ORAL ARGUMENT SCHEDULED FOR APRIL 17, 2017

No. 15-1381 (and consolidated cases)

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

STATE OF NORTH DAKOTA, *et al.*,
Petitioners,

v.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *et al.*,
Respondents.

On Petitions for Review of Final Agency Action of the United States Environmental Protection Agency 80 Fed. Reg. 64,510 (Oct. 23, 2015) and 81 Fed. Reg. 27,442 (May 6, 2016)

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CERTIFICATE AS TO PARTIES, RULINGS, AND RELATED CASES

Pursuant to Circuit Rule 28(a)(1), Non-State Petitioners state as follows:

A. Parties, Intervenors, and *Amici Curiae*

These cases involve the following parties:

Petitioners:

No. 15-1381: State of North Dakota.

No. 15-1396: Murray Energy Corporation.

No. 15-1397: Energy & Environment Legal Institute.

No. 15-1399: State of West Virginia; State of Alabama; State of Arizona Corporation Commission; State of Arkansas; State of Florida; State of Georgia; State of Indiana; State of Kansas; Commonwealth of Kentucky; State of Louisiana; State of Louisiana Department of Environmental Quality; Attorney General Bill Schuette, People of Michigan; State of Missouri; State of Montana; State of Nebraska; The North Carolina Department of Environmental Quality; State of Ohio; State of Oklahoma; State of South Carolina; State of South Dakota; State of Texas; State of Utah; State of Wisconsin; and State of Wyoming.

No. 15-1434: International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers & Helpers, AFL-CIO.

No. 15-1438: Peabody Energy Corporation.

No. 15-1448: Utility Air Regulatory Group and American Public Power Association.

No. 15-1456: National Mining Association.

No. 15-1458: Indiana Utility Group.

No. 15-1463: United Mine Workers of America, AFL-CIO.

No. 15-1468: Alabama Power Company; Georgia Power Company; Gulf Power Company; Mississippi Power Company; and Southern Power Company.

No. 15-1469: Chamber of Commerce of the United States of America; National Association of Manufacturers; American Fuel & Petrochemical Manufacturers; National Federation of Independent Business; American Chemistry Council; American Coke and Coal Chemicals Institute; American Foundry Society; American Forest & Paper Association; American Iron and Steel Institute; American Wood Council; Brick Industry Association; Electricity Consumers Resource Council; National Lime Association; National Oilseed Processors Association; and Portland Cement Association.

No. 15-1481: American Coalition for Clean Coal Electricity.

No. 15-1482: Luminant Generation Company LLC; Oak Grove Management Company LLC; Big Brown Power Company LLC; Sandow Power Company LLC; Big Brown Lignite Company LLC; Luminant Mining Company LLC; and Luminant Big Brown Mining Company LLC.

No. 15-1484: National Rural Electric Cooperative Association; Basin Electric Power Cooperative; East Kentucky Power Cooperative, Inc.; Hoosier Energy Rural Electric Cooperative, Inc.; Minnkota Power Cooperative, Inc.; Sunflower

Electric Power Corporation; and Tri-State Generation and Transmission Association, Inc.

No. 16-1218: Murray Energy Corporation.

No. 16-1220: State of West Virginia; State of Alabama; State of Arizona Corporation Commission; State of Arkansas; State of Florida; State of Georgia; State of Indiana; State of Kansas; Commonwealth of Kentucky; State of Louisiana; State of Louisiana Department of Environmental Quality; Attorney General Bill Schuette, People of Michigan; State of Missouri; State of Montana; State of Nebraska; The North Carolina Department of Environmental Quality; State of Ohio; State of Oklahoma; State of South Carolina; State of South Dakota; State of Texas; State of Utah; State of Wisconsin; and State of Wyoming.

No. 16-1221: Utility Air Regulatory Group and American Public Power Association.

No. 16-1227: Energy & Environment Legal Institute.

Respondents:

Respondents are the United States Environmental Protection Agency (in Nos. 15-1381, 15-1397, 15-1434, 15-1448, 15-1456, 15-1463, 15-1481, 15-1484, 16-1221, 16-1227) and the United States Environmental Protection Agency and Gina McCarthy, Administrator (in Nos. 15-1396, 15-1399, 15-1438, 15-1458, 15-1468, 15-1469, 15-1480, 15-1482, 16-1218, 16-1220).

Intervenors and *Amici Curiae*:

Lignite Energy Council and Gulf Coast Lignite Coalition are Petitioner-Intervenors.

American Lung Association; Center for Biological Diversity; Clean Air Council; Clean Wisconsin; Conservation Law Foundation; Environmental Defense Fund; Natural Resources Defense Council; Ohio Environmental Council; Sierra Club; State of California by and through Governor Edmund G. Brown, Jr., and the California Air Resources Board, and Attorney General Kamala D. Harris; State of Connecticut; State of Delaware; State of Hawaii; State of Illinois; State of Iowa; State of Maine; State of Maryland; State of Minnesota by and through the Minnesota Pollution Control Agency; State of New Hampshire; State of New Mexico; State of New York; State of Oregon; State of Rhode Island; State of Vermont; State of Washington; Commonwealth of Massachusetts; Commonwealth of Virginia; District of Columbia; City of New York; Golden Spread Electric Cooperative, Inc.; NextEra Energy, Inc.; Calpine Corporation; The City of Austin d/b/a Austin Energy; The City of Los Angeles, by and through its Department of Water and Power; The City of Seattle, by and through its City Light Department; National Grid Generation, LLC; New York Power Authority; Pacific Gas and Electric Company; Sacramento Municipal Utility District; Tri-State Generation and Transmission Association, Inc. are Respondent-Intervenors.

Institute for Policy Integrity at New York University School of Law, Nicholas Ashford, M. Granger Morgan, Edward S. Rubin, Margaret Taylor, Roger Aines, Sally Benson, S. Julio Friedmann, Jon Gibbins, Raghubir Gupta, Howard Herzog, Susan Hovorka, Meagan Mauter, Ah-Hyung (Alissa) Park, Gary Rochelle, Jennifer Wilcox, and Saskatchewan Power Corporation are *Amici Curiae* in support of Respondents.

B. Rulings Under Review

These consolidated cases involve final agency action of the United States Environmental Protection Agency entitled, "Standards of Performance for Greenhouse Gas Emissions From New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units," published on October 23, 2015, at 80 Fed. Reg. 64,510, and "Reconsideration of Standards of Performance for Greenhouse Gas Emissions From New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units," published on May 6, 2016, at 81 Fed. Reg. 27,442.

C. Related Cases

These consolidated cases have not previously been before this Court or any other court.

Per the Court's order of March 24, 2016, the following case was severed and is being held in abeyance pending potential administrative resolution of biogenic carbon dioxide emissions issues in the Final Rule: *Biogenic CO_2 Coalition v. EPA*, No. 15-1480.

CORPORATE DISCLOSURE STATEMENTS

Non-State Petitioners submit the following statements pursuant to Rule 26.1 of the Federal Rules of Appellate Procedure and Circuit Rule 26.1:

Alabama Power Company is a wholly-owned subsidiary of Southern Company, which is a publicly held corporation. Other than Southern Company, no publicly-held company owns 10% or more of Alabama Power Company's stock. Southern Company is traded publicly on the New York Stock Exchange under the symbol "SO."

American Chemistry Council ("ACC") states that it represents the leading companies engaged in the business of chemistry. ACC members apply the science of chemistry to make innovative products and services that make people's lives better, healthier, and safer. ACC is committed to improved environmental, health, and safety performance through Responsible Care®, common sense advocacy designed to address major public policy issues, and health and environmental research and product testing. The business of chemistry is an $801 billion enterprise and a key element of the nation's economy. ACC has no parent corporation, and no publicly held company has 10% or greater ownership in ACC.

American Coalition for Clean Coal Electricity ("ACCCE") is a partnership of companies that are involved in the production of electricity from coal. ACCCE recognizes the inextricable linkage between energy, the economy and our environment. Toward that end, ACCCE supports policies that promote the wise use of coal, one of America's largest domestically produced energy resources, to ensure a reliable and affordable supply of electricity to meet our nation's demand for energy. The ACCCE is a "trade association" within the meaning of Circuit Rule 26.1(b). It has no parent corporation, and no publicly held company owns a 10% or greater interest in the ACCCE.

American Coke and Coal Chemicals Institute ("ACCCI"), founded in 1944, is the international trade association that represents 100% of the U.S. producers of metallurgical coke used for iron and steelmaking, and 100% of the nation's producers of coal chemicals, who combined have operations in 12 states. ACCCI also represents chemical processors, metallurgical coal producers, coal and coke sales agents, and suppliers of equipment, goods, and services to the industry. ACCCI has no parent corporation, and no publicly held company has 10% or greater ownership in ACCCI.

American Forest & Paper Association ("AF&PA") is the national trade association of the paper and wood products industry, which accounts for approximately 4 percent

of the total U.S. manufacturing gross domestic product. The industry makes products essential for everyday life from renewable and recyclable resources, producing over $200 billion in products annually and employing nearly 900,000 men and women with an annual payroll of approximately $50 billion. AF&PA has no parent corporation, and no publicly held company has 10% or greater ownership in AF&PA.

American Foundry Society ("AFS"), founded in 1896, is the leading U.S. based metalcasting society, assisting member companies and individuals to effectively manage their production operations, profitably market their products and services, and equitably manage their employees. AFS is comprised of more than 7,500 individual members representing over 3,000 metalcasting firms, including foundries, suppliers, and customers. AFS has no parent corporation, and no publicly held company has 10% or greater ownership in AFS.

American Fuel & Petrochemical Manufacturers ("AFPM") states that it is a national trade association whose members comprise more than 400 companies, including virtually all United States refiners and petrochemical manufacturers. AFPM's members supply consumers with a wide variety of products that are used daily in homes and businesses. AFPM has no parent corporation, and no publicly held company has 10% or greater ownership in AFPM.

American Iron and Steel Institute ("AISI") states that it serves as the voice of the North American steel industry and represents 19 member companies, including integrated and electric furnace steelmakers, accounting for the majority of U.S. steelmaking capacity with facilities located in 41 states, Canada, and Mexico, and approximately 125 associate members who are suppliers to or customers of the steel industry. AISI has no parent corporation, and no publicly held company has 10% or greater ownership in AISI.

American Public Power Association ("APPA") is the national association of publicly-owned electric utilities. APPA has no outstanding shares or debt securities in the hands of the public. APPA has no parent company. No publicly held company has a 10% or greater ownership in APPA.

American Wood Council ("AWC") is the voice of North American traditional and engineered wood products, representing over 75% of the industry that provides approximately 400,000 men and women with family-wage jobs. AWC members make products that are essential to everyday life from a renewable resource that absorbs and sequesters carbon. AWC has no parent corporation, and no publicly held company has a 10% or greater ownership interest in AWC.

Basin Electric Power Cooperative ("Basin Electric") is a not-for-profit regional wholesale electric generation and transmission cooperative owned by over 100 member cooperatives. Basin Electric provides wholesale power to member rural electric systems in nine states, with electric generation facilities in North Dakota, South Dakota, Wyoming, Montana, and Iowa serving approximately 2.9 million customers. Basin Electric has no parent companies. There are no publicly held corporations that have a 10% or greater ownership interest in Basin Electric.

Big Brown Lignite Company LLC was formerly a wholly owned subsidiary of Luminant Holding Company LLC that owned the lignite reserves associated with the Big Brown Power Plant. As a result of a Chapter 11 financial restructuring process, Big Brown Lignite Company LLC no longer exists as a separate entity and has been merged into Luminant Mining Company LLC, whose corporate disclosure statement is provided herein.

Big Brown Power Company LLC is a wholly owned subsidiary of Vistra Asset Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Vistra Operations Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Vistra Intermediate Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Vistra Energy Corp., which is a publicly held corporation. Vistra Energy Corp. is traded publicly on the OTCQX market under the symbol "VSTE." Apollo Management Holdings L.P., Brookfield Asset Management Private Institutional Capital Adviser (Canada), L.P., and Oaktree Capital Management, L.P. are publicly held entities and each have subsidiaries that own more than 10% of Vistra Energy Corp.'s stock.

Brick Industry Association ("BIA"), founded in 1934, is the recognized national authority on clay brick manufacturing and construction, representing approximately 250 manufacturers, distributors, and suppliers that historically provide jobs for 200,000 Americans in 45 states. BIA has no parent corporation, and no publicly held company has 10% or greater ownership in BIA.

Chamber of Commerce of the United States of America (the "Chamber") is the world's largest business federation. The Chamber represents 300,000 direct members and indirectly represents the interests of more than 3 million companies, state and local chambers, and trade associations of every size, in every industry sector, and from every region of the country. The Chamber has no parent corporation, and no publicly held company has 10% or greater ownership in the Chamber.

East Kentucky Power Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of East Kentucky Power Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

Electricity Consumers Resource Council ("ELCON") is the national association representing large industrial consumers of electricity. ELCON member companies produce a wide range of industrial commodities and consumer goods from virtually every segment of the manufacturing community. ELCON members operate hundreds of major facilities in all regions of the United States. Many ELCON members also cogenerate electricity as a by-product to serving a manufacturing steam requirement. ELCON has no parent corporation, and no publicly held company has 10% or greater ownership in ELCON.

Energy & Environment Legal Institute ("EELI") is a non-profit, non-governmental corporate entity organized under the laws of the Commonwealth of Virginia. EELI does not have a parent corporation. No publicly held corporation owns 10% or more of EELI's stock.

Georgia Power Company is a wholly-owned subsidiary of Southern Company, which is a publicly held corporation. Other than Southern Company, no publicly-held company owns 10% or more of Georgia Power Company's stock. Southern Company is traded publicly on the New York Stock Exchange under the symbol "SO."

Gulf Power Company is a wholly-owned subsidiary of Southern Company, which is a publicly held corporation. Other than Southern Company, no publicly-held company owns 10% or more of Gulf Power Company's stock. Southern Company is traded publicly on the New York Stock Exchange under the symbol "SO."

Hoosier Energy Rural Electric Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of Hoosier Energy Rural Electric Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

Indiana Utility Group ("IUG") is a continuing association of individual electric generating companies operated for the purpose of promoting the general interests of the membership of electric generators. IUG has no outstanding shares or debt securities in the hand of the public and has no parent company. No publicly held company has a 10% or greater ownership interest in IUG.

International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers, and Helpers, AFL-CIO ("IBB") is a non-profit national labor organization with headquarters in Kansas City, Kansas. IBB's members are active and retired

members engaged in various skilled trades of welding and fabrication of boilers, ships, pipelines, and other industrial facilities and equipment in the United States and Canada, and workers in other industries in the United States organized by the IBB. IBB provides collective bargaining representation and other membership services on behalf of its members. IBB is affiliated with the American Federation of Labor-Congress of Industrial Organizations. IBB and its affiliated lodges own approximately 60 percent of the outstanding stock of Brotherhood Bancshares, Inc., the holding company of the Bank of Labor. Bank of Labor's mission is to serve the banking and other financial needs of the North American labor movement. No entity owns 10% or more of IBB.

Luminant Big Brown Mining Company LLC was formerly a wholly owned subsidiary of Luminant Holding Company LLC that owned the mine assets utilized in connection with mining lignite used to fuel the Big Brown Power Plant. As a result of a Chapter 11 financial restructuring process, Luminant Big Brown Mining Company LLC no longer exists as a separate entity and has been merged into Luminant Mining Company LLC, whose corporate disclosure statement is provided herein.

Luminant Generation Company LLC is a wholly owned subsidiary of Vistra Asset Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Vistra Operations Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Vistra Intermediate Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Vistra Energy Corp., which is a publicly held corporation. Vistra Energy Corp. is traded publicly on the OTCQX market under the symbol "VSTE." Apollo Management Holdings L.P., Brookfield Asset Management Private Institutional Capital Adviser (Canada), L.P., and Oaktree Capital Management, L.P. are publicly held entities and each have subsidiaries that own more than 10% of Vistra Energy Corp.'s stock.

Luminant Mining Company LLC is a wholly owned subsidiary of Vistra Asset Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Vistra Operations Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Vistra Intermediate Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Vistra Energy Corp., which is a publicly held corporation. Vistra Energy Corp. is traded publicly on the OTCQX market under the symbol "VSTE." Apollo Management Holdings L.P., Brookfield Asset Management Private Institutional Capital Adviser (Canada), L.P., and Oaktree Capital Management, L.P. are publicly held entities and each have subsidiaries that own more than 10% of Vistra Energy Corp.'s stock.

Minnkota Power Cooperative, Inc. has no parent corporation. No publicly held corporation owns any portion of Minnkota Power Cooperative, Inc., and it is not a subsidiary or an affiliate of any publicly owned corporation.

Mississippi Power Company is a wholly-owned subsidiary of Southern Company, which is a publicly held corporation. Other than Southern Company, no publicly-held company owns 10% or more of Mississippi Power Company's stock. Southern Company is traded publicly on the New York Stock Exchange under the symbol "SO."

Murray Energy Corporation has no parent corporation and no publicly held corporation owns 10% or more of its stock. Murray Energy Corporation is the largest privately-held coal company and largest underground coal mine operator in the United States.

National Association of Manufacturers ("NAM") states that it is the largest manufacturing association in the United States, representing small and large manufacturers in every industrial sector and in all 50 states. Manufacturing employs nearly 12 million men and women, contributes roughly $2.17 trillion to the U.S. economy annually, has the largest economic impact of any major sector, and accounts for three-quarters of private-sector research and development. The NAM is the powerful voice of the manufacturing community and the leading advocate for a policy agenda that helps manufacturers compete in the global economy and create jobs across the United States. The NAM has no parent corporation, and no publicly held company has 10% or greater ownership in the NAM.

National Federation of Independent Business ("NFIB") is a nonprofit mutual benefit corporation that promotes and protects the rights of its members to own, operate, and grow their businesses across the fifty States and the District of Columbia. NFIB has no parent corporation, and no publicly held company has 10% or greater ownership in NFIB.

National Lime Association ("NLA") is the national trade association of the lime industry and is comprised of U.S. and Canadian commercial lime manufacturing companies, suppliers to lime companies, and foreign lime companies and trade associations. NLA's members produce more than 99% of all lime in the U.S., and 100% of the lime manufactured in Canada. NLA provides a forum to enhance and encourage the exchange of ideas and technical information common to the industry and to promote the use of lime and the business interests of the lime industry. NLA is a non-profit organization. It has no parent corporation, and no publicly held company has 10% or greater ownership in NLA.

National Mining Association ("NMA") is a non-profit, incorporated national trade association whose members include the producers of most of America's coal, metals, and industrial and agricultural minerals; manufacturers of mining and mineral processing machinery, equipment, and supplies; and engineering and consulting firms that serve the mining industry. NMA has no parent companies, subsidiaries, or affiliates that have issued shares or debt securities to the public, although NMA's individual members have done so.

National Oilseed Processors Association ("NOPA") is a national trade association that represents 12 companies engaged in the production of vegetable meals and vegetable oils from oilseeds, including soybeans. NOPA's member companies process more than 1.6 billion bushels of oilseeds annually at 63 plants in 19 states, including 57 plants which process soybeans. NOPA has no parent corporation, and no publicly held company has 10% or greater ownership in NOPA.

National Rural Electric Cooperative Association has no parent corporation. No publicly held corporation owns any portion of National Rural Electric Cooperative Association, and it is not a subsidiary or an affiliate of any publicly owned corporation.

Oak Grove Management Company LLC is a wholly owned subsidiary of Vistra Asset Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Vistra Operations Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Vistra Intermediate Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Vistra Energy Corp., which is a publicly held corporation. Vistra Energy Corp. is traded publicly on the OTCQX market under the symbol "VSTE." Apollo Management Holdings L.P., Brookfield Asset Management Private Institutional Capital Adviser (Canada), L.P., and Oaktree Capital Management, L.P. are publicly held entities and each have subsidiaries that own more than 10% of Vistra Energy Corp.'s stock.

Peabody Energy Corporation ("Peabody") is a publicly-traded company. It has no parent corporation, and no publicly traded company owns more than 10% of Peabody's stock.

Portland Cement Association ("PCA") is a not-for-profit "trade association" within the meaning of Circuit Rule 26.1(b). PCA members represent 92 percent of the U.S. cement production capacity and have facilities in all 50 states. The association promotes safety, sustainability, and innovation in all aspects of construction, fosters continuous improvement in cement manufacturing and distribution, and generally

promotes economic growth and sound infrastructure investment. PCA has no parent corporation, and no publicly held company owns a 10% or greater interest in PCA.

Sandow Power Company LLC is a wholly owned subsidiary of Vistra Asset Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Vistra Operations Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Vistra Intermediate Company LLC, which is a Delaware limited liability company and is a wholly owned subsidiary of Vistra Energy Corp., which is a publicly held corporation. Vistra Energy Corp. is traded publicly on the OTCQX market under the symbol "VSTE." Apollo Management Holdings L.P., Brookfield Asset Management Private Institutional Capital Adviser (Canada), L.P., and Oaktree Capital Management, L.P. are publicly held entities and each have subsidiaries that own more than 10% of Vistra Energy Corp.'s stock.

Southern Power Company is a wholly-owned subsidiary of Southern Company, which is a publicly held corporation. Other than Southern Company, no publicly-held company owns 10% or more of Southern Power Company's stock. Southern Company is traded publicly on the New York Stock Exchange under the symbol "SO."

Sunflower Electric Power Corporation has no parent corporation. No publicly held corporation owns any portion of Sunflower Electric Power Corporation, and it is not a subsidiary or an affiliate of any publicly owned corporation.

Tri-State Generation and Transmission Association, Inc. ("Tri-State") is a wholesale electric power supply cooperative which operates on a not-for-profit basis and is owned by 1.5 million member-owners and 44 distribution cooperatives. Tri-State issues no stock and has no parent corporation. Accordingly, no publicly held corporation owns 10% or more of its stock.

United Mine Workers of America, AFL-CIO ("UMWA") is a non-profit national labor organization with headquarters in Triangle, Virginia. UMWA's members are active and retired miners engaged in the extraction of coal and other minerals in the United States and Canada, and workers in other industries in the United States organized by the UMWA. UMWA provides collective bargaining representation and other membership services on behalf of its members. UMWA is affiliated with the America Federation of Labor-Congress of Industrial Organizations. UMWA has no parent companies, subsidiaries, or affiliates that have issued shares or debt securities to the public.

Utility Air Regulatory Group ("UARG") is a not-for-profit association of individual electric generating companies and national trade associations. UARG participates on behalf of certain of its members collectively in Clean Air Act administrative proceedings that affect electric generators and in litigation arising from those proceedings. UARG has no outstanding shares or debt securities in the hands of the public and has no parent company. No publicly held company has a 10% or greater ownership interest in UARG.

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GLOSSARY OF TERMS

Agency	United States Environmental Protection Agency
CAA	Clean Air Act
CCS	Carbon Capture and Storage
CO_2	Carbon Dioxide
DOE	United States Department of Energy
EIA	United States Energy Information Administration
EPA	United States Environmental Protection Agency
FOIA	Freedom of Information Act
IGCC	Integrated Gasification Combined Cycle
JA	Joint Appendix
MWh	Megawatt-Hour
NETL	National Energy Technology Laboratory
Reconsideration Denial	Reconsideration of Standards of Performance for Greenhouse Gas Emissions From New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units, Notice of Final Action Denying Petitions for Reconsideration, 81 Fed. Reg. 27,442 (May 6, 2016)
RTC	Response to Comments
Rule	U.S. Environmental Protection Agency, Standards of Performance for Greenhouse Gas Emissions From New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units, Final Rule, 80 Fed. Reg. 64,510 (Oct. 23, 2015)

JURISDICTIONAL STATEMENT

These consolidated cases challenge final actions of the U.S. Environmental Protection Agency ("EPA" or "Agency") under the Clean Air Act ("CAA"), published at 80 Fed. Reg. 64,510 (Oct. 23, 2015) ("Rule"), Joint Appendix ("JA") 2-152, and at 81 Fed. Reg. 27,442 (May 6, 2016) ("Reconsideration Denial"), JA4403-04. This Court has jurisdiction under CAA § 307(b)(1).[1] Petitions for review of these actions were timely filed in accordance with that provision.

STATEMENT OF ISSUES

1. Whether EPA's standards of performance for new, modified, and reconstructed steam generating units violate CAA § 111, or are arbitrary, capricious, an abuse of discretion, or otherwise unlawful;

2. Whether EPA's disparate treatment of fossil fuel-fired electric generating units is arbitrary, capricious, an abuse of discretion, or otherwise unlawful;[2]

3. Whether EPA's failure to make the requisite endangerment and significant contribution findings violates CAA § 111(b)(1)(A), or is arbitrary, capricious, an abuse of discretion, or otherwise unlawful; and

4. Whether EPA's failure to place *ex parte* communications that formed a substantial basis for the Rule in the rulemaking docket and its failure to grant

[1] The Table of Authorities provides parallel citations to the U.S. Code.

[2] Petitioners in No. 15-1469 do not join this argument.

reconsideration on this issue violates CAA § 307(d), or is arbitrary, capricious, an abuse of discretion, or otherwise unlawful.[3]

STATUTES AND REGULATIONS

This case involves regulations promulgated pursuant to a claim of authority under CAA § 111(b). The addendum reproduces the pertinent regulations and statutory provisions.

INTRODUCTION

The Rule is an unlawful attempt to address carbon dioxide ("CO_2") emissions from new, modified, and reconstructed electric generating units under section 111(b) of the CAA. In the Rule, EPA determined that the "best system of emission reduction" for new fossil fuel-fired steam generating units (which primarily combust coal) is a supercritical pulverized coal boiler employing post-combustion partial carbon capture and storage ("CCS") with permanent storage in deep underground saline formations. The Rule violates the CAA and relies on EPA's policy preferences rather than the rule of law.

Under CAA § 111, EPA may not set a performance standard unless it is "achievable" by a system of emission reduction that *EPA has shown* to be "adequately demonstrated," "taking into account … cost … and energy requirements." CAA § 111(a)(1). EPA has not met its burden. EPA based its standard on the mere hope

[3] This argument is raised only by Petitioner Energy & Environment Legal Institute.

that by effectively requiring CCS for new units, the technology would materialize ready for full-scale application on a widespread basis. The CAA may "force" the adoption only of *demonstrated* technology that is available for commercial application.

Rather than showing that its preferred technology was effective, available, and reliable, EPA relies on projects still under development that received government subsidies to promote this nascent technology and that would not be available to the generating units subject to the Rule. This violates Congress's express prohibition against relying on such test projects to conclude that a technology is demonstrated. EPA also relied on projects that were not yet operational, and on small-scale pilot projects in unrelated industries, whose performance falls far short of demonstrating that the technology could operate reliably at full commercial scale steam generating units. Moreover, EPA disregarded that storage in deep saline formations is not available in many parts of the country, violating the requirement that a performance standard be achievable nationwide and that all regulated sources have access to the identified technology. EPA also arbitrarily treated steam generating units and combustion turbines inconsistently, specifically with regard to baseload coal-fired units and gas-fired units. Taken individually or together, these problems render the Rule unlawful and deprive it of any rational basis.

The standards for modified and reconstructed coal-fired units similarly fail. EPA did not provide *any* analysis showing its standard for modified units is achievable by individual units. For reconstructed units, EPA did not find that its best system had

been demonstrated or applied anywhere, and admitted that it lacked any information on the "design factors" and "operation and maintenance practices" forming the basis of its standards.

The CAA sets specific statutory requirements that EPA did not meet. This Court has routinely rejected speculative standards under section 111(b), and it should do so here. The Rule should be vacated.

STATEMENT OF THE CASE

This case involves EPA's new source performance standards under section 111(b) of the CAA regulating CO_2 emissions from two subcategories of electric generating units: (1) fossil fuel-fired steam generating units; and (2) fossil fuel-fired stationary combustion turbines. Fossil fuel-fired steam generating units ("steam generating units") are utility boilers and integrated gasification combined cycle ("IGCC") units that primarily combust coal. Fossil fuel-fired stationary combustion turbines ("combustion turbines") primarily combust natural gas. Under section 111(b), EPA establishes performance standards categories of "sources" of air pollution. The Rule established a new category, subpart TTTT, to regulate CO_2 emissions from these two subcategories of units. 40 C.F.R. pt. 60, Subpt. TTTT, Tbls. 1, 2; *id.* § 60.5540(a).

"New source" standards can apply to three types of sources: new, modified, and reconstructed. CAA § 111(a)(2). A "new" source is one that is newly constructed. A "modified" source is an existing source that undertakes physical or operational

modifications that result in a significant increase in air pollutant emissions.[4] *Id.* § 111(a)(4). A "reconstructed" source requires, as a predicate, that an existing source replace its components to such an extent that the expected fixed capital costs of the reconstruction exceed 50 percent of the cost to construct a new source. 40 C.F.R. § 60.15(b). The Rule applies to new sources that commenced construction after January 8, 2014, and to sources that commenced modification and reconstruction after June 18, 2014. *Id.* § 60.5509(a); 79 Fed. Reg. 1430 (Jan. 8, 2014) (proposed new source standards), JA226-315; 79 Fed. Reg. 34,960 (June 18, 2014) (proposed modified and reconstructed standards), JA4055-89.

I. CAA Requirements for New Source Performance Standards

Section 111(a)(1) defines a "standard of performance" as:

> a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.

To establish section 111 standards, EPA examines "system[s] of emission reduction" that can be "appli[ed]" to regulated sources, to determine which systems have been "adequately demonstrated" for use by such sources. CAA § 111(a)(1). EPA

[4] The Rule regulates steam generating units undertaking a modification resulting in a greater than 10 percent increase in hourly CO_2 emissions. 40 C.F.R. § 60.5509(b)(7).

then determines the "best" one, based on economic, energy, and non-air quality environmental considerations. *Id.* Once EPA determines the "best" system, it "appli[es]" that system to each type of regulated source within the source category to establish a numerical "emission limitation" that the sources can "achiev[e]," *id.*, on a continuous basis, *id.* § 302(k). EPA must show that its system is available to all sources within the source category, and that application of the system will allow those sources to achieve the standard. *Id.* § 111(a)(1).

This Court has clarified that there are limits on EPA's authority to determine what technologies have been adequately demonstrated, holding that "[a]n adequately demonstrated system is one which has been shown to be reasonably reliable, reasonably efficient," *Essex Chem. Corp. v. Ruckelshaus*, 486 F.2d 427, 433 (D.C. Cir. 1973), and not "unreasonably costly," *Sierra Club v. Costle*, 657 F.2d 298, 384 (D.C. Cir. 1981). For a system to be "adequately demonstrated," it must be commercially available. *Id.* at 364; *Portland Cement Ass'n v. Ruckelshaus*, 486 F.2d 375, 391 (D.C. Cir. 1973).

Once established, performance standards must be achievable for a "new source anywhere in the nation," and must represent "the least common denominator" of emission control. Letter from Gary McCutchen, Chief, New Source Review Section, EPA, Office of Air Quality Planning & Standards, to Richard E. Grusnick, Chief, Air Division, Ala. Dep't of Envtl. Mgmt. at 1 (July 28, 1987) ("McCutchen Letter"), https://www.epa.gov/sites/production/files/2015-07/documents/crucial.pdf,

JA4629; *see also* CAA § 169(3) (new source performance standards represent the minimum standard that a new, modified, or reconstructed source must achieve under the Act's preconstruction permitting program). EPA must account for regional variability in the "industry as a whole" and any "adverse conditions" that can be reasonably anticipated. *Nat'l Lime Ass'n v. EPA*, 627 F.2d 416, 431-34, 431 & n.46 (D.C. Cir. 1980).

Consistent with these boundaries on EPA's authority, Congress limited the types of projects on which EPA may rely to establish that a system is "adequately demonstrated." In particular, the Energy Policy Act of 2005 prohibits EPA from considering projects subsidized by the U.S. Department of Energy's ("DOE") Clean Coal Power Initiative to support a finding of adequate demonstration. Energy Policy Act of 2005, Pub. L. No. 109-58, § 402(i), 119 Stat. 594, 753 (2005) (codified at 42 U.S.C. § 15962(i)).

II. Steam Generating Unit Standards

A. New Units

In the Rule, EPA determined that "a new highly efficient supercritical pulverized coal (SCPC) boiler implementing partial CCS," involving post-combustion capture and permanent storage of the CO_2 in "deep saline formations" underground, constituted the "best system of emission reduction" for new steam generating units. 80 Fed. Reg. at 64,545, 64,590, JA37, 82. Partial CCS with sequestration in deep saline formations is a complex process. Post-combustion capture involves passing flue gas

through an amine solution, which chemically adsorbs the CO_2. The solution is then heated to strip out the adsorbed CO_2 from the flue gas stream. EPA, Technical Support Document, Literature Survey of Carbon Capture Technology at 5-8 (July 10, 2015), EPA-HQ-OAR-2013-0495-11773, JA3126-29; *see also id.* at 4-5 (separation and capture of CO_2 involves solvents, solid sorbents, and membrane-based technologies), JA3125-26. Because the captured CO_2 is sparse in volume and at a low atmospheric pressure, it must be compressed, using large, energy-intensive compressors, to make it suitable for pipeline transport. *Id.* at 19, JA3140.

Pipelines must be constructed, purchased, or otherwise made accessible to transport the CO_2 possibly hundreds of miles to geologic formations suitable for sequestration. *See id.* at 22-23, JA3143-44. Finally, deep injection wells (typically a mile or more below the surface) must be drilled to sequester the CO_2 and then managed to ensure permanent sequestration. *Id.* at 2-3, JA3123-24. These steps are costly and energy-intensive. *See id.* at 5, 19, JA3126, 3140; Utility Air Regulatory Group ("UARG"), Comments on Standards of Performance for Greenhouse Gas Emissions From New Stationary Sources: Electric Utility Generating Units; Proposed Rule, 79 Fed. Reg. 1430 (Jan. 8, 2014), at 44-45, 58-62 (May 9, 2014) ("UARG Comments") (discussing the substantial costs to install and operate CCS), and Attach. 5, J. Edward Cichanowicz, A Review of Carbon Capture and Sequestration (CCS) Technology at 5-1 to 5-10 (June 25, 2012) ("Cichanowicz CCS Technology Review"), EPA-HQ-OAR-2013-0495-9666, JA1615-16, 1629-33, 1712-21.

Applying its "best system," EPA established a performance standard for new steam generating units of 1,400 pounds of CO_2 per megawatt hour gross ("lb CO_2/MWh"). 40 C.F.R. pt. 60, Subpt. TTTT, Tbl. 1. EPA concluded that the cost of the standard is "reasonable" and "that the impacts on the industry as a whole are negligible," 80 Fed. Reg. at 64,563-64, JA55-56, but only because EPA believes "few new [steam generating units] will be constructed over the coming decade and … those that are built would have CCS" anyway, *id.* at 64,563, JA55.

EPA based its analysis that the 1,400 lb CO_2/MWh standard is "achievable" nationwide primarily on DOE engineering estimates of the capabilities of a *hypothetical* unit published shortly before the Rule was promulgated. *Id.* at 64,573, JA65; EPA, Achievability of the Standard for Newly Constructed Steam Generating EGUs at 1 (July 31, 2015), EPA-HQ-OAR-2013-0495-11771 ("Achievability TSD") (citing DOE, National Energy Technology Laboratory ("NETL"), Cost and Performance Baseline for Fossil Energy Plants Supplement: Sensitivity to CO_2 Capture Rate in Coal-Fired Power Plants (June 22, 2015), DOE/NETL-2015-1720, EPA-HQ-OAR-2013-0495-11340 ("NETL June 2015 Supplement Report"), JA3462-87), JA2963. The estimates modeled the ability of a different system (not EPA's "best system") to achieve emission reductions—one based on much more expensive (and less-used) ultra-supercritical technology rather than the supercritical boiler in EPA's system. DOE, NETL, Cost and Performance Baseline for Fossil Energy Plants, Vol. 1a: Bituminous Coal (PC) and Natural Gas to Electricity, Rev. 3 at 22 (July 6, 2015),

DOE/NETL-2015/1723, EPA-HQ-OAR-2013-0495-11341 ("NETL July 2015 Report"), JA3513. DOE cautioned against using the estimates, noting that "[a]ctual average annual emissions from operating plants are likely to be higher than the design emissions rates shown." NETL June 2015 Supplement Report at 1, JA3468.

B. Modified Units

EPA's analysis and support for its standards for modified steam generating units were sparse. *See* 80 Fed. Reg. at 64,597-600, JA89-92. The Agency identified the "best system of emission reduction" for these units as "each affected unit's own best potential performance as determined by that unit's historical performance," *id.* at 64,597, JA89, and established a unit-specific standard equal to each unit's "[b]est annual performance (lb CO_2/MWh-g) during the time period from 2002 to the time of modification," *id.* at 64,547, JA39.

C. Reconstructed Units

EPA's analysis for reconstructed steam generating units was also minimal, encompassing about one page. *Id.* at 64,600-01, JA92-93. EPA determined that, regardless of existing boiler design, the best system of emission reduction is the use of a boiler with supercritical steam conditions for large units (those with a heat input greater than 2,000 MMBtu/h) and the use of a boiler with subcritical steam conditions for small units (those with a heat input 2,000 MMBtu/h or less). *Id.* at 64,600, JA92. EPA then established a performance standard of 1,800 lb CO_2/MWh gross for large

units and 2,000 lb CO_2/MWh gross for small units. 40 C.F.R. pt. 60, Subpt. TTTT, Tbl. 1.

EPA did not find that either boiler type had been demonstrated or applied anywhere as a "system of emission reduction" for reconstructed units. Nor did EPA identify any steam generating unit that has ever converted from subcritical steam conditions to supercritical when "the boiler was not originally designed to do so." 80 Fed. Reg. at 64,546, JA38. EPA also did not provide any evidence that its performance standards are achievable through application of subcritical or supercritical boiler design, admitting that it "does not have information" regarding the "design factors" and "operation and maintenance practices" that form the basis of the standards. EPA, Office of Air Quality Planning & Standards, Best System of Emissions Reduction (BSER) for Reconstructed Steam Generating Units and Integrated Gasification Combined Cycle (IGCC) Facilities at 7 (June 2014), EPA-HQ-OAR-2013-0603-0046 ("Reconstruction TSD"), JA4240.

III. Combustion Turbine Standards

A. New and Reconstructed Units

To meet electricity demand, "baseload" electric generating units operate over long periods of time at a high capacity to meet relatively steady (or baseload) demand for power, while non-baseload units operate to serve "peak demand" for electricity. For new and reconstructed baseload combustion turbines that combust non-solid

fuels like natural gas, EPA established a standard of 1,000 lb CO_2/MWh gross,[5] 40 C.F.R. pt. 60, Subpt. TTTT, Tbl. 2, based on the capabilities of "efficient natural gas combined cycle [("NGCC")] technology." 80 Fed. Reg. at 64,515, JA7. For non-baseload units, EPA established a standard of 120 lb CO_2/MMBtu based on the predominant use of natural gas as a "clean fuel." *Id.* at 64,601, JA93.

B. Modified Units

EPA did not finalize its proposed standard for existing combustion turbines that undertake modifications because it found that few such sources were likely to exist. *Id.* at 64,515, JA7.

IV. Endangerment and Significant Contribution Findings

The CAA mandates that, before proposing performance standards, EPA must determine that stationary sources from a source category "cause[] or contribute[] significantly" to pollution that EPA determines "may reasonably be anticipated to endanger public health or welfare." CAA § 111(b)(1)(A). Congress thus limited section 111 regulation to "endanger[ing]" air pollution emitted by "significant[]" "contribut[ors]" to that pollution.

Despite this statutory requirement, EPA stated it need not make such a determination because it previously made an endangerment determination for some parts of the source category back in 1971 for *other* pollutants. 80 Fed. Reg. at 64,529-

[5] Such sources may elect to comply instead with a 1,030 lb CO_2/MWh standard based on net energy output. 40 C.F.R. pt. 60, Subpt. TTTT, Tbl. 2.

30, JA21-22. Second, and "in the alternative," EPA relied on a prior endangerment finding it made in 2009 for a collection of six greenhouse gases emitted from new motor vehicles. *Id.* at 64,532, JA24. Finally, EPA maintained that "information and conclusions" contained in the Rule "should be considered to constitute the requisite endangerment finding." *Id.* at 64,530, JA22.

V. Denial of Reconsideration Petitions

Six entities asked EPA to reconsider certain aspects of the Rule that EPA had not proposed. *See* 81 Fed. Reg. at 27,443, JA4404. EPA denied five of the six petitions "as not satisfying one or both of the statutory conditions for compelled reconsideration," and deferred action on one petition. *Id.*

SUMMARY OF ARGUMENT

Congress mandated that EPA establish performance standards that sources can achieve through application of the "best system of emission reduction," taking into account cost and energy requirements. CAA § 111(a)(1). EPA's Rule, which established performance standards for new, modified, and reconstructed steam generating units and combustion turbines, is unlawful.

With regard to the standard for new steam generating units, the system of emission reduction EPA identified (partial CCS with sequestration of CO_2 in deep saline formations) is not adequately demonstrated. EPA improperly relied on projects receiving federal subsidies in violation of the Energy Policy Act of 2005. The only project on which EPA relied that did not receive *U.S.* subsidies is a small Canadian

plant, heavily subsidized by the Canadian government and riddled with problems. Moreover, there is no steam generating unit in the world that applies all of the components of EPA's "best system," and thus the system could not have been adequately demonstrated. Finally, EPA failed to take regional variability into account, as it did not—and cannot—establish that CO_2 sequestration in deep saline formations (a key part of its system) is available throughout the country.

Even if EPA's system were adequately demonstrated, it could not be considered the "best" system because of its excessive cost and energy requirements. EPA separately failed to make the required showing that the new source standard for steam generating units is achievable because it based its analysis on a different generating technology than that reflected in its "best system" and ignored many of the factors that influence units' CO_2 emissions.

Additionally, EPA reached a conclusion for baseload gas-fired units that should have applied with equal force for baseload coal-fired units were it not for EPA's policy objectives. Such disparate treatment without adequate justification independently renders the Rule arbitrary and capricious.

The performance standards for modified and reconstructed steam generating units are also unlawful because there is no evidence in the record that they can be achieved. The standard for reconstructed units further fails because it has not been adequately demonstrated.

The CAA requires EPA to make findings of endangerment and significant contribution, which EPA failed to do. This failure is fatal to the Rule. Finally, EPA improperly denied petitions for reconsideration of the Rule.

STANDING

Petitioners have standing to challenge the Rule. The Rule regulates new, modified, and reconstructed fossil fuel-fired generating units. Many petitioners own and operate fossil fuel-fired electric generating units or have members who own or operate them. These petitioners plan to continue to rely on those resources in the future, through both the construction of new fossil fuel-fired generating units that would be subject to the Rule and the upgrade of existing fossil fuel-fired generating units that could be found to be subject to the modification and reconstruction provisions of the Rule. *See Lujan v. Defenders of Wildlife*, 504 U.S. 555, 561-62 (1992) (when a party is the object of government regulation "there is ordinarily little question that the [governmental] action … has caused him injury"). The Rule significantly increases the costs associated with designing, constructing and operating such units and constrains available options.

The other petitioners also have standing. The Rule effectively precludes the construction of new steam generating units and shortens the lives of existing units, which may not be able to be modified without triggering the performance standard. This has the effect of harming the coal company petitioners by diminishing demand for coal in the electric generating sector. *See* Declaration of Ryan Murray (Attachment

A). This also harms labor union petitioners whose members mine coal and construct and maintain new steam generating units.

Petitioners also have standing because the Rule is a legal prerequisite for the Clean Power Plan, 80 Fed. Reg. 64,662 (Oct. 23, 2015), JA5117, which regulates existing fossil fuel-fired generating units under CAA section 111(d). CAA § 111(d)(1)(A)(ii). Petitioners who are injured by the Clean Power Plan, most of whom are also petitioners challenging that rule before this Court,[6] have standing to challenge this Rule because the injury imposed on them by the Clean Power Plan would be redressed by vacatur of this Rule.

STANDARD OF REVIEW

The Court must set aside EPA action under the CAA if it is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." CAA § 307(d)(9); 5 U.S.C. § 706. Agency action is invalid if the agency failed to consider an important aspect of a problem, offered an explanation for its decision that runs counter to the evidence, or is so implausible that the decision could not be ascribed to a difference in view or the product of agency expertise. *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983).

[6] *West Virginia v. EPA*, No. 15-1363 (and consolidated cases) (D.C. Cir.).

ARGUMENT

I. The New Steam Generating Unit Standard Is Unlawful.

Section 111 authorizes EPA to establish "standards of performance for new sources" within a listed source category. CAA § 111(b)(1)(B). Congress mandated that such standards define a "degree of emission limitation" that is "achievable" by sources "appl[ying]" the "best system of emission reduction" that EPA has shown is "adequately demonstrated," "taking into account the cost … and energy requirements" of the system. *Id.* § 111(a)(1). In the Rule, EPA identified a supercritical pulverized boiler using partial CCS, with sequestration of CO_2 in deep saline formations, as the "best system of emission reduction" for new units. But EPA's system is not adequately demonstrated, nor is it cost-effective or efficient. Moreover, EPA's performance standard of 1,400 lb CO_2/MWh cannot be achieved by new steam generating units applying that system.

A. EPA's System Is Not "Adequately Demonstrated."

EPA failed to show that its system is "adequately demonstrated." An "adequately demonstrated" system is one that is more than merely "feasible." *Sierra Club*, 657 F.2d at 364. It must be commercially "available" to be "install[ed] in new plants," *Portland Cement*, 486 F.2d at 391, "reasonably efficient," *Essex Chem.*, 486 F.2d at 433, and not "unreasonably costly," *Sierra Club*, 657 F.2d at 384. While EPA may make projections "based on *existing* technology," *Portland Cement*, 486 F.2d at 391 (emphasis added), that authority is limited to situations where a technology is

"available," even if not yet in routine commercial use, *id.* And that latitude is "narrowed" when the standard applies immediately, as it does here. *Id.* at 391-92. As EPA's counsel explained in a recent oral argument, the "adequately demonstrated" requirement is a "constraint[] embedded within Section 111 on EPA's authority" that provides that "any emission reduction system that isn't already in place and successful within an industry can't be used" for setting performance standards. Tr. of Oral Arg. at 61, *West Virginia v. EPA*, No. 15-1363 (D.C. Cir. Sept. 27, 2016), ECF No. 1640958. *Id.*

An adequate demonstration finding may not be based on "mere speculation or conjecture" that a system will emerge that will be both commercially available and technologically feasible to apply to all regulated sources nationwide. *Lignite Energy Council v. EPA*, 198 F.3d 930, 934 (D.C. Cir. 1999). Thus, a system is not "adequately demonstrated" when its use is supported by data only from "prototype" or "pilot scale" demonstration facilities, or for only one coal type.[7] *Sierra Club*, 657 F.2d at 341 n.157.

[7] For example, EPA provided a cursory response to concerns regarding the impacts of different coal types, particularly the unique challenges associated with combusting lignite coal. *See* Luminant, Comments on EPA's Proposed Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units, 79 Fed. Reg. 1430 (January 8, 2014) at 15-16 (May 9, 2014), EPA-HQ-OAR-2013-0495-9777 ("Luminant Comments"), JA1419-20. EPA noted that "additional cost would be entailed," if a unit used lignite, but asserted without explanation that those costs "remain reasonable." 80 Fed. Reg. at 64,574, JA66.

1. EPA Improperly Relied on Government-Subsidized Projects To Support Its Determination.

Section 402(i) of the Energy Policy Act of 2005 expressly prohibits EPA from considering projects subsidized by the DOE's Clean Coal Power Initiative to support an "adequately demonstrated" finding. 42 U.S.C. § 15962(i). Similarly, section 1307(b) of the Energy Policy Act of 2005 prohibits EPA from considering, as part of its section 111 assessment, technology used at a facility that is allocated a Qualifying Advanced Coal Project Tax Credit under section 48A of the Internal Revenue Code.[8] 26 U.S.C. § 48A(g).

As discussed in greater detail in Section I.B.3. of State Petitioners' Opening Brief, EPA's best system for new steam generating units unlawfully relies on projects receiving Energy Policy Act development subsidies. Congress's express prohibition makes sense because the purpose of these government subsidies is to foster the research and development of incipient technologies that are not yet adequately demonstrated. *See* 42 U.S.C. § 15962(a) (subsidies available only for projects that "advance efficiency, environmental performance, and cost competitiveness *well beyond* the level of technologies that are *in commercial service* or *have been demonstrated* on a scale" that DOE "determines is sufficient to demonstrate that commercial service is *viable* as of [the date of enactment]") (emphases added). When a technology needs such

[8] Section 421(a) of the Energy Policy Act of 2005 also amends the Energy Policy Act of 1992 by adding a pair of similar provisions to that program. Pub. L. No. 109-58, § 421(a), 119 Stat. 594, 759-60 (2005).

subsidies, it cannot be considered to be "adequately demonstrated" for purposes of section 111.[9] A new source performance standard requires a track record of proven success; it is not a license for experimentation.

Yet, all of the full-scale utility projects on which EPA relied received U.S. government subsidies, with the exception of one: the SaskPower Boundary Dam project in Canada. But the Boundary Dam project is also heavily subsidized, receiving C$240 million from the Canadian federal government and matching funds from the provincial government. Budget Implementation Act, 2008, S.C. 2008, c. 28, § 138 (Can.). These subsidies were the "key component of the business case" for proceeding with the project at all. International Energy Agency, Integrated Carbon Capture and Storage Project at SaskPower's Boundary Dam Power Station at 30 (Aug. 2015), http://www.ieaghg.org/docs/General_Docs/Reports/2015-06.pdf, JA5066. Like the U.S. experimental sites, the Boundary Dam project would not have been constructed without government subsidies, *see id.* at 24 ("Federal funding was the catalyst for converting SaskPower's clean coal power concept into a fully engineered design."), JA5063, and therefore could not be a basis for concluding that CCS is "demonstrated."

Indeed, in the Clean Power Plan, EPA stated that CCS was experimental and heavily subsidized when it *rejected* a best system of emission reduction that included CCS. EPA explained that CCS is "an emerging technology" that "*may* become

[9] Although CCS is a promising new technology that warrants continued government support, EPA has failed to meet its statutory mandate under section 111.

economically viable in the future." EPA, Regulatory Impact Analysis for the Clean Power Plan Final Rule at 2-27, 2-28 (Aug. 2015), EPA-452/R-15-003, EPA-HQ-OAR-2013-0602-37105 (emphasis added), JA5192, 5193. EPA added that "[a]ll of these units with CCS have received substantial subsidies to further develop and demonstrate the feasibility of CCS at a commercial scale, and the costs of these new units with CCS are not indicative of anticipated future costs of new or retrofit CCS units." *Id.*

EPA's substantial reliance on heavily subsidized and pilot projects proves that its chosen system is not adequately demonstrated within the meaning of section 111. *See* State Petitioners' Brief at II.A.; *see also Motor Vehicle Mfrs. Ass'n*, 463 U.S. at 43 (agency action is "arbitrary and capricious if the agency has relied on factors which Congress has not intended it to consider").

2. Even If the Subsidized Projects Could Have Been Considered, EPA Did Not Establish Its System Is Adequately Demonstrated.

Even if EPA could have relied on subsidized projects, it still did not—and could not—show that its "best system of emission reduction" for new steam generating units was adequately demonstrated.

a. EPA's Chosen System Has Never Been Applied or Demonstrated at Commercial-Scale.

EPA's best system of emission reduction for new steam generating units consists of various components: (i) a new supercritical pulverized coal boiler; (ii) a carbon capture system to partially separate the CO_2 from the rest of the flue gas; (iii)

transportation of the captured CO_2 to a disposal site; and (iv) permanent sequestration of the CO_2 in "deep saline formations" underground. *See* 80 Fed. Reg. at 64,545, 64,590, JA37, 82. EPA's "adequately demonstrated" analysis unlawfully focuses on establishing that these *individual* components of its system are "*technically* feasible." *See, e.g.*, *id.* at 64,538, 64,540, 64,547, 64,548, JA30, 32, 39, 40 (emphasis added). EPA did not point to *a single example* of a steam generating unit anywhere in the world applying *all* of the components of its best system together.[10] *See id.* at 64,548-52, JA40-44 (referencing only projects with individual components of the system). EPA's conspicuous failure to cite any steam generating unit applying an integrated system of post-combustion CO_2 capture with deep saline storage renders its finding of adequate demonstration indefensible.

EPA's view that it need show only that the *individual components* of the system have been demonstrated independently,[11] *id.* at 64,556, JA48, runs counter to the

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[10] As discussed *infra* Section I.A.2.b., the individual components of EPA's system are also not adequately demonstrated.

[11] EPA falsely claimed its system has been applied as an integrated system at Boundary Dam. 80 Fed. Reg. at 64,556, JA48. Boundary Dam has to date disposed of its captured CO_2 by selling it for enhanced oil recovery operations, while relying on deep saline storage only as a backup alternative. *See* EPA, Standards of Performance for Greenhouse Gas Emissions from New Stationary Sources: Electric Utility Generating Units, Response to Comments on January 8, 2014 Proposed Rule ("RTC"), Ch. 6, Standards for Fossil Fuel-fired Electric Utility Steam Generating Units (Boilers and Integrated Gasification Combined Cycle Units) at 6-47 (Aug. 3, 2014), EPA-HQ-OAR-2013-0495-11865, JA2547. There is no experience with that "alternative." This fundamentally distinguishes Boundary Dam from EPA's system, where the CO_2 is to be transported to and stored in deep saline formations.

plain language of section 111, which states that the "best *system* of emission reduction"—not its component parts separately—must be "adequately demonstrated." CAA § 111(a)(1) (emphasis added). It also runs counter to experience with other control technologies, as recognized by a federal advisory committee to the Secretary of Energy. *See* UARG, Comments on Carbon Pollution Standards for Modified and Reconstructed Stationary Sources: Electric Utility Generating Units; Proposed Rule (Oct. 16, 2014) ("UARG Modified/Reconstructed Comments"), Attach. J, Nat'l Coal Council, Reliable and Resilient–The Value of Our Existing Coal Fleet: An Assessment of Measures to Improve Reliability & Efficiency While Reducing Emissions at 78 (May 2014) ("NCC Report"), EPA-HQ-OAR-2013-0603-0215 ("a control technology can be affordable and reliable only with multiple applications that show how to integrate the components"), JA4172. EPA's argument is akin to saying that, because a person can touch her toes, stand on one foot, drink a glass of water, and spin in a circle, she necessarily is able to do all these things *simultaneously*. Under section 111, EPA must show that all of the components of the system are demonstrated as an integrated whole for full-scale application, and that integrated whole must be "reasonably reliable" and "reasonably efficient." *Essex Chem.*, 486 F.2d at 433. EPA did not even attempt to do so here.

Indeed, prior to this rulemaking, EPA took the position that CCS may not be "a technically feasible" option because of challenges with "integration of the CCS components," even if those components were determined to be "generally available

from commercial vendors." EPA, PSD and Title V Permitting Guidance for Greenhouse Gases at 36 (Mar. 2011), EPA-457/B-11-001, https://www.epa.gov/sites/production/files/2015-12/documents/ghgpermittingguidance.pdf, JA4781. EPA "recognize[d] the significant logistical hurdles that the installation and operation of a CCS system presents and that sets it apart from other add-on controls," particularly the lack of "an existing reasonably accessible infrastructure in place to address waste disposal and other offsite needs." *Id.* Other hurdles EPA previously cited include "obtaining contracts for offsite land acquisition," "the need for funding" of offsite sequestration sites, "timing of available transportation infrastructure," and "developing a site for secure long term storage." *Id.* The Global CCS Institute and the International Energy Agency have confirmed the difficulties of integration. UARG Comments, Suppl. Material No. 1, Global CCS Institute, The Global Status of CCS 2013 at 10 (2013), EPA-HQ-OAR-2013-0495-9666 ("2013 Global CCS Report") ("key technical challenge for widespread CCS deployment is the integration of component technologies into successful large-scale demonstration projects"), JA1733; UARG Comments, Suppl. Material No. 4, International Energy Agency, Technology Roadmap Carbon Capture and Storage at 5 (2013 ed.), EPA-HQ-OAR-2013-0495-9666 ("2013 IEA Roadmap") ("largest challenge for CCS deployment is the

integration of component technologies into large-scale demonstration projects"), JA1933.[12]

The record confirms that integrating these systems and applying them at a new steam generating unit involves coordinating a large number of complex processes. For example, the Boundary Dam project involves 125 separate sub-systems. UARG Comments, Attach. 2, J. Edward Cichanowicz, Status of Carbon Capture and Sequestration (CCS) Demonstrations in Response to Proposed New Source Performance Standards for CO_2 at 7-5 (May 2, 2014) ("2014 Cichanowicz CCS Report"), EPA-HQ-OAR-2013-0495-9666, JA1687. These processes must work together seamlessly while meeting variable (and sometimes unpredictable) electricity demand. *Id.* Integration also involves addressing chemical reactions between the CO_2 capture system and other air pollutants in the steam unit's flue gas, and minimizing any resulting byproduct contamination. *Id.*; *see also* RTC at 6-26 ("some capture systems may require additional control equipment to be installed upstream to remove flue gas components that may degrade the capture solvents"), JA2526. Boundary Dam, for example, experienced unplanned outages to address problems with integration of emissions control technology upstream of the CCS system, in addition to other design flaws and operational problems. *See infra* Section I.A.2.b.2.; EPA, Basis

[12] None of these challenges is a reason not to pursue or continue to develop CCS, but they are reasons why EPA has violated section 111's requirements based on currently available data.

for Denial of Petitions to Reconsider the CAA Section 111(b) Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Fossil Fuel-Fired Electric Utility Generating Units at 8 (Apr. 2016), EPA-HQ-OAR-2013-0495-11918 ("Reconsideration Denial Basis"), JA4417.

In response to these problems, EPA claimed that it must only identify the obstacles to full integration of the system's components and "give plausible reasons for its belief that the industry will be able to solve those problems." 80 Fed. Reg. at 64,557, JA49. But speculation about how industry might be able to address acknowledged problems is not the statutory test for "adequately demonstrated." Even if it were, EPA failed to explain how the obstacles it has identified will be overcome. EPA's express recognition that full integration of its "best system" remains uncertain in light of unresolved "problems" confirms that the system is not adequately demonstrated.

b. EPA Did Not Show that the Individual Components of Its System Are Adequately Demonstrated for Utility-Scale Steam Generating Units.

Even if EPA could have shown that its system is adequately demonstrated merely by evaluating its individual components, EPA failed to show that the key components of its best system of emission reduction—post-combustion capture and deep saline storage—are adequately demonstrated in utility-scale steam generating unit applications. EPA's claim that these two components are, individually, adequately demonstrated represents more "crystal ball inquiry." *Portland Cement*, 486 F.2d at 391.

1) EPA Did Not Establish that CO_2 Sequestration in Deep Saline Formations Is Available Throughout the Country.

EPA failed to meet the "adequately demonstrated" test because its system is based on a technology—sequestration in deep saline formations—that is not available in many States. Because a new source performance standard is nationally applicable, applying to every new source in a category no matter where it is built, the standard must be based on a system that has been adequately demonstrated for application by any new source throughout the country to which the standard would apply. *See Sierra Club*, 657 F.2d at 330 (water-dependent technology cannot be a nationwide "best system" due to "disastrous" effects in arid West); *Nat'l Lime*, 627 F.2d at 441-43 (rejecting standard that, *inter alia*, did not account for regional variability); Luminant Comments at 26-28 (identifying concerns about the feasibility of CCS due to the increase in water consumption in western states, such as Texas), JA1430-32.

EPA admitted that eleven States—more than one-fifth of the nation—possess no identified deep saline storage capacity. 80 Fed. Reg. at 64,576, JA68. This lack of capacity puts these States at a competitive disadvantage in attracting new development and renders the Agency's system of emission reduction unfit to serve as the basis for a nationally applicable minimum standard. *See Sierra Club*, 657 F.2d at 325 (performance standards cannot "give a competitive advantage to one State over another").

Nor does EPA's claim that the remaining thirty-nine States possess deep saline storage capacity help its case, because EPA did not examine either the volume of

capacity available in these States or the suitability of that capacity for permanent, secure sequestration of CO_2. According to the U.S. Geological Survey, the vast majority of accessible storage resources—66 percent—is confined to the Coastal Plains region, with 91 percent of that storage located in the Gulf Coast basin. U.S. Geological Survey, National Assessment of Geologic Carbon Dioxide Storage Resources – Results at 3, 15 (Version 1.1, Sept. 2013), Circular 1386, EPA-HQ-OAR-2013-0495-11561, JA3806, 3818. Another 10 percent of the nation's storage capacity is confined to Alaska's North Slope. *Id.* at 3, JA3806. The urban East coast contains less than 1 percent of the nation's deep saline storage capacity. *Id.* at 16, JA3819.

Moreover, EPA recognized that accessible formations may not be suitable for permanent storage, even in States with significant potential deep saline capacity. 80 Fed. Reg. at 64,573 ("sequestration siting issues are of course site-specific, and raise individual issues"), JA65; *see also id.* at 64,581, JA73; RTC at 6-54 (storage estimates are only "an initial assessment … and additional site specific work would be needed to demonstrate that a specific site meets the requirements for safe and secure storage"), JA2554. Determining a deep saline location's suitability for sequestration requires extensive site evaluations that can take ten or more years and several hundred million dollars. 2013 Global CCS Report at 15, JA1738; 2013 IEA Roadmap at 17, 21, JA1945, 1949.

EPA suggested that units in areas with inadequate deep saline capacity can simply transport captured CO_2 by pipeline to other locations. 80 Fed. Reg. at 64,581,

JA73. But having failed to investigate where suitable sites might be, EPA cannot show that pipeline transport is feasible, much less "adequately demonstrated." Existing and currently planned CO_2 pipelines are confined to a small area of the country, leaving much of the West, Midwest, and Atlantic coast unable to transport captured CO_2. *Id.* at 64,577, Fig. 1, JA69. Without any information on where such infrastructure would have to be located, EPA could not—and did not—account sufficiently for the costly and time-consuming infrastructure development required to serve new units in areas without deep saline formations when it asserted that its best system is adequately demonstrated for units located anywhere in the country. *See id.* at 64,572, JA64 (assuming maximum CO_2 pipeline length of 62 miles for new unit).

Notably, none of the commercial-scale steam generating unit projects cited by EPA that capture or plan to capture CO_2 in the next five years relies on deep saline formations for CO_2 storage.[13] *See id.* at 64,549-54, JA41-46. Instead, each of these projects sells (or plans to sell) captured CO_2 to third parties for use in enhanced oil recovery or for other niche uses that cannot accommodate the volume of CO_2 that will need to be captured by units subject to the Rule. *Id.* Enhanced oil recovery involves different technological systems than those used in deep saline sequestration and can be performed at even fewer sites. DOE, Office of Fossil Energy, NETL, The

[13] And, as discussed *infra* in Section I.A.2.b.2., none of these projects demonstrate the availability of CCS even apart from the fact that they do not permanently sequester CO_2 in deep saline formations.

United States 2012 Carbon Utilization and Storage Atlas at 25, 27 (4th ed. Dec. 2012), EPA-HQ-OAR-2013-0495-11410, JA3356, 3358. Most importantly, injecting CO_2 for enhanced oil recovery can improve a project's economics; while a steam unit's owner must *pay* to dispose of CO_2 in a deep saline formation, it will *profit* by selling CO_2 for enhanced oil recovery. 80 Fed. Reg. at 64,566, JA58. Thus, any industry experience with enhanced oil recovery cannot establish that CO_2 storage in deep saline formations is reasonably reliable and efficient, and not unreasonably costly. *Essex Chem.*, 486 F.2d at 433; *Sierra Club*, 657 F.2d at 343.

In support of the Rule, EPA cited three, large-scale sequestration projects—none of which is integrated with carbon capture at steam units. Moreover, two of those projects—In Salah and Snøhvit—suffered serious setbacks associated with the attempted CO_2 injection and sequestration and had to cease injection earlier than planned due to unforeseen problems created by injection pressures, including the development of fractures in the cap rock at In Salah that threatened to release injected CO_2 to the atmosphere. UARG Comments at 56, JA1627. The evidence thus undermines rather than supports EPA.

2) EPA Did Not Establish that Post-Combustion CO_2 Capture Was Adequately Demonstrated for Steam Generating Units.

In support of its conclusion that post-combustion CO_2 capture was adequately demonstrated for steam generating units, EPA pointed to *only one* small steam unit employing post-combustion capture (Boundary Dam). 80 Fed. Reg. at 64,549-50,

JA41-42). That unit's experience only emphasizes the technology's unsuitability. Every other project EPA cited was pilot-scale, outside the utility sector, or under construction.

Boundary Dam—Boundary Dam's characteristics make it inappropriate to generalize its experience with post-combustion capture to other steam units. To begin, Boundary Dam is heavily subsidized by the Canadian government, which as described above, Section I.A.1., makes it inappropriate support for EPA's "adequately demonstrated" conclusion. *See* UARG Comments 49, 128-30, JA1620, 1644-46.

Reflecting the still-developing nature of the technology, the record shows that Boundary Dam has been plagued by numerous problems involving the post-combustion capture process (e.g., contamination and degradation of amine solvent due to temperature and fly ash). *See* Reconsideration Denial Basis at 8, JA4417. In its first year of operation, the unit's post-combustion capture system operated *only 40 percent of the time*, and it never sustained its design CO_2 capture rate. Utility Air Regulatory Group, Petition for Reconsideration of Final Rule at 6 (Dec. 22, 2015), EPA-HQ-OAR-2013-0495-11894 ("UARG Reconsideration Petition"), JA4502. The carbon capture system was not expected to be fully operational until at least a year past the Rule's promulgation. *Id.* at 7, JA4503. Recognizing that at least "a year of stable operation" near maximum performance is needed to evaluate the system's performance, the owner delayed its planned decision on whether to implement post-combustion capture at its other units until the end of 2017. *Id.* Because Boundary

Dam continues to struggle, it has been "taken down" on multiple occasions in 2016 "due to issues with the chemistry of the capture process," SaskPower, BD3 Status Update: June 2016 (July 7, 2016), http://www.saskpower.com/about-us/blog/bd3-status-update-june-2016/, JA5217, and to address "fundamental, operationally crippling problems," UARG Reconsideration Petition, Ex. G, SaskPower Admits to Problems at First "Full-Scale" Carbon Capture Project at Boundary Dam Plant (Oct. 30, 2015), JA4519.

Boundary Dam is also fundamentally different from the utility boilers to which the system applies in the Rule. In contrast to new utility boilers, which typically have a capacity of 500 MW or more and burn bituminous or subbituminous coals, 2014 Cichanowicz CCS Report at 7-2 to 7-4, JA1684-86, Boundary Dam is a smaller, 110 MW unit and combusts lignite coal, 80 Fed. Reg. at 64,549, JA41.[14] And it is sited near existing CO_2 pipelines and enhanced oil recovery operations that enable the sale of the CO_2. EPA did not explain how these circumstances would allow it to draw conclusions regarding the very different conditions that characterize regulated steam units in the U.S., *see Nat'l Lime*, 627 F.2d at 433, and its best system of emission reduction based on sequestration in deep saline formations.

[14] Larger units generate more CO_2 emissions, necessitating larger-scale equipment (with higher costs, greater technical complexity, and energy needs) to capture those emissions. 2014 Cichanowicz CCS Report at 7-2 to 7-4, JA1684-86.

Despite the overwhelming evidence of Boundary Dam's problems, EPA saw fit to rely on unverified statements by Boundary Dam's owners, *see* 80 Fed. Reg. at 64,549, 64,573, JA41, 65, to conclude that "the plant is operating on a highly successful upward trajectory." Reconsideration Denial Basis at 12, JA4421. First, being on an "upward trajectory" is meaningless; a student who scores 20 percent on his first spelling test and then scores 25 percent on his second one is on an "upward trajectory." Second, a single, heavily-subsidized Canadian plant's "upward trajectory" in utilizing parts of EPA's "best system" does not establish that these parts of the system, much less an integrated system that includes *different* components, are "adequately demonstrated" for application across the U.S. industry. It confirms the opposite.

Other Post-Combustion Capture Projects—The only evidence besides Boundary Dam that EPA cited in support of adequate demonstration was a handful of: (i) *small-scale technology* validation or demonstration projects an order of magnitude smaller than a typical steam generating unit; (ii) *non-utility* applications inapplicable to steam generating unit operations; or (iii) *incomplete and inconclusive* projects.[15] These examples, either individually or collectively, do not support an adequate demonstration finding for EPA's best system for new steam generating units.

[15] Many of these projects also received substantial government subsidies, which disqualified them from being used to support an adequate demonstration finding. *See* Section I.A.1.

First, EPA relied on the planned Petra Nova project in Texas, despite admitting that it "does not yet directly demonstrate the technical feasibility or performance" of post-combustion capture. 80 Fed. Reg. at 64,551, JA43. This project is under construction and is not slated for operation until the end of 2016 at the earliest. *Id.* EPA is also barred from considering this project because it received Energy Policy Act subsidies. *Id.*

The other post-combustion capture projects EPA cites are limited pilot projects an order of magnitude smaller than commercial-scale steam units; although some of these generating units are large, they capture CO_2 from only a minuscule slip-stream of their emissions. *Id.* at 64,550-52 (AES Warrior Run, 18 MW-equivalent slip-stream; AES Shady Point, 16 MW-equivalent slip-stream; AEP Mountaineer, 20 MW-equivalent slip-stream; Southern Company Plant Barry, 25 MW), JA42-44. EPA presented no evidence these small-scale "proof of concept" projects could be scaled up to commercial-scale units while being reasonably reliable, efficient, and not unreasonably costly. *See Sierra Club*, 657 F.2d at 341 n.157 (technology not adequately demonstrated where no evidence "would justify extrapolating from the pilot scale data").

Finally, EPA relied on the non-electric utility Searles Valley Minerals soda ash plant, even though industrial carbon capture applications are much smaller and are not subject to the unique constraints of the utility duty cycle. 80 Fed. Reg. at 64,550, JA42. Unlike industrial facilities, where operations can remain relatively constant,

utilities must often adjust operations hourly to meet variable demand, leading to rapid, unpredictable increases in CO_2 emissions to be captured and processed. UARG Comments at 51, JA1622. Further, steam generating units may be unable to stop generating when the CO_2 capture system malfunctions because of their regulatory duty to meet retail electric load demands. *See* NCC Report at 77 (noting that units that fail to provide electricity when needed can face steep fines), JA4171. And while Searles Valley uses its captured CO_2 as part of its soda ash production process, providing operational and financial benefits for the capture system, that option is not available for generating units capturing their CO_2 emissions and storing them in deep saline formations. 80 Fed. Reg. at 64,550, JA42.

B. EPA's Cost and Efficiency Conclusions Are Arbitrary, Capricious, and Unsupported by Substantial Evidence.

Even if EPA's system were "adequately demonstrated," it cannot be considered the "best" system because of the excessive cost and energy requirements of CCS. *See* CAA § 111(a)(1) (directing EPA to "tak[e] into account the cost … and energy requirements" in determining the "best system of emission reduction"). EPA acknowledged "legitimate concerns regarding the cost" of CCS. 80 Fed. Reg. at 64,513, JA5. In fact, the costs of CCS—in terms of both the equipment's capital cost and the levelized cost of electricity produced by the unit—mean that it cannot meet the statutory standard.

EPA estimated that the capital costs of a steam generating unit incorporating CCS would increase 31 percent. EPA, Regulatory Impact Analysis for the Final Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units at 4-24, Tbl. 4-5 (Aug. 2015, rev. Oct. 23, 2015), EPA-HQ-OAR-2013-0495-11877, JA2887 (capital cost increase from $39 to $51/MWh).

Additionally, EPA estimated that the levelized cost of electricity for a steam generating unit using CCS is 21 to 61 percent higher than the cost of electricity from such a unit without CCS, depending on the type of coal combusted. 80 Fed. Reg. at 64,562, Tbl. 8 (increase from $76-$95/MWh to $92-$117/MWh for bituminous coal-burning units, and from $75-$94/MWh to $95-$121/MWh for low rank coal-burning units), JA54. The U.S. Energy Information Administration ("EIA"), which is the federal government's premier energy forecasting agency, estimates that the levelized cost of electricity for a steam generating unit with CCS is 39 percent higher than for a unit without CCS (increase from $91.70/MWh to $127.60/MWh). EIA, Levelized Cost and Levelized Avoided Cost of New Generation Resources in the Annual Energy Outlook 2015 at 10, Tbl. A5, (June 2015), EPA-HQ-OAR-2013-0495-11884 (relied on by EPA, *see* 80 Fed. Reg. at 64,563 n.282, JA55), JA3789.

This substantial cost increase is due in part to the significant energy penalty associated with CCS. 80 Fed. Reg. at 64,549, JA41. A steam generating unit with CCS typically must use 30 percent of its total electricity output just to power the CCS

equipment. DOE/NETL Advanced Carbon Dioxide Capture R&D Program: Technology Update at 4-5 (May 2013), https://www.netl.doe.gov/research/coal/carbon-capture/capture-handbook. This is an exorbitant energy requirement that EPA failed to take into account in violation of the CAA. By comparison, the combined energy penalty for state-of-the-art controls for nitrogen oxides and sulfur dioxide is 5-6 percent. Cichanowicz CCS Technology Review at 4-3, JA1700.

In an attempt to justify its conclusion that the cost of CCS is acceptable, EPA compared the cost of a new unit employing CCS with the cost of a new nuclear unit. *See* 80 Fed. Reg. at 64,562, 64,568, JA54, 60. This is an unfair and misleading comparison. Nuclear units are the most expensive type of electric generation and typically receive substantial government subsidies. In fact, these units are so costly that few new nuclear units are being built. *See* Michael Reilly, *US starts building first nuclear reactors in 30 years*, NEW SCIENTIST, Apr. 3, 2013, https://www.newscientist.com/article/mg21829116-600-us-starts-building-first-nuclear-reactors-in-30-years/ (noting "massive cost" and federal loans). The fact that EPA compares a steam generating unit to a nuclear unit in an attempt to justify the costs as "reasonable" demonstrates the exact opposite: the costs of the Rule are exorbitant and intended to discourage construction of new steam units. Indeed, numerous commenters brought to EPA's attention the fact that the under construction Kemper facility (an IGCC unit that will employ CCS) has cost *billions* of

dollars. RTC, Ch. 3, Costs and Benefits at 3-88, EPA-HQ-OAR-2013-0495-11862, JA2269. EPA cursorily disregarded these concerns. 80 Fed. Reg. at 64,571, JA63. EPA provided no further analysis on this important point, despite the fact that it had been "mentioned repeatedly in the public comments." *Id.*

EPA also asserted that the costs are reasonable because the "[R]ule will result in negligible costs *overall*." *Id.* at 64,563 (emphasis added), JA55. This conclusion rests on EPA's assumption that, given low natural gas prices, developers are unlikely to build new steam generating units and thus will rarely, if ever, have to comply with the Rule. *Id.*

In assessing cost, however, EPA must consider the full range of variability, including the possibility of construction of steam generating units. *Nat'l Lime*, 627 F.2d at 441-43. EPA's failure to do so here violates the CAA. Among other things, EPA's reasoning ignored record evidence that it is the Rule that is impeding construction of new steam generating units, not low natural gas prices. UARG Comments at 15-17, JA1607-09, and Attach. 1, J. Edward Cichanowicz, A Critique of the September 2013 Regulatory Impact Analysis: Coal-Fired Power Without CCS Is Competitive With Natural Gas Combined Cycle Power Without CCS (Apr. 29, 2014), EPA-HQ-OAR-2013-0495-9666 ("Cichanowicz Competitiveness Report"), JA1655-70.

EPA's reasoning is contradicted by the EIA's prediction that natural gas prices will rise. The reference case natural gas prices forecast in EIA's 2016 Annual Energy Outlook for 2020 (at Henry Hub) are $4.43 per MMBtu—72 percent higher than

EIA's projected price for 2016. EIA, Annual Energy Outlook 2016 with projections to 2040 at App. A, A-1, Tbl. A1 (Aug. 2016), DOE/EIA-0383 (2016), http://www.eia.gov/forecasts/aeo, JA5238. In 2025, EIA forecasts further increases to $5.12 per MMBtu. *Id.* Further, an additional sensitivity case modeled by EIA finds prices could exceed $6.00 per MMBtu as early as 2020, climbing to nearly $8.00 by 2030. *Id.* at App. D, D-12, Tbl. D4, JA5240. Under these price sensitivity scenarios, developers would favor new steam generating units. *See* Cichanowicz Competitiveness Report, JA1655-70; UARG Comments at 107-08, JA1641-42.

C. EPA Did Not Show that the New Steam Generating Unit Standard Is "Achievable."

A section 111 performance standard must reflect the "degree of emission limitation *achievable* through the application of the best system of emission reduction" by sources in the regulated source category. CAA § 111(a)(1) (emphasis added). As discussed below, EPA did not show that the new steam generating units can achieve the standard set in the Rule.

1. The Standard Is Not Achievable With a System that Can Be "Appli[ed]" at Regulated Units.

A section 111 standard must be "achievable through the application of the" best system at a regulated source. CAA § 111(a)(1). EPA's standard for new steam units is based on a system that *by definition* cannot be implemented, "appl[ied]," or "achiev[ed]" at *any* source in the regulated source category because in critical parts the

Rule depends on CO_2 management activities offsite and by third parties. *See, e.g.*, 80 Fed. Reg. at 64,548, 64,581, 64,586, JA40, 73, 78.

Post-combustion CO_2 capture merely separates (rather than "reduces") from the flue gas stream the CO_2 created by a new steam unit. The degree to which CO_2 emissions to the atmosphere are reduced through EPA's system depends entirely upon the unit's separated CO_2 emissions being transported to, injected, and permanently sequestered underground in "deep saline formations," a complicated and costly process that has not been undertaken by any electric utility and which EPA expects will be developed and managed by others. *Id.* at 64,579, JA71. These steps that occur after CO_2 emissions are separated from the unit's flue gas cannot, *by definition*, be achieved by any system "appl[ied]" at any steam generating *unit* itself. A steam generating unit is "any furnace, boiler, or other device used for combusting fuel and producing steam … plus any integrated equipment that provides electricity or useful thermal output to the affected [electric generating unit(s)] or auxiliary equipment." 40 C.F.R. § 60.5580. Whether the source's CO_2 emissions will be emitted to the atmosphere is outside the control of the *source* and does not reflect its emissions "performance" based on any system applied at the source. Therefore, EPA failed to meet the statutory requirements to show the system could be applied *at a source* to achieve the standard.

2. EPA's Achievability Finding Is Not Supported by the Record.

Even if EPA's system could be applied by the regulated sources themselves, EPA failed to show that a new source applying EPA's best system could achieve the standard of 1,400 lb CO_2/MWh. EPA must demonstrate that sources throughout "the industry as a whole" can achieve the standard by applying the best system, even "under most adverse conditions which can reasonably be expected to recur." *Nat'l Lime*, 627 F.2d at 431 n.46, 433.

EPA derived both the standard and its achievability analysis entirely from an engineering report issued by DOE's NETL shortly before the Rule was signed and over a year after the comment period closed. NETL June 2015 Supplement Report, JA3462-87; *see also* 80 Fed. Reg. at 64,573, JA65; Achievability TSD at 1, JA2963; NETL July 2015 Report, JA3488-727 (detailing basis for estimates in NETL June Supplement 2015 Report). But that report was not an adequate basis for, and did not support, EPA's achievability finding.

First, EPA drew conclusions from the report that go far beyond that report's scope. The report's sole purpose was to estimate the *cost* and *power generation* of a hypothetical unit based on assumptions about the unit's design which, if they proved true, would allow the unit to reach various CO_2 capture rates. *See* NETL June 2015 Supplement Report at 5, JA3472. These included assumptions regarding the hypothetical unit's design and operational characteristics, its baseline CO_2 emissions

before capture, and the size and type of post-combustion capture equipment that would be used at the unit if it were designed for a specific capture rate. The report did not purport to show that any particular capture rate or emission standard is achievable under the full range of foreseeable conditions; to the contrary, it simply *assumed* that the hypothetical unit's specified design would yield the desired emission rate and that the unit would perform flawlessly at ideal conditions in perpetuity. The report's authors recognized the unrealistic nature of these assumptions, stating that "[a]ctual average annual emissions from operating plants are likely to be higher than the design emissions rates shown." *Id.* at 1, JA3468.

Second, the report's analysis is not "representative of potential industry-wide performance, given the range of variables that affect the achievability of the standard." *Sierra Club*, 657 F.2d at 377 (citing *Nat'l Lime*, 627 F.2d at 433). The report's hypothetical unit is assigned specific design and operational features (such as capacity, steam cycle temperature and pressure, and capacity factor) that influence its CO_2 emission rate but that vary across the industry and at individual units. The hypothetical unit was assumed to have a generating capacity of 550 MW, a very high steam cycle temperature and pressure, and a steady 85 percent capacity factor, all of which would produce more efficient operation (and a lower CO_2 emission rate) than

many other typical units in the source category.[16] NETL July 2015 Report at 12, JA3503.

In particular, capacity factor (a unit's actual output as a percentage of its potential output) is a key driver of CO_2 emission rates that varies widely across the industry, and even from year-to-year at individual units, largely due to factors beyond the unit's control like demand and dispatch. UARG Modified/Reconstructed Comments at 49, JA4127. In the Clean Power Plan, EPA acknowledged the average annual capacity factor for steam generating units is only 53 percent, in contrast to the NETL June 2015 Supplement Report's assumed 85 percent. EPA, Greenhouse Gas Mitigation Measures Technical Support Document at 2-36 (Aug. 3, 2015) ("Mitigation TSD"), EPA-HQ-OAR-2013-0495-11879, JA3026. As a result, the average real unit would emit CO_2 at a higher baseline rate than the hypothetical unit. EPA did not account for this factor, making its analysis unreasonable.

The NETL June 2015 Supplement Report also did not account for the "adverse conditions" that may be expected to influence a unit's CO_2 emission rate. *See*

[16] EPA also did not account for the effect on CO_2 emissions of combusting different coals. EPA cited another NETL report to assert that the standard is achievable for units burning "low rank" (i.e., subbituminous and lignite) coals. DOE, NETL, Cost and Performance Baseline for Fossil Energy Plants: Vol. 3 Executive Summary: Low Rank Coal and Natural Gas to Electricity (Sept. 2011), DOE/NETL-2010/1399, EPA-HQ-OAR-2013-0495-11667, JA3280-331. But EPA considered only the level of capture that would be needed for a unit burning subbituminous coal, even though CO_2 emissions from lignite coal combustion are 80-90 lb CO_2/MWh higher. *Id.* at 5, Ex. ES-3, JA3294.

Nat'l Lime, 627 F.2d at 431 n.46. Instead, the report assumes a post-combustion capture system would perform exactly as designed and never break down. As discussed in Section I.A.2.b.2., experience at Boundary Dam (which has never sustained its design capture rate) actually shows the opposite. Likewise, the NETL June 2015 Supplement Report did not account for the inevitable degradation in a unit's efficiency over time, *see* NETL June 2015 Supplement Report at 1, JA3468, a well-documented and unavoidable phenomenon that EPA previously determined should be accounted for in setting CO_2 emission standards, *see In re Footprint Power Salem Harbor Development, LP*, PSD Appeal No. 14-02, 2014 WL 11089298, at *9 (EAB Sept. 2, 2014).

Third, and more fundamentally, the NETL June 2015 Supplement Report did not show that the standard is achievable by steam generating units applying the best system of emission reduction because *the report did not apply that system in its analysis.* EPA defined the best system for steam generating units as "a highly efficient *supercritical* pulverized coal boiler using post-combustion partial CCS" with sequestration in deep saline formations. 80 Fed. Reg. at 64,596, JA88 (emphasis added). But as the report acknowledged, its emission estimates were based on the performance of a more advanced class of steam generating units that is currently under development and used at only one site in the U.S., known as *ultra*-supercritical

boilers, which use higher steam cycle temperatures and pressures than supercritical boilers.[17] NETL July 2015 Report at 22, JA3513.

This difference is not "purely semantic"; an ultra-supercritical boiler is not merely a "highly efficient" or "optimized" supercritical boiler. *See* Reconsideration Denial Basis at 20-21, JA4429-30. Ultra-supercritical boilers are designed with different equipment, allowing them to utilize higher steam cycle temperatures and pressures than the supercritical boilers that form the bulk of the units in this source category. UARG Reconsideration Petition at 12, JA4508. Because the NETL reports assumed the use of ultra-supercritical steam conditions, they also assumed baseline CO_2 emission rates before carbon capture that are lower than the baseline rate of a supercritical unit applying EPA's best system. *See* Achievability TSD at 6 (acknowledging ultra-supercritical units achieve lower CO_2 emission rates than supercritical), JA2968. For this additional reason, the NETL reports do not support EPA's conclusion that its performance standard is achievable using its best system.

Apparently recognizing this weakness, EPA purported to "assess the reasonableness" of the assumed baseline emission rates in the NETL reports by comparing them to emissions from existing steam generating units. Achievability TSD at 5, JA2967. That justification fails for three reasons. First, EPA (like NETL) relied

[17] EPA committed the same error with respect to its achievability analysis for "low rank" coal units. Achievability TSD at 2 (emission value derived "from the case of an ultra-supercritical [pulverized coal unit] burning subbituminous coal"), JA2964.

on the performance of an *ultra*-supercritical unit when assessing the baseline emission rate of coal units using "low rank" coal. *Id.* at 6, JA2968 (comparing NETL estimate to emissions from AEP Turk facility, America's *only* ultra-supercritical steam generating unit). EPA's analysis therefore is not representative of emissions from the supercritical units on which its best system is based.

Second, EPA examined only what it calls the two "best performing units using bituminous and low rank coal." *Id.* This approach violates section 111 and decades of case law and EPA policy establishing that in determining whether a standard is achievable, EPA may not focus solely on what the best performing units might be capable of achieving. *See, e.g.*, *Nat'l Lime Ass'n*, 627 F.2d at 433 (standard must be achievable "for the industry as a whole"); McCutchen Letter at 1 (performance standard is "least common denominator" and "establishes what every source can achieve, not the best that a source could do"), JA4629.

Third, actual emissions data do not support EPA's assumed baseline rates of 1,618 lb CO_2/MWh and 1,737 lb CO_2/MWh for bituminous and low rank coals, respectively. Achievability TSD at 3, Tbl. 1, JA2965. To the contrary, even at EPA's "best performing units," the *best* observed 12-month average emission rates exceed those baseline estimates. *Id.* at 6, Tbl. 3, JA2968. Across the source category, actual emissions are significantly higher and display substantial variation, both among units and from year-to-year at each unit. Indeed, some supercritical units combusting bituminous coal experienced annual CO_2 emission rates in excess of 2,000 lb

CO_2/MWh—at least 25 percent above the NETL June 2015 Report's baseline estimate. UARG Reconsideration Petition, Ex. J, J. Edward Cichanowicz & Michael C. Hein, Critique of the Environmental Protection Agency's Evaluation of Partial Carbon Capture and Storage as Best System for Emissions Reduction (BSER) at 3-4 (Dec. 21, 2015), EPA-HQ-OAR-2013-0495-11894, JA4536. Much of this variation appears to be driven by differences in each unit's annual capacity factor, which is primarily governed by demand and dispatch considerations and is thus beyond any individual unit's control. *Id.* at 3-5, 3-6, JA4537, 4538.

These are not simply "adverse conditions which can reasonably be expected to recur" that EPA must—but did not—account for in determining an achievable standard. *See Nat'l Lime*, 627 F.2d at 431 n.46. They are the *typical* conditions under which steam generating units operate. The Agency's achievability analysis rested entirely on a hypothetical unit, operating under ideal conditions, and using a boiler design different from that on which the best system is based. This falls far short of what section 111 requires.

Accordingly, EPA failed to show that its standard for new steam generating units is "achievable" by those units "appl[ying]" a "system of emission reduction" that is both "best" (reflective of cost and energy requirements) and "adequately demonstrated," and, therefore, the standard must be vacated.

II. EPA's Disparate Treatment of Baseload Fossil Fuel Units Independently Renders the Rule Unlawful.

This Court has held agencies "to be at [their] most arbitrary" when they "treat similar situations dissimilarly." *Steger v. Def. Investigative Serv.*, 717 F.2d 1402, 1406 (D.C. Cir. 1983). "Deference to agency authority or expertise … is not a license to … treat like cases differently." *Airmark Corp. v. FAA*, 758 F.2d 685, 691 (D.C. Cir. 1985) (internal quotation marks omitted). Thus, absent a "coherent explanation for [its] disparate treatment," an agency's action is "patently arbitrary" and "compels" vacatur. *Id.* at 687, 692, 695.

Additionally, in setting section 111 performance standards, EPA must justify differential treatment within the same industry because "[t]his bears on the issue of 'economic cost'" just as does "inter-industry comparison in the case of industries producing substitute or alternative products." *Portland Cement,* 486 F.2d at 390. Competitive-industry impacts may not be "either ignored or assessed invalidly." *Id.* EPA also must consider "energy requirements" in setting performance standards. CAA § 111(a)(1). In this case, the consideration of energy requirements would strongly support the adoption of standards that allow the market and industry to choose the appropriate mix of fleet-wide fuel use, rather than dictate to industry what that fuel mix should be.

In the Rule, EPA set a performance standard for new baseload gas-fired units based on efficient generation technology. Juxtaposing EPA's determination for that

subcategory with its determination for new coal-fired units (supercritical pulverized coal boiler technology plus CCS with permanent sequestration in deep saline formations), however, reveals that EPA's analysis was so inconsistent as to render the Rule arbitrary and capricious.[18] Nothing in the record justifies such disparate treatment of baseload fossil fuel units.

EPA found only two gas-fired units that employed post-combustion carbon capture—one in Massachusetts from 1991 to 2005 and one in Japan since 1994. 80 Fed. Reg. at 64,613, JA105. EPA also described two additional gas-fired units with that technology at varying stages of planning and development in Texas and Scotland. *Id.* at 64,613-14, JA105-06. These limited examples led EPA to conclude that post-combustion carbon capture did not meet the section 111 statutory requirements for baseload gas-fired units. *Id.* at 64,614, JA106. Logic compels a similar outcome for coal-fired units, for which there is *no* U.S. operational experience using post-combustion carbon capture and less than a full year of extremely costly and mixed results using carbon capture on one heavily-subsidized Canadian unit. *Id.* at 64,551-52, JA43-44; *see supra* Section I.A.2. Yet somehow EPA reached the opposite conclusion for coal-fired units. The discrepancy in EPA's reasoning is unsupported and unjustified.

[18] Because this section addresses EPA's disparate treatment of fossil fuels used for baseload generation, the terms "coal-fired units" and "gas-fired units" are used for the subcategories to present the issue.

EPA relied heavily upon the NETL studies to support the standard for new coal-fired units, yet those same studies indicate "the cost of CCS for NGCC units would be more cost-effective than for coal-fired [units]." 80 Fed. Reg. at 64,613, JA165. This is largely because the greater technical requirements for capturing CO_2 from coal-fired units substantially increase the capital and operating costs in ways not applicable to gas-fired units. For example, acid gas found in high levels in coal-fired unit flue gas must be "scrubbed to very low levels prior to the flue gas entering the CO_2 capture system" to avoid costly degradation of carbon capture solvents. *See id.* at 64,549, JA41.

When confronted with comments pointing out its inconsistencies, EPA responded with a "barebones incantation of … abbreviated rationales" without a single citation to supporting evidence. *Action for Children's Television v. FCC*, 821 F.2d 741, 746 (D.C. Cir. 1987). EPA asserts that its definition of the baseload gas-fired unit subcategory may include "some" unknown number of "intermediate units that cycle more frequently" than "true base load units," and that these units could not be expected to utilize CCS because doing so would lead to "increased costs and energy penalties." 80 Fed. Reg. at 64,614, JA106.[19] But the inappropriateness of CCS for

[19] EPA offered no discussion or record evidence of intermediate units that may fall into the baseload combustion turbine subcategory. EPA asserted that all units selling more than 50 percent of their potential output to the grid "are serving base load demand." RTC, Ch. 5, Applicability to New EGUs, IGCC, and CTs at 5-35, EPA-HQ-OAR-2013-0495-11864, JA2478. EPA referenced the possibility of fast-

these *non*-baseload units "lends no support whatsoever" to EPA's disparate treatment of baseload fossil fuel units. *Ill. Commerce Comm'n v. ICC*, 787 F.2d 616, 634 (D.C. Cir. 1986). Agencies cannot justify regulatory treatment of two distinct circumstances with a reason applicable to only one. *Id.* Moreover, EPA did not set a standard for coal-fired units that took into account that some such units cycle more frequently than others and that some even cycle as frequently as those gas-fired units the Agency considered to be an intermediate unit. EPA did not hesitate in applying CCS to a frequently-cycling coal-fired unit despite determining that even the possibility of frequent cycling for some unspecified number of baseload gas-fired units was reason to discard CCS as the best system for such units. 80 Fed. Reg. at 64,614, JA106. Indeed, in its first proposed rule to establish performance standards to address CO_2 emissions from fossil fuel-fired electric generating units, EPA explained with respect to coal- and gas-fired units, "all of the plants covered by the new combined category … perform the same essential function, which is to provide generation to serve baseload or intermediate load demand … regardless of their design or fossil fuel type." 77 Fed. Reg. 22,392, 22,410 (Apr. 13, 2012).

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start NGCC units, but this is still an emerging technology and it is unclear if any such units will be used to provide intermediate load rather than peaking power. Adding to its inconsistencies, EPA assumed at least a 75 percent capacity factor for existing NGCC units in the separate rulemaking for existing coal-fired units. 80 Fed. Reg. at 64,799, JA5149.

EPA's only other attempt to distinguish baseload fossil-fuel units was a half-hearted attempt to "enumerate" a smattering of factual differences without any effort to "explain the relevance of those differences." *Melody Music, Inc. v. FCC*, 345 F.2d 730, 733 (D.C. Cir. 1965). For one, EPA contrasted an absence of a "currently operational" gas-fired demonstration project *in the United States* with the presence of an operational coal-fired demonstration project *in Canada*, ignoring a decades-old operational gas-fired unit *in Japan* and another that operated for 14 years *in the United States*. EPA also incorrectly claimed that there are "multiple CCS demonstration projects for coal-fired units … in various stages of development throughout the U.S." and "no NGCC-with-CCS demonstration projects … [are] being constructed in the U.S." 80 Fed. Reg. at 64,614, JA106. Yet there is only one coal demonstration project under development in the U.S. using the post-combustion carbon capture technology that EPA relied on for the standard for coal-fired units, and one such natural gas demonstration project under development in the U.S.

EPA also asserted without evidence that DOE has not funded a demonstration project for a gas-fired unit, as if that statement somehow supports requiring carbon capture for coal-fired units. Federal demonstration projects focus on the more technically challenging capture of carbon from coal generation, and almost all of the federal funding has been appropriated for use in coal projects alone. Arguably, the absence of funding for gas-fired demonstration projects shows that carbon capture

for coal-fired units is farther behind carbon capture for gas-fired units, not the other way around.

Ultimately, EPA's determination of the standards for baseload coal- and gas-fired units impermissibly "ignored those considerations found dispositive" in determining the standard for one type of unit when it set the standard for the other. *Airmark Corp.,* 758 F.2d at 694. EPA considered but rejected efficiency improvements as the best system for new coal-fired units because it found that that system "does not achieve emission reductions beyond the sector's business as usual." 80 Fed. Reg. at 64,548, 64,594, JA40, 86. And yet EPA endorsed the "normal business practice" of efficient generation technology as the best system for baseload gas-fired units. *See id.* at 64,640, JA132. EPA also insisted that its identification of CCS as the best system for coal-fired units is intended to "drive new technology deployment," *id.* at 64,596, JA88, but EPA cited no similar technology-forcing ambitions when identifying the best system for gas-fired units. "Elementary even-handedness requires" that EPA apply consistent criteria to all baseload fossil fuel units. *Airmark Corp.*, 758 F.2d at 692. Moreover, any assertion that technology development and emission reductions beyond "business as usual" are important factors in setting performance standards is

belied by the fact that EPA applied CCS to the *only* type of units regulated in the Rule that EPA predicted (rightly or wrongly) will *not* be built.[20]

Faced with its own record that capturing carbon from coal-fired units is even more difficult, even more expensive, and even less proven than capturing carbon from gas-fired units, EPA's inconsistent criteria for setting the new source standards plainly favor one fossil fuel used for baseload electricity over another. Lacking reasoned justification for distinguishing between baseload fossil fuel units, EPA's "dissimilar treatment of evidently identical cases, on the same day" is nothing short of "the quintessence of arbitrariness and caprice." *Colo. Interstate Gas Co. v. FERC*, 850 F.2d 769, 774 (D.C. Cir. 1988).

In the end, EPA's failure to justify its double standard suggests its analysis was outcome-driven. Instead of systematically and impartially examining a range of systems and determining which was "adequately demonstrated" and "best" based on consistent criteria, EPA adopted inconsistent criteria it knew would prevent the construction of one type of unit and encourage the construction of another. As part of its overall policy agenda, EPA unlawfully used section 111(b) to force a desired

[20] In fact, selecting CCS for coal-fired units will *slow* the deployment of the technology because, just as EPA intended, the Rule's unachievable standard will cause electricity generators to avoid developing new coal-fired units entirely. Additionally, this highlights more inconsistent treatment by EPA. It did not finalize its proposed standard for existing combustion turbines that undertake modifications because it found that few such sources were likely to exist. 80 Fed. Reg. at 64,515, JA7. Applying this same reasoning, EPA should have also decided not to finalize the proposed standard for new coal-fired units given its belief that they will not be built.

outcome—shutting the door on new coal-fired units. The Rule must be vacated for this reason.[21]

III. The Standards for Modified and Reconstructed Steam Generating Units Are Unlawful.

A. The Modified Unit Standard Is Not Achievable Through Application of an Adequately Demonstrated System of Emission Reduction.

In discussing the standard for modified steam generating units—spanning a mere three pages of the Federal Register—EPA provided no evidence that its standard is achievable. *See* 80 Fed. Reg. at 64,597-600, JA89-92. Accordingly, this standard must be vacated.

EPA set its modified unit standard on a case-by-case determination of each unit's "best historical annual CO_2 emission rate." 40 C.F.R. pt. 60, Subpt. TTTT, Tbl. 1. But there is no evidence in the record that a modified steam generating unit can replicate its best past performance on a continuous basis under the range of operating conditions the unit will confront during normal operations in the future. Indeed, EPA's entire discussion of the modified unit standard never even uses the word "achievable." 80 Fed. Reg. at 64,597-600, JA89-92.

[21] If the Court agrees EPA improperly treated baseload fossil fuel units inconsistently, but is disinclined to vacate the entire Rule, or in the alternative the standard for new coal-fired units only, then Petitioner Murray Energy Corporation alone asks that the Court remand the standard for baseload gas-fired units to allow the Agency to address its disparate treatment of baseload fossil fuel units.

At most, EPA claims its modified steam generating unit system is "technically feasible," *id.* at 64,599, JA91, which is inadequate to establish "adequate demonstration." In fact, EPA's one-paragraph technical feasibility discussion simply cited to unspecified portions of an analysis prepared in support of a *different* rule—the Clean Power Plan. *Id.* (citing Mitigation TSD at Ch. 2, JA2991). That analysis addressed only what efficiency improvements (and thus CO_2 emission rate reductions) are available across the entire fleet of existing steam generating units *on average* as compared to 2012 emissions. *See* Mitigation TSD at 2-2, JA2992. It did not show what efficiency improvements are achievable for the *individual* units to which the modified unit standard would apply. In fact, EPA in that other proceeding specifically said it was drawing *no* conclusions about individual unit capabilities. *Id.* at 2-61, JA3051. EPA offers no explanation of how its analysis of a different standard based on industry averages is relevant to the achievability of the standard by individual modified steam generating units.

Likewise, nothing in the Mitigation TSD provides evidence that a steam unit can match its best historical performance. It simply stated EPA's unsupported "expectation" that "in the general sense, if coal-fired EGUs in an interconnection were able to demonstrate and achieve specific heat rates in the past, the EGUs should be able to achieve similar heat rates again." *Id.* at 2-22, JA3012; *see also id.* ("the historical unit-level gross heat rate is by definition demonstrated and achievable by the respective coal-fired EGU"). But "expectation" alone cannot support a finding that a

standard is achievable. *See Lignite Energy Council*, 198 F.3d at 934 (achievability finding cannot be based on "mere speculation or conjecture"). The fact that a unit performed at a certain emission rate under ideal conditions in the past—i.e., the best conditions under which it has ever operated—does not indicate that it can repeat that performance under "the range of relevant conditions which may affect the emissions to be regulated." *Nat'l Lime*, 627 F.2d at 433.

Moreover, a substantial share of the variation in each unit's CO_2 emission rate is due to factors beyond the unit's control. Mitigation TSD at 2-39, JA3029. Capacity factor alone accounts for up to 50 percent of variation in some steam generating units' efficiency, while ambient temperature conditions account for up to 30 percent. *Id.* at 2-35, 2-37, JA3025, 3027. Because these factors are beyond the unit's control, most if not all units are unable to match their best historical performance, which would have occurred when these conditions were favorable on a continuous basis. EPA's assumption is also inexplicable in light of its admission that a steam generating unit's efficiency—and the benefits of measures it may take to improve its efficiency—degrades over time, *id.* at 2-61, JA3051, and that many of the available measures for improving efficiency are unavailable for some units or do not have additive benefits, *id.* at 2-10, JA3000, further increasing the difficulty of returning to and continuously maintaining the unit's best historical performance.

EPA has not shown that its standard for modified sources is "within the realm of the adequately demonstrated system's efficiency." *Essex Chem.*, 486 F.2d at 433.

Because EPA neglected the most basic requirements of section 111, the standard for modified units must be vacated.

B. The Reconstructed Unit Standards Are Neither Based on, Nor Achievable Through Application of, an Adequately Demonstrated System of Emission Reduction.

EPA's standards for reconstructed steam generating units are likewise unlawful. EPA did not show that its "best system" has been demonstrated or applied *anywhere*, in *any* source category. The Agency's achievability analysis also relied on data that are unrepresentative of steam generating units. Accordingly, these standards must be vacated.

1. EPA's System of Emission Reduction Has Never Been Demonstrated.

EPA concluded that the best system for reconstructed steam generating units is the use of a boiler with supercritical steam conditions for large units and the use of a boiler with subcritical steam conditions for small units. 80 Fed. Reg. at 64,600, JA92. EPA emphasized that this means *converting* the unit to operate using "the most efficient steam conditions available, even if the boiler was not originally designed to do so." *Id.* at 64,546, JA38.

Yet, as commenters noted, no steam generating unit has *ever* converted from subcritical steam conditions to supercritical. *See, e.g.*, UARG Modified/Reconstructed Comments at 29, JA4107. EPA did not refute this fact. *See* 80 Fed. Reg. at 64,600-01, JA92-93. Nor did it point to examples of boilers converting from subcritical to

supercritical steam conditions in other industries and explain why that experience can be extrapolated to steam generating units. *See Lignite Energy Council*, 198 F.3d at 934 (extrapolating performance from utility boilers to industrial boilers). Indeed, as commenters showed, such a radical design change would be prohibitively expensive. UARG Modified/Reconstructed Comments, Attach. B, J. Edward Cichanowicz & Michael C. Hein, Evaluation of Heat Rate Improving Techniques For Coal-Fired Utility Boilers As A Response to Section 111(d) Mandates at 4-2 (Oct. 13, 2014), EPA-HQ-OAR-2013-0603-0215, JA4139. EPA's standard here is akin to requiring the conversion of the family station wagon into a Formula One race car and assuming this is possible because the station wagon and the race car are both motor vehicles.

Lacking any examples of such a redesign of the boiler, EPA based its adequate demonstration finding on the fact that brand-new units have been built using supercritical boiler design. 80 Fed. Reg. at 64,600-01, JA92-93; 79 Fed. Reg. at 34,983, JA4078. While true, this does not indicate that an *existing* subcritical boiler can be completely rebuilt to handle supercritical steam conditions, or that such a redesign would be reliable, efficient, and not unreasonably costly. Nowhere did EPA even attempt to analyze the changes that would be needed at a subcritical steam generating unit to handle the higher steam temperatures and pressures associated with supercritical boiler design, or the costs of undertaking such changes.

Elsewhere in the Rule, EPA posited that it could find a system adequately demonstrated that has not yet been applied by the source category if it "identif[ies] the

major steps necessary … and give[s] plausible reasons for its belief that the industry will be able to solve those problems." 80 Fed. Reg. at 64,557 (internal quotation marks omitted), JA49. Even if future work to resolve acknowledged problems were permissible to establish a system is "demonstrated," EPA failed to actually identify the "major steps" that would be needed here. *See id.* at 64,600-01, JA92-93. And hoping that the industry will be able to fill *ex post* a void that EPA was required to fill *before* finalizing the Rule cannot cure EPA's deficiency. A system must be shown to be "adequately demonstrated" when the Rule is promulgated. EPA's conclusion that conversion from subcritical to supercritical boiler design has been adequately demonstrated is thus "mere speculation or conjecture," which is an unlawful basis for a performance standard. *Lignite Energy Council*, 198 F.3d at 934.

2. The Reconstructed Standards Have Not Been Shown To Be Achievable.

EPA also failed to show that its standards for reconstructed steam generating units (1,800 lb CO_2/MWh gross for large units and 2,000 lb CO_2/MWh gross for small units) are achievable through application of subcritical or supercritical boiler design. 40 C.F.R. pt. 60, Subpt. TTTT, Tbl. 1. The proposed rule's achievability analysis—which EPA did not update for the final Rule—relied on a speculative analysis of limited data from what EPA called the two "best performing facilities" in each subcategory. *See* Reconstruction TSD at 7, JA4240. And EPA made the

standards even more stringent than what these "best performing facilities" achieved without providing any basis for doing so.

As discussed above, a new source performance standard is broadly applicable and must be shown to be achievable by sources across the whole industry, under variable conditions, including the most adverse conditions that are reasonably likely to recur. *Nat'l Lime*, 627 F.2d at 431 n.46, 433. Despite EPA's acknowledgment that the existing steam generating unit fleet is "numerous and diverse in size and configuration," 79 Fed. Reg. at 34,982, JA4077; *see also* Mitigation TSD at 2-7, JA2997, EPA's achievability analysis focuses on just two units that are not representative of this diverse fleet. Reconstruction TSD at 7-8, JA4240-41. Both units are relatively new and combust subbituminous coal. *Id.* at 8, JA4241. Units combusting subbituminous coal may emit CO_2 at a rate that is 80-90 lb CO_2/MWh lower than lignite coal. *Supra* note 16. Both units operate at relatively high average capacity factors, indicating that they may operate more efficiently (and at a lower CO_2 emission rate) than units that operate less frequently. Reconstruction TSD at 8 Fig. 4, JA4241. EPA's estimates of the emissions from these "best performing units" hardly support a finding that the standard is achievable for the industry as a whole, including under variable and adverse conditions affecting emissions.

Rather than recognizing the variable and adverse conditions reconstructed steam generating units may face and adjusting the standard accordingly, EPA instead further tightened the standards beyond even what those "best performing units" have

achieved without providing any basis for its expectation of improved performance. *Id.* at 7, JA4240. Accordingly, the Rule established an emission limit for small reconstructed steam units that has *never* been achieved by even the so-called "best performing unit" for that subcategory. *See id.* at 7-8 (Wygen emission rate 120 lb CO_2/MWh higher than standard EPA proposed and ultimately finalized), JA4240-41.

Although EPA may, in some cases, "hold the industry to a standard of improved design and operational advances," it may do so only if it provides "substantial evidence that such improvements are feasible." *Sierra Club*, 657 F.2d at 364. Here, EPA adjusted the emission performance of the "best performing unit" to reflect what it calls a "normalized" emission rate based on improvements in unspecified "design factors" for a "*theoretical* reconstructed facility." Reconstruction TSD at 7, JA4240 (emphasis added). Far from providing "substantial evidence" that improved performance is feasible, EPA admitted that it "does not have information" regarding the "design factors" and "operation and maintenance practices" that form the basis of the adjusted, more stringent emission rates it adopted as the standards. *Id.* Instead, EPA simply assumed, without explanation, that "[a] reconstructed EGU would be able to incorporate" these unknown design factors and operation and maintenance practices. *Id.* This pure "'crystal ball' inquiry" is unlawful. *Portland Cement*, 486 F.2d at 391. EPA's standards for reconstructed steam generating units must be vacated.

IV. EPA's Failure To Make the Requisite Section 111(b) Endangerment and Significant Contribution Findings Renders the Rule Unlawful.

EPA failed to make the statutorily required findings of endangerment and significant contribution, and the Rule is therefore invalid for failure to follow mandatory requirements. The CAA does not authorize section 111 new source standards unless EPA makes two findings: (i) the specific "air pollution" to be regulated is "reasonably … anticipated to endanger public health or welfare"; and (ii) the specific source category—in this case, defined by EPA as "fossil fuel-fired [electricity generating units]," 80 Fed. Reg. at 64,529-30, JA21-22—"causes, or contributes significantly to" that endangering air pollution. CAA § 111(b)(1)(A). Only if it validly makes both findings may EPA establish performance standards to address the specific pollution from the specific source category. Because EPA promulgated the Rule without making these threshold statutory findings, the Rule is unlawful.

EPA made three arguments as to why it has met its statutory obligations. First, it argued that because it previously made an endangerment finding for other pollutants emitted from the types of sources regulated here, it was not required to make a new finding for CO_2. Second, it claimed it may rely on a 2009 endangerment finding for motor vehicles. Third, it said that the "information and conclusions" in the Rule's preamble could fulfill this prerequisite. Each of these arguments fails.

A. EPA Was Wrong in Claiming that New CO_2-Specific Findings Were Unnecessary.

EPA claimed it need not make new endangerment and significant contribution findings for CO_2 because it was not listing a brand-new source category. 80 Fed. Reg. at 64,529, JA21. EPA insists that findings regarding *other* pollutants (not CO_2) made over 45 years ago for "steam generators," 36 Fed. Reg. 5931 (Mar. 31, 1971), JA4567 (one-sentence finding), and nearly 40 years ago for "stationary gas turbines," 42 Fed. Reg. 53,657 (Oct. 3, 1977), JA4628, suffice. Regulating CO_2 on the basis of findings made many years ago for different pollutants and different source categories ignores the text and structure of the CAA.

First, EPA incorrectly argued that it was not listing a new source category. It was. Its prior findings related to "steam generators" and "stationary combustion turbines." Here, EPA established an entirely new category—codified in a new subpart TTTT of its regulations—which was "specifically created for CAA 111(b) standards of performance for [greenhouse gas] emissions from fossil fuel-fired [electricity generating units]." 80 Fed. Reg. at 64,512, JA4.

Second, EPA's findings made *decades ago* addressed *different* pollutants from other source categories. These different findings do not give EPA a regulatory blank check *for all time* to regulate any other air pollutant emitted from the source category. EPA's interpretation has no limiting principle. Under EPA's view, it could regulate any air pollution from any source category, regardless of whether the specific

pollutant endangers public health or welfare, and regardless of whether the source category is a significant contributor to that endangering air pollution. In contrast, the Committee Report accompanying the 1977 amendments explained that Congress did "not intend this [section 111 endangerment finding] language as a license for 'crystal ball' speculation. The Administrator's judgment … [is] subject to restraints of reasoned decisionmaking" and "the careful and thorough procedural safeguards" in the Act. H.R. Rep. No. 95-294, at 51 (1977), *reprinted in* 4 COMM. PRINT, A LEGISLATIVE HISTORY OF THE CLEAN AIR ACT AMENDMENTS OF 1977, at 2465, 2518 (1978) ("1977 Legis. History"), JA4607.

EPA concedes that other endangerment provisions in the CAA "do require the EPA to make endangerment findings for each particular pollutant that the EPA regulates under those provisions." 80 Fed. Reg. at 64,530 (citing CAA §§ 202(a)(1), 211(c)(1), 231(a)(2)(A)), JA22. EPA is wrong in claiming that the wording of section 111(b) somehow leads to a different result. Section 111(b)(1)(B) provides that EPA may issue performance standards for sources listed under section 111(b)(1)(A). A "standard of performance" is, by definition, tied to specific pollutants for which an endangerment finding has been made. *See* CAA § 111(a)(1) (defining a "standard of performance" as "a standard for emissions of *air pollutants*") (emphasis added). Any other reading would give EPA unfettered authority to regulate any air pollutant emitted by that source regardless of whether it endangers health or welfare, which the Supreme Court disavowed. *See Massachusetts v. EPA*, 549 U.S. 497, 532-33 (2007)

(EPA does not have "a roving license to ignore the statutory text"); *see generally id.* at 532-35.

Legislative history confirms that Congress viewed the endangerment sections in the CAA as "standardized" provisions and that "[t]his same basic formula is used" throughout the Act. H.R. Rep. No. 95-294 at 50 (1977), *reprinted in* 4 1977 Legis. Hist. at 2517, JA4606. Indeed, in 2009, EPA observed that the CAA contains several endangerment provisions sharing a basic architecture: "[i]n all of the various provisions, there is broad similarity in the phrasing of the endangerment and contribution decision." 74 Fed. Reg. 66,496, 66,507 (Dec. 15, 2009), JA4674, 4685. The only difference EPA noted then was that section 111(b) creates a *higher* standard by requiring a finding of a "'*significant*' contribution." *Id.* at 66,506, JA4684 (emphasis added). This higher standard means more—not less—evidence of endangerment is required.

Ultimately, even EPA does not really accept its own argument. It invents an extra-textual "rational basis" standard to try to cabin its otherwise limitless theory. *See* 80 Fed. Reg. at 64,530, JA22. But "rational basis" is found nowhere in section 111, and that deferential standard is not what Congress enacted. EPA is rewriting the statute to adopt an impermissibly lower standard for itself than Congress prescribed. *Coal. for Responsible Regulation*, 684 F.3d at 118 ("In *Massachusetts v. EPA*, the Supreme Court rebuffed an attempt by EPA itself to inject considerations of policy into its decision…. The statute speaks in terms of endangerment, not in terms of policy….").

B. EPA Cannot Rely on Its 2009 Finding Regarding Greenhouse Gas Emissions From Automobiles.

EPA alternatively points to its 2009 endangerment finding for motor vehicles under Title II of the CAA, 80 Fed. Reg. at 64,530, JA22, but that finding does not satisfy EPA's section 111(b)(1)(A) obligations. The 2009 endangerment finding determined that "six well-mixed greenhouse gases" in the "aggregate" endanger public health or welfare and that new motor vehicles contributed to that endangering air pollution. 74 Fed. Reg. at 66,497, 66,517, 66,519, 66,536, 66,537 n.36, 66,538 n.38, JA4675, 4695, 4697, 4714, 4715, 4716. Importantly, the "combined mix" of those six gases was defined as a single air pollutant, and therefore the 2009 finding was, by EPA's own definition, about a different air pollutant than the one controlled here (CO_2 alone). *Id.* at 66,516, JA4694. Further, EPA emphasized that its finding was made for the *sole purpose* of establishing *motor vehicle* emission standards. *Id.* at 66,501, JA4679. Indeed, EPA distinguished section 111 as imposing a *higher* standard. *Id.* at 66,506, JA4684.

In contrast, the Rule here regulates *only* CO_2, 80 Fed. Reg. at 64,531 n.110, JA23, and EPA has *never* found that CO_2 alone endangers public health or welfare, much less that CO_2 from fossil fuel-fired electricity generating units (as opposed to motor vehicles) has that effect. Whether EPA believes it would be able to develop a record that would support such a finding is irrelevant. EPA's 2009 finding was made

with respect to a different pollutant, from a different source category, and without any examination of "significant" contribution.

C. EPA's Attempt To Manufacture New "Findings" Fails.

Lastly, EPA claimed "the information and conclusions" contained in the Rule "should be considered to constitute the requisite endangerment finding" and "cause-or-contribute significantly findings." *Id.* at 64,530, JA22. EPA did not specify what "information and conclusions" it had in mind, but its argument fails nevertheless.

The Background section of the Rule's preamble broadly discusses "climate change impacts from [greenhouse gas] emissions, both on public health and public welfare," *id.* at 64,517, JA9, but it does not focus on CO_2 alone and recognizes that climate change is a complex phenomenon. *Id.* at 64,517-24, JA9-16; *see also* Intergovernmental Panel on Climate Change, Fourth Assessment, Working Group I, *Climate Change 2007: The Physical Science Basis* 539-65 (2007), http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_wg1_report_the_physical_science_basis.htm (discussing the roles of nitrogen, methane, and myriad other factors). The literature EPA relied upon is too general and outdated to constitute valid endangerment or significant contribution findings, given the requirements imposed by the CAA.

EPA's failure to make the requisite findings of endangerment and significant contribution violate the CAA, and this failure renders the Rule invalid. EPA is not

entitled to *Chevron* deference here because its "regulation is 'procedurally defective.'" *Encino Motorcars, LLC v. Navarro*, 136 S. Ct. 2117, 2125 (2016).

V. EPA Improperly Rejected Petitions for Reconsideration Regarding Its Failure To Reveal *Ex Parte* Contacts Prior to the Notice and Comment Period.[22]

The Agency's failure to place in the public docket critical *ex parte* communications between its employees and environmental groups, communications which formed a substantial basis of the Agency's action, violates section 307(d)(3) of the CAA. That section requires that "[a]ll data, information, and documents referred to in this paragraph on which the proposed rule relies shall be included in the docket on the date of publication of the proposed rule." The same failure also violates due process through promulgating a rule without permitting the public or affected parties to adequately understand the real basis and motivations for the Rule, or the origin of the basis of the Rule, and thus to meaningfully (and equally) comment or contribute to the Rule's development. Here, EPA did not place in the public docket numerous communications helping form the basis of the Rule, between the head of the task force developing the rules under section 111 of the CAA and environmental groups, even though these communications resulted in a Rule carefully calibrated to shut down existing coal power plants.

[22] This argument is raised only by Petitioner Energy & Environment Legal Institute.

In particular, Michael Goo, then EPA's Associate Administrator for the Office of Policy, was tasked with writing EPA's initial 'Options Memo' regarding regulating coal power plants. *See* JA4492. Using his private email account — which he describes in certain such correspondence as a "channel" for "offline chats", *See* JA4474 — rather than his official, required EPA email, Mr. Goo shared his draft options secretly, with lobbyists and high-level staffers at the Sierra Club, the Natural Resource Defense Council, and the Clean Air Task Force ("CATF") who in turn, also using his non-official account, told him how to draft or alter the policy that formed the basis for Goo's Options Memo presented to the Administrator, and ultimately implemented in the Rule.

Goo did not contemporaneously copy his EPA email account, and these records were not available at the legally required time, were not placed in the docket, and were uncovered through Freedom of Information Act requests only after the notice and comment period ended. These showed that on May 30, 2011, a Sierra Club lobbyist sent Mr. Goo an email to his personal address stating, in toto, "[Y]ou might want to change your personal email address, now that you have new job and all. Attached is a memo I didn't want to send in public." The two-page memo was entitled, "Standards of Performance for Existing Sources" and concluded: "EPA can therefore establish a performance standard for existing plants that is not achievable by any plant nearing the end of its 'remaining useful life' as defined by EPA." Only two hours after receiving this, Goo sent to other high ranking EPA staff a document entitled "NSPS

new source options" which was withheld as being the Agency's internal deliberations. *See* JA4492.

Additional documents showed that Goo, using his non-official email account, sent Sierra Club a draft of the EPA working group document titled the "NSPS Option X" laying out the proposed rule (despite the title, this memo and related correspondence were not limited to the NSPS rule, but also addressed existing-source regulation). He also sent Sierra Club another version of this document, one which reflected edits made the day before by staff for the outside activist group Clean Air Task Force, as extensively documented in Petitioners' Appendix, and again all on his private account. This version, "NSPS Option for Existing Utilities: Single Emission Rate Approach," was marked "Draft Deliberative." This meant that it reflected the deliberations of senior governmental policy-making officials.

Further records not included in the public docket showed that, through Goo's non-official, "offline channel," senior staff at NRDC sent Goo numerous consultant analyses/advocacy pieces (for which Goo thanked them), and an internal NRDC analysis titled "Retire v Co-fire," which told him they were "concerned that a coal only standard is not likely to achieve significant emissions reduction" and argued against allowing existing coal plants to reduce emissions by co-firing coal and natural gas and in favor of forcing those plants to close. JA4474-81. Indeed the three NRDC staff Goo emailed from his private account, David Doniger, David Hawkins, and Daniel Lashof, were noted by a New York Times analysis of NRDC's influence on these GHG rules as having played an

outsized role in developing the rule. It noted, e.g., what was "Indisputable, however, is that the Natural Resources Defense Council was far ahead of the E.P.A. in drafting the architecture of the proposed regulation" about which, the article quoted another supporter of the EPA's rule in saying, "The NRDC's proposal has its fingerprints throughout this."[23]

Emails also showed that Goo informed CATF of when he planned to brief the EPA administrator on the proposed rule and was told "I know you said the NSPS briefing for the Administrator is today. Here is the latest on our development of a "function" for use in a EGU NSPS rule." CATF also sent a multi-page presentation done by its own contractor by the "offline channel". (*See* JA4484-91) Later CATF received a "read out" by this "offline channel" from Goo's meeting on the options with the Administrator, and responded saying "I wanted to give you some brief reactions from CATF staff to your read out from the meeting with the Administrator."

Through these and other communications E&E Legal obtained under FOIA, and by heavily incorporating the advocates' work into EPA's own deliberative drafts, Goo made CATF and these other groups effectively part of EPA's taskforce. None of these communications were docketed in the public record when the Notice of Proposed Rulemaking ("NPRM") was released for comments. Goo only provided these records to

[23] See Coral Davenport, *Taking Oil Industry Cue, Environmentalists Drew Emissions Blueprint*, New York Times, July 6, 2014. http://www.nytimes.com/2014/07/07/us/how-environmentalists-drew-blueprint-for-obama-emissions-rule.html.

EPA in late August 2013, nearly two and a half years after much of the correspondence occurred, while preparing to leave the Agency's employ. Yet EPA did have these records in its possession in time to place them in the public docket when it released its NPRM. The result of this deficiency is that commenters could not have known that the Rule was drafted through such extensive *ex parte* contacts with environmental groups with whom Mr. Goo once worked when employed by NRDC. Such secrecy is inconsistent with fundamental principles of due process, fair notice, and accountable government. This far exceeds what, in December 2015, the General Accounting Office criticized as improper practices in finding that EPA violated federal law by engaging in "covert propaganda" and "grassroots lobbying" in connection with another rule.[24]

In rejecting the petitions for reconsideration which included the documents evidencing these *ex parte* contacts and which noted the Agency's obligations to place such records in the docket prior to the notice and comment period, EPA made several critical factual and legal errors. In rejecting the petitions for reconsideration, EPA erroneously determined that this rule is somehow unrelated to all the documented *ex parte* contacts, noting that there were two proposed rules, one in 2012 and one in 2014. Yet the 2014 rule 79 FR 1430 (January 8, 2014) was built entirely on the back of the 2012 proposal which was withdrawn the very day the 2014 proposal was issued (79 FR 1352 (January 8, 2014) (withdrawing the 2012 proposal)). The Agency cannot pretend these proposals are

[24] *See* GAO, Environmental Protection Agency — Application of Publicity or Propaganda and Anti-Lobbying Provisions, B-326944 (Dec. 14, 2015).

somehow distinct and unrelated. The Agency also rejected the petitions for reconsideration on the basis that the record contained adequate support for the proposed rule, yet the documented evidence suggests that these *ex parte* contacts contained the key motivations, organic input and support for the rule.

Most critically, EPA improperly determined that this Circuit's rule against *ex parte* contacts does not apply to informal rulemakings such as this one. JA4445-47. In *Home Box Office, Inc. v. FCC*, 567 F.2d 9 (D.C. Cir. 1977), this Court opined that "[i]f actual positions were not revealed in public comments . . . and, further, if the Commission relied on these apparently more candid private discussions in framing the final . . . rules, then the elaborate public discussion in these dockets has been reduced to a sham." *Id.* at 52–54. Such secrecy is inconsistent "with fundamental notions of fairness implicit in due process and with the ideal of reasoned decision making on the merits." *Id.* at 56.

EPA cited *Sierra Club v. Costle*, 657 F. 2d 298, 400-402 (D.C. Cir. 1981) in claiming that the rule crafted in *HBO* does not apply to informal rulemakings. However, the Court in *Costle* made clear this was not accurate, stating that "but we believe that a fair inference can be drawn that in some instances such docketing may be needed in order to give practical effect to section 307(d)(4)(B)(i), which provides that all documents "of central relevance to the rulemaking" shall be placed in the docket as soon as possible after their availability." While the Court here was speaking about *ex parte* contacts made after the close of the notice and comment period, the need for such docketing when those contacts occurred during the formation of the rule is even more critical. EPA erroneously

conflates the notion that no *ex parte* contacts are permitted at all, which is of course not the case, with its obligation to publicly docket and make available information about those contacts. EPA conspicuously failed to docket these contacts here, despite having all the documents needed to do so well in hand before opening the notice and comment period. It is that failure to transparently make the information available to the public that renders the Rule defective, not merely the existence of the *ex parte* contacts.

CONCLUSION

For the foregoing reasons, the petitions should be granted and the Rule vacated.

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CERTIFICATE OF COMPLIANCE

Pursuant to Rule 32(a)(7)(B), (f), and (g) of the Federal Rules of Appellate Procedure and Circuit Rules 32(e)(1) and 32(e)(2)(C), I hereby certify that the foregoing final form Opening Brief of Non-State Petitioners contains 17,951 words, as counted by a word processing system that includes headings, footnotes, quotations, and citations in the count, and therefore is within the word limit set by the Court.

Dated: February 3, 2017

/s/ Allison D. Wood
Allison D. Wood

CERTIFICATE OF SERVICE

I hereby certify that, on this 3rd day of February 2017, a copy of the foregoing final form Opening Brief of Non-State Petitioners was served electronically through the Court's CM/ECF system on all ECF-registered counsel.

/s/ Allison D. Wood
Allison D. Wood

Attachment A

DECLARATION OF RYAN MURRAY

BEFORE ME, the undersigned authority, personally appeared Ryan Murray, who after being duly sworn states as follows:

Background

1. My name is Ryan Murray. I am the Vice President of Operations of Murray Energy Corporation ("Murray Energy").

2. I am providing this Declaration in connection with finalization by the United States Environmental Protection Agency ("EPA") of the final rule "Standards of Performance for Greenhouse Gas Emissions From New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units." 80 Fed. Reg. 64510 (Oct. 23, 2015) (the "Standards").

3. I make this Declaration based upon personal knowledge or information supplied to me in the ordinary course of my job responsibilities at Murray Energy.

4. I have a bachelor's degree in mining engineering from West Virginia University and an MBA from Ohio State University.

5. My responsibilities at Murray Energy involve oversight of company operations including the general management of all mines owned by Murray Energy Corporation. In this role, I have input on long-range planning, and routinely track and anticipate trends in coal markets in order to adjust production.

The Business of Murray Energy Corporation

6. Formed in 1988 with the purchase of a single mining operation in the Ohio Valley, Murray Energy is now the largest underground coal mining company and the largest privately-held coal company in America, with combined operations that currently produce and ship about 50 million tons of bituminous coal annually.

7. Murray Energy also owns a substantial interest in Foresight Energy GP LLC and Foresight Energy LP ("Foresight Energy"), a leading producer of coal in the United States.

8. Employment by Murray Energy peaked in 2015 at about 8,400 persons, but has since declined to about 4,600.

9. Together, Murray Energy and Foresight Energy currently operate fourteen (14) active mines in the United States located in three major high-Btu coal-producing regions — Northern Appalachia in Ohio and West Virginia, the Illinois Basin in Illinois and Kentucky, and the Uintah Basin in Utah, and one mine in Colombia, South America.

10. Murray Energy and Foresight Energy own or control over 5.0 billion tons of proven and probable coal reserves in the United States, strategically located near our customers, near favorable transportation, and high in heat value.

11. Additionally, Murray Energy and Foresight Energy own over 120 subsidiary and support companies directly or indirectly related to the domestic coal industry, including factories located in Illinois, Ohio, Kentucky and West

Virginia where the vast majority of the mining equipment used at its mines is built.

12. Murray Energy and Foresight Energy mines have supplied coal directly to electric utility generating units ("power plants") located in at least twenty-three (23) different States, providing affordable energy to households and businesses across the country.

Fossil Fuel Power Plants and the Market for Baseload Power Generation

13. Electricity generation must match electricity demand to avoid intentional or unintentional blackouts. Accordingly, the nation's fleet of power plants must vary the amount of generation with demand. To most efficiently perform this task, one portion of the fleet is optimized for continuous operation over long periods of time to meet the minimum "baseload" demand, and another portion of the fleet is optimized for variable operation to serve the additional "peaking" demand requirements above that minimum.

14. There are three basic ways electricity is generated using fossil fuels. First, a steam generator burns fuel to create heat and generate steam that drives a generator. Second, a combustion turbine compresses and combusts non-solid fuel in a turbine that drives a generator. Coal can be used in a combustion turbine only if it is first "gasified," which is a highly energy intensive process. Third, these two are combined so that exhaust heat from a combustion turbine is used in a steam generator (referred to as a "combined cycle" unit).

15. Combustion turbines are more cost effective than steam generators and combined cycle units for variable operation. These "simple cycle" combustion turbines burn natural gas and are primarily constructed to provide peaking power.

16. Steam generators burning coal and natural gas combined cycle units are more cost effective than simple cycle combustion turbines for continuous operation, and are therefore primarily built to provide baseload power.

17. For a new baseload power plant, without regard for the impact of existing or threatened environmental regulations, the choice between steam coal and combined cycle natural gas as the method for electric generation largely depends on fuel access and fuel costs, which vary significantly by location and over time.

18. Given the significant geographic diversity in access and costs, at any given time steam coal can be economic for baseload capacity in some places while combined cycle natural gas is more economic for baseload capacity in other places.

19. As fuel prices change over time in certain areas of the country, the most economic choice for new baseload capacity can change from steam coal to combined cycle natural gas. When this happens, construction of new baseload capacity and retirement of existing baseload capacity results in shift in fuel use from coal to natural gas. Under these conditions, the construction of new power plants in those areas directly and unavoidably reduces coal sales.

20. At this time, there is significant political and regulatory pressure to reduce the overall emissions of carbon dioxide from fossil fuel power plants. Assuming carbon dioxide emissions from the power sector are limited to a given level of emissions this century, new uncontrolled baseload natural gas power plants likely hasten the retirement of existing coal units because they consume room in any such carbon budget that would otherwise be available to existing coal units.

21. The coal industry and coal miners are harmed by the construction of new baseload natural gas units.

EPA Regulation of New Coal-Fired Units

22. On April 13, 2012, EPA proposed a standard for all new fossil fuel power plants of 1,000 lbs of carbon dioxide per megawatt hour, which EPA found could only be met by natural gas-fired units, 77 Fed. Reg. 22392, 22418 (April 13, 2012), effectively choosing the fuel source for future growth or replacement because a final Section 111 new source standard retroactively applies to any project that begins construction after the date of *proposal*.

23. At that time, several coal power plants were under development, and the United States Energy Information Administration ("EIA") projected in its 2012 Annual Energy Outlook that at least 10 GW of new coal power plants would be built by 2020.

24. As of September 7, 2011, Sierra Club was tracking 15 to 20 new coal power plant projects that were in the permitting process. E-mail from

John Coequyt, Sierra Club, to Alex Barron, United States Environmental Protection Agency (Sept. 7, 2011), *available at* http://eelegal.org/wp-content/uploads/2014/01/Final-8-1-13-release_Redactions-applied.pdf (page 30 of 407).

25. But as of the proposal date, utilities and independent power providers could not risk building a new coal power plant that EPA's proposal, if finalized, would retroactively outlaw.

26. Several pending coal power plant projects were halted, stranding millions of dollars of investments, including projects by Tenaska Trailblazer Partners, LLC, Power4Georgians, and White Stallion Energy Center, LLC. Another (Holcomb 2 project) had to fight to be carved out of the proposed rule's requirements in order to avoid losing a $60 million investment by Sunflower and Tri-State Generation.

27. On January 8, 2014, EPA published a replacement proposal with a standard of 1,100 lbs of carbon dioxide per megawatt hour for coal units based on carbon capture and sequestration ("CCS"), and a separate standard for baseload natural gas units of 1,000 lbs based on "no control," which had the continuing practical effect of precluding the use of coal for new baseload generating capacity.

28. EPA's final rule published October 23, 2015, closely mirrors the 2014 proposal by again setting a standard for coal units based on the use of unworkable and exorbitantly costly carbon controls, while recognizing that

those carbon controls were not appropriate for new baseload natural gas power plants.

29. Based on EIA's publicly available data, while natural gas prices for electric power generation have remained stable since 2009, there has nonetheless been a dramatic end in construction of new conventional steam coal power plants since 2012, with only those that had already commenced construction as of 2012 coming online.

30. In all, Sierra Club's Carl Pope credits EPA's actions since 2012 with preventing the construction of "80 brand new white elephant coal plants." Intelligence Squared Debate Transcript at 6 (Sept. 7, 2016), *available at* http://www.intelligencesquaredus.org/sites/default/files/20160907_climatechangetheepahasgoneoverboard_transcript_1.pdf.

31. While EPA has stated that it "does not expect the construction of any new non-compliant coal-fired capacity" between now and 2020 (Final Rule Regulatory Impact Analysis at 4-3), its proposals in 2012 and 2014 have ensured no conventional steam coal power plant projects are currently under development.

32. Additionally, as it did in the 2012 proposal, EPA continued to rely on modeling that assumes a nearly 30% increase in capital costs for new coal power plants (from 11.1 percent to 14.1 percent) to reflect potential future climate change regulations (essentially representing a carbon tax), with no such premium on the cost of obtaining capital for new natural gas power plants. *See* EPA-HQ-OAR-2011-0660-9935 at 5.

33. In comparing levelized costs of electricity for new steam coal power plants and baseload natural gas combined cycle power plants (RIA at 4-28), EPA also assumed low natural gas prices and higher coal costs than are found in many parts of the country, avoided the possibility that natural gas prices will rise, and assumed the existence of the necessary infrastructure to deliver sufficient supplies of natural gas. For example, EPA assumed a delivered coal cost of $2.94/MMBtu even though the average delivered coal cost for electric utilities in Ohio and Illinois in 2014 was $2.16/MMBtu and $2.04/MMBtu, respectively.

34. Changing these assumptions to more accurately reflect real-world conditions, new steam coal power plants is the most economic choice for new electricity generating capacity in many areas of the country.

35. Additionally, some new coal plants would be built in areas where coal can provide fuel diversity and a hedge against spikes in natural gas prices. EPA has acknowledged that the desire for fuel diversity can cause utilities to choose to build coal plants even if they are not the most economic choice. 80 Fed. Reg. at 64,563.

36. EIA's Annual Energy Outlook had projected a mix of new steam coal and new natural gas would be built by 2020 in each of its annually published estimates from 2009 to 2014.

37. Specifically, the 2014 Annual Energy Outlook projects: (1) 1.6 GW of planned new coal without CCS by 2020 (assuming an arbitrary 30 percent increase in capital costs for new coal power plants to reflect potential

future climate change regulations without any commensurate increase in capital costs for natural gas power plants); and (2) 3.2 GW of new coal without CCS by 2030 if the capital cost penalty is not assumed.

38. Instead, EPA's rule takes coal off the table as an option for new capacity (and has since the 2012 proposal).

Harm to Murray Energy and Foresight Energy

39. Murray Energy and Foresight Energy have low cost coal reserves that would be supplied to the new coal power plants that are prevented from being built because EPA's rule dramatically increases the costs and risks of using coal, and to the existing coal power plants that are forced to retire prematurely.

40. Murray Energy, Foresight Energy, and thousands of employees depend upon the presence of a stable and continuing domestic market for coal. Every coal power plant that is shut down and replaced with a new baseload natural gas power plant affects the financial condition of Murray Energy and Foresight Energy and threatens the well paid and well benefited jobs of our employees.

I make this Declaration under penalty of perjury under the laws of the United States, and I state that the foregoing is true and correct to the best of my knowledge, information, and belief.

Ryan Murray

Dated: October 13, 2016