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Paper 6
Date: September 20, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PHARAOH ENERGY SERVICES, LLC,
Petitioner,

v.

FLEX-CHEM HOLDING COMPANY, LLC, and
FLEX-CHEM SERVICES CORPORATION
Patent Owner.

IPR2024-00822
Patent 10,697,282 B2

Before ERIC C. JESCHKE, RICHARD H. MARSCHALL, and ARTHUR M. PESLAK, *Administrative Patent Judges*.

JESCHKE, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. BACKGROUND

Pharaoh Energy Services, LLC filed a Petition to institute *inter partes* review of claims 1–22 of U.S. Patent No. 10,697,282 B2 (Ex. 1001, "the challenged patent"). Paper 2 ("Pet."). Flex-Chem Holding Company, LLC and Flex-Chem Services Corporation (together, "Patent Owner")[1] timely filed a Patent Owner's Preliminary Response. Paper 5 ("Prelim. Resp.").

We have authority to determine whether to institute *inter partes* review. *See* 35 U.S.C. § 314 (2018); 37 C.F.R. § 42.4(a) (2023) ("The Board institutes the trial on behalf of the Director."). *Inter partes* review may not be instituted "unless . . . the information presented in the petition . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314. Upon consideration of the evidence and arguments in the record, for the reasons below and based on the particular facts of this case, we exercise our discretion under 35 U.S.C. § 314(a) and decline to institute *inter partes review* of the challenged patent.

[1] Petitioner identified only Flex-Chem Holding Company, LLC as the "Patent Owner" in the Petition. *See* Pet. (case caption), 1 (discussing Related Matters). Both Flex-Chem Holding Company, LLC and Flex-Chem Services Corporation, however, provided the Patent Owner's Mandatory Notices. *See* Paper 4 (Patent Owner's Mandatory Notices) at 1 (adding Flex-Chem Services Corporation to the caption used in the Petition), 2 (identifying both corporate entities). Although we identify both corporate entities as "Patent Owner" for purposes of this proceeding, we note that the assignment data for the challenged patent identifies only Flex-Chem Holding Company, LLC. *See* Ex. 3001.

A. Related Proceedings

The parties identify an active proceeding in the U.S. District Court for the Western District of Oklahoma ("the Oklahoma District Court") involving the challenged patent: *Flex-Chem Holding Co., LLC & Flex-Chem Services Corp. v. Pharaoh Energy Services, LLC*, No. 5:23-cv-00316-JD (W.D. Okla.), filed April 13, 2023 ("the Parallel Litigation"). Pet. 1; Paper 4 at 2.

The Parallel Litigation also involves U.S. Patent No. 9,944,843 B2 ("the '843 patent"). *See, e.g.*, IPR2024-00815, Paper 2 at 1. Petitioner filed a petition for *inter partes* review of claims 1–13 of the '843 patent in IPR2024-00815. *See id.* Concurrently with this Decision on Institution, the Board denies *inter partes* review in IPR2024-00815.

B. The Challenged Patent

The challenged patent "describes formulations and methods for remediating . . . subterranean-formed metal-polymer complexes with residual polymers such as polyacrylamide or other gelable polymer that forms crosslinks or complexes with metals or metal complexes such as ferric hydroxide." Ex. 1001, 4:21–25. According to the challenged patent, "[f]ollowing the introduction of a hydraulic fracturing fluid, including slickwater, where high volumes of polymers such as polyacrylamide are used as friction reducers, into a well bore, over time the well production can decrease." *Id.* at 4:26–29. The challenged patent posits that "the observed flow reduction can be attributed to a build-up of metal-polymer complex in the well bore that was formed after the well was created" and that, "when fracturing fluid containing a polymer, such as polyacrylamide, is pumped into subterranean formations, the polymer can cross-link with metals present or introduced in the subterranean formations and form metal-polymer

complexes." *Id.* at 4:33–41. These metal-polymer complexes "may form a physical block in the subterranean formations, plugging up the conductive pathways formed during the fracturing process." *Id.* at 4:41–44. The disclosed methods seek to remove the blockages and thereby increase production by "[b]reaking the crosslinking in the metal-polymer complex [and] caus[ing] the metal-polymer complex to go into a solution that can be pumped to the surface." *Id.* at 2:39–42.

Figure 1 is reproduced below:

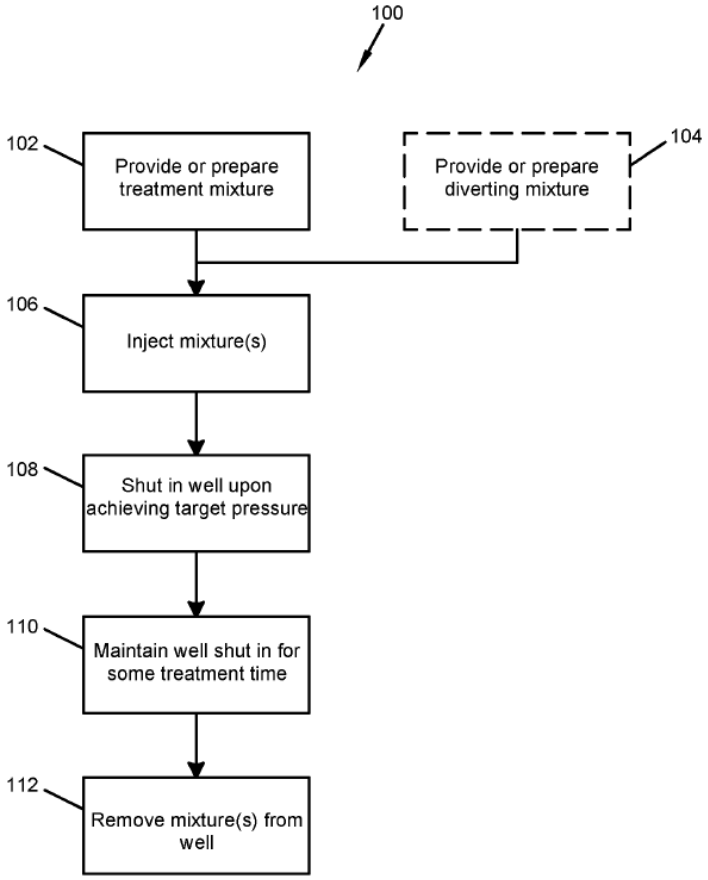

Figure 1 depicts a method of remediating a subterranean-formed metal-polymer complex. Ex. 1001, 3:48–49. In program 100 shown in Figure 1, a remediation mixture is obtained, prepared at, or provided to the well site at step 102, and then, optionally, a diverting mixture is prepared at

or provided to the well site at step 104. *Id.* at 9:1–16; *see id.* at 8:39–41 (describing diverting materials as "designed to take up larger volumes without interfering with the delivery of treatment chemicals to the target zones").

At step 106, the remediation mixture and any diverting mixture are injected into the well. Ex. 1001, 9:18–34. After the well reaches a target pressure, the well is closed and the mixture is trapped in the well at step 108. *Id.* at 9:35–37. At step 110, the well is maintained in this "shut in state" for a certain amount of "contact time" to "allow[] the treatment chemicals to react with the subterranean-formed metal-polymer complex, thereby allowing the metal-polymer complex to dissociate and dissolve into the treatment mixture." *Id.* at 9:39–43. The disclosed method ends at step 112 with the extraction of the remediation mixture along with the dissociated and dissolved metal-polymer complexes when the well is opened and the liquid pumped out of the well. *Id.* at 9:59–63.

C. The Challenged Claims

Petitioner challenges claims 1–22, of which claims 1 and 21 are independent. Claims 2–20 depend from independent claim 1 and claim 22 depends from independent claim 21. Independent claim 1 is reproduced below, reformatted from the version provided in the challenged patent, with bracketed alphanumerical designations added to identify each clause, and with emphasis added to language relevant to the discussion below:

> 1. [**1[Preamble]**] A method for remediating a *subterranean-formed metal-polymer complex* in a pre-existing well in a subterranean shale formation, the method comprising:
>
> **[1[a]]** providing a metal-polymer complex remediation mixture comprising between 0.1% and 95% by weight metal complexing agent;

> **[1[b]]** injecting the metal-polymer complex remediation mixture into the well at a pressure less than a fracture pressure of the subterranean formation until at least some of the metal-polymer complex remediation mixture contacts the *subterranean-formed metal-polymer complex*, wherein the *subterranean-formed metal polymer complex* forms from a previously injected fracturing fluid and the metal of the *subterranean-formed metal-polymer complex* includes metal naturally present within the subterranean formation;
>
> **[1[c]]** maintaining the metal-polymer complex remediation mixture in contact with the *subterranean-formed metal-polymer complex* for a contact time of between about 1 minute and about 100 days, thereby allowing the metal complexing agent to cause the *subterranean-formed metal-polymer complex* to dissociate and dissolve but not precipitate the metal and thereby creating a low viscosity flow back fluid comprising the spent metal-polymer complex remediation mixture and the metal-polymer complex components; and
>
> **[1[d]]** removing the low viscosity flow back fluid from the well after the contact time, thereby improving hydrocarbon production of the well.

Ex. 1001, 14:27–55.[2]

[2] We adopt and apply below Petitioner's designations for the elements of the challenged claims. *See* Pet. 14–21 (showing alphanumerical designations for the language in the challenged claims).

D. Asserted Grounds of Unpatentability

Petitioner challenges claims 1–22 on the following grounds:

Claim(s) Challenged	35 U.S.C. §[3]	Reference(s)/Basis
1–3, 11–14, 19	102(a)(2)	Ayers[4]
1–22	103	Ayers[5]
1–22	103	Ayers, Frenier[6]

Petitioner supports its challenges with a declaration from Dr. Jeffrey H. Harwell. Ex. 1003 ("the Harwell Declaration" or "Harwell Decl.").

II. DISCUSSION

A. Framework for Discretionary Denial Under 35 U.S.C. § 314(a)

In deciding whether to exercise discretion under § 314(a), the Board may consider events in other proceedings related to the same patent, either at the U.S. Patent and Trademark Office or in federal district courts. Consolidated Trial Practice Guide 58 (Nov. 2019), https://www.uspto.gov/TrialPracticeGuideConsolidated. The precedential order in *Apple Inc. v.*

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[3] The Leahy-Smith America Invents Act ("AIA") included revisions to 35 U.S.C. §§ 102, 103 that became effective on March 16, 2013. Pub. L. No. 112-29, §§ 3(b)–3(c), 3(n)(1), 125 Stat. 284, 285–87, 293 (2011). Because there is no dispute that the challenged claims of the challenged patent have an effective filing date after March 16, 2013, we apply the AIA versions of these statutes.

[4] US 9,410,405 B2 (Ex. 1004, "Ayers").

[5] Petitioner asserts that claims 1–22 would have been obvious based on "Ayers alone and/or in view of Frenier." Pet. 4. We understand this to present two separate bases: (1) claims 1–22 would have been obvious based on Ayers alone; and (2) claims 1–22 would have been obvious based on Ayers and Frenier.

[6] US 6,436,880 B1 (Ex. 1005, "Frenier").

Fintiv, Inc., IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) identifies factors to consider when a patent owner raises an argument for discretionary denial due to the advanced state of a parallel proceeding:

> 1. whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted;
> 2. proximity of the court's trial date to the Board's projected statutory deadline for a final written decision;
> 3. investment in the parallel proceeding by the court and the parties;
> 4. overlap between issues raised in the petition and in the parallel proceeding;
> 5. whether the petitioner and the defendant in the parallel proceeding are the same party; and
> 6. other circumstances that impact the Board's exercise of discretion, including the merits.

Fintiv, Paper 11 at 5–6. "These factors relate to whether efficiency, fairness, and the merits support the exercise of authority to deny institution in view of an earlier trial date in the parallel proceeding." *Id.* at 6. There is some overlap among these factors and some facts may be relevant to more than one factor. *Id.* In evaluating the factors, the Board takes a holistic view of whether the efficiency and integrity of the system are best served by denying or instituting review. *Id.*

On June 21, 2022, the Director of the U.S. Patent and Trademark Office issued a Memorandum setting forth an "Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation" ("Guidance Memo").[7] The Guidance Memo states that "to benefit the patent system and the public good, the PTAB will not rely on the

[7] Available at https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf.

Fintiv factors to discretionarily deny institution in view of parallel district court litigation where a petition presents compelling evidence of unpatentability." Guidance Memo 2. In the analysis that follows, we first consider whether the first five *Fintiv* factors overall weigh in favor of denying institution, and, if so, we must also determine whether the Petition presents "compelling merits." *See CommScope Techs. LLC v. Dali Wireless, Inc.*, IPR2022-01242, Paper 23 at 5 (Dir. Vidal Feb. 27, 2023) (precedential) ("In circumstances where . . . the Board's analysis of *Fintiv* factors 1–5 favors denial of institution, the Board shall then assess compelling merits.").

B. Analysis of the Fintiv *Factors*

Patent Owner argues that we should exercise our discretion to deny institution under § 314(a) based on the Parallel Litigation. Prelim. Resp. 57–65. Petitioner did not address discretionary denial under § 314(a) in the Petition, nor did Petitioner request to file a preliminary reply to address the issue. We discuss each *Fintiv* factor in turn below.

1. Factor 1: whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted

The first *Fintiv* factor requires consideration of whether the district court has stayed or may stay the proceeding pending *inter partes* review. "A district court stay of the litigation pending resolution of the PTAB trial allays concerns about inefficiency and duplication of efforts." *See Fintiv*, Paper 11 at 6.

Patent Owner argues that, because neither party has filed a motion to stay the Parallel Litigation, the first *Fintiv* factor is neutral. *See* Prelim. Resp. 57–58. We agree that this factor is neutral. *See Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 15 at 12 (PTAB May 13, 2020) (informative)

(determining that the first *Fintiv* factor is neutral when neither party has requested a stay and the issue has not been ruled on by the district court).

2. Factor 2: proximity of the court's trial date to the Board's projected statutory deadline for a final written decision

Under the second *Fintiv* factor, "[i]f the [district] court's trial date is earlier than the projected statutory deadline, the Board generally has weighed this fact in favor of exercising authority to deny institution." *See Fintiv*, Paper 11 at 9.

As noted by Patent Owner, the trial in the Parallel Litigation is currently scheduled to begin on January 14, 2025. Prelim. Resp. 58 (citing Ex. 2003 (Specialized Scheduling Order in the Parallel Litigation) at 2). Based on the date of issuance of this Decision, the beginning of the trial in the Parallel Litigation is over eight months before any final decision would have been due had *inter partes* review been instituted. This large length of time from the trial in the Parallel Litigation to the due date of the final decision in this proceeding weighs strongly in favor of discretionary denial.

As stated in the Guidance Memo, "when considering the proximity of the district court's trial date to the date when the PTAB final written decision will be due, the PTAB will consider the median time from filing to disposition of the civil trial for the district in which the parallel litigation resides." Guidance Memo 3. Patent Owner provides median time-to-trial statistics for the Oklahoma District Court, which predict a trial date approximately 26.9 months after the Parallel Litigation's filing date of April 13, 2023. *See* Prelim. Resp. 59 (citing Ex. 2005 at 2). Because the predicted trial date—approximately July 17, 2025—still precedes by two months the due date of any final decision had *inter partes* review been instituted, the statistics provided also weigh strongly in favor of denial of

institution. Given the proximity of the current trial date—less than four months from the date of this Decision—and the lack of any indication from the parties that the trial date will not hold or that either party seeks a later trial date, we view this factor as strongly favoring discretionary denial.

3. Factor 3: investment in the parallel proceeding by the court and the parties

The third *Fintiv* factor considers "the amount and type of work already completed in the parallel litigation by the [district] court and the parties at the time of the institution decision." *Fintiv*, Paper 11 at 9. For example, "if, at the time of the institution decision, the district court has issued substantive orders related to the patent at issue in the petition, this fact favors denial." *Id.* at 9–10. Thus, the more advanced the parallel proceeding, the less likely we are to institute *inter partes* review. *Id.* at 10.

We agree with Patent Owner that, as of the issuance of this Decision, the investment in the Parallel Litigation by the Oklahoma District Court and the parties favors denial. *See* Prelim. Resp. 60–62. As noted by Patent Owner, the parties prepared and served responsive expert reports (including on invalidity issues) on August 13, 2024, and completed fact and expert discovery on September 9, 2024. Prelim. Resp. 61 (citing Ex. 2003 ¶ 6; Ex. 2006 (Scheduling Order) ¶¶ 2, 5). The parties have also filed all their claim construction briefs (but the Oklahoma District Court has not yet ruled on claim construction issues). *See id.* at 60–61 (citing Ex. 2011 ¶¶ 3, 5). And on October 9, 2024, all dispositive motions and *Daubert* motions will be due. *See id.* at 61; Ex. 2006 ¶ 5. We view the advanced state of the Parallel Litigation as weighing strongly in favor of discretionary denial.

4. Factor 4: overlap between issues raised in the petition and in the parallel proceeding

The fourth *Fintiv* factor requires consideration of "inefficiency and the possibility of conflicting decisions." *See Fintiv*, Paper 11 at 12. Therefore, "if the petition includes the same or substantially the same claims, grounds, arguments, and evidence as presented in the parallel proceeding, this fact has favored denial." *Id*. The *Fintiv* panel stated that "the degree of overlap is highly fact dependent" and encouraged the parties to "indicate whether all or some of the claims challenged in the petition are also at issue in district court." *Id.* at 13.

Patent Owner asserts that the Parallel Litigation and this proceeding "reflect a complete overlap of issues, fully supporting denial." Prelim. Resp. 62. We first address the degree of overlap in issues based on the *prior art* involved in each proceeding. *See Fintiv*, Paper 11 at 12–13 (discussing how, "if the petition includes materially different grounds, arguments, and/or evidence than those presented in the district court, this fact has tended to weigh against exercising discretion to deny institution"). As argued by Patent Owner (Prelim. Resp. 62–63), the record indicates that *both* prior art references in the Petition—U.S. Patent No. 9,410,405 B2 to Ayers and U.S. Patent No. 6,436,880 B1 to Frenier—are included in the Invalidity Contentions filed in the Parallel Litigation on April 22, 2024, just four days after the filing of the Petition in this proceeding. *See* Ex. 2009 at 1–8 (listing Ayers and Frenier among only three prior art references addressing the challenged patent), *cited at* Prelim. Resp. 62. That Petitioner also relies on a 1989 publication to Borchardt (titled *Chemicals Used in Oil Field Operations*) in addition to Ayers and Frenier to assert invalidity in the Parallel Litigation does not change the analysis here. *Fintiv*, Paper 15 at 14–

15 ("Petitioner's assertion of additional invalidity contentions in the District Court is not relevant to the question of the degree of overlap for this factor.").

Moreover, the record does not indicate that Petitioner has entered into a stipulation regarding prior art asserted in the Parallel Litigation. *See* Prelim. Resp. 63 ("Petitioner has ***not*** entered into any type of stipulation, *Sotera*-style or otherwise, that would minimize inefficiencies."); *see also* Guidance Memo 3 (stating that, consistent with *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 18–19 (PTAB Dec. 1, 2020) (precedential as to § II.A), "the PTAB will not discretionarily deny institution in view of parallel district court litigation where a petitioner presents a stipulation not to pursue in a parallel proceeding the same grounds or any grounds that could have reasonably been raised before the PTAB"). We find the overlap in prior art weighs in favor of discretionary denial.

We next address the degree of overlap in issues based on the *claims* at issue in each proceeding. *See Fintiv*, Paper 11 at 13 ("The existence of non-overlapping claim challenges will weigh for or against exercising discretion to deny institution under *NHK* [*Spring Co. v. Intri-Plex Techs. Inc.*, IPR2018-00752, Paper 8 (PTAB Sept. 12, 2018) (precedential)] depending on the similarity of the claims challenged in the petition to those at issue in the district court."). In this proceeding, Petitioner challenges all issued claims (1–22) of the challenged patent, which are the same claims Petitioner seeks to invalidate in the Parallel Litigation. *See* Pet. 4 (summarizing the grounds in this proceeding); Ex. 2009 at 1–8 (Petitioner's Invalidity Contentions in the Parallel Litigation explaining how Ayers and Frenier allegedly teach or suggest all limitations of claims 1–22); Prelim.

Resp. 62–63 ("In both this IPR proceeding and the [Parallel L]itigation, Petitioner asserts all claims of the [challenged] patent are unpatentable/invalid under Section 102 based on Ayers and under Section 103 based on Ayers alone and/or in view of Frenier."). We view the overlap in claims as weighing in favor of discretionary denial. Overall, the fourth *Fintiv* factor strongly favors discretionary denial.

5. *Factor 5: whether the petitioner and the defendant in the parallel proceeding are the same party*

Under the fifth *Fintiv* factor, "[i]f a petitioner is unrelated to a defendant in an earlier [district] court proceeding, the Board has weighed this fact against exercising discretion to deny institution." *See Fintiv*, Paper 11 at 13–14. As noted by Patent Owner, Petitioner Pharaoh Energy Services, LLC is the defendant in the Parallel Litigation. *See* Prelim. Resp. 63 (citing Ex. 2007 (complaint in the Parallel Litigation); Ex. 2010 (first amended complaint in the Parallel Litigation)). This factor weighs in favor of discretionary denial. *See Fintiv*, Paper 15 at 15.

6. *Factor 6: other circumstances that impact the Board's exercise of discretion, including the merits*

Under the precedential decision in *CommScope*, if we determine that the first five *Fintiv* factors favor discretionary denial, we must also consider whether the Petition presents "compelling merits." *CommScope*, Paper 23 at 4–5. We take "a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review" when evaluating these factors. *Fintiv*, Paper 11 at 6. We have considered the circumstances and facts before us in view of the first five *Fintiv* factors. As discussed above, the first *Fintiv* factor is neutral, the second, third, and fourth *Fintiv* factors weigh strongly in favor of discretionary denial, and the fifth *Fintiv*

factor weighs in favor of discretionary denial. We therefore conclude that the evidence of record on the first five *Fintiv* factors favors exercising our discretion to deny institution of an *inter partes* review. Following *CommScope*, we now address (in Section II.C below) whether the merits presented in the Petition are compelling.

C. Compelling Merits Analysis

1. Legal Standard

As explained in the Guidance Memo, "[c]ompelling, meritorious challenges are those in which the evidence, if unrebutted in trial, would plainly lead to a conclusion that one or more claims are unpatentable by a preponderance of the evidence." Guidance Memo 4. "A challenge can only 'plainly lead to a conclusion that one or more claims are unpatentable' if it is highly likely that the petitioner would prevail with respect to at least one challenged claim." *OpenSky Indus., LLC v. VLSI Tech. LLC*, IPR2021-01064, Paper 102 at 49 (Dir. Vidal Oct. 4, 2022) (precedential) (quoting Guidance Memo 4)). The "compelling merits" standard is higher than the "reasonable likelihood" standard set by 35 U.S.C. § 314(a) for institution of *inter partes* review. *CommScope*, Paper 23 at 3 (citing Guidance Memo 4–5; *OpenSky*, Paper 102 at 49). If the Board determines that a petitioner has presented "compelling merits," we will not discretionarily deny institution. Guidance Memo 4–5. Below, we address the level of ordinary skill in the art and claim construction, and we then turn to the asserted grounds.

2. The Level of Ordinary Skill in the Art

The level of ordinary skill in the art is the "prism or lens" through which we view the prior art and the claimed invention. *Okajima v.*

Bourdeau, 261 F.3d 1350, 1355 (Fed. Cir. 2001). The person of ordinary skill in the art is a hypothetical person presumed to have known the relevant art at the time of the invention. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In determining the level of ordinary skill in the art, we may consider certain factors, including the "type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field." *Id.* (internal quotation marks and citation omitted).

Petitioner states—without any supporting evidence—that Patent Owner (assumedly in the Parallel Litigation) has

> described a person of ordinary skill in the art ("POSITA") at the time of the alleged invention of the [challenged p]atent [as having] at least a bachelor's degree in chemistry, chemical engineering, petroleum engineering, geology, or the equivalent, and at least two years of experience in oil and natural gas well treatments, or an equivalent amount of relevant work and/or educational experience.

Pet. 5. Petitioner "is prepared to adopt" this definition for this proceeding. *Id.*

Patent Owner "adopts" Petitioner's proposed definition of the level of ordinary skill in the art, which appears consistent with the record in this proceeding, including the prior art. Prelim. Resp. 10–11; *GPAC Inc.*, 57 F.3d at 1579. For purposes of this Decision, we adopt, and apply below, the definition proposed by Petitioner.

3. Claim Construction

In *inter partes* reviews, the Board interprets claim language using the same claim construction standard that would be used in a civil action under

35 U.S.C. § 282(b), as described in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 37 C.F.R. § 42.100(b).

Petitioner does not propose constructions for any claim terms. *See* Pet. 11–12. In response, Patent Owner "agrees to accept the construction for any claim terms from the [challenged] patent it presented in district court . . . [,] none of which require a construction different from the plain import of the claim language itself." Prelim. Resp. 12.

Based on the current record, we need not construe explicitly any claim terms because doing so would not change the outcome of the analysis below. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (stating that "we need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy'" (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

4. Asserted Anticipation of Claims 1–3, 11–14, and 19 by Ayers

Petitioner asserts that claims 1–3, 11–14, and 19 of the challenged patent are anticipated under 35 U.S.C. § 102(a)(2) by Ayers. Pet. 4, 12–26. Patent Owner provides arguments specifically addressing this asserted ground. Prelim. Resp. 22–38. We first summarize aspects of Ayers.

a. Overview of Ayers

Ayers generally discloses "compositions of and methods of using a fluid formulation for increasing flow, production, and/or recovery of oil and gas hydrocarbons from a wellbore or a portion of a subterranean formation." Ex. 1004, 1:48–51. The fluid formulation may include a peroxygen, a surfactant, an alkali metal chelate, and a cosolvent. *Id.* at 1:51–53; *see also id*. at 1:53–2:3 (providing examples of each component and their function).

As one embodiment of the method, Ayers claims "[a] method for enhancing hydrocarbon recovery in a subterranean formation having a blockage or accumulation of material," including the steps of: (a) injecting a treatment mixture into a formation, (b) creating gas pressure, (c) removing blockage, and (d) wherein the pH of the mixture is less than 10 and the chelate comprises between 0.2% and about 5% by weight of the mixture. *Id.* at 49:10–29 (claim 1).

b. Independent Claim 1

For independent claim 1, Petitioner contends that Ayers discloses each limitation. *See* Pet. 14–21. Patent Owner asserts (among other arguments) that Ayers does not satisfy the recitations of a "subterranean-formed metal-polymer complex" in the preamble, and limitations 1[b] and 1[c], of claim 1 (as identified in Section I.C). *See* Prelim. Resp. 24–35. For the reasons below, we determine that Petitioner's showing as to these recitations in the context of this anticipation ground does not demonstrate compelling merits.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987). The dispositive question is "whether one skilled in the art would reasonably understand or infer from a prior art reference that every claim element is disclosed in that reference." *Eli Lilly & Co. v. Los Angeles Biomedical Rsch. Inst. at Harbor-UCLA Med. Ctr.*, 849 F.3d 1073, 1074–75 (Fed. Cir. 2017) (quoting *AstraZeneca LP v. Apotex, Inc.*, 633 F.3d 1042, 1055 (Fed. Cir. 2010)).

As to the three recitations of "subterranean-formed metal-polymer complex" in limitation 1[b],[8] Petitioner first highlights Ayers's teaching that "[t]he introduced **composition may be brought into contact with, for example, blockage or damage in the wellbore or subterranean formation**." Pet. 17 (quoting Ex. 1004, 38:29–31, with emphasis added by Petitioner). Next, Petitioner states, "Ayers further explains that said blockage or damage *may result* from previously injected fracturing fluid" as allegedly evidenced by this passage from Ayers: "Inevitably, hydraulic fracturing also typically results in some level of formation damage and blockage as the **fracturing fluids intrude the natural formation and have negative interactions** in the way of . . . **forming immobile emulsions or gels** . . . ." *Id*. (quoting Ex. 1004, 8:27–35, with emphasis in second quotation added by Petitioner). From those disclosures, Petitioner concludes, "[a]s such, Ayers discloses that subterraneous formations of metal-polymer complexes *may result* due to previous injections of fracturing fluid." *Id.* (emphasis added). Citing the Harwell Declaration as alleged support, Petitioner then asserts that it would have been obvious to one of ordinary skill in the art "that, for example, a fracturing fluid containing polyacrylamide, a common polymer additive, may intrude the natural formation and have negative interactions, including forming metal-polymer complexes with metal ions naturally present in the formation." *Id.* (citing Harwell Decl. ¶ 98).

For the recitations of "subterranean-formed metal-polymer complex" in limitation 1[c], Petitioner refers back to the discussion as to limitation

[8] We need not and do not determine whether the preamble's recitation of "subterranean-formed metal-polymer complex" is limiting.

1[b]. *See* Pet. 19 ("As discussed above, Ayers discloses the existence of subterranean-formed metal-polymer complexes occurring within the subterranean formation.").

Here, Petitioner does not assert that Ayers expressly discloses the presence of a "subterranean-formed metal-polymer complex." *See* Pet. 14–21. Instead, Petitioner takes the position that one of ordinary skill in the art would have understood, based on the relied-upon disclosures in Ayers (quoted above), that a "subterranean-formed metal-polymer complex" may result. *See* Pet. 17 ("*As such*, Ayers discloses that subterraneous formations of metal-polymer complexes may result due to previous injections of fracturing fluid. It would be obvious to [one of ordinary skill in the art] that, for example, a fracturing fluid containing polyacrylamide, a common polymer additive, may intrude the natural formation and have negative interactions, including forming metal-polymer complexes with metal ions naturally present in the formation." (citing Harwell Decl. ¶ 98)).

Patent Owner responds that Petitioner has not compellingly shown that one of ordinary skill in the art would have understood, based on the relied-upon disclosures in Ayers, that a "subterranean-formed metal-polymer complex" would necessarily have been present in Ayers's subterranean formations. *See* Prelim. Resp. 30–32. We agree with Patent Owner.

As noted by Patent Owner, Petitioner relies on the Harwell Declaration to support that one of ordinary skill in the art would have understood that a "subterranean-formed metal-polymer complex" would necessarily have been present in Ayers. *See* Pet. 17 (citing Harwell Decl. ¶ 98); *see also* Prelim. Resp. 31 (presenting this argument). In the paragraph

from his Declaration cited on page 17 of the Petition, however, Dr. Harwell essentially repeats verbatim the conclusions from the Petition quoted above:

> 98. As such, Ayers discloses that subterraneous formations of metal-polymer complexes may result due to previous injections of fracturing fluid. For example, fracturing fluid containing polyacrylamide, a common polymer additive to fracturing fluid, may intrude the natural formation and have negative interactions in the way of forming a metal-polymer complex with metal ions naturally present in the formation.

Harwell Decl. ¶ 98, *cited at* Pet. 17. Dr. Harwell provides no additional scientific or technical basis for these conclusory restatements of Petitioner's assertions, and we find Dr. Harwell's testimony on this issue entitled to little weight. *See Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15–17 (PTAB Aug. 24, 2022) (precedential) (denying institution and determining that testimony of a declarant that merely repeats, *verbatim*, conclusory assertions from a petition, without citing additional supporting evidence or providing technical reasoning to support the testimony, is entitled to little weight), *cited at* Prelim. Resp. 31 (arguing that paragraph 98 of the Harwell Declaration "repeats the Petition essentially *verbatim* and fails to provide any further evidence or explanation on how Ayers discloses (or even suggests) the claimed subject matter"); *see also* 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.").

We also view Petitioner's and Dr. Harwell's conclusions as lacking because they fail to demonstrate that a "subterranean-formed metal-polymer complex" *would necessarily have been present* in Ayers's subterranean formations. Instead, as noted by Patent Owner, both Petitioner and Dr. Harwell can muster only that "subterraneous formations of metal-polymer

complexes *may result* due to previous injections of fracturing fluid" and that "fracturing fluid containing polyacrylamide . . . *may intrude* the natural formation and have negative interactions in the way of forming a metal-polymer complex . . . ." Pet. 17; Harwell Decl. ¶ 98 (emphasis added); *see* Prelim. Resp. 31–32 (presenting this argument). Even assuming these statements to be accurate, and even if the statements are unrebutted at trial, they are not sufficient on the record here to demonstrate compelling merits of anticipation. *See In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999) (quoting *In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981)) ("Inherency . . . may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.").[9]

For these reasons, Petitioner has not adequately supported its position that one of ordinary skill in the art would have understood, based on the relied-upon disclosures in Ayers, that a "subterranean-formed metal-polymer complex" would necessarily have been present in Ayers's subterranean formations to show compelling merits.

[9] Petitioner also alludes to an obviousness argument for this limitation in the middle of its anticipation argument. *See* Pet. 17 ("It would be obvious to [one of ordinary skill in the art] that, for example, a fracturing fluid containing polyacrylamide, a common polymer additive, may intrude the natural formation and have negative interactions, including forming metal-polymer complexes with metal ions naturally present in the formation." (citing Harwell Decl. ¶ 98)). The cited testimony, however, does not address obviousness, and the argument lacks sufficient development and explanation to merit consideration here. *See id.*; Harwell Decl. ¶ 98.

c. Conclusion as to Asserted Anticipation

For the reasons above, Petitioner's showing as to the requirements for a "subterranean-formed metal-polymer complex" in claim 1 in the context of the anticipation ground based on Ayers does not demonstrate compelling merits. Because challenged claims 2, 3, 11–14, and 19 all depend from claim 1, Petitioner's showing as to those claims in the context of this anticipation ground also does not demonstrate compelling merits.

5. Asserted Obviousness of Claims 1–22 Based on Ayers Alone & Asserted Obviousness of Claims 1–22 Based on Ayers and Frenier

Petitioner asserts that claims 1–22 of the challenged patent would have been obvious under 35 U.S.C. § 103 based on "Ayers alone and/or in view of Frenier." Pet. 4; *see also id.* at 26–65 (detailed discussion). As discussed (*see* note 5 above), we understand this to present two separate bases: (1) claims 1–22 would have been obvious based on Ayers alone; and (2) claims 1–22 would have been obvious based on Ayers and Frenier. We address these two bases in turn below. Patent Owner provides arguments specifically addressing these asserted grounds. Prelim. Resp. 39–57. We first summarize aspects of Frenier.

a. Overview of Frenier

Frenier "relates to the stimulation of hydrocarbon wells and in particular to acid fluids and methods of using such fluids in treating a subterranean formation having low permeability." Ex. 1005, 1:6–9. One aspect of Frenier involves disclosures of "a method of acid-treating a subterranean formation." *Id*. at 4:44–45. The method includes "the step of injecting a well treatment fluid composition via a wellbore into a subterranean formation" in which the "injection step is preferably performed

at a fluid pressure that is less than the minimum in situ rock stress (i.e., a matrix acidizing method), [but] can also be performed at a higher pressure (i.e., an acid fracturing method)." *Id.* at 4:45–53.

According to Frenier, it would "be desirable if the acid well treatment fluid could lead to improved radial penetration than is commonly seen for acid well treatment fluids known in the art, and it is additionally desirable that the acid well treatment fluid could be used in either matrix acidizing or fracture acidizing treatments." Ex. 1005, 3:57–62. The goal of the methods disclosed in Frenier is "an increase in the permeability of the formation, for example by the creation or enlargement of passageways through the formation, and therefore an increase in the rate of production of formation fluids such as oil and gas." *Id.* at 7:34–38.

b. Independent Claims 1 and 21

For independent claims 1 and 21, Petitioner contends that Ayers, alone or in combination with Frenier, discloses or suggests each limitation. Pet. 30–37 (claim 1), 60–63 (claim 21). Patent Owner asserts (among other arguments) that neither Ayers, nor Frenier, nor the combination of Ayers and Frenier, satisfy the recitations of a "subterranean-formed metal-polymer complex" in the preamble, and limitations 1[b] and 1[c], of claim 1 as well as the preamble, and limitations 21[c] and 21[d], of claim 21.[10] *See* Prelim. Resp. 41–45, 51–55. For the reasons below, we determine that Petitioner's showing as to these recitations in the context of the two separate bases of this obviousness ground does not demonstrate compelling merits.

[10] We need not and do not determine whether the recitations of "subterranean-formed metal-polymer complex" in the preamble of claim 1 or the preamble of claim 21 are limiting.

For obviousness, the question "is not merely what the references expressly teach, but what they would have suggested to one of ordinary skill in the art at the time the invention was made." *In re Lamberti*, 545 F.2d 747, 750 (CCPA 1976); *see also In re Burckel*, 592 F.2d 1175, 1179 (CCPA 1979) ("Under 35 U.S.C. § 103, a reference must be considered not only for what it expressly teaches, but also for what it fairly suggests.").

We note at the outset that Petitioner does not present the allegations of obviousness based on Ayers alone separately from the allegations of obviousness based on Ayers and Frenier; instead, these two bases are presented together. *See* Pet. 26–37, 60–63. Petitioner begins the discussion of the preamble of claim 1 with "Petitioner incorporates herein its statements and arguments above from Ground I with respect to Ayers's disclosure of Element 1[Preamble]." Pet. 30. Then, Petitioner contends that it would have been obvious to one of ordinary skill in the art "to apply the disclosures of Ayers to a method for remediating a subterranean formed metal-polymer complex in a pre-existing well in a subterranean formation." *Id.* (citing Harwell Decl. ¶ 148). Petitioner then quotes Frenier regarding "methods to **enhance the productivity of hydrocarbon wells** (e.g., oil wells) by . . . **removing (by dissolution) near-wellbore formation damage**." Pet. 30–31 (quoting Ex. 1005, 1:55–60, with emphasis added by Petitioner). According to Petitioner, one of ordinary skill in the art would have understood that disclosure "to apply to remediating a subterranean-formed metal-polymer complex." Pet. 31 (citing Harwell Decl. ¶ 150).

Petitioner begins the discussion of limitation 1[b] with "Petitioner incorporates herein its statements and arguments above from Ground I with respect to Ayers's disclosure of Element 1[b]." Pet. 34. Then, Petitioner

turns to teachings in Frenier about the use of its methods in "subterranean formation[s]." Pet. 34 (citing Ex. 1005, 4:44–45, 4:45–47). Petitioner concludes that "Ayers, either alone or in combination with Frenier, as informed by the knowledge of [one of ordinary skill in the art], discloses Element 1[b]." *Id.* Petitioner does not address the recitations of "subterranean-formed metal-polymer complex" in the discussion of limitation 1[c]. *See* Pet. 34–36. For the preamble, and limitations 21[c] and 21[d], of claim 21, Petitioner refers to its discussion of the preamble, and limitations 1[b] and 1[c], of claim 1, respectively. *See* Pet. 60–63.

(1) Asserted Obviousness Based on Ayers Alone

For the asserted obviousness based on Ayers alone, Petitioner largely relies on the same arguments and evidence presented in the context of the ground of anticipation based on Ayers. Specifically, for the preamble, limitation 1[b] and limitation 1[c] (each of which recite the "subterranean-formed metal-polymer complex"), Petitioner *expressly* "incorporates" its prior "statements and arguments" from the anticipation ground before turning to Frenier. *See* Pet. 30 (preamble), 34 (limitations 1[b] and 1[c]).

Patent Owner argues that Petitioner "appears to hang its hat on anticipation by Ayers" and thus performs an "incomplete and patchwork" obviousness "analysis contained within a single ground directed to both Ayers alone and Ayers in view of Frenier." Prelim. Resp. 42. Patent Owner relies on many of the same arguments presented as to alleged anticipation, including those for "subterranean-formed metal-polymer complex." *Id.* at 41–44.

We turn now to the one assertion by Petitioner addressing "subterranean-formed metal-polymer complex" in the context of alleged

obviousness based on Ayers alone that does not rely on its positions from the alleged ground of anticipation based on Ayers: Petitioner's contention that it would have been obvious to one of ordinary skill in the art "to apply the disclosures of Ayers to a method for remediating a subterranean formed metal-polymer complex in a pre-existing well in a subterranean formation." Pet. 30 (citing Harwell Decl. ¶ 148). In the cited paragraph from his Declaration, Dr. Harwell repeats verbatim the conclusion from the Petition quoted in the prior sentence. *Compare* Pet. 30, *with* Harwell Decl. ¶ 148. Dr. Harwell provides no additional scientific or technical basis for this conclusory restatement of Petitioner's assertions, and we find Dr. Harwell's testimony on this issue entitled to little weight. *See Xerox Corp.*, Paper 9 at 15–17, *cited at* Prelim. Resp. 43 (identifying paragraph 148 of the Harwell Declaration as an example in which "the Petition incorporates statements and arguments from its flawed anticipation analysis combined with unsupported conclusory assertions about [one of ordinary skill in the art] that Dr. Harwell repeats essentially *verbatim*"); *see also* 37 C.F.R. § 42.65(a).

For the same reasons discussed above in the context of the anticipation ground, Petitioner has not compellingly shown that Ayers expressly discloses a "subterranean-formed metal-polymer complex" or that one of ordinary skill in the art would have understood that a "subterranean-formed metal-polymer complex" would necessarily have been present in Ayers's subterranean formations. *See* Section II.C.4.b. Moreover, to the extent argued, Petitioner has not explained compellingly why Ayers suggests a "subterranean-formed metal-polymer complex" or why one of ordinary skill in the art would have modified the teachings of Ayers for use on a "subterranean-formed metal-polymer complex."

(2) Asserted Obviousness Based on Ayers and Frenier

For the reasons discussed in the prior section, Ayers does not disclose or suggest a "subterranean-formed metal-polymer complex." In the context of this basis for obviousness based on the proposed combination of Ayers and Frenier, Petitioner does not clearly rely on Frenier (or Ayers for that matter) for the recitations of the "subterranean-formed metal-polymer complex." *See* Prelim. Resp. 42 (asserting that "it was challenging for Patent Owner (and should likewise be challenging to the Board) to unearth Petitioner's analysis separate and apart from any alleged disclosures from Frenier"). Regardless, we discuss Petitioner's evidence and argument with the understanding that Frenier is relied on—at least in the alternative—for those recitations.

Frenier does not expressly disclose a "subterranean-formed metal-polymer complex," and Petitioner does not assert so. *See* Pet. 30–37, 60–63. Instead, for the separate basis of obviousness based on the combination of Ayers and Frenier, Petitioner takes the position (at least in the alternative) that one of ordinary skill in the art would have understood Frenier's disclosure at column 1, lines 55–60 "to apply to remediating a subterranean-formed metal-polymer complex." *See* Pet. 30–31 (citing Harwell Decl. ¶ 150).

Patent Owner responds that Petitioner has not explained compellingly how Frenier "cure[s] the deficiencies of Ayers alone . . . including how the Ayers/Frenier combination discloses or suggests" the "subterranean-formed metal-polymer complex" in claims 1 and 21. Prelim. Resp. 51. We agree.

On the record here, Petitioner has not shown compellingly why one of ordinary skill in the art would have understood the teaching of "removing

(by dissolution) near-wellbore formation damage" (Ex. 1005, 1:55–60, *quoted at* Pet. 30–31) to apply to remediating a "subterranean-formed metal-polymer complex" as recited in claims 1 and 21. As noted by Patent Owner, Petitioner relies on the Harwell Declaration to support that alleged understanding of Frenier's disclosure. Pet. 31 (citing Harwell Decl. ¶ 150); *see also* Prelim. Resp. 53 (presenting this argument). In the relied-upon paragraph from his Declaration, however, Dr. Harwell merely restates, word for word, the quoted assertion from Petitioner, with no additional scientific evidence or technical basis for this conclusory statement. *Compare* Pet. 31, *with* Harwell Decl. ¶ 150. We find this testimony entitled to little weight. *See Xerox*, Paper 9 at 15–17, *cited at* Prelim. Resp. 53 ("And while the Petition cites to portions of [the] Harwell Declaration in an attempt to support Petitioner's insufficient assertions, Dr. Harwell repeats those same assertions essentially *verbatim* without providing any further evidence or explanation."); 37 C.F.R. § 42.65(a). This inadequate showing as to requirements in limitations 1[b] and 1[c] and in limitations 21[c] and 21[d] reveals a lack of compelling merits.

For these reasons, Petitioner has not adequately supported its alternative position that one of ordinary skill in the art would have understood Frenier to disclose or suggest a "subterranean-formed metal-polymer complex" to show compelling merits. Further, as argued by Patent Owner (Prelim. Resp. 51), Petitioner has not adequately explained why one of ordinary skill in the art would have modified the proposed combination of Ayers and Frenier to address the recitations of a "subterranean-formed metal-polymer complex" to show compelling merits.

c. Conclusion as to Asserted Obviousness

For the reasons above, we determine that Petitioner's showing as to the requirements for a "subterranean-formed metal-polymer complex" in claim 1 and claim 21 in the context of this obviousness ground based on either Ayers alone and on the combination of Ayers and Frenier does not demonstrate compelling merits. Because challenged claims 2–20 all depend from claim 1 and because claim 22 depends from claim 21, Petitioner's showing as to those claims in the context of this ground also does not demonstrate compelling merits.

6. Conclusion as to Compelling Merits

As discussed above, "[c]ompelling, meritorious challenges are those in which the evidence, if unrebutted in trial," show it is "highly likely that the petitioner would prevail with respect to at least one challenged claim." Guidance Memo 4; *OpenSky*, Paper 102 at 49. For the reasons above, Petitioner's arguments and evidence do not satisfy the "compelling merits" standard as to any ground presented.

D. Overall Balancing of the Fintiv *Factors*

We have considered the circumstances and facts before us in view of the *Fintiv* factors. As discussed above, we have determined that the first five *Fintiv* factors overall weigh in favor of discretionary denial of institution. Moreover, we have further determined that the Petition does not show compelling merits under the sixth *Fintiv* factor. We therefore conclude that the evidence of record favors exercising our discretion to deny institution.

III. CONCLUSION

For the reasons above, we exercise our discretion under 35 U.S.C. § 314(a) to deny institution of *inter partes* review.

IV. ORDER

Accordingly, it is hereby:

ORDERED that the Petition is denied as to all challenged claims, and no *inter partes* review is instituted.

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