

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT TRIAL AND APPEAL BOARD

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

Petitioners

v.

Birchtech Corp.

Patent Owner

IPR2025-00718
Patent No. 10,926,218

**PETITIONERS' AUTHORIZED REPLY TO PATENT OWNER'S
PRELIMINARY RESPONSE**

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PETITIONERS' EXHIBIT LIST

Exhibit	Description of Exhibits
1001	U.S. Patent No. 10,926,218 to Olson et al. (filed July 11, 2019) (“218 Patent” or “Challenged Patent”)
1002	Declaration of Dr. Stephen Niksa in Support of Petition for <i>Inter Partes</i> Review of U.S. Patent No. 10,926,218 (“218 Niksa Decl.”)
1003	Curriculum Vitae of Dr. Stephen Niksa
1004	Family Tree of ME2C Patents
1005	U.S. Patent Publication No. 2004/0013589 to Vosteen et al. (filed July 24, 2002) (“Vosteen589”)
1006	U.S. Patent Pub. No. 2008/0107579 to Downs et al. (published May 8, 2008) (“Downs-Boiler”)
1007	RESERVED
1008	Travis Starns, “Full-Scale Test of Mercury Control with Sorbent Injection and an ESP at Wisconsin Electric’s Pleasant Prairie Power Plant,” Session AE1-C, Paper No. 43249, AIR & WASTE MANAGEMENT’S ASSOCIATION’S 95 TH ANNUAL CONFERENCE (Baltimore, MD: June 23-27, 2002) (“Starns”)

Exhibit	Description of Exhibits
1009	Massachusetts Dep. of Environmental Protection, Bureau of Waste Prevention, “Evaluation of the Technological and Economic Feasibility of Controlling and Eliminating Mercury Emissions from the Combustion of Solid Fossil Fuel” (Dec. 2002) (“Mass-EPA”), available at https://web.archive.org/web/20030411074158/http://www.state.ma.us/dep/bwp/daqc/files/mercfeas.pdf and at https://www.mass.gov/doc/evaluation-of-technological-economic-feasibility-of-controlling-eliminating-mercury-emissions/download
1010	Sharon Sjostrom, “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) (“Sjostrom”)
1011	RESERVED
1012	U.S. Patent Pub. No. 2006/0048646 to Olson et al. (published Mar. 9, 2006) (“Olson-646”)
1013	U.S. Patent No. 6,953,494 to Nelson (filed May 6, 2003) (“Nelson”)
1014	U.S. Patent No. 7,514,052 to Lissianski et al. (issued Apr. 7, 2009) (“Lissianski”)
1015	U.S. Patent Publication No. 2011/0030592 to Baldrey (filed Feb. 10, 2011) (“Baldrey”)

Exhibit	Description of Exhibits
1016	U.S. Patent Pub. No. 2014/0255279 to Olson et al. (published Sept. 11, 2014) (“Olson-279”)
1017	RESERVED
1018	U.S. Patent No. 8,652,235 to Olson et al. (issued February 18, 2014) (“Olson-235”)
1019	File History of U.S. Patent Application No. 15/974,343, which ultimately issued as U.S. Patent No. 10,668,430 (“430 Patent File History”).
1020	File History of U.S. Patent Prov. App. No. 60/605,640 (“Provisional”)
1021	File History of U.S. Patent Application No. 11/209,163, which ultimately issued as U.S. Patent No. 7,435,286 (“163 Application File History”)
1022	File History of U.S. Patent Application No. 12/201,595, which ultimately published as 2009/0062119 and was abandoned (“595 Application File History”)
1023	Excerpts of File History of U.S. Patent Application No. 15/951,970, which ultimately issued as U.S. Patent No. 10,933,370 (“370 Patent File History”)
1024	RESERVED

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1025	File History of U.S. Patent Application No. 12/419,219, which ultimately issued as U.S. Patent No. 8,168,147 (“147 Patent File History”)
1026	File History of U.S. Patent Application No. 15/978,760 (issued as U.S. Patent No. 10,343,114) (“114 Patent File History”)
1027	Babcock & Wilcox, STEAM: ITS GENERATION AND USE, 40th ed. (The Babcock & Wilcox Company: 1992) (“B&W: Steam”)
1028	J. Bustard, S. Sjostrom, et al., “Full Scale Evaluation of Sorbent Injection for Mercury Control on Coal-Fired Power Plants,” International Conference on Air Quality III, Paper No. A5-4 (Sept. 9-12, 2002: Arlington, VA) (“Bustard”)
1029	U.S. Patent No. 1,984,164 to Stock et al. (issued Dec. 11, 1934) (“Stock”)
1030	Electric Utilities Environment Conference 2005 Handout (“EUEC Handout”)
1031	Scan of jacket/cover of CD mailed to conference attendees from EUEC: 8th Electric Utilities Environmental Conference (Tucson, Arizona: January 23-26, 2005) (“EUEC CD Scan”)
1032	RESERVED
1033	U.S. Patent No. 8,512,655

Exhibit	Description of Exhibits
1034	U.S. Patent No. 8,821,819
1035	U.S. Patent No. 9,757,689
1036	CRC Handbook of Chemistry and Physics, 86th Ed.; Lide, D.R., ed. (“CRC Press: March 2005”)
1037	Paul Chu, “Power Plant Evaluation of the Effect of SCR Technology on Mercury,” Paper No. 106, COMBINED POWER PLANT AIR POLLUTANT CONTROL MEGA SYMPOSIUM (MEGA) (Washington, DC: May 19-22, 2003) (“Power Plant Evaluation”)
1038	Evan J. Granite et al., “Sorbents for Mercury Removal from Flue Gas,” DOE/FETC/TR-98-01, U.S. Department of Energy (Jan. 1998) (“Granite”)
1039	Thomas J. Feeley, et al., “A Review of DOE/NETL’s Mercury Control Technology R&D Program for Coal-Fired Power Plants,” <i>DOE/NETL Hg R&D Program Review</i> (April 2003) (“Feeley”)
1040	Oxtoby et al., PRINCIPLES OF MODERN CHEMISTRY, 4 th ed (Saunders College Publishing: 1999) (“Oxtoby”)
1041	N.N. Greenwood and A. Earnshaw, CHEMISTRY OF THE ELEMENTS, 2nd ed. (Butterworth-Heinemann: 1997) (“Greenwood”)
1042	B.R. Puri, <i>Surface Complexes on Carbons</i> , in CHEMISTRY AND PHYSICS OF CARBON 191 (Philip L. Walker, ed.) (Marcel Dekker: 1970) (“Puri”)

Exhibit	Description of Exhibits
1043	Frank E. Huggins et al., “XAFS Examination of Mercury Sorption on Three Activated Carbons,” <i>Energy & Fuels</i> 1999(13), p. 114-121 (1999) (“ XAFS ”)
1044	S. Niksa et al., <i>Predicting Complete Hg Speciation Along Coal-Fired Utility Exhaust Systems</i> , MEGA SYMPOSIUM, Paper # 45 (Washington, DC: Aug. 2004) (“ Hg Speciation ”)
1045	D.L. Laudal et al., <i>Evaluation of Mercury Speciation at Power Plants Using SCR and SNCR NOx Control Technologies</i> , Paper No. A5-01, INT’L CONF. ON AIR QUALITY III (Arlington, VA: Sept. 9-12, 2002) (“ Laudal ”)
1046	U.S. Patent No. 4,196,173 to DeJong (“ DeJong ”)
1047	U.S. Patent No. 5,695,726 to Lerner (“ Lerner ”)
1048	Carey, T. R., Jr., O. W. H., Richardson, C. F., Chang, R., & Meserole, F. B. (1998). Factors Affecting Mercury Control in Utility Flue Gas Using Activated Carbon. <i>Journal of the Air & Waste Management Association</i> , 48(12), 1166–1174. https://doi.org/10.1080/10473289.1998.10463753 (“ Carey ”)
1049	NETL - Mercury Emissions Control, February, 2003, available at https://web.archive.org/web/20030315093905fw_/http://www.netl.doe.gov/coalpower/environment/mercury/control-tech/inactive.html (“ U.S. DOE, Completed Mercury Projects, February, 2003 ”)
1050	Proposed National Emission Standards for Hazardous Air Pollutants; and, in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Electric

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	Utility Steam Generating Units, 69 Fed. Reg. 4652-4752 [Volume 69, No. 20] (Jan. 30, 2004) (“EPA-Proposal”)
1051	U.S. EPA, “Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generation Units -- Final Report to Congress,” (Vol. 1 1998), available at https://www3.epa.gov/ttn/utox/eurtc1.pdf (“U.S. EPA – Vol. 1 1998”)
1052	U.S. EPA, “Mercury Study Report to Congress Volume 1: Executive Summary,” EPA-452/R-97-003 (Dec. 1997), available at https://www.epa.gov/sites/production/files/2015-09/documents/volume1.pdf (“U.S. EPA – Exec. Summary Vol. 1 Dec. 1997”)
1053	U.S. EPA, AP-42: External Combustion Sources, Chapter 1: Fifth Edition, Volume I (Sep. 1998), available at https://www3.epa.gov/ttn/chief/ap42/ch01/index.html (last visited Nov. 20, 2024) (“Chapter 1 of AP-42”)
1054	U.S. DOE, Mercury Emissions Control - Regulatory Drivers (Jan. 24, 2003), available at https://web.archive.org/web/20030416142937/http://www.netl.doe.gov/coalpower/environment/mercury/regs.html (“Mercury Emissions Control”)
1055	Clean Air Mercury Rule: Basic Information, available at https://web.archive.org/web/20050920005951/http://www.epa.gov/mercuryrule/basic.htm (“Clean Air Mercury Rule”)
1056	EPA Newsroom, “EPA Announces First-Ever Rule to Reduce Mercury Emissions from Power Plants” (Mar. 15, 2005), available

Exhibit	Description of Exhibits
	at https://archive.epa.gov/epapages/newsroom_archive/newsreleases/91ab7266e65751b985256fc50067d9b0.html (“3/15/2005 EPA Press Release”)
1057	EPA Newsroom, “Public Comment Period Begins for Proposed Power Plant Regulations” (Jan. 29, 2004), available at https://archive.epa.gov/epapages/newsroom_archive/newsreleases/4daf1d46e8dd755c85257036005511f9.html (“1/29/2004 EPA Press Release”)
1058	EPA Newsroom, “EPA Supplements Proposal to Reduce Power Plant Mercury Emissions,” (Feb. 24, 2004), available at https://archive.epa.gov/epapages/newsroom_archive/newsreleases/5810096dabfc9eba85256e440078905f.html (“2/24/2004 EPA Press Release”)
1059	Sharon Sjostrom et al., “Field Studies of Mercury Control Using Injected Sorbents,” AWWA ANNUAL MEETING, Session Ae-1b (2002) (“Field Studies of Mercury Control”)
1060	EPA, “Mercury Study Report to Congress Volume VIII: An Evaluation of Mercury Control Technologies and Costs,” EPA Report No. EPA-452/R-97-010 (Dec. 1997), available at https://www3.epa.gov/airtoxics/112nmerc/volume8.pdf (“EPA 1997 Mercury Study Report Vol. VIII”)
1061	EUEC 2005 home page, available at https://web.archive.org/web/20050303090129/http://www.euec.com/

Exhibit	Description of Exhibits
1062	Charlene R. Crocker et al., “Mercury Control with the Advanced Hybrid Particulate Collector Technical Progress Report,” U.S. DOE-NETL (Nov. 2003) (“ Crocker ”)
1063	Redline Comparison, showing changes from ’163 Application (as published at 2006/0048646) to ’970 Application (as published at 2018/0229182)
1064	Redline Comparison, showing changes from ’558 Application (as published at 2015/0246315) to ’970 Application (as published at 2018/0229182)
1065	U.S. Patent No. 8,168,147
1066	U.S. Patent No. 10,933,370
1067	U.S. Patent No. 10,589,225
1068	RESERVED
1069	U.S. Patent Pub. No. 2018/0229182 to Olson et al. (published Aug. 16, 2018) (“ Published ’970 Application ”)
1070	Roop Chand Bansal, et al., ACTIVE CARBON (Marcel Dekker:1988). (“ Bansal ”)
1071	<i>Midwest Energy Emissions Corp., et al. v. Arthur J. Gallagher & Co., et al.</i> , No. 1:19-cv-01334-CJB, Dkt. No. 440 (D. Del. June 24, 2022) (“ Dkt No. 440 ”)

Exhibit	Description of Exhibits
1072	<i>Midwest Energy Emissions Corp., et al. v. Arthur J. Gallagher & Co., et al.</i> , No. 1:19-cv-01334-CJB, Dkt. No. 447 (D. Del. July 12, 2022) (“ Dkt No. 447 ”)
1073	Welcome Page of CD mailed to conference attendees of the 2002 Air & Waste Management’s Association’s 95 th Annual Conference & Exhibition (Baltimore, Maryland: June 23-27, 2002) (“ AWMA CD Scan ”)
1074	Main Menu of CD mailed to conference attendees of the 2002 Air & Waste Management’s Association’s 95 th Annual Conference & Exhibition (Baltimore, Maryland: June 23-27, 2002) (“ AWMA CD Scan, Main Menu ”)
1075	Author Index of CD mailed to conference attendees of the 2002 Air & Waste Management’s Association’s 95 th Annual Conference & Exhibition (Baltimore, Maryland: June 23-27, 2002) (“ AWMA CD Scan, Author Index ”)
1076	Papers by Session of CD mailed to conference attendees of the 2002 Air & Waste Management’s Association’s 95 th Annual Conference & Exhibition (Baltimore, Maryland: June 23-27, 2002) (“ AWMA CD Scan, Papers by Session ”)
1077	Scan of jacket/cover of CD mailed to conference attendees of the 2002 Air & Waste Management’s Association’s 95 th Annual Conference & Exhibition (Baltimore, Maryland: June 23-27, 2002) (“ AWMA CD Photo ”)

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1078	AWMA Website (Internet Archive), available at https://web.archive.org/web/20020613041559/http://www.awma.org/about/overview.htm (“AWMA Overview”)
1079	AWMA Website (Internet Archive), available at https://web.archive.org/web/20020527005933/http://www.awma.org/ (“AWMA Homepage”, advertising AWMA 2002 Conference)
1080	AWMA Website (Internet Archive), available at https://web.archive.org/web/20020604012426/http://www.awma.org:80/about/ (“AWMA About Page”)
1081	AWMA Website (Internet Archive), available at https://web.archive.org/web/20020601173851/http://www.awma.org/ACE2002/tech-program/MondayPM.asp#AE-1c (“AWMA Technical Program Schedule for June 24, 2002 for Session AE-1C”)
1082	AWMA Website (Internet Archive), available at https://web.archive.org/web/20020616091740/http://www.awma.org/ACE2002/exhibition/list.asp (“AWMA 2002 Conference list of exhibitors”)
1083	AWMA Website (Internet Archive), available at https://web.archive.org/web/20020601121532/http://www.awma.org/ACE2002/top10list.asp (“AWMA 2002 Conference Top Ten Reasons”)
1084	AWMA Website (Internet Archive), available at https://web.archive.org/web/20020610093515/http://www.awma.org

Exhibit	Description of Exhibits
	/ACE2002/welcome.asp (“AWMA 95th Annual Conference and Exhibition Welcome Page”)
1085	AWMA Website (Internet Archive), available at https://web.archive.org/web/20020806044928/http://www.awma.org:80/pubs/bookstore/ItemInfo.asp?OrderCode_s=VIP-110-CD (“AWMA Bookstore Page for 2002 AWMA Conference CD”)
1086	AWMA Website (Internet Archive), available at https://web.archive.org/web/20020806041256/http://www.awma.org:80/pubs/bookstore/ (“AWMA Bookstore Homepage”)
1087	State of Massachusetts Mass-EPA (Internet Archive) (dated Jan. 6, 2003), available at https://web.archive.org/web/20030106044457/http://www.state.ma.us/dep/bwp/about.htm (describing mission of Mass Department of Environmental Protection, Bureau of Waste Prevention)
1088	State of Massachusetts Mass-EPA (Internet Archive) (dated Dec. 21, 2002), available at https://web.archive.org/web/20021221040816/http://www.state.ma.us/dep/bwp/bwpprogs.htm (describing the divisions and programs of the Mass Bureau of Waste Prevention)
1089	State of Massachusetts Mass-EPA (Internet Archive) (dated Jan. 6, 2003), available at https://web.archive.org/web/20030106024342/http://www.state.ma.us/dep/bwp/bwppubs.htm (describing the publications by program of the Mass Bureau of Waste Prevention)
1090	State of Massachusetts Mass-EPA (Internet Archive) (dated Dec. 20, 2002), available at

Exhibit	Description of Exhibits
	https://web.archive.org/web/20021220143210/http://www.state.ma.us/dep/bwp/daqc/daqcpubs.htm#ecp (describing the Air Program Planning Unit Publications of the Mass Bureau of Waste Prevention)
1091	Internet Archive Standard Affidavit, explaining how to interpret hyperlinks, available at https://archive.org/legal/affidavit.php
1092	Expert Report of Philip J. O’Keefe, PE Regarding Infringement (Oct. 25, 2022) (excerpted), submitted by Patent Owner in <i>Midwest Energy Emissions Corp., et al. v. Arthur J. Gallagher & Co., et al.</i> , No. 1:19-cv-01334-CJB
1093	Deposition Transcript of Phillip O’Keefe Vol. 1 (Mar. 2, 2023), taken in <i>Midwest Energy Emissions Corp., et al. v. Arthur J. Gallagher & Co., et al.</i> , No. 1:19-cv-01334-CJB.
1094	Deposition Transcript of Phillip O’Keefe Vol. 2 (Mar. 3, 2023), taken in <i>Midwest Energy Emissions Corp., et al. v. Arthur J. Gallagher & Co., et al.</i> , No. 1:19-cv-01334-CJB.
1095	Deposition Transcript of Edwin Olson (Aug. 26, 2022) (excerpted), taken in <i>Midwest Energy Emissions Corp., et al. v. Arthur J. Gallagher & Co., et al.</i> , No. 1:19-cv-01334-CJB.
1096	Deposition Transcript of Michael Holmes (Aug. 24, 2022) (excerpted), taken in <i>Midwest Energy Emissions Corp., et al. v. Arthur J. Gallagher & Co., et al.</i> , No. 1:19-cv-01334-CJB.

Exhibit	Description of Exhibits
1097	Deposition Transcript of John Pavlish (Aug. 25, 2022) (excerpted), taken in <i>Midwest Energy Emissions Corp., et al. v. Arthur J. Gallagher & Co., et al.</i> , No. 1:19-cv-01334-CJB.
1098	Affidavit of Tanya Zeif, Custodian of Records for Internet Archive (1/10/2025), sponsoring Exhibits 1078-1086
1099	Affidavit of Tanya Zeif, Custodian of Records for Internet Archive (1/13/2025), sponsoring Exhibits 1009, 1061, 1087-1090
1100	RESERVED
1101	RESERVED
1102	RESERVED
1103	RESERVED
1104	<i>IN RE: MIDWEST ENERGY EMISSIONS CORP. PATENT LITIGATION</i> , No. 4:24-md-03132-SHL-WPK, Dkt. No. 60 (S.D. Iowa Mar. 7, 2025) (“ Dkt No. 60 ”)
1105	<i>NRG Energy, Inc. et al. v. Midwest Energy Emissions Corp.</i> , IPR2020-00926, Paper 13 (P.T.A.B. Sep. 4, 2020)
1106	Clarion Energy Content Directors, “A Variety of Hg Capture Solutions Are Available” (June 1, 2009), available at https://www.power-eng.com/environmental-emissions/a-variety-of-

Exhibit	Description of Exhibits
	hg-capture-solutions-are-available/ (“Variety of Hg Capture Solutions”)
1107	Modern Power Systems, “Full scale tests show KNXTM is effective for mercury control” (October 1, 2009), available at https://www.modernpowersystems.com/analysis/full-scale-tests-show-knxtm-is-effective-for-mercury-control/ (“KNXTM is effective”)
1108	File History of U.S. Patent Application No. 16/509,071, which ultimately issued as U.S. Patent No. 10,926,218 (“ 218 Patent File History ”)
1109	U.S. Patent Pub. No. 2019/0336913 to Olson et al. (published Nov. 7, 2019) (“ Published ’071 Application ”)
1110	Petitioner PacifiCorp’s Stipulation Regarding District Court Proceedings
1111	Petitioner MEC’s Stipulation Regarding District Court Proceedings
1112	Petitioners WPL and IPL’s Stipulation Regarding District Court Proceedings
1113	Puget Sound Energy, Colstrip Facts, available at: https://www.colstripfacts.com/faqs#:~:text=Talen%20Energy%20owns%2030%25%20interest,operator%20of%20all%20four%20plants.&text=PacifiCorp%20owns%20a%2010%25%20interest%20in%20units%203%20%26%204

Exhibit	Description of Exhibits
1114	Plaintiff's Initial Infringement Contentions (March 18, 2025) served in In re: Midwest Energy Emissions Corp. Patent Litig., No. 4:24-md-03132-SHL-WPK (S.D. Iowa) and filed publicly at ECF 106-3
1115	Exhibit A to Plaintiff's Initial Infringement Contentions (March 18, 2025) served in In re: Midwest Energy Emissions Corp. Patent Litig., No. 4:24-md-03132-SHL-WPK (S.D. Iowa) and filed publicly at ECF 106-3
1116	Coal Explained: Use of Coal, U.S. Energy Information Administration (last updated Sept. 14, 2023), available at: https://www.eia.gov/energyexplained/coal/use-of-coal.php#:~:text=In%202022%2C%20coal%20accounted%20for,19.5%25%20of%20U.S
1117	What EPA is Doing to Reduce Mercury Pollution, and Exposures to Mercury, U.S. Env't Protection Agency (last updated July 11, 2024), available at https://www.epa.gov/mercury/what-epa-doing-reduce-mercurypollution-and-exposures-mercury
1118	Birchtech, Technology Overview, available at https://www.birchtech.com/tech-overview
1119	Exec. Order No. 14261, 90 Fed. Reg. 15517 (April 8, 2025)
1120	Patent Owner's Response to Petitioners' Motion to Stay Pending Inter Partes Review In re: Midwest Energy Emissions Corp. Patent Litig., No. 4:24-md-03132-SHL-WPK, ECF 128 (S.D. Iowa)
1121	Docket Navigator, Time to Trial in the Southern District of Iowa, https://search.docketnavigator.com/patent/binder/0/0 (last accessed June 2, 2025)
1122	Deere & Co. et. al v. Kinze Mfg., Inc. et. al, 4:20-CV-00389 (S.D. Iowa) (Docket Sheet)
1123	Piatz v. State Farm Mut. Auto. Ins. Co., 3:21-CV-00007 (S.D. Iowa) (Judge Locher) (Docket Sheet and ECF 8)

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1124	Probasco et al v. MFA Inc., 4:22-CV-00117 (S.D. Iowa) (Judge Locher) (Docket Sheet and ECF 7, 9)
1125	Shin v. Winnebago Indus., Inc. et. al, 3:23-CV-00077 (S.D. Iowa) (Judge Locher) (Docket Sheet)
1126	Nuhn Industries Ltd v. Bazooka Farmstar LLC, 3:22-cv-00015 (S.D. Iowa) (Docket Sheet and ECF 286)
1127	G.W. Lisk Company, Inc. v. Gits Manufacturing Company, 4:17-cv-00273 (S.D. Iowa) (Docket Sheet)
1128	In re: Midwest Energy Emissions Corp. Patent Litig., No. 4:24-md-03132-SHL-WPK, ECF 131 (S.D. Iowa May 22, 2025) (Order Denying Without Prejudice Pre-Institution Stay)
1129	In re: Midwest Energy Emissions Corp. Patent Litig., No. 4:24-md-03132-SHL-WPK, ECF 111 (S.D. Iowa Apr. 18, 2025) (Order re: Petitioners' Deadline to File Surreply)
1130	In re: Midwest Energy Emissions Corp. Patent Litig., No. 4:24-md-03132-SHL-WPK, ECF 19 (S.D. Iowa Jan 10, 2025) (Order on Motions to Dismiss and Motion to Sever)
1131	In re: Midwest Energy Emissions Corp. Patent Litig., No. 4:24-md-03132-SHL-WPK, ECF 1 (S.D. Iowa December 17, 2024) (MDL Transfer Order)
1132	In re: Midwest Energy Emissions Corp. Patent Litig., No. 4:24-md-03132-SHL-WPK, ECF 129 (S.D. Iowa May 21, 2025) (Petitioners' Reply Brief In Support of Motion to Stay Pending Inter Partes Review)
1133	Email from Justin Nemunaitis to Joe Jacobi (Jan. 16, 2024, 11:01 AM)

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1134	In re Midwest Energy Emissions Corp. Patent Litig., MDL No. 3132 ECF 35 (J.P.M.L. Nov. 14, 2024) (Patent Owner's Reply Brief in Support of Consolidation)
1135	Midwest Energy Emissions Corp. v. Arthur J. Gallagher & Co., No. 19-1334-RGACJB ECF 1 (D. Del. July 17, 2019) (Complaint for Patent Infringement)
1136	Midwest Energy Emissions Corp. v. Arthur J. Gallagher & Co., No. 19-1334-RGACJB ECF 130 (D. Del. July 15, 2020) (First Amended Complaint for Patent Infringement)
1137	<i>IN RE: MIDWEST ENERGY EMISSIONS CORP. PATENT LITIGATION</i> , No. 4:24-md-03132-SHL-WPK, Dkt. No. 182 (S.D. Iowa Mar. 7, 2025) (notice of withdrawal of motion for preliminary injunction)

I. INTRODUCTION

In the POPR (Paper 16), PO does not identify any claim limitations missing from any grounds. Rather, PO argues: (i) the '218 Patent has an effective filing date before Sjostrom, Baldrey, Olson-646, and Olson-235; and (ii) Sjostrom was not publicly accessible. These arguments are without merit and mirror those the Board rejected in previously instituted proceedings against the ancestor '147 Patent (IPR2020-00926, -00928) and counterpart '114 Patent (IPR2020-00832, -00834).¹

The Board granted institution, holding that the ancestor '147 Patent lacks support to earlier applications before 2009. IPR2020-00928, Paper 17 at 32. The Board explained that there was “no suggestion that bromine and the activated carbon are separately injected into mercury-containing flue gas.” *Id.* at 29. Like the '147 Patent, the child '218 Patent also requires separate injection. Claim 1 of the '218 Patent claims require adding “HI, an iodide salt, or a combination thereof ... to the coal before the coal enters the combustion chamber,” and then injecting activated-carbon sorbent “downstream of the combustion chamber.” POPR at 8 (emphasis added) (arguing that Claim 1 should be “considered as a representative claim”).

The '218 Patent drifts even further from the written-description of the parent

¹ IPR2020-00928 and -00832 relied on prior art dated after PO's asserted 2004 priority date, while IPR2020-00926 and -00834 relied on earlier prior art.

patents. The parent patents focus on what PO calls “the critical bromine component” (POPR at 19), but the ’218 Patent does not claim bromine components. The ’218 Patent claims upstream addition of “HI” or an “iodide salt.” The parent applications cannot support this, which is why the POPR repeatedly references a different set of chemicals, “Br₂” (molecular bromine) and “HBr” (hydrogen bromide). The ’147 Patent could not trace earlier support before the asserted prior art, and neither can the ’218 Patent.

II. THE ’218 PATENT IS NOT ENTITLED TO EARLIER PRIORITY

PO seeks to pre-date the ’218 Patent and trace priority to the 2004 Provisional, but the Board previously rejected this argument when granting institution for the counterpart ’114 Patent with “similar subject matter.” IPR2020-00832, Paper 17 at 25. And for the parent ’147 Patent, the Board granted institution, holding that it lacks support before 2009. IPR2020-00928, Paper 17 at 32. If the ’147 Patent does not have an earlier effective filing date, its child (’218 Patent) also does not.

A. The Board Determined the Incorporation Statement Was Unclear

PO contends that the “Pre-2018 applications state that the provisional application ‘is hereby incorporated by reference in [its] entirety for all purposes.’” POPR at 14. That is not true. The ’147 Patent (parent to the ’218 Patent) does not use the “entirety for all purposes” language. *See* EX1065. Rather, as the Board recognized, the ’147 Patent (filed as App. No. 12/419,219) “claims priority to the

extent appropriate from provisional application 60/604,640” and then states merely that the Provisional is “incorporated by reference.” IPR2020-00928, Paper 17 at 31-32 (emphasis added); Pet., Paper 1 at 26-27. The Board stated regarding the ’147 Patent that “[i]t is unclear to us what ‘to the extent appropriate’ means in this context.” IPR2020-00928, Paper 17 at 32. The ’147 Patent “fails to identify with detailed particularity the specific material incorporated and fails to clearly indicate where that material is found in the various documents,” and the “ambiguity creates an additional concern regarding the chain of priority for the ’219 application.” *Id.* (holding the ’147 Patent could not claim priority to the Provisional).

B. The Board Determined that the Provisional Was “Essential” Material that Could Not Be Incorporated by Reference

Another reason the ’114, ’147, and ’218 Patents cannot achieve priority to 2004 is because, as the Board previously held, the Provisional is “essential” material, and essential material may not be incorporated by reference from an unpublished patent application under 37 C.F.R. § 1.57(d). IPR2020-00832, Paper 17 at 29; IPR2020-00928, Paper 17 at 23-24. PO urges reconsideration over M.P.E.P. 608.01(p) and *Maquet Cardiovascular LLC v. Abiomed, Inc.*, 627 F. Supp. 3d 72, 78-84 (D. Mass 2022). POPR at 15. Petitioners already addressed these two sources. IPR2025-00718, Paper 1 at 29-33. PO ignores the Petition, and PO is wrong.

a. The Board Was Consistent with M.P.E.P. § 608.01

PO faults the Board’s prior decisions for not citing M.P.E.P. § 608.01, but

M.P.E.P. § 608.01 supports the Board’s prior holding. Because a provisional is unpublished and cannot be incorporated by reference under 37 C.F.R. §1.57(d), an applicant can add omitted material from a provisional—but 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” of the child application. M.P.E.P. 608.01(p)(I) (quoting 37 C.F.R. §1.57(b)); Pet., Paper 1 at 32-33. When PO “physically incorporate[d] the content of the provisional application” (POPR at 17) in April 2018 in the ’370 Patent (parent of ’218 Patent), that was too late. The ’370 Patent is the eighth non-provisional from the Provisional (EX1004); the Pre-2018 Applications were either abandoned or issued, but never “amended to include the inadvertently omitted portion of the [Provisional before] the close of prosecution.” 37 C.F.R. §1.57(b); *see* M.P.E.P. 217(III) (Example 3).

This understanding is consistent with other provisions in the M.P.E.P. cited by PO. Because the Pre-2018 Applications did not physically incorporate the Provisional, the ’370 Patent “contains subject matter that would have been new matter in the application.” Thus, when filing the ’370 Patent in 2018, the “applicant [was] required to delete the benefit claim or change the relationship (continuation or divisional application) to continuation-in-part.” M.P.E.P. 201.06(c)(III) (cited by POPR at 17). The ’370 Patent added new matter in 2018, not present in earlier applications, and the priority chain was broken.

b. The Board Was Consistent with *Maquet*

PO also faults the Board for not applying a district court decision, *Maquet*, which analyzed whether material from an unpublished application is “essential” to support claim limitations not only in the challenged patent, but also in intervening applications. *See* Paper 1 at 15 (discussing *Maquet*, 627 F. Supp. 3d at 81-82). The ’218 Patent is a child to the ’147 Patent, which has claims whose sole support (if any) is from the Provisional. EX1004.

Claims 18-19 of the ’147 Patent require “injecting separately” a sorbent material and a bromine-containing promoter “whereby in-flight reaction produces the promoted brominated sorbent.” IPR2025-00718, Paper 1 at 29-31; EX1002 ¶¶ 190-208. The Board previously held that in the ’147 Patent, there is “no suggestion that bromine and the activated carbon are separately injected into mercury-containing flue gas.” IPR2020-00928, Paper 17 at 29. PO’s expert in Delaware, Mr. O’Keefe, then buttressed the Board’s opinion. He agreed that in the ’147 Patent: “[t]here are no examples where bromine is introduced into the flue gas apart from activated carbon”; there “is no example where the brominated activated carbon sorbent is being prepared in flue gas”; and “there’s no example here where there is bromine in a form being added to coal.” EX1093 (O’Keefe) at 156:1-170:5. Thus, PO’s Delaware expert unequivocally asserted that Figure 2 of the Provisional and its accompanying text are “essential material for the patents at issue” in the Delaware

case, which included the '147 Patent (parent to the '218 Patent). IPR2025-00718, Paper 17 at 28 (discussing EX1094 at 237:20-241:19). PO ignores its expert's prior sworn concessions.

Under both *Maquet* and M.P.E.P 608.01, there is a lack of written-description support in parent applications, confirming a break in priority.

C. The Parent Applications Do Not Support the '218 Patent Claims

As discussed in the Petition, the Provisional and Pre-2018 Applications fail to provide written-description support for the “Newly-Introduced Limitations” in the '218 Patent: (i) “HI, an iodide salt, or a combination thereof”; and (ii) these chemicals “added to the coal.” Pet., Paper 1 at 21. PO relies on attorney argument to patch together non-existent written-description support.

1. Patent Owner Applies the Wrong Standard for Disclosure

PO improperly applies an obviousness-type analysis for priority, rather than the required written-description analysis. For example, PO argues that “Petitioners cannot meaningfully contend that a POSITA would understand Sjostrom’s arrow to disclose adding bromine to pulverized coal, but reach a different conclusion with respect to the provisional application.” POPR at 25 & n.2. PO conflates two standards, while ignoring that Sjostrom expressly refers to this embodiment as “coal additives.” For priority, “[t]he 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” *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1571-72 (Fed. Cir. 1997) (emphasis added); *see PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1306 (Fed. Cir. 2008) (similar). PO provides attorney argument for what would have been obvious to a POSITA, rather than what was actually disclosed in Provisional and Pre-2018 Applications.

2. PO Conflates Downstream and Upstream Processes

The only support PO identifies for iodine-containing materials “added to the coal” upstream of the combustion chamber (as in independent claims 1, 25, and 26) is how “the inventive sorbent can be injected where desired (e.g., before, after, or within the boiler.”). POPR at 12, 16 (citing ’595 App ¶ 107). The Board expressly rejected this passage, as it does not support separate injection:

[T]his disclosure regards the promoted sorbent material [and] 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 claims 1 and 23–25 of the ’114 patent recite. As a result, we do not agree with Patent Owner’s arguments regarding paragraph 107 of the ’595 application.

IPR2020-00832, Paper 17 at 24 (emphasis added). PO presents no reason for a different result.

3. No Disclosure of “Iodide Salt”

Even if the Provisional could be incorporated, there is still no written-description support in the Pre-2018 Applications for coal comprising “added HI, an

iodide salt, or a combination thereof,” as required by each of the independent claims. Pet., Paper 1 at 21. In its POPR, PO hops around the Provisional and Pre-2018 Applications and their various disclosures of downstream addition of HBr or Br₂, and then tries to extrapolate that to upstream addition of HI and iodide salt. But a “written description sufficient to satisfy the requirement of the law requires a statement of an invention, not an invitation to go on a hunting expedition to patch together after the fact a synthetic definition of an invention.” *Indivior UK Ltd. v. Dr. Reddy’s Labs. S.A.*, 18 F.4th 1323, 1329 (Fed. Cir. 2021). PO cannot demonstrate written-description in the Provisional.

The POPR does not identify any disclosure in the Provisional or Pre-2018 Applications of an “iodide salt,” whether added to the coal or anywhere else. EX1002 ¶178. Absent any supporting citation or other evidence, PO asserts that “a halogen/halide promoted sorbent necessarily includes a halogen/halide such as HI and iodide salts.” POPR at 16 (emphasis added). However, an “iodide salt” is never disclosed at all in the Provisional or Pre-2018 Applications. And even considering the broader “salt” category, the patentee taught not to use the category of halide salts: “In the conventional view therefore, a halide-salt-treated activated carbon will not effectively oxidize elemental mercury and capture elemental mercury.” EX1010 at exhibit page 10; EX1002 ¶178.

PO seeks to bypass the disclosure requirements by arguing that “the general

rule [is] that disclosure of a species provides sufficient written description support for a later filed claim directed to the genus.” IPR2025-00718, Paper 17 at 20-21 (quoting *Bilstad v. Wakalopulos*, 386 F.3d 1116, 1125 (Fed. Cir. 2004)). Even *Bilstad* itself clarifies that this “general” rule does not apply when “the difference between members of the group is such that the person skilled in the art would not readily discern that other members of the genus would perform similarly to the disclosed members, i.e., if the art is unpredictable, then disclosure of more species is necessary to adequately show possession of the entire genus.” *Bilstad*, 386 F.3d at 1125 (emphasis added). *Bilstad* is even more inapt when the disclosed species in the Provisional (e.g., HBr or HI) are not even members of the claimed genus (iodide salt). As Mr. Pavlish previously informed the USPTO, HBr and HI “are gases that dissolve in water to give acids which are commonly known as hydrohalic acids.” Ex. 1026 at 320-321 (Pavlish Decl. C) ¶¶ 11-12. In contrast, “salt” is “an ionic compound that can be formed by the neutralization reaction of an acid and a base.” *Id.* at 329-330 ¶ 29; *see also* ¶¶ 31-33 (further describing salts).

Subsequent cases have further explained that though “a single example can provide written description support for a genus, that is not the case unless the specification provides the required ‘blaze marks.’” *PureCircle USA Inc. v. SweeGen, Inc.*, No. 2022-1946, 2024 WL 20567, at *3 (Fed. Cir. Jan. 2, 2024) (analyzing *Bilstad*); *see also Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336,

1350 (Fed. Cir. 2010) (disclosure of a type does not provide sufficient written description support for a claimed class). In the Pre-2018 Applications, there is not even a single example disclosed of potassium iodide or any other “iodide salt,” let alone “blaze marks” for the entire genus. EX1002 ¶¶ 178, 189.

4. No Disclosure of “HI” Added to Coal

There is also no disclosure of hydrogen iodide (HI) added to coal, even considering Example 1E of the Provisional, which recites that the “additional substance is hydrohalide (HI, HBr, HCl), etc., 1%-10% of bromine.” Here, the Provisional refers to an “additional substance” (i.e., to downstream base chemistry) rather than an “additive” (i.e., added to combustion chamber or coal). EX1020 at 6 (Example 1E); EX1002 ¶176. The primary function recognized by this “additive” in the Provisional is to neutralize other contaminants within the flue gas that would otherwise “compete for mercury reactive/sorption sites” on the sorbent. EX1020 at 7 (Example 9); EX1002 ¶177. As the Board held, “the ’640 provisional application refers to ‘additives’ as ‘Ca, Na, and others’ as separate from the ‘additional substances,’ including bromine.” IPR2020-00928, Paper 17 at 22 (emphasis added).

To the extent that any of HI or iodide salt are individually disclosed as being added to coal (they are not), the Provisional and Pre-2018 Applications still fail to provide written-description support the additive comprising “a combination thereof” of such chemicals (i.e., both HI and iodide salt), as recited in the independent claims.

Thus, even if the Provisional could be legally considered in the priority analysis—despite the improper incorporation and priority language, the fact it is “essential” material, and that Patent Owner waited until April, 2018 to physically incorporate the Provisional into the non-provisional applications—the Provisional and Pre-2018 Applications still fail to provide written-description support for the ’218 Patent claims.

III. SJOSTROM WAS PUBLICLY ACCESSIBLE

As the Board previously held, “Petitioner has demonstrated a reasonable likelihood that Sjostrom was publicly available.” IPR2020-00928, Paper 17 at 47. PO now accuses Petitioners of a “blatant mischaracterization,” suggesting Petitioners’ evidence as limited to whether “the relevant public has a means of accessing” it. POPR at 26. But Petitioners did not merely present that the public was able to access Sjostrom; rather, Petitioners presented evidence that POSITAs actually did access Sjostrom.

The Sjostrom reference (EX1010) relied upon in the Petition and Dr. Niksa’s declaration was copied from the physical CD that Dr. Niksa personally received within a few weeks of completion of the conference in 2005. EX1002 ¶¶243, 248 (discussing EX1030 and EX1031). As the Board held when previously qualifying Sjostrom as prior art, “Petitioner also provides evidence of the CD that was mailed to the conference attendees and copies of the Sjostrom presentation from the CD,

without any apparent restriction of expectation of confidentiality.” IPR2020-00928, Paper 17 at 47-48.

PO asserts that “Dr. Niksa claims, without support, that ‘[h]undreds of people attended’ the relevant track presentations, including POSITAs.” POPR at 27 (emphasis added). Dr. Niksa attended the 2005 EUEC Conference where Sjostrom was presented, and Dr. Niksa presented his research findings at that conference. EX1002 ¶249 (discussing EX1030). Dr. Niksa further provided “the attendee list included in the EUEC Handout.” EX1002 ¶250 (citing EX1030 at 106-118). This list included the names, titles, and companies of 848 attendees, including Dr. Niksa.

ATTENDEE LIST								
#	First Name	Last Name	Title	Company	Address	City	ST	ZIP
1	Michael	Abbott	Env. Sci.	Idaho National Laboratory	PO Box 1625	Idaho Falls	ID	83415
2	Richard	Abrams	Dir.-Bus. Dvlp	Babcock Power, Inc.	5 Neponset Street	Worcester	MA	1606
3	**Brad	Adams		Reaction Engineering Internatio				
555	Stephen	Niksa	Pres.	Niksa Energy Associates	1745 Terrace Drive	Belmont	CA	94002
846	Susan	Zinga	Energy Policy	Southface Energy Institut	25 Walnut Circle	Basking Ridge	NJ	7920
847	Ronda	Zivalich		ADA-ES, Inc	8100 South Parkway, Unit B	Littleton	CO	80120
848	Carl	Zoephel	Dir., Bus. Deve	TRC	5 Waterside Crossing	Windsor	CT	06095-156

Thus, Sjostrom was publicly accessible in 2005. This is more than a decade before the 2018 date when PO amended the specification in App. No. 15/951,570, and is more than four years before the filing date of the 12/419,219 Application, which the Board held was not “entitled to a priority date early than April 6 2009.” IPR2020-00928, Paper 17 at 32; *see* EX1004 (family tree).

IV. CONCLUSION

Petitioners respectfully request that IPR of the '218 Patent be instituted.

Respectfully submitted,

Aug. 26, 2025

Date

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR § 42.6(e)(4), the undersigned certifies that on August 26, 2025, a complete copy of the foregoing Petitioners' Authorized Reply to Patent Owner's Preliminary Response was served on Lead and Back-up Counsel for Petitioner at the service address provided in Patent Owner's

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