

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PROFRAC HOLDING CORP.
and
U.S. WELL SERVICES, LLC,
Petitioners,

v.

HALLIBURTON ENERGY SERVICES, INC.,
Patent Owner.

IPR2023-01318
Patent No. 7,931,082

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Submitted Electronically

**PATENT OWNER'S PRELIMINARY RESPONSE
UNDER 37 C.F.R. § 42.107**

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I. INTRODUCTION

Halliburton Energy Services, Inc. (“Patent Owner”) respectfully submits this Preliminary Response (“POPR”) in accordance with 35 U.S.C. § 313 and 37 C.F.R. § 42.107, responding to the Petition for *inter partes* review (the “Petition”) filed by Profrac Holding Corporation and U.S. Well Services, LLC (“Petitioner”) challenging Claims 1-15 and 17-27 (the “challenged claims”) of U.S. Patent No. 7,931,082 (the “’082 Patent”).

The Board should exercise its discretion to deny institution of *inter partes* review of the ’082 Patent under 35 U.S.C. § 325(d). Two of the Petition’s three references for the independent claims, Tolman and Crawford, were substantially considered by the Patent Office during prosecution and overcome based on arguments consistent with those presented herein. The only other reference for the independent claims, Means, is cumulative to references that were considered by the Patent Office during prosecution.

On the merits, Petitioner fails to address whether a POSITA would have a reasonable expectation of success in combining any of the references. This omission is fatal to the Petition, and the Board should deny institution for this reason alone. In addition, the Petition fails to show that the combination of Tolman, Means, and Crawford renders obvious (i) “flowing from a centralized well treatment fluid center to one or more centralized service factories one or more well

development task fluids” and/or (ii) “flowing from the one or more centralized service factories to the centralized well treatment fluid center [] one or more recovered well treatment fluids.” Moreover, a POSITA would not be motivated to combine Crawford and Tolman, and Crawford in fact teaches away from the Petition’s proposed use of a single central processing facility (over multiple) and subsequent combination of the central processing facility with Tolman’s stimulation fluid storage system. For the reasons set forth more fully below, institution should be denied.

II. PERSON OF ORDINARY SKILL

For the purposes of this POPR only, Patent Owner applies Petitioner’s definition of a POSITA. Petition at 3-4. Patent Owner reserves the right to propose its own definition if this IPR is instituted.

III. CLAIM CONSTRUCTION

Patent Owner does not dispute Petitioner’s constructions for the purposes of this POPR. Patent Owner reserves all rights to later dispute Petitioner’s constructions of any terms in this proceeding.

IV. OVERVIEW OF THE ’082 PATENT

U.S. Patent Application No. 11/873,186 (“the ’186 Application”) leading to the ’082 Patent was filed on October 16, 2007. EX1001 at (22). The ’082 Patent issued on April 26, 2011. *Id.* at (45).

A. Specification and Claims

The '082 Patent discloses “methods and systems for simultaneously treating multiple wells from a centralized location and simultaneously connecting multiple wells to a single manifold.” *Id.* at 1:6-10. The '082 Patent claims two structures for achieving these ends, a centralized well treatment fluid center 102 and one or more centralized service factories 104. *Id.* at cl. 1. As shown in Fig. 1 of the '082 Patent (reproduced below), “[t]he centralized well treatment fluid center 102 is located about [a] selected oil field 100.” *Id.* at 3:13-14.

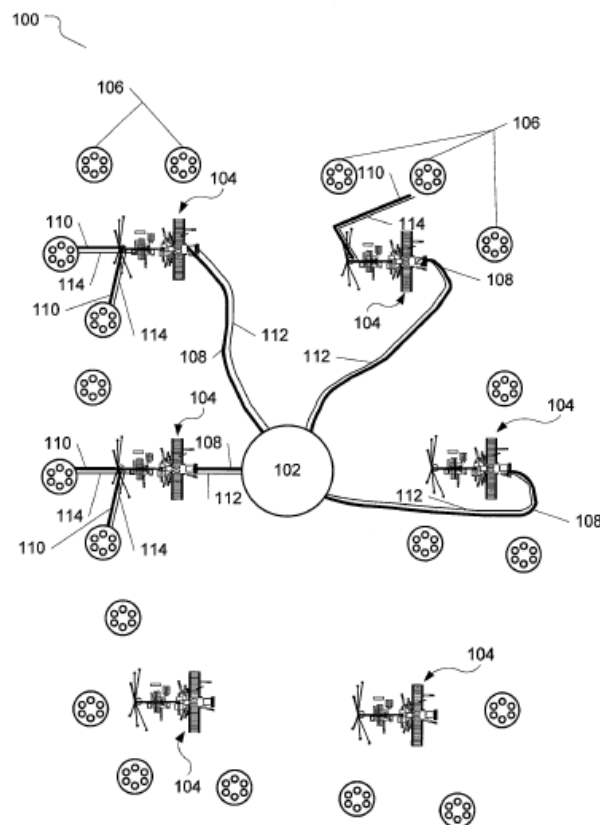


FIG. 1

Id. at Fig.1. “Though shown centrally located, the centralized well treatment fluid center 102 may be located at any location accessible to the selected oil field.” *Id.* at 3:14-17.

“Distribution lines 108 couple the centralized well treatment fluid center 102 to centralized service factories 104.” *Id.* at 3:22-26. “Distribution lines 108 may be adapted to flow well development task fluids from the centralized well treatment fluid center 102 to the centralized service factories 104.” *Id.* at 24-26. The centralized service factories 104 are selectively configurable to use one or more of the received well development task fluids to make well treatment fluids. *Id.* at 3:26-29.

“Return lines 112 may also couple the centralized well treatment fluid center 102 to centralized service factories 104.” *Id.* at 3:29-31. “Return lines 112 may be adapted to flow recovered well treatment fluids or production fluid from the centralized service factories 104 to the centralized well treatment fluid center 102.” *Id.* at 3:31-34. “The centralized service factories 104 are distributed about the oil field 100 in locations that provide efficient treatment to a plurality of wells 106.” *Id.* at 3:34-37.

Both “[t]he centralized well treatment fluid center 102 and the centralized service factories 104 may be enclosed in a supported fabric structure, a collapsible structure, a prefabricated structure, a retractable structure, a composite structure, a

temporary structure, a prefabricated wall and roof structure, a deployable structure, a modular structure, a preformed structure, a mobile accommodation structure, combinations thereof, or any other structure known to one of ordinary skill in the art.” *Id.* at 4:9-17.

B. Prosecution History

The '186 Application was filed with 31 claims, with claims 1 and 17 being independent. EX1002 at 67-78. The Examiner issued an Office Action on September 24, 2008, rejecting all claims under 35 U.S.C. § 102 as anticipated by U.S. Patent No. 4,305,463 to Zakiewicz (“Zakiewicz”) and U.S. Patent No. 5,515,920 to Luk (“Luk”). *Id.* at 248-250. In a response dated December 23, 2008, Applicant argued against these rejections without substantive amendments to the claims. *Id.* at 351-358. Applicant stated that “Zakiewicz discloses the injection of a brine into a subterranean formation, the recovery of a fluid [from] the subterranean formation, the separation of a brine from that fluid, and the recirculation of the brine into the subterranean formation.” *Id.* at 360. Applicant further stated that “the portions of Luk cited by the Examiner disclose the injection of a fracturing fluid into a subterranean formation.” *Id.* at 361. Applicant further stated, however, that neither reference discloses “flowing from a centralized well treatment fluid center to one or more centralized services factories one or more well development task fluids or flowing from the one or more centralized service factories to the

centralized well treatment fluid center the one or more recovered well treatment fluids.” *Id.* at 361, 363.

The Examiner issued another Office Action on March 23, 2009, rejecting all claims under 35 U.S.C. § 102 as anticipated by U.S. Patent Application Publication No. 2009/0114392 to Tolman (“Tolman”). *Id.* at 380-382. In a response dated June 12, 2009, Applicant argued against these rejections without substantive amendments to the claims, arguing that Tolman does not disclose a centralized well treatment fluid center. *Id.* at 463-64.

The Examiner issued another Office Action on January 25, 2010, rejecting claims 1-15, 17-21, 24, 28, 29, and 31 under 35 U.S.C. §§ 102 and 103 as anticipated or in the alternative obvious over U.S. Patent No. 7,367,411 to Leuchtenberg (“Leuchtenberg”). *Id.* at 549, 552. The Examiner further noted that U.S. Pat. No. 6,236,894 to Stoitsits et al. (“Stoitsits,” also referred to in the Petition and this Preliminary Response as “Crawford”) teaches a system of centralizing well services for a plurality of wells and is considered relevant to the ’186 Application. *Id.* at 550. In a response dated June 12, 2009, Applicant argued against these rejections without substantive amendments to the claims.

The Examiner issued another Office Action on September 30, 2010, again rejecting all claims under 35 U.S.C. § 102 as anticipated by Tolman. *Id.* at 777-78. In a response dated November 4, 2010, Applicant argued against these rejections

without amendments to the claims, again pointing out that Tolman does not disclose a centralized well treatment fluid center. *Id.* at 812-13.

On January 27, 2011 the Examiner issued a notice of allowance, withdrawing the rejections over Tolman and allowing all pending claims 1-31. *Id.* at 821-24.

V. OVERVIEW OF PRINCIPAL CITED REFERENCES

A. Tolman

U.S. Patent Application Publication No. US 2009/0114392 to Tolman *et al.* is entitled “Method and Apparatus Associated with Stimulation Treatments for Wells.” EX1005. Tolman was filed on July 24, 2006 and published on May 7, 2009. *Id.*

Tolman teaches a “method and apparatus associated with the production of hydrocarbons.” *Id.* at Abstract. “In one embodiment, the method describes connecting multiple wells to a stimulation fluid pumping system [202] via a pumping system manifold [206].” *Id.* at Abstract, Fig.2. For example, Figure 2 illustrates the configuration of surface equipment involved in the stimulation treatment of three wells 104a-104c (not shown).

Tolman’s configuration includes two systems. In the first system (annotated in blue below), “the wells 104a-104c produce hydrocarbons through piping 228a-228c that is coupled between the respective oil field trees 106a-106c and the

flowback manifolds 230a-230c.” *Id.* at [0028]. “The piping 228a-228c may include high pressure steel lines utilized in oil field applications.” *Id.* “The flowback manifolds 230a-230c may also be coupled to one or more flowlines 234a–234c, 236a-236c and 238a–238c, respectively.” *Id.* “These flowlines 234a-234c, 236a-236c and 238a–238c may be coupled to flowback pits, flow test units, sales lines, tankage, oil/gas/water separating and processing units and/or other similar devices.” *Id.*

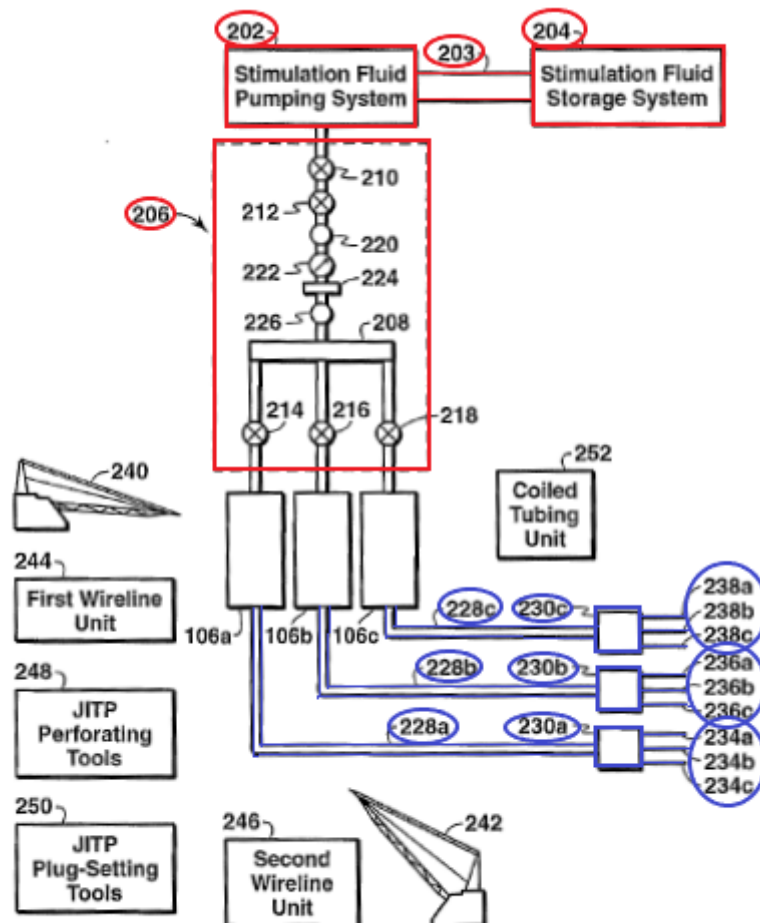


FIG. 2

Id. at Fig.2 (annotated).

The second system (annotated in red above) includes “a stimulation fluid pumping system 202 and stimulation fluid storage system 204.” *Id.* at [0029]. “The stimulation fluid pumping system 202 couples to the stimulation fluid storage system 204 via piping 203, which may be high pressure steel lines or low pressure hoses depending on the specific application.” *Id.* “The stimulation fluid storage system 204 is a vessel that holds a sufficient volume of fluid for the planned stimulation treatments.” *Id.* “It is noted that the stimulation fluid storage system 204 may include tanks located on the surface pad 102, a pit dug on the surface pad 102, and/or a pond, lake, river or water storage facility located in close proximity to the surface pad 102.” *Id.*

Unlike the claimed centralized well treatment fluid center which both flows fluids **to** wells and receives fluid **from** wells (*e.g.*, via “a plurality of distribution lines” *and* “a plurality of return lines,” respectively), Tolman discloses **non-centralized** systems for flowing fluids **to** wells (red) and receiving fluids **from** wells (blue). *Id.* at Fig.2; *see also id.* at Abstract, [0008], [0010]-[0011], [0021], [0028]-[0031], [0035], [0037]-[0039], [0044], [0046]-[0052], [0053], [0056]-[0059], [0067], Cls. 2-3, 8, 14, 24, 33, 38, 49 (describing separate systems involved in the flow of fluids to the wells and from the wells). For the second system (blue), for example, Tolman explains that “[t]he pumping system manifold 206 may include various components utilized to manage access to the wells 104a-

104c from the stimulation fluid pumping system 202.” *Id.* at [0030]. “Through the coupling of the valves 210, 212, 214, 216 and 218, flow paths may be provided through the pumping system manifold 206. Because the first manifold well valve 214, second manifold well valve 216, and a third manifold well valve 218 may be set to an open or closed position, stimulation fluid may be injected into one or more of the wells 104a-104c, while the other wells 104a-104c may be isolated by at least one of the valves 214-218 from the stimulation fluid pumping system 202.” *Id.* at [0031]. The first system (red) on the other hand, only provides flow paths from the wells. *See, e.g., Id.* at [0028] (“[T]he hydrocarbons from the wells 104a-104c typically flow through the flowback manifolds 230a-230c for further processing or sales.”). Tolman thus discloses non-centralized systems for flowing fluids to and from wells.

B. Means

U.S. Patent Application Publication No. 2005/0166961 to Means *et al.* is entitled “Closed Loop Additive Injection and Monitoring System for Oilfield Operations.” EX1006. Means was filed on February 7, 2005 and published on August 4, 2005. *Id.*

In contrast with Tolman’s system, which discloses **injection of stimulation fluids** during wellbore **stimulation**, Means’s system discloses **injection of additives** into a wellbore during **production**. Means explains that “[a] variety of

[additives] are often introduced into producing wells, wellsite hydrocarbon processing units, oil and gas pipelines and chemical processing units to control, among other things, corrosion, scale, paraffin, emulsion, hydrates, hydrogen sulfide, asphaltenes and formation of other harmful chemicals.” *Id.* at [0005]. Means further explains that “production wells are sometimes unmanned and are often located in remote areas on substantially unmanned offshore platforms.” *Id.* at [0006]. “A recent survey by Baker Hughes Incorporated of certain wellbores revealed that as many as thirty percent (30%) of the additive pumping systems at unmanned locations were either injecting incorrect amounts of the additives or were totally inoperative.” *Id.* at [0006]. To address this problem and others with **producing** wells, Means “provides an additive injection system which dispenses precise amounts of additives, monitors the dispensed amounts, communicates with remote locations, takes corrective actions locally, and/or in response to commands received from the remote locations.” *Id.* at [0008].

FIG. 3 of Means (annotated below) is a schematic of the additive injection system 300 including a mixer 310 [red] for mixing or combining at the wellsite a plurality of additive#1–additive#m stored in sources 313a–312m respectively [orange].” *Id.* at [0047]. “[A]dditives to be combined, such as additives additive#1–additive#m [orange] are metered into the mixer by associated pumps 314a–314m [yellow]. Meters 316a–316m [blue] measure the amounts of the

additives from sources 312a–312m [orange] and provide corresponding signals to the control unit 340 [green], which controls the pumps 314a–314m [yellow] to accurately dispense the desired amounts into the mixer 310 [red]. A pump 318 [purple] pumps the combined additives from the mixer 310 [red] into the well 50, while the meter 320 [cyan] measures the amount of the dispensed additive and provides the measurement signals to the controller 340 [green].” *Id.*

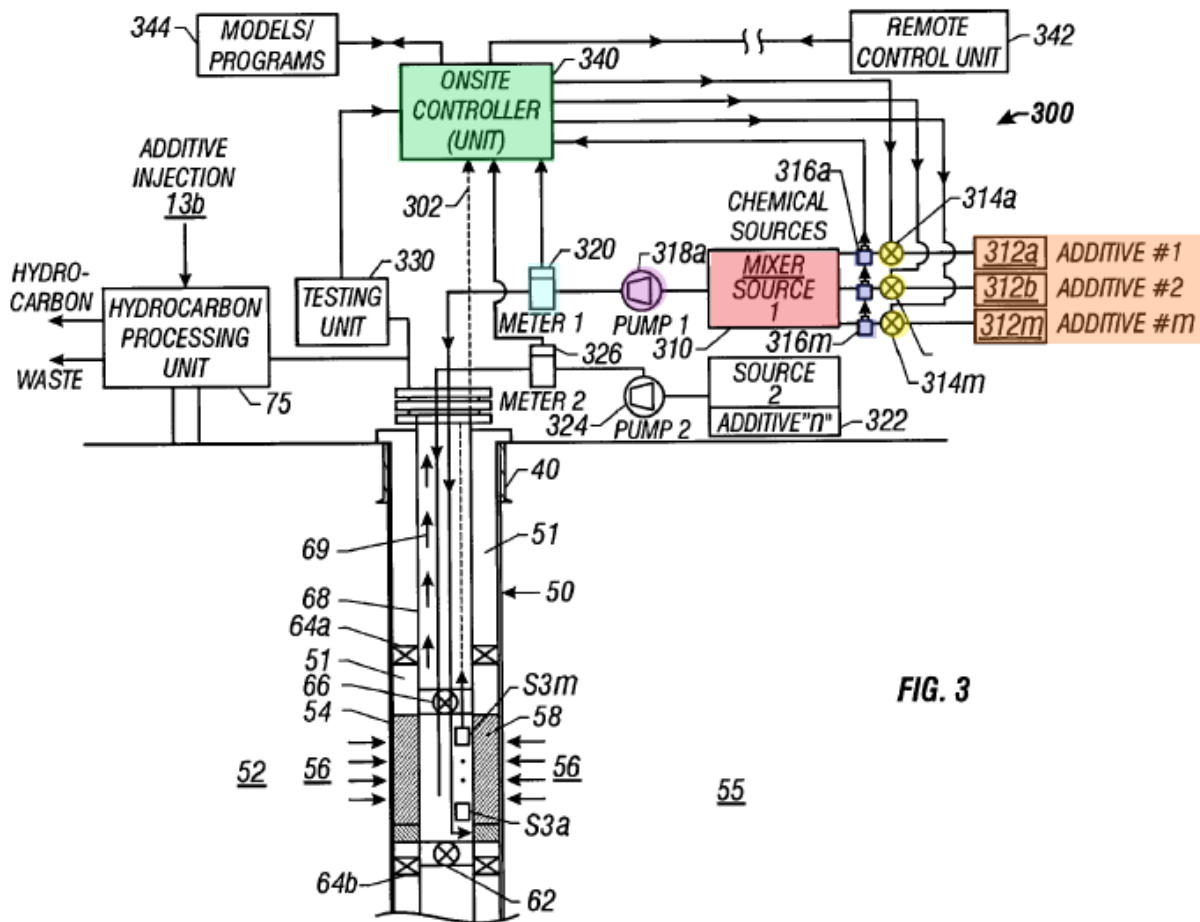


FIG. 3

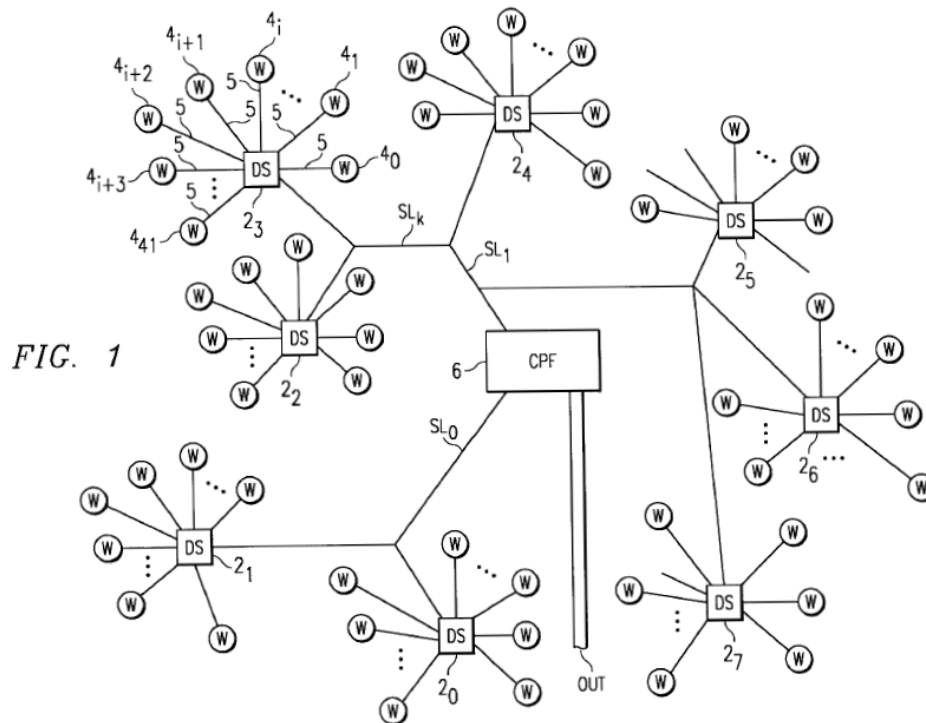
Id. at Fig.3 (annotated).

C. Crawford

U.S. Patent No. 6,236,894 to Stoitsits *et al.* (“Stoitsits” or “Crawford”)¹ is entitled “Petroleum Production Optimization Utilizing Adaptive Network and Genetic Algorithm Techniques.” EX1007. Crawford was filed on December 19, 1997 and issued on May 22, 2001. *Id.*

Crawford is directed to production activities and more specifically to “production optimization from large production fields.” *Id.* at 1:17-18. Crawford describes a production field including “many wells 4, deployed at various locations within [a] field, from which oil and gas products are to be produced in the conventional manner.” *Id.* at 6:10-13, FIG.1.

¹ The first-named inventor is Stoitsits and the second-named inventor is Crawford. EX1006. The Petition and this Preliminary Response refer to this reference as “Crawford” although the prosecution history refers to it as “Stoitsits.”



Id. at FIG.1. Each well is connected to one of multiple drill sites 2 by a surface line 4. *Id.* at 6:24-27. “Each drill site 2 gathers the output from its associated wells 4, and forwards the gathered output to central processing facility 6 via one of surface lines SL.” *Id.* at 6:32-34. Central processing facility 6 receives oil, water, and gas (including both recycled lift gas and formation gas) phases from drill sites 2 via Surface lines SL, and includes the appropriate separation and compression equipment for separating the desired phases from one another.” *Id.* at 6:55-59.

D. Lehman

U.S. Patent Pub. No. 2004/0050550 to Lehman *et al.* is entitled “Re-use Recovered Treating Fluid.” EX1008. Lehman was filed on September 16, 2002 and published on March 18, 2004. *Id.*

Lehman states that, “in many environmentally sensitive areas, the water based fracturing fluids containing polysaccharide gelling agents must be recovered from the well and disposed of by environmentally appropriate means, which increases the overall cost of the fracturing treatment.” *Id.* at [0009]. For this reason and others, Lehman states that “there have been needs for improved subterranean formation treating fluids and methods whereby the fluids are not thermally unstable, do not produce insoluble residues, have high proppant carrying capacities, produce easily removed filter cake, do not have to be hydrated in holding tanks for long periods of time, can have their properties changed during use, and can be recovered and reused if desired.” *Id.* at [0009].

VI. THE BOARD SHOULD EXERCISE ITS DISCRETION UNDER 35 U.S.C. § 325(D) AND DENY INSTITUTION

The Board should exercise its discretion under 35 U.S.C. § 325(d) to deny institution because “the same or substantially the same prior art or arguments previously were presented to the Office.” 35 U.S.C. § 325(d). When evaluating whether to deny institution under § 325(d), the Board has identified the following non-exclusive factors:

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

(c) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection;

(d) the extent of the overlap between the arguments made during examination and the manner in which petitioner relies on the prior art;

(e) whether petitioner has pointed out sufficiently how the examiner erred in its evaluation of the asserted prior art; and

(f) the extent to which additional evidence and facts presented in the petition warrant reconsideration of the prior art or arguments.

Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GMBH, IPR2019-01469, Paper 6 at 7–8 (P.T.A.B. Feb. 13, 2020) (precedential) (citing *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 (P.T.A.B. Dec. 15, 2017)).

“If, after review of factors (a), (b), and (d)” the Board “determine[s] that the same or substantially the same art or arguments previously were presented to the Office, then factors (c), (e), and (f) relate to whether the petitioner has demonstrated a material error by the Office.” *Id.* at 10-11. “[I]f the alleged error is a disagreement with a specific finding of record by the Office, then ordinarily the petitioner’s required showing of material error must overcome persuasively that specific finding of record.” *Id.*

Advanced Bionics provides that “[i]f a condition in the first part of the framework is satisfied and the petitioner fails to make a showing of material error, the Director generally will exercise discretion not to institute inter partes review.” *Id.* at 8-9. The *Advanced Bionics* “framework reflects a commitment to defer to previous Office evaluations of the evidence of record unless material error is shown.” *Id.* at 9.

A. Factors (a), (b), and (d) demonstrate that the Patent Office already considered substantially the same art and arguments, and thus these factors weigh in favor of denying institution

For the independent claims and most of the dependent claims, the Petition relies on a combination of Tolman, Means, and Crawford. The Petition acknowledges that “[t]he Examiner rejected the claims over Tolman as anticipating the claims” but argues that the specific combinations presented in the Petition were not considered during prosecution of the ’082 Patent. Pet. at 97-98. The mere fact that Petitioner uses different combinations does not weigh against discretionary denial, however, because the Petition ultimately relies on art and arguments that are substantially the same as previously those evaluated by the Office. *See Ivantis, Inc. et al. v. Sight Sciences, Inc.*, IPR2022-01530, Paper 14, 16-17, 22 (Mar. 27, 2023 PTAB) (denying institution under § 325(d) although the Examiner did not discuss the specific combination presented in the Petition because the Examiner made similar arguments asserted by the Petition). As explained further below,

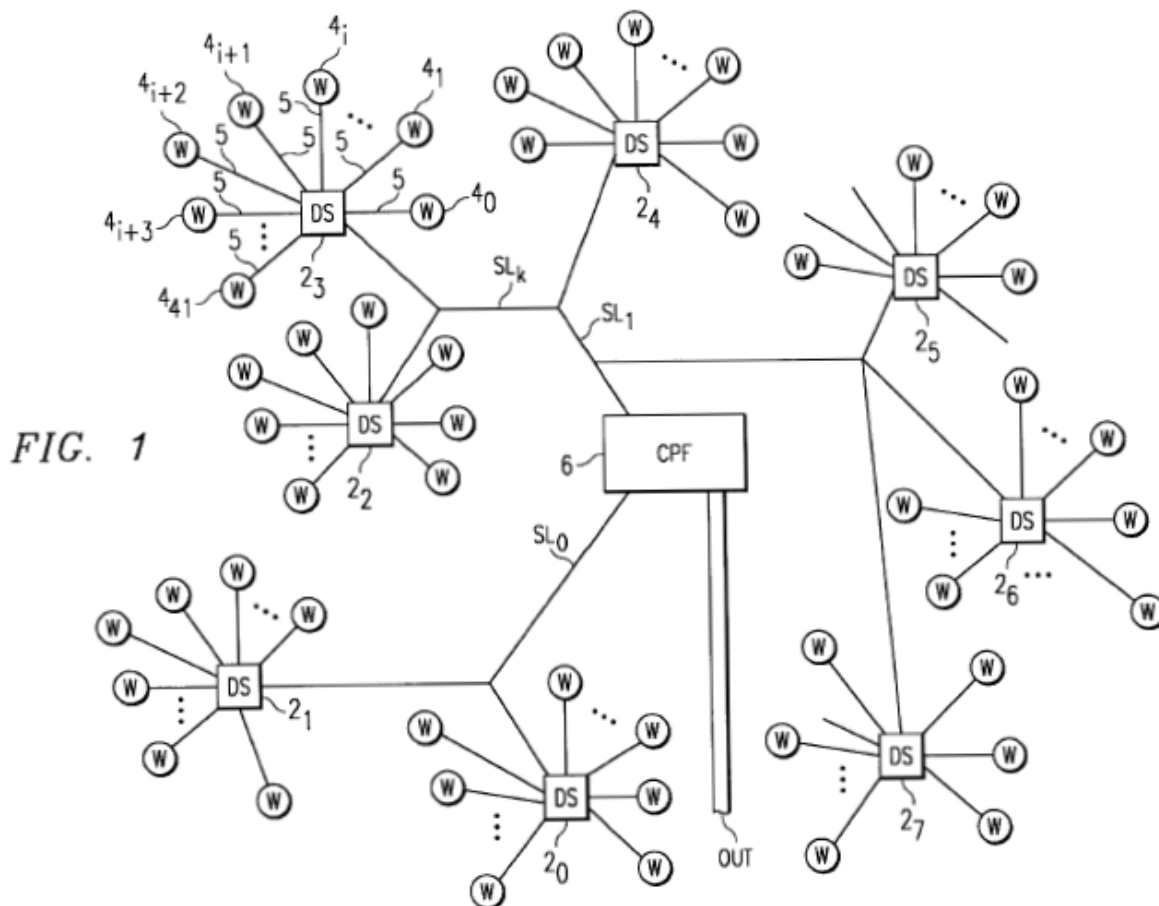
Tolman, Means, and Crawford are either the same or cumulative of references considered by the Examiner.

Tolman was considered by the Examiner throughout prosecution. *See* EX1002 at 380 (citing EX1005 at [0012]; [0018]-[0041]; [0067]), 777-778 (citing EX1005 at Figs. 1-2, [0027-0031], [0037]), 777-778 (citing Figs. 1-2, [0027]-0031], [0037]). Just as in examination by the Patent Office, the Petition relies on Tolman's stimulation fluid pumping system 202 and pumping system manifold 206 as the "one or more centralized service factories" recited in independent claims 1 and 17. EX1002 at 380, 462. With respect to this mapping, Applicant already pointed out during prosecution that "[a]ssuming, *arguendo*, that the stimulation fluid pumping system and/or the well coupling system of Tolman are analogous to the centralized service factories recited in independent claims 1 and 17, Tolman nevertheless fails to disclose a centralized well treatment fluid center coupled to one or more centralized service factories which can provide well development task fluids to the one or more centralized service factories through distribution lines and receive production fluids or recovered well treatment fluids from the one or more centralized service factories through return lines." *Id.* at 464. "Similarly, the remaining portions of Tolman fail to disclose a centralized well treatment fluid center which is coupled to one or more service factories with distribution lines and return lines, as recited in independent claims 1 and 17." *Id.*

The Examiner then withdrew the Tolman rejection in the next office action. *Id.* at 480-484. In a later office action, the Examiner again rejected the claims based on Tolman, this time including Tolman's oil field trees 106 along with the pumping system manifold 206 as the "centralized service factories" and Tolman's production system 100 as the "centralized well treatment fluid center." *Id.* at 777-778. The Applicant overcame this rejection in the next office action response, after which the Examiner issued a Notice of Allowance. *Id.* at 811-814, 821. Not only did the Applicant overcome rejections based on Tolman *twice* during prosecution, but the Petition also applies Tolman in the same manner as during prosecution. The Patent Office has considered the Petition's primary reference Tolman extensively, which strongly weighs in favor of discretionary denial.

The Petition's combination of Tolman's stimulation fluid storage system 204 with elements from Means and Crawford to form its alleged "centralized well treatment fluid center" weigh against discretionary denial. Means and Crawford are substantially the same as art previously considered by the Patent Office. The substance of Crawford (also referred to as "Stoisits") was specifically considered during prosecution. *Id.* at 550. The Examiner noted that Crawford "teaches a system of centralizing well services for a plurality of wells." *Id.* More specifically, Figure 1 of Crawford teaches an oil and gas production field including wells 4 connected by surface lines 5 to drill sites 2, which are further connected to a

central processing facility 6 by surface lines. EX1007 at Fig.1. The drill sites receive the oil, gas, and water from the wells 4 via the surface lines 5. *Id.* at 6:24-43. The central processing facility 6 receives oil, gas, and water from the drill sites 2 via the surface lines SL. *Id.* at 6:50-57.



The Petition relies on Crawford for the same system of centralizing well services for a plurality of wells as previously noted by the Examiner. More specifically, Petitioner relies on one of Crawford’s central processing facilities 6 for the “centralized well treatment fluid center,” Crawford’s drill sites 2 for the “centralized service factories,” and Crawford’s surface lines SL for the “flowing

from the one or more centralized service factories to the centralized well treatment fluid center [] one or more recovered well treatment fluids.” Pet. at 31-38. The Petition thus relies on Crawford in substantially the same way that it was previously evaluated by the Patent Office.

Although the Patent Office did not consider Means during prosecution, the Patent Office considered Luk, which presents a substantially equivalent system to that of Means. EX2001. During prosecution, the Examiner asserted Luk as a basis for § 102(b) rejection. EX1002 at 249-250. The Examiner relied on Luk for its disclosure, among other things of “[a] conventional frac fluid supply side includ[ing a] storage vessel 60 for the fluid, a conventional blender 70 for blending the fluid with proppants taken from proppant 45 transport 80, high pressure pumpers 30 which [] are for pumping the fluid with entrained proppants through supply line 40 to the well head.” EX2001 at Fig.6, 6:42-47.

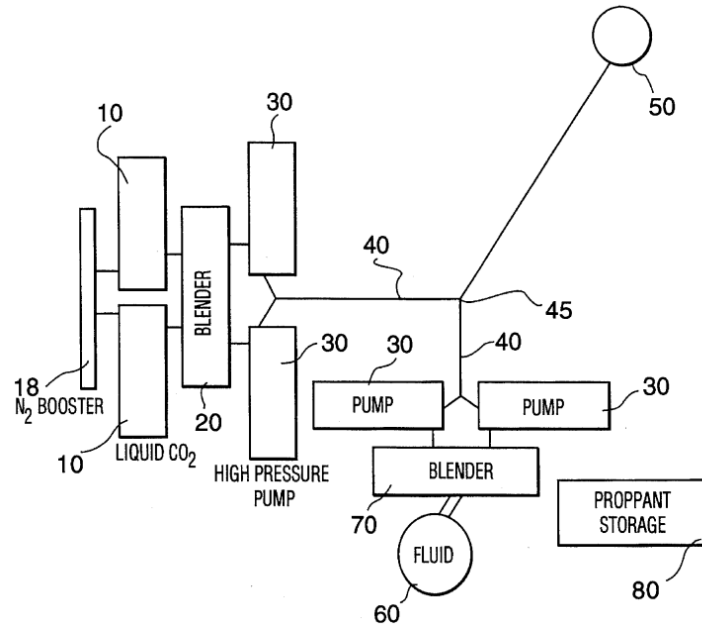


FIG. 6

Id. at Fig. 6. The Petition similarly relies on Means for an additive injection system including a mixer for the step of “preparing, at the one or more centralized service factories, one or more well treatment fluids from the one or more well development task fluids, wherein the one or more centralized service factories are selectively configurable to prepare the one or more well treatment fluids.” Pet. at 14-15, 24-27.

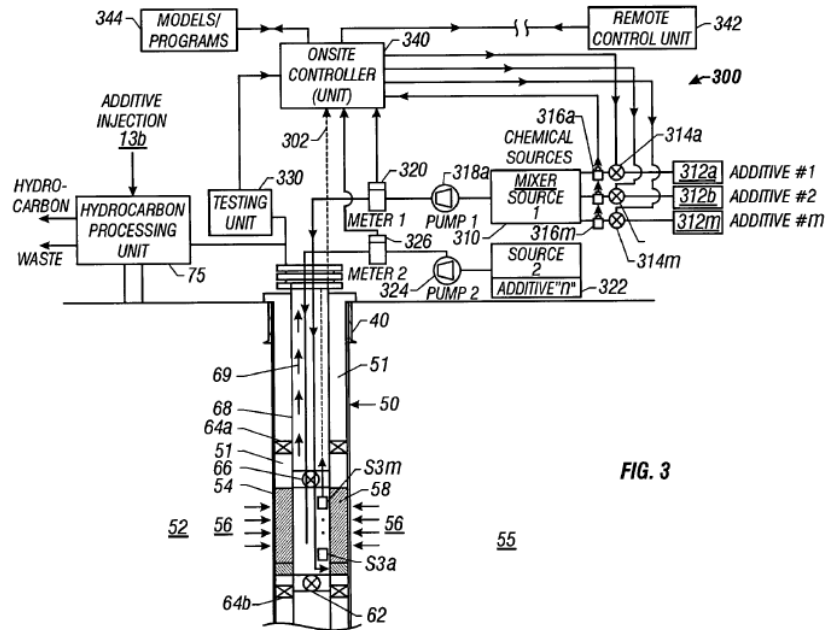


FIG. 3

EX1006 at Fig.3. Means does not disclose any additional details as compared to Luk regarding the preparing step that would warrant the Board's reconsideration. Because Means's disclosure is cumulative to that of Luk, the Patent Office substantively considered Means's disclosure through consideration of Luk.

Because Tolman, Means, and Crawford were substantively considered during prosecution, factors (a), (b), and (d) favor denying institution.

B. Factors (c), (e), and (f) demonstrate Petitioner has failed to show any material error by the Patent Office, and thus these factors weigh in favor of denying institution

Petitioner relies upon Tolman, Means, and Crawford for its argument that the Patent Office erred in granting the independent claims of the '082 Patent. Petitioner argues that Means was not considered during prosecution but provides no support for its argument and never attempts to distinguish these references from

any art considered during the prosecution. Pet. at 97-98. And as previously discussed, Means was substantively considered through Luk. Petitioner argues that “Crawford was only made of record by the examiner.” Pet. at 97. This is not accurate; the Examiner substantively reviewed Crawford, noting in an office action that it “teaches a system of centralizing well services for a plurality of wells.” EX1002 at 550. Regardless, “[p]reviously presented art includes art made of record by the Examiner, and art provided to the Office by an applicant, such as on an Information Disclosure Statement (IDS), in the prosecution history of the challenged patent.” *Advanced Bionics*, Paper 6 at 7–8 (stating that previously presented art includes art cited in an IDS). And finally, Tolman was a basis for rejection *twice* in the prosecution history. Factor (c) favors denying institution.

Petitioner has not established that the examiner erred in evaluating the asserted prior art. Petitioner argues that the Examiner erred by not considering Tolman in combination with any other reference. However, it does not matter that the Examiner did not consider the specific combinations in the Petition. The Petitioner relies on similar art and arguments made during prosecution. *See, e.g., Ivantis*, Paper 14 at 17 (finding that the Petition did not establish that the Patent Office materially erred although the Examiner did not discuss the specific combination presented in the Petition because the Examiner made similar arguments asserted by the Petition). As explained above, Petition relies on the

same art and arguments (*i.e.*, Tolman, Crawford, and Means through Luk) that were substantively considered by the Examiner during prosecution. *Supra* V.A.

The Petition argues that the Examiner materially erred by mapping different elements of Tolman to the claim elements than the Petition, referring to the Examiner's second rejection based on Tolman identifying Tolman's production system 100 as the "centralized well treatment fluid center." EX1002 at 812-813. However, the Petition actually relies on a component of Tolman's production system 100 (*i.e.*, the stimulation fluid storage system 204) in combination with Means and Crawford for this element. And as explained previously, the Examiner substantively considered the disclosures of each of these references for the same concepts as the Petition. *Supra* V.A. Moreover, Petitioner's haphazard combination of components from these references fails to render obvious this element as explained further below, which is likely why the Examiner did not attempt the combination in the first place. *Infra* VI.C.1.a. Because the Petitioner has not established how the Examiner erred in evaluating these references, factor (e) further favors denying institution.

Petitioner has not provided any additional evidence beyond that which is discussed above that warrants reconsideration of the prior art or prosecution arguments. Although Petitioner claims "the Examiner also did not have the benefit of Dr. Nikolaou's detailed expert testimony and the further evidence of record,"

Dr. Nikolaou primarily repeats the disclosures from Tolman, Means, and Crawford to support the alleged motivation to combine. Pet. at 99; *see also, e.g.*, EX1003 at ¶¶ 65-73, 77-89, 97-107, 108-120 (citing EX1005-EX1007). As previously discussed, the Patent Office considered the disclosures of Tolman and Crawford, as well as Means through Luk during prosecution. *Supra* V.A (citing EX1002 at 249-250, 380-382, 550, 552, 777-778). Furthermore, Dr. Nikolaou’s testimony merely parrots the Petition, which is itself conclusory. *See also infra* VI.E. Thus, Dr. Nikolaou’s testimony based on disclosures from the asserted references does not warrant reconsideration of the prior art or corresponding prosecution arguments. As such, factor (f) further favors denying institution.

Because all of the *Becton Dickinson* factors weigh in favor of a discretionary denial of institution under § 325(d), the Board should decline to institute an IPR proceeding here.

VII. PETITIONER HAS NOT SHOWN A REASONABLE LIKELIHOOD OF PREVAILING

A. Legal Requirements of a Petition Asserting Obviousness

Petitioner bears the burden of demonstrating a reasonable likelihood that it would prevail in showing unpatentability on the grounds asserted in the Petition. 37 C.F.R. § 42.108(c); 35 U.S.C. § 314(a). The grounds asserted must be described with “particularity” in the petition. 35 U.S.C. § 312(a)(3); *Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016) (“It is of the

utmost importance that petitioners . . . adhere to the requirement that the initial petition identify ‘with particularity’ the ‘evidence that supports the grounds for the challenge to each claim.’” (quoting 35 U.S.C. § 312(a)(3)). Specifically, the Petition “must specify where each element of the claim is found in the prior art patents or printed publications relied upon.” 37 C.F.R. § 42.104(b)(4). Petitioner must therefore show that “the structural features of [the challenged claims] were **known prior art elements.**” *K/S HIMPP v. Hear-Wear Technologies, LLC*, 751 F.3d 1362, 1365-66 (Fed. Cir. 2014); *Personal Web Techs., LLC v. Apple*, 848 F.3d 987, 991 (Fed. Cir. 2017).

Under 35 U.S.C. § 103, Petitioner must prove that the claimed subject matter would have been obvious to a POSITA at the time of the invention. In considering obviousness, the Board must determine the scope and content of the prior art and differences between the prior art and the claims and the level of ordinary skill in the pertinent art. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966).

A claim limitation must be proven to be in the prior art; it cannot be proven by conclusory testimony unsupported by concrete evidence. *See Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1363-66 (Fed. Cir. 2016) (reversing the Board’s obviousness determination, which relied on “common sense,” because the petitioner’s expert declaration lacked “evidence and a reasoned explanation”). Petitioner must offer “a sufficient explanation of how the references may be

combined, from the perspective of one with ordinary skill in the art, to arrive at the claimed invention, and **why the proffered combination accounts for all the features of each claim.**” *Dominion Dealer Sols., LLC v. AutoAlert, Inc.*, IPR2013-00223, Paper 9 at 19 (P.T.A.B. Aug. 15, 2013); *see also Arendi*, 832 F.3d at 1362 (“[O]ur cases repeatedly warn that references to ‘common sense’—whether to supply a motivation to combine or a missing limitation—cannot be used as a wholesale substitute for reasoned analysis and evidentiary support . . .”).

“[A] clear, evidence-supported account of the contemplated workings of the combination is a prerequisite” to concluding “that a relevant skilled artisan would have been motivated to make the combination and reasonably expect success in doing so.” *Personal Web Techs.*, 848 F.3d at 994. Moreover, “[o]bviousness may not be established using hindsight or in view of the teachings or suggestions of the inventor.” *Para-Ordnance Mfg., Inc. v. SGS Importers Int’l, Inc.*, 73 F.3d 1085, 1087 (Fed. Cir. 1995); *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

B. Petitioner’s Failure to Address Reasonable Expectation of Success is Fatal

The Board should deny institution because the Petition never addresses reasonable expectation of success and therefore cannot establish obviousness. “An obviousness determination requires finding that a POSITA would have been motivated to combine or modify the teachings in the prior art **and would have had**

a reasonable expectation of success in doing so.” *Endo Pharm., Inc. v. Actavis LLC*, 922 F.3d 1365, 1373 (Fed. Cir. 2019) (emphasis added). Motivation to combine and reasonable expectation of success are “two different legal concepts.” *Intelligent BioSystems, Inc. v. Illumina Cambridge, Ltd.*, 821 F.3d 1359, 1367 (Fed. Cir. 2016). The absence of *either* is sufficient to establish nonobviousness. *See id.* at 1367-68.

Both grounds in the Petition are based on obviousness. In relying on that theory, Petitioner has the burden of presenting its analysis of reasonable expectation of success in its Petition and expert declaration. *Eli Lilly & Co. v. Teva Pharm. Int'l GmbH*, 8 F.4th 1331, 1348 (Fed. Cir. 2021) (It is, “at all times, [Petitioner’s] burden to show that the claims would have been obvious, including that a skilled artisan would have had a reasonable expectation of success in achieving the claimed invention.”). “It is of the utmost importance that petitioners in the IPR proceedings adhere to the requirement that the initial Petition identify with particularity the evidence that supports the grounds for the challenge to each claim [T]he expedited nature of IPRs bring with it an obligation for petitioners to make their case in their Petition to institute.” *Wasica Finance GmbH v. Continental Automotive Systems, Inc.*, 853 F.3d 1272, 1286–87 (Fed. Cir. 2017). “Failure to prove the matter as required... means that the party with the burden of persuasion [i.e., the Petitioner] loses on that point—thus, if the fact trier of the

issue is left uncertain, the party with the burden loses.” *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378-79 (Fed. Cir. 2015).

Despite that burden, the Petition does not even mention reasonable expectation of success. Petitioner’s expert declaration acknowledges that reasonable expectation of success is a legal requirement in establishing obviousness in the legal background section, yet then fails to offer any arguments, evidence, or even any conclusory opinions that would address this factor in any of the sections on the merits. EX1003 §§ 21-22, 24. It is Petitioner’s burden to establish reasonable expectation of success in the Petition yet Petitioner fails to do so.

Even if an inferential argument would be sufficient, there also is no foothold in the Petition or Petitioner’s expert declaration for Petitioner to assert an inferential case of a reasonable expectation of success. The Petition alleges reasons or motivations to combine the references, “but in doing so, Petitioner leaps silently over the requirement to evidence a reasonable expectation of success to establish obviousness.” *Juniper Networks, Inc. v Correct Transmission, LLC*, IPR2021-00682, at 21, 23 (PTAB Oct. 3, 2022) (finding that the Petition failed to meet its burden prove a reasonable expectation of success). None of Petitioner’s arguments or evidence in support of its motivation to combine could be characterized as reasonable expectation of success.

Although the Petition argues why “a POSITA would have been motivated to incorporate Means’s teachings addressing the benefits of additive injection in Tolman’s centralized well-operations system,” none of Petitioner’s contentions address why a POSITA would have a reasonable expectation of success in the same, especially given that, as further discussed *infra* in Section VI.C.1.a, Petitioner’s proposed combination mixes Tolman’s **stimulation** equipment and chemicals with Means’ **production** equipment and chemicals, which would never be combined in the way that Petitioner proposes. Pet. at 15; *see also id.* at 10-16. And although the Petition argues why “[a] POSITA would have been motivated to incorporate Crawford’s teaching of a centralized processing of recovered well fluids in the combined system of Tolman and Means,” none of these arguments address why a POSITA would have a reasonable expectation of success in the same, especially given the complexity of combining Crawford’s multipart oil and gas processing system with Tolman’s multipart stimulation system, each of which in turn are interconnected with additional complex systems via piping and flowlines. Pet. at 31-35.

Furthermore, Petitioner’s combination involves the Tolman system’s reuse of fluids processed by Crawford’s system, yet the Petition never describes what the system would look like or how it would work to reuse fluids, much less whether a POSITA would have a reasonable expectation of success in making the

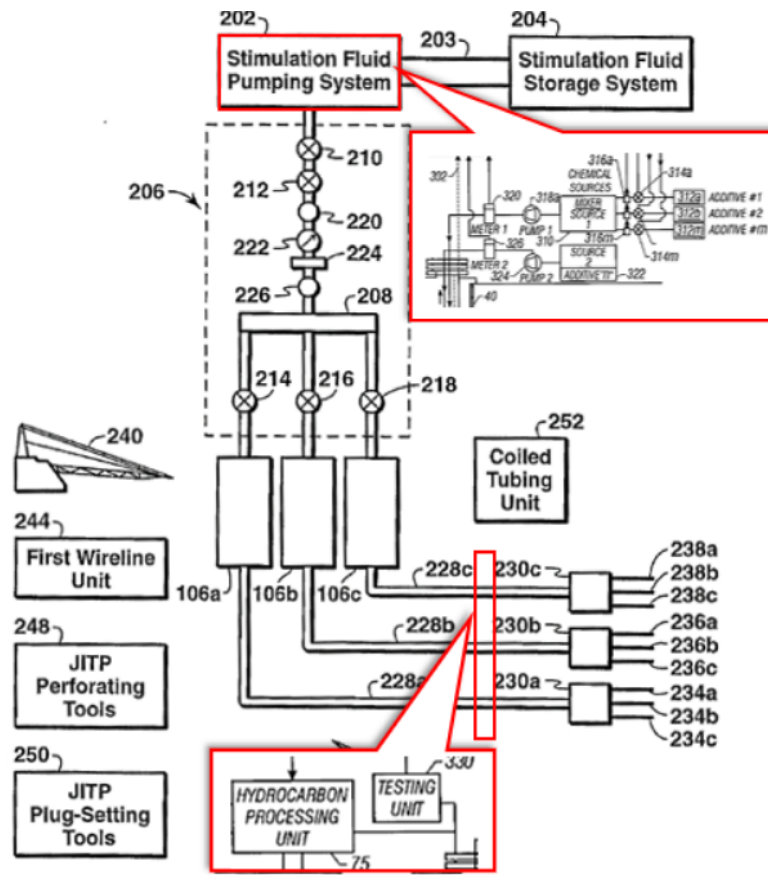
combination or making it work. There is no explanation as to why a POSITA would have a reasonable expectation of success in combining the complex systems disclosed in Tolman, Means, or Crawford. Regardless, not even Petitioner's motivations to modify could be repurposed to explain why a POSITA would have a reasonable expectation of success. There is no argument that the proposed combinations would even be predictable or routine. It is impossible for the Board to find obviousness when the Petition fails to provide any evidence or analysis of a reasonable expectation of success. Petitioner's failure to meet the bare minimum of its burden is fatal, and institution should be denied.

C. Grounds 1 and 2 Fail as to All Claims Because the Tolman/Means/Crawford Combination Does Not Disclose or Render Obvious Each Element of Independent Claims 1 and 17.

The Petition relies on a combination of Tolman's "surface pad configuration with equipment and wells" with Means's additive injection system for independent claim limitations 1[A] and 17[C]. Pet. at 21-24, 39-43. The Petition also relies on a combination of Tolman's "surface pad configuration with equipment and wells" with Crawford's "teaching of a centralized processing of recovered well fluids" for independent claim limitations 1[E] and 17[B]. Pet. at 33, 43. The Petition fails to show how the Tolman/Means/Crawford combination discloses or renders obvious any of these limitations.

1. Claim Limitations 1[A] & 17[C]: “flowing from a centralized well treatment fluid center to one or more centralized service factories one or more well development task fluids” / “a plurality of distribution lines coupled between [a] centralized well treatment fluid center and [] one or more centralized service factories, wherein the plurality of distribution lines are adapted to flow one or more well development task fluids”

With respect to limitations 1[A] and 17[C], the Petition relies on the combination of various elements from multiple complex systems in multiple references. Petitioner begins with Tolman’s stimulation fluid storage system 204, piping 203, and stimulation fluid pumping system 202. Pet. at 10-11. The Petition then proposes to combine Means’s mixer, pumps 314, and relevant meters from Means’s additive injection system with the stimulation fluid pumping system 202 and Means’s additive sources from Means’s additive injection system with the stimulation fluid storage system 204. *Id.* at 11-12. The Petition further proposes using Tolman’s pipes 203 to deliver both Means’s additives in addition to Tolman’s stimulation fluid between Tolman’s modified stimulation fluid storage system 204 and stimulation fluid pumping system 202. *Id.*



An illustration of the Petition’s proposed combination is reproduced above. Pet. at 11.

a) Petitioner’s Haphazard Combination of Tolman’s Stimulation Equipment and Chemicals and Means’s Production Equipment and Chemicals Does Not Make Sense

As previously explained, Petitioner proposes flow of Tolman’s stimulation fluid and Means’s additives (“*one or more well development task fluids*”) from Tolman’s modified Storage System 204 through Tolman’s piping 203 to Tolman’s modified Pumping System 202, where the stimulation fluid and additives may be mixed together to become “*one or more well treatment fluids.*” Pet. at 24-26.

However, Tolman and Means are directed to fluids and equipment that are used in different applications during different phases of the well's life cycle. Tolman and Means make clear that a POSITA would not mix these equipment and chemicals and use them together as Petitioner proposes. Tolman is directed to equipment and fluids used during the **stimulation** phase including piping 203 that directs pre-prepared **stimulation** fluid from a **stimulation** fluid storage system 204 to a **stimulation** fluid pumping system 202. *See, e.g.*, EX1005 at Fig.2, [0009] (“These adjustments to provide the **stimulation** fluid and isolation of the other well are repeated until each of the plurality of wells have received stimulation **treatments**”). The only fluid that Tolman discloses is stimulation fluid. *See, e.g., id.* at [0009], [0020]. Tolman does not disclose any kinds of additives.

Means, on the other hand is directed to equipment and chemicals used during the **production** phase including a production **additive** injection system 300. *See, e.g.*, EX1006 at Fig.3, [0005] (“A variety of chemicals (also referred to herein as ‘**additives**’) are often introduced into **producing** wells, wellsite hydrocarbon processing units, oil and gas pipelines and chemical processing units to control, among other things, corrosion, scale, paraffin, emulsion, hydrates, hydrogen sulfide, asphaltenes and formation of other harmful chemicals”). Means does not disclose stimulation fluid; it solely focuses on the “supply of [production] additives to formation fluid recovered through a production wellbore.” *Id.* at [0009].

Based on Tolman and Means's disclosures, any combination of features of Tolman's stimulation system with features of Means's production system would not form anything that could or would be used at the same time in the oilfield. Tolman distinguishes between stimulation and production activities throughout. *See, e.g.*, EX1005 at [0009] (“[H]ydrocarbons are produced from the plurality of wells **once the stimulation treatments have been performed.**”). Figure 3 of Tolman illustrates how stimulation and production activities are distinct, sequential in nature, and rely on different equipment. Stimulation (steps 312-316) occurs before production (step 324). *Id.* at Fig.3. More specifically, stimulation treatments are performed (steps 312-316) and once the planned stimulation treatments are complete (step 318), the stimulation equipment may be moved (step 320), production tubing is provided (step 322), and then production occurs (step 324). *Id.*; *see also* [0040].

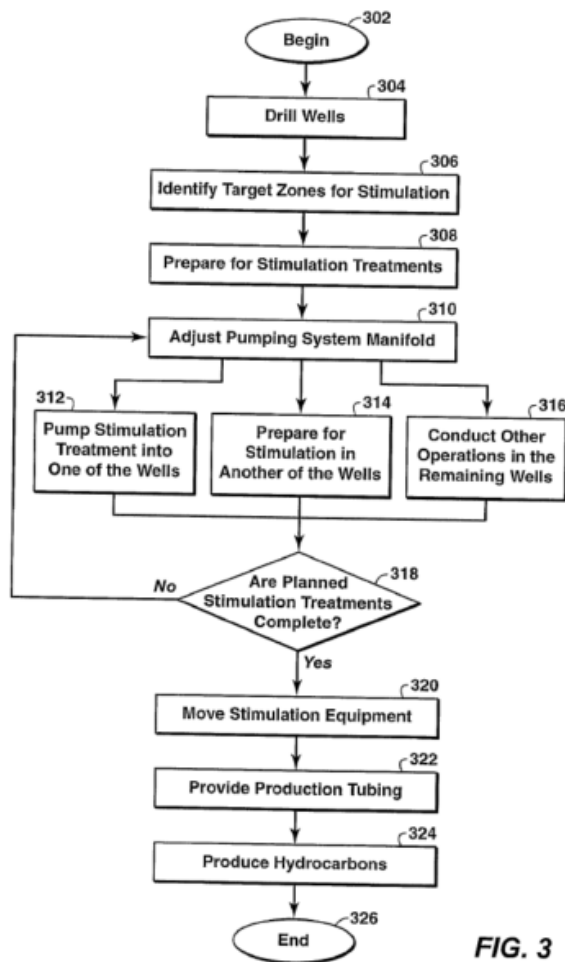


FIG. 3

Id. at Fig.3. Tolman's stimulation fluids and equipment are used during the stimulation phase and are moved from the wellsite by the time that production begins. *Id.* Means's additive injection system 10 and additives, on the other hand are implemented in a **production wellbore 50** (which includes **production tubing 60**). EX1006 at Fig.1, [0032].

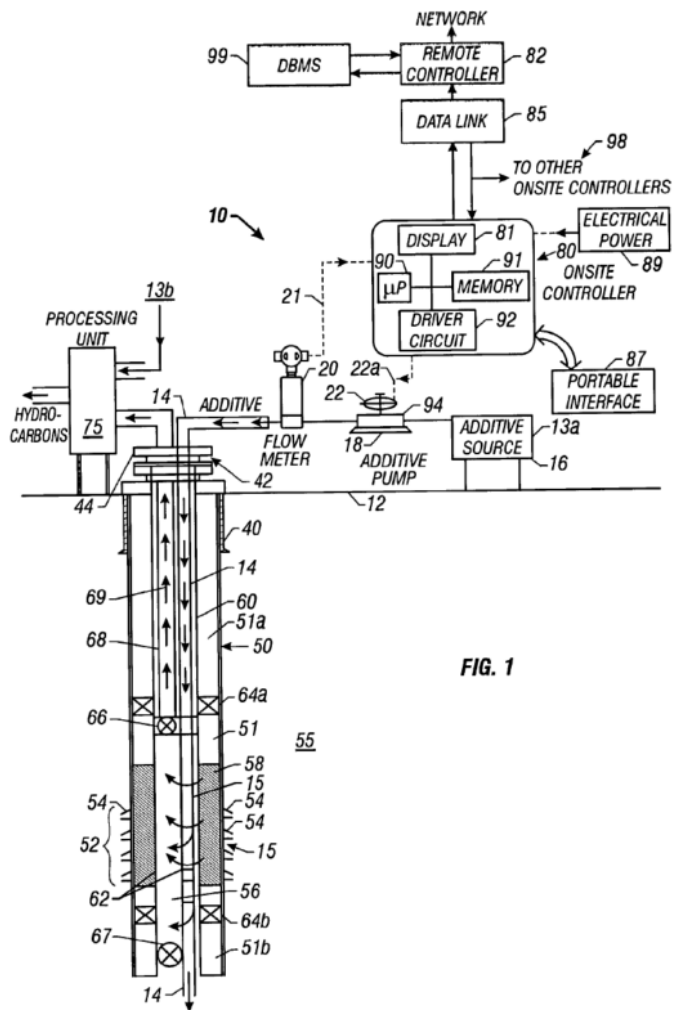


FIG. 1

EX1006 at Fig.1. In the context of Tolman's Figure 3, Means's additive injection system would not come into play until after stimulation treatments are complete, after the stimulation equipment been moved, and after the production equipment such as the production tubing 60 and accompanying additive injection system 10 have been provided. *See, e.g., id.* ("Formation fluid 56 enters a **production tubing 60** in the well 50 via perforations 54 and passages 62."), [0034] ("[T]he desired additive 13a flows through the line 14 and discharges into the **production tubing**

60 near the production zone 52 via inlets or passages 15”). It is clear from Tolman and Means that a POSITA would not mix Tolman’s stimulation fluid and equipment with Means’s production additives and equipment or use them at the same time. *Also compare* EX1010 at 97 (describing maintenance activities that are implemented **during or after the production stage** including pumping fluids inside the well bore through the production tree including “**chemicals used to inhibit the scales and hydrates, and to ensure smooth flow of hydrocarbons through the well**”), *with* EX1012 at 106 (describing reservoir **simulation treatments** that are implemented **prior to the production stage** such as acid fracturing, hydraulic fracturing, and a well **stimulation** operation known as ‘perforating,’ all of which “are carried out on a reservoir to **improve its productivity**”) (emphasis added). Petitioner’s proposed combination does not form a system that could or would be used in the oilfield according to Tolman and Means and therefore Tolman/Means cannot render these limitations obvious.

b) Petitioner’s Combination Fails to Disclose Flow of One or More Well Development Task Fluids / Distribution Lines That Are Adapted to Flow One or More Well Development Task Fluids

Even if Tolman and Means could be combined, Petitioner’s proposed combination fails to disclose (i) flowing from a centralized well treatment fluid center to one or more centralized service factories one or more well development task fluids or (ii) a plurality of distribution lines [that] are adapted to flow one or

more well development task fluids. The Petition states that “a POSITA would have understood that Tolman/Means would include storing Means’s additive sources in Tolman’s storage system....Similarly, Tolman’s treatment fluid is stored in its Storage System 204.” Pet. at 11 (citations omitted). The Petition further states that “Means further explains that it is desirable to store additives unmixed when away from the wellsite for safety reasons” and that “[a]ccordingly, Dr. Nikolaou explains that to get the additives to the wellsite, a POSITA would have recognized that the combined system would use **pipes 203** to deliver **both additives and any other stimulation fluid** needed for well operations.” *Id.* at 11-12 (emphasis added). With respect to limitation 1[A], the Petition states that “[s]torage System 204 in Tolman/Means discloses a ‘*centralized well treatment fluid center*’ becau[s]e it stores ‘a sufficient volume of fluid for the planned stimulation treatments’” and “also stores additives described by Means, and both fluids ‘*flow*’ via piping 203 to the Pumping System 202 and pumping system manifold 206 (collectively, ‘*one or more centralized service factories*’).” *Id.* at 23-24 (emphasis in original). With respect to limitation 17[C], Petitioner states that “[a]s explained in addressing limitation 1A, piping 203 in Tolman/Means delivers (is ‘*adapted to flow*’) additives and/or other fluids (‘*one or more well development task fluids*’) to Pump System 202, which then mixes the various additives.” *Id.* at 43 (citations omitted and emphasis in original).

For both limitations 1[A] and 17[C], the Petition conclusorily relies on Tolman's piping 203 to flow Tolman's stimulation fluid *and* Means's additives from Tolman's modified stimulation fluid storage system 204 to Tolman's modified stimulation fluid pumping system 202: "[A] POSITA would have recognized that the combined system would use pipes 203 to deliver both additives and any other stimulation fluid needed for well operations." *Id.* at 11-12. However, the Petition never explains *how* Tolman's pipes 203 as disclosed could flow Tolman's stimulation fluid *and* Means's additives. Tolman's pipes 203, at most, disclose flow of stimulation fluid; Tolman does not disclose additives anywhere. Further, Petitioner never addresses the modifications that would necessarily need to be made to Tolman's pipes 203 and stimulation fluid storage system 204 to enable the pipes to flow at least two types of fluid to Means's mixer instead of one type of fluid as originally disclosed. It is Petitioner's burden to offer "a sufficient explanation of how the references may be combined, from the perspective of one with ordinary skill in the art, to arrive at the claimed invention, and why the proffered combination accounts for all the features of each claim." *Dominion Dealer Sols., LLC v. AutoAlert, Inc.*, IPR2013-00223, Paper 9 at 19 (P.T.A.B. Aug. 15, 2013). Because Petitioner does not sufficiently explain its proposed combination, Petitioner has not met its burden under this limitation. Pet. at 11-12.

The Petitioner’s and its expert’s conclusions, devoid of reasoning or supporting evidence, are insufficient to support an argument of obviousness. *See ActiveVideo Networks v. Verizon*, 694 F. 3d 1312, 1327 (Fed. Cir. 2012) (finding non-obviousness as a matter of law where “[t]he expert failed to explain ... how any specific combination would operate or read on the asserted claims”). As the Federal Circuit noted in *ActiveVideo*, this slipshod approach to obviousness fails because it “is fraught with hindsight bias.” *Id.* Because Petitioner has failed to offer this necessary explanation to support its obviousness arguments as part of its Petition, and because the Board is limited in this proceeding to the arguments and theories raised in the Petition, the Petition should be denied. *Apple Inc. v. MPH Techs. Oy*, No. 2021-1355, 2022 WL 4103286 (Fed. Cir. Sept. 8, 2022) (nonprecedential) (“We have previously reversed Board decisions that found a motivation to combine where the petitioner presented only threadbare arguments to support its combination”); *see also SAS Institute, Inc. v. Iancu*, 138 S. Ct. 1348, 1357 (2018) (“[T]he petitioner’s contentions . . . define the scope of the litigation all the way from institution through to conclusion.”).

2. Claim Limitations 1[E] and 17[B]: “flowing from the one or more centralized service factories to the centralized well treatment fluid center the one or more recovered well treatment fluids” / “a plurality of return lines coupled between the centralized well treatment fluid center and the one or more centralized service factories, wherein the plurality of return lines are adapted to flow one or more recovered well treatment fluids”

The Petition’s deficiencies are even more apparent in view of the additional requirement in independent claims 1 and 17 of “flowing from the one or more centralized service factories to the centralized well treatment fluid center the one or more recovered well treatment fluids” / “a plurality of return lines coupled between the centralized well treatment fluid center and the one or more centralized service factories” that “are adapted to flow one or more recovered well treatment fluids.” The Petition does not sufficiently explain its combination of Crawford with Tolman or Means for this limitation. Further, it would not have been obvious to flow Tolman’s recovered well treatment fluids to Tolman’s stimulation fluid storage system when Tolman already discloses the flow of recovered well treatment fluids elsewhere.

a) The Petition Does Not Sufficiently Explain Its Combination of Crawford with Tolman or Means

Petitioner must offer “a sufficient explanation of how the references may be combined, from the perspective of one with ordinary skill in the art, to arrive at the claimed invention, and why the proffered combination accounts for all the features

of each claim.” *Dominion Dealer Sols., LLC v. AutoAlert, Inc.*, IPR2013-00223, Paper 9 at 19 (P.T.A.B. Aug. 15, 2013). For this limitation, Petitioner relies on Tolman’s disclosure that “flowlines [234a–234c, 236a-236c and 238a–238c] may be coupled to processing units” and suggests that Tolman’s processing units are “like the one described in Crawford.” Pet. at 33 (citing EX1005 at [0028]). The Petition states that “[b]ecause fluids like water may be reused for future stimulation treatment after being separated from other recovered well fluids, Crawford’s centralized processing unit should be part of Tolman’s Storage System 204, which provides fluids for stimulation treatment.” *Id.* at 33. “The Tolman/Means/Crawford system includes [Tolman’s] surface lines between Tolman’s flowback manifolds and the Crawford’s central processing facility carry the well treatment fluids recovered from Tolman’s wells” *Id.* at 34.

“[A] clear, evidence-supported account of the contemplated workings of the combination is a prerequisite” to concluding “that a relevant skilled artisan would have been motivated to make the combination and reasonably expect success in doing so.” *Personal Web Techs.*, 848 F.3d at 994. The Petition does not provide a sufficient account of its combination of Tolman’s storage system 204 with Crawford’s central processing unit. For example, Petitioner merely states that Crawford’s central processing facility “should be part of” Tolman’s Storage System 204 but never goes further to explain what “being a part of” the Storage

System 204 would mean. It also is unclear whether Petitioner is proposing to substitute, combine, or modify Crawford's central processing unit with Tolman's existing processing units, or how or why a POSITA would accomplish any of these options. In addition, the Petition's combination neglects the other structures coupled to Tolman's flowlines. Tolman states that "flowlines 234a-234c, 236a-236c and 238a-238c may be coupled to flowback pits, flow test units, sales lines, tankage, oil/gas/water separating and processing units and/or other similar devices. Thus, the hydrocarbons from the wells 104a-104c typically flow through the flowback manifolds 230a-230c for further processing or sales." EX1005 at [0028]. It is unclear from Petitioner's description whether the other structures coupled to the flowlines would also "be a part of" Tolman's Storage System 204 or remain in their original locations. As another example, Petitioner does not address if and how Tolman's flowlines 234a-234c, 236a-236c and 238a-238c would need to be modified to accommodate Crawford's central processing unit along with any other the other structures associated with the flowlines.

In addition, Petitioner does not even attempt to address Crawford's combination with Means. The Petition also proposes to combine Tolman's Storage System 204 with certain components of Means's additive injection system for the "centralized well treatment fluid center" in a previous element. *See supra* VII.B.1. Yet Petitioner fails to address how Crawford's central processing unit and

components of Means's additive injection system would relate to one another as part of the "centralized well treatment fluid center." Petitioner does not provide an adequate description of its combination.

b) It Would Not Have Been Obvious to Combine Tolman and Crawford to Flow Recovered Fluids to the Stimulation Fluid Storage System When Tolman Teaches Flow of Recovered Fluids to a Flowback System and Not a Stimulation System.

The Petition relies on Tolman's disclosure that flowlines 234a-234c, 236a-236c and 238a-238c may be coupled to processing units to argue that it would have been obvious to combine one of Crawford's processing units with Tolman's stimulation storage system 204 to teach flow of recovered fluids to Tolman's stimulation storage system 204 (*i.e.*, Petitioner's proposed centralized well treatment fluid center). On the contrary, this disclosure teaches the flow of recovered fluids to a processing system located in Tolman's flowback system, which is a separate system from the storage system 204, and therefore does not render this limitation obvious.

First, Tolman already discloses processing units, making Crawford's processing facilities redundant. Petitioner concedes that Tolman's processing units are "like the one[s] described in Crawford." Pet. at 33. It would not be obvious for a POSITA to combine Tolman and Crawford for Crawford's processing facilities when Tolman already discloses processing units.

Second, even if it would have been obvious to combine Crawford's processing facilities in some way with Tolman's processing units, it would not have been further obvious based on Tolman or Crawford to *combine* Crawford's processing facilities as a part of Tolman's Storage System 204. Tolman's processing units are a part of a completely separate system from Tolman's Storage System 204. Figure 2 of Tolman illustrates a surface pad configuration with two systems, one including Tolman's storage system 204 and the other including processing units (coupled to 234a-234c, 236a-236c and 238a-238c).

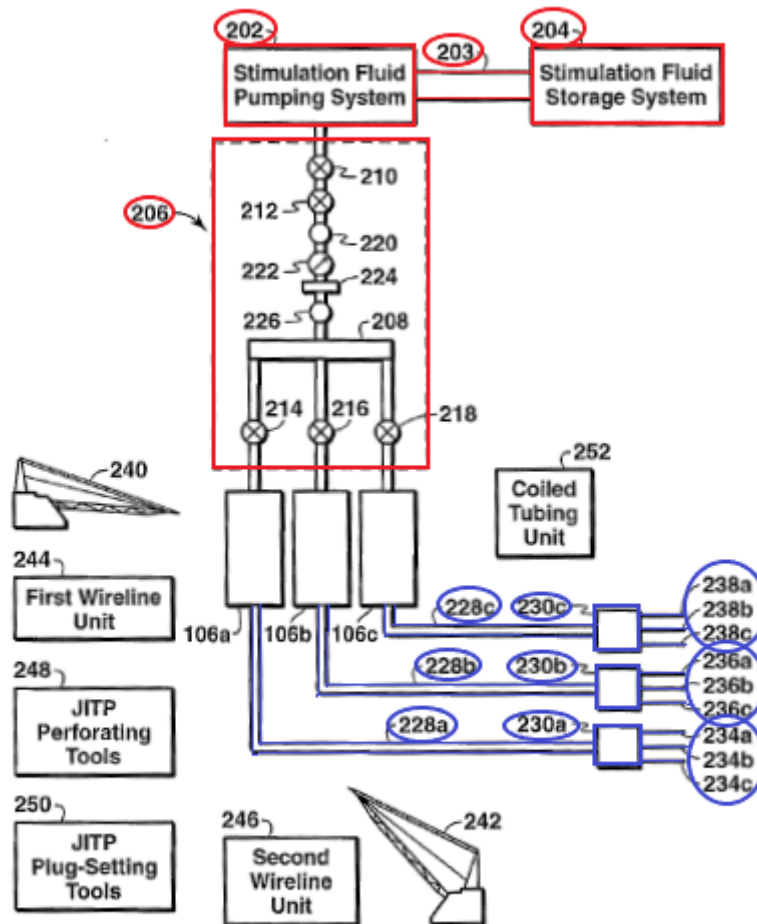


FIG. 2

EX1005 at Fig.2 (annotated). As previously explained *supra* in Section IV.A, the first system is a stimulation system that flows fluid *to* the trees 106 (and their associated wells) (annotated red), and the second is a flowback system that flows fluid *from* from the wells (annotated blue). Tolman's storage system 204 is a part of the stimulation system while Tolman's processing units are a part of the flowback system. Crawford does not disclose stimulation fluid or a stimulation fluid storage system. Nothing in Tolman or Crawford teaches combining processing units with a stimulation fluid storage system. Instead, the Petition argues its combination by stating that a POSITA's knowledge of reuse of recovered fluids would motivate a POSITA to combine the references. Pet. at 33-34. As explained *infra* VI.D.1., mere knowledge of reuse of recovered fluids does not explain why a POSITA would *combine* Crawford's processing facility with Tolman's stimulation fluid storage system. Petitioner looks to the '082 Patent for this solution, which is impermissible hindsight.

Tolman teaches that it would *not* be obvious to combine Crawford's processing facilities with Tolman's storage unit 204. Tolman already teaches processing units, and these as well as the processing units disclosed in Crawford are *not* a part of the storage system 204. At the very most, a combination of Tolman and Crawford only gets the Petitioner so far as replacement or addition of Crawford's processing units where Tolman's processing units are already

located—as a part of Tolman’s flowback system (blue) and not as a part of the storage system 204 (red). As a result, a combination of Crawford with Tolman would not flow recovered fluids to Petitioner’s proposed centralized well treatment fluid center). Petitioner fails to render obvious the independent claims of the ’082 Patent and therefore institution should be denied.

D. Grounds 1 and 2 Further Fail as to All Claims Because a POSITA Would Not Have Been Motivated to Combine Crawford’s Central Processing with Tolman’s Stimulation Fluid Storage System as the Petition Proposes

Even if a POSITA had established that Tolman/Mean/Crawford discloses or renders obvious the elements of independent claims 1 and 17 (which Patent Owner does not concede), the Petition fails to establish that a POSITA would have been motivated to combine Crawford’s central processing facility 6 as part of Tolman’s stimulation fluid storage system 204. Crawford teaches away from doing so.

1. The Petition’s Motivation to Combine Crawford with Tolman Storage System Is Deficient

Even if Petitioner had provided a sufficient explanation of its combination of Tolman with Crawford, the Petition fails to show that a POSITA would be motivated to make the combination, because Petitioner’s motivation to combine is deficient. “[A] clear, evidence-supported account of the contemplated workings of the combination is a prerequisite” to concluding “that a relevant skilled artisan would have been motivated to make the combination and reasonably expect

success in doing so.” *Personal Web Techs.*, 848 F.3d at 994. The Petition lacks an evidence-supported account of the workings of the combination of Crawford’s centralized processing facility 6 with Tolman’s stimulation fluid storage system 204. Dr. Nikolaou states that Crawford’s centralized processing unit should be a part of Tolman’s Storage System 204, “[b]ecause fluids like water may be reused for future stimulation treatment after being separated from other recovered well fluids.” However, Dr. Nikolaou offers no evidence to support this statement, such as whether it was common knowledge to a POSITA at the time of the invention. Pet. at 33. Even if the Petition did provide such evidence, Petition fails to articulate why “reuse of recovered well fluids” would motivate a POSITA to *combine* Crawford’s centralized processing facility 6 with Tolman’s stimulation fluid storage system 204. Petitioner’s conclusory motivation to combine is merely an argument for reuse of fluids at a wellsite; not a motivation to *combine* two structures. Moreover, recovered fluid can still be reused without having to combine the systems. The Petitioner relies on the ’082 Patent as a guide to *combine* these systems; this is textbook hindsight bias and should be rejected.

Dr. Nikolaou next offers that “[a] POSITA would have been motivated to use a single processing unit for multiple wells and drilling sites in the combined system of Tolman and Means to better focus labor and resources to a single unit.” Pet. at 34. Again, Dr. Nikolaou does not provide any evidence from

Tolman, Crawford, or any other source to support this assertion. Moreover, this statement only addresses why a POSITA would supposedly be motivated to use *one* of Crawford’s processing facilities over Tolman’s *multiple* processing units. It does nothing to explain why a POSITA would be further motivated to *combine* Crawford’s processing facility with Tolman’s storage system 204 to form Petitioner’s alleged “centralized well treatment fluid center.” Furthermore, Crawford teaches away from a single processing facility 6 as explained in the following section. *See infra* VI.D.3.

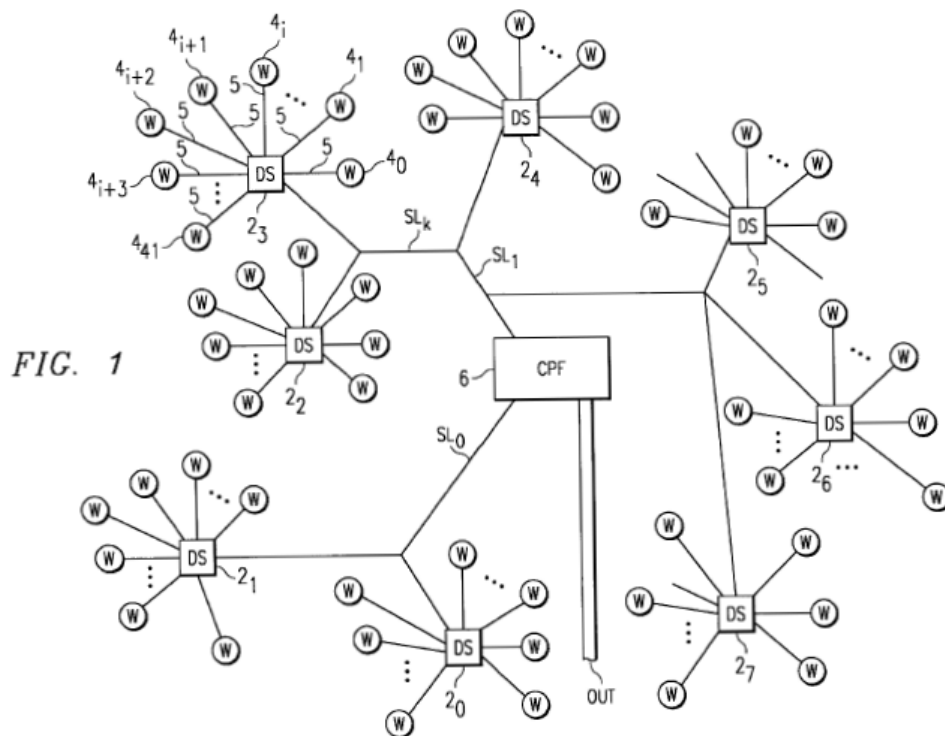
Next, Dr. Nikolaou states that Crawford’s description of “a process that optimizes well production using a central processing facility” would have motivated a POSITA to use Crawford’s central processing facility (along with other structures) in the combined system of Tolman and Means.” Pet. at 34-35. However, Crawford’s mere disclosure of a central processing facility does not explain why a POSITA would have been motivated to *combine* the central processing facility 6 with Tolman’s stimulation fluid storage system 204. For example, Petitioner's expert does not address why one of skill in the art desiring to implement Crawford's processing system in Tolman would decide to combine it with Tolman's stimulating fluid storage system 204, as opposed to implementing it separately or elsewhere in the system. *See also supra* VI.C.2.

Finally, Dr. Nikolaou states that a POSITA would have been motivated to use Crawford's central processing facility (along with other features) in combination with Tolman and Means to "optimize cost reduction." *Id.* at 35. For this motivation, the Petition relies on a background reference, Lehman, for its alleged disclosure of "regulations regarding the use and disposal of produced water" and testimony from Dr. Nikolaou that at the time of the invention, "a POSITA would have understood that it was common in the industry to use recycled water in hydraulic fracturing operations to reduce [costs]." *Id.* at 35 (citing EX1008 at [0009], [0039], [0052]; EX1003 ¶ 106). Like the other motivations proposed by Petitioner for this element, neither Lehman nor Dr. Nikolaou articulates why using recycled water in hydraulic fracturing operations to reduce costs would motivate a POSITA to *combine* Crawford's central processing facility 6 with Tolman's stimulation fluid storage system 204, as opposed to implementing it separately or elsewhere in the system. *See also supra* VI.C.2.

In each of the Petition's motivations to combine Tolman and Crawford, the Petition fails to provide an evidence-supported explanation of the contemplated workings of the combination of Crawford's central processing units 6 as "a part of" Tolman's storage system 204.

2. The Petition Should Not Have Ignored Crawford's "Central Processing Facilities"

A prior art reference must be considered as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Assoc.*, 721 F.2d at 1551. Crawford discloses that "[i]t is contemplated that the preferred embodiment of the present invention will be particularly applicable to the situation of multiple central processing facilities 6." EX1007 at 7:30-33. Crawford states that only "for the purposes of clarity," the production field in the embodiment is "described for the simple example of a single central processing facility 6." *Id.* at 33-35; *see also id.* at Fig.1 (reproduced below).



For its combination of Crawford central processing facility 6 with Tolman's stimulation fluid storage system 204, the Petition relies on Crawford for "using one central processing unit over multiple processing units located at each well site" to "allow workers and a company to focus maintenance efforts on a single building." Pet. at 34. Petitioner states that "[a] POSITA would have recognized that, by having multiple processing units, additional workers and resources will be needed to maintain those multiple units rather than a single, central processing unit." *Id.* at 34.

The Petition's analysis should not have ignored Crawford's teachings regarding the benefits of multiple central processing facilities 6. Crawford explains that "[m]odern production fields may include multiple ones of central processing facilities 6" and further provides that "the provision of multiple central processing facilities 6 allows for the additional optimization of production through the reallocation of wells 4 to central processing facilities 6." EX1007 at 7:22-23, 7:27-30. Yet, Petitioner's analysis relies on Crawford for the opposite, arguing that a POSITA would be motivated by Crawford to reduce the number of central processing facilities 6 to one. Petitioner failed to consider Crawford in its entirety by ignoring Crawford's teachings regarding the benefits of multiple central processing facilities 6.

3. Crawford Teaches Away from the Petitioner's Proposed Combination with Tolman

“A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (quoting *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994)). Crawford would have led a POSITA away from the Petition's claimed combination of using one of Crawford's central processing facilities 6 (over multiple) in combination with Tolman's storage system 204. Crawford expressly teaches the benefits of having *multiple* central processing facilities 6 over *one*, because having multiple central processing facilities 6 “allows for the *additional optimization* of production through the reallocation of wells 4 to central processing facilities 6.” EX1007 at 7:27-30 (emphasis added); *see also id.* at 7:22-23, 7:30-35.

These teachings in Crawford do not merely express a general preference for multiple central processing facilities 6 over one. Crawford's teaching regarding “additional optimization of production through reallocation of wells 4 to [multiple] central processing facilities 6” would discourage a POSITA from reducing the number of central processing facilities 6 that are available to wells. For example, in the case of combining Crawford and Tolman, any combination accounting for the teachings of the references would include multiple central processing facilities 6 or

units. Crawford acknowledges that modern oil fields contain multiple central processing facilities and suggests that its disclosure is “particularly applicable to the situation of multiple central processing facilities 6.” Tolman also teaches multiple processing units. *See* EX1005 at [0028]. Not only would Crawford encourage a POSITA to utilize multiple processing units as disclosed in Tolman, it would also discourage a POSITA from reducing the number of processing units as Petitioner suggests. Crawford would have led a POSITA away from “using one central processing unit over multiple processing units located at each well site” (and from there combining the central processing unit with Tolman’s stimulation fluid storage system 203) to create a “centralized well treatment fluid center” as claimed. The Petition thus fails to establish that the combination of Crawford/Tolman renders obvious the claims of the ’082 Patent.

E. Dr. Nikolaou’s Declaration Merely Parrots the Petition and Is Entitled to Little or No Weight

Wide swathes of Dr. Nikolaou’s declaration merely provide conclusory and unsupported opinions that substantively mirror the Petition. *E.g., compare* Pet. at 10-16 *with* EX1003 at ¶¶ 65-73; *compare* Pet. at 31-38 *with* EX1003 at ¶¶ 98-107 (comparing the Petition and Declaration’s sections on combining Tolman, Means, and Crawford). Such conclusory and unsupported opinions are entitled to little or no weight. *TQ Delta, LLC v. CISCO Sys., Inc.*, 942 F.3d 1352, 1359 (Fed. Cir. 2019) (“This court’s opinions have repeatedly recognized that conclusory expert

testimony is inadequate to support an obviousness determination on substantial evidence review”); *see also Rohm & Haas Co. v. Brotech Corp.*, 127 F.3d 1089, 1092 (Fed. Cir. 1997) (“Nothing in the rules or in our jurisprudence requires the fact finder to credit the unsupported assertions of an expert witness”). Crediting such testimony “risks allowing the challenger to use the challenged patent as a roadmap to reconstruct the claimed invention using disparate elements from the prior art.” *TQ Delta, LLC*, 942 F.3d at 1361.

The Board has repeatedly held that conclusory expert declarations that merely copy attorney argument are entitled to “little or no weight.” *Exacq Techs., Inc. v. Jds Techs., Inc.*, IPR2016-00568, Paper 7 at 22 (P.T.A.B. June 14, 2016) (citing 37 C.F.R. § 42.65(a)); *Guest Tek Interactive Ent. Ltd. v. Nomadix, Inc.*, IPR2019-01191, Paper 9 at 38 (P.T.A.B. Dec. 27, 2019) (denying institution where supporting expert declaration paragraphs “largely mirror the language of the Petition and are equally conclusory”); *Kinetic Techs., Inc. v. Skyworks Sols., Inc.*, IPR2014-00529, Paper 8 at 15 (P.T.A.B. Sept. 23, 2014) (“Merely repeating an argument from the Petition in the declaration of a proposed expert does not give that argument enhanced probative value”); *Johns Manville Corporation v. Knauf Insulation Inc.*, IPR2015-01633, Paper 10 at 13 (P.T.A.B., Jan. 4, 2016) (“We have broad discretion to assign weight to be accorded witness testimony”); *InfoBionic, Inc. v. Braemer Mfg., LLC*, IPR2015-01704, Paper 11 at 6 (P.T.A.B. Feb. 16,

2016) (finding expert declaration unpersuasive when it “repeats the Petitioner’s arguments and offers little or no elaboration”). The Board should thus decline to accord weight to Dr. Nikolaou’s conclusory and duplicative opinions because such opinions do not offer enhanced probative value.

* * * * *

Accordingly, Petitioner has not demonstrated a reasonable likelihood that it would prevail under 35 U.S.C. § 314(a).

VIII. CONCLUSION

For the foregoing reasons, Patent Owner respectfully requests that the Board decline to institute *inter partes* review of the ’082 Patent.

January 17, 2024
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CERTIFICATE OF WORD COUNT

The undersigned certifies that the foregoing Preliminary Response has a word count of 11,156, as defined by 37 C.F.R. § 42.24 using the word count feature of Microsoft Word 2010.

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CERTIFICATE OF SERVICE

In accordance with 37 C.F.R. § 42.6(e), the undersigned certifies that on the 17th day of January, 2024, a complete and entire copy of PATENT OWNER'S PRELIMINARY RESPONSE UNDER 37 C.F.R. § 42.107 and related documents were served on Petitioner via electronic mail to counsel for Petition at the following addresses:

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