The Strong Legal Foundation for the Carbon Pollution Standards for New Power Plants:

A Response to the House Energy & Commerce Committee's Letter on the Energy Policy Act of 2005 and Carbon Capture and Storage Technology

December 5, 2013

Introduction

On November 15, 2013, the Republican leadership of the House Committee on Energy and Commerce published a letter addressed to EPA Administrator Gina McCarthy in which they requested that the agency withdraw its proposed Carbon Pollution Standards for new power plants.[1] In the letter, they argue that the agency unlawfully relied on four ongoing projects to establish that carbon capture and storage (CCS) is "adequately demonstrated" for purposes of Clean Air Act (CAA) section 111, despite the fact that these projects receive government funding.[2] The projects referenced in the letter are Southern Company's Kemper County Energy Facility (Kemper County), Summit Power Group's Texas Clean Energy Project (TCEP), Hydrogen Energy California's integrated gasification combined cycle (IGCC) plant (HECA), and SaskPower's Boundary Dam CCS project (Boundary Dam). Except for Boundary Dam, these projects all receive assistance from DOE's Clean Coal Power Initiative (CCPI),[3] established in the Energy Policy Act of 2005 (EPAct),[4] as well as a tax credit under an EPAct amendment to section 48 of the Internal Revenue Code.[5] Boundary Dam is located in Canada

[1] Letter from Fred Upton, Chairman, Ed Whitfield, Chairman, Subcommittee on Energy and Power, Joe Barton, Chairman Emeritus, and Steve Scalise, Vice-Chair, Subcommittee on Energy and Commerce, to Gina McCarthy, Administrator, EPA (Nov. 15, 2013) (available at http://energycommerce.house.gov/sites/republicans.energycommerce.house.gov/files/letters/20131115EPA.pdf).

[2] *Id.*

[3] *Major Demonstrations: Clean Coal Power Initiative*, NETL, http://www.netl.doe.gov/technologies/coalpower/cctc/ccpi/ (last visited Nov. 21, 2013).

[4] 42 U.S.C. §§ 15961-64.

[5] *See Kemper County IGCC Fact Sheet: Carbon Dioxide Capture and Storage Project*, Carbon Capture and Sequestration Technologies @ MIT, http://sequestration.mit.edu/tools/projects/kemper.html (last visited Nov. 21, 2013); Summit Power, Texas Clean Energy Project: A Progress Report 8 (2011), *available at* http://www.netl.doe.gov/publications/proceedings/11/co2capture/presentations/4-Thursday/25Aug11-Kirksey-Summit-Carbon%20Capture%20using%20Rectisol.pdf; *Hydrogen Energy California*, Chadbourne & Park LLP, http://www.chadbourne.com/Hydrogen-Energy-California-02-01-2013/ (last visited Nov. 21, 2013).

and does not receive funding from CCPI or a tax credit under section 48A, and therefore the provisions of EPAct discussed below do not apply to this project.

Discussion

1. EPAct Provisions

EPAct places boundaries on the manner in which EPA may rely on projects that receive funding from the CCPI or a tax credit to establish that a technology been adequately demonstrated under CAA section 111. However, the authors of the letter misconstrue the EPAct provisions in question, ignoring the carefully struck legislative compromise enacted in the statute's plain language. Section 402(i) of EPAct provides:

> No technology, or level of emission reduction, **solely** by reason of the use of the technology, or the achievement of the emission reduction, by 1 or more facilities receiving assistance under this Act, shall be considered to be—
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> (1) adequately demonstrated for purposes of section 111 of the Clean Air Act. . . .[6]

Thus, EPAct section 402(i) only prohibits EPA from relying "solely" on facilities that receive financial assistance from CCPI when determining whether a particular technology has been adequately demonstrated for purposes of CAA section 111. The plain language of this provision leaves the agency free to consider such projects *in addition to* other considerations supporting such a determination.

Section 1307 of EPAct, which amends the Internal Revenue Code to create a tax credit for clean-coal projects, contains a similar prohibition:

> No use of technology (or level of emission reduction solely by reason of the use of the technology), and no achievement of any emission reduction by the demonstration of any technology or performance level, by or at one or more facilities with respect to which a credit is allowed under this section, **shall be considered to indicate that** the technology or performance level is—
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> (1) adequately demonstrated for purposes of section 111 of the Clean Air Act. . . .[7]

The language "shall be considered to indicate that" again provides that the use of technology at EPAct-supported facilities is insufficient, without other evidence, to support a finding that a technology is adequately demonstrated under section 111. Given that EPA's determination that

[6] 42 U.S.C. § 15962(i) (emphasis added).

[7] Energy Policy Act of 2005, Pub. L. No. 109-58, § 1307, 119 Stat. 594, 1003-04 (codified at 26 U.S.C. § 48A(g)) (emphasis added).

CCS is adequately demonstrated does not rest primarily (much less wholly) upon the plants receiving support under section 1307, that determination is legally sound.

2. Demonstration that CCS is the Best System of Emission Reduction for Coal-Fired Power Plants in the Proposed Rule

EPA analyzes systems of emission reduction and identifies the "best system of emission reduction" (BSER) within the meaning of section 111 using four factors: feasibility, costs, size of emission reductions, and technology development (i.e., whether the system promotes the further development and implementation of emission reducing technology).[8] EPA, following established case law, has interpreted the specific question of whether a system is "adequately demonstrated" to hinge on the technical feasibility of implementing that system.[9] In identifying CCS as the best system of emission reduction for new coal-fired power plants, including establishing that CCS is adequately demonstrated, EPA rigorously supports its determination primarily with evidence other than the three projects the authors of the letter reference. EPA's Proposed Rule satisfies the statutory requirements of both the Clean Air Act and EPAct.

a. Feasibility

To establish the technical feasibility of CCS (i.e., whether CCS has been adequately demonstrated), EPA considered "an extensive literature record"[10] and "fossil fuel-fired industrial plants currently in commercial operation and pilot-scale fossil fuel-fired EGUs currently in operation,"[11] in addition to "the progress towards completion of construction of fossil fuel-fired EGUs implementing CCS at commercial scale."[12] This final category includes reference to the three plants receiving funding under EPAct.

EPA cites numerous publications by governmental bodies and scientists that establish that CCS is adequately demonstrated. These include a 2009 study by the Pacific Northwest National Laboratory that concluded that CCS is technically viable and that "key component technologies of complete CCS systems have been deployed at scales large enough to meaningfully inform discussions about CCS deployment on large commercial fossil-fired power plants,"[13] as well as a series of DOE/NETL reports assessing the cost and performance of CCS

[8] EPA, Standards of Performance for Greenhouse Gas Emissions from New Stationary Sources: Electric Utility Generating Units 25 (Sept. 20, 2013), *available at* http://www2.epa.gov/carbon-pollution-standards/2013-proposed-carbon-pollution-standard-new-power-plants [hereinafter Proposed Rule].

[9] *See id.* at 174 (citing *Portland Cement Ass'n v. Ruckelshaus*, 486 F.2d 375, 390 (D.C. Cir. 1973)).

[10] *Id.* at 215.

[11] *Id.* at 215; *see also id.* at 233-36.

[12] *Id.* at 215; *see also id.* at 236-37.

[13] Proposed Rule, *supra* note 8, at 216-17 (presumably referring to JJ Dooley, CL Davidson & RT Dahowski, An Assessment of the Commercial Availability of Carbon Dioxide Capture and Storage Technologies as of June 2009 (2009), *available at* http://www.pnl.gov/main/publications/external/technical_reports/PNNL-18520.pdf).

at pulverized coal and IGCC plants.[14] In addition, EPA reviews several studies that attest to the availability of the separate components of CCS systems, including capture,[15] transportation,[16] and storage.[17] This body of research lends highly credible, independent support to EPA's determination that CCS is technically feasible.

EPA bolsters its determination that CCS is adequately demonstrated with evidence demonstrating that the individual components of the technology have long been in use in other applications and are adequately demonstrated.[18] For instance, EPA references: AES's Warrior Run and Shady Point power plants, which are coal-fired units that capture CO_2 with amine scrubbers;[19] the Searles Valley Minerals soda ash plant, which employs the same process;[20] the Dakota Natural Gas Company's synthetic natural gas production plant, which captures CO_2 to be used in enhanced oil recovery 200 miles away;[21] AEP's Mountaineer Plant, which used chilled ammonia CO_2 capture technology, as well as a project by Alstom Power's validating the technology;[22] the Vattenfall plant, which uses oxy-combustion of coal;[23] and Southern Company's Alabama Power Plant Barry, which captures and stores 90 percent of the CO_2

[14] *Id.* at 217; *see generally* DOE/NETL, Cost and Performance of PC and IGCC Plants for a Range of Carbon Dioxide Capture (2011), *available at* http://www.netl.doe.gov/energy-analyses/pubs/Gerdes-08022011.pdf.

[15] *Id.* at 217-19 (citing Report of the Interagency Task Force on Carbon Capture and Storage 29 (2010), *available at* http://www.epa.gov/climatechange/Downloads/ccs/CCS-Task-Force-Report-2010.pdf).

[16] *Id.* at 219-20 (citing JJ Dooley et al., Carbon Dioxide Capture and Geologic Storage: A Key Component of a Global Energy Technology Strategy to Address Climate Change (2006), *available at* http://www.epa.gov/air/caaac/coaltech/2007_02_battelle.pdf).

[17] *Id.* at 220-30 (citing, *inter alia*, Intergovernmental Panel on Climate Change, Special Report on Carbon Dioxide Capture and Storage (2005), *available at* http://www.ipcc.ch/pdf/special-reports/srccs/srccs_chapter5.pdf; Sally M. Benson & David R. Cole, *CO_2 Sequestration in Deep Sedimentary Formations*, 4 Elements , 325 (2008), *available at* http://www.geo.arizona.edu/~reiners/geos195K/CO2Sequestration_Benson_ELEMENTS.pdf; Report of the Interagency Task Force on Carbon Capture and Storage 29 (2010), *available at* http://www.epa.gov/climatechange/Downloads/ccs/CCS-Task-Force-Report-2010.pdf; Weon Shik Han et al., *Evaluation of Trapping Mechanisms in Geologic CO_2 Sequestration: Case Study of SACROC Northern Platform, a 35-year CO_2 Injection Site*, 310 Am. J. of Sci. Online 282 (2010) *available at* http://www.ajsonline.org/content/310/4/282.abstract; Margaret Sewell, Frank Smith & Dominique Van Gent, *Western Australia Greenhouse Gas Capture and Storage: A Tale of Two Projects* (2012), *available at* http://cdn.globalccsinstitute.com/sites/default/files/publications/39961/ccsinwareport-opt.pdf; DOE/NETL, Best Practices for: Monitoring, Verification, and Accounting of CO_2 Stored in Deep Geologic Formations – 2012 Update (2012), *available at* http://www.netl.doe.gov/technologies/carbon_seq/refshelf/BPM-MVA-2012.pdf; U.S. Geological Survey Geologic Carbon Dioxide Storage Resources Assessment Team, National Assessment of Geologic Carbon Dioxide Storage Resources – Results: U.S. Geological Survey Circular 1386 (2013), *available at* http://pubs.usgs.gov/circ/1386/).

[18] *See id.* at 233-36.

[19] *Id.* at 233

[20] *Id.*

[21] *Id.* at 234.

[22] *Id.*

[23] *Id.* at 235.

produced.[24] To demonstrate the viability of geologic sequestration, the agency also points to four existing commercial CCS facilities in other countries, including the Sleipner gas processing unit in the North Sea, the Snøhvit LNG processing facility in the Barents Sea, the In Salah gas processing facility in Algeria, and the Weyburn enhanced-oil-recovery site in Canada.[25] Thus, through use of CCS in the U.S. and internationally, commercial scale projects and demonstration projects, application of the same technology for a variety of sources types, and a large body of engineering studies and analyses of the central aspects of the technology and the technology as a whole, EPA establishes the foundation for its finding that the technology is technically feasible--independent of the three projects receiving EPAct support.

The evidence supporting EPA's determination that CCS is adequately demonstrated is extensive and considerably more extensive than what was available to show the feasibility of emergent technologies that have been identified as the best system of emission reduction in past section 111 performance standards. For example, the 1971 and 1978 NSPS for sulfur dioxide emitted by coal-fired power plants relied upon use of then-emergent flue gas desulfurization (FGD) technologies. When the 1971 NSPS was promulgated (requiring use of low-sulfur coal or FGD), there was only one FGD vendor and three units in operation. The 1979 NSPS could only be met using an FGD device. The Congressional Research Service, in documenting the technology-forcing function that section 111 has played in the past, notes that the flexibility inherent in the Administrator's authority to determine which technologies have been adequately demonstrated "has been used to authorize control regimes that extended beyond the merely commercially available to those technologies that have only been demonstrated, and thus are considered by many to have been 'technology-forcing.'"[26] This is in line with case law holding

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[24] *Id.* at 236.

[25] *Id.* at 222 n. 201; *see also* JJ Dooley, CL Davidson & RT Dahowski, An Assessment of the Commercial Availability of Carbon Dioxide Capture and Storage Technologies as of June 2009 (2009), *available at* http://www.pnl.gov/main/publications/external/technical_reports/PNNL-18520.pdf.

[26] Larry Parker & James E. McCarthy, Cong. Research Serv., R40585, Climate Change: Potential Regulation of Stationary Greenhouse Gas Sources Under the Clean Air Act 12 (2009). A history of the development of FGD devices (cited in the CRS report) further illustrates how much the SO_2 NSPS motivated the development of this technology:

> The Standards of Performance for New Sources are technology-forcing, and for the utility industry they forced the development of a technology that had never been installed on facilities the size of utility plants. That technology had to be developed, and a number of installations completed in a short period of time. The US EPA continued to force technology through the promulgation of successive regulations. The development of this equipment was not an easy process.
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> . . .
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> Chemical and mechanical engineers had never dealt with the challenges they faced in developing FGD systems for utility plants during this period. Chemical engineers had never designed process equipment as large as was required, nor had they dealt with the complex chemistry that occurred in the early FGD systems. Mechanical engineers were faced with similar challenges. While they had designed equipment for either acid service or slurry service, they typically had not designed for a combination of the two. Generally, equipment was larger than what they normally dealt with in chemical plants and refineries.

that EPA may base its BSER determination on a reasonable prediction from existing technology, especially when there is significant lead time for compliance.[27]

Ultimately, to meet the requirements of CAA section 111 a technology need only be "available."[28] The use of the component technologies required for CCS is long-established in other industrial applications, while carbon capture has been in use at coal-fired power plants in the United States since the late 1970s.[29] Considerable research further supports EPA's determination that CCS is adequately demonstrated, as does its use in demonstration and full-scale projects both in the United States and elsewhere (in addition to its use in the three plants receiving support under EPAct). EPA's determination that CCS is adequately demonstrated is technically sound and legally robust.

b. Costs

Regarding costs, EPA relies primarily on comparisons of the levelized cost of electricity developed by DOE/NETL[30] and EIA.[31] The DOE/NETL estimates are based on contracting methodology, ISO ambient conditions, labor costs, and a generic "level greenfield site in the United States Midwest with no unusual characteristics";[32] Kemper County, TCEP, and HEPA are only an "additional consideration" in the cost analysis.[33] The agency also points to EIA modeling that "projects that few, if any, new coal-fired EGUs would be built in this decade and that those that are built would include CCS."[34] From this discussion, it is clear that EPA did not

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> It is an understatement to say that the new source performance standards promulgated by the EPA were technology-forcing. Electric utilities went from having no scrubbers on their generating units to incorporating very complex chemical processes. Chemical plants and refineries had scrubbing systems that were a few feet in diameter, but not the 30- to 40-foot diameters required by the utility industry. Utilities had dealt with hot flue gases but not with saturated flue gases that contained all sorts of contaminants. Industry, and the US EPA, has always looked upon new source performance standards as technology-forcing, because they force the development of new technologies in order to satisfy emission requirements.

Donald Shattuck et al., A History of Flue Gas Desulfurization (FGD) – The Early Years at 15, 3. As a result of the innovation stimulated by the performance standards, Germany subsequently implemented a program to control acid rain, 33% of the FGD systems installed were licensed from U.S. companies. M. Taylor, The Influence of Government Actions on Innovative Activities in the Development of Environmental Technologies to Control Sulfur Dioxide Emissions from Stationary Sources 211-12 (Jan. 2001) (unpublished Ph.D. thesis, Carnegie Mellow University) (on file with author) at 56, 131.

[27] *Id.* at 391-92.

[28] *Portland Cement Ass'n v. Ruckelshaus*, 486 F.2d 375, 391 (D.C. Cir. 1973) (citing S. Rep. No. 91-1196, at 16 (1970); H.R. Rep. No. 91-1146, at 10 (1970)).

[29] Dooley et al., *supra* note 25, at 8-9.

[30] *See id.* at 239-40.

[31] *Id.* at 244.

[32] *Id.* at 240.

[33] *Id.* at 251.

[34] *Id.* at 22.

rely "solely," or even primarily, on the three projects at issue in determining that CCS is economically viable.

EPA does mention Kemper County, TCEP, and HECA (as well as Boundary Dam, to which the EPAct provisions do not apply) in noting that the costs of CCS are expected to decrease over time,[35] but only to establish the factual predicate for its reasoning. The agency posits that the costs of CCS will be reasonable partly because projects using it will be "next of a kind," and others will have the opportunity to gain "operational knowledge" from a number of "first of a kind" projects, including those at issue here and others.[36] In addition to the three projects at issue here, EPA also points to Summit Power's polygeneration project in Texas, the Captain Clean Energy Project in the UK,[37] and the Future Gen project in Illinois,[38] none of which receives funding from CCPI.[39] EPA does not reference the Kemper County, TCEP, and HECA plants as demonstrating the costs of CCS, but as the forerunners of the CCS revolution which will allow costs of CCS to come down over time. Thus, EPA notes that the existence of first-generation facilities employing CCS—which include but are not limited to those at issue here—supports its prediction that the costs of CCS will decrease over time.

Finally, EPA recognizes that although many of the CCS projects currently under development have received government subsidies, it did not base its BSER determination on these projects without taking the subsidies into account. Rather, EPA "consider[s] the current costs of partial-capture CCS even without subsidization to be reasonable."[40] Likewise, it concludes that government subsidies do not "mean that the costs of CCS would otherwise be unreasonable."[41] EPA explicitly states that its cost determination was made independently of government subsidies.

Conclusion

The House committee members over-read EPAct as prohibiting EPA from even looking at facilities that receive CCPI funding or tax credits when making its BSER determination under CAA section 111. Their argument ignores not only the plain language of EPAct's provisions, but also EPAct's carefully circumscribed purpose of preventing one or more subsidized projects, in isolation, from being used as the full proof that a technology has been adequately demonstrated. By carefully examining extensive research, the established use of component

[35] *See id.* at 241-43, 258-59.

[36] *Id.*

[37] *Id.* at 242-43.

[38] *Id.* at 258.

[39] *See* Major Demonstrations: Clean Coal Power Initiative, NETL, http://www.netl.doe.gov/technologies/coalpower/cctc/ccpi/ (last visited Nov. 21, 2013)

[40] Proposed Rule, *supra* note 8, at 254.

[41] *Id.* at 251.

technologies in other industrial applications, and a variety of demonstration and full-scale projects (in addition to those receiving support under EPAct), EPA has established that CCS is adequately demonstrated. The identification of CCS as the best system of emission reduction for new coal-fired power plants is legally sound.

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