

ORAL ARGUMENT SCHEDULED FOR APRIL 17, 2017

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

STATE OF NORTH DAKOTA,)	
)	
Petitioner,)	
)	Case No. 15-1381 (and
v.)	consolidated cases)
)	
UNITED STATES ENVIRONMENTAL)	
PROTECTION AGENCY,)	
)	
Respondent.)	
)	
)	

**FINAL REPLY BRIEF OF PETITIONER-INTERVENORS GULF COAST
LIGNITE COALITION AND THE LIGNITE ENERGY COUNCIL**

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**ATTORNEYS FOR THE LIGNITE ENERGY COUNCIL AND THE
GULF COAST LIGNITE COALITION**

DATED: January 23, 2017
FILED FORM: February 3, 2017

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GLOSSARY OF TERMS

Act	Clean Air Act
CAA	Clean Air Act
CCS	Carbon Capture and Storage
CO ₂	Carbon Dioxide
EPA	United States Environmental Protection Agency
JA	Joint Appendix
MW	Megawatt
MWh	Megawatt-Hour
NETL	National Energy Technology Laboratory
RIA	Regulatory Impact Analysis
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)
TSD	Technical Support Document

I. INTRODUCTION AND SUMMARY OF ARGUMENT

The United States Environmental Protection Agency's ("EPA") "Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units," 80 Fed. Reg. 64,510 (Oct. 23, 2015) ("111(b) Rule" or "Rule" or "Final Rule"), must be set aside. Petitioner-Intervenors the Lignite Energy Council and the Gulf Coast Lignite Coalition join in all the arguments in Petitioners' briefs.

In addition, the record does not support EPA's treating subbituminous coal and lignite as the same for purposes of CO₂ emissions. Specifically, dried lignite cannot be treated as substantially similar to subbituminous coal for purposes of CO₂ emissions. Nor is "lignite drying" "adequately demonstrated" within the meaning of § 111(b) of the Clean Air Act ("CAA" or "Act").

Furthermore, while EPA relies heavily on data from the Department of Energy ("DOE"), DOE does not view carbon capture and storage ("CCS") as a technology that is already available at full scale for new Electric Generating Units ("EGUs"). Similarly, notwithstanding the arguments made in the amicus brief filed on behalf of the "Carbon Capture and Storage Scientists," their public statements contradict the claims in the amicus brief and suggest that they too do not believe CCS is "adequately demonstrated."

Finally, even accepting all EPA's arguments and assumptions, and rejecting all the arguments made by Petitioners, SaskPower's Boundary Dam project would still be insufficient to demonstrate that CCS is "adequately demonstrated" for new lignite-fueled units larger than Boundary Dam

II. ARGUMENT

A. **The record does not support treating subbituminous coal and lignite as the same for purposes of CO₂ emissions.**

As discussed in the opening briefs, the Best System of Emission Reduction ("BSER") chosen by EPA in the Rule is an EGU using post-combustion partial CCS with a supercritical pulverized coal ("SCPC") boiler. 80 Fed. Reg. at 64,542, JA34. The captured CO₂ is to be stored underground in "deep saline formations." *Id.* at 64,572, JA64.¹

In its analysis, EPA used a baseline emission level—its assumed emissions level without partial CCS—of 1,740 lbs CO₂/MWH-g for EGUs fueled by both subbituminous coal and lignite, *see* 80 Fed. Reg. at 64,562, JA54, based only on data from EGUs burning bituminous and subbituminous coal. It did not separately evaluate any EGUs burning lignite. *See* EPA, Achievability of the Standard for Newly Constructed Steam Generating EGUs (July 31, 2015) ("Achievability TSD") at 5-6, JA2967-2968. By treating subbituminous coal and lignite as identical, EPA failed to properly define a baseline emission rate for lignite. The baseline for lignite is too low,

¹ For convenience sake, this reply sometimes just refers to "CCS with underground storage," which includes storage in deep saline formations

and this is another reason the record fails to show that CCS with underground storage is adequately demonstrated for new lignite-fueled EGUs.

The only study evaluating the newest, best-performing lignite-fueled EGUs found that the difference in emission levels for bituminous and subbituminous (55 lbs CO₂/MWh) was significantly less than the difference for subbituminous and lignite (170 lbs CO₂/MWh). 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 3-7 (Dec. 21, 2015), EPA-HQ-OAR-2013-0495-11894, JA4539. Different baselines were used for bituminous and subbituminous. 80 Fed. Reg. at 64562, JA54. Likewise, different baselines should have been used for subbituminous and lignite.

EPA claims it based its emission rates on both DOE studies and actual emissions, for which it references another section of its brief. *See* EPA Br. 83, n.46. But in that other section, EPA makes clear it made no evaluation of lignite-fueled units. EPA Br. 57-58.

Further, even the data on which EPA relied shows that lignite generation has a CO₂ emissions rate roughly 80-90 lbs/MWh higher than subbituminous generation, when using an SCPC boiler. DOE, NETL, Cost and Performance Baseline for Fossil Energy Plants: Vol. 3 Executive Summary: Low Rank Coal and Natural Gas to

Electricity (Sept. 2011) at 5, Ex. ES-3, DOE/NETL-2010/1399, EPA-HQ-OAR-2013-0495-11667, JA3294.

EPA does *not* argue that this difference is insignificant and can be ignored. Instead, its only response is the unsupported claim “that *dried* lignite has emissions comparable to subbituminous coal.” EPA Br. 84 (emphasis in original). Lignite drying is the practice of using hot flue gas to reduce the moisture content of lignite prior to combustion.

This represents a shift in EPA’s position. Lignite drying was not mentioned in the proposed rule. In the Final Rule, EPA treated subbituminous coal and lignite as identical—not dried lignite, just lignite or “virgin” lignite. Almost as an afterthought, and citing only to a three-page summary of a single report on lignite drying, EPA acknowledge that CO₂ emissions are higher when lignite is used, but asserted without analysis that drying could reduce the baseline emissions of lignite down to the level of subbituminous. 80 Fed. Reg. at 64,548, JA40; Achievability TSD at 2, n.7, JA2964.

In its brief, however, EPA distances itself from “virgin” lignite, and does not dispute that a new EGU using lignite without drying could not meet its standard of 1400 lbs CO₂/MWh. Instead, EPA effectively adopts as BSER for lignite-fueled units CCS with storage in deep saline formations *plus* lignite drying. *See* EPA Br. 84. EPA argues that this is justified because “[l]ignite drying can be accomplished through numerous available technologies identified in the record[,]” such as the DryFinTM

process used at the Coal Creek Power Station in North Dakota. EPA Br. 85. The record, however, fails to support this claim.

- 1. The record does not support EPA's claim that dried lignite can be treated as substantially similar to subbituminous coal for purposes of CO₂ emissions. Nor is there sufficient record evidence that lignite drying is "adequately demonstrated."**

In addition to its own reconsideration memo, EPA cites only two things to support its claims about lignite drying. The first is a June 2014 memo from EPA's Office of Air Quality Planning and Standards on the subject of "Coal Cleaning and Upgrading," (the "Coal Memo"), EPA-HQ-OAR-2013-0603-0046, Attach. 1, at 4, JA4246. The Coal Memo is an attachment to another memo from the same office about BSER for "reconstructed" EGUs. Best System of Emissions Reduction (BSER) for Reconstructed Steam Generating Units and Integrated Gasification Combined Cycle (IGCC) ("Reconstructed BSER Memo") EPA-HQ-OAR-2013-0603-0046, JA4234.

The Coal Memo is 3 1/2 pages. It provides brief, thumbnail sketches of different techniques for reducing the moisture content of coal, based not on any study or analysis performed by EPA, or any other independent body, *but on the unverified claims of the developers of the technologies*. The Coal Memo specifically mentions the DryFiningTM process that EPA cites, but says only that the developer reports small (2-4%) gains in efficiency. It says nothing about any CO₂ reductions. Coal Memo at 3-4. Moreover, the Reconstructed BSER Memo to which the Coal Memo is attached

appears to have treated CO₂ emissions from both dried and undried lignite as the same, and higher than emissions when using subbituminous coal. Reconstructed BSER Memo at 9, n.13, JA4242. This certainly does not support EPA's claim that dried lignite can be treated as substantially similar to subbituminous coal.

Additionally, as the Coal Memo states, the DryFinTM process uses the plant's waste heat to dry the lignite. Coal Memo at 4, JA4250. The amount of waste heat an EGU produces is related to its efficiency. The more efficient the EGU, the less waste heat it produces. Just because the Coal Creek power station is sufficiently inefficient to generate enough waste heat to economically dry lignite, it does not follow—and cannot just be assumed—that a new lignite plant with cutting-edge technology will be similarly inefficient. Likewise, it cannot be assumed, as EPA does, that lignite drying costs will be lower for new EGUs. *See* EPA Br. 86. On the contrary, a new, highly efficient plant will likely not produce sufficient waste heat to dry lignite as Coal Creek does; it would have to use a different technology. EPA apparently does not understand this—which reflects the broader point that this is not an area in which EPA has special, technical expertise to which the Court should defer.

The second document upon which EPA relies is what it refers to as a “report” from the International Energy Agency (IEA) Clean Coal Centre in the United Kingdom. International Energy Agency Clean Coal Centre, “Techno-economics of modern pre-drying technologies for lignite-fired power plants,” EPA-HQ-OAR-2013-0495-11574, JA3846. This is actually a 2 1/2 page summary of a study conducted by

the Centre, the full report of which is (a) not part of the record and (b) not publicly available without payment. The summary does *not* say that “[l]ignite drying can be accomplished through numerous available technologies[,]” as EPA claims. Instead, among other things, it states that “the techno-economic information on modern pre-drying processes is scarce and incomplete in the public literature.” *Id.* at 3, JA3848.

Further, while the summary does discuss, briefly, the DryFinishing™ process, it makes clear, as EPA’s brief does not, that this is a proprietary process. EPA cites nothing concerning when, if ever, DryFinishing™ (or any other drying process) was available for licensing, at what cost, and under what limitations.²

Additionally, DOE, not EPA, has the real expertise in this area—indeed, EPA repeatedly cites to DOE statistics and information in its brief. *See, e.g.*, EPA’s Br. 58. The IEA summary notes that DOE invested \$13 million in retrofitting four DryFinishing™ dryers at Coal Creek. As recently as 2014, DOE was referring to this as a “demonstration project,” not as already developed technology that is available for general use.³ *See* Cleantech: Innovative Lab Partnership Reduces Emissions from Coal (Jan. 2014), available at <https://energy.gov/articles/cleantech-innovative-lab-partnership-reduces-emissions-coal>.

² The Coal Memo states that, according to the developer, it is trying to market the technology, but provides no other information. Coal Memo at 5, JA4250.

³ The summary also discusses lignite drying projects in Germany. The German government considers lignite drying to be “at the development stage” and not yet “implemented on a large scale.” Federal Republic of German, Federal Ministry for Economic Affairs and Industry, *Lignite Drying*, available at <http://kraftwerkforschung.info/en/lignite-drying/>.

Finally, there is nothing in the Coal Memo or the IEA summary, nor does EPA cite to any analysis anywhere else in the Rule or the record, demonstrating that there exists any generally available process for drying lignite that reduces CO₂ emissions by at least 80-90 lbs/MWh, which would be required even looking only at the data on which EPA relied.⁴ Nor is there anything in the Record to support EPA's assumption that adding the cost of lignite drying to the cost of CCS technology would not render the cost of CCS unreasonably expensive for a new, lignite-fueled EGU. EPA cites two sentences in the IEA Summary that "the capital costs . . . are likely to be in the range of US \$33-50 million" but "could largely be offset by the gains in plant thermal efficiencies and power saving" IEA summary at 3, JA3848. But the very next sentence in the IEA Summary adds the following qualifier: "The actual cost level, however, depends both on the properties of the lignite in question and the operational parameters." *Id.* Here, EPA failed to assess either of these in any meaningful way.

⁴ Further, in its brief, EPA tries to claim that it treated subbituminous coal and dried lignite as identical based on a comparison of CO₂ emissions from Coal Creek and a subbituminous-fueled EGU in Montana. *See* EPA brief at 84. Although the Coal Creek emissions were higher, EPA claims they were not so much higher that the two could not be treated as similar.

But leaving aside the incredibly small sample size, EPA cites nothing from the Rule to support this claim, only its Reconsideration Memo. In the Rule, EPA treated subbituminous as equivalent to lignite, not just dried lignite, and mentioned, almost as an afterthought and citing only to the IEA summary, that lignite drying—which it assumed to be available and cost effective—could reduce the CO₂ emissions of virgin lignite. EPA cannot now rely on the post-rule Reconsideration Memo to overcome its failure support these claims within the Rule itself.

Its failure to do so dooms its belated attempt to utilize CCS plus lignite drying as BSER for new lignite-fueled plants.

To be clear, the *potential* for lignite drying is promising—just as the *potential* for CCS is promising. But the record does not support the conclusion that lignite drying is sufficiently demonstrated—including being sufficiently cost effective—to be adequately demonstrated as BSER under 111(b). Accordingly, there is inadequate record support for EPA’s treating subbituminous coal and lignite as identical, using identical baseline CO₂ emissions rates for subbituminous-fueled and lignite-fueled EGUs, and imposing bituminous/subbituminous-based standards on lignite-fueled EGUs.

B. DOE is still funding “pre-feasibility” CCS studies.

As noted above, EPA claims that, to estimate CO₂ emissions using lignite, it relied upon “available data from DOE concerning [CCS] performance at units burning bituminous coal” EPA Br. 58. However, just as DOE views lignite drying as still being at the “demonstration” stage, it continues to view CCS with underground storage as not-yet-feasible for widespread commercial use.

Indeed, in a press release dated November 30, 2016, long after the publication of the Rule, and, indeed, after the filing of the opening briefs in this case, DOE announced \$44 million in funding for “CO₂ Storage Projects.” About one-third is for what DOE referred to as “pre-feasibility projects,” which “will provide a *pre feasibility*

study for a commercial scale geologic storage site.”⁵ Thus, in DOE’s view, CCS with underground storage, including storage in deep saline formations, is not “adequately demonstrated.” It is at the “pre-feasibility” stage, meaning it is not yet feasible for “commercial scale deployment.” DOE Press Release at 2.

C. The public statements of the “Carbon Capture and Storage Scientists” contradict the claims in their amicus brief and suggest that they too do not believe CCS is “adequately demonstrated.”

Relatedly, a group calling itself the “Carbon Capture and Storage Scientists” has filed an amicus brief in support of EPA. However, a comparison of the academic affiliations of the members of this group and the DOE press release reveals that some of the group’s members are affiliated with institutions that will be receiving DOE grants for “pre-feasibility” studies. In other words, while the CCS scientists claim in their brief that CCS with underground storage is “adequately demonstrated,” some of the institutions with which they are affiliated, including the University of Texas and Columbia University, are to receive grants premised on the notion that CCS with underground storage is not yet feasible for widespread use.

⁵ ENERGY.GOV, Energy Department Announces More Than \$44 Million for CO₂ Storage Projects (Nov. 30, 2016) (“DOE Press Release”), *available at* <https://energy.gov/under-secretary-science-and-energy/articles/energy-department-announces-more-44-million-co2-storage> (emphasis added). A copy of this press release is included as an addendum submitted with this reply. Petitioner-Intervenors recognize it is unusual to refer to extra-record material in a reply brief, but not only was this press release not available to be part of the record, but it and the other extra-record material cited herein are only in response to arguments raised for the first time in EPA’s brief, not in the proposed or final rules.

Likewise, while space does not permit an examination of the scientists' research, their public statements, including requests for funding, contradict the claims in their brief. For example, Dr. Gary Rochelle is currently seeking funding for the "Texas Carbon Management Program" at the University of Texas, which is a "research program . . . focused on the technical obstacles to the deployment of CO₂ capture" According to Dr. Rochelle's fundraising document, "[t]he deployment of this technology will require a demonstration of CO₂ capture and sequestration on an absorber module *at a commercial scale*."⁶ This does not sound like something that is already "adequately demonstrated" at a commercial scale.

Similarly, in a LinkedIn post on April 1, 2016, *almost six months after* the Final Rule was published, Roger Aines of the Lawrence Livermore National Laboratory stated that CCS "*is too expensive to put on electric power facilities . . .*" Roger Aines, Carbon Capture Innovation at the Right Scale (emphasis added), *available at* <https://www.linkedin.com/pulse/carbon-capture-innovation-right-scale-roger-aines?trk=prof-post>. Likewise, the website of Jennifer Wilcox of the Colorado School of Mines states, "Within my research group we combine experimental and theoretical methods to investigate capture and sequestration of trace metals . . . and carbon dioxide. *Central to the approach of our lab is to connect with government labs and establish industry partnerships to assist in focusing and directing our research efforts in a way that bridge atomistic to*

⁶ See the "Prospectus" for Dr. Rochelle's Texas Carbon Management Program, which is *available at* http://rochelle.che.utexas.edu/files/2015/04/Prospectus_TXCMP_2-25-16m.pdf. (emphasis added).

plant scales.” Available at <http://chemeng.mines.edu/faculty/jwilcox/> (emphasis added).

D. Boundary Dam is insufficient to support EPA’s claim that CCS is adequately demonstrated for new lignite-fueled units larger than Boundary Dam.

As evidence that CCS is adequately demonstrated, EPA relies primarily upon SaskPower’s Boundary Dam project, asserting that it is sufficient, standing alone, to support CCS as BSER for all coal-fueled EGUs. EPA Br. 52.

This argument fails for all the reasons discussed in Petitioners’ briefs. In addition, focusing specifically on lignite-fueled EGUs, even accepting all of EPA’s claims and assumptions as true, Boundary Dam is insufficient to support CCS as adequately demonstrated for new, lignite-fueled EGUs even slightly larger than Boundary Dam.

At 110 MW, see 80 Fed. Reg. at 64,549, JA41, Boundary Dam is small—as EGUs go, it is tiny. EPA claims that half of all domestic commercial coal-fired power plants are 149 MW or smaller, EPA Br. 22, but this statistic is both misleading and irrelevant.

New EGUs should be expected to reflect current trends. Units smaller than 150 MW are only about 11% of the nation’s coal-fueled capacity and are, on average, smaller than EGUs being constructed today. According to the evidence EPA itself cites, 55% of the total current U.S. coal-fueled generation capacity is from EGUs with capacities greater than 500 MW per unit, and these units have an average age of about

34 years. The remaining 45% is from EGUs with capacities under 500 MW per unit. These units average 45 years old, and the youngest have the largest capacities: 250-499 MW. They average 38.4 years old. Over half the EGUs with capacities under 250 MW per unit are, on average, about 50 years old. Revised Regulatory Impact Analysis (“RIA”), 2-6 (Table 2-3), EPA-HQ-OAR-2013-0495-11877, JA2809

Additionally, not only was Boundary Dam heavily subsidized by the Canadian government, it is a matter of public record that the Boundary Dam demonstration project that now exists had to be scaled downward from an earlier plan to build a 300 MW facility because of costs overruns—*the 300 MW project was too expensive*. See generally Comments of the Edison Electric Institute at 78, EPA-HQ-OAR-2013-0495-9780, JA1267; see also power-technology.com, *SaskPower Boundary Dam and Integrated CCS, Canada*, available at <http://www.power-technology.com/projects/sask-power-boundary/>.

EPA is not free to ignore this. Rather, even if the Court were to accept all EPA’s arguments and defer to all its assumptions and inferences, the available evidence *still* shows that CCS is cost-prohibitive for new lignite-fueled EGUs that are even slightly larger than Boundary Dam. In other words, even accepting for argument’s sake EPA’s position (which the Court should not for the many reasons outlined by Petitioners and Petitioner-Intervenors), EPA would *still* have to come up with a different BSER and a different emissions limitations for new lignite-fueled EGUs larger than Boundary Dam.

Respectfully submitted,

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February 3, 2017.

CERTIFICATE OF SERVICE

I hereby certify that, on this 3rd day of February, 2017, a true and correct copy of the foregoing was served electronically through the Court's CM/ECF system on all ECF-registered counsel.

/s/ Mark Walters

Mark Walters

CERTIFICATE OF COMPLIANCE

I certify that the computer program used to prepare this document reported that there are 3,263 words in the pertinent parts of the document, including headings, footnotes, quotations, and citations, and therefore is within the word limit set by the Court.

/s/ Mark Walters

Mark Walters