

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Berkshire Hathaway Energy Company, Interstate Power & Light Company,
MidAmerican Energy Company, PacifiCorp, WEC Energy Group, Inc., and
Wisconsin Power & Light Company

Petitioners

v.

Birchtech Corp.
(d/b/a Midwest Energy Emissions Corp.)

Patent Owner

Case IPR2025-00423
Patent 10,668,430

**PATENT OWNER'S
PRELIMINARY RESPONSE**

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Exhibit List	
Exhibit	Description
2001	Declaration of Justin T. Nemunaitis
2002	Declaration of Richard Cochrane
2003	Original Complaint for Patent Infringement, <i>Midwest Energy Emissions Corp., et al. v. Vistra Energy Corp., et al.</i> , C.A. 1:19-cv-01334, ECF No. 1 (D. Del. July 17, 2019)
2004	Transcript of Jury Trial, <i>Midwest Energy Emissions Corp., et al. v. Arthur J. Gallagher & Co., et al.</i> , C.A. 1:19-cv-01334 (D. Del.) (Feb. 26, 2024–March 1, 2024)
2005	Non-Final Judgment Following Jury Verdict, <i>Midwest Energy Emissions Corp., et al. v. Arthur J. Gallagher & Co., et al.</i> , C.A. 1:19-cv-01334, ECF No. 697 (D. Del. March 8, 2024)
2006	Case Management Order, <i>In re: Midwest Energy Emissions Corp. Pat. Litig.</i> , No. 4:24-md-03132-SHL-WPK, ECF No. 60 (S.D. Iowa March 7, 2025)
2007	Complaint for Patent Infringement, <i>Midwest Energy Emissions Corp. v. Berkshire Hathaway Energy Company, et al.</i> , 4:24-cv-00243-SHL-WPK, ECF No. 1 (S.D. Iowa July 18, 2024)
2008	PacifiCorp’s First Amended Answer, Affirmative Defenses, and Counterclaims in Response to Plaintiff’s First Amended Complaint for Patent Infringement, <i>In re: Midwest Energy Emissions Corp. Pat. Litig.</i> , No. 4:24-md-03132-SHL-WPK, ECF No. 82 (S.D. Iowa March 21, 2025) (Redacted)
2009	Defendant MidAmerican Energy Company’s First Amended Answer, Affirmative Defenses, and Counterclaims to Plaintiff’s First Amended Complaint, <i>In re: Midwest Energy Emissions Corp. Pat. Litig.</i> , No. 4:24-md-03132-SHL-WPK, ECF No. 83 (S.D. Iowa March 21, 2025) (Redacted)
2010	Defendant Wisconsin Power and Light Company’s First Amended Answer, Affirmative Defenses, and Counterclaims to First Amended Complaint, <i>In re: Midwest Energy Emissions Corp. Pat. Litig.</i> , No.

	4:24-md-03132-SHL-WPK, ECF No. 87 (S.D. Iowa March 21, 2025) (Redacted)
2011	Opening Expert Report of Dr. Stephen Niksa, <i>Midwest Energy Emissions Corp., et al. v. Arthur J. Gallagher & Co., et al.</i> , C.A. 1:19-cv-01334 (D. Del.)
2012	Pilot- and Full-Scale Demonstration of Advanced Mercury Control Technologies for Lignite-Fired Power Plants, Quarterly Report (for the Period October 1, 2003 – December 31, 2003), dated February 2004
2013	Pilot- and Full-Scale Demonstration of Advanced Mercury Control Technologies for Lignite-Fired Power Plants, Final Report, dated February 2005
2014	Mercury Control Technologies for Electric Utilities Burning Subbituminous Coals, Final Report (For the period January 1, 2004 through June 30, 2005), dated October 2005
2015	Center for Air Toxic Metals (CATM), 2003 Research Ideas, dated August 30, 2002
2016	Document Metadata for Center for Air Toxic Metals (CATM), 2003 Research Ideas
2017	Declaration of Thomas Erickson including PTC logbook entries
2018	Declaration of Inventor John Pavlish, dated July 27, 2020
2019	Plaintiff ME2C’s Brief in Support of Its Motion for Preliminary Injunction, <i>Midwest Energy Emissions Corp. v. Berkshire Hathaway Energy Company, et al.</i> , 4:24-cv-00243-SHL-WPK, ECF No. 58-1 (S.D. Iowa Oct. 11, 2024)
2020	Defendants’ Brief in Support of Their Resistance to Plaintiff’s Motion for Preliminary Injunction, <i>Midwest Energy Emissions Corp. v. Berkshire Hathaway Energy Company, et al.</i> , 4:24-cv-00243-SHL-WPK, ECF No. 125 (S.D. Iowa Dec. 16, 2024) (Redacted)
2021	Plaintiff ME2C’s Reply Brief in Support of Its Motion for Preliminary Injunction, <i>Midwest Energy Emissions Corp. v. Berkshire Hathaway Energy Company, et al.</i> , 4:24-cv-00243-SHL-WPK, ECF No. 139 (S.D. Iowa Dec. 23, 2024) (Redacted)
2022	DTE Electric Company Affiliates Report, dated December 31, 2023

2023	First Amended Complaint for Patent Infringement, <i>Midwest Energy Emissions Corp., et al. v. Vistra Energy Corp., et al.</i> , C.A. 1:19-cv-01334, ECF No. 130 (D. Del. July 15, 2020)
2024	EPA, “Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units—Final Report to Congress”
2025	EPA Clean Air Act Overview, https://www.epa.gov/clean-air-act-overview/1990-clean-air-act-amendment-summary-title-iii
2026	EPA, Mercury Study Report to Congress Vol. I (1997)
2027	EERC internal presentation, “Description of Test Facilities Particulate Test Combustor”
2028	EERC internal presentation, “Mercury Control Technologies for Electric Utilities Burning Lignite Coals, Introduction to Project” (12/4/2001)
2029	EERC internal presentation, “Mercury Control Technologies for Electric Utilities Burning Lignite Coals Project Kickoff Meeting” part 1 (2/28/2002)
2030	EERC internal presentation, “Mercury Control Technologies for Electric Utilities Burning Lignite Coals Project Kickoff Meeting” part 2 (2/28/2002)
2031	EERC internal presentation, “Mercury Control Technologies for Electric Utilities Burning Lignite Coals, Project Review Meeting” (2/25/2003)
2032	“JV TASK 45 – MERCURY CONTROL TECHNOLOGIES FOR ELECTRIC UTILITIES BURNING LIGNITE COAL, PHASE I BENCH- AND PILOT-SCALE TESTING Final Report” (Oct. 2003) (the “Oct. 2003 Report”)
2033	Metadata for Notes on Center for Air Toxic Metals (CATM) 2003 Research Ideas
2034	DOE, Success Story for Sorbent Enhancement Additives
2035	EPA, Mercury and Air Toxics Standards, https://www.epa.gov/mats/cleaner-power-plants
2036	Order Denying Motions to Stay and Motion to Compel, <i>In re: Midwest Energy Emissions Corp. Pat. Litig.</i> , No. 4:24-md-03132-SHL-WPK, ECF No. 131 (S.D. Iowa May 22, 2025)

2037	Refined Coal Supply Agreement by and between Portage Fuels Company, LLC and Wisconsin Power and Light Company, dated September 6, 2016 (ALLIANT-ME2C-004484)
2038	Contract for Purchase of Refined Coal between Louisa Refined Coal LLC and MidAmerican Energy Company, dated Oct. 4, 2011 (MEC001747-MEC001789)
2039	Contract for Purchase of Refined Coal between George Neal Refined Coal LLC and MidAmerican Energy Company, dated Aug. 29, 2012 (MEC001916-MEC001934)
2040	Contract for Purchase of Refined Coal between George Neal North Refined Coal LLC and MidAmerican Energy Company, dated Apr. 30, 2013 (MEC001954-MEC001984)
2041	Contract for Purchase of Refined Coal between Walter Scott Refined Coal LLC and MidAmerican Energy Company, dated Oct. 10, 2011 (MEC001832-MEC001873)
2042	License and Services Agreement by and between Arbor Fuels Company, LLC and Wisconsin Public Service Corp., dated July 8, 2016 (WEC000001-WEC000040)
2043	J. D. Kilgroe, C. B. Sedman, R. K. Srivastava, J. V. Ryan, C. W. Lee, S. A. Thorneloe, <i>Control of Mercury Emissions from Coal-Fired Electric Utility Boilers: Interim Report</i> , U.S. Environmental Protection Agency, Office of Research and Development, EPA-600/R-01-109, April 2002.
2044	File History of U.S. Patent App. No. 15/974,343, which ultimately issued as U.S. Patent No. 10,668,430

I. Introduction

The Board should deny institution because (1) Petitioners fail to establish the required reasonable likelihood of success on their priority date challenge; and (2) the Petition is time-barred based on a 2019 patent infringement case that Patent Owner ME2C filed against real-parties-in-interest of Petitioners.

All of the asserted grounds in this Petition assume that the patent-at-issue is not entitled to its earliest claimed priority date. That assumption is based on a prior institution decision where the Board held that the provisional application could not be incorporated by reference into the intervening applications. ***However, subsequent case law has clarified that that a provisional application can be incorporated by reference for purposes of maintaining a priority date. See, e.g., Maquet Cardiovascular LLC v. Abiomed, Inc., No. CV 17-12311, 2022 WL 4138711, at *5 (D. Mass. Sept. 12, 2022) (explaining the difference between incorporation by reference under § 120 versus § 112 and further explaining that an application can incorporate a provisional application by reference for purposes of maintaining a priority date).***

The Board specifically found that one of the applications identified by Petitioners as the “Pre-2018 Applications” (the ’595 Application) failed to include the written description support contained in the original provisional application, and it concluded that essential material from a provisional application cannot be

incorporated by reference into a non-provisional application. However, MPEP 608.01(p) provides that information from a provisional application *can* be incorporated by reference for priority date purposes if it identifies the application number and includes an incorporation by reference statement. Here, the '595

Application states:

This application is a divisional of U.S. patent application Ser. No. 11/209,163 filed Aug. 22, 2005, entitled “Sorbents for the Oxidation and Removal of Mercury”, which claims the benefit of U.S. Provisional Application Ser. No. 60/605,640, filed Aug. 30, 2004, both applications are hereby incorporated herein by reference in their entirety for all purposes.

Ex. 1022 at 256. Accordingly, there is no break in the priority chain, and the '430 Patent is entitled to its earliest claimed priority date. In any event, the express disclosures in the '595 Application (and the other Pre-2018 Applications) also support the '430 Patent, such that there is no break in priority even absent this incorporation by reference statement. In either case, Petitioners cannot demonstrate that the asserted grounds qualify as prior art.

In addition, this petition is time-barred under 35 U.S.C. § 315(b). All of the Petitioners or their privies own power plants that were accused of infringement in a prior patent infringement case that ME2C filed in Delaware in 2019 (“the 2019 Delaware Action”). That litigation ultimately resulted in settlement and supply agreements valued at over \$30 million dollars, and a judgment of willful

infringement, no invalidity, and damages of \$57 million dollars. While Petitioners were not named in that lawsuit, their co-owners and/or suppliers were named in that lawsuit, defended that lawsuit, and settled the case.¹

II. Applicable Law Related to Patent Priority

A. Legal Standard for Patent Priority

“To be entitled to the benefit of the filing date of an earlier-filed application . . . the disclosure of the invention in the prior application and in the later-filed application must be sufficient to comply with the requirements of 35 U.S.C. 112(a) except for the best mode requirement.” MPEP 211.05. To satisfy the written description requirement under 35 U.S.C. § 112(a), the specification “must clearly allow persons of ordinary skill in the art to recognize that the inventor invented what is claimed.” *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc) (cleaned up). In other words, a patent applicant must “convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention. The invention is, for purposes of the ‘written description’ inquiry, whatever is now claimed.” *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563–64 (Fed. Cir. 1991); *see also Nalpropion Pharm., Inc. v. Actavis Labs. FL, Inc.*, 934 F.3d 1344, 1350 (Fed. Cir. 2019)

¹ ME2C is currently litigating follow-on cases against Petitioners for additional power plants and time periods not covered in the 2019 Delaware Action.

(explaining that it “is not necessary that the exact terms of a claim be used *in haec verba* in the specification”).

A claim “will not be invalidated on section 112 grounds simply because the embodiments of the specification do not contain examples explicitly covering the full scope of the claim language.” *LizardTech, Inc. v. Earth Res. Mapping, Inc.*, 424 F.3d 1336, 1345 (Fed. Cir. 2005); *see also Fox Factory, Inc., v. Sram, LLC*, No. PGR2016-00043, 2017 WL 1242973, at *5 (P.T.A.B. Apr. 3, 2017) (finding that petitioner failed to show lack of written description support for claims that covered a broader range of embodiments than those disclosed in the specification). Relatedly, “[n]ot every claim must contain every limitation or achieve every disclosed purpose.” *See ScriptPro LLC v. Innovation Assocs., Inc.*, 833 F.3d 1336, 1342 (Fed. Cir. 2016); *see also In re Rasmussen*, 650 F.2d 1212, 1215 (C.C.P.A. 1981) (explaining “that a claim may be broader than the specific embodiment disclosed in a specification is in itself of no moment”).

The Board must consider the following factors in evaluating the level of disclosure required: “the existing knowledge in the particular field, the extent and content of the prior art, the maturity of the science or technology, [and] the predictability of the aspect at issue.” *Ariad Pharms.*, 598 F.3d at 1344. This is because:

[T]he patent specification is written for a person of skill in the art, and such a person comes to the patent with the knowledge of what has come before. Placed in that context, it is unnecessary to spell out every detail of the invention in the specification; only enough must be included to convince a person of skill in the art that the inventor possessed the invention and to enable such a person to make and use the invention without undue experimentation.

LizardTech, 424 F.3d at 1345 (internal citation omitted).

“[T]he general rule [is] that disclosure of a species provides sufficient written description support for a later filed claim directed to the genus.” *Bilstad v. Wakalopulos*, 386 F.3d 1116, 1125 (Fed. Cir. 2004). A specification supports a genus claim if “one of skill in the art would recognize that the applicant was in possession of the necessary common attributes or features possessed by the members of the genus in view of the species disclosed.” MPEP 2163.II.A.3.a.ii. For example, disclosure of a species in a specification may provide support for a genus claim covering species that are predictable alternatives to the disclosed species. *In re Glob. IP Holdings LLC*, 927 F.3d 1373, 1377 (Fed. Cir. 2019) (reversing Board decision for failure to consider predictability of alternatives).

Similarly, a specification may support a claim where there is “a reasonable structure-function correlation.” Such a correlation may be established “by the inventor as described in the specification,” or it may be “known in the art at the time of the filing date.” *AbbVie Deutschland GmbH & Co., KG v. Janssen Biotech, Inc.*, 759 F.3d 1285, 1301 (Fed. Cir. 2014); *see, e.g., In re Smythe*, 480

F.2d 1376, 1383 (C.C.P.A. 1973) (the phrase “air or other gas which is inert to the liquid” was sufficient to support a claim to “inert fluid media” because the description of the properties and functions of the air or other gas segmentizing medium would suggest to a person skilled in the art that appellant’s invention includes the use of “inert fluid” broadly).

Conclusory expert testimony that a specification fails to provide support for a claim is insufficient to demonstrate lack of written description. *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1346 (Fed. Cir. 2016) (reversing Board decision and criticizing petitioner’s expert testimony as “abstract and untethered from the context provided by the [challenged patent]”).

B. Petitioners Bear the Burden of Persuasion with Respect to a Disputed Priority Date.

“In an *inter partes* review, the burden of persuasion is on the petitioner to prove ‘unpatentability by a preponderance of the evidence,’ 35 U.S.C. § 316(e), and that burden never shifts to the patentee.” *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). In particular, the burden of proving that an asserted reference pre-dates an alleged priority date rests on the petitioner, not the patentee. *Id.*

Initially, a petitioner has the burden of persuasion, and the burden of production (*i.e.*, coming forward with evidence) on all issues. *See id.* at 1379. If

the petitioner provides *prima facie* evidence that its burden has been met, the burden of production—but not the burden of persuasion—shifts to the patentee on some issues such as the determination of a patent’s priority date. *Id.* at 1380. If the patentee meets this burden by providing evidence of an earlier priority date, the Board must evaluate the petitioner’s arguments in light of all the evidence to determine if the petitioner has met its burden of persuasion. *Id.*; see, e.g., *Boart Longyear Ltd. v. Australian Mud Co. Pty Ltd.*, No. IPR2019-01129, 2019 WL 6442439, at *14 (P.T.A.B. Nov. 25, 2019) (describing this procedure).

Citing *PowerOasis*, Petitioners mistakenly assert that a patent owner bears the burden of persuasion with respect to establishing a priority date. In doing so, Petitioners confuse the burden of *production* with the burden of *persuasion*. The Federal Circuit has already rejected this misinterpretation of *PowerOasis*. See *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008) (explaining that *PowerOasis* held that the burden of *production* can shift to the patentee, not the burden of *persuasion*).

III. The ’430 Patent Is Entitled to Its Earliest Claimed Priority Date.

As explained more fully below, the earliest filed provisional application supports the challenged claims of the ’430 Patent, and this provisional application was incorporated by reference and/or physically incorporated into all intervening

applications leading to the '430 Patent. Thus, Petitioners have failed to meet their burden of demonstrating a break in the priority chain.

All of the asserted grounds assume that the claims of the '430 Patent cannot claim the priority date of the provisional application. Petitioners do not identify any differences between the claims that impact their priority date analysis, and thus claim 1 may be considered as a representative claim:

1. A method of separating mercury from a mercury-containing gas, the method comprising:
combusting coal in a combustion chamber, to provide the mercury-containing gas, wherein
the coal comprises an additive comprising Br₂, HBr, a bromide compound, or a combination thereof, wherein the additive is added to the coal before the coal enters the combustion chamber, or
the combustion chamber comprises an additive comprising Br₂, HBr, a bromide compound, or a combination thereof or
a combination thereof;
injecting a sorbent comprising activated carbon into the mercury-containing gas downstream of the combustion chamber;
contacting mercury in the mercury-containing gas with the sorbent; and
separating the sorbent contacted with the mercury from the mercury-containing gas.

Contrary to Petitioners' assertions, the provisional application and all intervening applications provide written description support for this claim.

As Petitioners acknowledge, the chain of applications connecting the provisional application to the '430 Patent all incorporate the provisional application by reference. In addition, all Post-2018 Applications also physically incorporate the material from the provisional application. For ease of reading, Patent Owner will refer to the following applications:

- The provisional application (Ex. 1020);
- The '595 Application, which is representative of the Pre-2018 Applications (Exs. 1021, 1022, 1025, 1033, 1034, 1035, 1067);
- The '430 Patent itself, which is representative of the Post-2018 Applications (Exs. 1001, 1066, 2044).

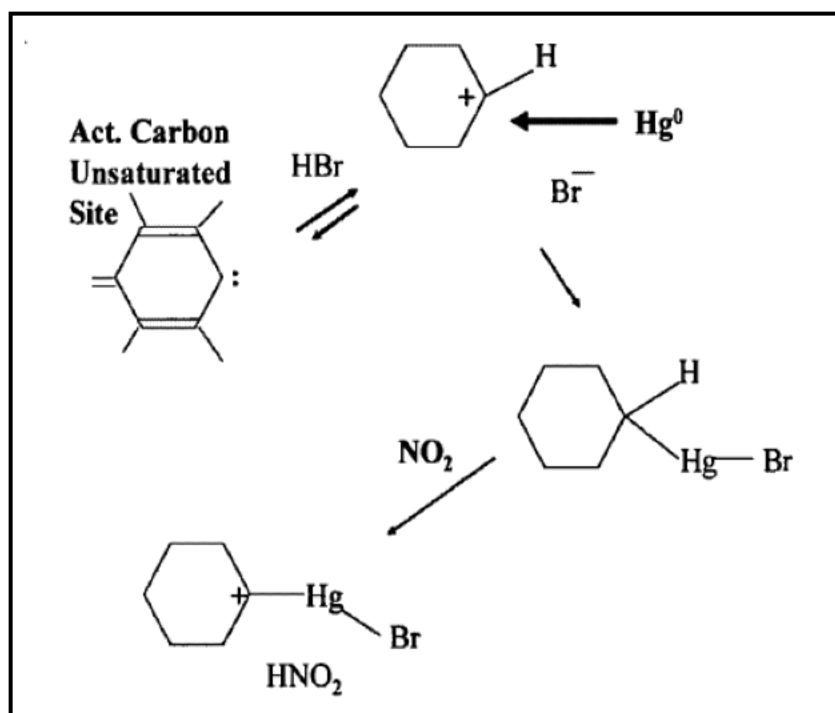
A. The Provisional Application Supports the '430 Claims.

The provisional application explains the scientific basis for the invention. It states:

We now teach that the formation of the new bromide compound with carbon increases the reactivity of the carbon forms toward mercury and other pollutants. The resulting bromide compound is uniquely suited to facilitate oxidation of the mercury. The effectiveness of the oxidation results from the promotion effect of the halide exerted on the developing positive charge on the mercury during the oxidation, known in the chemical art as a specific catalytic effect. *Thus, as the mercury electrons are drawn toward the positive carbon, the halide anion electrons are pushing in from the other side, which stabilizes the positive charge developing on the mercury and lowers the energy requirement for the oxidation process. Bromide is especially reactive, owing to the highly polarizable electrons in the outer 4p orbitals of*

the ion. Thus, adding HBr or Br₂ to the carbon forms a similar carbon bromide, in which the positive carbon oxidizes the mercury with the assistance of the bromide ion.

Ex. 1020 at 7–8 (emphasis added). Here, the inventors explained that the benefits of the claimed promoted sorbent are obtained by forming a carbon bromide out of activated carbon and a negative Bromine ion, *i.e.*, Br⁻. They further explain that this Br⁻ ion may be supplied by adding HBr or Br₂ (both of which contain Br⁻) to the carbon. This is further illustrated in the diagram below:



Ex. 1020, fig. 1. As shown above, activated carbon is mixed with HBr. This results in carbon bonded with the hydrogen atom, and a Bromine ion Br⁻. When these components are mixed into mercury-containing gas, the mercury (Hg) is

drawn toward the carbon, and the Bromine ion is drawn toward the mercury, creating a stable bond.

Thus, the inventors explained that mercury is captured by intermixing activated carbon and bromine ions with the mercury. It also provides examples of chemicals that can supply the bromine ion, Hydrogen Bromide (HBr) and Bromine gas (Br₂). Of course, the chemical model described above demonstrates that other sources of Bromine ions (i.e., bromides) may be used. As Petitioners' expert testified, a POSITA would recognize that a "bromide" consists of a bromine ion (Br⁻) and some other element. Ex. 1002, Niksa Decl. ¶¶ 57, 63.

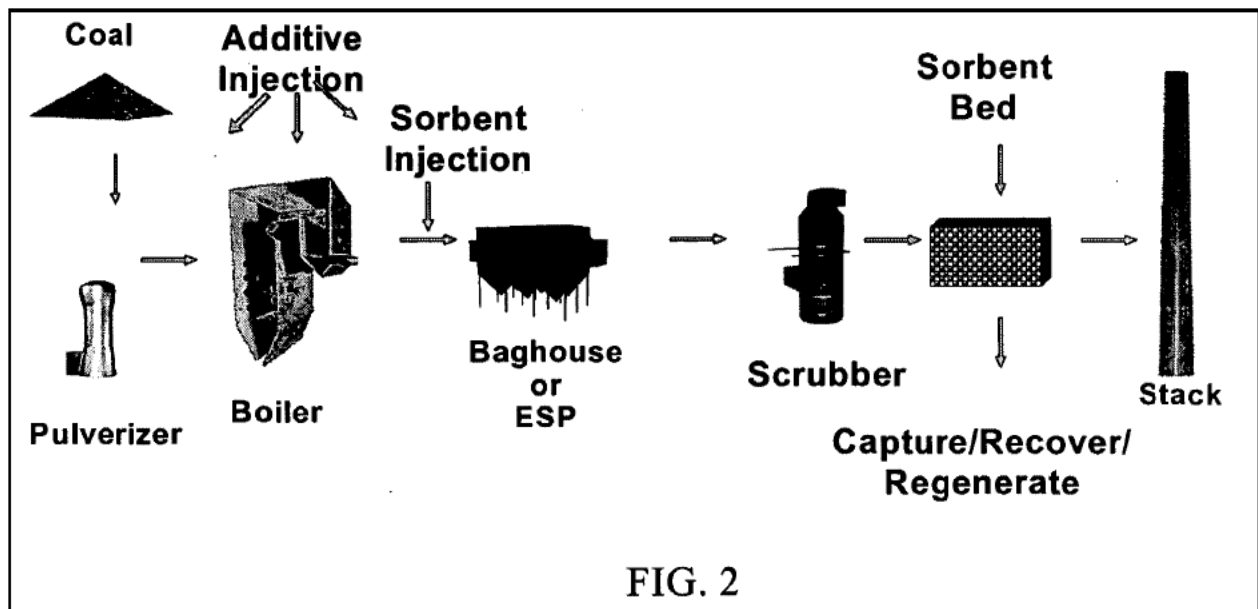
The provisional application also describes the use of "an optional second component." This component is a halogen or a compound from a halogen such as HBr. Ex. 1020 at 10; *see also id.* at 3 (sample claim 1E describing various bromine and other halogen additives). Thus, the inventors describe the use of an activated carbon sorbent with a source of bromine ions, and, optionally, another source of halogen ions, which could also be bromine ions:

It has been demonstrated that addition of an optional second component, in addition to the bromine, results in improved reactivity and capacity for the sorbent, exceeding that of both the untreated carbon and the brominated carbon. The second compound comprises either a second halogen or a compound from a second halogen, such as HBr.

Id. at 12. Having described the scientific theory behind their invention, the inventors also described various implementations of their theory, including the example provided below:

FIG. 2 is a block diagram illustrating the use of the invention in a coal fueled facility. Of course, the invention can also be used in any other desired type of facility. FIG. 2 shows a boiler for burning pulverized coal. The facility utilizes various devices to clean the exhaust of the boiler. In this example, a baghouse or ESP is used to collect particulates in the exhaust. A scrubber and sorbent bed are also used to remove undesired constituents from the flue gas stream, before being fed to the stack. *In the example shown, the sorbent is injected into the flue gas after the boiler. The additive can be injected where desired (e.g., before, after, or within the boiler).*

Id. at 12. And as illustrated below:



Id., fig. 2. In this example, a bromine-containing additive is shown being added to the coal, to the boiler, or after the boiler, and the activated carbon sorbent is shown being added after the boiler. These components mix and contact the mercury in the

gas exiting the boiler and then the combined bromine, mercury, carbon particles are captured in the baghouse or ESP to produce a cleaned gas. Thus, the provisional application provides full written description support for each of the claims of the '430 Patent.

B. The Pre-2018 Applications Support the '430 Claims.

The Pre-2018 Applications contain substantively identical disclosures. For ease of reading, patent owner refers to the '595 Application below. Ex. 1022.

The Pre-2018 Applications state that the provisional application “is hereby incorporated by reference in [its] entirety.” Ex. 1022 at 256. This statement is sufficient to incorporate the provisional application. MPEP 201.06(c) (explaining that a party can maintain a priority date by merely identifying an application number along with an incorporation statement such as “hereby incorporated by reference”); *see also Harari v. Lee*, 656 F.3d 1331, 1335 (Fed. Cir. 2011) (holding that the phrase “The disclosures of the two applications are hereby incorporate[d] by reference” incorporated the entirety of the applications for purposes of evaluating written description support).

Petitioners argue that this incorporation statement is ineffective for determining priority date because a provisional application cannot be incorporated by reference to provide essential material. This is incorrect:

The limitations on the material which may be incorporated by reference in U.S. patent applications which are to issue as U.S. patents do not apply to applications relied on only to establish an earlier effective filing date under 35 U.S.C. 119 or 35 U.S.C. 120. Neither 35 U.S.C. 119(a) nor 35 U.S.C. 120 places any restrictions or limitations as to how the claimed invention must be disclosed in the earlier application to comply with 35 U.S.C. 112(a). Accordingly, an application is entitled to rely upon the filing date of an earlier application, even if the earlier application itself incorporates essential material by reference to another document.

MPEP 608.01(p) (emphasis added) (further explaining the policy reasons why § 1.57(d) limitations on the types of documents that can be incorporated into a patent do not apply in the context of a priority date challenge); *see also Maquet Cardiovascular LLC v. Abiomed, Inc.*, No. CV 17-12311, 2022 WL 4138711, at *5 (D. Mass. Sept. 12, 2022) (explaining the difference between incorporation by reference under § 120 versus § 112 and further explaining that an application can incorporate a provisional application by reference for purposes of maintaining a priority date).

This makes sense. The reason for limiting incorporation by reference practice is to provide the public with a patent disclosure which minimizes the public's burden to search for and obtain copies of documents incorporated by reference. That same policy concern does not apply where the sole purpose for which an applicant relies on an earlier U.S. application is to establish an earlier

filing date. MPEP 608.01(p) (explaining that “essential material” can be incorporated by reference for priority date purposes).

To the extent the provisional application provides support for the '430 Patent claims, the Pre-2018 Applications do so as well.

Even absent this incorporation by reference, these applications support the '430 Patent claims. The '595 Application discloses the same chemical model as the provisional application (fig. 2; ¶¶ 52–53), the use of a “promoter” that supplies Br- such as HBr or Br₂ (¶¶ 53, 64, original claim 8), and the practice of adding the promoter and sorbent at one or multiple locations (¶ 56).

The '595 Application does not contain provisional figure 2, but it does provide a similar disclosure of bromine species being added to coal. Specifically, it describes an experimental test setup at an actual coal-fired power plant. In that example, the promoter and sorbent were both injected downstream of the boiler. However, the inventors explained that these components could be added before, after, or within the boiler. *Id.* ¶ 107 (“In this example, the halogen/halide promoted carbon sorbent was injected into the flue gas after the boiler. In general, however, the inventive sorbent can be injected where desired (e.g., before, after, or within the boiler)”).

Because a halogen/halide promoted sorbent necessarily includes a halogen/halide such as Br₂, HBr, or Br-, a POSITA would recognize that adding

this material before the boiler necessarily results in the limitations at issue in the '517 Patent.

C. The Post-2018 Applications Support the '430 Claims.

The Post-2018 Applications contain substantively identical disclosures. For ease of reading, Patent Owner refers to the '430 Patent below. Ex. 1001. These applications contain the same incorporation by reference statement and the same disclosure of separate addition of bromine and activated carbon as the Pre-2018 Applications. Thus, for the exact same reasons, they support the '430 claims.

In addition, the Post-2018 Applications also physically incorporate the content of the provisional application. Thus, for the same reason the provisional application supports the claims, these applications do so as well. Although, Petitioners are not challenging whether the '430 application provides written description support for its claims under 35 U.S.C. § 112, as opposed to 35 U.S.C. § 120, this physical incorporation ensures that the claims do have § 112 support.

Petitioners also argue that the Post-2018 Applications could not have been amended to include material from the provisional application, but this is a red herring as no amendment is necessary when filing a continuation application. MPEP 201.06(c)(III) ("A continuation or divisional application may be filed under 35 U.S.C. 111(a) using the procedures set forth in 37 CFR 1.53(b), by providing: (A) a new specification and drawings and a copy of the signed oath or declaration

as filed in the prior application provided the new specification and drawings do not contain any subject matter that would have been new matter in the prior application; . . .”).

D. Response to Petitioners’ Arguments.

For the reasons stated above, Patent Owner has met its burden to provide evidence establishing an earlier priority date. In light of that evidence, Petitioners cannot sustain their burden of proving that the challenged claims are not entitled to the priority date of the provisional application.

1. The Provisional Application Discloses the Claimed Bromine Species.

According to Petitioners, the provisional application fails to disclose adding bromine additives to coal or the boiler. First, Petitioners argue that while example claim 1E discloses various bromine additives, it does not disclose the other claimed species, *i.e.*, Br₂. However, Petitioners fail to address the description of Br₂ cited above. For example, the provisional application states: “Bromide is especially reactive, owing to the highly polarizable electrons in the outer 4p orbitals of the ion. Thus, adding HBr or Br₂ to the carbon forms a similar carbon bromide, in which the positive carbon oxidizes the mercury with the assistance of the bromide ion.” Ex. 1020 at 8.

Moreover, while example claim 1E is just one example, Petitioners interpret this example too narrowly. It further states: “additional substance is a compound

comprised of a Group V or VI element or combination of Group V or VI with Group VII element, such as SCl_2 , 1-10 wt% of bromine.” As Petitioners’ expert explained, a group VII element includes chlorine and bromine, and thus example claim 1E discloses the use of various bromine-containing compounds. Ex. 1002 ¶ 61.

Petitioners also argue that the provisional application fails to teach this limitation because it states that an “additive” may be added before the boiler instead of stating that bromine/bromide may be added before the boiler. *See* Ex. 1020, fig. 2. This is elevating form over substance. As noted above, the inventors’ chemical model relies on a combination of two components—bromine ions and activated carbon sorbent. It strains credulity to think that a POSITA would be unable to determine what “additive” is referred to in Figure 2.

The provisional application does describe an “optional second component” that may be used in addition to the bromine and activated carbon. Ex. 1020 at 13. However, Petitioners fail to show that a POSITA would interpret figure 2 as describing the combination of activated carbon and an “optional second component,” while *omitting* the critical bromine component. Regardless, even if the “additive” in figure 2 referred to the “optional second component, the provisional application states: “The second compound comprises either a second halogen or a compound from a second halogen, such as HBr .” *Id.* at 10.

This is further confirmed by the provisional application's description of "in-flight" mixing. It states: "we demonstrated that the sorbent can be readily treated with any combination of bromine and the second component in-flight using vapors of these components contacting the very fine carbon particles dispersed in air or other gas stream that conveys the particles to the flue gas duct." Ex. 1020 at 10–11. When listing the benefits of this method it states: "There are no costs for transporting carbon and additive to a treatment facility." Ex. 1020 at 11. If the inventors intended the word "additive" to refer only to the optional second component, this sentence should state: "There are no costs for transporting carbon [bromine] and additive to a treatment facility." This indicates that the inventors used the word "additive" with its ordinary meaning, *i.e.*, a component that is added to the carbon. Thus, the word "additive" encompasses bromine *and* the optional second component. *See also id.* ("This process allows rapid on-site tailoring of additive-sorbent ratios in order to match the requirements of flue gas changes, such as needed when changing fuels or reducing loads, thus further optimizing the economics.").

Petitioners also criticize the claims listed in the provisional, but an inventor is not required to include claims in a provisional application, let alone include

claims that, standing alone, provide § 112 support for later claims.²

Finally, Petitioners argue that the species disclosed in the provisional application fail to support genus claims encompassing Br⁻ or bromides. However, “the general rule [is] that disclosure of a species provides sufficient written description support for a later filed claim directed to the genus.” *Bilstad v. Wakalopulos*, 386 F.3d 1116, 1125 (Fed. Cir. 2004). Petitioners fail to show that this general rule is inapplicable here.

In particular, an application supports a genus claim if “one of skill in the art would recognize that the applicant was in possession of the necessary common attributes or features possessed by the members of the genus in view of the species disclosed.” MPEP 2163.II.A.3.a.ii. Similarly, a specification may support a claim where there is “a reasonable structure-function correlation.” *AbbVie*, 759 F.3d at 1300–01. The provisional application satisfies this standard. By describing a chemical model illustrating the interaction between activated carbon, mercury and Br⁻ ions, a POSITA would understand that the common attribute of the relevant genus is a chemical that can supply a Br⁻ ion, *i.e.*, a bromide.

² Relatedly, Petitioners criticize Mr. Pavlish for distinguishing HBr from Br₂, etc. Mr. Pavlish’s testimony on these issues merely provided basic truths of chemistry. HBr refers to a molecule containing a hydrogen atom and a bromine atom. Br₂ contains two bromine atoms. Drawing that distinction in no way minimizes the significance of the chemical model taught in the provisional application.

Similarly, disclosure of a species may provide support for a genus claim covering species that are predictable alternatives to the disclosed species. *In re Glob. IP Holdings LLC*, 927 F.3d 1373, 1377 (Fed. Cir. 2019) (reversing Board decision for failure to consider predictability of alternatives). For the same reasons described above, that standard is also met. Here, Petitioners argue that Sjostrom’s bare description of adding “Br” to coal is enough to inform a POSITA to use bromides. Pet. at 62 (“Sjostrom does not identify which chemical to use for “Br,” but it would have been obvious to use widely available materials, including aqueous solutions of a bromide compound like CaBr_2 .”). If Petitioners are correct, then the much more detailed description of chemical mechanisms contained in the ’430 Patent’s parent applications also inform a POSITA as to the scope of this genus.

2. The Provisional Application Discloses Coal Comprising Added Bromine.

Petitioners argue that, even if the provisional application describes adding bromine “before . . . the boiler,” it fails to disclose “the coal comprises added Br_2 , HBr , Br^- , or a combination thereof, added to the coal upstream of the combustion chamber.” Pet. at 39–41.

To understand the flaw in this argument, it is helpful to describe how coal is provided to a combustion chamber.³ As Petitioners' expert explained:

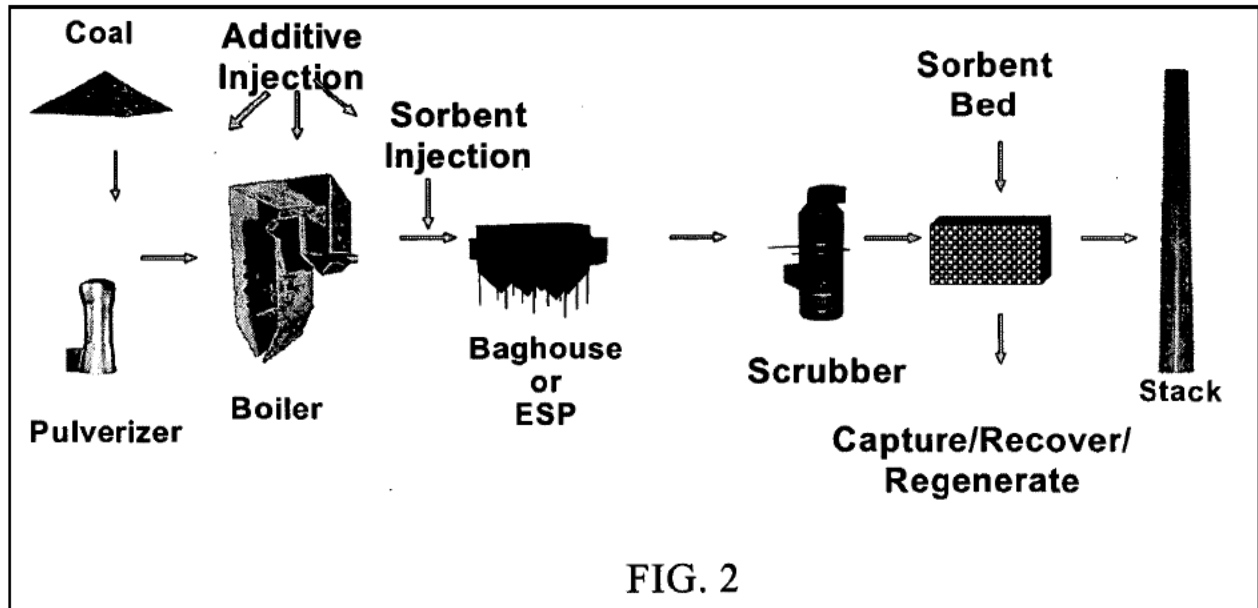
It was known that the main method in use by the electric utility steam generation industry for the combustion of coal as a fuel source was pulverized coal firing. Pulverized coal firing is performed by feeding small particle sized coal—around 50 micron mean diameter—to a combustion chamber or furnace for combustion of the pulverized coal.

...

[T]he components within these systems generally included a number of burners that fired the pulverized coal as it was carried from the pulverizers by a stream of primary air supplied by a large forced-draft fan. It was known that the combustion chamber may also include a supply of secondary air and over-fire air ports for the control of NO_x formation.

Ex. 1002 ¶¶ 72–73. In other words, coal is provided to a combustion chamber by first crushing the coal into a fine powder and then using air flow to transport the coal into entry ports for the chamber. Moreover, Dr. Niksa testified that a POSITA would understand a coal combustion chamber to have only two entry points: coal entry ports or secondary entry ports. This description is consistent with the provisional application which depicts coal passing through a pulverizer and then entering the combustion chamber:

³ Petitioners do not dispute that the term “boiler” as used in the provisional application encompasses a combustion chamber.



Ex. 1020, fig. 2. This description is also consistent with the overall structure of the claims, which describe adding bromine either through coal entry ports, alternative entry ports, or both:

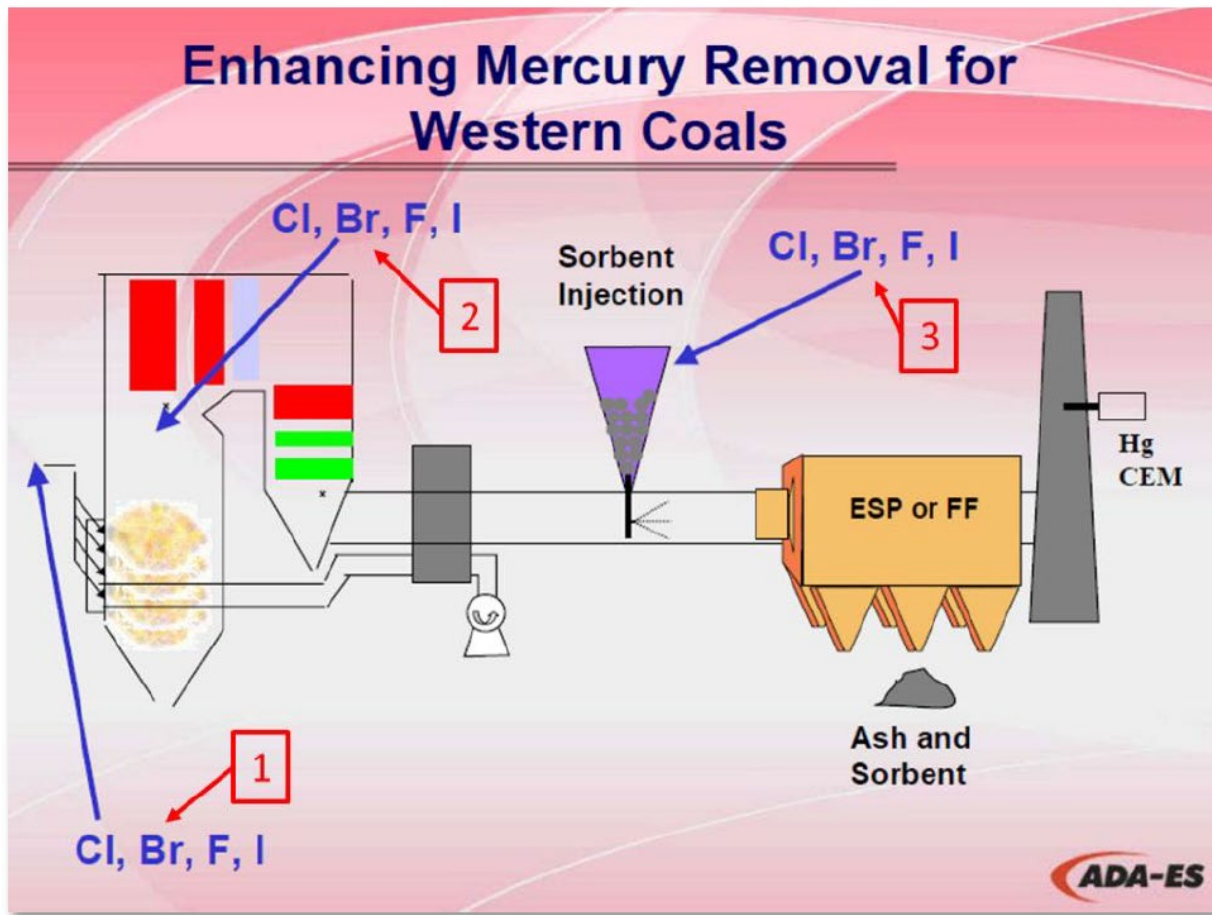
combusting coal in a combustion chamber, to provide the mercury-containing gas, wherein

the coal comprises an additive comprising Br₂, HBr, a bromide compound, or a combination thereof, wherein the additive is added to the coal before the coal enters the combustion chamber, or

the combustion chamber comprises an additive comprising Br₂, HBr, a bromide compound, or a combination thereof or a combination thereof;

Ex. 1001, claim 1. Given the background described above, a POSITA would understand that this claim refers to the two ways that bromine could be added to the combustion chamber: either it is added to the coal and then passed through the coal entry ports, or it is added through secondary air ports into the combustion chamber. This is consistent with the provisional application which describes adding the bromine “before” or “within” the boiler. Ex. 1020 at 12. And with figure 2 above which illustrates the addition of bromine near the pulverizer, or directly into the combustion chamber. Thus, the provisional application provides support for this limitation.

Even Petitioners acknowledge that a POSITA would understand an image similar to the provisional figure as disclosing this limitation. Petitioners argue that Sjostrom teaches this limitation based on the image below:



Pet. at 48–49. In particular, Petitioners state: “Sjostrom mentions ‘coal additives’ and, as shown at Location 1, teaches adding bromine (Br) to the pulverized coal entering the boiler.” Pet. at 49. Petitioners cannot meaningfully contend that a POSITA would understand Sjostrom’s arrow to disclose adding bromine to pulverized coal, but reach a different conclusion with respect to the provisional application.⁴

⁴ Petitioners may argue that there is no direct contradiction because they used the word “obvious.” This is too clever by half. In this statement, Petitioners acknowledge that a POSITA would understand the arrow pointing before the boiler

3. The Intervening Applications Support the Challenged Claims.

Petitioners offer only brief, vague assertions as to why these applications fail to provide support for the challenged claims, or they criticize portions of the applications not relied upon above. For example, Petitioners argue that some of the Pre-2018 Applications contain a statement that they “claim priority” to the provisional application “to the extent appropriate.” This does not break priority. Each of those applications plainly cites the provisional application as a priority application. Even if that later statement were interpreted to be ambiguous, the statement that matters is decidedly not ambiguous: that the provisional application “is hereby incorporated by reference in its entirety.”

All Pre-2018 Applications incorporate the provisional application by reference and also independently disclose separate addition of bromine and activated carbon. All Post-2018 Applications incorporate the provisional application by reference and also physically, and they contain the same disclosure of separate addition of bromine and activated carbon as disclosed in the Pre-2018 Applications. Accordingly, all intervening applications support the challenged claims.

in Sjoström to be describing bromine added to pulverized coal. Based on that same reasoning, a POSITA would also understand the provisional application to demonstrate the '430 inventors possessed the same idea.

IV. Petitioners Failed to Demonstrate a Reasonable Likelihood That Sjostrom and Eckberg Were Publicly Accessible.

“[T]he burden is on the petitioner to identify with particularity evidence sufficient to establish a reasonable likelihood that the reference was publicly accessible before the critical date of the challenged patent, and therefore that there is a reasonable likelihood that it qualifies as a printed publication.” *Hulu, LLC v. Sound View Innovations, LLC*, IPR2018-01039, Paper 29 at 16 (PTAB Dec. 20, 2019) (precedential). Petitioners claim they can meet this burden by showing merely that “the relevant public has a means of accessing” Sjostrom and Eckberg. Petition at 42 (citing *GoPro, Inc. v. Contour IP Holding LLC*, 908 F.3d 690, 693 (Fed. Cir. 2018)). This is, at best, an incomplete statement of the law; and at worst, a blatant mischaracterization.

The Federal Circuit has consistently held that “public accessibility requires more than technical accessibility.” *Samsung Elecs. Co. v. Infobridge Pte. Ltd.*, 929 F.3d 1363, 1369 (Fed. Cir. 2019) (quoting *Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 773 (Fed. Cir. 2018)). A reference may be considered publicly accessible if it was “disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art exercising reasonable diligence, can locate it.” *Kyocera Wireless Corp. v. Int’l Trade Comm’n*, 545 F.3d 1340, 1350 (Fed. Cir. 2008). The determination of

whether a document was publicly accessible “involves a case-by-case inquiry into the facts and circumstances surrounding the reference’s disclosure to members of the public.” *Medtronic, Inc. v. Barry*, 891 F.3d 1368, 1380 (Fed. Cir. 2018).

Here, Petitioners rely on their paid technical expert’s largely uncorroborated fact testimony regarding a conference that took place twenty years ago. In particular, Dr. Niksa claims that Sjostrom and Eckberg were presented at one of four tracks at the 2005 Electric Utilities Environmental Conference (“EUEC”). Dr. Niksa claims, without support, that “[h]undreds of people attended” the relevant track presentations, including POSITAs. Petition at 47 (citing Ex. 1002 ¶¶ 125, 276–79). However, Petitioners have not corroborated the number of people in attendance at this track during the relevant time, nor whether those people were skilled in the art. Thus, Petitioners have not provided sufficient evidence that Sjostrom and Eckberg were “disseminated or otherwise made available to . . . persons interested and ordinarily skilled in the subject matter or art.” *See Kyocera*, 545 F.3d at 1350; *see also Finnigan Corp. v. Int’l Trade Comm’n*, 180 F.3d 1354, 1369 (Fed. Cir. 1999) (“[C]orroboation is required of any witness whose testimony alone is asserted to invalidate a patent, regardless of his or her level of interest.”). Accordingly, Petitioners have failed establish a reasonable likelihood that Sjostrom and Eckberg were sufficiently publicly accessible to qualify as printed publications under § 102(b).

V. This Petition Is Time-Barred.

Petitioners bear the burden of demonstrating compliance with 35 U.S.C. § 312(a)(2) and § 315(b). *See, e.g., Ventex Co., Ltd. v. Columbia Sportswear N. Am., Inc.*, IPR2017-00651, Paper 152 (PTAB Jan. 24, 2019) (precedential). According to the Federal Circuit, “[d]etermining whether a non-party is a ‘real party in interest’ demands a flexible approach that takes into account both equitable and practical considerations, with an eye toward determining whether the non-party is a clear beneficiary that has a preexisting, established relationship with the petitioner.” *Applications in Internet Time, LLC v. RPX Corp.*, 897 F.3d 1336, 1351 (Fed. Cir. 2018) (emphasis added).

The Board follows this approach. *See, e.g., Ventex*, IPR2017-00651, Paper 152, at 10 (“[T]he Court in *AIT* invites a ‘flexible approach’ in the real party in interest query that focuses on whether a ‘non-party is a clear beneficiary that has a preexisting, established relationship with the petitioner.’”). In *Ventex*, the petitioner (Ventex) was a supplier to an accused infringer (Seirus) in parallel district court litigation and was obligated to indemnify and defend Seirus. Accordingly, the Board found that Seirus was a real party in interest with respect to Ventex. *Ventex*, IPR2017-00651, Paper 152, at 8.

Furthermore, privity may be demonstrated by “(1) an agreement between the parties to be bound; (2) pre-existing substantive legal relationships between the

parties; (3) adequate representation by the named party; (4) the non-party's control of the prior litigation; (5) where the non-party acts as a proxy for the named party to relitigate the same issues; and (6) where special statutory schemes foreclose successive litigation by the non-party (*e.g.*, bankruptcy and probate)."

Applications in Internet Time, 897 F.3d at 1360 (Reyna, J., concurring) (citing *Taylor v. Sturgell*, 553 U.S. 880, 894–95 (2008)). Any one factor or "category" can support a showing of privity. *Id.* Privity "prevent[s] successive challenges to a patent by those who previously have had the opportunity to make such challenges in prior litigation." *Id.* (quoting *WesternGeco LLC v. ION Geophysical Corp.*, 889 F.3d 1308, 1319 (Fed. Cir. 2018)).

Here, Petitioner PacifiCorp is a co-owner of at least one of the Talen power plants accused of infringement in Patent Owner ME2C's Delaware action, *i.e.*, the Colstrip power plant. *See* Ex. 2023 (2020 First Amended Complaint alleging infringement of the '430 Patent by Talen). As the named operator of that power plant, Talen defended the lawsuit and settled the litigation. Indeed, Talen specifically identified PacifiCorp as a real party in interest in its 2020 IPR.⁵ *See*

⁵ Petitioners identified PacifiCorp as a "potential" real party in interest. Patent Owner objected to this designation as improper and requested that the petitions be denied for failure to clearly identify all real parties in interest as required by 35 U.S.C. § 312(a)(2). IPR2020-00832, POPR at 8-9. The Board overruled that objection and apparently treated the identified parties as real-parties-in-interest. IPR2020-00832, Paper 17 at 9–10 (PTAB Oct. 26, 2020).

IPR2020-00832, Petition at 3. Moreover, in ME2C’s current lawsuit against PacifiCorp, PacifiCorp has alleged that Talen negotiated that settlement agreement on its behalf and for the benefit of PacifiCorp.⁶ Because Petitioner PacifiCorp failed to identify Talen as a real party in interest in contravention of § 312(a)(2), and because Talen is time-barred under § 315, the present petition is time-barred.

As to the remaining Petitioners Berkshire Hathaway Energy Company, Interstate Power & Light Company (“IPL”), MidAmerican Energy Company (“MidAmerican”), WEC Energy Group, Inc. (“WEC”), and Wisconsin Power & Light Company (“WPL”), they and their-real parties-in-interest own power plants that used something called “the Chem-Mod Solution” to burn coal. This process involved the sale of refined coal (coal treated with bromine) to Petitioners under sales agreements that included indemnity provisions. This type of supply relationship can create privity. *See, e.g., Semiconductor Components Indus., LLC v. Greenthread, LLC*, IPR2023-01242, Paper 94, DR Decision at 3 (PTAB Apr. 24, 2025).

In its Delaware action, ME2C asserted that this Chem-Mod Solution caused direct infringement at Petitioners’ power plants. Ex. 2003 at 12–13. Chem-Mod

⁶ ME2C does not dispute that the Talen agreement includes a license covering infringing activity at the Colstrip power plant. ME2C does dispute PacifiCorp’s broader claim that its other power plants are licensed.

LLC and its various affiliates were named as Defendants in the Delaware Action.

Ex. 2003.

In particular, WPL purchased refined coal from Chem-Mod LLC sublicensee Portage Fuels Company, LLC for combustion at the Columbia power plant. That agreement provided indemnity to WPL as the Buyer of refined coal for infringement of intellectual property rights.



Ex. 2037 § 13.1.

MidAmerican purchased refined coal from Chem-Mod LLC sublicensees Louisa Refined Coal LLC, George Neal Refined Coal LLC, George Neal North Refined Coal LLC, and Walter Scott Refined Coal LLC for combustion of refined coal at its Louisa, George Neal, and Walter Scott power plants. The agreements related to these sales also contain indemnity provisions. *See* Exs. 2038–2041.

Petitioner Berkshire Hathaway Energy Company owns and controls MidAmerican, and Petitioner IPL co-owns the Louisa and George Neal power plants.

Wisconsin Public Service Corporation, the parent of Petitioner WEC, purchased refined coal from Chem-Mod LLC sublicensee Arbor Fuels Company, LLC for combustion of refined coal at its Weston power plant. The agreements memorializing this relationship also contain indemnity provisions. *See, e.g.*, Ex. 2042.

Beginning on July 17, 2019, Patent Owner sued and named as defendants Chem-Mod, Portage Fuels Company, LLC, Louisa Refined Coal LLC, Walter Scott Refined Coal LLC, and Arbor Fuels Company, LLC for infringement of the Challenged Patents in the United States District Court for the District of Delaware. Ex. 2003. On July 15, 2020, Patent owner amended its complaint to add the '430 patent as well as Defendants George Neal Refined Coal LLC and George Neal North Refined Coal LLC. Ex. 2023.

These Petitioners have argued that Chem-Mod and its affiliates defended Patent Owner's infringement claims and negotiated a license on their behalf. *See* Ex. 2009 at 91. Other power plant operators such as Talen, NRG, and Vistra—the 2020 IPR petitioners—recognized that this relationship made Chem-Mod a real

party in interest. *See, e.g.*, IPR2020-00832, Petition at 2.⁷ For the exact same reason, Chem-Mod and its affiliates are real parties in interest with respect to Petitioners WPL Berkshire Hathaway Energy Company, MidAmerican, IPL, and WEC.

This is an additional reason why the present petition is time-barred under 35 U.S.C. § 315(b) and for failure to identify at least Chem-Mod, Portage Fuels Company, LLC, Louisa Refined Coal LLC, George Neal Refined Coal LLC, George Neal North Refined Coal LLC, Walter Scott Refined Coal LLC, and Arbor Fuels Company, LLC in violation of 35 U.S.C. § 312(a)(2).

VI. Conclusion

For the reasons provided above, the Board should conclude that Petitioners have failed to meet their burden of proving that the asserted references qualify as prior art, and that the present Petition is time-barred, and thus deny the Petition.

⁷ Talen and Vistra identified Chem-Mod as a “potential” real party in interest. NRG identified Chem-Mod as a real party in interest, and the Board agreed with NRG. IPR2020-00832, Paper 17 at 9–10 (PTAB Oct. 26, 2020).

Dated: July 9, 2025

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that the foregoing Patent Owner's Preliminary Response, exclusive of the exempted portions as provided in 37 C.F.R. § 42.24, contains 7,199 words and therefore complies with the type-volume limitations of 37 C.F.R. § 42.24. The word count was calculated by starting with Microsoft Word's total document word count and subtracting the words for the Cover Page, Table of Contents, Table of Authorities, Table of Exhibits, Table of Challenged Claims, Mandatory Notices, Certificate of Compliance, and Certificate of Service.

Date: July 9, 2025

/Hamad M. Hamad/

Hamad M. Hamad, Reg. No. 64,641

CERTIFICATE OF SERVICE UNDER 37 C.F.R. § 42.6(e)(4)

It is hereby certified that on this 9th day of July, 2025, a copy of the foregoing document was served via electronic mail, as consented to by Petitioner upon the following counsel of record:

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