PUBLIC VERSION

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571-272-7822

Paper 49
Date: September 8, 2025

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BERKSHIRE HATHAWAY ENERGY COMPANY, MIDAMERICAN ENERGY COMPANY, PACIFICORP, and WEC ENERGY GROUP, INC.
Petitioner,

v.

BIRCHTECH CORP.,
Patent Owner.

IPR2025-00278
Patent 10,343,114 B2

Before CHRISTOPHER M. KAISER, AVELYN M. ROSS, and DAVID COTTA, *Administrative Patent Judges*.

ROSS, *Administrative Patent Judge*.

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

I. INTRODUCTION

Berkshire Hathaway Energy Company, Interstate Power & Light Company, MidAmerican Energy Company, PacifiCorp, WEC Energy Group, Inc., and Wisconsin Power & Light Company[1] (collectively, "Petitioner") filed a Petition requesting *inter partes* review of claims 1–30 of U.S. Patent No. 10,343,114 B2 (Ex. 1001, "the '114 patent"). Paper 1 ("Pet."). Petitioner also filed an explanation regarding the necessity of multiple petitions (IPR2025-00274 and IPR2025-00278). Birchtech Corp. ("Patent Owner") filed a Preliminary Response. Paper 19 ("Prelim. Resp."). Paper 2. With our authorization, Petitioner filed a Reply to the Preliminary Response. Paper 24 ("Pet. Reply").

Patent Owner filed a brief regarding Discretionary Denial. Paper 15. Petitioner filed an opposition to the Discretionary Denial Brief. Paper 18. Patent Owner filed a reply to Petitioner's opposition to the Discretionary Denial Brief. Paper 20. Petitioner filed a sur-reply to Patent Owner's reply to Petitioner's opposition to the Discretionary Denial Brief. Paper 22. The Acting Director determined that "discretionary denial of institution is not appropriate" in this proceeding and referred the Petition to the Board. Paper 23.

Under 35 U.S.C. § 314(a), an *inter partes* review may not be instituted unless the information presented in the petition "shows that there is a reasonable likelihood that the petitioner would prevail with respect to at

[1] Interstate Power and Light Company and Wisconsin Power and Light Company subsequently settled their dispute with Patent Owner and have been terminated from this proceeding. Paper 30; Paper 32.

least [one] of the claims challenged in the petition." The following findings of fact and conclusions of law are not final, but are made for the sole purpose of determining whether Petitioner meets the threshold for initiating review. Any final decision shall be based on the full trial record, including any response timely filed by Patent Owner. Any arguments not raised by Patent Owner in a timely-filed response may be deemed waived.

For the reasons stated below, we determine that Petitioner has established a reasonable likelihood that it would prevail with respect to at least one claim. We hereby institute an *inter partes* review as to claims 1–30 of the '114 patent based upon Petitioner's asserted grounds of unpatentability.

II. BACKGROUND

A. Real Parties in Interest

Petitioner identifies itself, as well as Alliant Energy Corporation, Alliant Energy Corporate Services, Inc., MidAmerican Funding, LLC, MHC Inc., PPW Holdings LLC, Madison Gas and Electric Company, and Wisconsin Public Service Corporation as the real parties in interest. Pet. 1–2. Patent Owner identifies "MES, Inc." as the real party in interest. Paper 9, 1.[2]

B. Related Matters

Petitioner indicates that it filed a concurrent petition against the '114 patent (IPR2025-00274). Pet. 3.

[2] Paper 9 has all pages numbered 2. We consider the first of these pages as page number 1.

The parties identify the following matters as related to this proceeding:

> *Midwest Energy Emissions Corp. et al. v. Arthur J. Gallagher & Co. et al*., No. 1:19-cv-01334 (D. Del.);
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> *Midwest Energy Emissions Corp. v. Ameren Corporation et al*., No. 4-24-cv-00980 (E.D. Mo);
>
> *Midwest Energy Emissions Corp. v. Tucson Electric Power Co. et al*., No. 3:24-cv-08145-DJH (D. Az.);
>
> Midwest Energy Emissions Corp. v. Berkshire Hathaway Energy Co. et al., No. 4:24-cv-00248 (S.D. Iowa);
>
> *In re Midwest Energy Emissions Corp. Patent Litigation*, No. 4:24-md-3132 (S.D. Iowa) (consolidating the Iowa, Arizona, and Missouri);
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> *Midwest Energy Emissions Corp. v. Berkshire Hathaway Energy Company et al*., No. 2-25-cv-00015 (D. Wy.);
>
> *Midwest Energy Emissions Corp. v. Wisconsin Power and Light Company*, No. 3-25-cv-00026 (W.D. Wis);
>
> *Midwest Energy Emissions Corp. v. MidAmerican Energy Company et al*., Case No. 4-24-cv-00243 (S.D. Iowa); and
>
> *Birchtech Corp. f/k/a Midwest Energy Emissions Corp. v. Evergy, Inc. et al*., Case No. 4-25-cv-00050 (W.D. Mo).

Pet. 4–5; Paper 9, 1–2.

Petitioner additionally identifies the following proceedings as related matters:

> *NRG Energy, Inc. et al. v. Midwest Energy Emissions Corp.*, IPR2020-00832 (U.S. Patent No. 10,343,114) (filed Oct. 26, 2020);

> *NRG Energy, Inc. et al. v. Midwest Energy Emissions Corp.*, IPR2020-00834 (U.S. Patent No. 10,343,114) (filed Oct. 26, 2020);
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> *NRG Energy, Inc. et al. v. Midwest Energy Emissions Corp.*, IPR2020-00926 (U.S. Patent No. 8,168,147) (filed Dec. 2, 2020); and
>
> *NRG Energy, Inc. et al. v. Midwest Energy Emissions Corp.*, IPR2020-00928 (U.S. Patent No. 8,168,147) (filed Dec. 2, 2020).

Pet. 3–4.

> We also note the following related proceedings:
>
> *Berkshire Hathaway Energy Co. et al. v. Birchtech Corp.*, IPR2025-00280 (U.S. Patent No. 10,596,517) (filed Jan. 24, 2025); and
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> *Berkshire Hathaway Energy Co. et al. v. Birchtech Corp.*, IPR2025-00281 (U.S. Patent No. 10,596,517) (filed Jan. 24, 2025).
>
> Petitioner additionally identifies the following applications as related to the application of the '114 patent:
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> U.S. Patent Application No. 15/295,594 (filed Oct. 17, 2016);
>
> U.S. Patent Application No. 14/102,896 (filed Dec. 11, 2013, now U.S. Patent No. 9,468,886);
>
> U.S. Patent Application No. 12/429,058 (filed Apr. 23, 2009, now U.S. Patent No. 8,652,235);
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> U.S. Patent Application No. 12/201,595 (filed Aug. 29, 2008);
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> U.S. Patent Application No. 11/209,163 ("the '163 application") (filed on Aug. 22, 2005, now U.S. Patent No. 7,435,286); and
>
> U.S. Provisional Patent Application No. 60/605,640 (filed Aug. 30, 2004).

Pet. 5–6.

C. The '114 patent

The '114 patent, titled "Sorbents for the Oxidation and Removal of Mercury," "relates to methods and materials for the removal of pollutants from flue gas or product gas from a gasification system," and "[i]n particular, mercury is removed from gas streams generated during the burning or gasification of fossil fuels by highly reactive regenerable sorbents." Ex. 1001, code (54), 1:27–31. The '114 patent discloses that the "combustion and gasification of fossil fuel such as coal generates flue gas that contains mercury and other trace elements that originate from the fuel" and "[s]everal types of mercury control methods for flue gas have been investigated, including injection of fine sorbent particles into a flue gas duct and passing the flue gas through a sorbent bed." *Id.* at 1:33–35, 1:56–59. The '114 patent explains that a "major problem with existing carbon injection systems is that the sorbent is relatively unreactive toward mercury" and therefore "these sorbents must be used in large amounts." *Id.* at 2:10–12. The '114 patent further describes other mercury sorbent approaches and their problems. *Id.* at 2:20–3:15.

The '114 patent describes a halogen/halide-promoted sorbent "that is highly effective for the removal of mercury from flue gas streams" and that the "sorbent comprises any activated carbon and/or non-carbon compound." *Id.* at 3:36–39. Further, "[o]ptional secondary components and alkali may be added to further increase reactivity and mercury capacity." *Id.* at 3:43–44. The '114 patent states that "the optional secondary component is selected from the group consisting of Group V halides, Group VI halides, HI, HBr, HCl, and combinations thereof." *Id.* at 4:52–55.

The '114 patent discloses in "an embodiment, the promoted sorbent is introduced by direct injection into the flue gas stream" and in "another embodiment, the base sorbent is promoted within the flue gas stream." *Id.* at 5:41–43. The '114 patent describes that in "some embodiments, the carbon base sorbent and the promoter are introduced into the mercury-containing gas at the same location or at separate locations." *Id.* at 7:5–8. For instance, the '114 explains for one example that "the sorbent is injected into the flue gas after the boiler" and the "additive can be injected where desired (e.g., before, after, or within the boiler)." *Id.* at 30:1–4.

The '114 patent explains that when "a promoted or a non-promoted base sorbent reacts with elemental or oxidized mercury, a mercury/sorbent chemical composition is formed and, in the case of elemental mercury reacting with the promoted base sorbent, the mercury is oxidized." *Id.* at 3:53–57. The '114 patent further describes separating the promoted sorbent from the gas stream and adjusting "the rate at which the carbon base sorbent is introduced or the rate at which the promoter is introduced or combination thereof" according to a monitored mercury content of the cleaned gas "so that the mercury content of the cleaned gas is maintained at substantially the desired level with minimal operating cost." *Id.* at 7:10–16.

D. Illustrative Claims

Claims 1 and 23–25 are independent. Claims 2–22 depend from claim 1 and claims 26–30 depend from claim 25. Ex. 1001, 33:49–36:48.

Claim 1 (with identifiers of claim elements, *see*, *e.g.*, Pet. xviii) is reproduced below.

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 mercury-containing gas comprises a halogen or halide promoter comprising HBr, Br-, or a combination thereof, wherein
the coal comprises added Br_2, HBr, Br-, or a combination thereof, added to the coal upstream of the combustion chamber, or
the combustion chamber comprises added Br_2, HBr, Br-, or a combination thereof, or
a combination thereof;
injecting a sorbent material comprising activated carbon into the mercury-containing gas downstream of the combustion chamber;
contacting mercury in the mercury-containing gas with the sorbent, to form a mercury/sorbent composition;
separating the mercury/sorbent composition from the mercury-containing gas, to form a cleaned gas;
monitoring the mercury content of the cleaned gas; and
controlling, in response to the monitored mercury content of the cleaned gas, an injection rate of injecting the sorbent into the mercury-containing gas, the sorbent composition, or a combination thereof, so that the mercury content of the cleaned gas is maintained at or below a desired level.

Ex. 1001, 33:49–34:7.

E. Asserted Grounds of Unpatentability

Petitioner, supported by the declaration of Dr. Stephen Niksa (Ex. 1002), asserts the following grounds of unpatentability (Pet. 10):

Claims Challenged	35 U.S.C. §	References/Basis
1–9, 12–30	103	Sjostrom,[3] Eckberg[4]
1–30	103	Sjostrom, Olson-646[5]
1–5, 7–12, 14–18, 20, 23–25, 27–30	102(a)(1)	Olson-235[6]

III. MULTIPLE PETITIONS

Petitioner filed two petitions on the same day challenging claims 1–30 of the '114 patent. In IPR2025-00274, Petitioner presented one anticipation challenge based on Downs-Boiler and four obviousness challenges based on either Vosteen or Downs-Boiler in combination with additional references. IPR2025-00274, Paper 3, 10. In this proceeding, Petitioner presents one anticipation challenge based on Olson-235 and two obviousness challenges, the first based on Sjostrom and Eckberg and the other based on Sjostrom and Olson-646. Pet. 10.

Petitioner filed a Petitioner's Explanation Regarding the Necessity of Multiple Petitions. Paper 2 ("Explanation"). Arguing that "[g]iven the

[3] Sjostrom, Sharon, *Full Scale Evaluations of Mercury Control Technologies with PRB Coals*, Track A, Session A3 (Mercury – Control), Presentation A3b, EUEC: 8TH ELECTRIC UTILITIES ENVIRONMENTAL CONFERENCE (Tucson, Arizona: January 25, 2005), Ex. 1010 ("Sjostrom).

[4] Eckberg, Craig, et al., *Mercury Control Evaluation of Halogen Injection into a Texas Lignite-Fired Boiler*, Track A, Session A3 (Mercury – Control), Presentation A3c, EUEC: 8TH ELECTRIC UTILITIES ENVIRONMENTAL CONFERENCE (Tucson, Arizona: January 25, 2005), Ex. 1011 ("Eckberg").

[5] US 2006/0048646 A1, published Mar. 9, 2006, Ex. 1012 ("Olson-646").

[6] US 8,652,235 B2, issued Feb. 18, 2014, Ex. 1018 ("Olson-235").

strength of the prior-art references on the merits, and noncumulative nature of the references, both petitions should be instituted," Petitioner nevertheless ranks the IPR2025-00274 petition above the IPR2025-00278 petition. Explanation 2. Citing the CTPG's statement that "more than one petition may be necessary . . . when there is a dispute about priority date requiring arguments under multiple prior art references," Petitioner also contends that the two petitions assert different priority dates and assert different references. *Id.* at 4 (citing CTPG 59) (alteration in original). Petitioner further argues that the issues presented to the Board by the two Petitions are limited, because the Petition in IPR2025-00274 uses only two primary references and two secondary references whereas the Petition in this proceeding uses only two primary references and two secondary references. *Id.* at 4–5. Petitioner also argues that, instead of each party individually filing separate petitions, the parties joined forces for reasons of efficiency. *Id.* at 4–5.

Petitioner's arguments are persuasive. As argued by Petitioner, the CTPG recognizes that more than one petition may be necessary when there is a priority date dispute that requires arguments under multiple prior art references. CTPG 59. We also agree with Petitioner that the second petition in this proceeding does not unduly burden the Board, due to its grounds based on four references.

Patent Owner does not contest Petitioner's arguments that the simultaneous filing of two petitions does not unduly burden the Board. *See generally* Prelim. Resp.; Prelim. Sur-reply. Nor does Patent Owner argue that two petitions prejudice Patent Owner. *Id.*

Given the unique circumstances in this proceeding, we find this to be a rare instance in which we should decline to exercise our discretion to deny the lower-ranked Petition.

IV. WHETHER THE PETITION IS TIME-BARRED

Patent Owner argues the Petition is time-barred and fails to identify all real parties-in-interest. Prelim. Resp. 30–36.

Under 35 U.S.C. § 315(b), an inter partes review "may not be instituted if the petition requesting the proceeding is filed more than [one] year after the date on which the petitioner, real party in interest, or privy of the petitioner is served with a complaint alleging infringement of the patent." 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).

Whether an unnamed party is a real party-in-interest or a privy of the instant petitioner is highly fact dependent and "demands a flexible approach that takes into account both equitable and practical considerations." *See Applications in Internet Time, LLC v. RPX Corp*., 897 F.3d 1336, 1351, 1360 (Fed. Cir. 2018) ("AIT"); *Ventex*, IPR2017-00651, Paper 152 at 4–5 (citing *Worlds Inc. v. Bungie, Inc*., 903 F.3d 1237, 1242 (Fed. Cir. 2018)); Consolidated Trial Practice Guide, 13 (2019), https://www.uspto.gov/TrialPracticeGuideConsolidated) ("CTPG"). "Courts invoke the terms 'real party-in-interest' and 'privy' to describe relationships and considerations sufficient to justify applying conventional principles of estoppel and preclusion." CTPG 13. These requirements are designed to "protect patent

owners from harassment via successive petitions by the same or related parties, to prevent parties from having a 'second bite at the apple,' and to protect the integrity of both the USPTO and federal courts by assuring that all issues are promptly raised and vetted." *Id.* at 12–13. Factors to consider in determining whether a sufficient relationship exists include

> (1) an agreement to be bound; (2) pre-existing substantive legal relationships between the person to be bound and a party to the judgment (e.g., "preceding and succeeding owners of property"); (3) adequate representation by someone with the same interests who was a party (e.g., "class actions" and "suits brought by trustees, guardians, and other fiduciaries"); (4) assumption of control over the litigation in which the judgment was rendered; (5) where the nonparty to an earlier litigation acts as a proxy for the named party to relitigate the same issues; and (6) a special statutory scheme expressly foreclosing successive litigation by nonlitigants.

WesternGeco LLC v. ION Geophysical Corp., 889 F.3d 1308, 1319 (Fed. Cir. 2018); *Taylor v. Sturgell*, 553 U.S. 880, 894–95 (2008); *AIT Time*, 897 F. 3d at 1351. But "the mere existence of some relationship between a petitioner and another entity is not sufficient" to place that petitioner in privity with that entity. *Google LLC v. DDC Technology, LLC*, IPR2023-00707, Paper 27 at 37 (PTAB Oct. 25, 2023). Instead, "that relationship must be related to [an earlier] lawsuit and be sufficiently close that it can be fairly said the petitioner had a full and fair opportunity to litigate the validity of the patent in that lawsuit" or the evidence must show "that petitioner is simply serving as a proxy to allow another party to litigate the patent validity question that the other party raised in an earlier filed litigation." *Id.*

Patent Owner argues that the Petition is time-barred based on the relationship between the parties named as Petitioners and unnamed real parties-in-interest (i.e., Talen and Chem-Mod)[7] who were defendants in a prior patent infringement suit filed in Delaware 2019, i.e., the Delaware Action. Prelim. Resp. 32–33. According to Patent Owner, "Petitioners are coal plant owners and/or operators with a close relationship to Delaware Defendants. Consequently, the clock for time-barring this Petition ran from the time Delaware Defendants were served in the Delaware [Action]." Prelim. Sur-reply 1–2. For convenience, we break Patent Owner's argument into two separate categories—(1) Patent Owner's argument that petitioners who purchase coal from Chem-Mod are time-barred and (2) Patent Owner's argument that PacificCorp is time-barred. Prelim. Resp. 32–36; Prelim. Sur-reply 5 ("Each Petitioner is in privity with one or more Delaware Defendants based on the nature of their business relationship and associated indemnity agreements").

A. Petitioners who purchase coal from Chem-Mod

Patent Owner asserts that Petitioners Berkshire Hathaway Energy Company ("Berkshire"), MidAmerican Energy Company ("MidAmerican"), and WEC Energy Group, Inc. ("WEC") (collectively "Chem-Mod Purchasers") "and their-real parties-in-interest own power plants that used something called 'the Chem-Mod Solution' to burn coal." Prelim. Resp. 33. Patent Owner "asserted that this Chem-Mod Solution caused direct

[7] Talen Energy Corporation and Talen Energy Holdings, Inc. (collectively "Talen") and Chem-Mod LLC ("Chem-Mod"), among others, were named as defendants in the Delaware Action. Ex. 2023.

infringement at Petitioner's power plants" and that "Chem-Mod LLC and its various affiliates were named as Defendants in the Delaware Action." *Id.*

More specifically, Patent Owner contends that "MidAmerican purchased refined coal from Chem-Mod sublicensees" and that Berkshire "owns and controls MidAmerican." *Id.* at 34. Patent Owner further alleges that "Wisconsin Public Service Corporation, the parent of Petitioner WEC, purchased refined coal from Chem-Mod LLC sublicensee Arbor Fuels Company." *Id.* (citing Ex. 2042). Patent Owner states that these "Petitioners have argued that Chem-Mod and its affiliates defended Patent Owner's infringement claims and negotiated a license on their behalf." *Id.* at 35. For these reasons, Patent Owner contends that "Chem-Mod and its affiliates are real parties in interest with respect to Petitioners WPL Berkshire Hathaway Energy Company, MidAmerican, IPL, and WEC," and because Chem-Mod was a defendant in the 2020 Delaware Litigation, this Petition is time-barred. Prelim. Resp. 35.

Petitioner argues that the mere fact that "Chem-Mod and its affiliates supplied refined coal to some of Petitioners through agreements that expired in 2021" is insufficient to establish Chem-Mod as a real party-in-interest or create privity. Prelim. Reply 7. Petitioners argue that a generic indemnity agreement, like that provided by Chem-Mod to Berkshire, MidAmerican, and WEC, without more, is insufficient to create privity or establish a real

party-in-interest relationship. *Id.* at 8–9. Further, Petitioner explains that "the Chem-Mod entities have no current relationship with Petitioners." *Id.*[8]

After reviewing the evidence of record, we are persuaded the instant Petition is not time-barred as to the Chem-Mod Purchasers. Generic indemnity agreements are insufficient, without more, to establish privity. *WesternGeco LLC*, 889 F.3d at 1321 ("a contractual and fairly standard customer-manufacturer relationship regarding the accused product" does not suggest, "without more, that the parties were litigating . . . [an] IPR[] as proxies for the other."). The only relationship alleged to exist between Chem-Mod, its affiliates, and the Chem-Mod Purchasers is that of a supplier customer relationship. As part of that relationship the parties entered into supply agreements that included an indemnification provision for the purchased products. Ex. 2038–2042 (discussed at Prelim. Sur-reply 7–8). We acknowledge, but disagree with, Patent Owner's argument that the terms of the indemnity "specifically targeted" the activities "at the heart of the infringement dispute." Prelim. Sur-reply 8. Rather, the indemnification language in these agreements appears to be standard and typical of supply agreements. *See* Ex. 2037, 26;[9] Ex. 2038, 10–12; Ex. 2039, 10–12;

[8] Petitioner asserts that the supply agreements between the Chem-Mod Purchasers and Chem-Mod expired in 2021. For the reasons discussed below, we determine that the language of these agreements does not establish privity. In the event Patent Owner maintains its argument that the Chem-Mod Purchasers are in privity with Chem-Mod, the parties should address the legal impact, if any, of the expiration of these agreements on Patent Owner's arguments.

[9] Exhibit 2037 is an agreement with WPL, who has recently been terminated

Ex. 2040, 10–12; Ex. 2041, 10–12; Ex. 2042, 24–27. Such language, without more, "does not amount to a sufficiently-close relationship to warrant finding . . . privity." *WesternGeco LLC*, 889 F.3d at 1321–22.

Patent Owner argues that other power plant operators recognized that their supply relationships with Chem-Mod made Chem-Mod a real part of interest in IPR2020-00832. Prelim. Resp. 32. This is not persuasive because the present inquiry considers the relationship between Chem-Mod and the Chem-Mod Purchasers, not between Chem-Mod and other non-party power plant operators. Moreover, the other power plant operators in IPR2020-00832 identified Chem-Mod only as a "potential" real party in interest (IPR2020-00832, Paper 3 at 1–3) and, even if we were inclined to consider Chem-Mod's relationship with these other power plant operators, the current record is devoid of evidence sufficient for use to determine the nature of such relationship.

Patent Owner asserts that "MidAmerican and WPL own power plants that were at issue in the Delaware Litigation, and they contend that the Chem-Mod-affiliated Defendants defended against Patent Owner's infringement claims and obtained a license on their behalf, at least for some

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from this *inter partes* review. Paper 32 (granting Joint Motion to Terminate as to Petitioner WPL). For purposes of this decision, we have considered whether WPL is in privity with Chem-Mod and/or whether WPL should have named Chem-Mod as a real party in interest. If Patent Owner maintains its position that Chem-Mod should have been named as a real-party-in interest, the parties should address whether we should consider privity and real-party-in interest issues with respect to Petitioners who have been dismissed from this proceeding.

periods of time." Prelim. Sur-reply 4 (citing Ex. 2009, 91; Ex. 2010, 107). If supported by persuasive evidence, the allegation that Chem-Mod obtained a license on behalf of MidAmerican and WPL could lend some support for Patent Owner's position. But the evidence Patent Owner cites—two affirmative defenses in Answers to Patent Owner infringement allegation filed by MidAmerican and WPL in district court—is ambiguous at best. In relevant part the two affirmative defenses state:

FIFTH DEFENSE

> ME2C's claims as to MidAmerican are barred by a covenant not to sue. ME2C entered into a license and covenant not to sue that retroactively and prospectively authorized MidAmerican to practice the asserted claims of the patents-in-suit by covenanting not to sue MidAmerican for any alleged infringement of any claim of any patent-in-suit.

Ex. 2009, 91.

Fifth Defense – License/Release

> 30. WPL has a license to the Patents-in-Suit and/or has been released from this litigation.

Ex. 2010, 107. Neither of these affirmative defenses even mentions Chem-Mod, much less provides information sufficient for us to determine that, as Patent Owner asserts, Chem-Mod obtained a license on behalf of MidAmerican or WPL.[10] Accordingly, on the current record. Patent

[10] Petitioner contends that Patent Owner's allegation that Chem-Mod negotiated licenses on behalf of certain Petitioners is "false." Prelim. Reply 5. According to Petitioner, certain Petitioners argued only that Patent

Owner's allegation that Chem-Mod obtained licenses for MidAmerican and WPL does not support Patent Owner's position that MidAmerican and WPL are in privity with Chem-Mod and/or that MidAmerican and WPL should have named Chem-Mod as a real party in interest.

Patent Owner's assertion that "MidAmerican and WPL own power plants that were at issue in the Delaware Litigation" (Prelim. Sur-reply 4) could also lend some support for Patent Owner's position. But the evidence Patent Owner cites as support (Ex. 2009, 91; Ex. 2010, 107) does not speak to whether MidAmerican and WPL own power plants in Delaware and, if so, what their ownership stake in such plants is. Moreover, Patent Owner asserts that the power plant operators it sued in 2024—which includes MidAmerican and WPL—"are not incorporated in Delaware and thus could not have been included in the Delaware Litigation" (Prelim. Sur-reply 3), which suggests that their interest in the Delaware power plants at issue in the 2020 litigation was not substantial.

Patent Owner does not point to any record evidence that suggests the parties to the Delaware Action adequately represented Chem-Mod Purchasers' interests or that the Chem-Mod Purchasers controlled, directed, or funded the Delaware Action. *See generally* Prelim. Resp. and Prelim. Sur-reply. Nor does Patent Owner suggest that the Indemnified Petitioners are acting as a proxy for Chem-Mod and its affiliates in this case. *Id.* Thus, the relationship with Chem-Mod, its affiliates, and the Indemnified

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Owner "cannot pursue infringement claims against refined coal that [Patent Owner] licensed." *Id.*

Petitioners was not "sufficiently close that it can be fairly said petitioner had a full and fair opportunity to litigate the validity of the patent in that lawsuit." *Google*, IPR2023-00707, Paper 27 at 37.

In sum, mindful that Petitioners bear the burden of demonstrating compliance with 35 U.S.C. § 312(a)(2) and § 315(b), the current record does not provide sufficient reason to doubt Petitioner's assertion that Chem-Mod was not "funding the petition, advising on strategy, or controlling the decision to file or the arguments presented." Prelim. Reply 2; *see also* Pet. 2. Indeed, the current record supports that the relationship between Chem-Mod and the Chem-Mod Purchasers was a standard supplier/customer relationship. Exs. 2037–2042. The evidence does not support that Chem-Mod negotiated a license on behalf of the Chem-Mod Purchasers or that the Chem-Mod purchases owned power plants that were at issue in the Delaware Litigation. Ex. 2009, 91; Ex. 2010, 107. Therefore, on this record, we determine that the relationship between the Chem-Mod and the Chem-Mod Purchasers does not support that Petition is time-barred.

B. PacifiCorp

Patent Owner identifies three primary reasons why Talen is a real party in interest with respect to Petitioner PacifiCorp. First, Patent Owner argues that "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," and "[a]s the named operator of that power plant, Talen defended the lawsuit and settled the litigation." Prelim. Resp. 32. Second, Patent Owner notes that "PacifiCorp has alleged that Talen negotiated that settlement agreement on its behalf and for the benefit

of PacifiCorp." *Id.* Third, Patent Owner asserts that "Talen specifically identified PacifiCorp as a real party in interest" in IPR2020-00832. *Id.* We address each of these arguments in turn.

The evidence supports Patent Owner's argument that PacificCorp is a co-owner of the Colstrip power plant. Ex. 1113. However, PacificCorp owns only a 10% interest in the Colstrip plant. *Id.* The remaining 90% is owned by Talen (with a 30% interest), NorthWestern Energy (with a 30% interest), Puget Sound Energy (with a 25% interest), and Portland General Electric (with a 20% interest). *Id.* Patent Owner does not allege, or identify evidence supporting, that PacificCorp's 10% ownership interest gave it any degree of control over Colstrip's day-to-day operations, or any say in legal proceedings relating to the Colstrip plant. *See generally,* Prelim. Resp; Prelim. Sur-reply. Without more, we are not persuaded that PacificCorp's 10% ownership interest in the Colstrip plant contributes meaningfully support Patent Owner's argument that Colstrip co-owner, Talen, should have been named as a real party in interest.

We turn next to Patent Owner's allegation that PacificCorp asserted that Talen negotiated a settlement agreement on PacificCorp's behalf and for PacifiCorp's benefit. Prelim. Resp. 32. Here, our analysis is complicated by the fact that the evidence Patent Owner cites in support of its position—PacificCorp's answer to the district infringement suit—is heavily redacted. Paragraphs 54–60 of PacificCorp's Answer are representative and are reproduced below.

54. As a co-owner of the Colstrip Plant, PacifiCorp is included within the scope of [redacted] in the Talen Agreement.

55. PacifiCorp is one of the [redacted] in the Talen Agreement.

[redacted]

57. ME2C had a duty to abide by the terms of the Talen Agreement.

58. ME2C had a duty to not sue or threaten to sue the Talen Released Parties.

59. ME2C had a duty to not identify Talen Released Parties for any purpose as infringing in whole or in party any claim of any Patent-in-Suit.

60. By filing the instant suit against PacifiCorp, ME2C breached and/or violated its [redacted] the Talen Released Parties in Section 2.2 of the Talen Agreement. *See* Exhibit 1 at Section 2.2.

Ex. 2008, 99. On the current record, we can only speculate as to the nature of the redacted material. We have reviewed the portions of PacifiCorp's answer cited by Patent Owner and cannot determine, for example, whether PacifiCorp is one of the Talen Released Parties or, if so, what the nature of the release is. *Id.*; *see also id.* at 95–100. As a party to the Talen Agreement

(*id.* at 95), presumably this is information in Patent Owner's possession. And, having filed suit against PacificCorp for infringement of the '114 patent (Ex. 2007), Patent Owner must not agree that Talen negotiated a license to the '114 patent on PacificCorp's behalf.[11] Without more, we are not persuaded that the allegations in PacificCorp's Answer meaningfully support Patent Owner's argument that Colstrip co-owner, Talen, should have been named as a real party in interest.

Finally, we consider Patent Owner's assertion that "Talen specifically identified PacifiCorp as a real party in interest" in IPR2020-00832. Prelim. Resp. 32. In IPR2020-00832, Talen, "out of an abundance of caution," identified PacifiCorp, along with numerous other entities, as a "potential real party-in-interest." IPR2020-00832, Paper 3, 1–3.[12] The Petition in IPR2020-00832 makes clear that none of the companies listed "agreed to be listed as a real-party in interest," and none "is funding, controlling, or directing, or otherwise has an opportunity to control or direct this Petition or proceeding." *Id.* at 1. The institution decision in that case recognized Talen's belief that PacifiCorp may be a real party-in-interest, but made no

[11] In its Preliminary Response, Patent Owner asserts that a license exists covering "activity at the Colstrip power plant" but none of PacifiCorp.'s other plants." Prelim Resp. 55 n.23.

[12] As Petitioner points out, at the time the Petition in IPR2020-00832 was filed, "the PTAB had not yet made precedential *SharkNinja*, which held that failing to name an RPI was "not jurisdictional" and that an unnamed RPI can be added later." Prelim. Resp. 3 (citing *SharkNinja Operating LLC v. iRobot Corp.*, IPR2020-00734, Paper 11, at 18-20 (PTAB Oct. 6, 2020, designated precedential Dec. 4, 2020)).

determination that Talen was in fact a real party-in-interest. IPR2020-00832, Paper 17 at 9–10. Indeed, the Institution Decision explains that "over-identification of potential real parties-in-interest . . . does not appear to be a problem." *Id.* Under these circumstances, Talen's identification of PacifiCorp as a "potential real party-in-interest" in IPR2020-00832 does little to support Patent Owner's position that PacifiCorp should have identified Talen as a real party-in-interest in this proceeding.

In sum, mindful that Petitioners bear the burden of demonstrating compliance with 35 U.S.C. § 312(a)(2) and § 315(b), the current record does not provide sufficient reason to doubt Petitioner's assertion that no unnamed party, including Talen, is "funding the petition, advising on strategy, or controlling the decision to file or the arguments presented." Prelim. Reply 1–2; *see also,* Pet. 2. The current record supports that PacificCorp and Talen are co-owners of the Colstrip power plant and that the Patent Owner granted a license covering the Colstrip power plant. Ex. 1113, 1; Prelim Resp. 55 n.6. Without more, this relationship does not make Talen a real-party-in interest to this proceeding or support that PacificCorp was in privity with Talen during the Delaware Litigation. Therefore, on this record, we determine that the relationship between the PacifiCorp and Talen does not support that Petition is time-barred.

V. ANALYSIS OF ASSERTED GROUNDS

A. Legal Standard

A claim may be invalid as anticipated by a prior art reference if "each and every limitation is found either expressly or inherently in a single prior art reference." *Sanofi–Synthelabo v. Apotex, Inc.,* 470 F.3d 1368, 1375 (Fed.

Cir. 2006). Anticipation under § 102 may be established by showing, as a matter of fact, that all elements arranged as specified in a claim are disclosed within the four corners of a reference, either expressly or inherently, in a manner enabling one skilled in the art to practice an embodiment of the claimed invention without undue experimentation. *See ClearValue, Inc. v. Pearl River Polymers, Inc.*, 668 F.3d 1340, 1344 (Fed. Cir. 2012).

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and "the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

In order to determine whether an invention would have been obvious at the time the application was filed, we consider the level of ordinary skill in the pertinent art at the critical time. *Graham*, 383 U.S. at 17. The resolution of this question is important because it allows us to "maintain[] objectivity in the obviousness inquiry." *Ryko Mfg. Co. v. Nu–Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991). In assessing the level of ordinary skill in the art, various factors may be considered, including the "type of problems

encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field." *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). Generally, it is easier to establish obviousness under a higher level of ordinary skill in the art. *Innovention Toys, LLC v. MGA Entm't, Inc*., 637 F.3d 1314, 1323 (Fed. Cir. 2011) ("A less sophisticated level of skill generally favors a determination of nonobviousness . . . while a higher level of skill favors the reverse.").

Petitioner contends that a person of ordinary skill in the art (POSITA) "would have at least a bachelor's degree in chemical engineering, mechanical engineering, or a related field of study with at least two years of experience implementing pollution control in power generation plants for natural gas, coal, and/or industrial waste incineration." Pet. 10 (citing Ex. 1002 ¶¶ 48–51). Patent Owner does not dispute the level of ordinary skill in the art. *See generally*, Prelim Resp.

For purposes of this Decision, we adopt Petitioner's proposal as reasonable and consistent with the '114 patent specification and the prior art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (the prior art may reflect an appropriate level of skill in the art).

C. Claim Construction

In *inter partes* reviews, the Board interprets claim language using the district-court-type standard, as described in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See also* 37 C.F.R. § 42.100(b) (same). Under that standard, we generally give claim terms their ordinary and customary meaning, as would be understood by a person of ordinary skill in

the art at the time of the invention, in light of the language of the claims, the specification, and the prosecution history. *See Phillips*, 415 F.3d at 1313–14. Although extrinsic evidence, when available, may also be useful when construing claim terms under this standard, extrinsic evidence should be considered in the context of the intrinsic evidence. *See id.* at 1317–19.

Petitioner does not propose any claim constructions. Pet. 10.

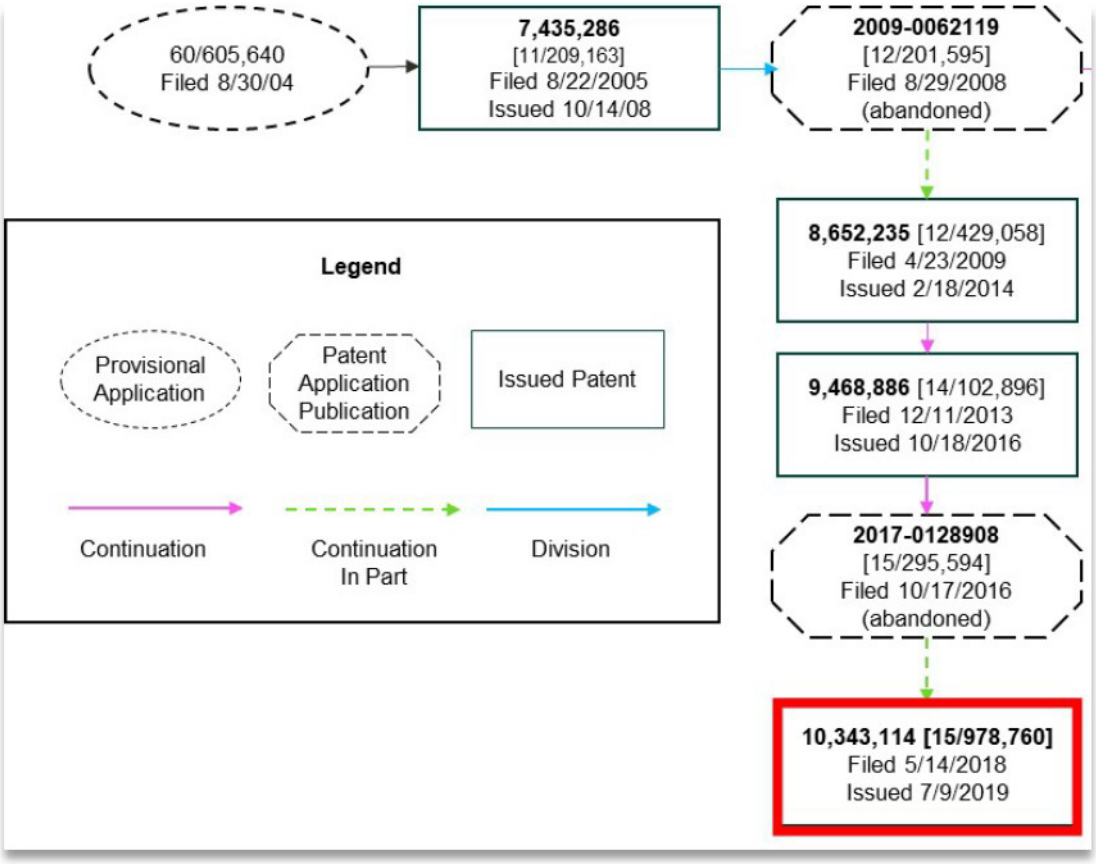
Patent Owner also does not propose any claim constructions. *See generally*, Prelim. Resp.

We do not discern a need to construe explicitly any claim language at this juncture because doing so would have no effect on our analyses below of Petitioner's asserted grounds and will not assist in resolving the present controversy between the parties. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) ("The Board is required to construe 'only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.'") (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

D. Priority

Petitioner asserts that the priority date of the '114 patent is no earlier than its filing date of May 14, 2018. Pet. 21. The '114 patent was filed on May 14, 2018, stemming from chain of applications including multiple continuation-in-part applications and a provisional application.

Petitioner provides the following summary of the '114 patent's priority chain and family:



Id. at 19 (citing Ex. 1004). This summary depicts the earliest filed application at the top left and shows the latest filed application at the bottom right. As illustrated above, the '114 patent has the following priority chain:

- Provisional Application 60/605,640, filed August 30, 2004, ("the provisional application");
- Non-provisional Application 11/209,163 ("the '163 application"), filed August 22, 2005, claiming priority to the Provisional Application;
- Non-provisional Application 12/201,595 ("the '595 application"), filed August 29, 2008, claiming priority to the '163 application as a divisional application;

- Non-provisional Application 12/429,058 ("the '058 application"), filed April 23, 2009, claiming priority to the '595 application as a continuation-in-part;
- Non-provisional Application 14/102,896 ("the '896 application"), filed December 11, 2013, claiming priority to the '058 application as a continuation;
- Non-provisional Application 15/295,594 ("the '594 application"), filed October 17, 2016, claiming priority to the '896 application as continuation; and
- Non-provisional Application 15/978,760 ("the '760 application"), filed May 14, 2018, claiming priority to the '594 application as a continuation-in-part.

Id.; Ex. 1001, code (21), (22), (60).

The provisional application has an earlier date than Sjostrom and Eckberg (2005), Olson-646 (March 2006), and Olson-235 (2014). *See, e.g.*, Pet. 18. Therefore, if the '114 patent were entitled to the priority date of the provisional application, none of the asserted prior art, i.e., Sjostrom, Eckberg, Olson-646 and Olson-253, would qualify as prior art to the '114 patent.

The parties group these applications into two categories: the provisional application (Ex. 1020), the pre-CIP applications (which includes the '163 and '595 applications), and the post-CIP applications (which includes the '058, '896, and '594 applications). *See e.g.,* Prelim. Resp. 8; Pet. 25–29.

Petitioner argues that before May 2018, a person of ordinary skill in the art "would not have concluded that applicants were in possession of the subject matter of the issued claims of the '114 patent." Pet. 19. According

to Petitioner newly-added limitations "directed to where bromine-containing ingredients are added" and "what species of bromine-containing ingredients are added" were not introduced until the '760 application in 2018. *Id.* at 19–20. As a result, Petitioner contends that Patent Owner is not entitled to claim priority to its provisional application for three reasons. ***First,*** Petitioner contends that neither the pre-CIP or the post-CIP applications (collectively the "parent applications") support the newly-added limitations. Pet. 25, 27. ***Second,*** Petitioner contends that Patent Owner cannot remedy this problem by relying on the provisional application for support because Patent Owner cannot demonstrate that each of the parent applications upon which the '114 Patent depends for priority includes the disclosure from the provisional application. *Id.* at 29–36. ***Third,*** Petitioner contends that the Provisional does not, itself, provide written description support for the subject matter claimed in the '114 patent. *Id.* at 36–44. We address each of these three reasons in turn.

1. Whether the parent applications disclose the newly-added limitations

Each of the challenged claims requires that "Br_2, HBr, Br-, or a combination thereof [is] added to the coal upstream of the combustion chamber or the combustion chamber comprises added Br_2, HBr, Br-, or a combination thereof." Ex. 1001, 33:55–60 (claim 1), 35:8–14 (claim 23), 36:9–15 (claim 25). Petitioner contends that the pre-CIP applications are "directed to brominating activated carbon … outside mercury-containing flue gas …, then injecting the pre-brominated sorbent into the mercury-containing flue gas … downstream from the combustion chamber." Pet. 25–

26. Petitioner further asserts that, even after Patent Owner amended the Specification in 2009, the newly-added limitations were not added. Specifically, Petitioner alleges that the post-CIP applications "do not expressly or inherently describe: (1) adding halogens 'to the coal'; (2) adding halogens 'upstream of thecombustion chamber,' as opposed to later addition to the mercury-containing gas; or (3) the particular bromine-containing species" identified in the newly-added limitation. *Id.* at 28. Petitioner explains that "halogens can be added to the combustion chamber without being added to the coal, such as through auxiliary systems located before the combustion chamber. *Id.* (citing Ex. 1002 ¶¶ 180–183). Therefore, Petitioner argues, the parent applications do not provide written description support for the challenged claims. *Id.* at 28–29.

Patent Owner argues that the pre-CIP applications paragraph 56 of the '595 Application[13] discloses adding bromine to the coal in the combustion chamber by disclosing "the practice of adding the promotor and sorbent at one or multiple locations." Prelim. Resp. 14. On the current record, this argument is not persuasive for the reasons explained by the panel in IPR2020-00832:

> Paragraph 56 explains that "single injection points 116 or 119 are shown in Figure 3, although one skilled in the art will understand that multiple injection points are within the scope of the present invention." Ex. 1022, 11, ¶ 56. However, this refers to injection points in flue gas stream 15 described in paragraph 55 of the '595

[13] Patent Owner contends that the pre-CIP applications "contain substantively identical disclosures" and relies on the Application No. 12/201,595 ("the '595 Application," Ex. 1022) as representative of the pre-CIP applications. For convenience, we do the same.

> application, not multiple injection points at different points in the process (e.g., in the flue gas stream, in the combustion chamber, or with coal). *Id*. at 10–11, ¶ 55. Further, to the extent Patent Owner argues there is written description support in the [pre-CIP applications] for adding the promoter to the coal or to the combustion chamber . . . because this would have been an obvious variation of the '595 application's disclosure, rendering an invention obvious does not satisfy the written description requirement. *Ariad Pharms., Inc. v. Eli Lilly & Co*., 598 F.3d 1336, 1352 (Fed. Cir. 2010) (en banc) (citing *Lockwood*, 107 F.3d at 1571–72).

IPR2020-00832, Paper 17 at 28–29 (second alteration in original).

Patent Owner acknowledges that the pre-CIP applications do "not contain provisional figure 2," but argues that they do "provide a similar disclosure of bromine species being added to coal." Prelim. Resp. at 15. Specifically, Patent Owner points to the following disclosure in the pre-CIP applications:

> 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).

Id. Patent Owner argues that "[b]ecause a halogen/halide promoted sorbent necessarily includes a halogen/halide such as Br_2, HBr, or Br-, a POSITA would recognize that adding this material before the boiler necessarily results in the limitations at issue in the '114 Patent." *Id.* With respect to the post-CIP applications[14], Patent Owner explains that "the figures and

[14] Patent Owner contends that the post-CIP applications "contain substantively identical disclosures" and relies on the Application No. 15/295,594 ("the '594 Application," Ex. 1025) as representative of the post-

accompanying descriptions . . . provide a similar disclosure to that provided in the provisional application." *Id.* at 18. In particular, Patent Owner points to "Figure 3 [which] depicts activated carbon reservoir 110, halogen reservoirs 120 and 130, and an injection point 116 where these materials are added to a mercury containing gas 15" and states that "[t]he '594 Application further explains that the invention is not limited to a single injection point." *Id.*

On this issue we also find Patent Owner's argument unpersuasive for the reasons provided by the panel in IPR2020-00832:

> For this example [the example described in ¶ 107], the '595 application discloses "the halogen/halide promoted carbon sorbent was injected into the flue gas after the boiler." *Id*. Thus, this passage describes a combination of promoter and sorbent material being added at one single point: "into the flue gas after the boiler." The '595 application continues the description of this example by stating "[i]n general however, the inventive sorbent can be injected where desired (e.g., before, after, or within the boiler)." *Id*. Although this describes other injection points ("e.g., before, after, or within the boiler"), this disclosure regards the promoted sorbent material. As a result, it describes the addition of both the promoter and the sorbent material at a single point, not (1) the addition of the promoter with the coal or the combustion chamber and (2) the injection of the sorbent material into mercury-containing gas downstream of the combustion chamber. As a result, we do not agree with Patent Owner's arguments regarding paragraph 107 of the '595 application.

IPR2020-00832, Paper 17, 28.

CIP applications. For convenience, we do the same.

For the reasons discussed above, the current record supports that the parent applications do not expressly disclose adding bromine to the coal in the combustion chamber. Accordingly, the current record supports that the parent applications do not provide written description support for the challenged claims.

2. Whether the parent applications incorporate the disclosure of the provisional application

Patent Owner contends that even if the parent applications do not expressly disclose adding bromine to the combustion chamber, they disclose this subject matter because they incorporate the provisional application by reference. Prelim. Resp. 13, 15–16. Petitioner argues that the parent applications do not incorporate the provisional for two reasons. First, according to Petitioner, the post-CIP applications do not clearly identify the specific material they incorporate and are therefore ambiguous. Pet. 29–30. Second, Petitioner argues that the subject matter incorporated into the pre-CIP applications is "essential material," which cannot be incorporated by reference. *Id*. at 29. We address each of these arguments in turn.

a. *Are the incorporation statements sufficiently specific?*

To incorporate another document, "the host document must identify with detailed particularity what specific material it incorporates and clearly indicate where that material is found in the various documents." *Callaway Golf Co. v. Acushnet Co*., 576 F.3d 1331, 1346 (Fed. Cir. 2009). Petitioner contends that the post-CIP applications break the priority chain by using ambiguous language to incorporate the provisional application. Pet. 30. More specifically, Petitioner contends that the post-CIP applications

introduced ambiguity by incorporating the provisional application "'to the extent appropriate,' indicating that applicants did not intend to incorporate the entire document, but only unidentified parts of it." *Id.*

The following statement from the prosecution history of the '058 application is representative of the allegedly ambiguous language:

> This application is a continuation-in-part of U.S. patent application 12/201,595 filed on August 29, 2008, which is a division of U.S. patent application 11/209,163, filed on August 22, 2005 (now Patent No. 7,435,286), which claims priority from provisional application 60/605,640, filed on August 30, 2004. The disclosures of US Patent Applications 12/201,595; 11/209,163; and 60/604,640 are hereby ***incorporated herein by reference to the extent appropriate***.

Ex. 1023, 6 (emphasis added); Ex. 1018, 1:7–14 (the '235 patent). Petitioner argues that the phrase "to the extent appropriate" introduces some degree of ambiguity to the post-CIP applications' attempts to claim priority from the provisional application. Pet. 30. Patent Owner argues "[t]his phrase does not exclude any portion of the provisional application from incorporation. Indeed, it is merely a correct statement of the law." Prelim. Resp. 16. We recognize some potential for ambiguity in the incorporation statements in the post-CIP applications, but find that the issue of whether the incorporation statements are sufficiently specific to incorporate the provisional application is best reserved for trial.

b. *Is the subject matter from the provisional application amenable to incorporation?*

The parent applications do not include the full disclosure of the provisional application. Among the material disclosed in the provisional

application, but not included in the parent applications, is Figure 2 of the provisional application and the surrounding text.[15] It is not until the '760 application that this omitted material is reintroduced as Figure 6. *See* Ex. 1026, 861. Petitioner contends that material disclosed in the provisional but omitted from the parent applications cannot be incorporated by reference because it is "essential material." Pet. 32–34.

"Essential material" includes material that is necessary to "[d]escribe the claimed invention in terms that particularly point out and distinctly claim the invention." 37 C.F.R. § 1.57(d)(2). For the reasons discussed *supra* § V.D.2.a., the current record supports that the parent applications do not provide written description support for the challenged claims. Because Patent Owner contends that the material disclosed in the provisional application but not parent applications provides written description support for the challenged claims (Prelim. Resp. 12–15), it is, by definition essential material (37 C.F.R. § 1.57(d)(2)).

Essential material "may be incorporated by reference, but only by way of an incorporation by reference to a U.S. patent or U.S. patent application publication." 37 C.F.R. § 1.57(d). Because a U.S. provisional application is not a "U.S. patent or U.S. patent application publication," 37 C.F.R. § 1.57(d) renders the statement incorporating the provisional by reference in the parent applications ineffective.

[15] Figure 2 of the provisional application corresponds to Figure 6 of the issued '114 patent.

Patent Owner argues that 37 C.F.R. § 1.57(d) does not apply because Patent Owner relies on the provisional only for its priority date. Prelim. Resp. 13–15. As support, Patent Owner cites MPEP § 608.01(p), which states:

> 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). We do not find this argument persuasive because 37 C.F.R. § 1.57(b) specifically addresses the circumstances under which material described in a priority application but omitted from a pending application may be "considered an incorporation by reference of the prior-filed application as to the inadvertently omitted portion of the specification or drawing." 37 C.F.R. § 1.57(b).[16] Treating a claim for priority as an incorporation by reference under 37 C.F.R. § 1.57(d) would render the

[16] Among the requirements of 37 C.F.R. § 1.57(b) is that the application "must be amended to include the inadvertently omitted portion of the specification or drawing(s) . . . in no case later than the close of prosecution as defined by § 1.114(b), or abandonment of the application, whichever occurs earlier." 37 C.F.R. § 1.57(b)(1). Petitioner argues, and we agree, that the amendment in the '760 application to add material disclosed in the provisional but omitted from the parent applications occurred after the close of prosecution and was, thus, ineffective. *See* Pet. 34–36.

specific provisions of 37 C.F.R. § 1.57(b) superfluous. Accordingly, we agree with Petitioner that the material disclosed in the provisional application, but not the parent applications cannot be incorporated by reference.

3. Whether the provisional application supports the challenged claims

Petitioner contends that even if all of the material disclosed in the provisional could be considered, it would not provide written description support for the challenged claims. More specifically, Petitioner argues that the provisional application does not support either "adding to coal or combustion chamber each of the bromine-containing species . . . such as Br_2, Br- and 'bromide compound'" (Pet. 36–38) or that the bromine-containing species are "added to the coal . . . upstream of the combustion chamber" (*Id.* at 38–41).

a. *Support for the claimed genus*

As support for the claimed genus of bromine-containing species, Patent Owner points to the following disclosure in the provisional application as explaining the "scientific basis" for the invention:

> 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, 7–8 (cited at Prelim. Resp. 9). From this disclosure, Patent Owner draws the teaching 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-" and that the bromine ion can be "supplied by adding HBr or Br_2 (both of which contain Br-) to the carbon." Prelim. Resp. 9. According to Patent Owner, the provisional thus teaches that "[w]hen 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." *Id.* at 10.

Patent Owner's citation to discussion in the provisional of the alleged "scientific basis" for the invention is not persuasive because, as Petitioner explains, it describes a "chemical model in which Br_2 reacts with activated carbon downstream of the combustion chamber, but that says nothing about whether Br_2 is added to coal rather than formed in situ or added downstream." Prelim. Reply. 15. On the current record, it is unclear to what extent, if at all, this disclosure extends to bromine added to coal. In this regard, Patent Owner is reminded that written description requires more than that the disclosure renders the claimed subject matter obvious. *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1571-72 (Fed. Cir. 1997) (The question is not whether a claimed invention is an obvious variant of that which is

disclosed in the specification. Rather, a prior application itself must describe an invention."); *PowerOasis, Inc. v. T-Mobile USA, Inc*., 522 F.3d 1299, 1306 (Fed. Cir. 2008) ("Entitlement to a filing date does not extend to subject matter which is not disclosed, but would be obvious over what is expressly disclosed.").

Patent Owner also points to the following disclosure of using an optional second component as providing support for the claimed genus:

> 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.

Ex. 1020, 10 (cited at Prelim. Resp. 11). Patent Owner points to provisional example claim 1E as disclosing the use of an "additional substance" which may be HBr or 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." Prelim. Resp. 20–21. Patent Owner interprets example claim 1E as disclosing "the use of various bromine-containing compounds." *Id*. at 21 (citing Ex. 1002 ¶ 61) (testimony of Dr. Niksa that bromine is a Group VII element)). Petitioner interprets example claim 1E differently, contending that it discloses only the bromine compound HBr. Pet. 36–37; Prelim. Reply 15.

Before considering whether example 1E provides support for the

claimed genus, we first consider what example 1E discloses.[17] Here, Petitioner's interpretation of example 1E as disclosing only HBr seems too narrow. Example 1E discloses that the additional substance may be a "combination of Group V or VI with Group VII element" where the recited "Groups" correspond to element groupings in the periodic table. *See* Prelim. Resp. 21 (interpreting example claim 1E in this manner). "Group V of the periodic table contains nitrogen (N), phosphorus (P), and other less common elements" while "Group VI contains oxygen (O), sulfur (S), and other less common elements." Ex. 1002 ¶ 60. Group VII includes bromine. *Id.* ¶ 61. Thus, example claim 1E discloses that the additional substance may comprise a combination of bromine with Group V or Group VI elements.

We now consider whether the disclosure of HBr and compounds comprising bromine and Group V or Group VI elements supports the genus of "Br_2, HBr, a bromide compound, or a combination thereof." In this regard, we note that the recited "bromide compound" is quite broad, encompassing far more than just compounds formed by the combination of bromine with Group V and Group VI elements; "bromine compound," for example, includes the sodium bromide compound relied upon by Patent Owner as evidence of reduction to practice in IPR2025-00274. Ex. 1002 ¶¶ 188 (testimony of Dr. Niksa explaining that "there are a nearly infinite

[17] Petitioner argues that there is no disclosure that the "additional substance" of example claim 1E is the additive supplied before the boiler. Pet. 36. For purposes of this discussion, we assume that the additional substance is the additive supplied before the boiler. If this issue remains before us, we will resolve it on a more fully developed record.

number of forms of bromide compounds"), 58 (identifying sodium as a Group I element); IPR2025-00274, Paper 19 at 29 and Paper 27 at 13 (arguing that disclosure of NaBr supports the claimed genus).

On this preliminary record, we are not persuaded that the disclosure of HBr and compounds formed by the combination of bromine with Group V and Group VI elements, supports the full scope of the claimed genus. Provisional example claim 1E does not disclose Br_2, and the record supports that Br_2 and HBr have different properties. *See e.g.,* Ex. 1002 ¶ 354 (testimony of Dr. Niksa that Br_2 has a boiling point of 58.8 °C while HBr has a boiling point of -66.38 °C). In addition, Patent Owner does not direct us to persuasive evidence that compounds formed by the combination of bromine with, for example, a Group I, Group II, or Group III element would be expected to have similar properties as compounds formed by the combination of bromine and a Group VI or Group VII element.

Patent Owner argues that the Provisional Application describes the genus by providing a structure-function correlation. Prelim. Resp. 20. More specifically, Patent Owner contends that the disclosure it identifies as providing the "scientific basis for the invention" (discussed *supra*) illustrates "the interaction between activated carbon, mercury and Br- ions," from which a person of ordinary skill in the art "would understand that the common attribute of the relevant genus is a chemical that can supply a Br- ion, *i.e.*, a bromide." *Id.* at 23. For the reasons discussed above, it is unclear to what extent, if at all, the disclosure Patent Owner relies upon extends to bromine added to coal. Accordingly, the preliminary record tends to support Petitioner's position that the provisional does not support the full scope of

the claimed genus.

b. *Support for adding the genus to the coal*

As support for adding the claimed genus of bromine additives to coal downstream of the combustion chamber, Patent Owner points to Figure 2 and the accompanying disclosure. Prelim. Resp. 26. Figure 2 is reproduced below.

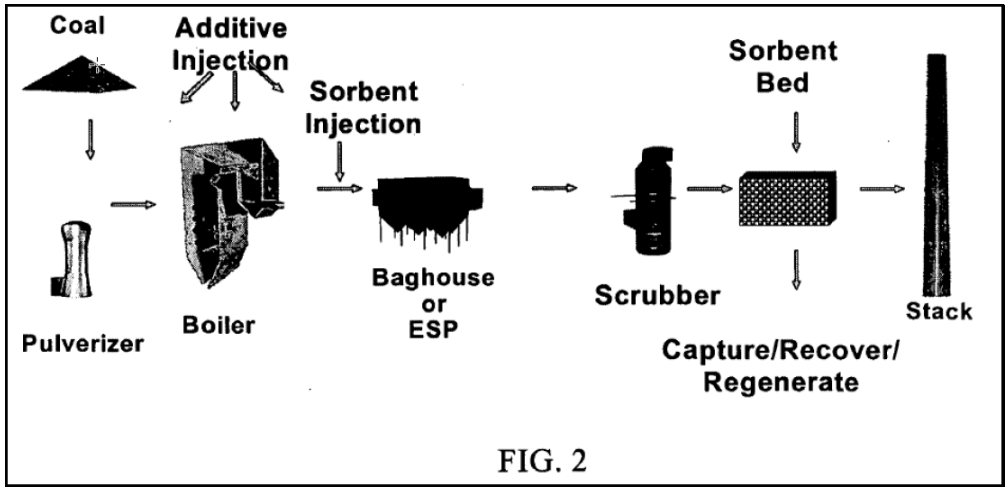


FIG. 2

Ex. 1020, Fig. 2. As described in the provisional:

> FIG. 2 is a block diagram illustrating the use of the invention in a coal fueled 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 (cited at Prelim. Resp. 26–27). Patent Owner contends that the example of Figure 2 and its accompanying text provide support for adding a

bromine-containing additive to the coal. Prelim. Resp. 12.

Petitioner argues that the "before the boiler" language in the provisional "does not expressly or inherently disclose any bromine-containing species supplied 'to the coal,' as opposed to elsewhere upstream of the boiler." Pet. 39. Petitioner contends that there are "numerous systems in a coal plant 'before . . . the boiler' that could deliver halogens, but do not interface with the coal." *Id.* (citing Ex. 1027, 13-5; Ex. 1002 ¶ 182). For example, Dr. Niksa explains that an additive could be fed directly to the combustion chamber as part of a separate stream of "Secondary Air." Ex. 1002 ¶ 182.

Patent Owner argues that "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" which "is consistent with the provisional application which describes adding the bromine 'before' or 'within' the boiler." Prelim. Resp. 26–28. Patent Owner further asserts that even Petitioner acknowledges a person of ordinary skill in the art would understand the provisional to encompass this limitation because Petitioner's argue that "Sjostrom mentions 'coal additives' and, as shown at Location 1, teaches adding bromine to the pulverized coal entering the boiler." *Id.* (quoting Pet. 46; citing Ex. 1020, 12). This argument is not persuasive because rendering an invention obvious does not satisfy the written description requirement. *Lockwood*, 107 F.3d at 1571–72.

Therefore, on this preliminary record, Petitioner has the better position

that the provisional does not support the full scope of the claims.

c. *Conclusion with respect to claiming priority to the provisional*

As discussed above, the preliminary record supports that: 1) the parent applications do not expressly support using coal comprising a bromine-containing additive in a combustion chamber, 2) the parent applications cannot incorporate disclosure from the provisional application that was omitted from the parent applications because such disclosure is "essential material," and 3) the provisional application does not support the claimed subject matter. For these reasons, and on this preliminary record, we determine that the '114 patent cannot claim priority to the provisional application.

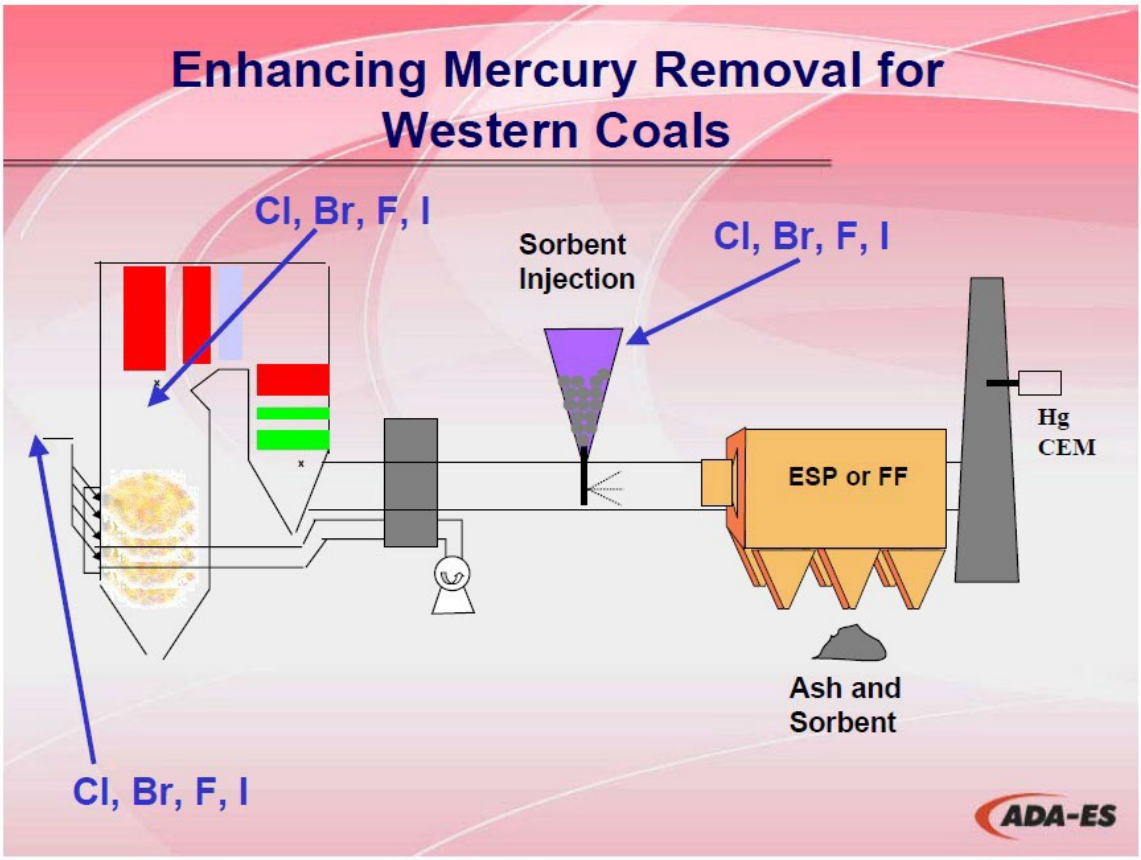
E. Unpatentability Challenges

1. Challenges based on Sjostrom (Grounds 1 and 2)

Petitioner asserts that claims 1–9 and 12–30 are unpatentable under 35 U.S.C. § 103(a) as obvious over Sjostrom in view of Eckberg and claims 1–30 are unpatentable under 35 U.S.C. § 103(a) as obvious over Sjostrom in view of Olson-646. Pet. 10, 72–102.

a. *Sjostrom (Exhibit 1010)*

Sjostrom is a presentation titled "Full Scale Evaluations of Mercury Control Technologies with PRB Coals" that was made during the 2005 Electric Utilities Environment Conference ("EUEC"). Ex. 1010, 1; Ex. 1030, 3, 23. Sjostrom includes the following drawing of a process:

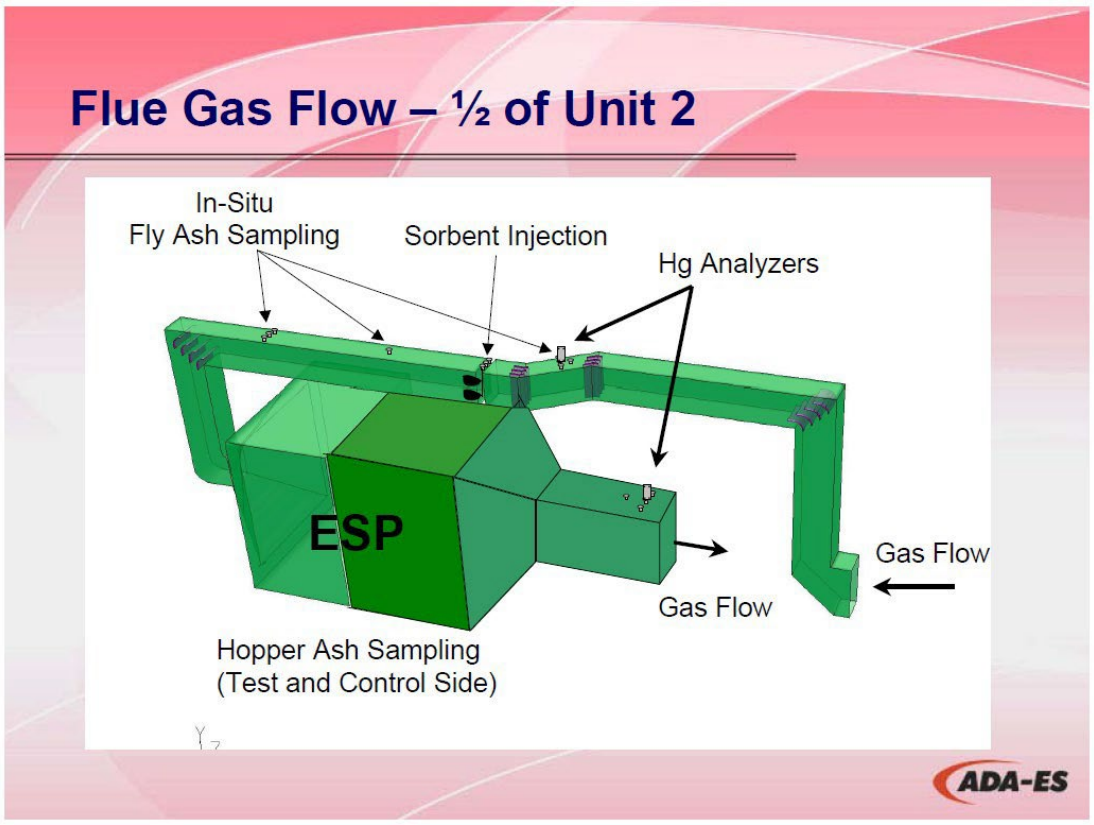


Sjostrom's Process Diagram

Ex. 1010, 4. Sjostrom's Process Diagram is captioned "Enhancing Mercury Removal for Western Coals." *Id.* The figure includes a boiler (or combustion chamber) on the left and arrows pointing to what appears to be upstream of the boiler, into the boiler, and to a "Sorbent Injection" device, which appears to be located downstream of the boiler. *Id.* The arrows are labeled with chemical species, such as bromine. *Id.* An "ESP or FF" is located on the right side of the figure with "Ash and Sorbent" located below the "ESP or FF" device. *Id.*

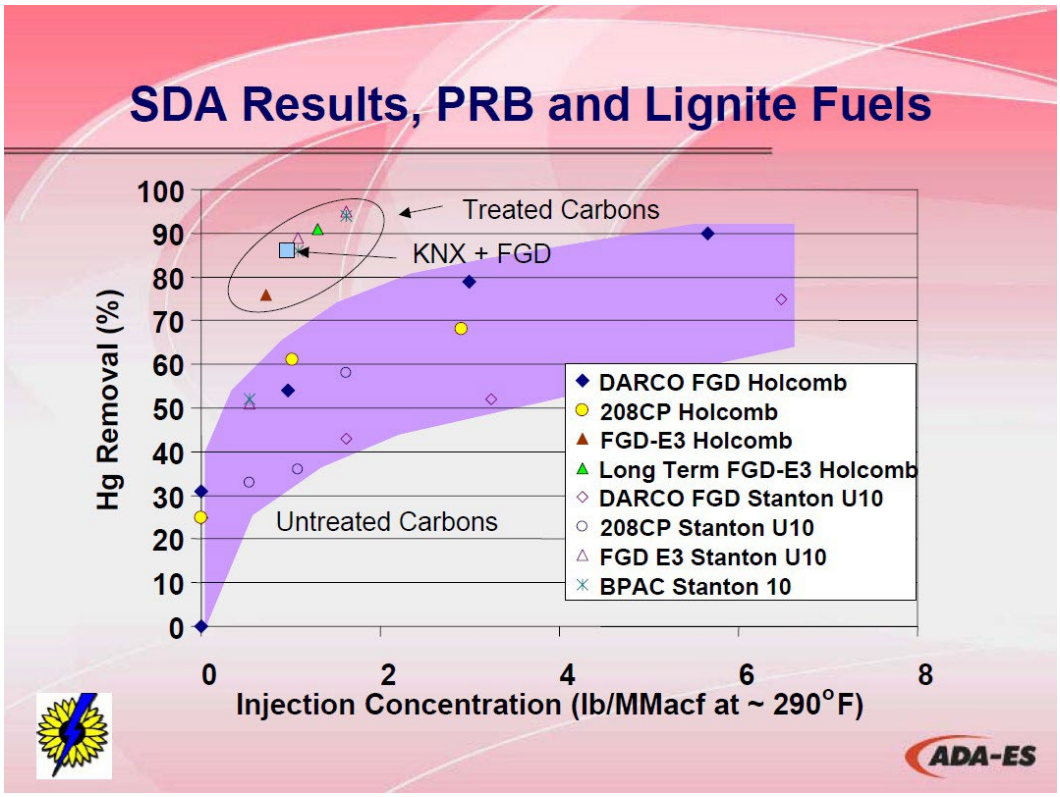
Sjostrom describes "KNX (Alstom Power)" when discussing "Coal Additives at Meramec" and describes "Activated Carbon Injection to Improve Mercury Control." *Id.* at 10, 23.

The far right side of Sjostrom's figure above also has a "Hg CEM." *Id.* at 4. Sjostrom provides the following drawing when discussing "Flue Gas Flow – ½ of Unit 2:"

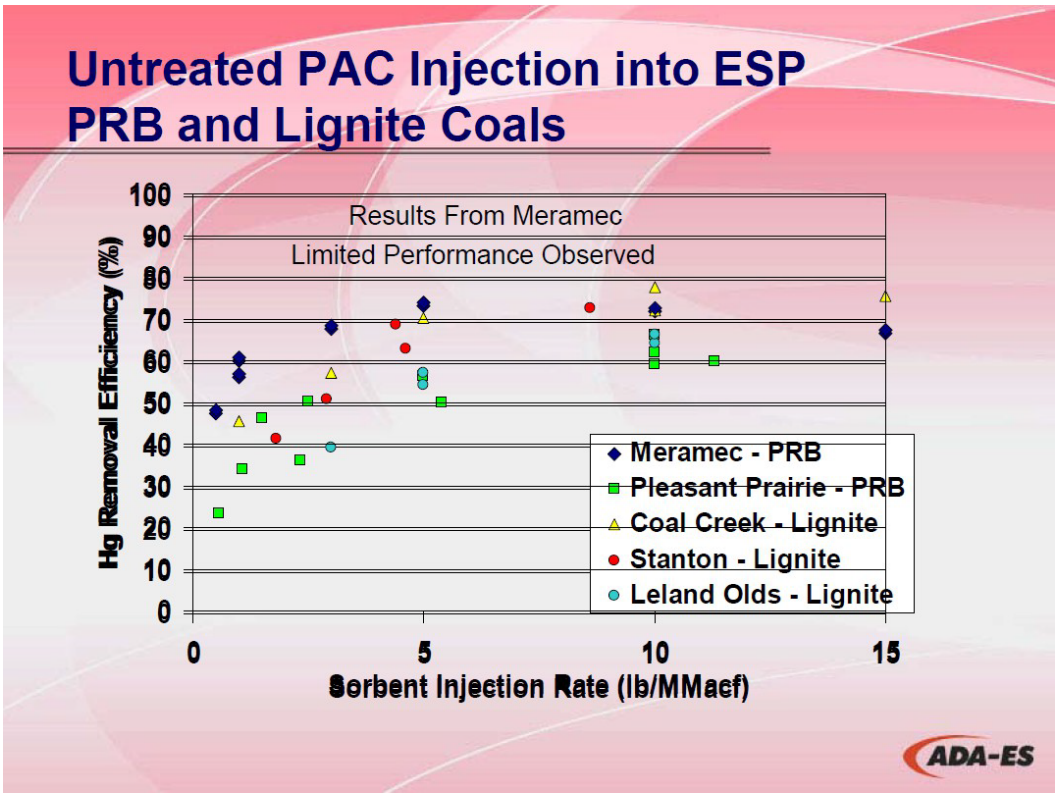


Sjostrom's Flue Gas Flow Figure

Id. at 19. Sjostrom's Flue Gas Flow figure includes "Hg Analyzers." *Id.* Sjostrom also includes the following graphs:



Sjostrom's "SDA Results" Graph

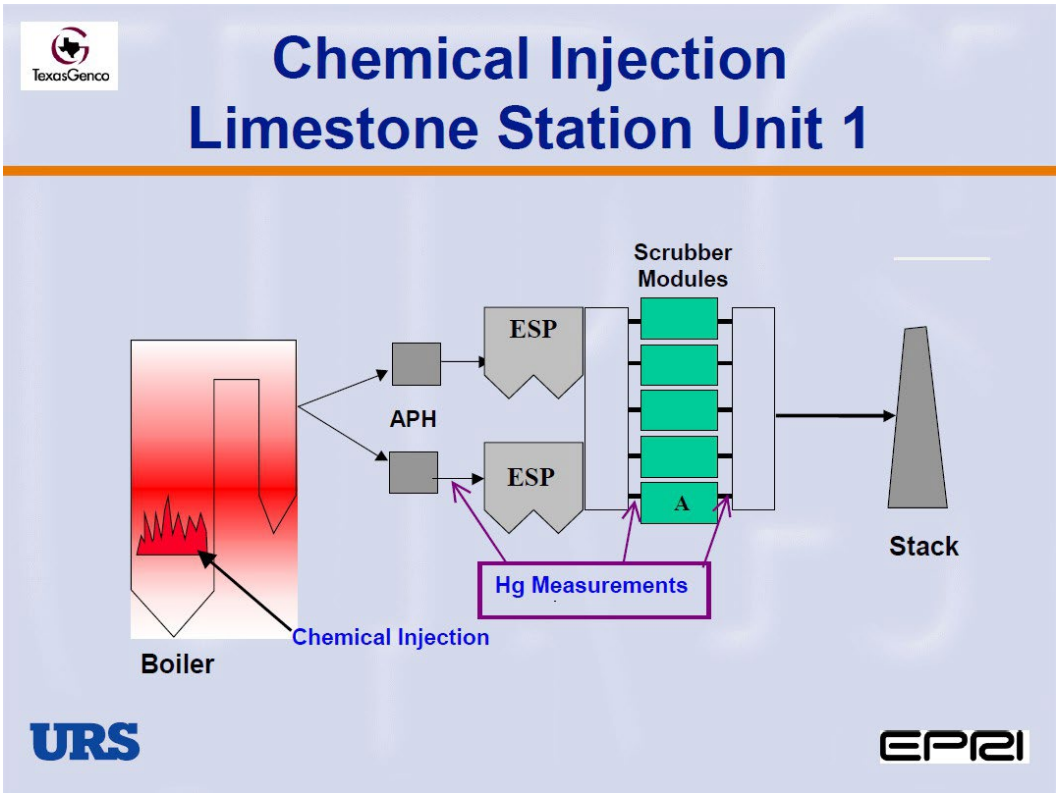


Sjostrom's "Untreated PAC Injection" Graph

Id. at 16, 20.

b. *Eckberg (Exhibit 1011)*

Eckberg is a presentation titled "Mercury Control Evaluation of Halogen Injection into a Texas Lignite-Fired Boiler" that, like Sjostrom, was made during the 2005 EUEC. Ex. 1011, 1; Ex 1030, 3, 23–24. Eckberg includes the following process figure:



Eckberg's Process Figure

Ex. 1011, 5. Eckberg's process figure includes a boiler on the left with an arrow pointing to the boiler that is labeled "Chemical Injection." *Id.* Eckberg further describes $CaBr_2$ as a chemical addition for its tests and refers to a "Salt Solution Tank" when depicting injection equipment. *Id.* at 3, 8–9.

c. *Olson-646 (Ex. 1012)*

Olson-646 is a patent publication titled "Sorbents for the Oxidation and Removal of Mercury." Ex. 1012, code (54). Petitioner acknowledges that Olson-646 is the patent publication of the '163 application, but argues that the earliest priority date for the challenged claims of the '114 patent is May 2018, which is the filing date of the '760 application that matured as

the '114 patent,[18] and that thus Olson-646 is available as prior art under 35 U.S.C. §§ 102(a) and 102(b) (pre-AIA) and §§ 102(a)(1)(post-AIA). Pet. 18–21, 41, 44 (citing § VII; Ex. Ex. 1004; 1002 ¶¶ 159–160, 170–197, 268–269, 274–275; Ex. 1026, 46).

Olson-646 "relates to methods and materials for the removal of pollutants from flue gas or product gas from a gasification system. In particular, mercury is removed from gas streams generated during the burning or gasification of fossil fuels by highly reactive regenerable sorbents." Ex. 1012 ¶4. Olson-646 proposes a model for the oxidation of mercury in Figure 2, which is reproduced below.

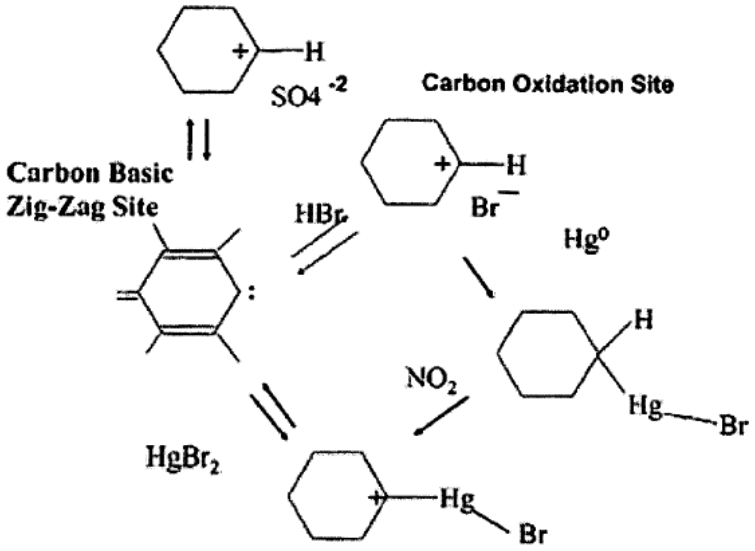


FIG. 2

[18] Petitioner states that it "assert[s] prior art dated before the May 2018 filing date of the '114 Patent" (Pet. 18), and that Patent Owner "cannot demonstrate priority back to 2004, and the '114 Patent's priority date is not before May 2018" (*id.* at 14).

Figure 2 is a proposed mechanistic model of the chemical reactions in the oxidation and capture of mercury. *Id.* ¶ 33. Olson-646 explains that "as illustrated in FIG. 2, hydrogen bromide reacts with the unsaturated structure of the activated carbon" and this "may be, by way of illustration only, a carbene species on the edge of the graphene sheet structures of the carbon." *Id.* ¶ 54. According to Olson-646, "[m]olecular bromine or a bromine compound reacts to form a similar structure, with a positive carbon that is active for oxidizing the mercury with subsequent capture by the sorbent." *Id.* Olson-646's Figure 3 is reproduced below.

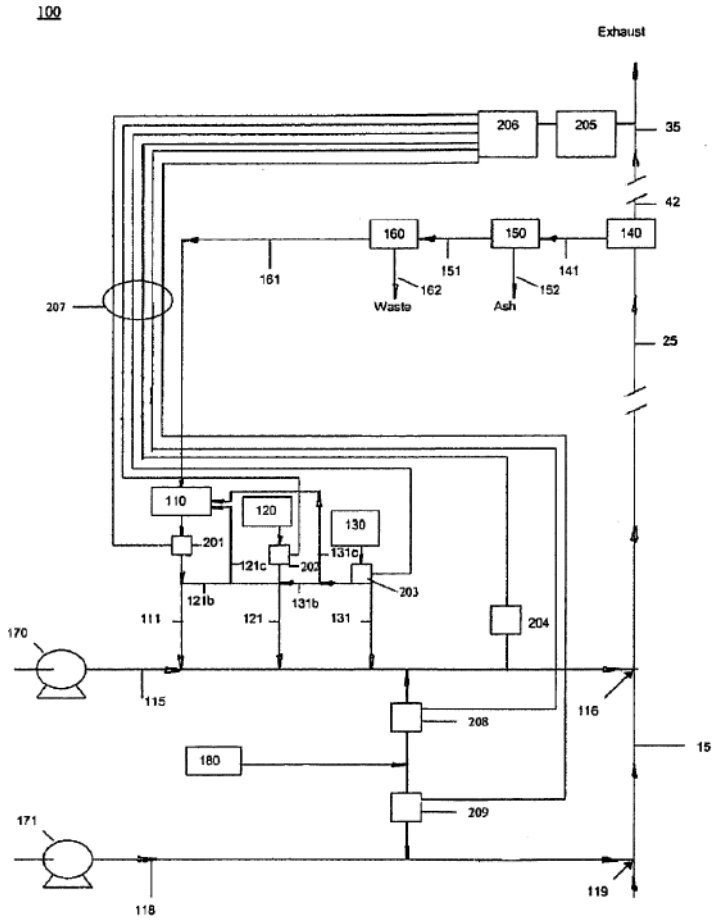


FIG. 3

Figure 3 is schematic for the preparation of promoted carbon sorbents and processes for flue gas mercury reduction in flue gases. *Id.* ¶ 34. Figure 3 depicts a schematic of a "mercury control system 100 comprising preparation of promoted carbon sorbents" that includes a "base activated carbon reservoir 110, an optional halogen/halide promoter reservoir 120, an optional secondary component reservoir 130, and an optional a[l]kali component reservoir 180, each of which with corresponding flow control device(s) 201, 202, 203, and 208/209, respectively." *Id.* ¶ 56. Olson-646 further explains that in "operation, promoted carbon sorbent and/or an optional alkali component is injected into contaminated flue gas stream 15." *Id.* ¶ 61.

d. *Public Availability of Sjostrom and Eckberg*

Petitioner asserts "Sjostrom and Eckberg are printed publications, available as prior art under 35 U.S.C. §§102(a) and (b) (pre-AIA) and §102(a)(1) (post-AIA)." Pet. 41. Petitioner argues that the "Sjostrom and Eckberg presentations, delivered consecutively at the Electric Utilities Environment Conference ("EUEC") in January 2005 and mailed on CD to conference participants within a few weeks" meet the standard for public accessibility set forth in *GoPro, Inc. v. Contour IP Holding LLC*, 908 F.3d 690, 693 (Fed. Cir. 2018). *Id.* at 41–43.

Patent Owner argues that "Petitioners rely on their paid technical expert's largely uncorroborated fact testimony regarding a conference that took place twenty years ago." Prelim. Resp. 29. Patent Owner asserts that "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" and, 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.'" *Id.* (citing *Kyocera Wireless Corp. v. Int'l Trade Comm'n*, 545 F.3d 1340, 1350 (Fed. Cir. 2008); *Finnigan Corp. v. Int'l Trade Comm'n*, 180 F.3d 1354, 1369 (Fed. Cir. 1999)).

On this record, Petitioner has sufficiently demonstrated a reasonable likelihood that Sjostrom and Eckberg were publicly available. *Hulu, LLC v. Sound View Innovations, LLC*, IPR2018-01039, Paper 29 (PTAB Dec. 20, 2019) (for purposes of institution, a petitioner must show a reasonable likelihood that an asserted reference qualifies as a printed publication). Petitioner provides evidence, through the testimony of Dr. Niksa—who attended and delivered a presentation at the 2005 EUEC—that Sjostrom and Eckberg were presented on January 25, 2005 at the 2005 EUEC and that there were over eight hundred attendees. Ex. 1002 ¶¶ 246–257; Ex. 1030, 2–3, 7, 23, 32, 106–118. The conference materials as well as the conference CD sent to each of the attendees, within weeks of the conference, corroborates Dr. Niksa's testimony. Ex. 1030, 103–118; Ex. 1031. Petitioner's evidence does not indicate that attendance of the 2005 EUEC was restricted and the CD appears to have been disseminated with without any apparent restriction or expectation of confidentiality. *Id.*; Ex. 1002 ¶¶ 247, 255–256; Ex. 1031; Ex. 1010; Ex. 1011; *GoPro*, 908 F.3d at 694–95. Therefore, on this record, Petitioner has met its burden of showing that Sjostrom and Eckberg qualify as printed publications.

e. *Analysis of Claim 1*

Petitioner argues that claim 1 is obvious over the combinations of Sjostrom and Eckberg as well as the combination of Sjostrom and Olson-646. Pet. 48–71. Regarding the preamble of claim 25, Petitioner asserts that Sjostrom is titled "Full Scale Evaluations of Mercury Control Technology" and "quantifies mercury separation from a mercury containing gas through graphing 'Hg Removal (%) and 'Hg Removal Efficiency (%)'" Pet. 54–55 (citing Ex. 1010, 8, 15–17, 20–21; Ex. 1002 ¶¶ 598, 681).

Claim 25 further requires "combusting coal in a combustion chamber, to provide the mercury-containing gas" which Petitioner contends is taught by Sjostrom, Eckberg, and Olson-646. In particular, Petitioner asserts Sjostrom "combusts coal in a coal-fired boiler" and that "Sjostrom combusts PRB (Powder River Basin) coal to generate mercury in the flue gas." Pet. 55 (citing Ex. 1010, 3, 12, 18; Ex. 1002 ¶¶ 599, 682). In addition, Eckberg has a combustion chamber which it labels a "boiler." Pet. 56 (citing Ex. 1011, 5; Ex. 1002 ¶ 600). And, Olson-646 explains that the "combustion and gasification of fossil fuel such as coal generates flue gas that contains mercury." *Id.* (quoting Ex. 1012 ¶ 6; citing Ex. 1002 ¶ 682).

Regarding the limitation "the coal comprises added Br_2, HBr, a bromide compound, or a combination thereof, added to the coal upstream of the combustion chamber, or the combustion chamber comprises added Br_2, HBr, a bromide compound, or a combination thereof, or a combination thereof," Petitioner argues that Sjostrom "adds 'Br' to the combustion chamber" and to the coal itself. *Id.* at 57–58 (citing Ex. 1010, 23, 25; Ex. 1002 ¶¶ 601–602, 683; Ex. 1094, 246:21–247:6; 249:6–252:9).

Petitioner acknowledges that "Sjostrom does not identify which chemical to use for 'Br,' but it would have been obvious to use widely available materials including . . . $CaBr_2$" and further states that Sjostrom describes use of "'KNX (Alstom Powder),' a known aqueous solution of bromide salt for enhancing mercury removal." Pet. 58 (citing Ex. 1010, 23; Ex. 1002 ¶¶ 603–604, 683). In addition, Petitioner contends that Eckberg discloses injecting an aqueous calcium bromide solution into the boiler where it dissociates to form bromine ions. Pet. 58–59 (citing Ex. 1011, 5, 8–9, 14). Petitioner explains a person of ordinary skill in the art would have had reason to combine the calcium bromide from Eckberg with Sojstrom "because calcium bromide was widely obtainable and relatively cheap." *Id.* at 60 (citing Ex. 1002 ¶¶ 606–607); *see also id*. at 52 (explaining that "it would have been a simple substitution of one known element (the Br in Sjostrom) for another known element ($CaBr_2$ in Eckberg) to obtain predictable results"). Further Petitioner asserts that "Olson-646 'provides a cost-effective way to capture pollutants by utilizing exceptionally reactive halogen/halide promoted carbon sorbents using a bromide (or other halogen/halide) treatment of the carbon, that capture mercury via mercury-sorbent surface reactions'" and describes its promoter as "gaseous HBr or Br_2." *Id.* at 60 (citing Ex. 1012 ¶¶ 43, 66; Ex. 1002 ¶ 684). Petitioner reasons that a person of ordinary skill in the art would have been motivated "to apply the teachings of Olson-646 to the system of Sjostrom because both references teach using a conventional halogen (Br) in a conventional way (promoter) to increase the effectiveness of a conventional sorbent (activated carbon) to capturemercury." *Id.* (citing Ex. 1002 ¶ 684); *see also id*. at 54

(stating that "it would have been a simple substitution of one known element (e.g., "Br" in Sjostrom) for another known element (e.g., Br_2 or HBr of Olson-646) to improve a known device (activated-carbon sorbent in Sjostrom and Olson-646) and obtain predictable results").

Petitioner further argues that Sjostrom discloses injecting an activated carbon sorbent into a mercury-containing flue gas where mercury "is contacted with activated carbon, [and] it adsorbs to form a mercury/sorbent composition." Pet. 61–63 (citing Ex. 1010, 4, 10–11, 13, 15–16, 19, 32; Ex. 1002 ¶¶ 608–611). In addition, Petitioner contends that "Olson-646 describes that mercury and activated carbon in the flue gas react to form a mercury/sorbent composition: sorbent 'that capture[s] mercury via mercury-sorbent surface reactions.'" *Id.* at 63–64 (citing Ex. 1012, Abstr., ¶¶ 43, 128, Fig. 2; Ex. 1002 ¶¶ 685–687).

Petitioner also contends that "Sjostrom discloses separating the mercury/sorbent composition (labeled, 'Ash and Sorbent') from the flue gas, using an electrostatic precipitator or fabric filter" and a "'Hg CEM' (mercury continuous emissions monitor) to monitor mercury content of the cleaned gas." Pet. 64–67 (citing Ex. 1010, 4, 19, 22; Ex. 1002 ¶¶ 8–88, 612–613). In addition, Petitioner contends that Olson-646 "discloses that sorbent 'capture[s] mercury via mercury-sorbent surface reactions,' thus forming a mercury-sorbent composition" and the mercury-sorbent composition is then separated and removed using a particulate separator. *Id.* at 65–66 (citing Ex. 1012 ¶ 43; Ex. 1002 ¶¶ 59, 688). And, like Sjostrom, Petitioner explains that Olson-646 "discloses a 'continuous emissions

monitor' [to monitor] the mercury content in the cleaned gas." *Id.* at 67 (citing Ex. 1012 ¶¶ 22, 60; Ex. 1002 ¶ 689).

And lastly, Petitioner argues that "Sjostrom includes charts showing mercury-removal percentages, plotted against activated-carbon injection rates" which "teaches how sorbent-injection . . . affects Hg-removal percentage." *Id.* at 105 (citing Ex. 1018, 6:55–67, 7:17–20; Ex. 1002 ¶ 761). Thus, according to Petitioner, a person of ordinary skill in the art "would have been motivated to use the charts of Sjostrom as a guide to control the sorbent-injection rate to avoid injecting unneeded sorbent while reaching desired mercury-removal levels." Pet. 68–69 (citing Ex. 1010, 16, 20; Ex. 1002 ¶¶ 614–616, 114–115). In addition, Petitioner contends that Olson-646 also states that the CEM monitors the mercury emissions and the "mercury CEM 205 and flow controllers 201, 202, 203, 208, and 209 are electrically connected via optional lines 207 (or wirelessly) to an optional digital computer (or controller) 206, which receives and processes signals and preferably controls the preparation and injection of promoted carbon sorbent into contaminated flue gas stream 15." *Id.* at 70–71 (quoting Ex. 1012 ¶ 56; citing Ex. 1012 ¶¶ 60–61, Fig. 3; Ex. 1002 ¶¶ 690–692).

Patent Owner does not substantively address Petitioner's arguments regarding the combined teachings of Sjostrom and Eckberg or Sjostrom and Olson-646. Instead, Patent Owner asserts that Petitioner has failed to show that Sjostrom and Eckberg were publicly accessible and therefore available as prior art to the '114 patent and further that Petitioner failed to demonstrate that the '114 patent was not entitled to claim priority to its provisional application. We addressed these arguments above in Sections V.E.1.d and

V.D. Based on this preliminary record, and for the reasons discussed above, we find that Petitioner's arguments and evidence are sufficient to show a reasonable likelihood Petitioner would prevail in proving unpatentability of claim 1 based on the teachings of Sjostrom.

f. *Remaining Claims*

Petitioner also alleges that the subject matter of claims 2–9 and 12–30 is rendered obvious over Sjostrom in view of Eckberg and the subject matter of claims 2–30 is rendered obvious over Sjostrom in view of Olson-646. Pet. 10, 72–102. Patent Owner does not separately address claims 2–30. *See generally* Prelim. Resp. We have reviewed the information Petitioner provides—including Petitioner's contentions and the relevant portions of the Niksa Declaration—and determine that Petitioner's arguments and evidence are adequately supported for institution purposes.

2. Challenges based on Olson-235 (Ground 3)

Petitioner asserts that claims 1–5, 7–12, 14–18, 20, 23–25, and 27–30 are unpatentable under 35 U.S.C. § 102(a)(1) as anticipated by Olson-235. Pet. 10, 102–114.

a. *Olson-235 (Ex. 1018)*

Olson-235 is a patent titled "Sorbents for the Oxidation and Removal of Mercury" and issued Feb. 18, 2014. Ex. 1018, codes (54), (45). Petitioner acknowledges that Olson-235 is issued in 2014, but argues that the earliest priority date for the challenged claims of the '114 patent is May 2018, which is the filing date of the '760 application that matured as the '114 patent, and that thus Olson-235 is available as prior art under 35 U.S.C.

§ 102(a)(1) (post-AIA). Pet. 18–21, 41, 44, 102 (citing § VII; Ex. 1004; Ex. 1002 ¶¶ 159–160, 170–197, 268–269, 274–275).

Olson-235 "relates to methods and materials for the removal of pollutants from flue gas or product gas from a gasification system. In particular, mercury is removed from gas streams generated during the burning or gasification of fossil fuels by highly reactive regenerable sorbents." Ex. 1018, 1:20–24. Olson-235 proposes a model for the oxidation of mercury in Figure 2, which is reproduced below.

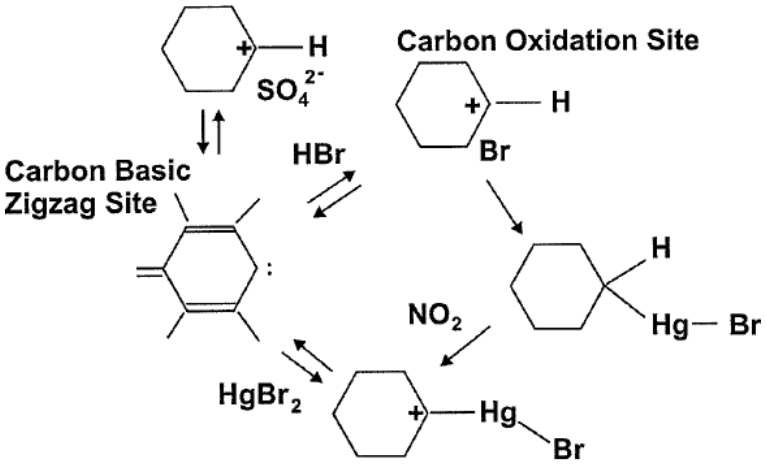


FIG. 2

Figure 2 is a proposed mechanistic model of the chemical reactions in the oxidation and capture of mercury. *Id.* at 8:63–65. Olson-235 explains that "the reactivity of the bromine-treated carbon with mercury [is] shown in FIG. 2" in which the "[h]alogen treatment resulted in higher-activity carbons because the halide anions (especially bromide and iodide) were effective in promoting oxidation by stabilizing the developing positive charge on the

mercury in the transition state for oxidation." *Id.* at 16:60–17:2. Olson-235's Figure 3 is reproduced below.

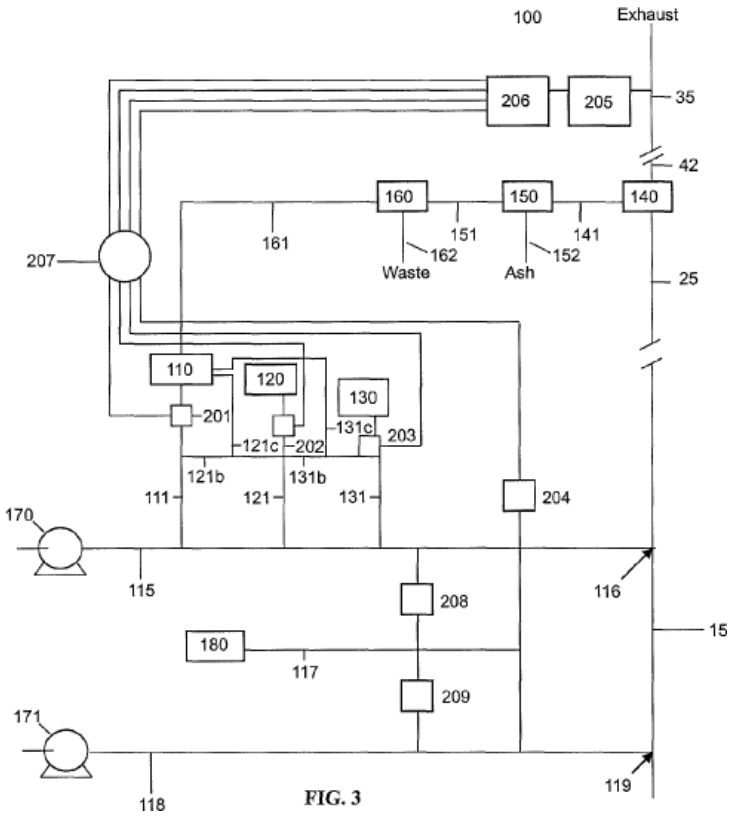


FIG. 3

Figure 3 is schematic for the preparation of promoted carbon sorbents and processes for flue gas mercury reduction in flue gases. *Id.* at 8:66–9:4. Figure 3 depicts a schematic of a "mercury control system 100 comprising preparation of promoted carbon sorbents" that includes a "base sorbent reservoir 110, a halogen/halide promoter reservoir 120, a secondary component reservoir 130, and an alkali component reservoir 180, each of which with corresponding flow control device(s) 201, 202, 203, and 208/209, respectively." *Id.* at 13:10–20. Olson-235 further explains that in

operation, "promoted carbon sorbent and/or an optional alkali component is injected into contaminated flue gas stream 15." *Id.* 14:30–32.

Olson-235 further discloses "monitoring the mercury content of the cleaned gas" in which "the carbon base sorbent and the promoter are introduced into the mercury-containing gas at the same location or at separate locations." *Id.* at 6:55–59. Olson-235 discloses, "[w]here possible and desirable, the mercury control technology of the present invention may preferably utilize continuous measurement of mercury emissions as feedback to assist in control of the sorbent injection rate." *Id.* at 20:1–5.

b. *Analysis of Claim 1*

Petitioner argues that claim 1 is anticipated by Olson-235. Pet. 102–105. Regarding the preamble of claim 25, Petitioner asserts that Olson-235 discloses "[a] method of separating mercury from a mercury-containing gas" Pet. 102 (citing Ex. 1018, 21:59–60; Ex. 1002 ¶¶ 754–755). Claim 25 further requires "combusting coal in a combustion chamber, to provide the mercury-containing gas" which Petitioner contends is taught by Olson-235. In particular, Petitioner asserts Olson-235 discloses "a combustion chamber that produces a mercury-containing gas." Pet. 103 (citing Ex. 1018, 22:39–42; *id.* at 17:60–18:25, Figs. 5A–5B; Ex. 1002 ¶ 756). Regarding the limitation "the coal comprises added Br_2, HBr, a bromide compound, or a combination thereof, added to the coal upstream of the combustion chamber, or the combustion chamber comprises added Br_2, HBr, a bromide compound, or a combination thereof, or a combination thereof," Petitioner argues that Olson-235 does not disclose all the claimed species but does "disclose one of the alternatives, that the 'halogen or halide promoter is

introduced … into a combustion chamber that produces a mercury-containing gas'" and that "the 'halide/halogen gas, for example, [is] gaseous HBR or Br_2.'" *Id.* 103–104 (citing Ex. 1018, 15:34–35, 15:60–61, 22:39–42; Ex. 1002 ¶ 757). Petitioner further argues that Olson-235 discloses injecting a powdered activated carbon sorbent into a mercury-containing flue gas stream and that the "promoted or . . . non-promoted base sorbent reacts with elemental or oxidized mercury, a mercury/sorbent chemical composition is formed." Pet. 104 (citing Ex. 1018, 5:31–33; 10:53–55; 3:41–43; Ex. 1002 ¶ 758). Petitioner contends that Olson-235 also teaches "separating particulates from the mercury containing gas to form a cleaned gas, the particulates including ash and the mercury/sorbent chemical composition" and "monitoring the mercury content of the cleaned gas," as claimed. *Id.* (citing Ex. 1018, 6:55–56, 7:8–9, 22:23–25; Ex. 1002 ¶¶ 759–760). And lastly, Petitioner asserts that "Olson-235 discloses 'adjust[ing]' a sorbent-injection rate (a form of controlling) 'according to the monitored mercury content of the cleaned gas so that the mercury content of the cleaned gas is maintained at substantially the desired level with minimal operating cost.'" *Id.* at 105 (citing Ex. 1018, 6:55–67, 7:17–20; Ex. 1002 ¶ 761).

Patent Owner does not substantively address Petitioner's arguments regarding the teachings of Olson-235 and instead asserts that Petitioner failed to demonstrate that the '114 patent was not entitled to claim priority to its provisional application, as discussed above. *See supra* Section V.D. Based on this preliminary record, and for the reasons discussed above, we find that Petitioner's arguments and evidence are sufficient to show a

reasonable likelihood Petitioner would prevail in proving unpatentability of claim 1 based on the teachings of Olson-235.

c. *Remaining Claims*

Petitioner also alleges that the subject matter of claims 2–5, 7–12, 14–18, 20, 23–25, and 27–30 is anticipated by Olson-235. Pet. 10, 102–114. Patent Owner does not separately address claims 2–5, 7–12, 14–18, 20, 23–25, and 27–30. *See generally* Prelim. Resp. We have reviewed the information Petitioner provides—including Petitioner's contentions and the relevant portions of the Niksa Declaration—and determine that Petitioner's arguments and evidence are adequately supported for institution purposes.

VI. CONCLUSION

For the reasons above, we determine that the information presented in the Petition establishes that there is a reasonable likelihood that Petitioner would prevail with respect to challenged claims 1–30 of the '114 patent. At this juncture in the proceeding, we have not made a final determination with respect to the patentability of the challenged claims, or with respect to claim construction.

VII. ORDER

For the foregoing reasons, it is

ORDERED that pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–30 of the '114 patent is hereby instituted with respect to all grounds of unpatentability set forth in the Petition; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial; the trial will commence on the entry date of this Decision; and

FURTHER ORDERED that, no later than fourteen days after the issuance of this decision, the parties may file a joint motion to seal, explaining why this decision should remain under seal, and including a redacted version of this decision that can be made publicly available;

FURTHER ORDERED that the present decision shall remain under seal until any joint motion to seal the present decision is resolved; and

FURTHER ORDERED that the present decision shall be made public if, after the expiration of time for the parties to file a joint motion to seal, no such motion has been filed.

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