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Filed on Behalf of:

Patent Owner LiquidPower Specialty Products Inc.

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BAKER HUGHES HOLDINGS, LLC
(f/k/a BAKER HUGHES, A GE COMPANY, LLC),

Petitioner

v.

LIQUIDPOWER SPECIALTY PRODUCTS INC.
(f/k/a LUBRIZOL SPECIALTY PRODUCTS, INC.)
Patent Owner

Case IPR2016-01903
Patent No. 8,426,498 B2

PATENT OWNER'S NOTICE OF APPEAL

INTRODUCTION

LiquidPower Specialty Products Inc. (“LSPI”) hereby files a notice of appeal stemming from the Patent Trial and Appeal Board’s Final Written Decision on Remand entered on April 30, 2021 (Paper 82) (the “Decision on Remand”) and the order of Andrew Hirshfeld, Commissioner for Patents, Performing the Functions and Duties of the Under Secretary of Commerce for Intellectual Property and Director of the United States Patent and Trademark Office, denying LSPI’s request for Director review (Paper 91) (the “Director Review Order”) in the above-captioned *inter partes* review of United States Patent No. 8,426,498 (the “498 Patent”). Please note that the Decision on Remand in this matter has been sealed to the public, and currently only the Parties and the Board have access to it. The Director Review Order and redacted version of the Decision on Remand are attached to this Notice.

LSPI previously filed a protective notice of appeal from the Decision on Remand. Although LSPI’s position was that, prior to the Director Review Order, a notice of appeal was not yet due because a final agency decision did not yet exist, LSPI filed its protective notice of appeal to preserve its appellate rights in the event that there was any uncertainty about when the agency decision became final. That

appeal is before the Federal Circuit in Case No. 21-2284. LSPI intends to request consolidation of this appeal with Case No. 21-2284¹.

LSPI'S APPEAL

Please take notice that under 35 U.S.C. §§ 141(c), 142, 319; 37 C.F.R. §§90.2(a), 90.3(a), and Federal Rules of Appellate Procedure/Federal Circuit Rule 4(3)(a), Patent Owner LSPI hereby appeals to the United States Court of Appeals for the Federal Circuit from the Decision on Remand and Director Review Order based on the “Decision, Institution of Inter Partes Review” entered on March 31, 2017 (Paper 11) (the “Institution Decision”).

LSPI'S ISSUES ON APPEAL

In accordance with 37 C.F.R. § 90.2(a)(3)(ii), LPSI's issues on appeal may include, but are not limited to: (i) the Board's finding that claim 3 of the 498 Patent is unpatentable under 35 U.S.C. § 103 as obvious over the combination of the Holtmyer Publication, the Holtmyer Patent, and Carnahan; (ii) the Board's finding that claim 3 of the 498 Patent is unpatentable under 35 U.S.C. § 103 as obvious over the combination of Inaoka and Carnahan; (iii) whether the objective evidence of non-obviousness precludes each of the findings of obviousness on claim 3 of the 498 Patent; (iv) whether it is unconstitutional for a panel of Administrative Patent

¹ Case No. 21-2284 has been consolidated with Case Nos. 21-2283 and 21-2285. Case No. 21-2283 is the lead case.

Law Judges to issue a final order invalidating the 498 Patent without an opportunity for review by a validly appointed Director or Acting Director, as *United States v. Arthrex, Inc.*, 141 S. Ct. 1970 (June 21, 2021) requires; (v) whether the Commissioner of Patents, Drew Hirshfeld, lacked authority under the Federal Vacancies Reform Act (FVRA), 5 U.S.C. § 3345 et seq., to deny LSPI's requests for review by the Director or Acting Director of U.S. Patent and Trademark Office of the Board's decisions and order that the PTAB's Final Written Decisions are final decisions of the agency; and (vi) any findings or determinations supporting or related to the aforementioned issues, as well as all other issues decided adversely to LSPI in any orders, decisions, rulings, and/or opinions.

Simultaneously with this submission, LSPI is filing a true and correct copy of this Notice of Appeal with the Director of the United States Patent and Trademark Office and a true and correct copy of the same, along with the required docketing fee, with the Clerk of the United States Court of Appeals for the Federal Circuit as set forth in the accompanying Certificate of Filing.

Dated: November 12, 2021

Respectfully Submitted,

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CERTIFICATE OF FILING

The undersigned hereby certifies that, in addition to being electronically filed through PTAB E2E, a true and correct copy of the above-captioned PATENT OWNER'S NOTICE OF APPEAL is being sent via priority mail on November 12, 2021, to the Director of the United States Patent and Trademark Office, at the following address:

Director of the United States Patent and Trademark Office
c/o Office of the General Counsel, 10B20
Madison Building East
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Alexandria, VA 22314

The undersigned also hereby certifies that a true and correct copy of the above-captioned PATENT OWNER'S NOTICE OF APPEAL and the filing fee is being filed via CM/ECF with the Clerk's Office of the United States Court of Appeals for the Federal Circuit on November 12, 2021.

Dated: November 12, 2021

Respectfully Submitted,

/Elizabeth S. Weiswasser/

Elizabeth S. Weiswasser

Reg. No. 55,721

CERTIFICATE OF SERVICE

I hereby certify that on November 12, 2021, a copy of **PATENT OWNER'S NOTICE OF APPEAL** was served by filing this document through the PTAB's E2E Processing System as well as delivering a copy via electronic mail upon the following:

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Dated: November 12, 2021

Respectfully Submitted,

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v.

LIQUIDPOWER SPECIALTY PRODUCTS INC.
(f/k/a LUBRIZOL SPECIALTY PRODUCTS, INC.),
Patent Owner.

IPR2016-01901 (Patent 8,450,249 B2)
IPR2016-01903 (Patent 8,426,498 B2)
IPR2016-01905 (Patent 8,450,250 B2)¹

Before KRISTINA M. KALAN, CHRISTOPHER M. KAISER, and
MICHELLE N. ANKENBRAND, *Administrative Patent Judges*.

KALAN, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision on Remand
Determining All Challenged Claims Unpatentable
35 U.S.C. §§ 144, 318

¹ We exercise our discretion to issue one decision to be entered in all three cases. The parties are not authorized to use this style heading for subsequent papers without Board preapproval.

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IPR2016-01905 (Patent 8,450,250 B2)

I. INTRODUCTION

We issue this decision pursuant to a remand from the United States Court of Appeals for the Federal Circuit in *LiquidPower Specialty Products Inc. v. Baker Hughes, A GE Company, LLC*, No. 2019-1838, 810 F. App'x 905 (Fed. Cir. 2020). For the reasons set forth below, we determine that Baker Hughes Holdings, LLC (“Petitioner” or “Baker”) has demonstrated by a preponderance of the evidence that all claims that remain before us in these proceedings are unpatentable.

A. Procedural History

Petitioner filed a Petition (Paper 2) requesting *inter partes* review of claims 1–5 of U.S. Patent No. 8,450,249 B2 (“the ’249 patent,” Ex. 1003²), a Petition (1903 Paper 2) requesting *inter partes* review of claims 1–5 of U.S. Patent No. 8,426,498 B2 (1903 Ex. 1002, “the ’498 patent”), and a Petition (1905 Paper 2) requesting *inter partes* review of claims 1–9 of U.S. Patent No. 8,450,250 B2 (1905 Ex. 1004, “the ’250 patent”) pursuant to 35 U.S.C. § 311.³ Pursuant to 35 U.S.C. § 314, we instituted *inter partes* review of claims 1–5 of the ’249 patent (Paper 10 (“Dec.” or “1901 Dec.”)), claims 1–5 of the ’498 patent (1903 Paper 11 (“1903 Dec.”)); and claims 1–9 of the ’250 patent (1905 Paper 10 (“1905 Dec.”)).

² IPR2016-01901, IPR2016-01903, and IPR2016-01905 include substantially the same papers and exhibits. The arguments and evidence set forth by Petitioner and Patent Owner are substantially the same in all cases. Accordingly, we issue a consolidated Decision on Remand, and all citations are to IPR2016-01901 unless otherwise indicated. Citations to IPR2016-01901 may be preceded by “1901” and citations to IPR2016-01903 and IPR2016-01905 are preceded by “1903” or “1905,” respectively.

³ In support of the Petition, Petitioner filed a declaration of Thomas H. Epps, III, Ph.D. (Ex. 1041).

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During trial, LiquidPower Specialty Products Inc. (“Patent Owner” or “LSPI”) filed a Response (Paper 19, “PO Resp.” (public version)), and Petitioner filed a Reply (Paper 31, “Pet. Reply” (public version)).⁴ We also authorized Patent Owner to file a Sur-Reply to respond to arguments and evidence presented in Petitioner’s Reply regarding, among other things, objective indicia of non-obviousness. Paper 40, “PO Sur-Reply” (public version).

On April 4, 2018, we issued a Final Written Decision determining that Petitioner had shown by a preponderance of the evidence that claims 1–5 of the ’249 patent were unpatentable. 1901 Paper 65 (“1901 Final Dec.”). On March 28, 2018, we issued a Final Written Decision determining that Petitioner had shown by a preponderance of the evidence that claim 3⁵ of the ’498 patent was unpatentable. 1903 Paper 68 (“1903 Final Dec.”). On April 4, 2018, we issued a Final Written Decision determining that Petitioner had shown by a preponderance of the evidence that claims 1–9 of the ’250 patent were unpatentable. 1905 Paper 65 (“1905 Final Dec.”).⁶

On May 1, 2019, Patent Owner appealed our decision holding claims 1–5 of the ’249 patent and claim 3 of the ’498 patent unpatentable as

⁴ With the Response, Patent Owner filed a declaration of Brian Dunn, Ph.D. (Ex. 2141 (public version)).

⁵ On November 16, 2017, Patent Owner filed a Disclaimer in Patent under 37 C.F.R. § 1.321(a), disclaiming claims 1, 2, 4, and 5 of the ’498 patent. 1903 Ex. 2156. Therefore, in IPR2016-01903, the only claim on which a final written decision issued was claim 3.

⁶ We collectively refer to claims 1–5 of the ’249 patent, claim 3 of the ’498 patent, and claims 1–9 of the ’250 patent as the “Claims at Issue.”

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obvious over (1) the combination of the Holtmyer Publication,⁷ the Holtmyer Patent,⁸ and Carnahan,⁹ and (2) the combination of Inaoka¹⁰ and Carnahan. 1901 Paper 73; 1903 Paper 76. On May 1, 2019, Patent Owner also appealed our decision holding claims 1–9 of the '250 patent unpatentable as obvious over (1) the combination of the Holtmyer Publication, the Holtmyer Patent, and Strausz,¹¹ and (2) the combination of Inaoka and Strausz. 1905 Paper 73.

On June 17, 2020, the Federal Circuit issued a consolidated decision vacating and remanding our Final Written Decisions in IPR2016-01901, IPR2016-01903, and IPR2016-01905, with the following conclusion:

For reasons analogous to those expressed in *LiquidPower Specialty Products Inc. v. Baker Hughes*, 749 F. App'x 965 (Fed. Cir. 2018) (“*LiquidPower 2018*”), we conclude that the Patent Trial and Appeal Board (“Board”) erred by reaching its obviousness conclusion without considering the evidence of secondary considerations proffered by LiquidPower Specialty Products Inc.

⁷ Marlin D. Holtmyer & Jiten Chatterji, *Study of Oil Soluble Polymers as Drag Reducers*, 20 POLYMER ENG'G & SCI. 7, 473–77 (1980) (“Holtmyer Publication”) (Ex. 1005).

⁸ U.S. Patent No. 3,758,406, issued September 11, 1973 (“Holtmyer Patent”) (Ex. 1006).

⁹ Norman F. Carnahan, *Precipitation of Asphaltenes in Heavy Oil and Tar Sands*, in 40B DEV. IN PETROLEUM SCI., ASPHALTENES AND ASPHALTS, 2 319–33 (Teh Fu Yen & George V. Chilingarian eds., 2000) (“Carnahan”) (Ex. 1008).

¹⁰ European Pat. App. No. EP 0,882,739 A2, published December 9, 1998 (“Inaoka”) (Ex. 1007).

¹¹ Otto P. Strausz & Elizabeth M. Lown, *The Chemistry of Alberta Oil Sands, Bitumens and Heavy Oils* 464–480 (2003) (“Strausz”) (1905 Ex. 1009).

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LiquidPower, 810 F. App'x at 906.¹²

Following the remand, and with our authorization, Petitioner filed a Brief on Remand (Paper 75, “Pet. Br.”) and Patent Owner filed a Brief on Remand (Paper 76, “PO Br.”).

*B. The '249 Patent, '498 Patent, and '250 Patent*¹³

The '249 patent, '498 patent, and '250 patent relate to a “method of introducing a drag reducing polymer into a pipeline such that the friction loss associated with the turbulent flow though [sic] the pipeline is reduced by suppressing the growth of turbulent eddies,” in which the “drag reducing polymer is introduced into a liquid hydrocarbon having an asphaltene content of at least 3 weight percent and an API gravity of less than about 26° to thereby produce a treated liquid hydrocarbon.” 1901 Ex. 1003, code (57); 1903 Ex. 1002, code (57); 1905 Ex. 1004, code (57).

According to the Specification, “[w]hen fluids are transported by a pipeline, there is typically a drop in fluid pressure due to the friction between the wall of the pipeline and the fluid.” 1901 Ex. 1003, 1:20–22. The pressure drop increases with increasing flow rate, resulting in energy

¹² In *LiquidPower 2018*, the Federal Circuit stated that, because “substantial evidence does not support the Board’s finding that LSPI failed to establish nexus, the Board erred in not weighing LSPI’s objective evidence of nonobviousness. Accordingly, we vacate its decision and remand. On remand, it is up to the Board to consider the amount of weight to give this evidence.” *LiquidPower 2018*, 749 F. App'x at 969.

¹³ For context, we repeat this information from our Final Written Decisions, primarily from our Final Written Decision in IPR2016-01901 concerning the '249 Patent. The specifications of all three challenged patents are substantially similar.

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losses and inefficiencies that increase equipment and operation costs. *Id.* at 1:24–32. The problems associated with pressure drop are most acute when fluids are transported over long distances. *Id.* at 1:29–31.

Before the '249 patent, it was known to use drag reducing additives in the fluid flowing through a pipeline to alleviate the problems resulting from pressure drop. *Id.* at 1:33–35. A drag reducer “is a composition capable of substantially reducing friction loss associated with the turbulent flow of a fluid through a pipeline,” and such a composition works by “suppress[ing] the growth of turbulent eddies, which results in higher flow rate at a constant pumping pressure.” *Id.* at 1:37–42. Drag reduction generally “depends in part upon the molecular weight of the polymer additive and its ability to dissolve in the hydrocarbon under turbulent flow.” *Id.* at 1:44–46.

According to the Specification, because conventional drag reducers do not perform well in crude oils having a low API gravity¹⁴ and/or a high asphaltene content, there exists a need for “improved drag reducing agents capable of reducing the pressure drop associated with the turbulent flow of low API gravity and/or high-asphaltene crude oils through pipelines.” *Id.* at 1:49–54. The subject matter of the disclosed invention, therefore, “relates generally to high molecular weight drag reducers for use in crude oils.” *Id.* at 1:15–16. More specifically, the '249 patent discloses a method for reducing the pressure drop associated with flowing a liquid

¹⁴ The Specification defines API gravity as “the specific gravity scale developed by the American Petroleum Institute for measuring the relative density of various petroleum liquids.” 1901 Ex. 1003, 3:50–54.

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hydrocarbon through a conduit, such as a pipeline. *Id.* at 2:48–50. The method comprises introducing a drag reducing polymer into a liquid hydrocarbon having an asphaltene content of at least 3 weight percent and an API gravity of less than about 26° to produce a treated liquid hydrocarbon wherein the viscosity is not less than the viscosity of the liquid hydrocarbon prior to treatment with the drag reducing polymer. *Id.* at 18:62–19:5. The '249 patent provides several examples of suitable heavy crude oils and blended heavy crude oils. *Id.* at 4:25–34, Table 1.

The Specification further explains that, “[i]n order for the drag reducing polymer to function as a drag reducer, the polymer should dissolve or be substantially solvated in the liquid hydrocarbon.” *Id.* at 11:16–18. The liquid hydrocarbon and the drag reducing polymer, therefore, have solubility parameters that can be determined according to known methods. *Id.* at 4:9–21 (setting forth known methods for determining the solubility parameter of the liquid hydrocarbon), 11:26–64 (setting forth known methods for determining the solubility parameter of the drag reducing polymer).

C. Illustrative Claims

Claim 1 of the '249 patent, claim 3 of the '498 patent, and claim 1 of the '250 patent are illustrative of the claimed subject matter we consider on remand, and are reproduced below:

1. A method comprising:

introducing a drag reducing polymer, into a pipeline, such that the friction loss associated with the turbulent flow through the pipeline is reduced by suppressing the growth of turbulent eddies, into a liquid hydrocarbon having an asphaltene content of at least 3 weight percent and an API gravity of less than

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about 26° to thereby produce a treated liquid hydrocarbon wherein the viscosity of the treated liquid hydrocarbon is not less than the viscosity of the liquid hydrocarbon prior to treatment with the drag reducing polymer;

wherein the drag reducing polymer is added to the liquid hydrocarbon in the range from about 0.1 to about 500 ppmw and

wherein a plurality of the repeating units comprise a heteroatom.

1901 Ex. 1003, 18:62–19:10.

3. A method comprising:

introducing a drag reducing polymer, into a pipeline, such that the friction loss associated with the turbulent flow through the pipeline is reduced by suppressing the growth of turbulent eddies, into a liquid hydrocarbon having an asphaltene content of at least 3 weight percent and an API gravity of less than about 26° to thereby produce a treated liquid hydrocarbon wherein the viscosity of the treated liquid hydrocarbon is not less than the viscosity of the liquid hydrocarbon prior to treatment with the drag reducing polymer;

wherein a plurality of the repeating units comprise a heteroatom and the heteroatom is selected from the group consisting of an oxygen atom, a nitrogen atom, a sulfur atom and/or a phosphorus atom.

1903 Ex. 1002, 19:17–20:4.

1. A method of preparing a drag reducing polymer comprising:

preparing the drag reducing polymer with a solubility parameter within $4 \text{ MPa}^{1/2}$ of the solubility parameter of a liquid hydrocarbon;

wherein the drag reducing polymer is able to be injected into a pipeline, such that the friction loss associated with the turbulent flow through the pipeline is reduced by suppressing the growth of turbulent eddies, into the liquid hydrocarbon having an asphaltene content of at least 3 weight percent and an API

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gravity of less than about 26° to thereby produce a treated liquid hydrocarbon wherein the viscosity of the treated liquid hydrocarbon is not less than the viscosity of the liquid hydrocarbon prior to treatment with the drag reducing polymer;
the drag reducing polymer is added to the liquid hydrocarbon in the range from about 0.1 to about 500 ppmw; and
a plurality of the repeating units comprise a heteroatom.

1905 Ex. 1004, 19:30–47.

II. DISCUSSION

A. *The Issues on Remand*

The Federal Circuit directed us on remand to evaluate Patent Owner’s submitted objective evidence of non-obviousness with a scope limited to “weighing the objective indicia evidence.” *LiquidPower*, 810 F. App’x at 906–907. The Federal Circuit disagreed with Patent Owner’s argument that in addition to the objective indicia evidence, the Board should revisit “all facets of the obviousness inquiry.” *Id.* Accordingly, we evaluate Patent Owner’s submitted objective indicia of obviousness and weigh that evidence in conjunction with our previous findings to make a final determination on remand as to whether Petitioner establishes by a preponderance of the evidence that the remaining challenged claims would have been obvious. *See Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063, 1075 (Fed. Cir. 2012).

B. *Brief Summary of Our Prior Obviousness Findings*

Before turning to the objective evidence of non-obviousness, we provide a brief summary of our findings in the Final Decisions in all three captioned cases, as relevant to the issues on remand. We note that the Federal Circuit disagreed with Patent Owner’s contention that the Federal

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Circuit should “instruct the Board to revisit ‘all facets of the obviousness inquiry,’ including without limitation the Board’s analysis on whether there was a motivation to combine, whether there was a reasonable expectation of success, whether the proposed combination is based on hindsight, and whether LSPI’s invention yielded a predictable result.” *LiquidPower*, 810 F. App’x at 906.

In IPR2016-01901, we found that claims 1–5 of the ’249 patent would have been obvious over the combination of the Holtmyer Publication, the Holtmyer Patent, and Carnahan, and unpatentable under 35 U.S.C. § 103 as obvious over the combination of Inaoka and Carnahan. 1901 Final Dec. 39. We determined Petitioner established, by a preponderance of the evidence, that the combined teachings of the prior art references disclose or suggest, *inter alia*, introducing a drag reducing polymer into a liquid hydrocarbon having an asphaltene content of at least 3 weight percent and an API gravity of less than about 26°, and that one of ordinary skill in the art would have had a reasonable expectation that the polymer would be effective at reducing drag. *Id.* at 13–17. We considered Patent Owner’s counterarguments (*id.* at 18–35), but ultimately were persuaded by Petitioner’s arguments.

In IPR2016-01903, we found that claim 3 of the ’498 patent would have been obvious over the combination of the Holtmyer Publication, the Holtmyer Patent, and Carnahan, and unpatentable under 35 U.S.C. § 103 as obvious over the combination of Inaoka and Carnahan. 1903 Final Dec. 39. We determined Petitioner established, by a preponderance of the evidence, that the combined teachings of the prior art references disclose or suggest, *inter alia*, introducing a drag reducing polymer into a liquid hydrocarbon

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having an asphaltene content of at least 3 weight percent and an API gravity of less than about 26°, and that one of ordinary skill in the art would have had a reasonable expectation that the polymer would be effective at reducing drag. *Id.* at 13–18. We considered Patent Owner’s counterarguments (*id.* at 18–35), but ultimately were persuaded by Petitioner’s arguments.

In IPR2016-01905, we found that claims 1–9 of the ’250 patent would have been obvious over the combination of the Holtmyer Publication, the Holtmyer Patent, and Strausz, and unpatentable under 35 U.S.C. § 103 as obvious over the combination of Inaoka and Strausz. 1905 Final Dec. 42. We determined Petitioner established, by a preponderance of the evidence, that the combined teachings of the prior art references disclose or suggest, *inter alia*, introducing a drag reducing polymer into a liquid hydrocarbon having an asphaltene content of at least 3 weight percent, an API gravity of less than about 26°, and a solubility parameter that is within 4 MPa^{1/2} of the solubility parameter of the iDMA polymer (a liquid hydrocarbon), and that one of ordinary skill in the art would have had a reasonable expectation that the polymer would be effective at reducing drag. *Id.* at 12–20. We considered Patent Owner’s counterarguments (*id.* at 20–37), but ultimately were persuaded by Petitioner’s arguments.

C. *Objective Evidence of Non-Obviousness*

Obviousness is resolved based on underlying factual determinations, including: (1) the scope and content of the prior art; (2) differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

Notwithstanding what the teachings of the prior art would have suggested to

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one of ordinary skill in the art at the time of the invention, the totality of the evidence submitted, including objective evidence of non-obviousness, may lead to a conclusion that the challenged claims would not have been obvious to one of ordinary skill in the art. *In re Piasecki*, 745 F.2d 1468, 1471–72 (Fed. Cir. 1984).

“For objective evidence of secondary considerations to be accorded substantial weight,” however, “its proponent must establish a nexus between the evidence and the merits of the claimed invention.” *In re Huai-Hung Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011) (quoting *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010)). “[N]exus” is a legally and factually sufficient connection between the objective evidence and the claimed invention, such that the objective evidence should be considered in determining nonobviousness. *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988).

In this case, the Federal Circuit held that Patent Owner submitted evidence establishing a nexus between the claimed invention and the objective evidence of record. *LiquidPower*, 810 F. App’x at 906 n.1 (citing *LiquidPower 2018*, 749 F. App’x at 968). Accordingly, we presume a nexus exists and consider the objective indicia of non-obviousness in turn.

1. *Long-Felt Need*

“The existence of a long felt but unsolved need that is met by the claimed invention is further objective evidence of non-obviousness.” *Millennium Pharms., Inc. v. Sandoz Inc.*, 862 F.3d 1356, 1369 (Fed. Cir. 2017). First, establishing long-felt need first requires objective evidence that a recognized problem existed in the art for a long period without solution. *See Orthopedic Equip. Co., Inc. v. All Orthopedic Appliances*,

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Inc., 707 F.2d 1376, 1382 (Fed. Cir. 1983); *In re Gershon*, 372 F.2d 535, 538 (CCPA 1967). Second, another must not have satisfied the long-felt need before the invention of the challenged patent. *Newell Cos. v. Kenney Mfg. Co.*, 864 F.2d 757, 768 (Fed. Cir. 1988). Third, the invention of the challenged patent must satisfy the long-felt need. *In re Cavanagh*, 436 F.2d 491, 496 (CCPA 1971); *see also Perfect Web Techs., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1332–1333 (Fed. Cir. 2009) (articulating all three factors).

Here, we consider only the first two factors, as we discern no dispute over whether the claimed invention satisfies the alleged long-felt need.

a. Whether There Was a Recognized Need for Long Period of Time

First, we consider whether the record includes sufficient objective evidence that a recognized problem existed in the art for a long period of time without solution. *See In re Gershon*, 372 F.2d at 538.

Patent Owner argues that the invention of the Claims at Issue satisfied a long-felt need for a drag reducing agent (“DRA”) that would work in heavy asphaltenic crude (“HAC”). PO Br. 5 (citing Ex. 2056, 5; Ex. 2065, 2; Ex. 2053, 1). Specifically, Patent Owner asserts, “[h]undreds of millions of barrels of heavy crude oil have been produced annually since at least the 1990s, and heavy crude oil has made up a significant portion of the crude oil imported into the U.S. since that time.” PO Resp. 42 (citing Ex. 2050 ¶ 170; Ex. 2018, 458; Ex. 2064; Ex. 2065); PO Br. 5. Patent Owner’s expert, Dr. Dunn, explained the problems associated with heavy crude, testifying, “[h]eavy crude oils are more difficult to transport by pipeline, including because such oils are more viscous and require greater pressure to pump, so those in the field needed and demanded solutions to those problems.” Ex. 2050 ¶ 171 (citing Ex. 1027, 275).

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Patent Owner asserts that Petitioner’s own customers and distributors demanded solutions to improve the pipeline transport of heavy crude oils. PO Resp. 43–44 (citing Ex. 2053, BH019026; Exs. 2066–2071). For example, ██████████, an energy distributor, stated that it was “certainly interested” in a DRA for heavy crude. Ex. 2053, BH019026. Further, Petitioner’s correspondence described “█████████’s (and others’) recent inquiry regarding a drag reducer for heavy crude lines.” PO Resp. 44 (citing Exs. 2066–2067).

In response, Petitioner contends that there was little need for a heavy crude DRA because, at the critical time, heavy crude represented a very small portion of the overall market—approximately 7%. Pet. Reply 24–25 (citing Ex. 2018, 458). Instead, Petitioner asserts that heavy crude oil was a “future relevant hydrocarbon resource.” *Id.* (citing Ex. 2018, 456). Petitioner further asserts that Patent Owner’s evidence of customer interest is inadequate because it includes email correspondence describing discussions from 2006–2009, a period after the filing of the parent application of each of the challenged patents. *Id.* at 25. In Petitioner’s view, the “post-filing-date correspondence does not show a long-felt need, but instead shows that drag reduction of heavy crude oils was considered, at most, ‘the way of the future.’” *Id.* (quoting Ex. 2067).

After having considered the evidence, we find that the record includes some evidence of a need for a DRA for heavy crude oils. We agree with Petitioner that the probative value of the evidence of customer interest is reduced because the evidence fails to establish that a need existed for a long time *See, e.g.*, Ex. 2067, BH036544 (“Heavier crudes are the way of the

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future.”); *see also* Ex. 1027, 275 (a 2010 article explaining, “[h]istorically demand for heavy and extra-heavy oil has been marginal”). However, we credit the testimony of Dr. Dunn, who describes, with supporting evidence, the historic challenges faced in transporting and distributing heavy crude oil through pipelines. Ex. 2050 ¶ 171; *see also* Ex. 1027, 275 (pointing to heavy crude oil’s “high viscosity and composition complexity” as historically having made them “difficult and expensive to produce, transport and refine”). Thus, we determine that at least some evidence points to a recognized need for methods of reducing drag in heavy crudes prior to the invention of the Claims at Issue.

b. Whether the Need Was Satisfied Earlier by Another

Second, we consider whether another satisfied the allegedly long-felt need before the invention of the Claims at Issue. *Newell Cos.*, 864 F.2d at 768. By asserting that it was the first to satisfy the aforementioned long-felt need, Patent Owner implies that nothing (and no other) satisfied the need earlier. *See generally* PO Resp. 42–45. Again, Patent Owner directs us to evidence that Petitioner’s customers and distributors expressed interest in a DRA for use in heavy crudes. *Id.* at 43–44 (citing Exs. 2053, 2066–2071). Patent Owner alleges that both Petitioner and Patent Owner’s “other main competitor, Flowchem LLC (‘Flowchem’)” (*id.* at 2) were unable to fulfill the requests of their customers and distributors because they were unable to develop their own DRAs for use in heavy crudes. *Id.* at 46–47 (citing Ex. 2050 ¶ 172; Ex. 1027, 280; Exs. 2066–2067, 2053, 2068–2071, 2080–2081).

In response, Petitioner asserts that Patent Owner marketed its own prior products, LP300 and LP400, as performing drag reduction in heavy crude. Pet. Reply 2 (citing Exs. 1028–1030). Specifically, Petitioner points

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to promotional brochures for LP300 and LP400 that describe the products as being “[d]esigned specifically to increase performance in heavier crudes.” Ex. 1029, 1; Ex. 1030, 1. Although the promotional brochures indicate that those products exhibit higher drag reduction performance in light crude oil, Patent Owner marketed the LP300 and LP400 products for use in heavy crude, and the brochures show that the products successfully reduced drag in heavy crude. Ex. 1029, 1; Ex. 1030, 1. The LP300 and the LP400 brochure are particularly probative, because an assertion of long-felt need loses persuasive value if the prior art shows a solution to that long-felt need. The fact that Patent Owner’s prior LP300 and LP400 products may have been less effective than Patent Owner’s later products is immaterial, as the claims do not require any specific level of drag reduction. *See, e.g.*, 1901 Ex. 1003, 18:62–19:10 (claim 1). Accordingly, we find that the record evidence demonstrates that LP300 and LP400 already met the need for a DRA for heavy crude.

c. Conclusion as to Long-Felt Need

In sum, although we credit Patent Owner’s evidence that both customers and distributors were seeking a solution to drag reduction in heavy crude, we consider Petitioner’s evidence with respect to Patent Owner’s earlier LP300 and LP400 products to be more probative. We acknowledge that Patent Owner’s later products that embody the invention (discussed in greater detail below) may have been an improved DRA for heavy crude. However, we view LP300 and LP400 as cutting against Patent Owner’s position that the long-felt need for a DRA that would work in heavy crude oil was not met prior to the invention of the Claims at Issue, especially because the claims do not require a particular level of drag

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reduction. On balance, and on this record, we accord minimal weight to Patent Owner's evidence of long-felt need.

2. *Failure of Others*

Patent Owner argues that prior to the invention of the Claims at Issue, industry competitors tried and failed to develop a DRA for heavy crude. PO Resp. 46–47; PO Br. 3. Specifically, Patent Owner directs us to a number of emails and documents in the record and asserts that neither Flowchem's FLO DRA product line nor Petitioner's products existing at the time of the challenged patents worked as DRAs in heavy crude. PO Resp. 46 (citing Ex. 2050 ¶¶ 173–176; Ex. 2056, 5; Ex. 1027, 280; Ex. 2106; Ex. 2076, BH011308; Exs. 2077–2079, 2066–2067, 2053, 2068–2071, 2080–2081); *see* Paper 63, 11:10–16 (asserting the same). Patent Owner argues that even in spite of their customer's demands a DRA for heavy crude, Baker Hughes "'suspended' development efforts only after it 'tried and failed' to solve the problem because its existing DRA technology was a failure in the claimed heavy, asphaltenic crudes." PO Resp. 47 (citing Ex. 2070).

Petitioner disputes Patent Owner's assertion that both Petitioner and Flowchem tried and failed to develop a DRA for use in heavy crudes. Pet. Reply 25–26. Petitioner asserts that the evidence demonstrates there was no active development at Baker Hughes prior to 2009 [REDACTED] [REDACTED] Pet. Reply 26 (citing Ex. 2066, BH028342; Ex. 2070, BH039322; Exs. 2080–2081; Ex. 2072, 355:18–21).

We agree with Patent Owner that the record evidence indicates neither Flowchem nor Petitioner had developed an effective DRA product for use in heavy crudes prior to the invention of the Claims at Issue. However, the

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lack of an effective product tells us little about whether Flowchem, Petitioner, or others tried and failed to develop a DRA for heavy crude during the relevant time frame. For example, evidence from 2011 describes Petitioner’s “research” into a DRA for heavy crude, but notes that development efforts were suspended to focus on “internal profitability and manufacturing support projects.” Ex. 2070, BH039322. This evidence, therefore, does not show an attempt, much less a failure, to develop a DRA for heavy crude prior to the priority date of the challenged patents.¹⁵ *Id.* To the contrary, Patent Owner’s evidence includes Petitioner’s emails and documents from 2009, 2011, 2013, and 2014—after the priority date of the challenged patents. In a 2009 email, one of Petitioner’s employees states that Petitioner was “beginning development efforts. My opinion, for whatever its worth, is to begin now.” Ex. 2067, BH036544; *see also* Exs. 2077–2079 ([REDACTED] documents setting forth a Preliminary Business Case for development of a FLO heavy crude product); Exs. 2080, 2081 [REDACTED]

In short, Petitioner asserts, and we agree, that the record contains insufficient evidence demonstrating that Petitioner or Flowchem attempted to develop a heavy crude DRA and failed in the attempt prior to the priority date of the challenged patents. Pet. Reply 25–26. Accordingly, we give little weight to Patent Owner’s evidence that others attempted but failed to

¹⁵ Petitioner represents that the ’249 patent claims priority to U.S. Patent Application No. 11/615,539 (now U.S. Patent No. 8,022,118, “the ’118 patent”), which was filed on December 22, 2006. Pet. 3; 1901 Ex. 1003, code (63); 1903 Ex. 1002, code (63) (’498 patent claiming priority to the same); 1905 Ex. 1004, code (63) (’250 patent claiming priority to the same).

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develop a DRA for heavy crude prior to the priority date of the challenged patents.

3. *Unexpected Results*

To be particularly probative, evidence of unexpected results must establish that there is a difference between the results obtained and those of the closest prior art, and that the difference would not have been expected by one of ordinary skill in the art at the time of the invention. *Kao Corp. v. Unilever U.S., Inc.*, 441 F.3d 963, 970 (Fed. Cir. 2006). Here, Patent Owner argues that the industry was skeptical and surprised that a DRA could reduce drag in heavy crude oil. PO Resp. 47–48; PO Br. 3–4. Specifically, Patent Owner asserts that Petitioner itself was skeptical that HAC could be drag reduced:

Baker’s scientists were stunned in 2008 when they first saw the success of LSPI’s invention in HAC They were baffled as they studied LSPI’s embodying product and conducted experiments to try and understand why it was successful in HAC and Baker’s existing drag reducers were not.

PO Br. 3 (citing Ex. 2087; Ex. 2069); PO Resp. 47–48 (citing Ex. 2066, BH028342 (“[W]e have no predictive capability in this area.”); Ex. 2085, BH036464; Ex. 2086; Ex. 2085, BH036464 (“My instinct is that [ExtremePower] is mainly a marketing effort . . . not a whole new product”)).

Such evidence does suggest surprise that Patent Owner’s DRA product was viable in heavy crude oil. However, other record evidence indicates that Petitioner’s scientists were surprised not because Patent

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Owner's ExtremePower ("EP") product¹⁶ was able to reduce drag, but rather, because it was more effective than Patent Owner's LP300 and LP400 products, which also reduced drag. *See* Ex. 2087 (email from Petitioner's scientists after seeing the published '118 patent stating "[i]t's pretty scary, and I mean it. . . . EP worked better in heavy crude than LP"). Such evidence, in our view, cuts against Patent Owner's position on unexpected results, as it suggests, at most, that the effectiveness of Patent Owner's EP product over the prior LP products surprised Petitioner's scientists; it does not suggest, however, that others were surprised that a DRA could reduce drag in heavy crude oil at all.

Petitioner argues, and we agree, that the evidence fails to demonstrate that Patent Owner's results were unexpected, or that there was "an industry-wide belief that no DRAs would work to reduce drag in heavy crude oils." Pet. Reply 2–4, 26–27. In particular, Petitioner asserts that skepticism of the results would have been groundless considering Patent Owner's own prior DRAs used in heavy crude. *Id.* at 26. For example, and as we explain above in connection with long-felt need, Patent Owner itself designed and marketed its prior LP DRA products for use in heavy crude. *Id.* at 2 (citing Exs. 1028, 1029, 1030). Patent Owner's marketing materials for its LP300 and LP400 DRA products include graphics and performance characteristics showing that they were effective at reducing drag in heavy crude oil. Ex. 1029, 1–2; Ex. 1030, 1–2.

¹⁶ Patent Owner asserts that its EP product practices the method recited in claims 1–5 of the '249 patent. PO Resp. 50 (ExtremePower "is the commercial embodiment used to perform the invention of the 249 Patent").

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On this record, we accord little weight to Patent Owner’s evidence of unexpected results. Although Patent Owner does present some evidence of surprise that its EP product reduced drag in heavy crude, we find the greater weight of the evidence suggests that, although others were surprised at the relative effectiveness of the EP DRA as a product for reducing drag in heavy crude oil, they were not surprised that it reduced drag in heavy crude oil. Such a lack of surprise is clearer in view of the fact that Patent Owner designed and marketed its prior DRA products for reducing drag in heavy crude, and those products were effective in doing so, albeit to a lesser extent than the EP product. Ex. 1029, 1–2; Ex. 1030, 1–2; *see also* Ex. 2084, BH013524, Figs. 4, 5 (showing that Patent Owner’s LP products reduced drag in heavy crude oils, e.g., Marlim Blend).

4. *Industry Praise*

Industry praise for an invention may provide evidence of non-obviousness where the industry praise is linked to the claimed invention. *See Geo. M. Martin Co. v. Alliance Mach. Sys. Int’l LLC*, 618 F.3d 1294, 1305 (Fed. Cir. 2010); *Asyst Techs., Inc., v. Emtrak, Inc.*, 544 F.3d 1310, 1316 (Fed. Cir. 2008). Here, Patent Owner directs us to evidence of praise, explaining that the industry recognized its EP product as a “significant improvement” over traditional DRAs and widely recognized EP as “pioneering.” PO Resp. 49–50 (citing Ex. 1027, 280; Ex. 2050 ¶¶ 178–179, 189, 205; Ex. 2078, BH013549). Patent Owner also directs us to statements that Patent Owner attributes to Petitioner, including that “Extreme Power was unique to the drag reduction of high asphaltene crudes versus the general offerings of DRAs for lighter crudes,” and “a significant technological breakthrough for heavy oil transport.” *Id.* at 49 (quoting

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Ex. 2084, BH013522, BH013524 (emphasis omitted)). However, upon careful review of the statements, we find that they are not Petitioner's, but rather, statements that Dr. Yung N. Lee (a representative of Patent Owner) made in connection with a presentation on Patent Owner's EO product. In other words, the statements represent Patent Owner's praise of itself, not praise from the industry. *See* Ex. 2084, BH013524 ("After touting the benefits of Extreme Power in heavy crude applications, Dr. Lee finally moved on to actual, albeit vague[], case studies where EP was employed."). Patent Owner's additional evidence of purported industry praise consists of internal documents or journals that primarily report test results of the polymer at issue. Such evidence does not support Patent Owner's allegations of industry praise.

Finally, Patent Owner directs us to additional evidence that Patent Owner contends describes EP as the only DRA for heavy crude oil in the market, including evidence that Patent Owner "has aggressively pursued patent protection for its heavy oil DRA formulation." PO Resp. 49–50 (quoting Ex. 2092; citing Ex. 2073). With respect to this evidence of EP's market position, we agree with Petitioner that it does not demonstrate industry praise, but instead is merely "recognition of LSPI's exclusivity in the market (due in part to its patents)." Pet. Reply 27–28.

On this record, Patent Owner's evidence of industry praise is entitled to minimal weight. Although there is some evidence describing the pioneering nature of Patent Owner's EP product and, presumably by extension, its method of use, we agree with Petitioner that much of Patent Owner's evidence—"self-laudatory statements," assessment of the state of

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the market, and internal documents (Pet. Reply 27–28)—is of little probative value.

5. *Commercial Success*

“When a patentee can demonstrate commercial success, usually shown by significant sales in a relevant market, and that the successful product is the invention disclosed and claimed in the patent, it is presumed that the commercial success is due to the patented invention.” *J.T. Eaton & Co. v. Atl. Paste & Glue Co.*, 106 F.3d 1563, 1571 (Fed. Cir. 1997); *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1329 (Fed. Cir. 2016). “Demonstrating that an invention has commercial value, that it is commercially successful, weighs in favor of its non-obviousness.” *WBIP*, 829 F.3d at 1337.

Patent Owner argues that the “claimed features of the 249 Patent, including the ability to successfully perform the drag reduction limitation in the claimed heavy, asphaltenic liquid hydrocarbons, are the critical driver of the commercial success of ExtremePower.” PO Resp. 50 (citing Ex. 2050 ¶ 205; Ex. 2096). Patent Owner asserts, as evidence of commercial success, “very high margins,” “recover[y] [of] their investment well beyond expectations,” and its ability to “command a price premium.” PO Resp. 1, 51 (quoting Ex. 2091, BH039305; Ex. 2077, BH013541; Ex. 2092, FC-LSPI001020). However, beyond a statement that it has sold “well over [REDACTED] of ExtremePower,” Patent Owner does not point to any data to demonstrate EP’s commercial success, and instead relies on Baker Hughes and Flowchem business documents. *See* PO Resp. 50–52 (citing Exs. 2050, 2095, 2121, 2096, 2076, 2079, 2091, 2077, 2073, 2092).

Petitioner responds that “[l]ittle to no weight should be given to LSPI testimony describing only sales volumes of its ExtremePower[] product.”

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Pet. Reply 28 (citing *In re Huang*, 100 F.3d 135, 140 (Fed. Cir. 1996)); *see also* Pet. Br. 3. Instead, Petitioner asserts that any commercial success is related to the improved degree of drag reduction achieved by the EP product. Pet. Reply 28. But Petitioner argues that any such improvement is immaterial here because the claims do not recite any particular degree of drag reduction. *Id.* (citing *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1312 (“[I]f the commercial success is due to an unclaimed feature of the device, the commercial success is irrelevant.”)).

Notably, a Baker Hughes business case states, “Extreme Power is the only DRA capable of providing drag reduction in heavy crudes at this time. As such, it commands very high margins.” Ex. 2077, BH013541. At best, this evidence suggests Patent Owner has achieved higher margins with its EP product than with its other products. But we find lacking in the record any evidence as to what margins are considered “very high margins,” or that the sales of EP product amounted to a commercial success. For example, Patent Owner does not provide any sales figures or evidence as to how EP sales relate to the overall DRA market or the DRA market for heavy crude oil. Patent Owner states that it has sold “over [REDACTED] of ExtremePower” (PO Resp. 50), but offers no evidentiary support for its assertion. Mr. Dunn’s conclusory testimony as to the same number of EP product barrels sold lacks foundation, omitting any mention of how he gained knowledge of the sales, or what if any information or documents he reviewed and relied on. *See* Ex. 2050 ¶ 204. Without support, we cannot make any findings regarding this statement’s persuasiveness. Accordingly,

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we accord minimal weight to Patent Owner’s evidence of commercial success.

6. Copying of the Claimed Invention

“Copying requires duplication of features of the patentee’s work based on access to that work.” *Institut Pasteur & Université Pierre et Marie Curie v. Focarino*, 738 F.3d 1337, 1347–48 (Fed. Cir. 2013); *see also Tokai Corp. v. Easton Enters., Inc.*, 632 F.3d 1358, 1370 (Fed. Cir. 2011).

“Evidence of copying may include internal documents, direct evidence such as photos of patented features or disassembly of products, or access and similarity to a patented product.” *Liqwd, Inc. v. L’Oreal USA, Inc.*, 941 F.3d 1133, 1137 (Fed. Cir. 2019) (citing *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004)).

Patent Owner asserts that, in response to requests from customers and distributors for a DRA for use in heavy crudes, Petitioner sought to develop a solution. PO Resp. 52–53. According to Patent Owner, Petitioner failed in its attempts to develop its own solution and studied the challenged patents in order to copy the invention. *Id.* at 52–68; PO Br. 5. The result, in Patent Owner’s view, is a product that is “a virtual carbon copy” of [REDACTED]. PO Resp. 55–56 (citing Ex. 2101, BH-IPR0019, BH-IPR0021; Ex.1003, 12:54–64; Ex. 2050 [REDACTED]; Ex. 2102, BH012455–56; Ex. 2019, 80). Specifically, Patent Owner asserts that “[REDACTED]¹⁷ (i.e., 100% [REDACTED]), and [Petitioner’s] FLO ULTIMA[] DRA polymer contains [REDACTED] [REDACTED].” *Id.* at 55 (citing Ex. 2101, BH-IPR0019; Ex. 1003, 12:54–64;

¹⁷ [REDACTED] is shorthand for [REDACTED]. Ex. 1003, 12:56–58.

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Ex. 2050 ¶¶ 206–208). Patent Owner acknowledges that Petitioner’s DRA product differs in composition from [REDACTED], but argues that copying is not negated because “[i]t is undisputed that [REDACTED] of Petitioner’s DRA polymer is the same as [REDACTED],” and “[t]here is no credible evidence that adding tiny amounts” of other “ingredients has any impact on the DRA product.” PO Resp. 65–66 n.19 (citing Ex. 2042, 12:20–23, 40:11–41:1, 87:9–89:12, 71:6–72:10; 76:10–77:2). Petitioner disagrees, asserting that

LSPI’s copying allegation is wrong for three reasons: (1) the Baker Hughes and [REDACTED] polymers are different from [REDACTED] (2) no evidence shows that either party tried to copy [REDACTED]; and (3) Inaoka had already disclosed [REDACTED] as a “particularly preferable” DRA for crude oil.

Pet. Br. 4. In particular, Petitioner asserts:

Although Petitioner’s product contains [REDACTED], the presence of that monomer, even in substantial amounts, does not render the product the same or virtually the same as [REDACTED]. Ex. 1092, ¶¶ 85–88. Specifically, Petitioner’s product is a [REDACTED] containing [REDACTED] repeat units, which is then reacted with [REDACTED] to form a [REDACTED] having an increased effective molecular weight. *Id.* Notably, this is the very process described in Petitioner’s own prior art patent. Ex. 1092, ¶¶ 89–90. Thus, contrary to LSPI’s assertion, Petitioner’s product is not a copy of [REDACTED]. Rather, Petitioner’s own patented technology is reflected in its unique heteroatom-containing DRA. *Id.*

Pet. Reply 30. Petitioner asserts that, contrary to Patent Owner’s allegations, Petitioner examined the challenged patents not to copy, but in an effort to avoid infringement. *Id.* at 31. For example, Petitioner considered “how much a patent analysis would cost (to determine where we have a right to practice based on our existing patent vs Conoco’s patent).” Ex. 2066,

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BH028342. Petitioner asserts that the evidence Patent Owner provides does not establish that any copying occurred. *See* Pet. Reply 30. Instead, Petitioner argues the evidence suggests at most that it attempted to “monitor their competitor’s activities and to release a competitive product.” *Id.* at 31 (citing Ex. 2066, BH028342; Ex. 2067, BH036544).¹⁸

On this record, we accord minimal weight to Patent Owner’s evidence of copying. Although we recognize that both Patent Owner’s EP product and Petitioner’s product include the [REDACTED] monomer, we credit Dr. Epps’s testimony as to the composition of Petitioner’s product. Dr. Epps explains that

the Baker Hughes product is a [REDACTED] containing [REDACTED] repeat units. Once synthesized, that terpolymer is reacted with [REDACTED] to form a [REDACTED] having an increased effective molecular weight, as compared to the [REDACTED] prior to [REDACTED] addition. *See* Ex. 1108; Ex. 2101. The inclusion of the [REDACTED] repeat units is important because without those units, the [REDACTED] would not react with the [REDACTED] to form a [REDACTED]. Accordingly, even though those [REDACTED] repeat units make up a relatively small percentage of the [REDACTED], they serve an important function, *i.e.*, to increase the effective molecular weight of the DRA [REDACTED]. Moreover, the reaction between the [REDACTED] and the [REDACTED] produces a [REDACTED] structure that differs significantly from a [REDACTED] without the additional [REDACTED] units in its backbone.

18 [REDACTED]

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Ex. 1092 ¶ 88.¹⁹ We find that, although the additional elements beyond [REDACTED] in Petitioner’s product represent a small percentage of the [REDACTED], “they serve an important function,” such that we view Petitioner’s product as different from [REDACTED]. *Id.* Such differences, in our view, are consistent with Petitioner’s attempts to “determine where we have a right to practice based on our existing patent vs Conoco’s patent,” and not merely to copy. Ex. 2066, BH028342. Moreover, the Claims at Issue here are not directed to a particular polymer, but instead are directed to a method of introducing a drag reducing polymer into a pipeline, or a method of preparing a drag reducing polymer. Despite Patent Owner’s arguments that “Petitioner’s and [REDACTED] products are designed to practice the methods of” the Claims at Issue (PO Resp. 66–68), we are not presented with significant evidence regarding copying of the methods set forth in the claims. *See, e.g.*, 1901 Ex. 1003, 18:62–19:10 (claim 1). Taking all of these facts into consideration, Patent Owner’s evidence of copying is entitled to minimal weight.

7. *Flowchem’s Stipulated Consent Judgment*

Finally, Patent Owner notes that Flowchem, an industry competitor, entered into a stipulated injunction in which Flowchem “acknowledges and admits that each of the Asserted Claims of the Patents-in-Suit,” including each claim at issue in each of the three challenged patents, “is valid and enforceable in all respects.” PO Resp. 68 (citing Ex. 2110, 4). Patent

¹⁹ [REDACTED]

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Owner asserts that we should give weight to Flowchem's acquiescence to the validity of the patent as one of the objective indicia supporting non-obviousness. *Id.* (citing *Forest Labs., Inc. v. Ivax Pharm., Inc.*, 438 F. Supp. 2d 479, 496 (D. Del. 2006), *aff'd*, 501 F.3d 1263 (Fed. Cir. 2007)).

In response, Petitioner asserts that Patent Owner provides no evidence that Flowchem entered into a stipulated injunction for the reason that Flowchem believed the claims were valid. Pet. Reply 32–33 (citing *EWP Corp. v. Reliance Universal Inc.*, 755 F.2d 898, 908 (Fed. Cir. 1985)). Although *EWP* differs from the present case in that the asserted evidence of acquiescence there was a license, as opposed to a stipulated injunction, we nevertheless find its reasoning persuasive here. The fact that Flowchem settled, without additional evidence regarding the circumstances surrounding the settlement, does not provide a strong indication of acquiescence of others in the industry. Rather, economic factors may have influenced the decision. *Cf. EWP Corp.*, 755 F.2d at 908 (discussing “business judgments that it is cheaper to take licenses than to defend infringement suits”). Patent Owner points to Flowchem's stipulation of validity without giving enough detail about the overall settlement to allow us to evaluate the weight that should be accorded Flowchem's acknowledgement. Accordingly, we give little weight to Flowchem's stipulated injunction.

D. Overall Weighing of Obviousness of Challenged Claims

Having considered the parties' arguments and evidence, we evaluate all of the evidence together to make a final determination of obviousness. *See Cyclobenzaprine*, 676 F.3d at 1075 (stating that a fact finder must

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consider all evidence relating to obviousness before determining whether patent claims are invalid).

Patent Owner argues that the “objective indicia evidence far outweighs the weak *prima facie* evidence here.” *See generally* PO Br. However, as described above, we have analyzed Patent Owner’s objective evidence of non-obviousness and found it to be entitled to little weight. *See supra* § II.B. Because we accord little weight to Patent Owner’s evidence of non-obviousness, we determine that the evidence of long-felt need, failure of others, unexpected results, industry praise, commercial success, copying, and acquiescence, when considered and weighed with the strong and substantial evidence as to the other three *Graham* factors, supports a conclusion that claims 1–5 of the ’249 patent, claim 3 of the ’498 patent, and claims 1–9 of the ’250 patent would have been obvious. *See supra* § II.B; 1901 Final Dec. 11–39; 1903 Final Dec. 13–39; 1905 Final Dec. 12–42.

III. CONCLUSION

For the foregoing reasons, we determine that Petitioner establishes, by a preponderance of the evidence, that claims 1–5 of the ’249 patent and claim 3 of the ’498 patent are unpatentable under 35 U.S.C. § 103 as having been obvious over (1) the combination of Holtmyer Publication, Holtmyer Patent, and Carnahan, and (2) the combination of Inaoka and Carnahan. We also determine that Petitioner establishes, by a preponderance of the evidence, that claims 1–9 of the ’250 patent are unpatentable under 35 U.S.C. § 103 as having been obvious over (1) the combination of Holtmyer Publication, the Holtmyer Patent, and Strausz, and (2) the combination of Inaoka and Strausz.

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For IPR2016-01901 (Patent 8,450,249 B2):

Claims	35 U.S.C. §	Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1-5	103	Holtmyer Publication, Holtmyer Patent, Carnahan	1-5	
1-5	103	Inaoka, Carnahan	1-5	
Overall Outcome			1-5	

For IPR2016-01903 (Patent 8,426,498 B2):

Claim	35 U.S.C. §	Basis	Claim Shown Unpatentable	Claim Not Shown Unpatentable
3	103	Holtmyer Publication, Holtmyer Patent, Carnahan	3	
3	103	Inaoka, Carnahan	3	
Overall Outcome			3	

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For IPR2016-01905 (Patent 8,450,250 B2):

Claims	35 U.S.C. §	Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1-9	103	Holtmyer Publication, Holtmyer Patent, Strausz	1-9	
1-9	103	Inaoka, Strausz	1-9	
Overall Outcome			1-9	

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner establishes, by a preponderance of the evidence, that claims 1-5 of the '249 patent are unpatentable, claim 3 of the '498 patent is unpatentable, and claims 1-9 of the '250 patent are unpatentable;

FURTHER ORDERED that, pursuant to 35 U.S.C. § 318(b), upon expiration of the time for appeal of this decision, or the termination of any such appeal, a certificate shall issue canceling claims 1-5 of the '249 patent, claim 3 of the '498 patent, and claims 1-9 of the '250 patent;

FURTHER ORDERED that the parties shall file, within ten (10) days of the entry of this decision, a joint motion to seal this decision, and also shall provide as an exhibit to the motion a proposed redacted public version of this decision; and

FURTHER ORDERED that this is a Final Written Decision; therefore, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2016-01901 (Patent 8,450,249 B2)
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE OFFICE OF THE UNDERSECRETARY AND DIRECTOR OF
THE UNITED STATES PATENT AND TRADEMARK OFFICE

BAKER HUGHES HOLDINGS, LLC
(f/k/a BAKER HUGHES, A GE COMPANY, LLC),
Petitioner,

v.

LIQUIDPOWER SPECIALTY PRODUCTS INC.
(f/k/a LUBRIZOL SPECIALTY PRODUCTS, INC.),
Patent Owner.

IPR2016-00734 (Patent 8,022,118 B2)
IPR2016-01901 (Patent 8,450,249 B2)
IPR2016-01903 (Patent 8,426,498 B2)
IPR2016-01905 (Patent 8,450,250 B2)

Before ANDREW HIRSHFELD, *Commissioner for Patents, Performing the
Functions and Duties of the Under Secretary of Commerce for Intellectual
Property and Director of the United States Patent and Trademark Office.*

ORDER

IPR2016-00734 (Patent 8,022,118 B2)
IPR2016-01901 (Patent 8,450,249 B2)
IPR2016-01903 (Patent 8,426,498 B2)
IPR2016-01905 (Patent 8,450,250 B2)

The Office has received a request for Director review of the Final Written Decision in each of the above-captioned cases. Ex. 3100. The requests were referred to Mr. Hirshfeld, Commissioner for Patents, Performing the Functions and Duties of the Under Secretary of Commerce for Intellectual Property and Director of the United States Patent and Trademark Office.

It is ORDERED that the requests for Director review are denied; and
FURTHER ORDERED that the Patent Trial and Appeal Board's Final Written Decisions are the final decisions of the agency.

IPR2016-00734 (Patent 8,022,118 B2)
IPR2016-01901 (Patent 8,450,249 B2)
IPR2016-01903 (Patent 8,426,498 B2)
IPR2016-01905 (Patent 8,450,250 B2)

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