ORAL ARGUMENT SCHEDULED FOR April 17, 2017

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.	Case No. 15-1381 (consolidated with cases no. 15-1396, 15-1397, 15-1399, 14-1434, 15-1438, 15-1448, 15-1456, 15-1458, 15-1463, 15-1468, 15-1469, 15-1481, 15-1482, 15-1484, 16-1218, 16-1220, 16-1221, 16-1227)

UNOPPOSED MOTION BY CARBON CAPTURE AND STORAGE SCIENTISTS FOR LEAVE TO PARTICIPATE AS *AMICI CURIAE*

MICHAEL BURGER
Columbia Law School
Sabin Center for Climate Change Law
435 West 116th Street
New York, NY 10027
Tel: (212) 854-2372
mburger@law.columbia.edu

Counsel for Amici Curiae

December 13, 2016

REQUEST FOR MOTION TO PARTICIPATE AS *AMICI CURIAE*

Pursuant to Fed. R. App. Pro. 29(b) and D.C. Cir. Rule 29(b), experts on carbon capture and sequestration ("CCS") Roger Aines, Sally Benson, S. Julio Friedmann, Jon Gibbins, Raghubir Gupta, Howard Herzog, Susan Hovorka, Meagan Mauter, Ah-Hyung (Alissa) Park, Gary Rochelle and Jennifer Wilcox (hereinafter, "CCS scientists") respectfully move for leave to participate as *amici curiae* in support of the Respondents Environmental Protection Agency ("EPA") and Regina A. McCarthy, EPA Administrator.

The proposed *amici curiae* have notified the other parties of this motion. Counsel for the following Respondent-Intervenors gave their consent to the CCS scientists to file an *amicus* brief: American Lung Association; 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; Clean Air Council; Clean Wisconsin; Conservation Law Foundation; National Grid Generation, LLC; New York Power Authority; Ohio Environmental Council; Pacific Gas and Electric Company; Sacramento Municipal Utility District; and Sierra Club. Counsel for Petitioner State of Missouri has also provided the consent of their client. Counsel for Petitioner State of North Dakota has stated that its client does not oppose the motion to participate. Counsel for Petitioners in case nos. 15-1381, 15-1396, 15-

1399, 15-1434, 15-1448, 15-1463 and 15-1469 have stated that they take no position on the question of whether this motion should be granted. Counsel for the following Respondent-Intervenors have also stated that they take no position on the motion: City of New York; Commonwealth of Massachusetts; Commonwealth of Virginia; State of California; State of Connecticut; State of Delaware; State of Hawaii; State of Illinois; State of Iowa; State of Maine; State of Maryland; State of Minnesota; State of New Hampshire; State of New Mexico; State of New York; State of Oregon; State of Rhode Island; State of Vermont; and State of Washington. Counsel for federal respondents, other respondent-intervenors and the additional petitioners in this consolidated case did not respond to notice sent to liaison counsel asking whether they consented, objected, or took no position on *amici's* proposed participation. That notice, which was sent to counsel on Tuesday, December 6, 2016, provided that if no response was received by Friday, December 9, 2016, counsel for proposed *amici* CCS scientists would notify this Court that those parties took no position on this motion.

In support of this motion, CCS scientists state as follows:

1. One of the fundamental issues underpinning this case is whether it was reasonable for EPA to conclude that the technologies required to implement partial CCS at new coal-fired power plants are adequately demonstrated within the meaning of the Clean Air Act ("CAA"), and can therefore be considered part of the

best system of emissions reduction ("BSER") for carbon dioxide ("CO_2") emissions from this source category.

2. The CCS scientists filing for leave to participate as *amici curiae* in this case are experts on the current status and deployment of CCS technologies. They are uniquely well-situated to evaluate the technical feasibility the conventional CCS technologies that underpin the BSER, specifically: post-combustion CO_2 capture, pipeline transport, and geologic storage. They also have expertise on new and emerging CCS technologies that are currently in development and could considerably reduce CCS costs in the near future. As such, they can provide a valuable perspective on one of the fundamental issues in this case.

Amicus curiae Roger Aines is a senior scientist at the Lawrence Livermore National Laboratory's Atmospheric, Earth and Energy Division. He is an expert in various aspects of carbon dioxide ("CO_2") capture and storage, including the development of catalysts for CO_2 capture, encapsulation of CO_2 capture solvents, and management of pressure in geologic sequestration through brine withdrawal and treatment. He has a Ph.D. in geochemistry from Caltech and a B.S. in chemistry from Carleton College.

Amicus curiae Sally Benson works at Stanford University as a Professor in the Department of Energy Resources Engineering, Co-Director of the Precourt

Institute for Energy, and Executive Director of the Global Climate and Energy Project. She previously worked as the Division Director for the Earth Sciences Division and Associate Laboratory Director for Energy Sciences at Lawrence Berkeley National Laboratory. Her research focuses on low carbon energy supply and conversion technologies, including the geologic storage of CO_2 in deep underground formations. She has a Ph.D. and M.S. in materials science and mineral engineering from U.C. Berkeley and a B.S. in geology from Barnard College, Columbia University.

Amicus curiae S. Julio Friedmann is the Senior Advisor for Energy Innovation at the Lawrence Livermore National Laboratory. He previously served as the Principal Deputy Assistant Secretary at the U.S. Department of Energy ("DOE") Office of Fossil Energy from 2013 through 2016, the Chief Energy Technologist at the Lawrence Livermore National Laboratory, and a Senior Research Scientist at ExxonMobil. He has a Ph.D. in geology from the University of Southern California and a B.S. and M.S. in geoscience from the Massachusetts Institute of Technology ("MIT").

Amicus curiae Jon Gibbins is the Director of the United Kingdom CCS Research Centre, where he conducts research on post-combustion capture using solvents. He is also a Professor of Power Plant Engineering and Carbon Capture at the University of Sheffield. He has worked on coal and biomass gasification and

combustion technologies for over 30 years. He has a Ph.D. in chemical engineering and a B.Sc. in mechanical engineering from Imperial College, London.

Amicus curiae Raghubir Gupta is the Vice President of RTI International's Energy Technology Division, where he spearheads the development of advanced clean energy technologies including CO_2 capture and utilization technologies. He has deep expertise in coal gasification systems and managed a $180 million CCS project at Tampa Electric's integrated combined cycle gasification ("IGCC") plant. He has a Ph.D. in chemical engineering from the Illinois Institute of Technology, and a B.S. in chemical engineering from the Indian Institute of Technology.

Amicus curiae Howard Herzog is a Senior Research Engineer at the MIT Energy Initiative, where he has worked since 1989 on the research and development of greenhouse gas mitigation technologies. He was a Coordinating Lead Author for the Intergovernmental Panel on Climate Change Special Report on Carbon Dioxide Capture and Storage, a co-author on the MIT Future of Coal Study, and a U.S. delegate to the Carbon Sequestration Leadership Forum's Technical Group. He was awarded the 2010 Greenman Award by the International Energy Agency ("IEA") Greenhouse Gas R&D Program for his work on CO_2 control technologies. He has a Chemical Engineer's Degree, M.S. in chemical engineering practice, and a B.S. in chemical engineering from MIT.

Amicus curiae Susan Hovorka is a Senior Research Scientist at the Bureau of Economic Geology, Jackson School of Geosciences, University of Texas at Austin. Her research focuses on assessing the effectiveness of subsurface geologic CO_2 sequestration approaches. She is the principal investigator of the Gulf Coast Carbon Center, the project lead for the early test of the Southeast Regional Carbon Sequestration Partnership, and recently led a team of researchers on the completion of the first U.S. field test of CO_2 storage in brine-filled sandstones (a form of deep saline storage). She has a Ph.D. and M.A. in geology from the University of Texas and a B.A. in geology from Earlham College.

Amicus curiae Meagan Mauter is an Assistant Professor in Civil Environmental Engineering and Engineering and Public Policy at Carnegie Mellon University. She conducts research on the techno-economic feasibility of CCS at coal-fired power plants, and the use of membrane materials and processes in carbon capture. She has a Ph.D. in chemical and environmental engineering from Yale University, and a masters of environmental engineering and B.S. in civil & environmental engineering from Rice University.

Amicus curiae Ah-Hyung (Alissa) Park is the Associate Director of the Lenfest Center for Sustainable Energy at Columbia University and the Lenfest Junior Professor in Applied Climate Science. She is currently leading a worldwide multidisplinary National Science Foundation Research Coordination Network

devoted to carbon capture, utilization and storage. Her research focuses on innovative technologies, including the use of novel organic-inorganic hybrid nanomaterials in CO_2 capture and conversion and the use of in-situ and ex-situ carbon mineralization for CO_2 storage. She has a Ph.D. in chemical and biomolecular engineering from Ohio State University, and an M.A.Sc. and B.A.Sc. in chemical and biological engineering from the University of British Columbia in Canada.

Amicus curiae Gary Rochelle is a professor at the University Of Texas Austin Department of Chemical Engineering. His research focuses on CO_2 capture technologies and other emission control techniques for power plants and industrial sources. He is currently working on the development of innovative solvents for CO_2 capture, which are currently being tested at a pilot scale facility. He has a Ph.D. in chemical engineering from U.C. Berkeley and a M.S. and B.S. in chemical engineering from MIT.

Amicus curiae Jennifer Wilcox is an associate professor at the Colorado School of Mines, where she leads a research group that combines experimental and theoretical methods to investigate CO_2 capture and sequestration approaches. She recently authored a comprehensive book on CO_2 capture technologies, "Carbon Capture" (2012). She has a Ph.D. in chemical engineering from the University of Arizona and a B.S. in mathematics and pre-medicine from Wellesley College.

3. Based on their collective expertise, CCS scientists believe that the technologies required to implement partial CCS at new coal-fired power plants are adequately demonstrated and ready for deployment at these facilities. In support of this conclusion, CCS scientists can refer the court to evidence that: (1) CCS technologies have been used in industrial applications for decades, and are now part of many large-scale, integrated CCS projects; (2) the same CCS technologies that are used in industrial applications can also be used to capture and store CO_2 from power plants; and (3) there are a variety of power-sector CCS projects currently in operation or under development today, including projects that capture significantly more than what would be required for a 500 MW power plant to meet EPA's standard, proving that these technologies are available for installation and that the standard is achievable.

5. CCS scientists also believe that the costs of implementing partial CCS at coal-fired power plants will decline in future years due to operational experience, cost reductions in existing CCS technologies, and research and development of novel CCS technologies. Thus, while the standard is already achievable, compliance will become even easier in the near future.

6. D.C. Cir. Rule 29 permits the filing of a motion for leave to participate as *amicus curiae* up to seven days after the filing of the principal brief of the party

being supported, but encourages filing of a notice of intent as soon as practicable. *Amici* CCS scientists are filing this motion as soon as practicable, prior to the filing of the Respondents' reply brief. If permitted to file as an *amicus* brief, *amici* would file a document within the briefing schedule, Circuit Rules, and any formatting requirements established by the Court.

WHEREFORE, the proposed *amici* CCS scientists respectfully request leave to file an *amicus curiae* brief in support of Respondents.

Dated: December 13, 2016

Respectfully Submitted,

/s Michael Burger

Michael Burger
Executive Director
Sabin Center for Climate Change Law
435 West 116th Street
New York, NY 10027
(212) 854-2372

CERTIFICATE OF COMPLIANCE

This motion complies with Federal Rules of Appellate Procedure 27(d)(1)&(2) and 29(b) and D.C. Circuit Rule 29(c) because it meets the prescribed format requirements, does not exceed 20 pages, and is being filed as promptly as practicable after the case was docketed in this Court. This motion also complies with the typeface requirements of Fed. R. App. P. 32(a)(5) and the type style requirements of Fed. R. App. P. 32(a)(5)&(6) because it has been prepared in a proportionally spaced typeface using Microsoft Word in 14-point Times New Roman.

/s Michael Burger

Dated: December 13, 2016

CERTIFICATE AS TO PARTIES AND AMICI CURIAE

Pursuant to D.C. Circuit Rule 28(a)(1)(A), counsel certifies as follows:

Except for the following, all parties, intervenors, and amici appearing in this court are, to the best of my knowledge, listed in the Certificates as to Parties, Rulings, and Related Cases filed by counsel for the State of North Dakota on October 13, 2016.

Amicus Curiae:

No. 15-1381 & consolidated cases:	Institute for Policy Integrity at New York University School of Law; Technology Innovation Experts, Nicholas Ashford, M. Granger Morgan, Edward S. Rubin, and Margaret Taylor

/s Michael Burger

Dated: December 13, 2016

CERTIFICATE OF SERVICE

I certify that the foregoing Motion of CCS Scientists for Leave to File as Amici Curiae, Certificate of Compliance, and Certificate of Parties and Amici Curiae were served to all registered counsel in these consolidated cases on December 13, 2016 via the Court's CM/ECF system. I also caused the foregoing to be served via first-class mail on counsel for the following parties at the following addresses:

Randy E. Brogdon
Troutman Sanders LLP
600 Peachtree Street, NE
Bank of America Plaza
Atlanta, GA 30308-2216
Counsel for Southern Power Company

Kelvin Allen Brooks
State of New Hampshire, Office of the Attorney General
33 Capitol Street Concord, NH 03301
Counsel for State of New Hampshire

William F. Cooper
State of Hawaii, Department of the Attorney General
425 Queen Street
Honolulu, HI 96813
Counsel for State of Hawaii

Tannis Fox
State of New Mexico, Office of the Attorney General
408 Galisteo Street Villagra Building
Santa Fe, NM 87501
Counsel for State of New Mexico

Carrie Noteboom
New York City Law Department
100 Church Street
New York, NY 10007
Counsel for City of New York

Thiruvendran Vignarajah
State of Maryland, Office of the Attorney General
200 St. Paul Place Baltimore, MD 21202
Counsel for State of Maryland

/s Michael Burger

Dated: December 13, 2016