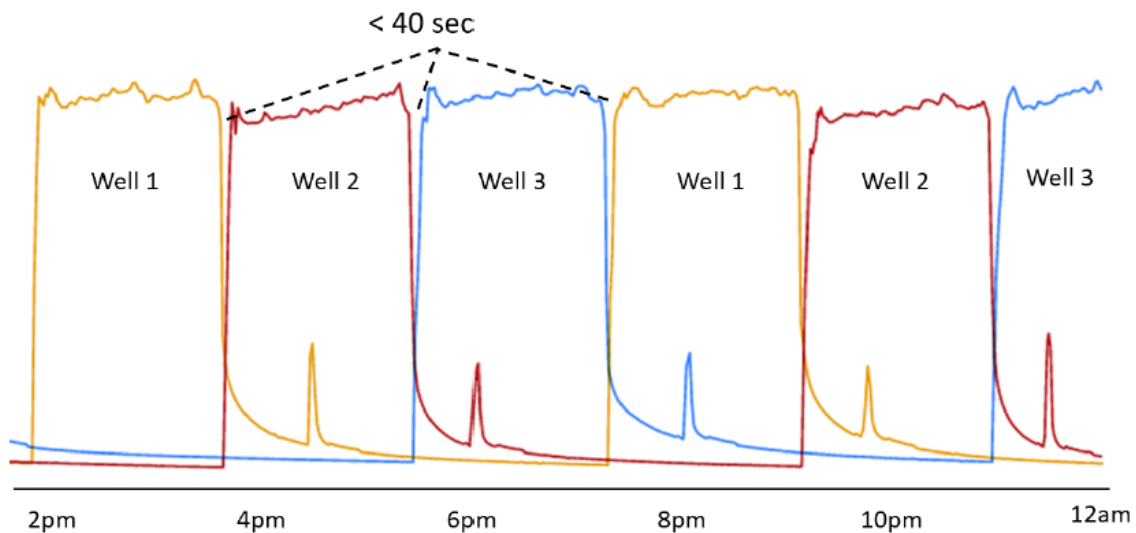
The Petition also groups limitations [1.3.3-1.3.4]/[20.3.3-20.3.4]/[39.5.3-39.5.4]/[58.4.3]/[65.4.3]/[72.6.4] together. Limitations [1.3.3-1.3.4] recites *"closing the first valve: after the at least a portion of fluid communicated via the manifold has satisfied the one or more conditions, which one or more conditions include the flow rate, and/or the pressure, of the at least a portion of fluid communicated via the manifold, and while fluid is communicated from the one or more pumps to the second well via the second valve and the manifold."* Ex.1001, claim 1. Limitations [20.3.3-20.3.4]/[ 39.5.3-39.5.4] recite substantially similar limitations as limitations [1.3.3-1.3.4]. Limitation [58.4.3] recites *"closing the first valve: after the at least a portion of fluid communicated via the manifold has satisfied the one or more conditions."* Limitations [65.4.3]/[72.6.4] recite substantially similar limitations as limitation [58.4.3]. The Petition contends that:

With the second valves opened and fluid pumped therethrough, hydraulic fracturing operations are conducted on the second well.

"Once injection is established and pressure has stabilized in both the first...and...second wellhead[s]..., the first set of valves...may be closed remotely to shut in the first wellhead" while fluid is pumped into the second well via the open second

valves and manifold to conduct fracturing operations on the second well [.]

Petition, 116-117 (citing Ex.1022, [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.2015 at 1 (emphasis added); Ex.2006, ¶16. 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.2015 at 2; Ex.2006, ¶16. 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.

The Petition groups [1.4]/[20.4]/[39.5]/[58.6]/[65.6]/[72.6] together.

Limitation [1.4] recites “*wherein, during the CP swap, fluid is continuously communicated from the one or more pumps via the manifold.*” Ex.1001, claim 1.

Limitations [20.4]/[39.5]/[58.6]/[65.6]/[72.6] recite substantially similar limitations. The Petition asserts that:

Figures 2A-2G show a CP swap, as claimed, between first/second wells, where the second well’s valve(s) are opened before closing the first well’s valve(s), to “connect[] the initial and terminal ‘cleaning’ portions of the frac operations of a first well and a second well, respectively,” all while continuously communicating pumped fluid (continuous pumping from the pumps) via the manifold. [0005]-[0007], [0046], [0058], claim 1.

Krupa’s CP operations may “eliminate the time required to transition between wells,” “allow operations to not have to shut down and/or idle pumps while bleeding pressure,” and “reduce[] maintenance on pumps due to less frequent start up and shut down of the pumps.” [0058].

Petition 117-118 (citing Ex.1022, [0005]-[0007], [0046], [0058], claim 1). Patent Owner’s continuous pumping webpage discloses this 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*. The *transition is instantaneous* and the total time between stages measured at treatment pressure is as fast as 40 seconds.” Ex.2015, 1 (emphasis added); Ex.2006, ¶16. The webpage also discloses that the key features and benefits includes “[c]ontinuously pump stage to stage.” Ex.2015, 2 (emphasis added); Ex.2006, ¶16. Further, the webpage states: “The Freedom Series Completion System with FS iControl *enables instant transitions between stages, allowing your pumps to run continuously, dramatically increasing completion rates and reducing cost per well.*” Ex.2015, 1 (emphasis added); Ex.2006, ¶16.

Accordingly, Patent Owner’s continuous pumping webpage discloses the same subject matter the Petition relies on in Krupa for the claimed CP swap sequence.

**iv. Without Krupa’s continuous pumping disclosure, Petitioner fails to carry its burden.**

Each independent claim mapped in the Krupa Grounds recites limitations related to the CP swap sequence disclosed on Patent Owner’s continuous pumping webpage. Because (i) Patent Owner publicly disclosed such CP swap sequence—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, such subject matter in Krupa is disqualified as prior art under § 102(b)(2)(B).

Petitioner argues that Krupa’s disclosures are not the “same” as Patent Owner’s continuous pumping webpage because Krupa discloses “specific CP operations that involve valve sequencing between sets of valves positioned between a shared manifold connection and multiple wells.” Petition, 110 (emphasis removed). But as explained above, the § 102(b)(2)(B) exception permits *partial disqualification of a reference*. See *supra* § V.F.2; MPEP § 717.01(b)(2) (explaining that prior public disclosure of elements A, B, and C disqualifies elements A, B, and C from a later reference, but element D remains available as prior art). At their core, Krupa and Patent Owner disclose this same sequence of opening a valve to a second well to communicate fluid to a second well while communicating fluid to a first well and subsequently closing the valve to the first well, all while pumping. Because these disclosures are the same, these disclosures in Krupa are not prior art. It is of no significance that Krupa discloses *additional* details. While those additional details remain available as prior art, Krupa’s continuous pumping swap sequence does not.

Without Krupa’s disclosure of the CP swap sequence, the Petition fails to address all the claim limitations of the independent claims and Petitioner cannot

establish that the Challenged Claims are more likely than not unpatentable on the Krupa Grounds.

**G. Ground 10: FS-Video does not disclose or enable a POSITA to make the claimed CP swap sequence**

Petitioner relies upon FS-Video (Ex.1027) in the event the portions of Krupa mapped to the CP swap sequence are disqualified as prior art. Petition, 127-135.

As discussed above, because those portions of Krupa are in fact disqualified, Petitioner's Krupa combination hinges upon FS-Video disclosing the claimed CP swap sequence: opening a valve to a second well to communicate fluid to a second well while communicating fluid to a first well and subsequently closing the valve to the first well, all while pumping. FS-Video, however, (i) does not illustrate the claimed CP swap sequence, and (ii) is an unrealistic marketing video that does not enable a skilled artisan to perform the claimed sequence.

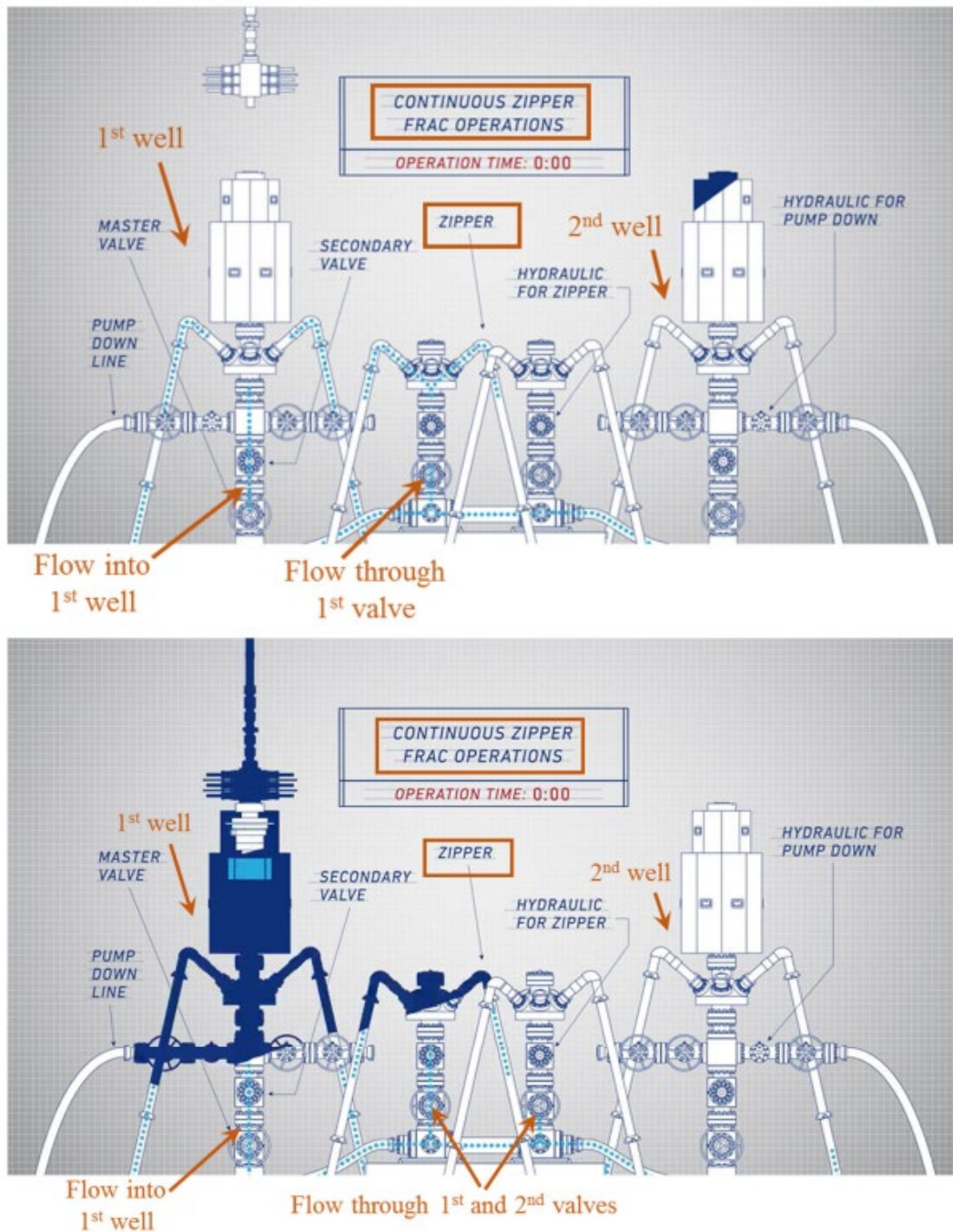
FS-Video is a video produced by Downing to advertise the capabilities of the "FS Valve" and "FS Latch" within the Freedom Series completion system. Ex.1027, 0:23; Ex.2005, ¶14. Importantly, this video *predates* Downing's invention of the continuous pumping swap claimed by the '952 Patent by more than a year. Downing posted FS-Video in 2019 but did not perform the CP swap with the Freedom Series until September 2020 or advertise it until October 2020. Ex.2005, ¶¶8, 11, 14. As such, FS-Video does not illustrate—nor could it

illustrate—the Freedom Series performing continuous pumping when transitioning between fracturing wells. Ex.2005, ¶14. Rather, FS-Video touts “continuous zipper frac *operations*,” which refers to the ability to simultaneously perform various operations on wells attached to a zipper manifold. Ex.2005, ¶15. For example, FS-Video illustrates that with FS Valve and FS Latch, “while fracking on one well you can simultaneously attach the lubricator” to the other well “allowing you to complete swap and equalization operations in under five minutes.” Ex.1027, 0:54-1:17. This is direct contrast to the later-introduced CP swap feature that can “transition the zipper valves from one well to the other” in “as fast as *40 seconds*” “all while pumping,” as noted in the Downing’s original Continuous Pumping webpage subsequently posted in October of 2020. Ex.2015, 1; Ex.2005, ¶15.

Tim Marvel, who helped develop and publish FS-Video, explains in his declaration that FS-Video was designed to showcase only the FS Valve and FS Latch’s “automated [] pressure equalization process” in the context of zipper operations. Ex.1027, 0:46-49; Ex.2005, ¶16. Because this equalization process lasted approximately 3-5 minutes, Downing took liberties with the video’s depiction of the fracturing operations in order to condense the process into a smaller timeframe. Ex.2005, ¶16. For marketing purposes, the three minutes of “operation time” depicted from 1:09-1:18, was sped up to span only 10 seconds. Ex.1027, 1:09-1:18; Ex.2005, ¶16. The various operations within those 10 seconds

of video time do not accurately depict—and are not meant to accurately depict—the actual fracturing steps and their respective timing. Ex.2005, ¶16.

For example, as relevant to Petitioner’s mapping, when the well on the left (“1<sup>st</sup> well”) is transitioned from being stimulated at 1:07 to being pressurized for wireline operations at 1:08, the transition is graphically depicted with a solid blue color covering the well over the course of two seconds:



Petition, 130, 133 (reproducing and annotating Ex.1027, 1:07, 1:08)

This aesthetically appealing but unrealistic transition underscores that the video's

primary purpose is to engage the viewer rather than provide accurate or detailed technical information. Ex.2005, ¶¶17-18.

Petitioner's entire mapping, however, is predicated upon the alleged operations depicted during the two seconds of this *intentionally* unrealistic transition. Specifically, for its mapping to work, Petitioner needs the "2<sup>nd</sup>" valve to open prior to the "1<sup>st</sup>" valve closing—but during this split-second transition, FS-Video does not depict *when* the second valve is actually opened or whether it is opened before or after the first valve is closed. Ex.1027, 1:07-1:09; Ex.2005, ¶18. Nor is FS-Video meant to depict individual valve operation. Ex.2005, ¶18. The Freedom Series in 2019 did not remotely control the valves Petitioner has labeled as "1<sup>st</sup>" and "2<sup>nd</sup>" valves. Ex.2005, ¶18. As Mr. Marvel explains, an operator would *manually* open and close the valves, which is not instantaneous as depicted in FS-Video for the sake of brevity. Ex.2005, ¶18. Petitioner thus fails to establish that FS-Video discloses the specific valve sequence recited in the claims.

Further, for limitation [1.4], which requires that "*fluid is continuously communicated from the one or more pumps,*" Petitioner alleges that "FS-Video shows the fluid/(blue dots) continuously communicated" and "a POSITA would have understood/considered obvious that the fluid was communicated via the manifold from pump(s)." Petition, 134. Petitioner has no basis for this argument because FS-Video does not illustrate pumps or their operational status. The

continuous presence the fluid (blue dots) in the manifold merely indicates a continuous *pressure*, which may exist after pumps have shut down. Ex.2005, ¶18. Indeed, Mr. Marvel explains that is exactly what is depicted in FS-Video: when the Freedom Series performed the FS Valve and FS Latch transition operation in 2019, an operator would (i) shut down the pumps, (ii) close the 1<sup>st</sup> valve to the 1<sup>st</sup> well, (iii) open the 2<sup>nd</sup> valve to the 2<sup>nd</sup> well, and then (iv) start the pumps back up, but pressure would remain in the manifold through the transition. Ex.2005, ¶18.

Accordingly, for at least the above reasons, FS-Video does not illustrate the claimed CP swap sequence, nor is it meant to. Ex.2005, ¶¶14-18.

Ground 10 additionally fails because it relies upon an intentionally unrealistic promotional video to establish unpatentability. By its very nature as non-technical marketing material, FS-Video does not enable a skilled artisan to “make and use” *any* stimulation sequence, much less the claimed CP swap sequence. *See In re Kumar*, 418 F.3d 1361, 1368 (Fed. Cir. 2005) (“Although published subject matter is ‘prior art’ for all that it discloses, in order to render an invention unpatentable for obviousness, the prior art must enable a person of ordinary skill to make and use the invention.”). A POSITA would not (and could not) rely on a marketing video that (i) condenses three minutes of operation time to ten seconds and (ii) intentionally omits depictions of valve operations and their respective timings. For example, FS-Video provides no indication of when the

alleged second valve being is opened and whether it is opened before or after the alleged first valve during the two seconds pointed to by Petitioner.<sup>6</sup> FS-Video is not enabling prior art.

Accordingly, Petitioner fails to establish it is more likely than not that Ground 10 renders the Challenged Claims unpatentable.

## VI. CONCLUSION

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

Respectfully submitted,

Dated: March 5, 2025  
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<sup>6</sup> Indeed, as noted above, even Downing *itself* could not “make or use” the CP swap when FS-Video was published—it had not yet been invented. Ex.2005, ¶¶8, 14.

**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 14,043. 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 5, 2025

*Manner of service* Electronic Service: [tammy.terry@nelsonmullins.com](mailto:tammy.terry@nelsonmullins.com);  
[lisa.margonis@nelsonmullins.com](mailto:lisa.margonis@nelsonmullins.com)

*Documents served* **Patent Owner Preliminary Response; Exhibit List and  
Exhibits Ex.2002 – Ex.2015**

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