

Senator Carper Questions EPA Administrator on the Clean Air Act and Public Health

On June 15, 2011, the Environment and Public Works Committee – in which Senator Carper is a member - held a hearing entitled, "The Clean Air Act and Public Health." The Environmental Protection Agency (EPA) Administrator Lisa Jackson testified in this hearing on her agency's ongoing efforts to protect the health of Americans by reducing air pollution. After the hearing, Senator Carper submitted some questions in writing to the Administrator regarding EPA's clean air efforts. Below are his questions and her responses.

- **Senator Carper's Question on Mercury.** It is my understanding that we have a wealth of scientific knowledge on the health effects of mercury – and that since the late 1990's, the Environmental Protection Agency has found that mercury emissions from uncontrolled coal-fired power plants are a health hazard to our children. Is that correct? Can you explain what we know about mercury exposure and developing children's health?

Administrator Jackson's Response: The scientific evidence regarding the impacts of exposure to mercury clearly indicates that exposure to these pollutants can result in adverse effects on children's health. The most common way people are exposed to mercury is by eating fish that are contaminated with mercury (specifically methylmercury). When mercury emitted to the air (such as from coal-fired power plants) deposits to water, it is transformed into the highly toxic form methylmercury. Methylmercury builds up in fish, including species eaten by people in the United States.

Mercury, depending on the form and dose, may cause neurological damage, including lost IQ points, in children who are exposed before birth and is also associated with impacts on children's cognitive thinking, memory, attention, language, and fine motor and visual spatial skills.

Additional information can be found in the Revised Technical Support Document: National-Scale Assessment of Mercury Risk to Populations with High Consumption of Self-caught Freshwater Fish In Support of the Appropriate and Necessary Finding for Coal- and Oil-Fired Electric Generating Units, December 2011¹ and in the preamble to the final Mercury and Air Toxics Rule.

- **Senator Carper's Question on Air Toxics.** Didn't the Environmental Protection Agency also determine that other air toxics emitted from a dirty coal plants can harm public health? I'm thinking of toxics like dioxins and acid gases to name a few. Can you provide more information on what these other toxics might do to my health if I lived near one of these uncontrolled coal plants? Are the health benefits from reducing these pollutants in the Environmental Protection Agency's cost-benefit analysis of the air toxics regulation?

Administrator Jackson's Response: In addition to mercury, a number of hazardous air pollutants, also known as air toxics, emitted by coal-fired power plants have been shown to cause adverse health effects. In addition to mercury, the primary air toxics emitted are arsenic, chromium, nickel, cadmium, dioxins, hydrogen chloride, and hydrogen fluoride. Exposure to these hazardous air pollutants, depending on

¹ On the web at: <http://www.epa.gov/mats/pdfs/20111216MercuryRiskAssessment.pdf>

exposure duration and levels of exposures, is associated with a variety of health effects, with the severity of effects increasing as the exposure levels increase. These adverse health effects may include chronic health disorders (e.g., irritation of the lung, skin, and mucus membranes; detrimental effects on the central nervous system; damage to the kidneys; and alimentary effects such as nausea and vomiting). Two of these hazardous air pollutants are classified as human carcinogens (arsenic and hexavalent chromium) and two as probable human carcinogens (cadmium and nickel).

EPA was not able to monetize the health benefits associated with reducing exposure to cadmium and these other air toxics in the cost-benefit analysis for the proposed Mercury and Air Toxics Rule, because of a lack of sufficiently specific data. The analysis does include a discussion of the health effects of these toxics that could be expected to be reduced as a result of reducing emissions.

- **Senator Carper's Question on Particulate Matter.** In previous hearings, we have had a few economists testify before us questioning the Environmental Protection Agency's science linking small particle pollution to negative impacts on public health. What do we know about small particles and how they impact our lungs? Is the science robust in this area?

Administrator Jackson's Response: EPA's review of currently available scientific information indicates there is compelling evidence that long- and short-term exposures to fine particle pollution (PM_{2.5}) cause premature mortality and cardiovascular-related effects resulting in increased hospital admissions. In addition, there is strong evidence that long- and short-term PM_{2.5} exposures likely cause respiratory-related effects such as increased hospital admissions and emergency department visits, exacerbation of asthma and decreased lung function growth in children. These conclusions are presented in the 2009 Integrated Science Assessment² for the current review of the fine particle standards and have been unanimously endorsed by EPA's independent science advisors, the Clean Air Scientific Advisory Committee (CASAC).³⁴

EPA has invested heavily in particulate matter (PM) research since 1998 to improve our understanding of PM-related effects. For fine particles (PM_{2.5}), thousands of studies, including more than 300 new epidemiological studies, make up the overall scientific data base considered in the development of the 2009 Integrated Science Assessment. In addition, hundreds of new controlled human exposure and toxicological studies, which provide support for the effects observed in epidemiological studies, also were considered in the current PM NAAQS review. Collectively, this evidence strongly reinforces our understanding of the health effects associated with PM_{2.5} exposures.

EPA considers the currently available scientific evidence to be stronger and more consistent than in previous reviews. The new epidemiological evidence includes extended analyses of the seminal studies of

² *Integrated Science Assessment for Particulate Matter* (December 2009). EPA 600/R-08/139F. Available at <http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=216546>

³ A summary of the causal determinations for health effects reached in the PM Integrated Science Assessment, including the determinations that short- and long-term exposure to PM_{2.5} cause cardiovascular effects and mortality effects and likely cause respiratory effects is presented in Table 2-6 on p. 2-32. A summary of the causal determinations for welfare effects is presented in Table 2-7 on p. 2-33.

⁴ Samet J (2009). Letter from Dr. Jonathan M. Samet, Chair, Clean Air Scientific Advisory Committee to the Honorable Lisa P. Jackson, Administrator, US EPA. CASAC Review of EPA's Integrated Science Assessment for Particulate Matter –Second External Review Draft (July 2009). November 24, 2009. Available: [http://yosemite.epa.gov/sab/sabproduct.nsf/264cb1227d55e02c85257402007446a4/151B1F83B023145585257678006836B9/\\$File/EPA-CASAC-10-001-unsigned.pdf](http://yosemite.epa.gov/sab/sabproduct.nsf/264cb1227d55e02c85257402007446a4/151B1F83B023145585257678006836B9/$File/EPA-CASAC-10-001-unsigned.pdf).

long-term PM_{2.5} exposures (i.e., the American Cancer Society and Harvard Six Cities studies⁵) as well as a substantial increase in new long- and short-term exposure studies. The epidemiological studies were conducted in numerous locations across the U.S. and abroad with consistent results, indicating that the scientific evidence is robust. Some more recent studies report effects at lower ambient PM_{2.5} concentrations than were reported earlier.

Controlled human exposure and toxicological studies which directly expose test animals to particles in a laboratory setting, provide insights and support for the effects observed in the epidemiological studies by demonstrating how inhalation of particles result in premature death or adverse cardiovascular or respiratory effects.⁶

- **Senator Carper’s Question on Coal Retirements.** In 2011, American Electric Power (AEP) stated that they are retiring 6,000 Megawatts in the next few years and all of these retirements are due to recent clean air regulations proposed under your watch. However, didn’t American Electric Power agree to retrofit or retire most of the megawatts in question under consent decrees with President George W. Bush’s EPA? Is it your understanding that the American Electric Power retirement announcement includes facilities listed in past consent decrees?

Administrator Jackson’s Response: AEP has made prior public statements announcing these steps, and they have acknowledged these public health standards were only one of several factors driving the decision regarding plant retirements – other factors include the fact that these plants were less efficient, the economic slowdown, the increasing price of coal and decreasing price of natural gas. The record also indicates that AEP’s decision to close these plants occurred before CSAPR [*Cross State Air Pollution Rule*] was finalized and while MATS [*Mercury and Air Toxics Standard*] was still in proposal stage. EPA does not believe that decisions to close these specific plants were tied to EPA’s actions on the CSAPR and MATS rules.

- **Senator Carper’s Question on Jobs.** Earlier this year, my subcommittee looked at the Clean Air Act and the impact clean air regulations had on our economy. We had companies testify about the positive impacts the Clean Air Act had on our economy and will have for years to come if you are allowed to do your job. In fact, I believe we heard that we are a lead exporter in clean air technology as a result of our clean air regulations. I’ve also heard from labor groups saying just set the new standards and get out of the way because they are ready to work. Can you discuss the job opportunities the Clean Air Act has provided historically and will do so again with these new upcoming clean air regulations?

⁵ Extended analyses of studies important in previous reviews of the national ambient air quality standards (NAAQS) for particulate matter (PM) are being considered in the current review including:

- Krewski D, Jerrett M, Burnett RT, Ma R, Hughes E, Shi Y, Turner MC, Pope AC III, Thurston G, Calle EE, Thun MJ (2009). Extended Follow-Up and Spatial Analysis of the American Cancer Society Study Linking Particulate Air Pollution and Mortality. HEI Research Report 140, Health Effects Institute, Boston, MA. Available: <http://pubs.healtheffects.org/view.php?id=315>.
- Laden F, Schwartz J, Speizer FE, Dockery DW (2006). Reduction in fine particulate air pollution and mortality: extended follow-up of the Harvard Six Cities Study. *Am. J. Respir. Crit. Care. Med.* 173: 667-672.
- Gauderman WJ, Avo, E, Gilliland F, Vora H, Thomas D, Berhane K, McConnell R, Kuenzli N, Lurmann F, Rappaport E, Margolis H, Bates D, Peters J (2004). The effect of air pollution on lung development from 10 to 18 years of age. *NEJM* 351:1057-67.

⁶ US EPA, 2009 (PM ISA). This information is discussed throughout ch 4-7 of the ISA.

Administrator Jackson's Response: In contrast to doomsday predictions, history has shown, again and again, that we can clean up pollution, create jobs, and grow our economy all at the same time. Over the 40 years since the Act was passed, the Gross Domestic Product of the United States grew by more than 200 percent.

Some may find it surprising that the Clean Air Act also has been a good economic investment for our country. A study led by Harvard economist Dale Jorgenson found that implementing the Clean Air Act actually increased the size of the US economy because the health benefits of the Clean Air Act lead to a lower demand for health care and a healthier, more productive workforce. According to that study, by 2030 the Clean Air Act will have prevented 3.3 million lost work days and avoided the cost of 20,000 hospitalizations every year.⁷ Another study that examined four regulated industries (pulp and paper, refining, iron and steel, and plastic) concluded that, "We find that increased environmental spending generally does not cause a significant change in employment."⁸

The EPA's updated public health safeguards under the Clean Air Act will encourage investments in labor-intensive upgrades that can put current unemployed or under-employed Americans back to work. Environmental spending creates jobs in engineering, manufacturing, construction, materials, operation, and maintenance. For example, EPA vehicle emissions standards directly sparked the development and application of a huge range of automotive technologies that are now found throughout the global automobile market. The vehicle emissions control industry employs approximately 65,000 Americans with domestic annual sales of \$26 billion.⁹ Likewise, in 2008, the United States' environmental technologies and services industry of 1.7 million workers generated approximately \$300 billion in revenues and led to exports of \$44 billion of goods and services,¹⁰ larger than exports of sectors such as plastics and rubber products.¹¹ The size of the world market for environmental goods and services is comparable to the aerospace and pharmaceutical industries and presents important opportunities for U.S. industry.¹²

Jobs also come from building and installing pollution control equipment. For example, the U.S. boilermaker workforce grew by approximately 35 percent, or 6,700 boilermakers, between 1999 and 2001 during the installation of controls to comply with EPA's regional nitrogen oxide reduction program.¹³ Over

⁷ Dale W. Jorgenson Associates (2002a). *An Economic Analysis of the Benefits and Costs of the Clean Air Act 1970-1990. Revised Report of Results and Findings*. Prepared for EPA. [http://yosemite.epa.gov/ee/epa/erm.nsf/vwAN/EE-0565-01.pdf/\\$file/EE-0565-01.pdf](http://yosemite.epa.gov/ee/epa/erm.nsf/vwAN/EE-0565-01.pdf/$file/EE-0565-01.pdf)

⁸ Morgenstern, R. D., W. A. Pizer, and J. S. Shih. 2002. "Jobs versus the Environment: An Industry-Level Perspective." *Journal of Environmental Economics and Management* 43(3):412-436.

⁹ Manufacturers of Emissions Control Technology (http://www.meca.org/cs/root/organization_info/who_we_are).

¹⁰ DOC International Trade Administration. "Environmental Technologies Industries: FY2010 Industry Assessment." [http://web.ita.doc.gov/ete/eteinfo.nsf/068f3801d047f26e85256883006ffa54/4878b7e2fc08ac6d85256883006c452c/\\$FILE/Full%20Environmental%20Industries%20Assessment%202010.pdf](http://web.ita.doc.gov/ete/eteinfo.nsf/068f3801d047f26e85256883006ffa54/4878b7e2fc08ac6d85256883006c452c/$FILE/Full%20Environmental%20Industries%20Assessment%202010.pdf) (accessed February 8, 2011).

¹¹ U.S. Census Bureau, Censtats Database, International Trade Data--NAICS, http://censtats.census.gov/naic3_6/naics3_6.shtml (accessed September 6, 2011).

¹² Network of Heads of the European Environment Protection Agencies, 2005. "The Contribution of Good Environmental Regulation to Competitiveness." http://www.eea.europa.eu/about-us/documents/prague_statement/prague_statement-en.pdf (accessed February 8, 2011).

¹³ International Brotherhood of Boilermakers, *Boilermaker Labor Analysis and Installation Timing*, March 2005, EPA Docket OAR-2003-0053 (docket of the Clean Air Interstate Rule).

the past seven years, the Institute for Clean Air Companies (ICAC) estimates that implementation of just one rule – the Clean Air Interstate Rule Phase 1 – resulted in 200,000 jobs in the air pollution control industry.¹⁴

- **Senator Carper’s Question on Costs of Pollution Abatement Control Technology.** Compared to payroll, labor, fuel and material costs, do you know how much an average manufacturer pays in pollution abatement control technology?

Administrator Jackson’s Response: According to US Census data, below are the relative costs of these items for manufacturing firms. All percentages are a function of total revenue for the firm.

Materials	52%
Profit, Taxes, Interest on Debt and Other	32%
Labor	12%
Depreciation	2%
Energy	2%
Pollution Abatement and Control Costs	0.40%

- **Senator Carper’s Question on Pollution Crossing State Boundaries.** As you have heard me say, Delaware is at the tailpipe of America – in that our neighbor’s air pollution comes across our state boundaries, making our citizens sick, raising our health care costs, and impacting our economy. In fact, up to 90% of our state’s air pollution is coming from sources out of state. Can you take a moment to discuss how the Transport Rule [*known now as the Cross-State Air Pollution Rule*] tries to ensure we are all good neighbors when it comes to air pollution?

Administrator Jackson’s Response: As you mention, air pollution emitted in one place, particularly from smokestacks that spew pollutants high into the air, travels up to hundreds of miles downwind, crosses state lines, and impacts air quality and human health and ecosystem services in all downwind states, including Delaware. The Cross-State Air Pollution Rule identifies the amount of emissions in one state that interfere with a downwind state’s ability to meet EPA’s health-based National Ambient Air Quality Standards and creates a cost effective program for states to eliminate these emissions. In so doing, the Cross-State Air Pollution Rule will help avoid tens of thousands of premature deaths and illnesses, achieving billions of dollars in public health benefits. By 2014, the required emissions reductions will annually avoid: 13,000 to 34,000 premature deaths; 15,000 nonfatal heart attacks; 19,000 hospital and emergency room visits; 1.8 million lost work days or school absences; and 400,000 aggravated asthma attacks. Pollution reductions will also lead to improvements in visibility in national and state parks, and increased protection for sensitive ecosystems including Adirondack lakes and Appalachian streams, coastal waters and estuaries, and forests.

¹⁴ November 3, 2010 letter from David C. Foerter, Executive Director of the Institute of Clean Air Companies, to Senator Thomas R. Carper (http://www.icac.com/files/public/ICAC_Carper_Response_110310.pdf (accessed February 8, 2011)).

- **Senator Carper's Question on Grandfathering Old Plants.** In the 1970 and 1990 Clean Air Act Amendments, Congress delayed older coal power plants air control requirements because it was thought that most of the old plants would die off in the decade after the legislation passed. It was thought there was no need to invest in new technologies at these old, dying plants. Did many of these coal plants actually retire? What is the average age of our coal fleet today?

Administrator Jackson's Response: As of 2010, there were 1,270 coal electric generating units in the U.S. fleet. Of these units, 1,077 are over 25 MW, which is the size requirement for applicability of the CSAPR. The average on-line year for these 1,077 units is 1970 (40 years old as of 2010):

- 573 of these units are older than 1970
- 956 of these units are older than 1990