

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTELLIGENT WELLHEAD SYSTEMS, INC.,
Petitioner,

v.

DOWNING WELLHEAD EQUIPMENT, LLC,
Patent Owner.

IPR2024-00584
U.S. Patent 11,560,770

PATENT OWNER PRELIMINARY RESPONSE

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	THE PETITION SHOULD BE DISCRETIONARILY DENIED UNDER <i>GENERAL PLASTIC</i> AND AS AN UNNECESSARY PARALLEL PETITION.....	2
A.	Factor 1: The same petitioner previously filed a petition directed to the same claims of the '770 patent.....	4
B.	Factor 2: At the time of the filing of the First Petition, Petitioner knew of the prior art asserted in the Second Petition.....	4
C.	Factor 3: Whether at the time of filing of the Second Petition the petitioner already received Patent Owner's Preliminary Response to the First Petition or received the Board's decision on whether to institute review of the First Petition.	5
D.	Factor 4: The Length of Time that Elapsed Between the Time the Petitioner Learned of the Prior Art Asserted in the Second Petition and the Filing of the Second Petition	8
E.	Factor 5: Whether the Petitioner Provides Adequate Explanation for the Time Elapsed Between the Filings of Multiple Petitions Directed to the Same Claims of the Same Patent.....	9
F.	Factor 6: The Finite Resources of the Board	13
G.	Factor 7: The Requirement to Issue a Final Determination Not Later Than One Year After the Date on Which the Director Notices Institution of Review.....	14
H.	Summary	14
III.	THE '770 PATENT	15
A.	Technological background	15
B.	Summary of the '770 Patent.....	18

IV. CLAIM CONSTRUCTION 21

V. THE PETITION FAILS TO SHOW A REASONABLE LIKELIHOOD
OF SUCCESS ON THE MERITS 21

 A. Ground 1: Ciezobka does not anticipate the Challenged Claims..... 22

 1. Ciezobka does not teach opening a second valve in
 response to determining that a fluid communicated via a
 manifold has satisfied one or more conditions 26

 2. Ciezobka does not teach closing the first valve after
 opening the second valve in response to determining
 that a fluid communicated via a manifold has satisfied
 one or more conditions..... 30

 B. Ground 2: Ciezobka does not render the Challenged Claims
 obvious. 32

 C. Ground 3: Ciezobka and McNeel do not render claims 2-3, 14-38
 obvious. 33

III. CONCLUSION.....34

Patent Owner's Exhibit List

Exhibit	Description
Ex.2001	IWS Initial Invalidity Contentions
Ex.2002	Downing Continuous Pumping Web Page (DOWNING003692)
Ex.2003	IPR2024-00300 Patent Owner Preliminary Response
Ex.2004	Wayback Machine - Downing Continuous Pumping Web Page
Ex.2005	Email Correspondence Regarding Parties Meet and Confer
Ex.2006	Declaration of John Hughett
Ex.2007	CV of John Hughett

I. INTRODUCTION

This is Petitioner IWS's second petition challenging the '770 Patent. IWS filed a first petition against the '770 Patent in IPR2024-00300 ("First Petition"), waited three months for the dispute between the parties to mature, and then filed the present petition ("Second Petition") against the same claims of the '770 Patent. By its own admission, IWS filed the Second Petition directly in response to learning about a deficiency of the primary prior art reference, Krupa, in the First Petition. This is precisely the type of serial attack that *General Plastic* was intended to address. *General Plastic Indus. Co. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 at 17 (Sept. 6, 2017) (precedential) ("Multiple, staggered petitions challenging the same patent and same claims raise the potential for abuse.") ("*General Plastic*").

Even ignoring the fairness concerns raised by IWS's staggered petitions, the Second Petition is simply not needed—IWS already had a chance to challenge the '770 Patent on non-Krupa grounds in the First Petition. This Second Petition merely asserts *more* non-Krupa grounds without a compelling reason.

While there is no reason to reach the substance of these additional backup grounds, a cursory review reveals that they fail to meet the standard for institution. The references in the Second Petition are again directed to aspects of hydraulic

fracturing unrelated to Downing’s continuous pumping invention, and thus lack disclosure of every element of the challenged claims.

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

II. THE PETITION SHOULD BE DISCRETIONARILY DENIED UNDER *GENERAL PLASTIC* AND AS AN UNNECESSARY PARALLEL PETITION

Although IWS refers to its two petitions challenging the ’770 patent as “parallel” petitions, they are anything but. The circumstances of the filings, including the timing and the content, illustrate that the Second Petition is the type of “serial” petition that should be denied under *General Plastic*.

IWS filed its Second Petition on March 1, 2024, *almost three months* after filing its First Petition on December 15, 2023. Despite the Second Petition being filed prior to Patent Owner’s Preliminary Response in the first proceeding, this delay allowed IWS to morph its positions in view of Patent Owner’s Response to IWS’s Initial Invalidity Contentions. That Response explained why Krupa is not prior art based upon Patent Owner’s earlier public disclosures. *See* Ex.1038, 9. IWS advantageously used this information to prepare a second petition with references not susceptible to Krupa’s deficiency. This road mapping strategy “imposes inequities” on Patent Owner and is not permitted under *General Plastic*. *General Plastic* at 11 (“[t]he filing of sequential attacks against the same claims,

with the opportunity to morph positions along the way, imposes inequities on [Patent Owner]”) (quoting original Institution Decision).

Moreover, IWS’s Reasons for Parallel Petitions (Paper 3, “Reasons”) fails to justify the Second Petition because it fails to acknowledge that the First Petition already guarded against the possibility that Krupa was not prior art. The First Petition included backup grounds based upon references with much earlier filing dates. IWS provides no reason why it needs **additional** backup grounds of the same type in the Second Petition. IWS similarly does not explain how the new non-Krupa grounds in the Second Petition are materially different from the instituted non-Krupa grounds in the First Petition, noting only the two petitions present “different grounds.” Reasons, 4. This is plainly not one of the “rare” situations in which a second petition is necessary. PTAB Consolidated Trial Practice Guide (“CTPG”), 59.

IWS’s Second Petition creates an unfair additional burden on Patent Owner and should be denied under *General Plastic* and as an unnecessary second petition. *See, e.g., Apple Inc. v. Koss Corp.*, IPR2021-00679, Paper 14 at 9-17 (Oct. 12, 2021) (denying a petitioner’s second petition filed four months after its first petition but before the preliminary response under *General Plastic* and as an unnecessary parallel petition). Patent Owner addresses IWS’s Reasons for Parallel Petitions in the context of the *General Plastic* factors below.

A. Factor 1: The same petitioner previously filed a petition directed to the same claims of the '770 Patent.

IWS's First and Second Petitions both challenge claims 1-38 of the '770 patent. This factor therefore heavily favors denial.

B. Factor 2: At the time of the filing of the First Petition, Petitioner knew of the prior art asserted in the Second Petition.

IWS admits in its Reasons for Parallel Petitions that it knew of the prior art asserted in the Second Petition at the time of the filing of the First Petition: "Petition 2's Grounds could not be presented in Petition 1 due to the IPR petition word limit." Reasons, 4. Consistent with this, each of the prior art references asserted in the Second Petition are listed in IWS's Initial Invalidity Contentions served on November 22, 2023—prior to the filing of the First Petition on December 15, 2023. *See* Ex.2001, 17-19 (listing Ciezobka¹ and McNeel).

In other words, at the time of the First Petition, IWS had a choice of many different references to form backup grounds in the event Krupa was found not to be prior art. It simply elected to assert references other than Ciezobka and McNeel.

¹ IWS's Invalidity Contentions list the substantively identical grandparent of the Ciezobka PCT application asserted in the Second Petition.

The policies of fairness and efficiency urge against institution of a follow-on petition based on second tier prior art excluded from the First Petition².

Accordingly, this factor also heavily favors denial.

C. Factor 3: Whether at the time of filing of the Second Petition the petitioner already received Patent Owner’s Preliminary Response to the First Petition or received the Board’s decision on whether to institute review of the First Petition.

Although IWS filed the Second Petition eight days before Patent Owner filed its Preliminary Response, this factor nevertheless favors denial. When IWS filed the Second Petition, it had already learned of Krupa’s deficiencies and morphed its positions to exclude Krupa—thus engaging in the sort of road mapping prohibited by *General Plastic*. General Plastic, 17.

On January 19, 2024, more than a month prior to the Second Petition, Patent Owner served its Response to IWS’s Initial Invalidity Contentions. *See* Ex.1038. Patent Owner’s Invalidity Response explained that the Krupa reference asserted in

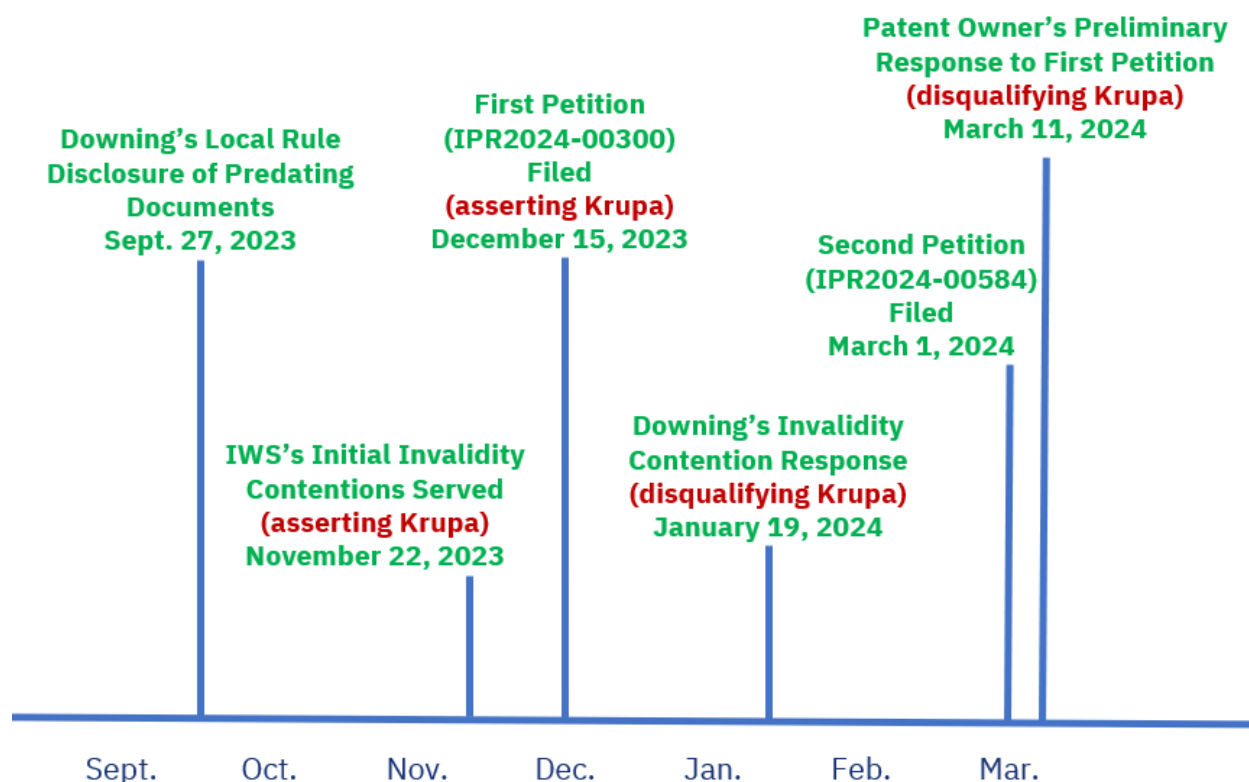
² Alternatively, it is possible IWS deemed Ciezobka and McNeel *more* relevant than the non-Krupa prior art included the First Petition—but holding back better prior art for future petitions also contradicts the policies of fairness and efficiency. *See Conopco, Inc. v. Proctor & Gamble Co.*, IPR2014-00628, Paper 21 at 11 (Oct. 20, 2014).

IWS's Initial Invalidity Contentions—and the First Petition—is not prior art under 35 U.S.C. § 102(b)(2)(B). *Id.* at 9. Specifically, Patent Owner demonstrated with previously produced documents that the subject matter claimed in the '770 Patent was publicly disclosed prior to Krupa's earliest filing date, and thus the portions of Krupa corresponding to that disclosed subject matter are excluded as prior art. *Id.* One of these previously produced documents supporting § 102(b)(2)(B) was a copy of Downing's Continuous Pumping webpage archived by the Wayback Machine on October 20, 2020. *See* Ex.2002 (bates labeled DOWNING003692 from Sept. 27, 2023, production³).

Because IWS also asserted Krupa in the First Petition, Patent Owner again made this § 102(b)(2)(B) argument in its Preliminary Response to the First Petition. *See* Ex.2003, 9-19. The Preliminary Response similarly showed that Krupa was not prior art because the claimed subject matter of the '770 Patent had been publicly disclosed on Downing's Continuous Pumping on October 20, 2020,

³ Notably, the archived copy of Downing's Continuous Pumping webpage was served on IWS two months prior to IWS's ***First Petition***. That is, IWS had in its possession a document illustrating that Krupa is not prior art before filing the First Petition but nevertheless elected to include Krupa as a primary ground of invalidity.

as illustrated by the same Wayback Machine archive. *Id.* (citing “Ex.2001,” reproduced here as Ex.2004).



Accordingly, when IWS filed its Second Petition, it already had knowledge of Patent Owner’s public disclosures under § 102(b)(2)(B)—it did not need to wait for the Preliminary Response to gain that knowledge. This is the specific situation addressed by Factor 3, which questions whether a petitioner is “in a position to gain a benefit from having that information before filing its second petition.” *Apple Inc. v. Uniloc 2017 LLC*, IPR2020-00854, Paper 9 at 10 (Oct. 28, 2020) (precedential). Here, IWS was undoubtably in a position to gain a benefit—and in fact *did* gain a benefit from this information. It was able to present new prior art in

the Second Petition that could not be excluded under § 102(b)(2)(B) based on Patent Owner’s public disclosures. IWS admits as much in its Reasons for Parallel Petitions. *See* Reasons, 3-4.

This factor strongly favors denial because IWS’s road mapping strategy is “unfair” and “an inefficient use of the *inter partes* review process.” *See General Plastic* at 17-18 (holding that it is unfair to “allow petitioners the opportunity to strategically stage their prior art and arguments in multiple petitions ... until a ground is found that results in the grant of review”).

D. Factor 4: The Length of Time that Elapsed Between the Time the Petitioner Learned of the Prior Art Asserted in the Second Petition and the Filing of the Second Petition

As noted in association with Factor 2, IWS knew of every prior reference asserted in the Second Petition prior to the First Petition—as they were listed in IWS’s Initial Invalidity Contentions served on November 22, 2023. *See* Ex.2001, 17-19. IWS could have raised the new challenges in a second petition at the time of the First Petition—it simply elected not to. *See General Plastic* at 18 (factor 4 “allows us to assess and weigh whether a petitioner should have or could have raised the new challenges earlier”).

Accordingly, this factor strongly favors denial.

E. Factor 5: Whether the Petitioner Provides Adequate Explanation for the Time Elapsed Between the Filings of Multiple Petitions Directed to the Same Claims of the Same Patent

In its Reasons for Parallel Petitions, IWS attempts to justify why it waited three months to file its Second Petition, despite knowing of the prior art in the Second Petition at the time of First Petition. None of its justifications, however, are adequate to overcome the important policy concerns noted in *General Plastic* and in the Trial Practice Guide. *See* CTPG, 59 (“Two or more petitions filed against the same patent ... may place a substantial and unnecessary burden on the Board and the patent owner and could raise fairness, timing, and efficiency concerns.”).

Most importantly, IWS fails to explain why it needs to challenge the ’770 Patent with additional grounds of the type already present in the First Petition—that is, non-Krupa grounds. IWS argues “Patent Owner revealed new information related to ’770’s priority date and alleged applicability of prior art exceptions” (Reasons, 1)—but this allegedly “new” information applies only to one of the three primary references the First Petition (*i.e.*, Krupa). The First Petition already included four other grounds based two earlier primary references (Carr and Tolman) filed prior to any possible priority date of the ’770 Patent and not subject to the prior art exceptions of 35 U.S.C. § 102(b)(2)(A) and (B). IWS purposely included these backup grounds in the event Krupa was excluded as prior art, as IWS itself explained in the First Petition. *See* Ex.1043, 13 n. 5 (“If ’770 is afforded

an earlier priority date, *Carr*, *Beuterbaugh*, *Tolman*, and *Jackson* are still § 102(a)(1) prior art.”).

Now that Krupa has been shown not to be prior art, Petitioner is asking for even *more* backup grounds based on earlier references of the type already included in the First Petition. Such a request is inherently unreasonable—especially considering IWS has not provided any reason for why it deserves a second bite at the apple with respect to non-Krupa grounds. For example, IWS utterly fails to provide an “explanation of the differences between the petitions,” as required by the Trial Practice Guide. CTPG, 60. Its analysis of this requirement is limited to: “Here, the petitions are materially different. While both address all Challenged Claims, IPR2024-00300 and IPR2024-00584 present different grounds (see Section II table, *infra*).” Reasons, 4. The Section II table simply reproduces the listing of grounds in each petition and does not, for example, provide any material differences between the non-Krupa grounds in the First Petition and the grounds in the Second Petition. *Id.* at 5. This oversight alone requires denial of the Second Petition.

Moreover, if not clear from IWS’s Reasons for Parallel Petition, there is no priority dispute. Patent Owner agrees with IWS that the earliest effective filing date of the ’770 Patent is May 17, 2021. To the extent IWS argues that Patent Owner somehow surprised it with the ’770 Patent’s earliest effective filing date

after the First Petition, any such surprise is not reasonable and not a justification for the Second Petition. *See General Plastic*, 21 (holding a petitioner’s alleged surprise must be “reasonable” from “an objective perspective in the context of the applicable law and facts”). Specifically, on November 29, 2023—**before** IWS filed the First Petition—the parties agreed that by December 15, 2023, Patent Owner would “provide its contentions regarding inventorship and priority” of the ’770 Patent. *See* Ex.2005, 2 (email memorialization of meet and confer). On December 15, IWS filed the First Petition despite knowing that effective filing date information would be served **later that same day**. And Patent Owner in fact did provide such filing date information later that day, which showed the parties agreed on the ’770 Patent’s earliest effective filing date. *See* Ex.1039 (Downing’s Supp. Objections and Responses to Defendants’ Interrogatories), 8 (“’770 Patent Claims ... are entitled to an earliest effective filing date of May 17, 2021”).

IWS’s Reasons for Parallel Petitions alleges the First Petition “necessarily” included a detailed priority discussion because Patent Owner “refused” to provide such information. Reasons, 2. Patent Owner did not refuse—it **agreed** to provide the effective filing date information—and so agreed before the First Petition. Likewise, the First Petition’s priority discussion was only “necessar[y]” because IWS chose not to wait a matter of hours for the service it agreed to. Moreover, the First Petition was filed with five months left before the one-year statutory bar. The

purpose of giving defendants a full year to seek IPR is to “afford defendants a reasonable opportunity to identify and understand the patent claims that are relevant to the litigation.” 157 Cong. Rec. S5429 (daily ed. Sept. 8, 2011). IWS did the opposite—it hurried to file the First Petition *without* knowing the relevant issues. Willful blindness is not a reasonable basis for a second petition.

Similarly, with respect to IWS’s complaint about Krupa’s disqualification as prior art under § 102(b)(2)(B) after the First Petition, IWS was already in possession of the evidence that formed the basis of the disqualification. Patent Owner had served the archived copy of Downing’s Continuous Pumping webpage on IWS over two months prior to IWS’s First Petition. *See* Ex.2002 (bates labeled DOWNING003692 from Sept. 27, 2023, production). Either IWS ignored that disqualifying evidence or elected to nevertheless proceed with the Krupa grounds. In either case, a second petition is not warranted because IWS already guarded against the possibility that Krupa was not prior art in the First Petition by including other grounds. *See Louisiana-Pacific Co. v. Huber Engineered Wood LLC*, IPR2020-00609, Paper 12 at 9 (Aug. 20, 2020) (holding that a second petition is not justified “simply because Patent Owner disputes the prior art status of [some but not all] references relied on in the Original Petition”).

For these reasons, this factor strongly favors denial.

F. Factor 6: The Finite Resources of the Board

The Board's finite resources would not be efficiently expended on IWS's Second Petition, which asserts prior art IWS has not distinguished from the prior art asserted instituted First Petition. Instituting two petitions with substantially similar grounds would "result in a significant waste of the Board's resources" and unfairly prejudice Patent Owner. *See Club Champion LLC v. True Spec Golf LLC*, IPR2019-01569, Paper 9 (March 17, 2020) (denying a second IPR that "would require the Board to conduct an entirely separate proceeding involving numerous issues that likely will already have been considered and resolved in the [first] IPR.").

Moreover, upon inspection of the prior art asserted in the Second Petition, it becomes apparent why Petitioner elected not to assert it in the First Petition. As explained below, Ciezobka teaches opening and closing valves in a predetermined sequence based on *time* to deliver alternating pulses to two wells being fractured simultaneously, whereas the claims require performing a specific valve sequence in response to *fluid* conditions.

Accordingly, this factor weighs strongly in favor of denial.

G. Factor 7: The Requirement to Issue a Final Determination Not Later Than One Year After the Date on Which the Director Notices Institution of Review

In its Reasons for Parallel Petitions, Petitioner requests that the First and Second Petitions be consolidated if instituted. Reasons, 4-5. Consolidation, however, would require delaying the schedule in the already-instituted first proceeding (IPR2024-00300), thus jeopardizing the Board’s ability to issue a final written decision before the one-year deadline. *See, e.g., Google LLC v. Realtime Adaptive Streaming, LLC*, IPR2018-01342, Paper 47 (Feb. 27, 2020) (FWD more than 1 year after institution decision where multiple IPRs were consolidated). More realistically, consolidation would not be possible at all given that Due Date 1 in the first proceeding will likely occur prior to the institution decision in the second proceeding. *See* IPR2024-00300, Scheduling Order at 11 (setting Due Date 1 for Sept. 5, 2024); *see also, e.g., Microchip Tech. Inc. v. HD Silicon Solutions LLC*, IPR2022-00105, Paper 12 at 13 (May 9, 2022) (denying institution of second petition because it was “too late” for consolidation given that Patent Owner has already filed its Patent Owner Response).

Accordingly, this factor strongly favors denial.

H. Summary

The *General Plastic* factors overwhelmingly favor denial of IWS’s Second Petition as all factors 1-7 weigh strongly against institution. Institution of IWS’s

Second Petition in the face of these circumstances would contradict the twin policies of “efficiency” and “fundamental fairness.” *General Plastic*, 18. And, while its true second petitions are occasionally needed “when there is a dispute about priority date requiring arguments under multiple prior art references,” as noted in the Trial Practice Guide, this is not one of those occasions. CTPG, 59. IWS was already able to challenge the ’770 Patent under multiple prior art references in the First Petition. It does not need another petition to do so.

Patent Owner therefore respectfully requests the Board deny institution of IWS’s Second Petition.

III. THE ’770 PATENT

A. Technological background

Hydraulic fracturing is a technique employed in the oil-and-gas industry to enhance the extraction of hydrocarbons from drilled wells. Ex.2006, ¶33.

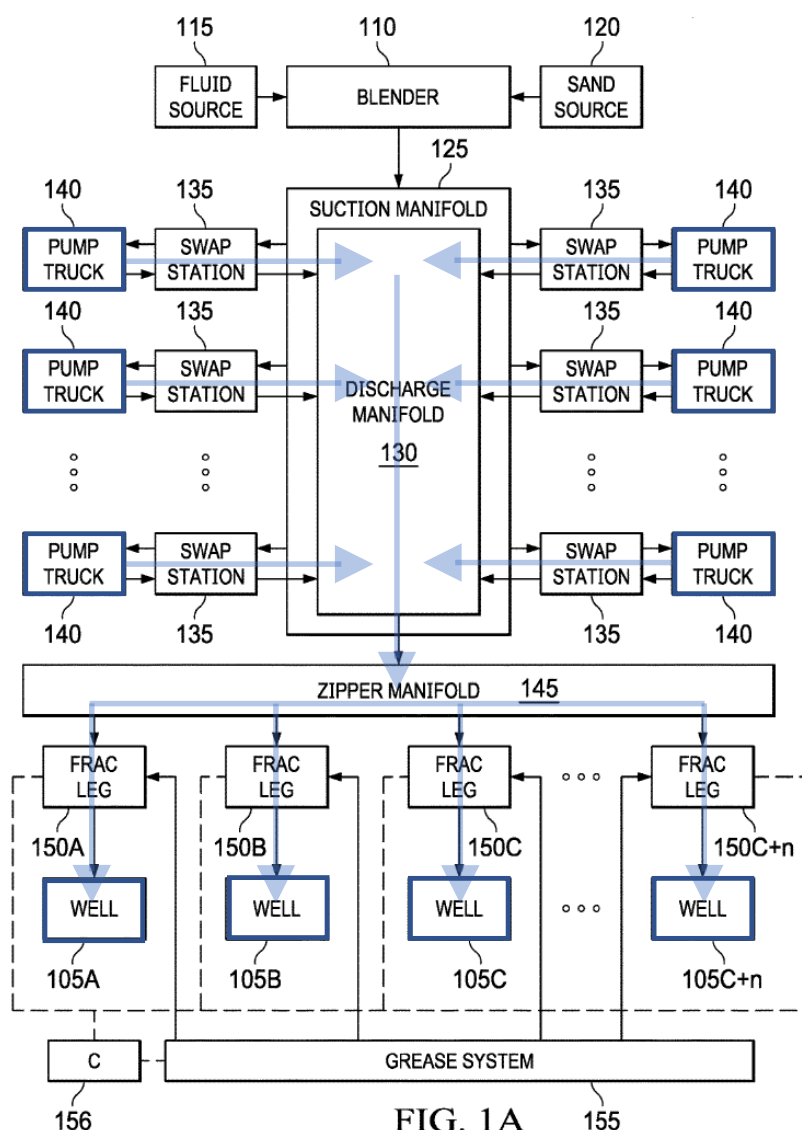
Hydraulic fracturing is used to fracture the geology in the formation by pumping high pressure fluid into the well, allowing oil and gas to flow out of the fractures into the well. *Id.*, ¶¶61-63. In many operations where hydraulic fracturing is employed, numerous wells are spaced closely apart on the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

One relatively recent improvement to the hydraulic fracturing process is known as “zipper fracturing.” *Id.*, ¶¶12, 99-100. Originally, hydraulic fracturing

was accomplished one stage at a time in a single well before moving on to the next well. *Id.*, ¶¶67,106. Zipper fracturing improved this process through use of a hydraulic fracturing manifold or “zipper manifold.” *Id.*, ¶¶12, 94-95. In this method, the pressure pumps are connected to a common manifold that distributes fluid to each of a series of connected wells. *Id.* Each well’s connection to the zipper manifold includes valves that can be closed to isolate the well. *Id.*, ¶94. Thus, pumping into a given well may be accomplished by closing the valves to all but one well, so that fluid is directed to the desired well. *Id.*

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

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



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

The dramatic reduction in non-productive time enabled by zipper fracturing resulted in its widespread adoption in the industry. *See, e.g.*, Ex.1009, 1. But operators accustomed to significant downtime between pumping operations had to adapt to the relatively fast-paced pumping schedule in zipper fracturing operations. *Id.*, 2. One Journal of Petroleum Technology article from 2014 described this

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

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

B. Summary of the ’770 Patent

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

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

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

Ex.1001, 14:43-48.

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

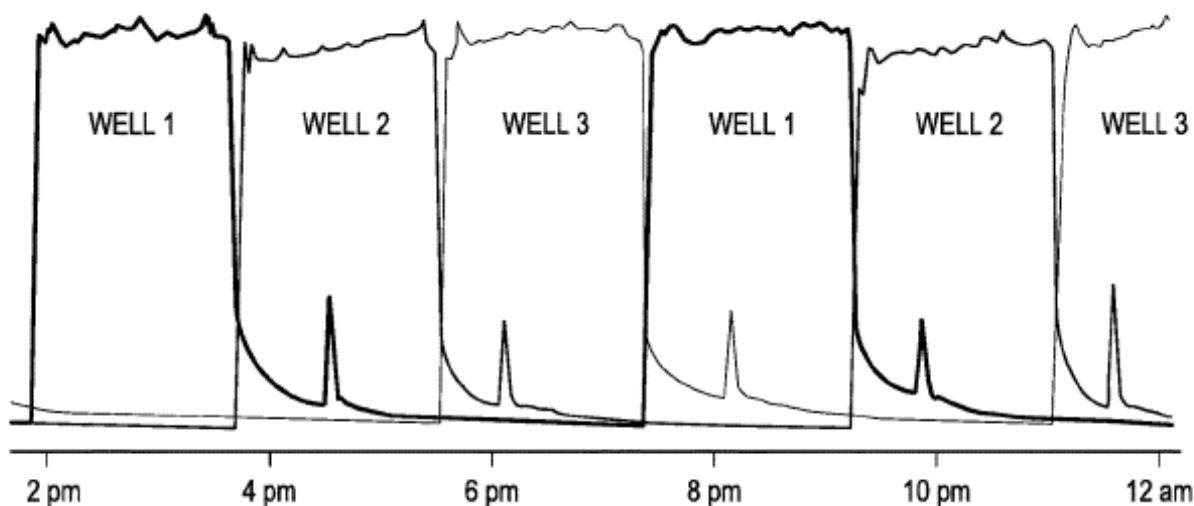


FIG. 16D

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

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

IV. CLAIM CONSTRUCTION

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

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

Petitioner fails to establish a reasonable likelihood of success in showing that Ciezobka, alone or in combination, anticipates or renders obvious any of the Challenged Claims. Ciezobka is not related to and does not describe the continuous pumping method claimed in the '770 Patent. Instead, Ciezobka discloses a different type of system for delivering *timed* pressure impulses pumping into two wells in an alternating fashion. *See* Ex.1036, 11:24-2:16. And because Ciezobka contemplates opening and closing valves based on time, Ciezobka's system necessarily fails to disclose opening and closing valves in response to a determined *fluid condition*, as required by the claims.

Moreover, although Petitioner also asserts that Ciezobka renders all Challenged Claims obvious, the Petition does not even attempt to explain why.

Petitioner's obviousness theory for claim 1 and its dependent claims consists of a single sentence: "To the extent any differences may exist, a POSITA would have considered Claims 1 and 4-13 obvious over Ciezobka." Petition, 31. And for independent claim 14, the Petition's only specific obviousness arguments relate to what Petitioner calls the "generic computer elements" and "generic controller(s)" recited in the claim. *See id.*, 31-35, 43-45. Because Petitioner fails to establish that Ciezobka discloses or renders obvious the claims' requirements of performing the recited valve sequences *in response to* fluid conditions, it cannot meet its burden with respect to any of the asserted grounds.

A. Ground 1: Ciezobka does not anticipate the Challenged Claims.

Each of the Challenged Claims of the '770 Patent requires "*determining that the fluid communicated via [a] manifold has satisfied one or more conditions*" and "*in response to*" that determination, "*opening a second valve*" and "*closing [a] first valve after opening the second valve.*"

For each of the claim elements related to fluid conditions, the Petition relies on Ciezobka's disclosures of controlling the flow of fracturing fluid into each of the wells to create timed pulses during which the flowrate in the well is less than the initial flowrate for a short period of time. Petition, 14-21, 23-25 (citing Ex.1036, 4:2-5; 12:5-15; 15:8-13; Fig. 7). More simply, these disclosures teach controlling valves based on time to create a known, reduced flow rate. *See*

Ex.1036, 12:8-11 (“A pressure pulse 222, 232 is *induced* by closing one of the valves 219, increasing the total flow rate 220 to the 10 first wellhead 202 and decreasing the total flow rate 230 to the second wellhead 204 *for a short period of time*.”).⁴ The claims, however, require something different: determining whether a fluid in an *unknown* state satisfies one or more conditions and opening and closing valves *in response* to that fluid condition determination.

In more detail, Ciezobka’s specification explains that during fracturing, the amount of pressure in the fracturing fluid being pumped into the well tends to naturally decrease as fractures open up, which decreases the fluid’s ability to create new fractures. Ex.1036, 1:25-31. To combat this problem, Ciezobka discloses systems and methods for providing timed “pressure pulses” to cause temporary increases in pressure to create new fractures. *Id.*, 3:32-4:2. In a preferred embodiment, “rather than rapidly increasing and/or decreasing the pump rate of the fracturing pumps” to create the pulses, “a portion of the fracturing fluid, with or without proppant, is diverted away” from one wellhead and toward another wellhead for a predetermined amount of time to create a pulse. *Id.*, 9:28-31.

The embodiment Petitioner cites contemplates having a pair of wellheads (206 and 208), each connected to both a “constant rate flow line (212 and 214),”

⁴ All emphasis is added unless otherwise noted.

and a “diverter line (216)” that is connected to both wellheads, as shown in Figure 6 below:

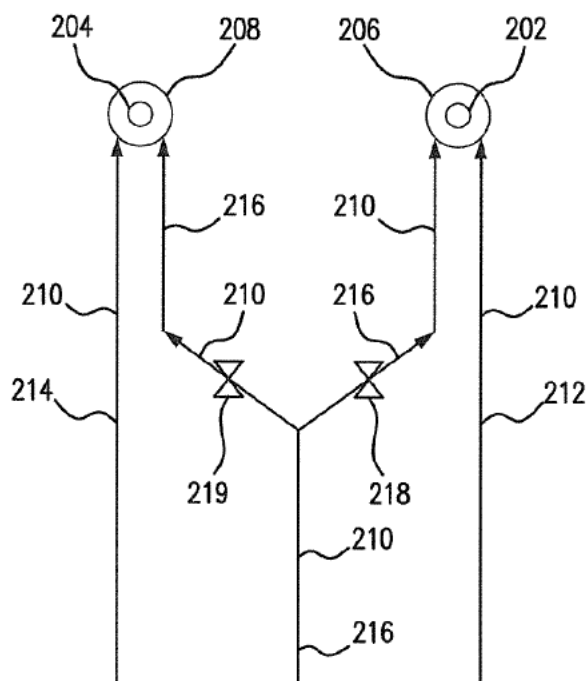


FIG. 6

Id., Fig. 6, 11:24-28. Ciezobka discloses closing diverter valves 218 and 219 in an alternating fashion to deliver alternating pulses to each of the two wells by diverting the fluid flowing through the diverter line 216 to each well one at a time.

Id., 12:2-5. Specifically, Ciezobka explains that in this embodiment, a high-pressure fracturing pump supplies fluid to each of the three lines 212, 214, and 216 at a constant rate, and initially, both diverter valves 218 and 219 are open to allow the fluid flowing in the diverter line 216 to flow to both wellheads. *Id.* 11:32-12:8. Then, “[a] pressure pulse 222, 232 is induced by closing one of the valves 219,

increasing the total flow rate 220 to the first wellhead 202 and decreasing the total flow rate 230 to the second wellhead 204 for a short period of time.” *Id.*, 12:8-11. After that “short period of time,” which “may range from 1 minute to 1 second” and preferably “equals 10 seconds,” the valve 219 is reopened, and the process is repeated by closing valve 218 for another “short period of time.” *Id.*, 12:11-15. Importantly, Ciezobka’s flow rate characteristics—including “magnitude” and “duration”—are “select[ed] and design[ed]” in advance:

... [the] selection and design of variable rate fracturing processing and parameters including, for example, for variable rate fracturing, parameters such as flow rate (e.g., magnitude of change and duration) as well as frequency (for example, such as measured in terms of the period of time between the endings of successive flow rate variations).

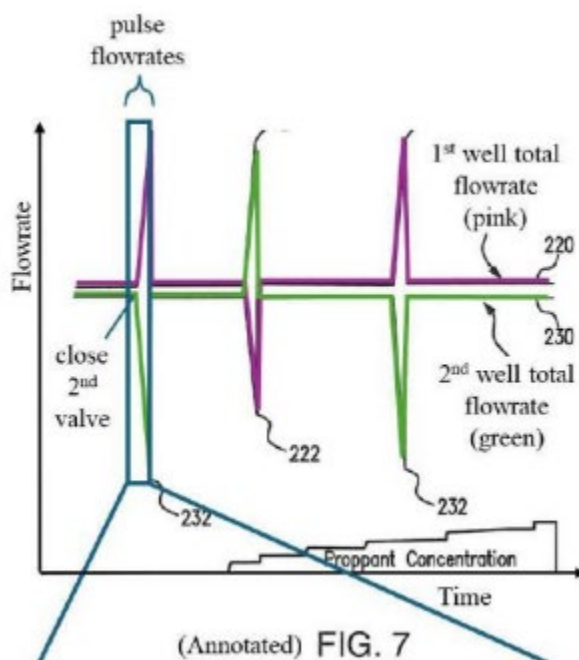
Ex.1036, 15:18-21.

Thus, Ciezobka discloses closing valves in a predetermined sequence based on *time* to create *known* flow rate changes (i.e., time-based pulses). That is the opposite of Challenged Claims, which require determining whether a fluid in an *unknown* state satisfies one or more conditions and opening and closing valves *in response* to that fluid condition determination.

Because Petitioner cannot show that Ciezobka discloses the claimed steps either expressly or inherently, Ground 1 fails.

1. Ciezobka does not teach opening a second valve in response to determining that a fluid communicated via a manifold has satisfied one or more conditions.

The Challenged Claims require performing the recited valve sequence “*in response to determining that a **fluid** communicated via a manifold has satisfied one or more **conditions**.*” Ciezobka does not disclose “*determining that a fluid communicated via a manifold has satisfied one or more conditions,*” opening a second valve “*in response to*” any such determination. Instead, as described above, Ciezobka teaches closing valves based on **time**. Time is not a “*condition*” of a “*fluid*.” Petitioner cites Ciezobka’s Figure 7 and related disclosures for the proposition that “when it’s determined that a certain flowrate range (e.g., a pulse flowrate greater than, less than, and/or within a range of an initial flowrate) has been directed into a well for a period of time, a subsequent valve sequence is performed to redirect flow between the two wells.” Petition, 15. But Petitioner has it backwards—the “certain flowrate range” is not an unknown to be “determined,” as suggested by Petitioner, it is **caused** by the diverter valves being opened or closed according to a “design[ed]” fracking plan. For example, Petitioner annotates Figure 7 as shown below:



Petition, 17. While Figure 7 illustrates the flow rate vs. time as the diverter valves are closed and opened, it does not teach or suggest that the flow rate of the fluid (i.e., a condition of the fluid) is the thing that **causes** the valves to close and open, as required by the claims. Just the opposite—closing and opening the valves causes the magnitude of the flow rate to change. Ciezobka is explicit that the thing that causes the diverter valves to be closed and opened is “time”:

Initially, both valves 218 are open allowing the third percentage of the flow rate to be provided to both of the wellheads 202, 204. A pressure pulse 222, 232 is induced by closing one of the valves 219, increasing the total flow rate 220 to the first wellhead 202 and decreasing the total flow rate 230 to the second wellhead 204 for a short period of time. For example, the short period of time may range from 1 minute to 1 second. Preferably, the short

period of time equals 10 seconds. Alternatively, any period of time may be used. The process is then repeated by closing the valve 218, increasing the total flow rate 230 to the second wellhead 204 and decreasing the total flow rate 220 to the first wellhead 202 for a short period of time.

Ex.1036, 12:5-15. This is consistent with the overall purpose of Ciezobka—timed pressure pulses. *Id.* at 3:34-4:2 (“the method of this invention includes introducing a pressure pulse into the wellbore for a pulse period of time causing a temporary increase of pressure leading to opening new fractures”).

Accordingly, nothing in Ciezobka’s description of its timed pulsing method indicates that fluid conditions are evaluated to determine when to close and open the valves. Instead, flow-rate changes that create pressure pulses are the desired results of closing and opening valves in Ciezobka, not a condition being evaluated to determine when to close and open them. Ex.2006, ¶ 132-34; *see also* Ex.1036, 9:30-31 (“a portion of the fracturing fluid, with or without proppant, is diverted away from the wellhead, changing the flow rate, in order to provide a pressure pulse to the wellbore 10.”).

Petitioner also cites Ciezobka’s general statement that the system initiates these timed pressure pulses “[a]s the system moves towards an equilibrium pressure.” *See* Petition, 14 (citing Ex.1036, 3:32-4:3). But to the extent “mov[ing] towards an equilibrium pressure” is characterized as a condition of the fluid,

Ciezobka does not (and cannot) disclose *opening* a diverter valve in response to such a determination—both of Ciezobka’s diverter valves are *already open*. As described above and shown in Petitioner’s annotated Fig. 7 below, diverter valves 218 and 219 are initially open at the outset of Ciezobka’s method. Ex.1036, 12:5-15 (“*Initially, both valves 218 are open* allowing the third percentage of the flow rate to be provided to both of the wellheads 202, 204. A pressure pulse 222, 232 is *induced by closing one of the valves 219 ...*”)

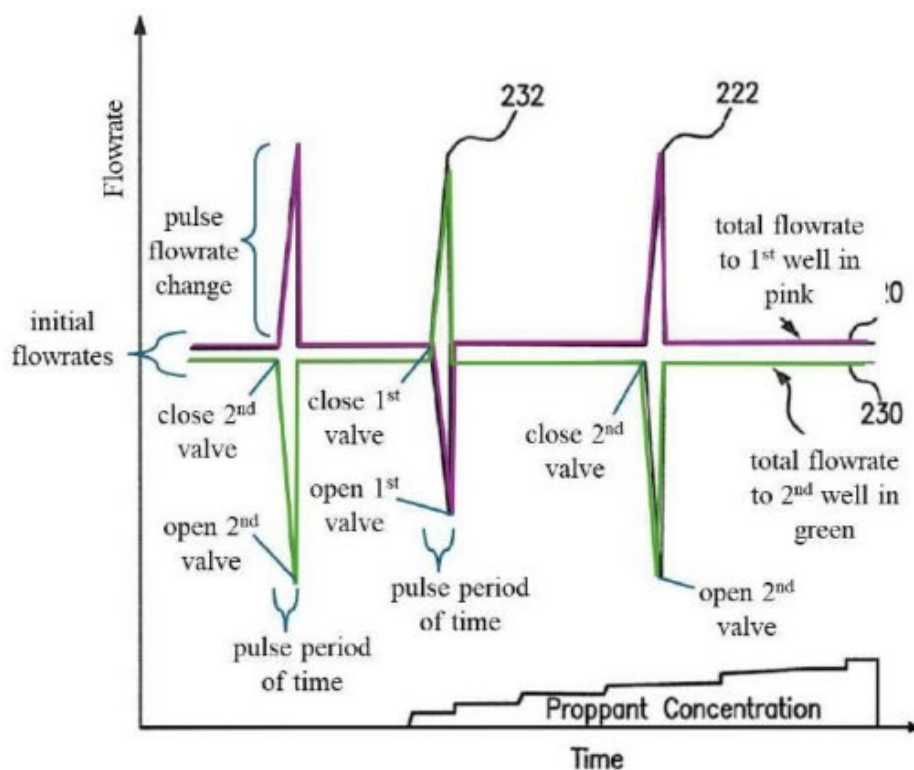


FIG. 7
 (Annotated)

Petition, 12 (annotating Ex.1036, Fig. 7).

And as illustrated by the “corresponding flowrate schedule” of Fig. 7, when it is time to initiate a pulse after the “initial flowrates,” the second valve is *closed* and remains closed until the predetermined time period has elapsed. *See id.* at 11-12; *see also* Ex.1036, 12:7-11 (“A pressure pulse 222, 232 is induced by closing one of the valves 219 . . . for a short period of time.”). Thus, the only time a valve is ever opened in Ciezobka’s method is at the end of each “pressure pulse,” which Ciezobka teaches are “rapid, large flow rate variations.” Ex.1036, 12:23-27. In other words, a valve can never be opened in response to the equilibrium condition in the method taught by Ciezobka, as alleged by IWS, because the only time a valve is ever opened is during a period of rapidly changing fluid conditions created by the pressure pulses. Ex.2006, ¶ 135.

Because Petitioner fails to establish that Ciezobka discloses opening a second valve in response to anything other than a predetermined timing scheme, it cannot show that Ciezobka anticipates the Challenged Claims.

2. Ciezobka does not teach closing the first valve after opening the second valve in response to determining that a fluid communicated via a manifold has satisfied one or more conditions.

Similarly, Ciezobka lacks any disclosure of “*closing a first valve after opening a second valve*” in response to determining that any fluid condition is met. Petitioner points to Ciezobka’s disclosure of, after completing a rapid pulse to a

first well, closing a diverter valve to the first well to create a rapid pulse to increase the flow rate to a second well. Petition, 19 (citing Ex.1036, 12:13-15). But once again, Petitioner fails to point to any disclosure of performing this particular valve sequence in response to any determined fluid condition. *See id.*

The portions of Ciezboka Petitioner cites state only that at some point after the pulse to the first well is complete, “[t]he process is then repeated” by closing the diverter valve to the first well. *See id.* Nothing Petitioner cites indicates that any determined fluid condition triggers closing the second valve. *See id.*

And, the Petition fails to disclose that any fluid condition triggers the full claimed sequence of opening the second valve and then closing a first valve after opening a second valve. The claims require “*in response to determining that the fluid communicated via the manifold has satisfied one or more conditions: opening a second valve; communicating fluid to a second well via the second valve; and closing the first valve after opening the second valve.*” Thus, the full sequence must be “*in response to*” a determination that fluid has satisfied one or more conditions.

Petitioner asserts that second valve is opened “when it’s determined that a certain flowrate range (e.g., a pulse flowrate greater than, less than, and/or within a range of an initial flowrate) has been directed into a well for a period of time.” Petition, 15. As already explained, Ciezobka does not disclose actually measuring

the flow rate to the first well over that time period and closing the second valve in response to that measurement. But even if it did, Petitioner does not explain how the completion of the first pulse *also* triggers the subsequent closing of the first valve to create a pulse to the second well. Indeed, as Petitioner's own annotations of Figure 7 show, the first valve is closed after a second, different period of time. Thus, Petitioner fails to point to any disclosure in Ciezobka of any determined fluid condition triggering the entire recited valve sequence, as the claims require.

B. Ground 2: Ciezobka does not render the Challenged Claims obvious.

Petitioner makes no attempt to show that Ciezobka renders obvious any of the missing limitations discussed above. Its sole argument with respect to how Ciezobka renders obvious Challenged Claims 1 and 4-13 consists of the following unsupported statement:

1. Claims 1 and 4-13

Ciezobka discloses all limitations of Claims 1 and 4-13, as discussed in Section IX.A. To the extent any differences may exist, a POSITA would have considered Claims 1 and 4-13 obvious over *Ciezobka*. Accordingly, *Ciezobka* also renders obvious Claims 1 and 4-13.

Petition, 31. This conclusory statement, made without citation, falls far short of meeting Petitioner's burden of showing with particularity why Ciezobka renders

Claim 1 or any of its dependent claims obvious. *See Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3)).

Petitioner also fails to show that Ciezobka renders any of the remaining Challenged Claims obvious because the remaining independent claims of '770 Patent—claims 14 and 27—similarly require performing the same valve sequence recited in claim 1 “*in response to determining that the fluid communicated via the manifold has satisfied one or more conditions.*” Petitioner does not argue that Ciezobka renders those claim elements obvious and instead focuses its obviousness arguments on the allegedly “standard computer language” in limitation 14.1 and “controllers” in limitation 27.3. Petition, 31-35.

Because Petitioner fails to show that Ciezobka discloses or renders obvious the Challenged Claims’ limitations requiring performing the recited valve sequence “*in response to determining that the fluid communicated via the manifold has satisfied one or more conditions,*” Ground 2 fails.

C. Ground 3: Ciezobka and McNeel do not render claims 2-3, 14-38 obvious.

Petitioner relies upon McNeel solely for its alleged disclosure of “third and fourth wells/valves, generic computer elements, and generic controller(s).” Petition, 43. Therefore, Petitioner’s combination of Ciezobka and McNeel also fails to render obvious the limitations of independent claims 14 and 27 missing

from Ciezobka—*i.e.*, performing the claimed valve sequence “*in response to determining that the fluid communicated via the manifold has satisfied one or more conditions.*” Ground 3 therefore fails.

III. CONCLUSION

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

Dated: June 17, 2024
HAYNES AND BOONE, LLP
2801 N. Harwood St., Suite 2300
Dallas, Texas 75201
Customer No. 27683

Respectfully submitted,

/Scott T. Jarratt/
Scott T. Jarratt
Lead Counsel for Patent Owner
Registration No. 70,297

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 6,717. 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).

/Scott T. Jarratt/
Scott T. Jarratt
Lead Counsel for Patent Owner
Registration No. 70,297

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 June 17, 2024

Manner of service Electronic Service: terry@obwb.com;
margonis@obwb.com;
cooper@obwb.com;
witbeck@obwb.com;
schechter@obwb.com;
OBWB-IWS-Downing@obwb.com

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

Persons served Tammy J. Terry
Lisa E. Margonis
Califf T. Cooper (*pro hac vice*)
Laura J. Witbeck
Peter C. Schechter
OSHA BERGMAN WATANABE & BURTON LLP
1100 Louisiana Street, Suite 4900
Houston, TX 77002

/Scott T. Jarratt/
Scott T. Jarratt
Lead Counsel for Patent Owner
Registration No. 70,297