

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VIANCE, LLC,
Petitioner,
v.

KOPPERS PERFORMANCE CHEMICALS, INC.,
Patent Owner.

Case PGR2026-00023
Patent 12,370,716

PATENT OWNER'S PRELIMINARY RESPONSE

TABLE OF CONTENTS

	Page
I. Introduction.....	1
II. Background.....	3
A. Overview of the '716 Patent.....	3
B. Overview of the Prosecution History	6
III. A Person of Ordinary Skill in the Art (POSA).....	7
IV. Claim Construction.....	8
V. Grounds 1–3 Fail Because the Challenged Claims are Entitled to the Priority Date of the '817 Provisional.....	9
A. The '817 Provisional Provides Written Description Support for the Claimed Weight Percentages.....	10
1. The Provisional explicitly discloses concentrated formulations of DCOI.	10
2. The Provisional's weight ratio and solvent-free descriptions necessarily disclose the claimed weight concentrations.	11
3. Petitioner confirms that a POSA would derive weight percentages from disclosed weight ratios	14
B. The '817 Provisional Provides Written Description Support for the Microcrystalline Wax Limitation	16
C. The '817 Provisional Provides Written Description Support for the Wax Melting Point Limitation.	19
VI. Grounds 4–6 Fail Because the BDES Agreement is Not a Statutory Bar.....	22
A. Factual Background.....	22
B. Non-Public, Third-Party Sales Do Not Trigger the On-Sale Bar	24
1. The On-Sale Bar.....	24
2. Inventor Sales vs. Third-Party Sales.....	27
3. Doctrinal Parallels for Third-Party Sales.....	30
4. Distinguishing “Secret Sales” From “Non-Public Sales”	31

5.	Doctrinal Parallels for Non-Public Sales	38
C.	The BDES Agreement is a Non-Public, Third-Party Sale that does Not Trigger the On-Sale Bar.....	39
VII.	Grounds 7–8 Fail Because Petitioner has Not Established a Motivation to Combine or a Reasonable Expectation of Success.....	43
A.	The Cited Prior Art.....	45
1.	The AWP Paper.....	45
2.	Rak	46
3.	Cui.....	48
B.	Petitioner Fails to Establish a Motivation to Combine.	50
1.	A POSA Would Not Have Modified the AWP Paper or Combined it with Other Prior Art.	50
2.	A POSA Would Not Have Relied upon Rak or Modified Rak	53
3.	Rak Teaches Away from Oil-Borne Systems.	59
4.	Rak addresses a problem that DCOI does not have.....	65
5.	Asserted References Teach Wax as a Hydrophobic Agent, Not a Retaining Additive.	68
C.	Even if the AWP Paper, Rak, and Cui Could be Combined, a POSA Would Not Have Expected Such a Combination to be Successful	70
1.	Rak Fails to Enable Its Concentrated Formulation of Penta.....	71
2.	Rak’s Own Experimental Data Undermine Any Expectation of Success.	73
3.	Substituting DCOI for Penta in Rak’s system is not a simple substitution.	74
VIII.	Ground 9 Fails Because Petitioner Fails to Support a Finding of Invalidity Under 35 U.S.C. § 112.....	77
IX.	Conclusion	80

TABLE OF AUTHORITIES

	Page(s)
Cases	
<i>Advanced Electrolyte Techs. LLC v. Samsung SDI Co., Ltd.</i> , No. A:17-CV-0030-LY, 2018 WL 2770648 (W.D. Tex. June 8, 2018)	12
<i>Ajinomoto Co., Inc. v. Int’l Trade Comm’n</i> , 932 F.3d 1342 (Fed. Cir. 2019)	16, 18, 19
<i>Ariad Pharms., Inc. v. Eli Lilly & Co.</i> , 598 F.3d 1336 (Fed. Cir. 2010) (en banc)	9, 19
<i>AstraZeneca LP v. Breath Ltd.</i> , 603 F. App’x 999 (Fed. Cir. 2015)	70
<i>BASF Corp. v. SNF Holding Co.</i> , 955 F.3d 958 (Fed. Cir. 2020)	<i>passim</i>
<i>Belden Inc. v. Berk-Tek LLC</i> , 805 F.3d 1064 (Fed. Cir. 2015)	53
<i>In re Caveney</i> , 761 F.2d 671 (Fed. Cir. 1985)	32
<i>Celanese Int’l Corp. v. Int’l Trade Comm’n</i> , 111 F.4th 1338 (Fed. Cir. 2024)	26
<i>Chemours Co. FC, LLC v. Daikin Indus., Ltd.</i> , 4 F.4th 1370 (Fed. Cir. 2021)	54
<i>Cisco Sys., Inc. v. Ramot at Tel Aviv Univ. Ltd.</i> , 2025 U.S. Dist. LEXIS 209503 (D. Del. 2025).....	33, 34
<i>Cisco Systems, Inc. v. C-Cation Technologies, LLC</i> , Case No. IPR2014-00454 (PTAB, Aug. 29, 2014)	78
<i>CTS Corp. v. Piher Int’l Corp.</i> , 527 F.2d 95 (7th Cir. 1975)	28

<i>Dey, L.P. v. Teva Parenteral Medicines, Inc.</i> , 6 F. Supp. 3d 651 (N.D.W. Va. 2014), <i>aff'd sub nom. DEY LP v. Teva Parenteral Medicines, Inc.</i> , 600 F. App'x 773 (Fed. Cir. 2015)	<i>passim</i>
<i>Eisai Co. v. Dr. Reddy's Labs., Inc.</i> , 533 F.3d 1353 (Fed. Cir. 2008)	74
<i>Eiselstein v. Frank</i> , 52 F.3d 1035 (Fed. Cir. 1995)	16
<i>EZ Dock, Inc. v. Schafer Sys., Inc.</i> , 276 F.3d 1347 (Fed. Cir. 2002)	25
<i>In re Gordon</i> , 733 F.2d 900 (Fed. Cir. 1984)	59, 64
<i>In re Gurley</i> , 27 F.3d 551 (Fed. Cir. 1994)	54
<i>Helsinn Healthcare S.A. v. Teva Pharm. USA, Inc.</i> , 586 U.S. 123 (2019).....	25, 27
<i>Honeywell Int'l Inc. v. Mexichem Amanco Holding S.A. de C.V.</i> , 865 F.3d 1348 (Fed. Cir. 2017)	74, 76
<i>Hybritech Inc. v. Monoclonal Antibodies, Inc.</i> , 802 F.2d 1367 (Fed. Cir. 1986)	16, 19
<i>Institut Pasteur v. Focarino</i> , 738 F.3d 1337 (Fed. Cir. 2013)	44
<i>InTouch Techs., Inc. v. VGo Commc'ns, Inc.</i> , 751 F.3d 1327 (Fed. Cir. 2014)	44
<i>J.A. LaPorte, Inc. v. Norfolk Dredging Co.</i> , 787 F.2d 1577 (Fed. Cir. 1986)	<i>passim</i>
<i>In re Kahn</i> , 441 F.3d 977 (Fed. Cir. 2006)	60
<i>Kinetic Concepts, Inc. v. Smith & Nephew, Inc.</i> , 688 F.3d 1342 (Fed. Cir. 2012)	50

<i>King Instrument Corp. v. Otari Corp.</i> , 767 F.2d 853 (Fed. Cir. 1985)	27
<i>Knauf Insulation, Inc. v. Rockwool International A/S</i> , 788 F. App'x. 728 (Fed. Cir. 2019).....	56, 57, 69
<i>In re Kollar</i> , 286 F.3d 1326 (Fed. Cir. 2002)	25
<i>In re Kroekel</i> , 504 F.2d 1143 (C.C.P.A. 1974).....	79, 80
<i>KSR Int'l Co. v. Teleflex Inc.</i> , 550 U.S. 398 (2007).....	54, 63, 76, 77
<i>Linear Tech. Corp. v. Micrel, Inc.</i> , 275 F.3d 1040 (Fed. Cir. 2001)	25
<i>MDS Associates, Ltd. P'ship v. United States</i> , 37 Fed. Cl. 611 (1997), <i>aff'd</i> , 135 F.3d 778 (Fed. Cir. 1998)	34, 36
<i>Medicines Co. v. Hospira, Inc.</i> , 827 F.3d 1363 (Fed. Cir. 2016) (en banc)	25, 26
<i>Merck & Cie v. Gnosis S.p.A.</i> , 822 F.3d 1350 (Fed. Cir. 2016)	39
<i>Metallizing Eng'g Co. v. Kenyon Bearing & Auto Parts Co.</i> , 153 F.2d 516 (2d Cir. 1946)	29, 30, 31
<i>Moleculon Research Corp. v. CBS, Inc.</i> , 793 F.2d 1261 (Fed. Cir. 1986)	25
<i>Nuvo Pharms. (Ir.) Designated Activity Co. v. Dr. Reddy's Labs. Inc.</i> , 923 F.3d 1368 (Fed. Cir. 2019)	20
<i>Ortho-McNeil Pharm., Inc. v. Mylan Labs., Inc.</i> , 520 F.3d 1358 (Fed. Cir. 2008)	58
<i>Otsuka Pharm. Co., Ltd. v. Sandoz, Inc.</i> , 678 F.3d 1280 (Fed. Cir. 2012)	71, 77

<i>Par Pharm., Inc. v. TWi Pharms., Inc.</i> , 773 F.3d 1186 (Fed. Cir. 2014)	59, 60
<i>Pfaff v. Wells Elecs.</i> , 525 U.S. 55 (1998).....	25, 40, 42
<i>Phillips v. AWH Corp.</i> , 415 F.3d 1303 (Fed. Cir. 2005) (en banc)	8
<i>Purdue Pharma L.P. v. Faulding Inc.</i> , 230 F.3d 1320 (Fed. Cir. 2000)	21, 22
<i>In re Ratti</i> , 270 F.2d 810 (CCPA 1959)	64
<i>Raytheon Techs. Corp. v. Gen. Elec. Co.</i> , 993 F.3d 1374 (Fed. Cir. 2021)	71, 72
<i>ResQNet.com, Inc. v. Lansa, Inc.</i> , 594 F.3d 860 (Fed. Cir. 2010)	29
<i>Schlumberger Tech. Corp. v. Bico Drilling Tools, Inc.</i> , No. H-17-3211, 2019 U.S. Dist. LEXIS 98509 (S.D. Tex. 2019).....	29, 35
<i>Siemens Aktiengesellschaft v. United States</i> , 26 Cl. Ct. 980 (1992)	35
<i>SmithKline Beecham Corp. v. Apotex Corp.</i> , 439 F.3d 1312 (Fed. Cir. 2006)	78
<i>South Corp. v. United States</i> , 690 F.2d 1368 (Fed. Cir. 1982)	79
<i>Standard Oil Co. v. American Cyanamid Co.</i> , 774 F.2d 448 (Fed. Cir. 1985)	44
<i>Technitrol Inc. v. Aladdin Industries, Inc.</i> , 316 F. Supp. 639 (N.D. Ill. 1970).....	35
<i>Union Oil Co. of Cal. v. Atl. Richfield Co.</i> , 208 F.3d 989 (Fed. Cir. 2000)	18

<i>United States v. Adams</i> , 383 U.S. 39 (1966)	54
<i>W.L. Gore & Assocs. v. Garlock, Inc.</i> , 721 F.2d 1540 (Fed. Cir. 1983)	31, 32, 33, 38
<i>In re Wertheim</i> , 541 F.2d 257 (C.C.P.A. 1976)	14
<i>Woodland Trust v. Flowertree Nursery, Inc.</i> , 148 F.3d 1368 (Fed. Cir. 1998)	24, 29, 30
<i>Wycoff v. Motorola, Inc.</i> , 209 USPQ 115 (N.D. Ill. 1980), <i>aff'd without op.</i> , 688 F.2d 843 (7th Cir. 1982)	35

Statutes

35 U.S.C. § 102	2, 24
35 U.S.C. § 102(b)	26, 36, 37
35 U.S.C. § 103	2
35 U.S.C. § 112	2, 3, 78
35 U.S.C. § 112(a)	3, 16
35 U.S.C. § 112(b)	3
35 U.S.C. § 119(e)	9
35 U.S.C. § 314(a)	3
35 U.S.C. § 324(a)	3, 78, 80

Regulations

37 C.F.R. § 42.6(a)(3)	78
37 C.F.R. § 42.200(b)	8
37 C.F.R. § 42.207	1

Other Authorities

MPEP § 2143.01(V).....	59
MPEP § 2143.01(V)–(VI).....	64
MPEP § 2163	16

LISTING OF EXHIBITS

Exhibit No.	Description
Ex. 2012	Declaration of Craig R. McIntyre, Ph.D.
Ex. 2013	Curriculum Vitae of Craig R. McIntyre, Ph.D.
Ex. 2014	U.S. Pat. No. 7,850,771
Ex. 2015	U.S. Pat. App. Pub. 2019/0161643 (pub. May 30, 2019)
Ex. 2016	U.S. Pat. App. Pub. 2021/0230442 (pub. Jul. 29, 2021)
Ex. 2017	Kathon™ 287T PRN 98-10 Notification
Ex. 2018	Update on Research with Non-Metal Based Wood Preservative Systems, CWPA Proceedings, 2009
Ex. 2019	EPA Risk Evaluation for Methylene Chloride
Ex. 2020	Montreal Protocol on Substances that Deplete the Ozone Layer
Ex. 2021	OSHA Limits on Methyl Chloroform

Pursuant to 37 C.F.R. § 42.207, Patent Owner Koppers Performance Chemicals, Inc. (“Patent Owner”) submits this Preliminary Response in opposition to the above-captioned Petition for Post-Grant Review of claims 1–27 of U.S. Patent No. 12,370,716 (“Petition”) filed by Viance, LLC (“Petitioner” or “Viance”).¹ This Preliminary Response is supported by the Declaration of Craig R. McIntyre, Ph.D. Ex. 2012. Petitioner’s scattershot arguments fail to demonstrate that any of the challenged claims are “more likely than not” unpatentable. Patent Owner respectfully requests that the Board deny institution.

I. Introduction

U.S. Patent No. 12,370,716 (“the ’716 Patent”) is directed to wood preservative compositions comprising concentrated amounts of 4,5-dichloro-2-octylisothiazol-3(2H)-one (“DCOI”) and a wax retaining additive, methods of treating wood with those compositions, and the resulting wood products. The ’716 Patent represents a significant innovation in the field of wood preservation, providing an alternative to pentachlorophenol (“Penta”), which has been phased out due to environmental concerns.

¹ Patent Owner has also filed a brief requesting that the Director discretionarily deny the Petition. *See* Paper 12.

Petitioner challenges all 27 claims of the '716 Patent across nine identified grounds,² relying on a patchwork of references and commercial evidence. Beyond presenting an excessive number of overlapping grounds, the Petition is fatally flawed as to each ground.

First, Grounds 1–3 fail because the Petition fails to defeat the '716 Patent's priority date. These grounds assume the '716 Patent is not entitled to claim priority to its '817 Provisional Application. As shown below, however, the '716 Patent is entitled to its priority date because the '817 Provisional satisfies 35 U.S.C. § 112. If priority is maintained, Petitioner's key references—including Archer (WO2023/096905) and the UP-50 product—are not prior art.

Second, Grounds 4–6 fail because the Business Development and Exclusive Supply Agreement ("BDES Agreement") is not a statutory bar. The BDES Agreement does not trigger the on-sale bar because the BDES Agreement is a non-public, third-party sale. Grounds 4–6 depend upon the BDES Agreement as prior art; without this reference, these grounds fail.

Third, Grounds 7–8 fail because the Petition does not establish a motivation to combine the disparate references it relies upon or a reasonable expectation of success in doing so.

² Three of the identified grounds combine grounds under §§ 102 and 103, so the true number of grounds is twelve. *See* Petition at 3–4.

Fourth, Ground 9 fails to establish that it is more likely than not that the challenged claims of the '716 Patent are invalid under 35 U.S.C. § 112 because Petitioner's written description and enablement arguments under § 112(a) are conclusory and ignore the specification's detailed disclosure of concentrated DCOI-wax compositions at the claimed ranges. And Petitioner's indefiniteness argument under § 112(b)—premised on the theory that it is “mathematically impossible” to satisfy both the recited weight ratios and weight percentages simultaneously—is foreclosed by well-settled case law.

The standard for institution of a PGR is that “the information presented in the petition, if such information is not rebutted, would demonstrate that it is more likely than not that at least one of the claims challenged in the petition is unpatentable.” 35 U.S.C. § 324(a). This standard is more demanding than the “reasonable likelihood” standard applicable to inter partes review under 35 U.S.C. § 314(a). Petitioner has not met this heightened burden.

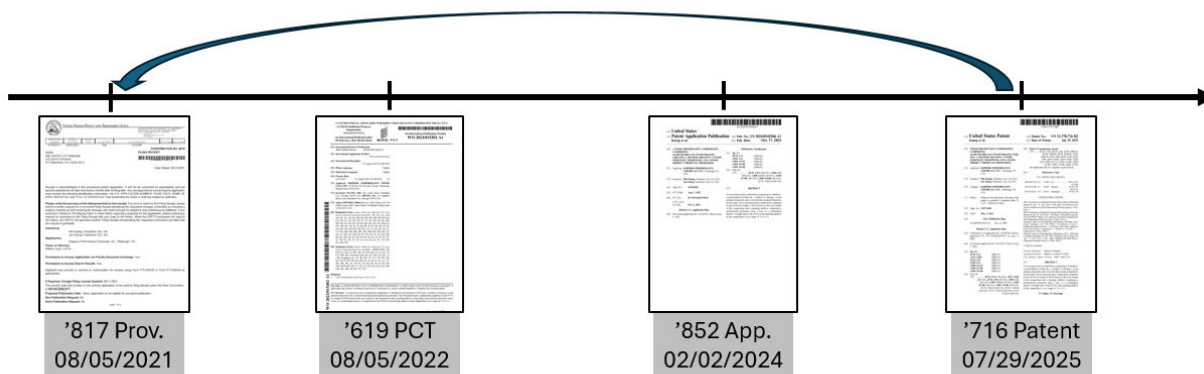
For these reasons, and as explained in detail below, the Petition should not be instituted.

II. Background

A. Overview of the '716 Patent

The '716 Patent, titled “Wood Preservative Composition Comprising 4,5-Dichloro-2-Octylisothiazol-3(2H)-One, a Method Treating a Wood Substrate

Therewith, and a Wood Product Produced Therefrom,” issued on July 29, 2025, from Application No. 19/072,608, filed March 6, 2025. The ’716 Patent claims priority to U.S. Provisional Application No. 63/229,817 (“the ’817 Provisional”), filed August 5, 2021, through PCT Application No. PCT/US2022/074619, filed August 5, 2022, and U.S. Application No. 18/294,852, filed February 2, 2024.



The ’716 Patent is directed to wood preservative compositions comprising DCOI and a retaining additive comprising a wax. Ex. 1001, 24:43–51. DCOI is a preservative compound used to inhibit fungal decay and insect attack in treated wood products such as utility poles, crossarms, railway ties, and similar infrastructure. *Id.*, 2:63–65. The retaining additive, particularly a wax, enhances the leach resistance and retention of DCOI within the treated wood substrate. *Id.*, 6:3–9, 17:58–62.

Independent Claim 1 of the '716 Patent recites a wood preservative composition comprising 40% by weight to 60% by weight DCOI based on the total weight of the composition, 40% by weight to 60% by weight of a retaining additive comprising a wax based on the total weight of the composition, wherein a weight ratio of the DCOI to the retaining additive is in a range of 1:5 to 5:1. *Id.*, Claim 1. Independent Claim 13 recites a narrower composition consisting essentially of 45% to 55% by weight DCOI and 45% to 55% by weight of a retaining additive comprising a first petroleum wax and a second petroleum wax comprising a paraffin wax. *Id.*, Claim 13. Independent Claim 26 recites a composition with a microcrystalline wax and a DCOI-to-retaining additive ratio of 1:1.5 to 1.5:1. *Id.*, Claim 26.

The '716 Patent also claims methods of treating a wood substrate by diluting the concentrated composition with an organic solvent (Claims 14–22, 27), wood products produced thereby (Claims 12, 23–25), and various dependent claims specifying wax types, melting points, and solvent characteristics (Claims 2–11). *Id.*

The invention disclosed in the '716 Patent addresses a critical need in the wood preservation industry. *Id.*, 1:29–46. The Stockholm Convention classified Penta as a persistent organic pollutant in 2015, and the sole North American Penta producer ceased manufacturing at the end of 2021. *Id.* The '716 Patent provides a concentrated DCOI-wax formulation that serves as an effective replacement for

Penta-based wood preservative systems, with the wax retaining additive providing excellent leach resistance to maintain DCOI within the treated wood substrate. *Id.*, 10:13–19, 17:58–62.

B. Overview of the Prosecution History

The application that issued as the '716 Patent was filed on March 6, 2025, Ex. 1009, as a continuation of Application No. 18/294,852, Ex. 1008, which is a national stage entry of PCT/US2022/074619, filed August 5, 2022, Ex. 1006, claiming priority to the '817 Provisional filed August 5, 2021, Ex. 1005.

During prosecution, the examiner conducted a prior art search and considered references including U.S. Application Nos. 2006/0057300 (“Cui”), Ex. 1016, 2006/0240263 (“Ashmore”), Ex. 1017, and 2021/0112812 (“Arumugam”), Ex. 1021. Ex. 1004, Part 1 at 107. Notably, the examiner independently located U.S. Patent No. 4,143,010 (“Rak”), Ex. 1015, during the prior art search and used the Rak reference to conduct further searches but ultimately elected not to cite it as a basis for rejection. Ex. 1004, Part 2 at [179].

Responding to an Office Action, Patent Owner amended the claims to recite the 40–60% DCOI and 40–60% wax concentration ranges. *Id.* at 145–46, 150, 164. The examiner allowed the claims based on a finding that no prior art of record taught or suggested the claimed 40–60% DCOI and 40–60% wax concentration ranges. *Id.* at 164. The '716 Patent issued on July 29, 2025. Ex. 1001.

III. A Person of Ordinary Skill in the Art (POSA)

Patent Owner submits that a POSA at the time of the '716 Patent's effective filing date would have had at least an Associate or Bachelor's degree in chemistry, chemical engineering, wood science, or a related field, with at least three to five years of extensive practical experience in wood preservative formulation, or a graduate degree in one of these fields with at least two years of practical experience. Such a person would have familiarity with wood treatment processes, preservative chemistries, analytical techniques, formulation science, and applicable industry standards (e.g., AWWA standards). *See* Ex. 2012, ¶ 64.

This definition reflects the multidisciplinary nature of the wood preservation field, which draws on organic chemistry, formulation science, wood science, and industrial process engineering. A POSA in this field would possess not only a foundational understanding of chemical composition and material properties, but also practical familiarity with the formulation, handling, and application of wood preservative systems—including concentrated and diluted compositions, wax retaining additives, and organic solvent carriers. *See* Ex. 2012, ¶ 64.

Patent Owner's expert, Dr. Craig R. McIntyre, exceeds both parties' proposed definitions. *See* Ex. 2012, ¶¶ 7–18.

IV. Claim Construction

Terms of a claim subject to a post-grant review are “construed using the same claim construction standard that would be used to construe the claim in a civil action..., including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” 37 C.F.R. § 42.200(b); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc).

Patent Owner submits that the claims of the ’716 Patent should be given their plain and ordinary meaning as understood by a POSA, consistent with the specification and prosecution history.

As disclosed in the ’716 Patent, the retaining additive functions to “bind the DCOI to the wood product, entrap the DCOI within the wood, [and] physically fix the DCOI to the wood product.” Ex. 1001, 5:65–66. This requires not merely any additive but one that functionally serves as a retention-enhancing agent for DCOI. As the plain language of the term indicates, “retaining additive” is defined by its function—retaining DCOI within the treated wood—not by the number or type of its constituent materials. Nothing in the claim language or the specification requires the retaining additive to include both a wax and a polymer, or any component other than a wax. To the contrary, the claims recite “a retaining additive comprising a wax,” and the specification confirms that wax alone can perform the retention

function. *Id.*, 17:58–62. The open-ended “comprising” language permits additional components but does not require them. A retaining additive that consists entirely of wax satisfies this claim limitation, provided the wax performs the claimed retention function.

As such, a POSA would have understood “retaining additive” to mean an agent that enhances the retention of DCOI in wood.

V. Grounds 1–3 Fail Because the Challenged Claims are Entitled to the Priority Date of the ’817 Provisional

Petitioner's Grounds 1–3 rely upon references dated after the ’817 Provisional’s August 5, 2021 filing date: the Archer Application (filed November 22, 2022), the UP-50 sales (beginning May 2022), and the UP-50 EPA Label (approved March 18, 2022). These grounds therefore depend on defeating the ’716 Patent’s claim to priority. Because the ’716 Patent properly claims priority to the ’817 Provisional, none of these references qualifies as prior art and Grounds 1–3 fail.

When claiming the benefit of priority to a provisional application, the provisional application must provide written description support for the claims in question. *See* 35 U.S.C. § 119(e). This requires that the provisional “reasonably convey[] to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc).

As demonstrated below, the claims of the '716 Patent have written description support from the '817 Provisional.

A. The '817 Provisional Provides Written Description Support for the Claimed Weight Percentages.

1. The Provisional explicitly discloses concentrated formulations of DCOI.

The '817 Provisional explicitly discloses a concentrated and a dilute formulation of DCOI: “The wood preservative composition according to the present disclosure can be formulated as a concentrated composition (e.g., greater than 5% by weight DCOI based on the total weight of the composition) or a diluted composition (e.g., ready to treat formulation, 0.5% by weight to 5% by weight DCOI based on the total weight of the composition).” Ex. 1005 at [0050]. The concentrated formulation is thus defined as any composition containing greater than 5% by weight DCOI, with no upper limit specified. *Id.* The diluted composition, in contrast, is defined as the “ready to treat formulation” containing 0.5% to 5% by weight DCOI. *Id.*

The '817 Provisional also teaches that the concentrated formulation may be formed by mixing DCOI with a retaining additive “with or without the presence of an organic solvent,” and that “[t]he resulting concentrate can be in a liquid form or a solid form.” *Id.* The provisional further explains that “the resulting concentrate can be further diluted in an organic solvent to make the final wood preservative treating

composition.” *Id.* As such, the provisional explicitly contemplates solvent-free concentrated compositions consisting of only DCOI and a retaining additive.

The Summary section of the ’817 Provisional reinforces this two-form structure; first, by describing “a wood preservative composition” generally, *id.* at [0003], then later describing “a wood preservative composition for application to a wood product,” *id.* at [0007]–[0008]. A POSA would have understood this distinction as reflecting two compositional forms: (1) the diluted form for application and (2) the concentrated form, which serves as an intermediate intended to be diluted before use. Ex. 2012, ¶ 79.

The independent claims of the ’716 Patent—Claims 1, 13, and 26—recite concentrated compositions. The high concentrations of DCOI (40–60%) and retaining additive (40–60%) exceed the diluted “ready to treat” formulations (0.5–5% DCOI) and align with what the provisional defines as “concentrated compositions” (greater than 5% DCOI). The ’716 Patent properly claims the concentrated formulation as disclosed by the ’817 Provisional.

2. The Provisional’s weight ratio and solvent-free descriptions necessarily disclose the claimed weight concentrations.

The ’817 Provisional discloses weight ratios of DCOI to retaining additive in ranges from 1:5 to 5:1, including specific ratios such as “1:4 to 4:1, 1:3 to 3:1, 1:2 to 2:1, 1.5:1 to 1:1.5, [] 1.1:1 to 1:1.1” and 1:1. *See* Ex. 1005 at [0031]. The ’716 Patent claims ranges of DCOI and retaining additives in terms of weight percentages,

as well as weight ratios. Weight ratios and weight percentages are two ways to define the parameters of a composition. Weight ratios express the relative amounts of two components directly as a ratio. Percentages express concentration relative to the whole by normalizing to 100% (by comparing one part to the total). Ex. 2012, ¶ 81.

When the '817 Provisional describes the concentrated formulation as DCOI with a retaining additive “with or without the presence of an organic solvent,” it is necessarily disclosing compositions where DCOI and the retaining additive together constitute the entirety of the composition, i.e., a substantially binary DCOI/wax composition. Ex. 1005 at [0050]; Ex. 2012, ¶ 77. A solvent-free composition consisting only of DCOI and a retaining additive at the disclosed weight ratios yields DCOI weight percentages that can be determined through simple arithmetic. *Advanced Electrolyte Techs. LLC v. Samsung SDI Co., Ltd.*, No. A:17-CV-0030-LY, 2018 WL 2770648, at *5 (W.D. Tex. June 8, 2018) (Weight percentages are “directly calculable” from weight ratios.). In a binary system—a system with exactly two components—the weight ratio of Component A to Component B uniquely determines the weight percentage of each component. If $A:B = x:y$, then $\text{wt\% A} = x/(x+y) \times 100$ and $\text{wt\% B} = y/(x+y) \times 100$. Ex. 2012, ¶ 81. Thus, for a binary system, a 1:1 weight ratio immediately conveys to a POSA a mixture containing 50% Component A and 50% Component B. *Id.*

For example, the '817 Provisional discloses a weight ratio of DCOI to retaining additive of 1:1.5 to 1.5:1. *See* Ex. 1005 at [0031]. A weight ratio of 1.5:1 means 1.5 parts DCOI to 1 part retaining additive; dividing 1.5 by the total of 2.5 parts yields 60% DCOI by weight and 40% retaining additive by weight. Ex. 2012, ¶ 83. Conversely, a weight ratio of 1:1.5 means 1 part DCOI to 1.5 parts retaining additive, which results in 40% DCOI by weight and 60% retaining additive by weight. *Id.* Thus, the disclosed weight ratio of 1:1.5 to 1.5:1, applied to a solvent-free concentrated composition, corresponds precisely to 40% to 60% DCOI by weight—the exact concentration range recited in Claims 1 and 26. *Id.* ¶¶ 83, 86.

The following table illustrates the straightforward conversion of the '817 Provisional's disclosed weight ratios to weight percentages for solvent-free concentrated compositions, Ex. 1005 at [0031]; Ex. 2012, ¶ 83:

Weight Ratio (DCOI : Retaining Additive)	% by Weight DCOI	% by Weight Retaining Additive
1:5 to 5:1	16.67% to 83.33%	83.33% to 16.67%
1:4 to 4:1	20.00% to 80.00%	80.00% to 20.00%
1:3 to 3:1	25.00% to 75.00%	75.00% to 25.00%
1:2 to 2:1	33.33% to 66.67%	66.67% to 33.33%
1:1.5 to 1.5:1	40.00% to 60.00%	60.00% to 40.00%
1:1.1 to 1.1:1	47.62% to 52.38%	52.38% to 47.62%
1:1	50.00%	50.00%

As the table demonstrates, the '817 Provisional's disclosed weight ratio of 1:1.5 to 1.5:1 corresponds precisely to the 40–60% concentration ranges recited in

Claims 1 and 26. Ex. 1001, Claims 1, 26. That disclosure, alongside the disclosed weight ratio of 1.1:1 to 1:1.1, bookend the ranges recited in Claim 13. *Id.*, Claim 13.

This is the straightforward mathematical consequence of the '817 Provisional's explicit teachings: (1) the concentrated composition can be formed without organic solvent, meaning DCOI and retaining additive are the only components; and (2) the weight ratio of DCOI to retaining additive can be "1:4 to 4:1, 1:3 to 3:1, 1:2 to 2:1, 1.5:1 to 1:1.5, [] 1.1:1 to 1:1.1" or 1:1. Ex. 1005 at [0031]; Ex. 2012, ¶¶ 80–86. A POSA reading the '817 Provisional would have immediately recognized that these two teachings, taken together, necessarily described compositions within the claimed concentration ranges. Ex. 2012, ¶¶ 80–86. Under *In re Wertheim*, 541 F.2d 257, 265 (C.C.P.A. 1976), a narrower claimed range within a broader disclosed range has adequate written description support when the narrower range represents the same invention. Here, the weight ratio of 1.5:1 to 1:1.5 perfectly corresponds to the claimed 40–60% ranges for DCOI and retaining additive.

3. Petitioner confirms that a POSA would derive weight percentages from disclosed weight ratios

Petitioner's own approach to the Rak reference (Ex. 1015) confirms that a POSA would readily understand weight ratios as disclosing commensurate weight

percentages.³ Petitioner and its expert Dr. Morgan convert Rak’s parts-by-weight ranges to weight percentages, stating that “[p]arts by weight can be converted to weight percent based on the total weight of the concentrate.” Pet. at 70–71; Ex. 1002, ¶ 358. Petitioner calculates that Rak’s Example 6 contains 45% Penta by weight of the solids components ($4.5/10 \times 100 = 45\%$) and asserts that this falls “within the range of DCOI recited in claim 1.” Pet. at 72; Ex. 1002, ¶ 359.

Petitioner cannot have it both ways. If a POSA reading Rak’s weight ratios would have understood that those ratios disclose specific weight percentages—as Petitioner insists they would—then the same applies to the ’817 Provisional. A POSA reading the ’817 Provisional’s weight ratios of 1:1.5 to 1.5:1, combined with its express teaching of solvent-free concentrated compositions, would equally have understood that these teachings disclose DCOI weight percentages of 40–60%. The arithmetic is identical. The conversion from weight ratio to weight percentage is the same elementary calculation in both contexts.⁴ Petitioner itself thus establishes that

³ Patent Owner does not concede Petitioner’s characterization of Rak. Patent Owner addresses this conversion solely to demonstrate that Petitioner’s own analytical framework, applied consistently, confirms written description support for the ’817 Provisional.

⁴ The patent examiner for the ’716 Patent performed this arithmetic in converting Cui’s weight percentages to weight ratios. Ex. 1004, Part 1 at 88–89

a POSA would have understood that the '817 Provisional provides written description support for the '716 Patent claims.

B. The '817 Provisional Provides Written Description Support for the Microcrystalline Wax Limitation

Petitioner contends that independent Claim 26 (and dependent Claim 8) lack written description support because the word “microcrystalline” does not appear in the '817 Provisional. Pet. at 26; Ex. 1002, ¶ 135. While the term “microcrystalline” does not appear in the '817 Provisional *in haec verba*, that absence does not end the inquiry. *See Eiselstein v. Frank*, 52 F.3d 1035, 1038 (Fed. Cir. 1995) (holding that exact claim terms need not be used *in haec verba* to satisfy the written description requirement of 35 U.S.C. § 112(a)). A patent specification need not recite every species by name when a POSA would understand the disclosed genus to encompass that species as a matter of common knowledge in the art. *Ajinomoto Co., Inc. v. Int'l Trade Comm'n*, 932 F.3d 1342, 1359 (Fed. Cir. 2019). Indeed, patent practitioners are encouraged not to describe well-known information. *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1384 (Fed. Cir. 1986); *see also* MPEP § 2163.

(noting that a POSA “would appreciate that . . . 0.1 wt % [DCOI] and 0.15 wt % hydrophobe or wax . . . meets the claimed range of 1:1.5.”).

Here, the '817 Provisional expressly discloses “petroleum wax” as a suitable wax for the retaining additive. Ex. 1005 at [0034] (“The wax can comprise . . . a petroleum wax . . .”). Microcrystalline wax was, and had long been recognized as, one of the two principal subcategories of petroleum wax—the other being paraffin wax, including slack wax. Ex. 2012, ¶¶ 87–88; *see also* Ex. 2014, 4:38–40 (Petitioner’s U.S. Pat. No. 7,850,771 stating “[e]xemplary petroleum waxes include slack wax or microcrystalline wax.”); Ex. 1040 at 14 (explaining that microcrystalline wax and slack wax are types of petroleum waxes). As Petitioner’s expert acknowledges, this classification was not obscure or debatable. Ex. 1002, ¶ 239 (quoting Ex. 1040 at 14), ¶ 225 (noting that “the use of microcrystalline and other waxes were well-known prior to 2022 for wood treatment”).

Particularly in the wood preservative industry, microcrystalline wax was a well-known form of petroleum wax. Ex. 2012, ¶ 88; *see generally* Ex. 1016 at [0021] (identifying “slack wax or microcrystalline wax” as exemplary petroleum waxes in teaching wood preservative composition); Ex. 2015 at [0020]–[0021] (identifying microcrystalline as an exemplary petroleum wax in teaching a wood sealant composition); Ex. 2016 at [0069] (identifying microcrystalline as an exemplary petroleum wax in teaching architectural coating compositions). A POSA reading the '817 Provisional’s disclosure of “petroleum wax” would thus have immediately

understood that microcrystalline wax—as a principal form of petroleum wax—fell squarely within the scope of that disclosure. Ex. 2012, ¶ 88.

The Federal Circuit has recognized that “a patentee may rely on information that is ‘well-known in the art’ for purposes of meeting the written description requirement, because the specification is viewed from the perspective of one of skill in the relevant art.” *Ajinomoto*, 932 F.3d at 1359 (cleaned up). This principle applies with particular force here, where the genus-species relationship between petroleum wax and microcrystalline wax is not merely “well-known” but is a basic taxonomic fact of petroleum chemistry. Ex. 2012, ¶ 88; *see* Ex. 1040 at 8, 14. A POSA in wood preservation would not have needed to consult any external source to understand that “petroleum wax” encompasses microcrystalline wax—this is the kind of fundamental knowledge that defined the field. Ex. 1002, ¶ 225 (“the use of microcrystalline and other waxes were well-known prior to 2022 for wood treatment”); Ex. 2012, ¶¶ 60–61, 88.

Petitioner’s contrary position proves too much. If the mere failure to recite a well-known species by name were sufficient to defeat written description, then no genus disclosure could ever support a species claim—a result squarely at odds with controlling precedent. *See Union Oil Co. of Cal. v. Atl. Richfield Co.*, 208 F.3d 989, 996 (Fed. Cir. 2000) (holding that even absent disclosure of specific compositions, a genus-like disclosure can satisfy written description where a POSA would

recognize and readily derive the relevant species). Petitioner’s argument would require patent applicants to exhaustively enumerate every known species within every disclosed genus, an impractical standard flatly rejected by the Federal Circuit. *Ajinomoto*, 932 F.3d at 1359; *Hybritech*, 802 F.2d at 1384.

A POSA reading this disclosure of the ’817 Provisional would have understood the inventor to have possessed the full range of petroleum wax types—including microcrystalline wax—as suitable retaining additives for the disclosed compositions. Ex. 2012, ¶ 87–92. Petitioner’s written description challenge to the microcrystalline wax limitation in Claims 8 and 26 therefore fails.

C. The ’817 Provisional Provides Written Description Support for the Wax Melting Point Limitation.

Petitioner also contends that independent Claim 13 (and dependent Claims 4 and 5) lack written description support because the ’817 Provisional does not “mention melting temperatures of the wax.” Pet. at 26; Ex. 1002, ¶ 134. This argument should be rejected because the claimed melting point ranges are known and readily available physical properties of the waxes expressly disclosed in the ’817 Provisional. Ex. 2012, ¶ 89.

The written description requirement does not demand that every property of every component be explicitly stated in the specification; it requires only that the disclosure, read through the eyes of a POSA, convey that the inventor was in possession of the claimed invention. *See Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598

F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). And, “the written description requirement may be satisfied without an explicit disclosure if the claimed features are necessarily inherent in what is expressly described.” *Nuvo Pharms. (Ir.) Designated Activity Co. v. Dr. Reddy’s Labs. Inc.*, 923 F.3d 1368, 1382–83 (Fed. Cir. 2019).

The ’817 Provisional explicitly identifies “a paraffin wax, an olefin wax, a petroleum wax, a carnauba wax, a polyethylene wax, a slack wax, a silicone wax, a polypropylene wax, a polytetrafluoroethylene (PTFE) synthetic wax, or a combination thereof” as suitable wax types. Ex. 1005 at [0034]. A POSA would have immediately known the melting points of these standard wax types or, at minimum, would have immediately recognized that the waxes have standard melting points and known where to find that information. Ex. 2012, ¶ 89. Indeed, the melting point of a given wax is an inherent physical property disclosed on the wax’s own Safety Data Sheet (“SDS”). *Id.*; Ex. 1041 at 4 (disclosing the melting point for a paraffin wax); Ex. 1042 at 4 (disclosing the melting point for a microcrystalline wax). Thus, the melting point of each wax was known and readily available from standard industry documentation.

Additionally, the melting points of petroleum waxes are well-characterized properties in the art and a POSA would have understood how to determine melting points. Ex. 2012, ¶ 91. The ASTM maintains standardized test methods specifically

for determining the melting point of petroleum waxes (ASTM D-87, D-3944, and D-127), and the Fuels and Lubricants Handbook, cited by Petitioner, confirms that “[m]elting point is a wax property that is of interest to the consumer and can be an indication of the performance properties of the wax being tested.” Ex. 1040 at 25. In fact, “waxes are often marketed based on melting point data” *Id.* Melting points of waxes are an inherent “general physical propert[y]” that could be found in reference materials or determined. Ex. 2012, ¶ 91. The very material Petitioner relies upon to say otherwise proves that a wax’s melting point is a known physical property. *Id.* at 14 (Table 9, reproduced below, “lists the general physical properties of the different petroleum waxes.”).

TABLE 9—Physical properties of petroleum waxes.				
Property	Paraffin Wax	Intermediate	Microcrystalline	Petrolatum
Melt. Point (°F)	110–155	150–165	140–195	110–180
Molecular Wt.	320–450	450–550	450–700	450–700
Crystal Structure	Plates	Needles	Needles	Needles
Color	White	White—Yellow	White—Dark Brown	White—Dark Brown

* * *

Viance’s argument rests on the premise that because the ’817 Provisional does not literally state certain weight percents or the words “microcrystalline” and “melting point,” there can be no written description support. But the written description requirement has never been a mere word matching exercise. *See Purdue Pharma L.P. v. Faulding Inc.*, 230 F.3d 1320, 1323 (Fed. Cir. 2000) (“In order to

satisfy the written description requirement, the disclosure as originally filed does not have to provide *in haec verba* support for the claimed subject matter at issue.”). What matters is whether the specification, viewed through the lens of a POSA, conveys that the inventor possessed the claimed invention. *Id.* at 1328. Through that lens, it is clear from the ’817 Provisional that the inventors possessed the claimed weight percents, microcrystalline wax, and melting points.

VI. Grounds 4–6 Fail Because the BDES Agreement is Not a Statutory Bar

The BDES Agreement does not trigger the on-sale bar because it is a non-public, third-party sale that does not implicate any of the four underlying policies for the on-sale bar.

A. Factual Background

The BDES Agreement is a development and supply agreement between Viance and [REDACTED] that governs the testing of Viance’s [REDACTED] and UP-50 DCOI-based wood preservatives for the treatment of wood poles and, if [REDACTED] is satisfied with the testing results, the subsequent marketing and promotion of wood poles treated [REDACTED] UP-50, as well as [REDACTED] [REDACTED] Ex. 1027. The recitals and operative provisions set out a phased structure that begins with start-up and testing at [REDACTED] facilities to satisfy technical, inspection, and standardization requirements before commercialization begins. *Id.* at 17–18.

The agreement imposes express and robust confidentiality obligations on both parties, defining Confidential Information broadly to include “research and development efforts, business activities and operations, customer and supplier lists and related data” as well as “inventions, trade secrets, know-how, methods, . . . [REDACTED] VIANCE UP-50 specifications,” and “similar items” regardless of the tangible media in which the Confidential Information is found. *Id.* at 13. The BDES Agreement restricts any disclosure or use of Confidential Information to performance under the BDES Agreement for three years after termination. *Id.*

UP-50 was not EPA-approved at the time of the BDES Agreement, Ex. 1013, and the BDES Agreement requires Viance [REDACTED]
[REDACTED], Ex. 1027 at 8. The EPA registered UP-50 on March 18, 2022, after the BDES Agreement’s execution, confirming that any UP-50 covered by the BDES Agreement could not have reached the public before (1) regulatory approval, (2) successful testing, and (3) successful market exploration. Ex. 1013; Ex. 1027 at 9. [REDACTED]
[REDACTED], reinforcing that the product was not yet in a form for public commerce under the BDES Agreement’s testing framework. Ex. 1027 at 6 [REDACTED]

Additionally, the BDES Agreement included specific procedures for [REDACTED] to

[REDACTED]. Ex. 1027 at 7. Importantly, any [REDACTED]

[REDACTED] *Id.*

B. Non-Public, Third-Party Sales Do Not Trigger the On-Sale Bar

Non-public, third-party offers and sales do not invalidate a later-filed patent under § 102 statutory bars because they do not place the invention in the public domain, create public reliance, or extend the inventor’s statutory monopoly. *Dey, L.P. v. Teva Parenteral Medicines, Inc.*, 6 F. Supp. 3d 651, 672 (N.D.W. Va. 2014), *aff’d sub nom. DEY LP v. Teva Parenteral Medicines, Inc.*, 600 F. App’x 773 (Fed. Cir. 2015) (“The on-sale bar also requires that the sale of an invention be public. The bar is not triggered when a third party, unaffiliated with the inventor, sells a non-public invention in a manner that does not give the public access to the transaction.”).⁵

1. The On-Sale Bar

The on-sale bar applies only when, before the critical date, the invention is the subject of a commercial offer for sale and is ready for patenting, proven either by

⁵ The same is true for non-public, third-party uses. *Woodland Trust v. Flowertree Nursery, Inc.*, 148 F.3d 1368, 1371 (Fed. Cir. 1998) (holding that “when an asserted prior use is not that of the applicant, § 102(b) is not a bar when that prior use or knowledge is not available to the public”).

reduction to practice or by enabling descriptions. *Pfaff v. Wells Elecs.*, 525 U.S. 55, 67 (1998).⁶ For the first prong, the sale must be commercial in nature, which, among other things,⁷ means that the sale or offer for sale must be made to the public. *Dey, L.P. v. Teva Parenteral Medicines, Inc.*, 6 F. Supp. 3d 651, 672 (N.D.W. Va. 2014), *aff'd sub nom. DEY LP v. Teva Parenteral Medicines, Inc.*, 600 F. App'x 773 (Fed. Cir. 2015) (“The on-sale bar also requires that the sale of an invention be public.”).

The on-sale bar has four animating policies. **First**, it prevents withdrawal of inventions from the public domain when products have been marketed such that the

⁶ *Helsinn* reaffirmed that the AIA did not change the meaning of the “on sale” bar. *Helsinn Healthcare S.A. v. Teva Pharm. USA, Inc.*, 586 U.S. 123, 131 (2019).

⁷ See *EZ Dock, Inc. v. Schafer Sys., Inc.*, 276 F.3d 1347, 1353 (Fed. Cir. 2002) (finding sales primarily for experimental purposes do not constitute commercial sale); *Medicines Co. v. Hospira, Inc.*, 827 F.3d 1363, 1373–74 (Fed. Cir. 2016) (en banc) (finding sales of manufacturing services by contract manufacturer to inventor do not constitute commercial sale); *Moleculon Research Corp. v. CBS, Inc.*, 793 F.2d 1261, 1267 (Fed. Cir. 1986) (finding sales of rights in the invention and potential patent rights is not a sale of “the invention”); *In re Kollar*, 286 F.3d 1326, 1331 (Fed. Cir. 2002) (finding offers to license patent for future development are not offers to sell the invention); *Linear Tech. Corp. v. Micrel, Inc.*, 275 F.3d 1040, 1050 (Fed. Cir. 2001) (finding promotional activity and preparation for future sales do not constitute commercial sales).

public justifiably regards them as publicly available. *Meds. Co. v. Hospira, Inc.*, 827 F.3d 1363, 1372 (Fed. Cir. 2016). **Second**, it “promote[s] the early filing of patent applications—i.e., to foster **disclosure of patented inventions to the public.**” *Id.* (emphasis added). **Third**, it bars extending the inventor’s patent term through pre-filing commercial exploitation. *Id.* **Fourth**, § 102(b) provides a limited one-year grace period to balance prompt filing against assessing commercial viability; that grace period, however, does not create a first-to-sell system and does not confer priority, which remains with the first-inventor-to-file under the AIA. *See id.* (recognizing that the on-sale bar gives “inventors a reasonable time to discern the potential value of an invention”); *Celanese Int’l Corp. v. Int’l Trade Comm’n*, 111 F.4th 1338, 1344, 1347 (Fed. Cir. 2024) (noting that the AIA transitioned the United States from a first-to-invent to a first-inventor-to-file regime while retaining the one-year grace period).

Courts do not apply the on-sale bar when discouraging the activity at issue “is not even an identifiable goal of the on-sale bar.” *See Medicines*, 827 F.3d at 1378. In other words, the on-sale bar is only applied when doing so would promote the animating policies that underlie it. *Id.* at 1376 (emphasizing that on-sale bar analysis is not a rigid formula, but instead turns on principles that render the doctrine coherent); *see also J.A. LaPorte, Inc. v. Norfolk Dredging Co.*, 787 F.2d 1577, 1582 (Fed. Cir. 1986) (“The purposes of the on-sale bar, in effect, define its terms.”)

(cleaned up); *King Instrument Corp. v. Otari Corp.*, 767 F.2d 853, 860 (Fed. Cir. 1985) (emphasizing that “a less stringent standard [for the on-sale bar] might be appropriate in some circumstances where the underlying statutory policies might otherwise be frustrated”). When a third-party engages in a non-public sale such that the public neither learns of, benefits from, nor relies upon the invention, the transaction does not constitute a commercial sale under *Pfaff*’s first prong, because the sale’s private nature and the identity of the parties do not implicate the policy objectives underlying the on-sale bar. *Dey, L.P. v. Teva Parenteral Medicines, Inc.*, 6 F. Supp. 3d 651, 672 (N.D.W. Va. 2014), *aff’d sub nom. DEY LP v. Teva Parenteral Medicines, Inc.*, 600 F. App’x 773 (Fed. Cir. 2015).

2. Inventor Sales vs. Third-Party Sales

The law treats an inventor’s own sales differently from a third-party’s sales because the policies underlying the on-sale bar are applied differently to each.⁸

An inventor’s own commercial sale, whether public or confidential, triggers the on-sale bar because the forfeiture principle precludes an inventor from extending the statutory monopoly through pre-filing commercialization. *Helsinn Healthcare S.A. v. Teva Pharm. USA, Inc.*, 586 U.S. 123, 131 (2019). Thus, regardless of the

⁸ The inventor in this instance is the Patent Owner. The third party is the Petitioner. While Petitioner contends it is an inventor, it remains a third-party inventor for purposes of the on-sale bar analysis.

inventor's efforts to keep his commercial exploitation secret or confidential, the on-sale bar operates to prevent his improper extension of the statutory monopoly. By contrast, courts treat third-party sales differently because the inventor is not the actor engaging in pre-filing commercial exploitation. In that context, the on-sale bar does not address any extension of the inventor's monopoly. The operative inquiry instead is whether the third party's sale rendered the invention publicly available.

This distinction between an inventor's own sales and a third-party's sale was addressed in *CTS Corp. v. Piher Int'l Corp.*, 527 F.2d 95 (7th Cir. 1975), where the court addressed two independent inventors: one inventor chose to patent its invention while the other chose to commercially exploit it. *Id.* at 102. The *CTS* court recognized that the underlying rationale of the on-sale bar shifted depending upon the party making the sale; because the patentee in *CTS* had not tried to commercially exploit the invention, the *CTS* court focused the on-sale bar analysis on whether the alleged sale rendered the invention prior art because it was disclosed to the public. *Id.*

The Federal Circuit in *J.A. LaPorte* acknowledged *CTS*'s analysis for those instances where there are two inventors and one inventor chooses to patent his invention while the other inventor chooses to commercially exploit his invention. 787 F.2d 1577, 1582 (Fed. Cir. 1986). Thus, while *J.A. LaPorte* held that what matters is whether the third-party sale put a device embodying the invention into the

public domain, the on-sale bar analysis is focused on the public's access to the invention.⁹ *Id.*

“Thus an inventor's own prior commercial use, albeit kept secret, may constitute a public use or sale under §102(b), barring him from obtaining a patent.” *Woodland Trust v. Flowertree Nursery, Inc.*, 148 F.3d 1368, 1370 (Fed. Cir. 1998). The underlying principle to this rule (“the *Metallizing* forfeiture principle”) is that “it is a condition upon an inventor's right to a patent that he shall not exploit his discovery competitively after it is ready for patenting; he must content himself with

⁹ See also *ResQNet.com, Inc. v. Lansa, Inc.*, 594 F.3d 860, 866 (Fed. Cir. 2010) (“The ‘on sale’ provision of 35 U.S.C. § 102(b) is directed at precluding an inventor from commercializing his invention for over a year before he files his application. Sales or offers made by others and disclosing the claimed invention implicate the ‘public use’ provision of 35 U.S.C. § 102(b).” (quoting *In re Caveney*, 761 F.2d 671, 675 n.5 (Fed. Cir. 1985))). While courts typically apply the on-sale bar analysis to third-party sales, the focus is inevitably on public access to the sales because the patentee is not accused of improperly extending his own monopoly or failing to promptly file his invention with the patent office. Compare *Dey, L.P. v. Teva Parenteral Medicines, Inc.*, 6 F. Supp. 3d 651, 672 (N.D.W. Va. 2014), *aff'd sub nom. DEY LP v. Teva Parenteral Medicines, Inc.*, 600 F. App'x 773 (Fed. Cir. 2015) (applying the on-sale bar analysis to find that no statutory bar is triggered by non-public, third-party sales), with *Schlumberger Tech. Corp. v. Bico Drilling Tools, Inc.*, No. H-17-3211, 2019 U.S. Dist. LEXIS 98509 (S.D. Tex. 2019) (reaching the same result through application of the public use analysis).

either secrecy, or legal monopoly.” *Metallizing Eng’g Co. v. Kenyon Bearing & Auto Parts Co.*, 153 F.2d 516, 520 (2d Cir. 1946). An inventor thus forfeits “his right [to a patent] regardless of how little the public may have learned about the invention.” *Id.* In other words, regardless of secrecy or confidentiality, the inventor forfeits his own right to a patent when he makes a commercial sale of his invention; but a third-party’s sale does not necessarily forfeit the inventor’s right to a patent unless that third-party’s sale implicates the underlying policies of the on-sale bar that focus on the public’s access to the invention.

3. Doctrinal Parallels for Third-Party Sales

The distinction between inventor sales and third-party sales mirrors the case law animating the public-use doctrine. In *Woodland Trust v. Flowertree Nursery*, the Federal Circuit held that “in order to invalidate a patent based on prior knowledge or use, that knowledge or use must have been available to the public.” 148 F.3d 1368, 1370 (Fed. Cir. 1998). That principle aligns the statutory bars toward rewarding disclosure rather than punishing later inventors for others’ secret conduct. Courts therefore look to confidentiality, public access, and public reliance when assessing third-party activities.

BASF Corp. v. SNF Holding Co., reaffirms that secret or confidential third-party uses are not invalidating because they confer no benefit on the public and create no public reliance. 955 F.3d 958, 965 (Fed. Cir. 2020).

4. Distinguishing “Secret Sales” From “Non-Public Sales”

When it is a third-party sale, whether the sale qualifies as commercial depends upon whether the public receives some benefit from the sale or offer to sell.

Secret sales and non-public sales are distinct concepts and are treated differently for third-party sales. However, the analysis always turns on whether the underlying principles of the on-sale bar are furthered by its application.

Case law uses “secret sale” in two ways—one for secret methods (“method secret sales”) and one for products that embody the invention but do not disclose the invention to the public (“embodiment secret sales”).

a. Method Secret Sales

In the first sense, method secret sales refer to a product made by a secret process that is then sold openly to the public; the process remains secret, but the product enters public commerce. *W.L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 1550 (Fed. Cir. 1983). The facts of *W.L. Gore* exemplify this use of “secret sale”: a tape made by a secret stretching process was sold openly to the public while the process remained undiscoverable from the product. *Id.* The sale of the tape was a method secret sale because the inventive process remained secret. *Id.*

An inventor’s method secret sale triggers the on-sale bar due to the *Metallizing* forfeiture principle. *Metallizing Eng’g Co. v. Kenyon Bearing & Auto Parts Co.*, 153 F.2d 516, 520 (2d Cir. 1946). By contrast, a third party’s method secret sale does not

trigger the on-sale bar as to later inventors. *In re Caveney*, 761 F.2d 671, 675 (Fed. Cir. 1985) (“An exception to this general rule exists where a patented method is kept secret and remains secret after a sale of the unpatented product of the method. Such a sale prior to the critical date is a bar if engaged in by the patentee or patent applicant, but not if engaged in by another.”). The patent system prioritizes public disclosure, and method secret sales do not disclose the invention to the public. *W.L. Gore*, 721 F.2d at 1550. “As between a prior inventor who benefits from a process by selling its product but suppresses, conceals, or otherwise keeps the process from the public, and a later inventor who promptly files a patent application from which the public will gain a disclosure of the process, the law favors the latter.” *Id.* This approach avoids rewarding concealment and instead promotes timely dissemination of new knowledge. *Id.*

b. Embodiment Secret Sales

In the second sense, embodiment secret sales occur when a product embodying the invention is sold directly to the public, but the inventive elements are not disclosed at the time of the sale—the public possesses the device yet cannot learn the inventive concept by examining it. *BASF Corp. v. SNF Holding Co.*, 955 F.3d 958, 968 n.7 (Fed. Cir. 2020) (characterizing *J.A. LaPorte* as holding that “a third party’s secret sale of a device created an on-sale bar to a later inventor’s patent on

the same device”).¹⁰ In this sense, the inventive elements remain secret because they are not disclosed to the public even though the public comes to rely upon their access to the product embodying the invention. Thus, embodiment secret sales enter the public domain and the public enjoys the benefit of the invention even if the product does not disclose the elements of the invention. *J.A. LaPorte, Inc. v. Norfolk Dredging Co.*, 787 F.2d 1577, 1583 (Fed. Cir. 1986).

Embodiment secret sales trigger the on-sale bar regardless of the seller because they place the product into the public domain, thereby implicating concerns of public reliance and the subsequent withdrawal of subject matter from the public domain. *Dey, L.P. v. Teva Parenteral Medicines, Inc.*, 6 F. Supp. 3d 651, 672 (N.D.W. Va. 2014). Regardless of whether the secret sale is made by the inventor or by a third party, the on-sale bar is triggered to protect the public by preventing the withdrawal of the invention from the public domain. *BASF Corp. v. SNF Holding Co.*, 955 F.3d 958, 968 n.7 (Fed. Cir. 2020).

A prime example of an embodiment secret sale exists in *Cisco Sys., Inc. v. Ramot at Tel Aviv Univ. Ltd.*, where a third party, Nortel, sold the “Nortel Modem” before the critical date which the court held triggered the on-sale bar. 2025 U.S. Dist.

¹⁰ *J.A. LaPorte* did not squarely address an embodiment secret sale. 787 F.2d at 1582 (noting that “unlike *Gore*, the invention here was discoverable from the device which was sold”).

LEXIS 209503 (D. Del. 2025). The Nortel Modem was an embodiment secret sale because the product was sold openly to the public, but its internal circuitry (which embodied the claimed invention) bore confidential designations and thus did not disclose the invention to the public. Arguing against the on-sale bar, the patentee emphasized that the Nortel Modem failed to “disclose” the invention to the public even though it did embody the invention and was sold to the public. The *Cisco* court applied *J.A. LaPorte* and held that disclosure was not necessary to trigger the on-sale bar, it was sufficient that the product embodying the invention was sold to the public. *Id.* (citing 787 F.2d at 1583).

c. Non-Public Sales

Finally, there are non-public sales. A non-public sale occurs when the entire transaction—including the product itself—is kept confidential between the seller and purchaser such that the general public cannot come to rely upon its availability. In a non-public sale, the public’s knowledge is not enriched by any disclosure of the invention, and the public derives no benefit from nor comes to rely upon any product embodying the invention. Courts have consistently held that non-public, third-party sales do not trigger the on-sale bar. *Dey, L.P. v. Teva Parenteral Medicines, Inc.*, 6 F. Supp. 3d 651 (N.D.W. Va. 2014), *aff’d sub nom. DEY LP v. Teva Parenteral Medicines, Inc.*, 600 F. App’x 773 (Fed. Cir. 2015); *MDS Associates, Ltd. P’ship v. United States*, 37 Fed. Cl. 611 (1997), *aff’d*, 135 F.3d 778 (Fed. Cir. 1998);

Schlumberger Tech. Corp. v. Bico Drilling Tools, Inc., No. H-17-3211, 2019 U.S. Dist. LEXIS 98509 (S.D. Tex. 2019); *Wycoff v. Motorola, Inc.*, 209 USPQ 115 (N.D. Ill. 1980), *aff'd without op.*, 688 F.2d 843 (7th Cir. 1982); *Technitrol Inc. v. Aladdin Industries, Inc.*, 316 F. Supp. 639 (N.D. Ill. 1970); *Siemens Aktiengesellschaft v. United States*, 26 Cl. Ct. 980, 990–91 (1992).

In *Dey*, the patentee Dey held patents on a composition marketed as Perforomist®. 6 F. Supp. 3d at 656. Teva argued that certain pre-critical-date transactions between the pharmaceutical company Sepracor (a third party unaffiliated with Dey) and its contract packager, ALP, triggered the on-sale bar. *Id.* at 669. Sepracor contracted with ALP for certain non-public sales to be used exclusively in Sepracor’s clinical trials. *Id.* at 670. At no point were the compositions distributed to the public. *Id.* at 674.

The court rejected the on-sale bar defense on the grounds that there was no “commercial sale” of the invention because “the on-sale bar [] requires that the sale of an invention be public,” and that “[t]he bar is not triggered when a third party, unaffiliated with the inventor, sells a non-public invention in a manner that does not give the public access to the transaction.” *Id.* (citing *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1550 (Fed. Cir. 1983)). A private transaction between parties unaffiliated with the inventor “neither create[s] an expectation that an unpatented invention is in the public domain nor constitute[s] pre-application

commercial exploitation of an invention by the inventor—the policies that the on-sale bar attempts to further.” *Id.* Because Dey was not a party to the Sepracor–ALP transaction and the public never gained access to the formulations, the non-public nature of the transaction prevented the on-sale bar’s application. *Id.*

In *MDS Associates, Ltd. P’ship v. United States*, 37 Fed. Cl. 611 (1997), *aff’d*, 135 F.3d 778 (Fed. Cir. 1998), the government argued that the plaintiff’s patent was invalid under the on-sale bar because Sperry, a defense contractor unaffiliated with the inventors, had sold SATIR radar systems—which the government contended embodied the claimed invention—to the U.S. Navy one year before the patent application was filed. Critically, the SATIR systems and their technical documentation were classified as “confidential” under the military classification system. The SATIR sales thus disclosed the invention to the U.S. Navy, but the entire transaction—including the product itself and its technical details—remained restricted from public access.

The court catalogued the four policies underlying § 102(b)’s on-sale bar and analyzed whether applying the bar to the classified, third-party SATIR sales would advance any of them. It observed that not all four policies are implicated by a third-party sale: the policy prohibiting prolonged exclusive exploitation and the policy allowing the inventor a reasonable time to assess commercial viability “do not come into play when the sale is made by a third party.” *Id.* Accordingly, the court

reasoned that to apply the on-sale bar to a third-party sale, the court must find that either the policy against removing inventions from the public domain or the policy promoting early disclosure is furthered—and “[b]oth of these policies focus on public accessibility, not simply the fact that a sale was made.” *Id.*

Applying those policies to the facts, the court found that neither was served. First, because the SATIR technical documentation was classified, the public would not have “justifiably come to believe” that the SATIR system was “freely available to all as a consequence of prolonged sales activities.” Although the fact of the sale itself was not classified, the public could not know the contents of the sale or the nature of the invention sold. Second, the policy encouraging prompt disclosure was not furthered because the SATIR technical information was classified, meaning the inventors of the ‘902 Patent could not have known—either actually or constructively—the contents of the SATIR sale. Because the SATIR sales did not implicate any of the policies underlying § 102(b), the court concluded that the on-sale bar did not apply.

MDS is particularly instructive because it demonstrates the principle that the on-sale bar should not be applied mechanically to every sale, but rather should be assessed against the statute’s underlying purposes. Where a third party unaffiliated with the inventor makes a non-public sale that does not enrich the public’s knowledge, does not create public reliance, and does not involve the inventor’s own

commercial exploitation, the on-sale bar's policies are not furthered, and the bar should not apply.

5. Doctrinal Parallels for Non-Public Sales

The on-sale bar aims to make disclosure prompt. *BASF Corp. v. SNF Holding Co.*, 955 F.3d 958, 968 (Fed. Cir. 2020) (holding that one of the primary reasons for the statutory bars is “to encourage prompt disclosure of inventions”). When a third party elects to maintain its secrecy through non-public sales, it is affirmatively choosing secrecy over disclosure. The third party has not contributed to the public's store of knowledge; it has withheld from it.

Early public disclosure is a linchpin of the patent system. As between a prior inventor who benefits from a process by selling its product but suppresses, conceals, or otherwise keeps the process from the public, and a later inventor who promptly files a patent application from which the public will gain a disclosure of the process, the law favors the latter.

W.L. Gore & Assocs. v. Garlock, Inc., 721 F.2d 1540, 1550 (Fed. Cir. 1983).

To be sure, the on-sale bar may be triggered even where the sale does not technically “disclose” the invention in the sense of teaching one of ordinary skill how to make it. *J.A. LaPorte, Inc. v. Norfolk Dredging Co.*, 787 F.2d 1577, 1583 (Fed. Cir. 1986) (holding that “the question is not whether the sale, even a third party sale, ‘discloses’ the invention at the time of the sale, but whether the sale relates to a device that embodies the invention”). But that rule operates precisely because when a product embodying the invention is sold publicly, the public benefits from

having access to that product and justifiably comes to rely on its availability. *Merck & Cie v. Gnosis S.p.A.*, 822 F.3d 1350, 1355 n.4 (Fed. Cir. 2016) (“One of the primary purposes of the on-sale bar is to prohibit the withdrawal of inventions that have been placed into the public domain through commercialization.”); *see also J.A. LaPorte*, 787 F.2d at 1583 (“The date of the purchase agreement is, therefore, the effective date on which the invention became part of the public domain.”).

So, for non-public sales, where the public never receives access to the product embodying the invention, refusing to apply the on-sale bar “is not inconsistent with [the on-sale bar’s policy rationale] because [non-public sales do not place the product] in the public domain in the first place.” *BASF Corp. v. SNF Holding Co.*, 955 F.3d 958, 968 (Fed. Cir. 2020) (holding that one of the primary reasons for the statutory bars is to “prevent the public from being deprived of that which it has come to rely on as publicly available” but this imperative is silent when the public domain is not enriched with the invention in the first place).

C. The BDES Agreement is a Non-Public, Third-Party Sale that Does Not Trigger the On-Sale Bar

The BDES Agreement is a non-public, third-party sale that never gave the general public access to UP-50, and its text strictly governs confidentiality, explicitly

listing “inventions” and “UP-50 specifications” as confidential matter.¹¹ The public received no access to UP-50 through the BDES Agreement and derived no benefit; thus the public could not reasonably rely on UP-50’s availability prior to EPA approval and completion of testing.

Petitioner characterizes itself as a third-party “inventor.” However, at best, Petitioner is an inventor that concealed its invention from the public by using non-public sales; such sales fail as a matter of law to trigger the on-sale bar. *See, e.g., Dey, L.P. v. Teva Parenteral Medicines, Inc.*, 6 F. Supp. 3d 651 (N.D.W. Va. 2014), *aff’d sub nom. DEY LP v. Teva Parenteral Medicines, Inc.*, 600 F. App’x 773 (Fed. Cir. 2015). The sales activity contemplated under the BDES Agreement is non-public, controlled by confidentiality obligations, and routed through a start-up/testing phase, with [REDACTED] [REDACTED] by its terms, UP-50 would not reach the public until after [REDACTED]. That non-public posture prevents the BDES Agreement from qualifying as a commercial sale under *Pfaff*.

¹¹ Indeed, Petitioner designated the BDES Agreement as “Outside Attorneys’ Eyes Only” under the Protective Order “because they disclose sensitive and confidential business information, including pricing and marketing strategies, as well as sensitive information relating to Petitioner’s agreements with its business partners.” Paper 1 at 4.

Critically, this is not an embodiment secret sale, because at the time of the BDES Agreement no product embodying the invention could have entered public commerce where members of the public could purchase or come to rely upon access to that product. In embodiment secret sale situations, the on-sale bar operates to protect the public reliance on products that have entered the public domain. Here, UP-50 stayed within a confidential testing scheme, with no public distribution prior to EPA approval in March 2022. Ex. 1027 at 8; Ex. 1013.

EPA approval for UP-50 post-dated the BDES Agreement, and Viance [REDACTED]. See Ex. 1027 at 8; Ex. 1013. Regulatory timing confirms that the product could not have been offered or sold to the public at the time of contract and that the Agreement's contemplated first phase was necessarily non-public testing and validation. Ex. 1027 at 3. The EPA registered UP-50 on March 18, 2022, Ex. 1013, well after the February 2021 BDES Agreement, Ex. 1027, underscoring that UP-50 could not have reached the public via the BDES before testing and approvals.

Apart from that, the BDES Agreement merely set forth how [REDACTED] UP-50 once it became available. Ex. 1027 at 7. The planned, future [REDACTED] of UP-50 was [REDACTED]. *Id.* As such, until [REDACTED] placed an order for UP-50 there was no offer for sale, and until Viance accepted [REDACTED] order there was no sale. Petitioner provided no evidence of [REDACTED] initial order of UP-50,

or evidence of that order's acceptance. *Pfaff v. Wells Elecs.*, 525 U.S. 55, 67 (1998) ("the acceptance of the purchase order prior to April 8, 1981, makes it clear that such an offer had been made"). The BDES Agreement was not an offer for sale with respect to UP-50. Rather, the BDES Agreement amounts to nothing more than mere instructions for [REDACTED].

Finally, triggering the on-sale bar here would not promote any of the four policy objectives. There is no withdrawal from the public domain because the public never had access to UP-50 or any reason to rely on its availability under the BDES Agreement. There is no need to promote prompt disclosure through a bar against Petitioner's non-public testing when Patent Owner in fact filed first and disclosed under the first-inventor-to-file system by submitting its '817 Provisional on August 5, 2021. Ex. 1005. There is no concern about Patent Owner's improper monopoly extension because it did not commercially exploit its invention pre-filing; Patent Owner pursued patent protection promptly. And, finally, the one-year grace period does not create a first-to-sell regime; activity that does not trigger the on-sale bar does not confer priority, and priority remains governed by filing date, which Patent Owner secured first. Applying a bar based on Petitioner's confidential testing agreement would convert the AIA's first-to-file into a first-to-sell system, contrary to statute and policy.

* * *

The BDES Agreement does not trigger the on-sale bar because it is a non-public, third-party sale. Such sales are insufficient to trigger the on-sale bar. Nor would applying a bar here further the statute's policies: the public never had access to UP-50 prior to the critical date; Patent Owner timely filed and disclosed first under the AIA's first-inventor-to-file system; there was no improper extension of monopoly; and the grace period does not transform U.S. law into a first-to-sell regime. On these facts and law, the BDES Agreement cannot bar Patent Owner's patent rights or be treated as an on-sale bar event. Grounds 4–6 therefore fail.

VII. Grounds 7–8 Fail Because Petitioner has Not Established a Motivation to Combine or a Reasonable Expectation of Success.

Petitioner's Ground 7 alleges that Claims 1–16 and 20–27 of the '716 Patent are obvious over Rak in combination with the AWP A 114th Annual Meeting Paper ("the AWP A Paper") and Cui, and Ground 8 alleges that Claims 17–19 are obvious over Rak in combination with the AWP A Paper, Cui, AWP A Standard HSA-18, and HCS 25 Treating Oil SDS. Pet. at 67, 92. Both grounds fail because Petitioner has not articulated a viable motivation to combine the asserted references and has not established a reasonable expectation of success in combining the asserted references.¹²

¹² Ground 8 necessarily fails if Ground 7 fails because the two additional references (HSA-18 and HCS 25 SDS) address only the flash point limitations of

Petitioner relies upon a combination of references spanning 40 years where one reference discloses a concentrated formulation of an active ingredient (Penta) and others disclose a dilute formulation of DCOI, but where no reference discloses concentrated formulations of DCOI or use of wax as a retaining additive. Also missing is any showing that a POSA¹³ would have had (1) reason to consider the references as relevant to a concentrated DCOI formulation to which the claimed invention is directed; (2) reason to combine the references; and (3) a reasonable expectation of success in doing so. *InTouch Techs., Inc. v. VGo Commc'ns, Inc.*, 751 F.3d 1327, 1351–52 (Fed. Cir. 2014); *Institut Pasteur v. Focarino*, 738 F.3d 1337,

dependent Claims 17–19—specifying minimum flash points of 66 °C and 150 °C for hydrocarbon solvents—and do not teach or suggest any compositional feature of the independent claims (concentrated DCOI formulation, wax retaining additive, or weight ratios), meaning they cannot cure the deficiencies in Petitioner’s motivation to combine Rak, the AWP Paper, and Cui or its reasonable expectation of success, nor overcome any teaching away by Rak from oil-borne DCOI-wax compositions, since the selection of a solvent with a particular flash point cannot independently supply the missing motivation to create the claimed concentrated binary DCOI-wax composition.

¹³ Keeping in mind that a person of ordinary skill is “presumed to be one who thinks along the line of conventional wisdom in the art and is not one who undertakes to innovate.” *Standard Oil Co. v. American Cyanamid Co.*, 774 F.2d 448, 454 (Fed. Cir. 1985).

1346 (Fed. Cir. 2013). None of these requirements is met here. Neither the AWWA Paper, Rak, nor Cui concern concentrated DCOI formulations or wax retaining additives as claimed in the '716 Patent and a POSA therefore would not have found their teachings to suggest concentrated DCOI with wax retaining additives.

A. The Cited Prior Art

1. The AWWA Paper

The AWWA Paper “summarizes available data associated with the chemistry, the human and eco-toxicological properties, the treatability and the efficacy of the active ingredient [DCOI] in an oil borne formulation.” Ex. 1028 at 11. The AWWA Paper reviews results of wood treatments using low concentration DCOI without retaining additives—2.5% DCOI in #2 diesel—concluding that it will perform similar to Penta in oil. *Id.* at 13. In the AWWA Paper, the low concentration DCOI is made by diluting bulk DCOI¹⁴ free from retaining additives.

Bulk DCOI was approved by the EPA for use as a wood preservative and was commercially available as Kathon™ 287T. Ex. 2017; *see also* Ex. 1028 at 12. Bulk DCOI was an amorphous semi-wax solid that, unlike Penta, did not crystallize under standard conditions. Ex. 1028 at 12; [REDACTED]

¹⁴ [REDACTED]
[REDACTED]

Nothing in the AWP Paper suggests that use of bulk DCOI without retaining additives performs poorly or that its efficacy should be enhanced. Indeed, the paper states that tests and commercial trials showed “DCOI in an oil-based carrier [i.e., #2 diesel] has demonstrated excellent treatability characteristics . . . using conventional treating plant processes and treatment cycles” and that “DCOI in an oil-borne carrier can be expected to perform as an effective wood preservative.” *Id.* at 42. According to the AWP Paper, 2.5% DCOI from bulk DCOI without retaining additive performed well and needed no further improvements.

2. Rak

Rak sought to address poor performance concerns associated with Penta formulations that relied on volatile, chlorinated solvents like methylene chloride and also avoid the disadvantages of oil-borne Penta formulations. Ex. 1015, 1:19–61. Rak’s approach was to formulate the preservative in chlorinated solvents with a polymer and hydrophobe. *Id.*; Ex. 2012 ¶¶ 111–16, 135. The polymer is amorphous so it can immobilize or reduce loss of the preservative once it is in the wood. Ex. 1015, 2:57–60; 66–68. The hydrophobe (i.e., acids, esters, fatty alcohols, and waxes) also is trapped in the wood by the polymer but itself cannot immobilize the preservative in the wood; instead, the hydrophobe functions as a water repellent. Ex. 1015, 1:30–50, 4:5–8. Rak’s preferred preservatives were “pentachlorophenol [Penta], an oxathiin antimicrobial, tributyl tin oxide or other organic biocide.” Ex.

1015, 2:23–26. Rak noted that oxathiin derivatives like carboxanilides were of interest because of their low mammalian toxicity. Ex. 1015, 10:52–11:8.

Petitioner concedes that Rak (Ex. 1015) concerns the preservatives Penta and oxathiin compounds, not DCOI. Pet. at 17; Ex. 1002, ¶ 109. There is no dispute that Penta, oxathiin compounds, and DCOI are different chemicals with materially different physical properties. On the one hand, DCOI does not crystallize under standard conditions and remains as an amorphous semi-wax solid in pure form—a characteristic it shares with wax. DCOI is also sparingly soluble in water (approximately 2–3 mg/L), making it inherently hydrophobic. Ex. 1028, at 33. On the other hand, Penta is crystalline (not amorphous): Rak itself acknowledges Penta’s crystalline nature, and notes that without additives Penta deposits on cell walls “in [the] form of crystals” rather than as a continuous layer. Ex. 1015, 10:28–33. Penta also is comparatively more water soluble (approximately 20 mg/L) and prone to sublimation than DCOI. Ex. 1028, at 33. Rak’s own accelerated sublimation testing showed that Penta alone lost nearly 99% of its weight under vacuum conditions. Ex. 1015, 4:67–68.

These fundamental differences in crystallinity, hydrophobicity, and sublimation behavior meant that a formulation designed to address Penta’s shortcomings—by adding a hydrophobic agent and an amorphous polymer to compensate for Penta’s crystalline structure and water vulnerability—does not speak

to the formulation requirements of DCOI, which already possesses the amorphous and hydrophobic characteristics that Rak's additives were designed to supply.

Because Penta is crystalline and highly prone to sublimation, Penta is susceptible to a process Rak describes as “bloom,” in which Penta migrates to the wood surface, leaving the wood core depleted of preservative and vulnerable to decay. This was not a risk associated with DCOI because DCOI has a very low vapor pressure (9.8×10^{-4} Pa at 25 °C) and “does not crystallize under standard conditions and remains as an amorphous semi-wax solid in pure form.” Ex. 1028 at 12. This meant that “even if the loss of the carrier solvent is extreme DCOI will not crystallize out into a form that might not be able to provide biological control, a phenomenon that has been observed with [P]enta in LPG gas and soft-rot.” *Id.*

Thus, Rak taught that hydrophobic agents and retaining additives are necessary specifically to combat Penta’s tendency to bloom, sublime, and leach—deficiencies rooted in Penta’s crystalline structure and relative water solubility. Because DCOI does not crystallize, does not bloom, and is inherently hydrophobic, the very problems Rak’s additives were designed to solve do not arise.

3. Cui

Cui concerned preservatives formulated with organic acids solubilized in an organic phase “essentially free of volatile organic compounds.” Ex. 1016 at [0016]. The driving concept of Cui is a multi-phase formulation that allows the preservative

to be present in an organic phase and an emulsifier that allows the organic phase to mix with water. Ex. 2012, ¶ 105–06. Cui addressed concerns about the limited stability of suspensions and the need for organic solvents given their expense and volatile organic compound (VOC) emissions. Ex. 1016 at [0011]. Cui’s approach was to use an organic acid solubilized in a VOC-free organic phase. *Id.*, [0016]. “The organic acid may serve one or more of the following purposes in the compositions of the present invention: (1) increasing preservative solubility in the organic phase, (2) improving the distribution gradient of the active preservative in treated wood, and (3) reducing preservative leaching.” *Id.*, [0020]. A hydrophobe may be included, such as a wax, which functions as a water repellent. *Id.*, [0021]. Cui does not suggest concentrated DCOI formulations as required by the ’716 Patent. Ex. 2012, ¶ 110.

Cui’s DCOI concentrations fall far below the claimed range. Cui teaches exemplary concentrations of the active preservative (including DCOI) at only “0.1–30 weight %, more preferably 0.5–20 weight %” and a hydrophobe component (wax) at “0–40 weight %, and more preferably 10–30 weight %.” Ex. 1016 at [0019], [0021]. These concentrations fall short of the ’716 Patent’s claimed 40–60 wt% DCOI and 40–60 wt% retaining additive. A POSA would not have extrapolated from Cui’s preferred 0.5–20 wt% DCOI range to a 40–60 wt% binary concentrate—a leap that would more than double the upper bound of Cui’s preferred range and require

eliminating the multiple additional components that define Cui's formulation approach. Ex. 2012, ¶¶ 105–10.

Cui also is a fundamentally different type of composition. Cui's formulations are complex multi-component emulsions—not concentrated binary compositions. A representative Cui formulation (Example 1) contains ethoxylated castor oil, DDBSA-IPA surfactant, slack wax at 18.64%, linseed oil at 10.13%, linseed fatty acid at 2.12%, tebuconazole fungicide, imidacloprid insecticide, zinc carbonate, and water. Ex. 1016 at [0041].

B. Petitioner Fails to Establish a Motivation to Combine.

1. A POSA Would Not Have Modified the AWPAPaper or Combined it with Other Prior Art.

The AWPAPaper would not have motivated a POSA to combine its teachings with Cui or Rak. The AWPAPaper teaches DCOI works fine in diesel without additives. In the AWPAPaper, the low concentration DCOI is made by diluting bulk, 98.5% DCOI free from retaining additives. Because the AWPAPaper shows that DCOI without retaining additive is effective, a POSA seeking to develop a DCOI-based wood preservative formulation would have had no reason to modify AWPAPaper. *See Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1369 (Fed. Cir. 2012) (stating “[b]ecause each device independently operates effectively, a [POSA], who was merely seeking to create a better device to drain fluids from a wound, would have no reason to combine the features of both devices into a single device.”). Thus,

a POSA aiming to create a concentrated formulation of DCOI would simply have used 98.5% bulk DCOI that is additive free. There is nothing in the AWPAPaper that would have motivated a POSA to add waxes or polymers to DCOI because the AWPAPaper teaches that DCOI performs well without additional additives. Indeed, a POSA as of the effective date would have been discouraged from adding wax to the bulk DCOI of the AWPAPaper as doing so would increase the cost of the formulation. Ex. 2012, ¶¶ 100–01.

The AWPAPaper does not disclose any additives at all, let alone a retaining additive comprising a wax. Indeed, the paper states that tests and commercial trials showed “DCOI in an oil-based carrier [i.e., #2 diesel] has demonstrated excellent treatability characteristics . . . using conventional treating plant processes and treatment cycles” and that “DCOI in an oil-borne carrier can be expected to perform as an effective wood preservative for use in the industrial treatment of wood . . . with a service life expected to be equal to, or exceeding, other AWPAPreservatives used at standardized retentions.” Ex. 1028 at 42. Thus, 2.5% DCOI from bulk DCOI without retaining additive performed well and needed no further improvements. A POSA reading the AWPAPaper would have concluded that simply dissolving bulk DCOI in diesel or another organic solvent was sufficient for an efficacious formulation and that no wax or other retaining additive was required.

The AWP Paper teaches that “DCOI does not crystallize under standard conditions and remains as an amorphous semi-wax solid in pure form,” meaning that “even if the loss of the carrier solvent is extreme DCOI will not crystallize out into a form that might not be able to provide biological control, a phenomenon that has been observed with [P]enta in LPG gas and soft-rot.” Ex. 1028 at 12. This teaching is significant because Rak’s entire system was designed to address Penta’s crystallization and blooming problems. Ex. 1015 at 7–8; Ex. 2012, ¶ 122. Thus, a POSA reading the AWP Paper would have understood that DCOI’s distinct chemical properties—including its lack of crystallization tendency—render the Rak system’s approach inapplicable to DCOI. Ex. 2012, ¶¶ 148–52.

Petitioner ignores the pathway that would have been recognized by a POSA—using bulk DCOI without any additives as taught by the AWP Paper. Ex. 2012, ¶ 95. And Petitioner fails to explain why a POSA would not have been satisfied with the AWP Paper’s retaining additive free, bulk DCOI concentrate, nor has Petitioner explained why a POSA would have been motivated to modify the AWP Paper. This alone is fatal to Grounds 7 and 8.

As such, Petitioner offers no adequate explanation why a POSA would have added amorphous vinylic polymers and hydrophobic agents from Rak to DCOI—a more complicated, expensive, and unnecessary modification of the AWP Paper—rather than simply using DCOI concentrate without any additives. At best,

Petitioner's approach says no more than that a skilled artisan, once presented with these two references, would have understood that they *could be* combined. *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015). Such an approach is insufficient to establish obviousness, because it does not imply a motivation to pick out three references and combine them to arrive at the claimed invention. *Id.*

2. A POSA Would Not Have Relied upon Rak or Modified Rak

Because a POSA would have had no reason to go beyond the AWWA Paper, Petitioner's obviousness argument starts in the wrong place and is premised on the wholly unsupported assumption that a POSA would have developed a concentrated DCOI formulation by looking to prior art about non-oil borne Penta formulations (like Rak). *See, e.g.*, Ex. 2012, ¶¶ 95, 154, 160. Moreover, Rak is based on obsolete solvents that are no longer viable because of environmental regulations and thus a POSA as of the effective date would not have considered Rak. Additionally, a POSA had many preservative choices, and Petitioner offers no reasonable explanation why a POSA would have replaced Penta in Rak with DCOI given the many other options that were available.

a. The AWWA Paper and Cui are incompatible with Rak because Rak relies upon obsolete solvents.

A reference whose core enabling technology has been rendered commercially obsolete by regulatory action would not have provided a POSA with motivation to

select it as a starting point for further development.¹⁵ A petitioner’s hindsight-driven reconstruction of the claimed invention from obsolete prior art components is precisely the type of impermissible ex post reasoning that the obviousness framework is designed to prevent. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007).

A POSA would not have been motivated to select Rak as a starting point for the combinations asserted in Grounds 7 and 8 because Rak’s preferred solvent system constitutes a class of substances that were largely withdrawn from commercial wood-treatment use during the 1980s in response to international regulatory action. Ex. 2012, ¶¶ 134–36; Ex. 1015, 3:11–25. Rak expressly teaches that these chlorinated solvents are “preferred” because they are nonflammable and

¹⁵ *See In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994) (a reference teaches away “if it suggests that the line of development flowing from the reference’s disclosure is unlikely to be productive of the result sought by the applicant”); *United States v. Adams*, 383 U.S. 39, 52 (1966) (“known disadvantages in old devices which would naturally discourage the search for new inventions may be taken into account”); *Chemours Co. FC, LLC v. Daikin Indus., Ltd.*, 4 F.4th 1370, 1377 (Fed. Cir. 2021) (holding that unclaimed practical considerations, such as the viability of a prior art approach, are properly considered in the motivation-to-combine analysis).

have low boiling points suitable for full solvent recovery, and its working examples are wholly dependent upon these now-obsolete solvent carriers. *Id.*

A POSA confronting the well-known regulatory phase-out of chlorinated solvents under the Montreal Protocol and related domestic regulations would have viewed Rak’s entire formulation philosophy—built around rapid evaporation and full recovery of volatile chlorinated carriers to deposit Penta in the wood—as a technological dead end rather than a viable platform for modification. Ex. 2012, ¶ 135. The solvent system that makes Rak’s compositions functional in practice was no longer commercially viable or legally permissible for wood-treatment operations as of the effective date. Ex. 2012, ¶¶ 134–36.

This is underscored by Cui. Because such solvents “are environmentally sensitive due to volatile organic compounds (VOC) emissions and potential toxicity,” Cui’s formulation was intentionally designed to be free of VOC. Ex. 1016 at [0011], [0016]. *See infra* VII.B.2.d.

The Petition’s hindsight-driven reconstruction ignores the reality that a POSA in 2021 would not have turned to a 1979 patent whose enabling technology had been commercially defunct for over three decades, particularly when more recent and directly relevant references (such as the AWWA Paper and Cui themselves) already disclosed DCOI-based wood preservative compositions without requiring the intermediary step of resurrecting an abandoned chlorinated-solvent platform.

b. Petitioner fails to explain why a POSA would have chosen to modify Rak by replacing Penta with DCOI.

Petitioner asserts that a POSA would have been motivated to use DCOI as the wood preservative agent in Rak but fails to explain why a POSA would have chosen DCOI over any of the many other alternatives to Penta. Pet. at 69.

The Federal Circuit has squarely held that “it is not enough, even after KSR, to support a determination of obviousness that a reference includes a broad generic disclosure and a common utility to that in the claims and other prior art references—there must be some reason to select a species from the genus.” *Knauf Insulation, Inc. v. Rockwool Int’l A/S*, 788 F. App’x. 728, 732 (Fed. Cir. 2019). The Petition fails to satisfy this requirement. Pet. at 69. Rak’s generic reference to “other preservative preferably of low mammalian toxicity” is precisely the type of broad genus disclosure that, under *Knauf*, cannot alone render the selection of a particular species—DCOI—obvious. Ex. 1015, Abstract; *Knauf*, 788 F. App’x. at 732.

Multiple AWWA-standardized, EPA-recognized alternatives to Penta existed at the relevant time, including copper naphthenate (“CuN”), oxine copper, chromated arsenicals, and creosote. Ex. 1023 at 11. Indeed, the EPA identified CuN—not DCOI—as the “leading alternative to pentachlorophenol” and noted that “DCOI lacks a track record as a preservative for utility poles.” *Id.* at 12, 40. Separately, the EPA predicted that CuN is the “most likely” alternative to Penta. *Id.* at 12. The EPA’s final decision noted the abundance of other preservative chemicals

that are used in the industry that were available to replace Penta. *Id.* (noting that “ten wood preservative chemicals are available for use in utility poles and 12 are available for sawn crossarms”).

Cui, cited by Petitioner, lists many other alternative organic preservatives besides DCOI, such as 3-Iodo-2-propynylbutyl carbamate, chlorothalonil, Propiconazole, Tebuconazole, Hexaconazole, Cyproconazole, and Dinaconazole. Ex. 1016 at [0019]. These and other alternatives also appear in Viance publications. Ex. 2017 at 1–2. Nor does Petitioner explain why a POSA would choose to replace Penta in Rak with DCOI as opposed to any of the other well-known organic preservatives in the same isothiazolinone family as DCOI, such as methylisothiazolinone (MI), methylchloroisothiazolinone (MCI), benzisothiazolinone (BIT), and octylisothiazolinone (OIT).

Merely pointing to Penta’s phase-out cannot supply the species-selection rationale that *Knauf* demands because Penta’s phase-out would equally motivate a switch to any of the many other preservatives that were available. The Petition’s failure to justify this threshold selection decision constitutes a fundamental deficiency in the obviousness analysis. *Knauf*, 788 F. App’x. at 732. Petitioner simply cherry-picks DCOI from the prior art in a transparent attempt to “retrace[] the path of the inventor with hindsight” while “discount[ing] the number and

complexity of the alternatives.” *Ortho-McNeil Pharm., Inc. v. Mylan Labs., Inc.*, 520 F.3d 1358, 1364 (Fed. Cir. 2008).

c. Cui and Rak are incompatible

A POSA would have understood Cui to be incompatible with Rak. Cui concerns preservatives specifically designed to be “essentially free of volatile organic compounds (VOC).” Ex. 1016 at [0016]. As explained by Cui, organic solvents “are expensive, difficult to handle due to their flammable or combustible nature, and are environmentally sensitive due to [VOC] emissions and toxicity.” *Id.* at [0011]. While Cui seeks to avoid organic solvents (such as VOCs), Rak relies on them.

A POSA seeking to create a simple, concentrated DCOI-wax formulation would not have looked to a seven- or eight-component aqueous emulsion system for guidance, particularly one that requires emulsifiers, surfactants, organic acids, and water—none of which are present in the ’716 Patent’s binary compositions. Cui provides no teaching, suggestion, or guidance toward a polymer-free, emulsifier-free, solvent-free binary DCOI-wax concentrate of the type claimed in the ’716 Patent. Cui thus fails to supply the concentrated binary composition, the 40–60% DCOI concentration, or the DCOI-to-wax weight ratio that are absent from both Rak and the AWWA Paper. *See* Ex. 2012, ¶ 110.

The proposed combination of Cui and Rak would render Cui unsatisfactory for its intended purpose. A proposed modification of a prior art reference that would render the reference unsatisfactory for its intended purpose weighs conclusively against a finding of obviousness. *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984); MPEP § 2143.01(V). Cui’s intended purpose is to provide a wood preservative formulation “essentially free of volatile organic compounds.” Ex. 1016 at [0016]. Combining Cui with Rak—whose entire system depends upon volatile chlorinated solvents for its mechanism of action—would reintroduce the very VOC-type solvents that Cui was specifically designed to eliminate. Because a POSA would not have combined two references when doing so would have defeated the express purpose of one of them, *see In re Gordon*, 733 F.2d at 902, a POSA would not combine Cui with Rak because doing so would defeat Cui’s purpose of avoiding harmful VOCs. Ex. 2012, ¶¶ 108–09.

3. Rak Teaches Away from Oil-Borne Systems.

a. Rak Teaches Away from the ’716 Patent’s Oil-Borne System.

Rak’s teaching-away is dispositive. A reference teaches away when it suggests that the line of development flowing from the reference’s disclosure is “unlikely to be productive of the result sought by the applicant.” *Par Pharm., Inc. v. TWi Pharms., Inc.*, 773 F.3d 1186, 1198 (Fed. Cir. 2014). In considering “the result sought” it is important to focus on “the general problem that confronted the inventor

before the invention was made” rather than the invention itself. *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). To focus on the invention itself is to improperly utilize hindsight bias. *Id.* (citing *Ecolochem, Inc. v. S. California Edison Co.*, 227 F.3d 1361, 1372 (Fed. Cir. 2000)).

Here, the result sought by the applicant is “an alternative oil-borne preservative to oil-borne preservatives comprising Penta is desired.” Ex. 1001, 1:45–46. In other words, a concentrated wood preservative composition—designed to be diluted into a hydrocarbon solvent for pressure treatment—that achieves deep penetration and long-term retention of the active preservative in treated wood suitable for heavy-duty commercial applications. *Id.* Rak expressly teaches that oil-based systems are “unacceptable for commercial pressure treatment use.” Ex. 1015, 7:22–25. In other words, Rak teaches that the very result sought by the applicant cannot be achieved using oil-borne solvents. This is a textbook case of teaching away: the primary reference directly states that the applicant’s chosen approach is unlikely to be productive of the desired result. *Par Pharm.*, 773 F.3d at 1198.

Rak is directed to an “oil-free” wood preservation system that relies on volatile, low-boiling-point solvents for deep penetration into wood. Ex. 1015, 3:9–18, 4:19–23. Rak’s preferred solvents are all non-oil solvents designed to evaporate rapidly after treatment, leaving solid deposits of the preservative components in the wood. *Id.*, 3:9–18. Rak specifies that for deep pressure treatment, the solvents

“should have a low boiling point ($< 100\text{ }^{\circ}\text{C}$) because almost full recovery of solvent is necessary.” *Id.*, 3:29–36. Rak expressly identifies this oil-free characteristic as “one of the major advantages of these systems,” because the excellent penetrability of oil-free systems enables them to “carry [Penta] deeply into wood” *Id.*, 4:19–23. Further, Rak emphasizes that “oil-borne systems have the major disadvantages of wood discolouration [sic], oil unpaintable surfaces, stickiness, and dirt retention.” *Id.*, 1:35–38. Rak further notes that aliphatic hydrocarbons such as those comprising diesel “do not dissolve the polymers” that are essential to Rak’s system and therefore those solvents composed of aliphatic hydrocarbons are unsuitable for use in Rak’s system. *Id.*, 3:42–51.

By contrast, the ’716 Patent employs persistent, high-boiling-point hydrocarbon solvents—principally diesel—in which the solvent remains liquid throughout the treatment process and does not need to evaporate to leave deposits in the wood. Ex. 1001; Ex. 2012, ¶ 139. The ’716 Patent’s operating mechanism is the opposite of Rak’s: penetration is achieved through pressure treatment combined with a persistent solvent that maintains the composition in liquid form during application, rather than through rapid solvent evaporation that deposits solids within the wood microstructure. Ex. 2012, ¶ 140.

Rak directly tested its preferred chlorinated volatile-solvent system against oil-based systems and taught that oil-based systems are “unacceptable for

commercial pressure treatment use for which the present formulation is primarily designed.” *Id.*, 7:22–25. In Example 6, Rak compared two formulations at a constant Penta level: the Rak formulation in chloroform and the Blunt formulation in solvent naphtha (an oil-type solvent). Ex. 1015, 6:45–7:47. The key distinction between these formulations, as Rak itself recognizes, is “the ability to penetrate wood”—Rak’s system was “designed for deep penetration for heavy duty, while Blunt et al’s is designed for surface blocking treatment.” *Id.*, 6:60–64. The penetration data were stark: Rak emphasized that the penetration of the Blunt formulation was “only about one third that of the present formulation,” and concluded that Penta “was left behind the solvent penetration for the Blunt samples,” meaning the preservative did not adequately penetrate with the oil-type carrier, rendering it “unacceptable for commercial pressure treatment use for which the present formulation is primarily designed.” *Id.*, 7:22–25 (emphasis added).

Rak conducted a similar experiment in Example 7, comparing “pole oil” (another oil-type solvent) against the chlorinated volatile-solvent system. *Id.*, 7:48–8:43. The results showed that the oil solution “penetrated into wood at a significantly slower rate,” with the chlorinated system displaying “27 to 46% higher solution uptake by volume than the oil solution.” *Id.*, 8:24–28. Moreover, “staining of penetrated sections revealed the [Penta] had fully penetrated with the solvent for

[chlorinated volatile-solvent system], while for [the oil-based system, the] penetration was *relatively superficial*.” *Id.*, 8:28–30 (emphasis added).

A POSA would have understood from this data that Rak teaches away from using oil-based systems because oil hinders penetrability and is “unacceptable for commercial pressure treatment use.” *Id.*, 7:22–25; Ex. 2012, ¶¶ 123–24. A POSA would have further understood that Rak teaches away from oil-based systems because they fail to dissolve the polymer retaining additives that were necessary for Rak’s system to work and because “oil-borne systems have the major disadvantages of wood discolouration, oil unpaintable surfaces, stickiness, and dirt retention.” Ex. 1015, 1:35–38; Ex. 2012, ¶ 119.

A POSA working on oil-borne systems would not have looked to Rak for guidance because Rak’s teachings are specific to volatile-solvent systems and Rak’s own experimental evidence demonstrates that oil-based carriers fail to achieve adequate penetration for commercial pressure treatment use. Ex. 2012, ¶ 155.

It is well established that “when the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be nonobvious.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). Rak teaches away from combining oil with the organic wood preservative agent, and the ’716 Patent discovered a successful means of combining the two: this speaks to the nonobviousness of the ’716 Patent’s claims.

b. Rak Teaches Away from the AWPAPaper’s Oil-Borne System.

A POSA who read Rak’s express criticism of oil-based systems—and their demonstrated inability to achieve adequate penetration—would not have been motivated to combine Rak with the AWPAPaper, which relies exclusively on an oil-based system. These two references point in opposite directions: the AWPAPaper teaches that DCOI performs comparably to Penta when dissolved in diesel, Ex. 1028, while Rak teaches that Penta in an oil-type solvent is “unacceptable for commercial pressure treatment use,” Ex. 1015, 7:22–25. A POSA could not reasonably have been motivated to combine two references where one expressly criticizes the very carrier system on which the other relies.

In fact, Petitioner’s proposed combination of the AWPAPaper and Rak would both change Rak’s principle of operation and render Rak unsatisfactory for its intended purpose—either of which independently forecloses the proposed modification. *See In re Ratti*, 270 F.2d 810, 813 (CCPA 1959) (a proposed modification that changes a reference’s “principle of operation” is not obvious); *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984) (a proposed modification that renders the prior art “unsatisfactory for its intended purpose” weighs conclusively against obviousness); MPEP § 2143.01(V)–(VI). Rak’s principle of operation is the rapid evaporation of volatile, low-boiling-point chlorinated solvents to deposit solid preservative-polymer-hydrophobe composites within the wood microstructure.

Substituting diesel—a persistent, high-boiling-point hydrocarbon that does not evaporate under treatment conditions—for Rak’s volatile chlorinated solvents would eliminate the evaporative deposition mechanism on which Rak’s entire system depends.

Moreover, because diesel “do[es] not dissolve the polymers” essential to Rak’s formulation, *id.*, 3:42–51, the substitution would render Rak’s compositions inoperable: the polymer would not dissolve, the ternary system could not form, and the preservative could not be deposited within the wood as Rak’s system requires. A modification to Rak that destroys the reference’s operative mechanism is not a modification a POSA would have been motivated to make. Ex. 2012, ¶¶ 142–43.

4. Rak addresses a problem that DCOI does not have.

The motivation to combine Rak with the AWPB Paper and Cui further fails at a fundamental level because the problem Rak was specifically designed to solve does not exist for DCOI. Rak’s entire formulation system—comprising Penta, a hydrophobic agent (e.g., wax), and an amorphous vinylic-type polymer—was engineered to address three specific problems associated with Penta: “(1) blooming or sublimation loss of preservative, (2) wetting and leaching of the preservative, and (3) biological attack and degradation.” Ex. 1015, 4:1–5. Of these, the first—blooming or sublimation loss—is the problem that drives Rak’s compositional choices and specifically necessitates Rak’s required polymer component. Rak

teaches that the polymer “forms impermeable barriers (even when in low concentration) effectively limiting sublimation loss and confining the preservative within the cell or closed microsegment.” Ex. 1015, 4:6–12. The polymer exists in Rak’s system precisely because Penta tends to “bloom” or crystallize upon solvent evaporation—migrating to the wood surface as visible crystals—a phenomenon that reduces the preservative’s effectiveness and creates aesthetic and handling problems. The hydrophobic agent (wax) in Rak complements the polymer by providing water repellency, but Rak expressly warns that the hydrophobic agent alone “cannot adequately immobilize the preservative in the wood microstructure.” Ex. 1015, 4:5–6. In other words, Rak teaches that wax without polymer is insufficient—precisely because the crystallization and sublimation problems of Penta demand the cooperative interaction of both polymer barriers and hydrophobic agents working in tandem.

DCOI does not suffer from the crystallization problems that motivated Rak’s system. The AWWA Paper—which Petitioner itself relies upon—expressly teaches that “DCOI does not crystallize under standard conditions and remains as an amorphous semi-wax solid in pure form,” and that “even if the loss of the carrier solvent is extreme DCOI will not crystallize out into a form that might not be able to provide biological control, a phenomenon that has been observed with [P]enta in LPG gas and soft-rot.” Ex. 1028 at 12. This is not a minor distinction. It means that

the very problem that Rak’s polymer-and-hydrophobic agent system was designed to address—the crystallization and blooming of Penta upon solvent evaporation—simply does not arise when DCOI is used as the preservative. A POSA reading both Rak and the AWPAPaper would have readily understood that Rak’s solution is directed to a problem that DCOI does not have. Ex. 2012, ¶¶ 147–48.

Because DCOI does not crystallize, a POSA would have had no reason to adopt Rak’s polymer-and-hydrophobic agent system for a DCOI-based formulation. A POSA would have understood that incorporating Rak’s additives into a DCOI system would have added unnecessary complexity and cost to solve a nonexistent problem. *Id.* The fundamental chemical distinction between DCOI and Penta with respect to crystallization behavior severs the logical connection between Rak’s teachings and any DCOI-based formulation. *Id.*

Nor does DCOI suffer from Rak’s second identified problem—wetting and leaching—which leads to Rak’s use of hydrophobic agents like wax. Ex. 1015, 4:1–8. The AWPAPaper teaches that DCOI is “sparingly soluble in water” and is significantly less soluble than Penta. Ex. 1028 at 33. The AWPAPaper logically theorizes that DCOI should enjoy “significantly lower leaching” than Penta because of this solubility difference. *Id.* A POSA would have understood that DCOI’s inherent resistance to leaching eliminated the need for Rak’s hydrophobic agents (i.e., wax) to combat preservative loss through wetting. Ex. 2012, ¶¶ 178–79.

5. Asserted References Teach Wax as a Hydrophobic Agent, Not a Retaining Additive.

A recurring and critical deficiency in the Petition is its failure to analyze the different functional roles that wax plays in the various prior art references. The Petition cherry-picks the bare presence of “wax” in Cui and Rak without addressing the role that wax serves in each reference—isolating wax from its functional context and ignoring the other components in each system that actually perform the retaining function.

In Cui, wax is identified as a “strong hydrophobe” that “provide[s] good water repellency to wood.” Ex. 1016 at [0021], Example 1 (describing wax as a “water repellent”). The component that performs the retention function in Cui is the organic acid, which serves to increase “preservative solubility in the organic phase,” improve “the distribution gradient of the active preservative in treated wood,” and reduce “preservative leaching.” Ex. 1016 at [0020].¹⁶

In Rak, wax is similarly classified as a “hydrophobic agent” that provides “the same degree of water repellency as the fatty acids.” Ex. 1015, 2:46–50. The component that performs the retaining function in Rak is the polymer, which “forms impermeable barriers . . . effectively limiting sublimation loss and confining the

¹⁶ Petitioner incorrectly asserts that Cui discloses that wax helps provide low preservative leaching. Pet. at 68.

preservative within the cell or closed microsegment.” Ex. 1015, 4:6–12. Rak expressly teaches that the wax alone “cannot adequately immobilize the preservative in the wood microstructure.” Ex. 1015, 4:5–6.

In both references, then, the retaining function is performed by other components—organic acids in Cui and polymers in Rak—while wax operates as a hydrophobic agent providing water repellency. This absence of any retaining function for wax in the prior art is compounded by a more fundamental problem with the Petition’s theory: DCOI is itself naturally hydrophobic, and thus a POSA would not have been motivated to add a hydrophobic agent such as wax to a DCOI formulation for the purpose of water repellency. Ex. 2012, ¶ 178. The rationale for including wax in Rak’s Penta-based system—to provide water repellency to the treated wood—simply would not apply to DCOI-based systems where the active ingredient was itself a powerful hydrophobe. *Id.* at ¶ 179.

Selectively extracting wax from these multi-component prior art systems—divorced from its expressly disclosed hydrophobic function—and reassigning it to an entirely different role as a retaining additive is the type of hindsight-driven reconstruction that the obviousness analysis prohibits. A proposed combination that changes the principal operation of a prior art reference weighs against a finding of obviousness. In *Knauf Insulation, Inc. v. Rockwool International A/S*, the Federal Circuit held that “[t]he alleged similarity of the references does not support the

conclusion that an ordinary artisan would find it obvious to replace [a component] (thus changing the fundamental teaching of [the reference]),” and that “[t]he apparent similarity between the prior art references, upon which the Board relied to motivate their combination, is an illusion built upon hindsight bias.” 788 F. App’x. 728, 732–33 (Fed. Cir. 2019).

So too here: the apparent similarity between the references—each containing “wax”—does not support the conclusion that a POSA would find it obvious to repurpose wax from its taught hydrophobic function into a retaining-additive function, thereby changing the fundamental teaching of both Cui and Rak. The Petition’s combination theory requires the POSA to disregard the express teachings of both references about the role of wax and instead reassign wax to an entirely different function—a leap that is not supported by the prior art and that a POSA would not have been motivated to make. Ex. 2012, ¶¶ 176–79.

C. Even if the AWP Paper, Rak, and Cui Could be Combined, a POSA Would Not Have Expected Such a Combination to be Successful

When a petitioner contends that various claim limitations are spread out among several prior art references, it must show that a [POSA] “would have perceived a reasonable expectation of success in making the invention in light of the prior art.” *AstraZeneca LP v. Breath Ltd.*, 603 F. App’x 999, 1002 (Fed. Cir. 2015) (quoting *Amgen Inc. v. F. Hoffmann-La Roche Ltd.*, 580 F.3d 1340, 1362 (Fed. Cir.

2009)). Without showing that the prior art created such a reasonable expectation of success, all Petitioner has done is to use “the inventor’s own path” as a route to obviousness: “that is hindsight.” *Otsuka Pharm. Co., Ltd. v. Sandoz, Inc.*, 678 F.3d 1280, 1296 (Fed. Cir. 2012).

1. Rak Fails to Enable Its Concentrated Formulation of Penta.

As a threshold issue, Rak’s concentrated formulation is not enabled by Rak’s disclosure. This is fatal because Petitioner’s obviousness case depends on Rak’s concentrate as the sole source of the claimed 40–60% compositional ranges—no other prior art reference or evidence of record would have enabled a POSA to make the claimed concentrated DCOI-wax composition. *Raytheon Techs. Corp. v. Gen. Elec. Co.*, 993 F.3d 1374, 1377 (Fed. Cir. 2021) (“[I]f an obviousness case is based on a non-self-enabled reference, and no other prior art reference or evidence would have enabled a skilled artisan to make the claimed invention, then the invention cannot be said to have been obvious.”).

To render a claim obvious, “the prior art, taken as a whole, must enable a skilled artisan to make and use the claimed invention.” *Id.* at 1380 (citing *In re Kumar*, 418 F.3d 1361, 1368 (Fed. Cir. 2005)). While a non-enabling reference may play a role in an obviousness analysis—for example, by furnishing a motivation to combine with another reference that does enable the limitation—“the evidence of record must still establish that a skilled artisan could have made the claimed

invention.” *Id.* at 1381. Where, as here, no other reference or evidence fills the enablement gap, the relied-upon reference “must necessarily enable the relied-upon portion of its own disclosure.” *Id.* (citing *In re Antor Media Corp.*, 689 F.3d 1282, 1290 (Fed. Cir. 2012)).

Rak does not enable its concentrated formulation. Every working example in Rak uses Penta dissolved at low concentrations (typically 1–6% w/v) in a volatile organic solvent that constitutes approximately 90% of the total composition. Not a single example prepares, characterizes, or tests a solvent-free concentrate. The concentrate concept appears only in a single paragraph near the end of the specification—stating that “[t]he preservative can be prepared in the form of a masterbatch or concentrate (without the organic solvent) or as a paste with small amounts of the organic solvent”—and in Claim 9, which recites the theorized concentrate in language near-verbatim from the bare disclosure made in the specification. Ex. 1015, 17:20–38. Rak discloses no processing conditions, no mixing temperatures, no order of addition, no cooling parameters, no physical form characterization, no stability data, and no performance testing for the concentrated formulation. The entirety of Rak’s guidance for producing the concentrate is the statement that it is “adapted for dilution to form the final solution at the jobsite.” *Id.* This level of disclosure does not enable a POSA to make the theorized concentrated formulation that Rak claims.

Neither the AWPB Paper nor Cui fills this enablement gap. The prior art taught fundamentally different physical forms that bear no resemblance to a concentrated DCOI composition: both the AWPB Paper and Cui teach only dilute solutions of DCOI. No prior art reference demonstrates that a 40–60% DCOI composition would form a stable product capable of being manufactured, stored, shipped, and diluted without phase separation, crystallization, or loss of biocidal efficacy. No other evidence of record demonstrates that a POSA could have made the claimed concentrated DCOI composition. *See* Ex. 2012, ¶ 186. Petitioner’s conclusory assertion of a reasonable expectation of success, without addressing these threshold enablement questions, is insufficient to carry its burden.

2. Rak’s Own Experimental Data Undermine Any Expectation of Success.

Rak’s own experimental data call into question the real-world effectiveness of the disclosed system. Ex. 2012, ¶ 132. Rak’s Example 8 showed no improvement in penetration under pressure treatment (120 psi for 7 hours); Example 9 showed high leaching losses (27% and 51% at six days) that would preclude commercial use; and Example 5’s claims that “toxicity and Penta retention remain high for prolonged service life” are unsupported by data. Ex. 1015, 6:24–44, 8:44–11:68; Ex. 2012, ¶¶ 125–26, 129.

A POSA reviewing Rak would not have expected that a concentrated DCOI formulation in diesel could achieve adequate wood penetration or deliver long-

lasting preservative performance. Ex. 2012, ¶ 132. Transferring Rak’s teachings from its oil-free, volatile-solvent framework into an oil-based system would not have been a straightforward undertaking because the mechanism on which Rak’s additives depend—the deposition of solids following solvent evaporation—simply does not function in a system where the solvent remains present as in the ’716 Patent. Ex. 2012, ¶ 164.

3. Substituting DCOI for Penta in Rak’s system is not a simple substitution.

While the AWWA Paper and Cui confirm that DCOI was known as a wood preservative, substituting DCOI for Penta in Rak’s system is far from a straightforward, predictable modification as Petitioner argues. Where the result of a proposed substitution is unpredictable, the substitution is not obvious—and this principle applies with particular force in the chemical arts. *Eisai Co. v. Dr. Reddy’s Labs., Inc.*, 533 F.3d 1353, 1359 (Fed. Cir. 2008) (“This is particularly true in the pharmaceutical and chemical arts.”). The burden remains on Petitioner to demonstrate that a POSA would have had a reasonable expectation of success—not on Patent Owner to prove that failure was certain—and the absence of predictive data in the prior art can itself defeat a prima facie case of obviousness. *Honeywell Int’l Inc. v. Mexichem Amanco Holding S.A. de C.V.*, 865 F.3d 1348, 1355 (Fed. Cir. 2017).

Here, the record affirmatively demonstrates unpredictability. Penta and DCOI differ fundamentally in crystallinity, hydrophobicity, solubility, and sublimation behavior—differences that mean a formulation engineered for one cannot be assumed to work for the other. *See supra* Sections VII.A.2 and VII.B.4. The '716 Patent's specification confirms this empirically: systematic compatibility testing of DCOI with twenty candidate retaining additives revealed that several—including cellulose ester resins, polyisocyanate resins, polyurethane resins, and acrylic resins—proved incompatible with DCOI. Ex. 1001, Table 1. A POSA could not have assumed that a wax-based retaining additive would function effectively with DCOI merely because wax functioned with Penta in Rak's polymer-containing system.

Petitioner's own development experience confirms this unpredictability.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] *Id.*; Ex.

2012, ¶¶ 158–59, 195. If Petitioner itself—a company with experience formulating DCOI— [REDACTED]

[REDACTED] a POSA reading Rak certainly could not have predicted success. Yet Dr. Morgan does not address whether DCOI's materially different chemical

properties—including its amorphous character, lower water solubility, and distinct polarity profile—would affect its interaction with wax and polymer in Rak’s system. *See* Ex. 1002, ¶¶ 352–53.

Petitioner bears the burden of showing predictability, and the record shows the opposite. The ’716 Patent’s compatibility data, Viance’s formulation failures, and the fundamental chemical differences between Penta and DCOI collectively establish that a POSA could not have predicted that DCOI would function satisfactorily in Rak’s multi-component system merely because Penta functioned in that system. *Honeywell*, 865 F.3d at 1355. The proposed substitution is not simple, and its result was not predictable.

* * *

Petitioner’s Grounds 7 and 8 represent quintessential examples of impermissible hindsight reconstruction. They require a POSA to ignore Rak’s express teachings regarding oil-free volatile-solvent systems; ignore the prior art’s teaching on the functional role of wax as a hydrophobic agent; substitute a different preservative (DCOI for Penta); and combine three to five disparate references spread across half a century of prior art—all to arrive at the concentrated DCOI composition claimed in the ’716 Patent.

As the Supreme Court warned in *KSR*, a factfinder must guard against “the distortion caused by hindsight bias” and be “cautious of arguments reliant upon ex

post reasoning.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007). “The inventor’s own path itself never leads to a conclusion of obviousness; that is hindsight. What matters is the path that the person of ordinary skill in the art would have followed, as evidenced by the pertinent prior art.” *Otsuka Pharm. Co., Ltd. v. Sandoz, Inc.*, 678 F.3d 1280, 1296 (Fed. Cir. 2012).

A POSA would not have been motivated to make the combinations proposed in Grounds 7 and 8, would not have had a reasonable expectation of success, and would have understood Rak as directed to a fundamentally incompatible technology that teaches away from the oil-borne DCOI compositions claimed in the ’716 Patent. The Board should deny institution of Grounds 7 and 8.

VIII. Ground 9 Fails Because Petitioner Fails to Support a Finding of Invalidity Under 35 U.S.C. § 112.

Ground 9 consists of one page of conclusory allegations that “Claims 1, 3–12, and 14–25 are indefinite and lack written description and enablement support for the full scope of claims.” Pet. at 93. It is unclear, but presumably all three allegations of invalidity depend on the theory that “[i]t is mathematically impossible to satisfy the full scope of both the recited weight ratios and weight percent concentrations of DCOI and retaining additive.” *Id.* Yet, Petitioner does not explain or apply its “mathematical impossibility” theory as it relates to the legal requirements for

enablement and written description.¹⁷ This alone is sufficient for Ground 9 to fail. *SmithKline Beecham Corp. v. Apotex Corp.*, 439 F.3d 1312, 1320 (Fed. Cir. 2006) (“A skeletal argument, really nothing more than an assertion, does not preserve a claim.”).

Petitioner’s only support for Ground 9 is a citation to its expert’s declaration. *Id.* This alone shows Petitioner has failed to meet its burden under 35 U.S.C. § 324(a). 37 C.F.R. § 42.6(a)(3) (“Arguments must not be incorporated by reference from one document into another document.”); *Cisco Systems, Inc. v. C-Cation Technologies, LLC*, Case No. IPR2014-00454 (PTAB, Aug. 29, 2014) (Droesch, APJ) (rejecting the “practice of citing the [expert] Declaration to support conclusory statements that are not otherwise supported in the Petition”). Petitioner also fails on the substance.

In essence, Petitioner appears to contend that because select combinations within the recited ranges could hypothetically sum to 100% (leaving no room for additional components), or because the full breadth of the weight ratio range cannot

¹⁷ The Petition cites two cases. The first involves enablement, but Petitioner has made no enablement argument or attempted to apply the *Wands* factors. The other case concerns definiteness and Petitioner’s arguments appear to be based on the definiteness requirement of § 112.

be simultaneously achieved at every point within the weight percentage ranges, the claims are invalid. This argument fails as a matter of law.

In re Kroekel is directly on point. 504 F.2d 1143, 1144 (C.C.P.A. 1974).¹⁸ There, a three-component composition claim recited ranges of (a) 20% to 80% by weight, (b) 20% to 80% by weight, and (c) 1% to 25% by weight. *Id.* The claim thus embraced a theoretical composition having a total weight exceeding 100% if the maximum concentration were selected at the same time. *Id.* The C.C.P.A. found the composition claim definite. *Id.* at 1144. The court found that a POSA “would have no difficulty ascertaining the subject matter encompassed within the scope of the appealed claims.” *Id.* at 1146. The court’s key holding was unambiguous: “Clearly, a rejection based on indefiniteness cannot stand simply because the proportions actually recited in the claims may be read in theory to include compositions that are impossible in fact to formulate.” *Id.* The court emphasized that “subject matter which cannot exist in fact can neither anticipate nor infringe in law.” *Id.*

Petitioner’s argument rests on the false premise that every mathematical combination within the recited ranges must be simultaneously achievable. *Kroekel* squarely forecloses this reasoning. 504 F.2d at 1144. The claims inform a POSA

¹⁸ The Federal Circuit treats C.C.P.A. decisions as binding precedent, making *Kroekel* authoritative in this area. *South Corp. v. United States*, 690 F.2d 1368, 1369 (Fed. Cir. 1982).

about what compositions fall within their scope—those satisfying all recited limitations—a determination made by “precisely the same well-recognized criteria as are applied with respect to all patent claims.” *Id.* Petitioner’s indefiniteness argument amounts to an attack on a universally accepted claim drafting practice in the chemical arts and should be rejected.

IX. Conclusion

For the foregoing reasons, the Petition should be denied and no proceedings instituted. The claims are entitled to the priority date of the ’817 Provisional, rendering Petitioner’s key references non-prior art. Even if priority is lost, Petitioner’s prior art characterization of confidential commercial activities is legally deficient. And on the merits, Petitioner has not met the “more likely than not” standard for PGR institution under 35 U.S.C. § 324(a).

Dated: June 22, 2026

Respectfully Submitted,

By: /Robert Riddle/

Robert R. Riddle
Registration No. 69,599
Reed Smith LLP
1221 McKinney Street, Suite 2100
Houston, TX 77010
rriddle@reedsmith.com
Telephone: 713-469-3881
Facsimile: 713-469-3899

Attorney for Patent Owner

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing PATENT OWNER'S PRELIMINARY RESPONSE, together with Exhibits 2012-2021, was served by electronic mail on Petitioner's lead and backup counsel at the following email address: PGR2026-00023@mcandrews-ip.com

Dated: June 22, 2026

By: /Robert Riddle/
Robert R. Riddle
Registration No. 69,599
Reed Smith LLP
1221 McKinney Street, Suite 2100
Houston, TX 77010
rriddle@reedsmith.com
Telephone: 713-469-3881
Facsimile: 713-469-3899

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.6(a)(2)(ii), this Patent Owner's Preliminary Response is typeset in Times New Roman proportional font, with normal spacing.

Pursuant to 37 C.F.R. § 42.24(d), I hereby certify that this Patent Owner's Preliminary Response contains no more than 18,700 words, excluding those portions exempted by § 42.24(a). The Microsoft Word version used to prepare this paper provides the following word count for the non-excluded portions of the document: 18,424.

Dated: June 22, 2026

By: Robert Riddle

Robert R. Riddle

Registration No. 69,599

Reed Smith LLP

1221 McKinney Street, Suite 2100

Houston, TX 77010

rriddle@reedsmith.com

Telephone: 713-469-3881

Facsimile: 713-469-3899

Attorney for Patent Owner