IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

CLEAN WATER ACTION, *et al.*, Plaintiffs, v. E. SCOTT PRUITT, *Administrator, U.S. Environmental Protection Agency, et al.*, Defendants.	Civil Action No. 17-cv-00817 (KBJ)

DECLARATION OF BARBARA GOTTLIEB

I, Barbara Gottlieb, declare and state as follows:

1. My name is Barbara Gottlieb. I am over 21 years of age and suffer from no impairment or disability affecting my ability to give truthful testimony. I have personal knowledge of the facts set forth below.

2. I am the Director for Environment & Health of Physicians for Social Responsibility (PSR). I joined the staff of PSR in 2008 and have held my current position as program director since 2011. In that capacity I work with physicians and other health professionals on PSR's board of directors and in our chapters across the country, providing them information on the health effects of energy sources and assisting them in preparing to speak, write and testify on related topics. I myself have submitted testimony and have testified live before the U.S. Environmental Protection Agency on air and water pollution issues. While at

PSR I have authored or coauthored reports on the health implications of coal combustion and coal ash, including *Selling Our Health Down the River*: *Why EPA Needs to Finalize the Strongest Rule to Stop Water Pollution from Power Plants* (coauthor);[1] *Coal Ash, The Toxic Threat to our Health and Environment* (lead author);[2] *Coal's Assault on Human Health* (coauthor); *EPA's Blind Spot: Hexavalent Chromium in Coal Ash* (coauthor); and "The Life Cycle of Coal and Associated Health Impacts" (book chapter, forthcoming, lead author), as well as other reports and fact sheets on subjects concerning fossil fuels and their impacts on health. Prior employment includes the American Bar Association, Women's Edge Coalition and other nonprofit organizations.

3. Physicians for Social Responsibility is a nonprofit organization based in Washington, DC and with chapters in multiple states across the country. Our mission is to protect human life from the gravest threats to health and survival; we number environmental pollution among those threats. PSR's offices are located at 1111 14th Street NW, Washington, DC 20005.

4. In my professional capacity, I have been involved in coal ash pollution issues for several years. Before EPA finalized the Effluent Limitations Guidelines for steam electric power plants ("ELG rule") in 2015, I reviewed the proposed rule, the environmental assessment for the proposed rule, and other rulemaking documents In 2015, I co-authored a report (cited above) describing the health benefits of a strong ELG rule.[3] That report provides more detail on many of the points that I make in this declaration.

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[1] B. Gottlieb et al., Selling Our Selling Our Health Down the River: Why EPA Needs to Finalize the Strongest Rule to Stop Water Pollution from Power Plants (June 17, 2015), attached hereto as Attachment A.
[2] B. Gottlieb et al., Coal Ash: The Toxic Threat to our Health and Environment (Sep. 2010), attached hereto as Attachment B.
[3] Gottlieb et al., *supra* note 1 and Attachment A.

5. For the reasons discussed below, and in the attached reports, it is my opinion that the waste stream regulated by the ELG rule creates a health risk every single day. Any delay in implementing the ELG rule will increase unnecessary exposure and human health risk.

6. When fossil fuels, especially coal, are burned to generate electricity, they leave behind enormous volumes of waste material containing some of the most toxic elements on earth: arsenic, lead, mercury, selenium, chromium, cadmium, boron, and more. These toxics, once in the environment, remain there indefinitely. Each day, steam electric power plants (subsequently, "power plants") dump millions of gallons of wastewater loaded with these toxic pollutants into surface waters across the United States. In fact, coal, gas and oil-burning power plants are the largest industrial source of toxic wastewater in the United States, accounting for roughly one-third of all toxic pollution from industrial dischargers.[4]

7. The pollutants discharged by power plants can cause severe health problems in humans, including cancer and non-cancer risks and lowered IQ among children. The outflow of toxic effluent from power plants results in a two-pronged risk to human health: surface waters become unsafe to drink, and fish in the water become unsafe to eat. These risks may extend to significant numbers of Americans, as more than one in three Americans depend on drinking water from surface water sources, and 33% of U.S. power plants are located within five miles of a drinking water intake.[5] Because some of the pollutants in power plant wastewater bioaccumulate, meaning they persist and concentrate in aquatic food chains, certain risks are extended to people who eat contaminated fish.

[4] U.S. EPA, Environmental Assessment for the Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category, EPA-821-R-15-006, at 3-12 – 3-15 (Sep. 2015), attached hereto as Attachment C.
[5] Id. at 3-47.

8. The leading risks to health to which Americans are exposed by power plant wastes are cancer and neurological damage. Power plants discharge tens of thousands of pounds of cancer-causing pollutants into waterways each year. One of the most widespread and dangerous is arsenic. Arsenic is a known human carcinogen; it contributes to increased mortality from multiple internal organ cancers (liver, kidney, lung, and bladder) as well as an increased incidence of skin cancer in populations consuming drinking water high in inorganic arsenic.

9. The current parameters established to protect humans from over-exposure to arsenic in drinking water are inadequate. Drinking water utilities are required to reduce arsenic to a level below the Maximum Contaminant Level (MCL) of 10 micrograms per liter. According to EPA's Integrated Risk Information System, the drinking water unit risk for arsenic is 0.00005 per microgram per liter.[6] This means that the lifetime cancer risk associated with drinking water at the Maximum Contaminant Level (MCL) of 10 micrograms per liter is 1 in 2,000. This would ordinarily be considered an "unacceptable" level of risk, but the MCL was based in part on the cost and feasibility of drinking water treatment options. Since arsenic is a carcinogen, it presents a cancer risk that is proportional to dose, even at low levels of exposure. As a result, surface water contaminated by power plants discharges can present a substantial cancer risk, even if treated to existing standards for drinking water.

10. Arsenic also contaminates fish tissue, which creates an increased cancer risk through fish consumption.

[6] U.S. EPA, Integrated Risk Information System, Arsenic, inorganic; CASRN 7440 -38-2 (downloaded on June 5, 2017), attached hereto as Attachment D.

11. According to the Environmental Assessment for the final ELG rule, power plants currently discharge over 80 pounds of arsenic every day, and the ELG rule would reduce these discharges by 94%.[7]

12. Lead and mercury, which are assessed for their neurological risks in the EPA rulemaking, as I discuss below, may also cause cancer. Lead is currently categorized by the EPA as a "probable" carcinogen, and methyl mercury is categorized as a "possible human carcinogen," both based on animal studies and evidence of damage to genetic material, a first step in cancer formation. Power plants discharge over 50 pounds of lead and mercury every day.[8] The ELG rule would reduce these discharges by 97-98%.[9]

13. Many of the pollutants found in power plant wastewater can adversely affect the nervous system, particularly the developing brain and central nervous system of children. Lead has long been known to cause neurological damage and in children can cause hyperactivity, behavioral and attention difficulties, delayed mental development, motor and perceptual skill deficits, reduced IQ, and deficits in cognitive abilities that are not reflected in IQ scores, including acquisition and retention of information presented verbally. As with many neurotoxins, developing infants appear may be especially vulnerable, and exposure to lead increases neonatal mortality. Adults can also be harmed; adult exposure to lead can affect both the central and peripheral nervous systems. According to the Environmental Assessment for the final ELG rule, the rule would reduce lead discharges by 98%.[10]

14. Mercury is another well-known neurotoxin, dangerous in very small doses, and children can experience profound and permanent developmental and

[7] U.S. EPA, *supra* note 4 and Attachment C, at 3-14 and 7-7.
[8] Id. at 3-14.
[9] Id. at 7-7.
[10] Id.

neurological delays as a result of exposure in utero. Intellectual impairment associated with mercury exposure has an enormous financial cost, estimated by some experts to be in the billions of dollars each year in the United States.[11] Effects on adults from mercury exposure include vision defects, hand-eye coordination, hearing loss, tremors, and others. EPA modeled human exposure to mercury through contaminated fish and estimated that roughly half of power plant receiving waters are associated with methyl mercury intake greater than the reference dose.[12] According to the Environmental Assessment for the final ELG rule, the rule would reduce mercury discharges by 97%.[13]

15. Power plant wastewater may also contain other known neurotoxins. There is growing concern in the scientific community over the effects of manganese, specifically in drinking water.[14] The effects of manganese exposure include reduced IQ and impaired memory and attention, even at levels that are commonly found in North American groundwater supplies.[15] As with many neurotoxins, children are more sensitive than adults. Power plants dump over 20,000 pounds of manganese into U.S. waterways every day.[16] According to the Environmental Assessment for the final ELG rule, the rule would reduce manganese discharges by 80%.[17]

16. Arsenic, in addition to causing cancer, is also a neurotoxin. As with manganese, there is growing concern over the risks associated with levels commonly found in drinking

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[11] L. Trasande et al., Public Health and Economic Consequences of Methyl Mercury Toxicity to the Developing Brain, 113 Environ. Health Perspect. 590 (2005), attached hereto as Attachment E.
[12] U.S. EPA, *supra* note 4 and Attachment C, at 7-20.
[13] Id. at 7-7.
[14] P. Grandjean and P. J. Landrigan, Neurobehavioural Effects of Developmental Toxicity, 13 Lancet Neurol. 330 (2014), attached hereto as Attachment F; H.A. Roels et al., Manganese Exposure and Cognitive Deficits: A Growing Concern for Manganese Neurotoxicity, 33 Neurotoxicology 872 (2012), attached hereto as Attachment G.
[15] Y. Oulhote et al., Neurobehavioral Function in School-Age Children Exposed to Manganese in Drinking Water, 122 Environ. Health Perspect. 1343 (2014), attached hereto as Attachment H.
[16] U.S. EPA, *supra* note 4 and Attachment C, at 3-14.
[17] Id. at 7-7.

water. One study conducted in Maine found significant reductions in IQ and other endpoints in children exposed to 5-10 micrograms of arsenic per liter, a level that is below the current Maximum Contaminant Level for arsenic (Attachment I).[18]

17. The pollutants listed above, as well as others commonly found in power plant discharges, present a wide range of health risks beyond cancer and neurotoxicity. For example, arsenic, boron, lead, and thallium are all associated with reproductive and developmental risks. Cadmium can cause kidney, liver and lung damage. Hexavalent chromium can affect the liver and blood. Adults exposed to lead are at an increased risk of multiple health effects including hypertension, heart attacks, strokes, and premature mortality, as well as anemia and other blood disorders. Drinking large amounts of boron can result in damage to the testes, intestines, liver, kidney, and brain.

18. Finally, there are two other factors that can multiply threats to health from power plant discharges. One is the additive or cumulative level of contaminants in surface waters. Even in the absence of other sources of pollution, discharges from power plants may cause receiving streams to exceed MCLs of measured contaminants, thus becoming unsafe for drinking. However the reality is that many receiving streams are already polluted with the same pollutants found in power plant wastewater, and are under fish consumption advisories for these pollutants. Thus the likelihood is actually significantly greater that cumulative contaminant levels will reach levels that are dangerous, be it for drinking, fishing, or recreation.

19. Synergistic interactions are also possible among the multiple toxic substances discharged by power plants. While the properties of these toxicants are understood as they function individually, little is known about what happens when these toxic substances are

[18] G.A. Wasserman et al., A Cross-Sectional Study of Well Water Arsenic and Child IQ in Maine Schoolchildren, 13 Environ. Health 23 (2014), attached hereto as Attachment I.

mixed—as routinely happens in power plant wastes. Where several coal ash contaminants share a common mechanism of toxicity, or where they affect the same body organ or system, simultaneous exposure to several contaminants produces a greater chance of increased risk to health. For example, aluminum, arsenic, manganese, mercury, and lead all have adverse effects on the central nervous system; barium, cadmium and mercury all have adverse effects on the kidney. Concurrent exposure to multiple contaminants may intensify existing effects of individual contaminants, or may give rise to interactions and synergies that create new effects. Yet the EPA has not taken into account in its risk assessments or benefits assessments the possibility of synergistic interactions, despite the common occurrence of multiple contaminants in combination in power plant wastes.

20. Large quantities of toxic post-combustion wastes – coal ash as well as smokestack scrubber sludge, the waste removed from air pollution control systems – are trapped in power plant furnaces and smokestacks by technologies employed to reduce air pollution. Indeed, under Clean Air Act programs, the electric power industry has made significant strides in reducing air pollutant emissions. However, in order to dispose of the coal ash and other solid wastes they capture, power plant operators may transfer those wastes from the air into the water, alleviating one problem while creating another.

21. Power plant wastes enter and contaminate surface waters via multiple pathways. The wastes are frequently disposed in enormous surface impoundments or "ponds," from which toxic substances have been documented to escape. The most dramatic contamination events occur when ash pond retaining walls give way. These accidents, while uncommon, have spilled billions of gallons of toxic coal ash slurry directly into nearby surface waters. Far more common are smaller surface spills which occur when ash pond dikes or dams leak or overflow due to

heavy precipitation or flooding. Runoff and erosion, and the deposition of airborne ash particles that settle on the water, also contribute. Toxics may also escape by leaching, the process by which toxic solids dissolve in water. This takes place both in ash ponds and in landfills and other dry dump sites that are exposed to rain, snow or flooding. The dissolved material, called "leachate," can percolate through the earth, endangering public health and the environment by contaminating surface water or groundwater used for drinking supplies.

22. In addition to these unintended forms of contamination, power plant permits may allow for the legal and near-constant direct discharge of contaminated water— often containing very high levels of arsenic, selenium, boron and many other toxics— through pipes from waste units. These discharges typically flow directly into nearby streams, rivers, ponds, lakes, and wetlands. We refer to the waterways into which these wastes make their way as "receiving" waters. Humans may swim, recreate, and fish in these contaminated receiving waters, which may also serve as the source of human drinking water.

23. Many health risks from power plant effluents are likely to persist in drinking water even after treatment. Although drinking water utilities are required to ensure that water meets Maximum Contaminant Levels for many individual pollutants, they do not always accomplish this goal. Data from the EPA show that in 2015, over 26 million people were served by community water systems with violations of MCLs or other standards, including over 400,000 people served by systems in violation of arsenic standards.[19] Furthermore, MCLs are not always set at levels that eliminate unacceptable risks, as is noted above in regard to arsenic, and MCLs do not account for the combined risk of multiple pollutants. Finally, the EPA has not set MCLs for many potent pollutants found in power plant discharges, and thus these substances

[19] U.S. EPA, Report on the Environment, Drinking Water (2016), available at https://cfpub.epa.gov/roe/indicator_pdf.cfm?i=45 and attached hereto as Attachment J.

are not required to be removed from drinking water. This is the case for boron, which can cause developmental and reproductive toxicity; power plants discharge over 85,000 pounds of boron every day.[20] It is also true in regard to aluminum and manganese, both of which are neurotoxins and both of which are found in power plant wastewater. Thus, drinking water contaminated by power plant effluents may, even after treatment, increase the risk of cancer due to the presence of arsenic and other carcinogens, and may increase the risk of neurological effects due the presence of lead, mercury, arsenic, manganese, and aluminum.

24. Even if people are not drinking contaminated water, their health may be threatened if they eat fish from water sources contaminated by post-combustion waste toxicants. Much of the power plant effluent pollution travels downstream, where it continues to present a health risk. The EPA estimates that power plants alone cause almost half of receiving streams to exceed criteria for water that is used for drinking and fishing. The scale of the fish contamination problem downstream from power plants is enormous – the EPA estimates that over 10,000 river miles are unsafe for subsistence fishing due to power plants wastewater pollution alone.[21]

25. Fish can absorb toxic substances present in the water or sediment through their gills or by eating contaminated food sources. (Certain grasses, algae, worms, and other fish food sources have all been shown to absorb coal ash toxicants.) When toxic substances have accumulated to high concentrations in fish, the fish become a major pathway for human exposure.[22] This has been well-documented in regard to mercury in ocean fish like tuna;[23] the same phenomenon is found in freshwater fish where power plant wastes have contaminated the aquatic environment. For example, sunfish, largemouth bass, and bluegill have all been

[20] U.S. EPA, *supra* note 4 and Attachment C, at 3-14.
[21] Id. at 7-35.
[22] Id. at 3-2 – 3-6.
[23] Trasande et al., *supra* note 11 and Attachment E, at 590.

documented to accumulate high levels of toxic selenium due to discharged wastes from power plants.[24]

26. State agencies may issue fish consumption advisories to caution against eating contaminated fish. Such advisories are often targeted at women of child-bearing age and children, since bodies and organ systems still under development are most susceptible to harm. However, there are additional populations at risk for harm from fish consumption, namely those that for cultural or economic reasons rely heavily on fishing to supplement their diets. Native Americans, Inuit peoples, African-Americans, and low-income rural populations are among the populations that frequently rely on non-recreational subsistence fishing to supply basic nutritional needs.[25] Fishing can provide an inexpensive and healthful food source, but when fish are contaminated, reliance on fishing for food poses increased health risks. Subsistence fishing communities are therefore far more vulnerable to water pollution and contaminated fish than the general population. In addition, the population downstream from steam electric power plants has a disproportionately high fraction of low-income and minority people.[26] The EPA has estimated that cancer and non-cancer risks from contaminated fish are higher for minorities than for non-minorities.[27] Furthermore, because coal plants are often located in areas where communities are impacted by other industrial pollution sources, the potential for cancer, neurological impacts or other health effects is raised as a result of cumulative chemical exposure. Compounding this risk is that fact that communities of color and low-income communities frequently have limited access to health care, allowing adverse impacts to go unaddressed. All of these factors require

[24] Gottlieb et al. 2010, *supra* note 2 and Attachment B, at 20.
[25] National Environmental Justice Advisory Council, Fish Consumption and Environmental Justice (Nov. 2002), attached hereto as Attachment K.
[26] U.S. EPA, Effluent Limitations Guidelines and Standards for the Steam Electric Generating Point Source Category; Final Rule, 80 Fed. Reg. 67,838, 67,891 (Nov. 3, 2015).
[27] U.S. EPA, *supra* note 4 and Attachment C, at 6-12 – 6-14.

that we look upon water contamination from power plant wastes as an environmental justice issue.

27. Contamination due to power plant wastewater also poses a serious threat to other life forms that live in and/or eat from surface waters. The effects of these wastes on wildlife have been the focus of published scientific studies, summarized in the Environmental Assessment for the final ELG rule.[28] These studies show significant risks, especially to aquatic and semiaquatic organisms, with effects ranging from physical deformities in fish and amphibians, to the elimination of entire populations. Plants and animals that inhabit contaminated sites accumulate toxic elements, sometimes in very high concentrations. Multiple studies have confirmed that selenium accumulation can cause developmental abnormalities in fish and amphibians and has led to the death of entire local fish populations. In addition, because selenium is bioaccumulative, it is passed up the food chain in increasing concentrations, and excessive amounts have also been found in bullfrogs, water snakes, slider turtles, barn swallows, and muskrats. Toxicants often build up in animals' organs, including the reproductive organs, where they can negatively influence reproductive rates. Other sublethal effects include physical abnormalities that can hinder critical behaviors, such as feeding, swimming speed and predator-avoidance reflexes, causing a negative impact on population survival rates.

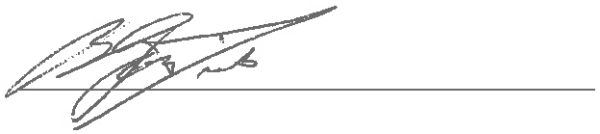
28. In conclusion, given the large quantity of toxic pollutants that power plants discharge each day, the health and environmental impacts discussed above, and the fact that the final ELG rule will reduce the discharges of many toxic pollutants by over 90%, it is my opinion that any delay in the implementation of the ELG rule will create an unacceptable increase in risks to human health and the environment. In particular, I am aware that there are many coal plant

[28] Id. at 3-20 – 3-26.

discharge permits currently scheduled for renewal, and that, but for EPA's stay, these permits would have to be renewed with the new pollution limits in the ELG rule. I am concerned that the stay will lead to the renewal of permits without the pollution limits, locking unsafe discharge levels in place for years. More generally, given the high daily pollution loads cited above, I believe that any delay in implementing the rule, by postponing compliance dates or otherwise, will lead to unsafe pollution discharges.

I declare, under penalty of perjury, that the foregoing is true and correct.

Executed on this 8th day of June, 2017.



Barbara Gottlieb