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EPA'S MERCURY CAP AND TRADE RULE: AN ENVIRONMENTAL INJUSTICE FOR WOMEN

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INTRODUCTION

In 2005, the United States Environmental Protection Agency (EPA) finalized the Clean Air Mercury Rule, which will change the way the agency had proposed to regulate mercury emission from power plants not five years before.¹ In 2000, the EPA concluded that coal and oil-fired utility steam generating units² were a major source of hazardous air pollutants, and that the emissions of such pollutants, including mercury, were hazardous to human health.³ The EPA decided to regulate emissions from such facilities using “maximum achievable control technology” (MACT).⁴ In March 2005, the EPA reversed its earlier findings and concluded that it was no longer “necessary” and “appropriate”⁵ to regulate mercury emissions in this manner.⁶ It issued a new rule, the Clean Air Mercury Rule (CAMR), which replaced the MACT scheme with an optional “cap and trade” program.⁷ All states, the EPA assumes, will implement the new rule.⁸

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¹ Revision of December 2000 Regulatory Finding on the Emissions of Hazardous Air Pollutants from Electric Utility Steam Generating Units and the Removal of Coal and Oil-fired Electric Utility Steam Generating Units from the Section 112 (c) List, 70 Fed. Reg. 15,994 (March 15, 2005) (*to be codified at* 40 C.F.R. pt. 60, 63, 72, and 75) [hereinafter Removal].

² The term “electric utility steam generating unit” means any fossil fuel fired combustion unit of more than twenty-five megawatts that serves a generator that produces electricity for sale. A unit that cogenerates steam and electricity and supplies more than one-third of its potential electric output capacity and more than twenty-five megawatts electrical output to any utility power distribution system for sale shall be considered an electric utility steam generating unit. 42 U.S.C. § 7412(a)(8) (2000).

³ Deposition of Air Pollutants to the Great Waters: Third Report to Congress II-5 (2000), Office of Air Quality Planning and Standards, U.S. Env'tl. Prot. Agency, *available at* <http://epa.gov/oar/oaqps/gr8water/3rdrpt/report00.html>.

⁴ *Id.*

⁵ Section 112(n)(1)(A) of the Clean Air Act requires the EPA to conduct a study to examine the hazards to public health that are “reasonably anticipated to occur as the result of HAP emissions from utility units after the imposition of the requirements of the CAA.” The provision also provides that the EPA shall regulate the utility units under section 112 of the CAA if the Administrator determines that such regulation is both appropriate and necessary considering, among other things, the results of the study. 42 U.S.C. §7412(n)(1)(A) (2000).

⁶ Removal, *supra* note 1 at 1-2.

⁷ Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units, *codified at* 40 C.F.R. §§ 60, 63, 72, 75 (March 15, 2005) EPA Docket ID No. OAR-

The EPA predicts that the trading program will create economic incentives to reduce pollution to levels below what could be achieved with technology based controls.⁹ Under a cap-and-trade program, participating states assign each utility a certain number of emission credits—also called “allowances”—depending on the size, age and capacity of the facility.¹⁰ Credits can then be traded with other utilities in participating states across the nation. While some power facilities may litter more mercury than they are “allowed” under the implementation plan, others will pollute less, so that in the end the total amount of pollution emitted nationwide will not exceed the cap set by the EPA.¹¹ Under the CAMR, the EPA has set the cap at thirty-eight tons per year by 2010, and fifteen tons per year by 2018.¹² In justifying its decision to change the way mercury emissions are regulated, the EPA maintains that the CAMR will not decrease the safeguards to human health that could have been achievable under MACT.¹³

The new rule is criticized by many scientists, physicians, and environmentalists as a trade-off between economic benefits to large power producers, and human health.¹⁴ People are exposed to mercury primarily through consumption of contaminated fish.¹⁵ When mercury is emitted from a power plant, it settles in nearby bodies of water and binds to micro-organisms. When these contaminated micro-organisms are consumed, mercury toxicity increases in the predator’s body where it accumulates in fatty tissue. Mercury continues to accumulate as it rises up the food chain, so that by the time people eat contaminated fish, mercury levels can be dangerously high. Methylmercury, the type of mercury that is most toxic to people, is particularly harmful to young children and to women of child-bearing age. The effects of methylmercury toxicity are most acute *in utero*. The developing brain is particularly susceptible to mercury contamination. Once pregnant, a woman can transfer mercury through the umbilical chord, so that the neurological impacts on the fetus are elevated above the impact observed in the mother. Critics argue that the new cap and trade rule will

2002-0056 [Hereinafter CAMR]. (All documents in the EDOCKET are listed in the EDOCKET index at <http://www.epa.gov/edocket>.)

⁸ See generally 40 C.F.R. § 60.24.

⁹ Jeffrey Holmstead, Assistant Administrator of EPA, Testimony before Energy and Air Quality Subcommittee, Energy and Commerce Committee 6 (2005), available at <http://www.epa.gov/air/clearskies/pdfs/testimony052605.pdf>.

¹⁰ 40 C.F.R. § 60.21(f).

¹¹ See Stephen M. Johnson, *Economics v. Equity: Do Market-Based Environmental Reforms Exacerbate Environmental Injustice?* 56 WASH. & LEE L. REV. 111 (1999).

¹² CAMR, *supra* note 7, at 1.

¹³ *Id.*

¹⁴ The EPA received over 6,000 public comments relating to the proposed CAMR, available at eDocket OAR-2002-0056, www.epa.gov/edocket. See, e.g., Tom Hamburger & Alan C. Miller, *Mercury Emissions Rule Geared to Benefit Industry, Staffers Say*, L.A. TIMES, March 16, 2004, (The Nation), at A1.

¹⁵ See Jeremiah Baumann, Julie Wolk, Jane Houlihan & Richard Wiles, *Brainfood: What Women Should Know About Mercury Contamination of Fish*, ENVTL. WORKING GROUP (2001).

slow the decrease in mercury emissions that otherwise would have been achieved under MACT, and thus cause unacceptable harm to human health in the interim.¹⁶ In condemning the effects that the Clean Air Mercury Rule will have on the health of women of child-bearing age and children, many have suggested that the resulting risks are acceptable to the EPA because the underlying assumptions in the risk analysis model used to promulgate the rule are biased and inconclusive.

Despite the breadth of research regarding the potential harms to women of child-bearing age from mercury toxicity, women have few legal and administrative remedies if and once they have been harmed. In 1994, President Clinton issued Executive Order 12,898 requiring federal agencies to consider the effects of their programs, policies, and activities on minority and low-income populations, including native tribes.¹⁷ Executive Order 12,898 formalizes the principles of environmental justice and obligates federal agencies to adhere to them, yet it makes no mention of gender as a factor to be considered in agency decisions.¹⁸ This is noteworthy because women have historically been active leaders and central figures in the environmental movement, and continue to be on the forefront of the grassroots environmental justice movement.¹⁹ Title VI of the Civil Rights Act, to which the EPA is bound, affords particular subgroups standing to bring a private cause of action for disparate impact from governmental programs, yet gender is not a mentioned subgroup.²⁰ The EPA relies on fish advisories to protect women from the harm of mercury contaminated fish.²¹ While the EPA maintains that such advisories are sufficient to protect human health, many believe that placing the burden of risk avoidance on the potential victim is an ethically questionable practice.²²

¹⁶ See Natural Resources Defense Council (NRDC) et. al. Petition for Reconsideration in the Matter of Final Rule: Revision of December 2000 Regulatory Finding on the Emissions of Hazardous Air Pollutants From Electric Utility Steam Generating Units and the Removal of Electric Utility Steam Generating Units From the Section 112(c) List, Docket ID No. OAR-2002-0056-6270 [hereinafter NRDC].

¹⁷ Exec. Order No. 12,898, 3 C.F.R. 859 (1994), reprinted in 42 U.S.C. § 4321 (1994).

¹⁸ See *id.*

¹⁹ See e.g., Tina Eshaghpour, *Confronting Toxic Contamination in our Communities*, The Women's Foundation of California (2003), available at www.womensfoundca.org. See also Dorceta E. Taylor, *American Environmentalism: The Role of Race, Class, and Gender in Shaping Activism 1820-1995*, 5 RACE, GENDER & CLASS 1, 16-62 (1997); Nancy Unger, *Women, Sexuality and Environmental Justice in American History*, in NEW PERSPECTIVES ON ENVIRONMENTAL JUSTICE, GENDER, SEXUALITY, AND ACTIVISM 45 (Rachel Stein ed., 2004) [hereinafter PERSPECTIVES]; Robert R. M. Verchick, *In a Greener Voice: Feminist Theory and Environmental Justice*, 19 HARV. WOMEN'S L.J. 23 (1996).

²⁰ U.S. Env'tl. Prot. Agency, EPA's Program to Implement Title VI of the Civil Rights Act of 1964, <http://epa.gov/civilrights/t6home.htm> (last visited Sept. 22, 2006).

²¹ See Joint Federal Advisory for Mercury in Fish, *Backgrounder for the 2004 FDA/EPA Consumer Advisory: What You Need to Know About Mercury in Fish and Shellfish* [hereinafter Joint Federal Advisory], available at <http://www.epa.gov/waterscience/fishadvice/factsheet.html#diff> (last visited Sept. 23, 2006).

²² Catherine A. O'Neill, *Risk Avoidance, Cultural Discrimination, and Environmental Justice for Indigenous Peoples*, 30 ECOLOGY L.Q. 1 (2003).

This Note does not seek to resolve the current legal and scientific debates between EPA and its critics over the authority to regulate mercury through a cap and trade program and the likely effect of such a scheme. Rather, it uses the EPA's new rule as the framework for discussing broader issues related to the lack of attention paid by agencies and our legal system to the particular impact of environmental harm on women. Part I describes the history of the environmental justice movement and highlights the central role women have played in it. Part II outlines the known effects of mercury toxicity on human health and women in particular. Here, this Note that there are broad policy reasons to protect women from the harm of mercury toxicity that transcend their role as carriers of developing children. In Part III, this Note discusses the justification for the Clean Air Mercury Rule and the impact on human health that the EPA predicts it will have. Part IV summarizes some of strongest criticisms of the new mercury rule as it pertains to women's health. Part V discusses the inadequacy of fish advisories and why they are insufficient to protect women's health. Part VI of this Note discusses potential legal remedies for women negatively impacted by mercury exposure. This Note concludes by suggesting that in cases where there is legitimate doubt about the particular effects of a regulatory scheme on an identifiable subpopulation and where that subpopulation is particularly sensitive to harm from the toxin and has few legal remedies for the harm it faces, that the precautionary principle should operate and the alternative with the lowest probability of causing harm should be implemented.

I. WOMEN'S ROLE IN THE ENVIRONMENTAL JUSTICE MOVEMENT

Women have been leaders of the environmental movement since the 1960's.²³ Even before "environmental justice" became part of the environmental movement's vernacular, women living in minority communities and low-income areas led numerous fights against development projects, toxic dumping, and pesticide use that disproportionately affected their families, their neighbors and themselves.²⁴ From Rachel Carson's groundbreaking look at DDT and human

²³ See Nancy C. Unger, *Women, Sexuality, and Environmental Justice in American History*, in PERSPECTIVES 45; Taylor, *supra* note 19; Valerie Ann Kaalund, *Witness to Truth: Black Women Heeding the Call for Environmental Justice*, in PERSPECTIVES 78; Eileen Gauna, Catherine A. O'Neill, & Clifford Rechtschaffen, *Environmental Justice 2*, CTR. FOR PROGRESSIVE REGULATION (2005), available at http://www.progressiveregulation.org/articles/EJ_505.pdf (crediting the 1982 struggle against the siting of a landfill for polychlorinated biphenyls ("PCBs") near an African-American community in Warren County as the birth of the environmental justice movement).

²⁴ A study by the U.S. Department of Health and Human Services' Office of Women's Health found that

[N]early two-thirds of women polled in a recent national survey indicated that they alone were responsible for health care decisions within their family, and 83 percent had sole or shared responsibility for financial decisions regarding their family's health. Women are also the primary care givers for ill or disabled family members. Of the estimated 15 percent of Americans who are informal care givers, an estimated 72 percent are women.

health in her book *Silent Spring*,²⁵ to doctor Marion Moses' work on the effects of pesticides on migrant farm workers,²⁶ to countless local community groups today, women have brought issues of environmental justice to the nation's attention.²⁷ In this way, women have been instrumental in defining the scope of what today falls under the umbrella of environmental justice.²⁸ Yet ironically, women as a specific subpopulation are not protected by the formal adaptation of Environmental Justice.

In 1994, President Clinton enacted Executive Order 12,898, requiring all federal agencies,

[T]o the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review... [to] make achieving environmental justice part of [their] mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions.²⁹

Section 1-103 of the order specifies that environmental justice strategies should include, as a minimum, programs, policies and plans that will:

USDHHS, *Women's Health Issues: An Overview* (2001),

<http://www.womenshealth.gov/owh/pub/womhealth%20issues/womenshealthissues.pdf>.

²⁵ RACHEL CARSON, *SILENT SPRING* (Riverside Press 1962).

²⁶ Marion Moses is the Director of the Pesticide Education Center in California. She worked alongside Cesar Chavez and the United Farm Workers Union in the 1960's drawing attention to the economic, social and environmental plight of migrant farm workers. See www.pesticides.org. See also Marcy Knopf-Newman, *Public Eyes: Investigating the Causes of Breast Cancer*, in *PERSPECTIVES*; Marion Moses, *Farmworkers and Pesticides*, in *CONFRONTING ENVIRONMENTAL RACISM: VOICES FROM THE GRASSROOTS* 161-185 (R.D. Bullard ed., South End Press 2004).

²⁷ For example, Sustainable South Bronx is a non-profit organization whose founder and executive director, Majora Carter, started the group in 2001 to address racial and class discrimination in land use and housing decisions that have caused the worst polluting waste-transfer stations, truck-dependent warehouses, and highways to disproportionately affect the South Bronx neighborhood. See www.ssbx.org (last visited Sept. 22, 2006). In 1998, Peggy Shepard founded the West Harlem Environmental Action, a non-profit organization working for environmental and social justice on issues of land use, waterfront development, brown-fields redevelopment, transportation and air pollution, open space and environmental health in upper Manhattan. Shepard served as the first female chair of the National Environmental Justice Advisory Council (NEJAC) to the EPA, and is a former member of the National Advisory Environmental Health Sciences Council of the National Institutes of Health and a member of the Environmental Justice Advisory Committee to the NYS Department of Environmental Conservation. See www.weact.org (last visited Sept. 22, 2006). Yolanda Garcia founded Nos Quedamos (We Stay), an award-winning grassroots organization addressing the problem of disproportionately high asthma rates for children living in the South Bronx. See http://www.nyipi.org/area_4_history_nosquedamos.html (last visited Oct. 9, 2006). See also John G. Bretting and Diane-Michele Prindeville, *Environmental Justice and the Role of Indigenous Women Organizing their Communities*, in *ENVIRONMENTAL INJUSTICES, POLITICAL STRUGGLES: RACE, CLASS, AND THE ENVIRONMENT* 141-176 (David E. Camacho ed., Duke University Press 1998) (describing indigenous Chicana and Native American women who have mobilized their communities to promote environmental justice in New Mexico).

²⁸ See generally Verchick, *supra* note 19.

²⁹ Exec. Order No. 12,898, *supra* note 17, § 1-101.

(1) promote enforcement of all health and environmental statutes in areas with minority populations and low-income populations; (2) ensure greater public participation; (3) improve research and data collection relating to the health of and environment of minority populations and low-income populations; and (4) identify differential patterns of consumption of natural resources among minority populations and low-income populations. In addition, the environmental justice strategy shall include, where appropriate, a timetable for undertaking identified revisions and consideration of economic and social implications of the revisions.³⁰

The order focuses on minority and low-income populations, whose vocal advocacy captured President Clinton's attention during his run for office.³¹ In October 1991, over 650 grassroots environmental justice advocates gathered for the First National People of Color Environmental Leadership Summit in Washington, D.C.³² They put together a list of seventeen principles of environmental justice, which are credited with forming the basis of President Clinton's executive order.³³ All seventeen principles deal with an environmental ethic that provides "universal protection" to "all peoples."³⁴ While the summit's concept of environmental justice was clearly broad, Executive Order 12,898 in its final version specifically protects minority and low-income communities.³⁵ Likewise, the EPA defines environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, programs and policies."³⁶ Women, despite their contributions to the environmental movement and obvious inclusion in the category of "all peoples," are not recognized as a vulnerable subpopulation.³⁷

Perhaps because women as a subpopulation are not distinct from minorities and the poor, but rather one of their largest constituents,³⁸ the environmental

³⁰ *Id.* § 1-103.

³¹ *Id.* § 1-103.

³² See Bradford C. Mank, Executive Order 12,898, in *THE LAW OF ENVIRONMENTAL JUSTICE: THEORIES AND PROCEDURES TO ADDRESS DISPROPORTIONATE RISKS* (Michael B. Gerrard, ed., American Bar Association 1999).

³³ Robert D. Bullard, *Environmental Justice in the 21st Century*, Environmental Justice Resource Center, available at <http://www.ejrc.cau.edu/ejinthe21century.htm> (last visited Sept. 22, 2006). See also Bradford, *supra* note 32.

³⁴ ENVIRONMENTAL JUSTICE RESOURCE CENTER, FIRST NATIONAL PEOPLE OF COLOR ENVIRONMENTAL LEADERSHIP SUMMIT, PRINCIPLES OF ENVIRONMENTAL JUSTICE (1991), <http://www.ejrc.cau.edu/princej.html>.

³⁵ Exec. Order No. 12,898, *supra* note 17, § 1-103.

³⁶ Environmental Justice, U.S. ENVTL. PROT. AGENCY, <http://www.epa.gov/compliance/environmentaljustice/index.html> (last visited Sept. 22, 2006).

³⁷ See *id.*

³⁸ According to the 2000 Census, 29.3 % of women are members of racial and ethnic minority groups, See U.S. Census 2000, Male-Female Ratio by Race Alone or in Combination and Hispanic or

justice movement has not taken steps to formally broaden the definition of environmental justice to include women, despite the widely understood vulnerability of women to environmental harms. Nonetheless, many environmental toxins, including mercury, are recognized to be particularly hazardous to women, bolstering the argument that women are sufficiently distinct from other populations to warrant special protection as a class.

II. MERCURY TOXICITY: WHO IS AT RISK?

Elemental mercury is emitted into the atmosphere from the combustion of coal, waste incineration, and other industrial processes.³⁹ Such anthropogenic sources now account for approximately seventy percent of the 2,000 metric tons of mercury that are released globally each year.⁴⁰ Mercury is very persistent; it does not break down easily, and it circulates and re-circulates from air to water to soil, producing what scientists call the "global mercury cycle."⁴¹ Elemental mercury in the atmosphere is eventually converted to inorganic mercury that returns to land and water surfaces along with precipitation.⁴² Through a process called methylation, some of this inorganic mercury is converted by microbial and abiotic processes into methylmercury.⁴³ Incidents of mercury poisoning in Japan and Iraq in the 1950's and 1960's led scientists to conclude that methylmercury is the most toxic form of mercury to humans.⁴⁴ Humans are exposed to methylmercury

Latino Origin in the United States, available at <http://www.census.gov/population/www/cen2000/phc-t11.html>. For all years between 1964-1994, a higher percent of women lived in poverty than men. See U.S. Envtl. Prot. Agency, *Sociodemographic Data Used for Identifying Potentially Highly Exposed Populations* 10-9 (1999).

³⁹ Baumann et. al., *supra* note 15, at 9.

⁴⁰ United Nations Envtl. Programme, *Global Mercury Assessment Report 2002*, 10 (2002) available at <http://www.unep.org/GC/GC22/Document/UNEP-GC22-INF3.pdf>.

⁴¹ Office of Air Quality Planning and Standards, U.S. Envtl. Prot. Agency, *Deposition of Air Pollutants to the Great Waters: Third Report to Congress II-5* (2000), available at <http://epa.gov/oar/oaqps/gr8water/3rd rpt/report00.html>. See also United Nations Envtl. Programme, *supra* note 40, at 8.

⁴² Gary Bigham, Betsy Henry, & Brad Bessinger, *Mercury-- A Tale of Two Toxins*, 19 NAT. RESOURCES & ENV'T 26, 28 (2005).

⁴³ National Research Council, *TOXICOLOGICAL EFFECTS OF METHYLMERCURY* 16 (National Academies Press 2000) [hereinafter EFFECTS] at 13.

⁴⁴ In the early 1950s, effluent from a chemical plant that used methylmercury as a catalyst was dumped into Minimata Bay, Japan, causing severe mercury toxicity in the residential population who ate the contaminated fish in the bay. Babies died within days of birth from symptoms of methylmercury poisoning, while their mothers were free of symptoms. Cases among adults were characterized by tingling and numbness, sensory impairment, loss of speech and muscle control, visual-field constriction, and hearing loss. All the children who were identified with the most severe form of the disease were mentally retarded, had primitive reflexes, experienced loss of speech and muscle control, or had limb deformities. See Baumann et. al., *supra* note 15, at 11-12. An outbreak of methylmercury contamination occurred in Iraq in the 1960s and again in the 1970s, when seed grain that had been treated with a fungicide containing methylmercury was baked into bread. Unlike the long-term exposures in Japan, the epidemic of methylmercury poisoning in Iraq was short in duration lasting approximately six months, and over 400 people died. An important result of the Iraq study was the discovery that methylmercury in hair reflects blood concentrations at the time the hair was formed,

primarily through the consumption of contaminated fish, particularly large predatory fish species such as tuna, swordfish, shark, and whale.⁴⁵ This is due to methylmercury's tendency to bioaccumulate in the muscle tissue of each successive consumer in the food chain, so that by the time a human consumes a contaminated fish, the concentration of mercury toxicity in the human's body is many times greater than it would be in the water or sediment from which the fish came.⁴⁶ Once absorbed into the bloodstream, methylmercury binds to hemoglobin in red blood cells.⁴⁷ The primary organs affected are the liver, kidneys, and brain.⁴⁸ While the half-life of methylmercury in humans is only seventy to eighty days for a given dose,⁴⁹ when fish is consumed as part of a regular diet, the period of time in which methylmercury remains in the body at unsafe levels may be much longer.⁵⁰

There is no evidence to date of a threshold level of blood-mercury concentrations below which no negative effects on cognition are seen.⁵¹ Three prospective epidemiological studies conducted in the 1980s and 90s in the Seychelle Islands, Faroe Islands and New Zealand have attempted to identify a more precise dose-response relationship that can be used to set international, national and local guidelines for acceptable amounts of fish consumption.⁵² However, the early incidents of mercury poisoning and the three prospective studies yielded inconsistent results.⁵³ Today, different levels of blood-mercury concentrations that considered safe by federal and state agencies and international organizations, depending on which study and risk analysis models are relied upon.⁵⁴ The EPA relied on an integrative analysis of all three prospective studies

and can be used to reconstruct an ingested dose of methylmercury. *Id.* at 13. *See also* U.S. ENV'T. PROT. AGENCY, MERCURY UPDATE: IMPACT ON FISH ADVISORIES 6 (June 2001). In both Japan and Iraq, the effects in offspring who were exposed to methylmercury in utero were more serious, and in some cases seen at lower doses than in adults. EFFECTS, *supra* note 43, at 19.

⁴⁵ *Id.* at 13.

⁴⁶ *Id.* at 17; Bigham, *supra* note 43, at 29.

⁴⁷ EFFECTS, *supra* note 43, at 42.

⁴⁸ *Id.* at 44-45, 54.

⁴⁹ *Id.* at 50. Half-life is defined as the time required for the elimination of half a total dose of a toxin from the body. *Id.* at 340.

⁵⁰ The half-life of methylmercury in larger fish species is estimated to be two years. *See Global Mercury Assessment Report 2002, supra* note 40, at 6.

⁵¹ Leonardo Trasande, Philip J. Landrigan & Clyde Schechter, *Public Health and Economic Consequences of Methyl Mercury Toxicity on the Developing Brain*, 113 ENV'TL. HEALTH PERSPECTIVES 590, 591 (2005).

⁵² A sixty-six month study of 711 children in the Seychelles Islands found no adverse neurological effects of prenatal exposure to methylmercury, while scientists working in the Faroe Islands found that children whose prenatal exposures were similar to those observed in the Seychelles Islands population had subtle developmental dose-related deficits that were apparent at seven years of age. EFFECTS, *supra* note 43, at 19-20. The New Zealand study found significant decrements in cognitive performance in the children exposed to moderate-to-high doses of MeHg prenatally when tested at age four and again at age six. *Id.* at 19-20.

⁵³ Specifically between the Seychelles and Faroe Island studies. *See id.* at 21.

⁵⁴ *Id.* at 22-23.

to set their mercury reference dose (RfD).⁵⁵ The EPA defines its RfD as an estimate of a daily exposure to the human population—including sensitive subgroups—that is “likely to be without an appreciable risk of deleterious effects during a lifetime,”⁵⁶ but there is no bright line above which individuals are at risk for adverse effects.⁵⁷ Currently, the RfD is 0.1 micrograms of mercury per day for each kilogram of a person’s body weight—0.1 µg/kg body weight/day.⁵⁸

Agencies and scientists agree that the most severe damage from methylmercury occurs in the developing fetal brain.⁵⁹ The blood-brain barrier is not fully developed until after the first year of life, making the developing child particularly vulnerable to exposure from methylmercury in the mother’s blood.⁶⁰ Children who are exposed to even low concentrations of prenatal methylmercury are at risk of experiencing cognitive impairments to their attention spans, fine motor functioning, language skills, visual-spatial abilities and verbal memory.⁶¹ Roughly one in six babies born in America, or 630,000 infants born each year, has a blood-mercury content above the EPA’s safe level,⁶² and recent studies suggest that the adverse effects of prenatal methylmercury exposure may be irreversible.⁶³ Because the developing child is most vulnerable to mercury toxicity in utero, the EPA and most scientists regard women of child-bearing age—between the ages of fifteen and forty-four⁶⁴—as the population of greatest concern when regulating methylmercury exposure.⁶⁵ The EPA and other regulatory bodies focus their research and prevention strategies on women of child-bearing age, instead of *pregnant* women, because by the time a woman becomes pregnant it is too late to

⁵⁵ Removal, *supra* note 1, at 101; for a more detailed look at EPA’s methodology see EPA’s Integrated Risk Information System, Methylmercury (MeHg), available at <http://www.epa.gov/iris/subst/0073.htm> (last visited Oct. 7, 2005).

⁵⁶ Removal, *supra* note 1, at 98. See also Mercury, U.S. Env’tl. Prot. Agency, <http://www.epa.gov/mercury/exposure.htm> (last visited Sept. 22, 2006).

⁵⁷ Removal, *supra* note 1, at 102.

⁵⁸ *Id.* at 99-100.

⁵⁹ EFFECTS, *supra* note 43, at 17; Removal, *supra* note 1, at 93.

⁶⁰ Wendy Thomas, *Through the Looking Glass: A Reflection on Current Mercury Regulation*, 29 COLUM. J. ENVTL. L. 145, 148; Trasande, *supra* note 51, at 590; EFFECTS, *supra* note 43, at 43.

⁶¹ Removal, *supra* note 1, at 92.

⁶² K.R. Mahaffey, Methylmercury: Epidemiology Update, presentation at the National Forum on Contaminants in Fish, San Diego (Jan. 28, 2004).

⁶³ Letter from R. David Pittle, et. al. to FDA Commissioner Mark McClellan (Feb. 24, 2004), available at <http://www.mercurypolicy.org/new/fdaletter022404.html> (last accessed Oct. 2, 2005) (citing a recent study of the brain function in Faroese children who had been exposed to methylmercury in utero, where researchers found cognitive impairments persisted up to age fourteen). See K. Murata et. al., *Delayed Brainstem Auditory Evoked Potential Latencies in 14-Year-Old Children Exposed to Methylmercury*, 144 J. OF PEDIATRICS 177-183 (2004), available at http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=14760257&doct=Citation.

⁶⁴ Clean Air Network, *Fact Sheet: The Problem with Mercury* (1999), available at <http://www.mercurypolicy.org/exposure/documents/problemhg.pdf>; Removal, *supra* note 1, at 97.

⁶⁵ Removal, *supra* note 1, at 93; EFFECTS, *supra* note 43, at 53.

protect her unborn child from exposure.⁶⁶ It is important to remember that while the EPA's regulatory scheme is targeted at a large and diverse population of women, the objective remains to protect young children.⁶⁷ A study by the Centers for Disease Control and Prevention revealed that 5.7 % of women of child-bearing age have blood-mercury concentrations above the level likely to produce neurological effects in their developing children.⁶⁸ Exacerbating this statistic is the fact that recent data indicate that fetal blood-mercury levels—represented by umbilical cord blood samples at birth—are as high as 1.7 times the blood-mercury levels of the newborn's mother.⁶⁹ This is likely explained by the larger proportion of red blood cells and greater hemoglobin concentration in fetal blood, to which methylmercury binds.⁷⁰ Consequently, young children may experience neurological impairments even when blood-mercury concentrations are not high enough to adversely affect their mothers.

The most harmful effects of methylmercury are seen in the developing fetus, but research suggests that women, independent of their reproductive status, are more sensitive than men to mercury toxicity owing to both physiological and social factors.⁷¹ Follow up studies of the Iraqi epidemic show that three times as many females as males were affected,⁷² and later research confirmed evidence of gender-dependent methylmercury metabolism.⁷³ Studies in animals indicate gender differences in the sensitivity to methylmercury toxicity, particularly renal toxicity,⁷⁴ and reveal that females exhibit a higher body burden of mercury per given dose than males.⁷⁵ However, the practice of excluding women from clinical trials has only in the past decade or so begun to change, so that today the gender-

⁶⁶ On its webpage, EPA advises women

If you regularly eat types of fish that are high in methylmercury, it can accumulate in your blood stream over time. Methylmercury is removed from the body naturally, but it may take over a year for the levels to drop significantly. Thus, it may be present in a woman even before she becomes pregnant. This is the reason why women who are trying to become pregnant should also avoid eating certain types of fish.

What You Need to Know about Mercury in Fish and Shellfish,

<http://www.epa.gov/waterscience/fishadvice/advice.html#notp> (last visited Jan. 2, 2006).

⁶⁷ See Staci Jeanne Krupp, *Environmental Hazards: Assessing the Risk to Women*, 12 FORDHAM ENVTL. LAW REV. 111, 137 (2000).

⁶⁸ CTRS. FOR DISEASE CONTROL AND PREVENTION, DEPT. OF HEALTH AND HUMAN SERVS., THIRD NATIONAL REPORT ON HUMAN EXPOSURE TO ENVIRONMENTAL CHEMICALS 48 (2005) available at <http://www.cdc.gov/exposurereport/3rd/pdf/thirdreport.pdf>.

⁶⁹ Alan H. Stern & Andrew E. Smith, *An Assessment of the Cord Blood-Maternal Blood Methylmercury Ratio: Implications for Risk Assessment*, 111 ENVTL. HEALTH PERSP, 1465-1470 (2003), available at <http://ehp.niehs.nih.gov/members/2003/6187/6187.pdf>.

⁷⁰ *Id.* at 1468.

⁷¹ EFFECTS, *supra* note 43, at 73 - 74.

⁷² *Id.* at 74.

⁷³ *Id.* at 73.

⁷⁴ *Id.* at 74.

⁷⁵ This result might be due to higher metabolism and urinary-excretion rates for MeHg in sexually mature male mice compared with female mice, *Id.*

specific effects of mercury toxicity and the possible effects of hormonal changes due to pregnancy, are not fully known.⁷⁶

III. THE NEW CLEAN AIR MERCURY RULE (CAMR)

On March 15, 2005, the EPA released its Final Clean Air Mercury Rule—CAMR—which altered the way methylmercury is to be regulated.⁷⁷ The new rule regulates mercury emissions from new and existing coal-fired electric utility steam generating units (EGUs) under section 111 of the Clean Air Act.⁷⁸ Section 111 allows for a national “cap and trade system” between major sources⁷⁹ of pollution, and sets the national cap at thirty-eight tons per year (tpy) in 2010, and fifteen tpy by 2018.⁸⁰ The new rule is a marked departure from the regulatory mechanism the EPA was set to employ to control mercury emissions from EGUs since 2000. Section 112(b) of the Clean Air Act lists over 180 hazardous air pollutants (HAPs)⁸¹ that Congress has determined to be hazardous to the environment and human health.⁸² The EPA must add pollutants to the list of HAPs if the “substance is known to cause or may reasonably be anticipated to cause adverse effects to human health or adverse environmental effects.”⁸³ Mercury compounds are on this list. Under section 112(c) of the Act, the EPA must promulgate a list of major sources of HAPs every eight years.⁸⁴ Emissions standards applicable to new or existing sources of hazardous air pollutants must be promulgated to ensure the “maximum degree of reduction in emissions of the hazardous air pollutants . . .

⁷⁶ See Samara F. Swanston, *Race, Gender, Age, and Disproportionate Impact: What Can We do to About the Failure to Protect the Most Vulnerable?* 21 *FORDHAM URB. L.J.* 577, 599 (1994); Krupp, *supra* note 67 at 129-131; Nat'l Env'tl. Justice Advisory Council, *Fish Consumption and Environmental Justice* 148 (Nov. 2002), available at http://www.epa.gov/compliance/resources/publications/ej/fish_consump_report_1102.pdf (“Current risk assessment methods do not adequately account for susceptibilities and co-risk factors that affect individuals’ responses to environmental contaminants. These factors include underlying health status (including existing body burdens), baseline diet quality, genetics, socioeconomic status, access to health care, limited English proficiency, age, gender, pregnancy, lactation, and other factors.”); *Women’s Health Seen as Neglected Subject for Research in Occupationally Related Cancer*, 17 *BNA CHEM. REG. REP.* 1449 (1993). See generally, Annette Kornblum, *What’s Good for the Gander May Not Be Good for the Goose*, 101 *ENVTL. HEALTH PERSPECTIVES* 2 (June 1993). See also, Marianne J. Legato, *The Weaker Sex*, *N.Y. TIMES*, June 16, 2006, at A13.

⁷⁷ See generally CAMR, *supra* note 7.

⁷⁸ Clean Air Act §111, 42 U.S.C. §7411 (2000).

⁷⁹ A major source emits more than ten tons per year of a listed substance or more than twenty-five tons per year of any combination of HAPs. 42 U.S.C. § 7412(a)(1) (2000).

⁸⁰ Clean Air Act §111, 42 U.S.C. §7411 (2000).

⁸¹ A HAP is defined as an “air pollutant to which no ambient air quality standard is applicable and which in the judgment of the Administrator causes, or contributes to, air pollution which may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness.” 42 U.S.C. § 7412 (2000).

⁸² 42 U.S.C. § 7412(b) (2000).

⁸³ 42 U.S.C. § 7412(b)(3)(B) (2000).

⁸⁴ 42 U.S.C. § 7412(c)(1) (2000).

that the Administrator, taking into consideration the cost of achieving such emission reduction, and any non-air quality health and environmental impacts and energy requirements, determines is achievable” through application of a number of measures, processes, methods, systems or techniques.⁸⁵ The various methods and technologies used to control emissions are known as “maximum achievable control technology,” or “MACT.” EGUs, until recently, were not on the source category list. In 2000, the EPA issued a report to Congress summarizing the results of a 1998 study that evaluated the “hazards to public health reasonably anticipated to occur as a result of HAP emissions from fossil fuel-fired electric utility steam generating units.”⁸⁶ The EPA concluded that mercury emissions from EGUs were harmful to human health, and as such, should be regulated under section 112 of the Clean Air Act.⁸⁷ At that point, EGUs were added to the 112(c) source category list.⁸⁸

However, The Clean Air Act permits the EPA to find alternate means of regulating EGUs if it determines, after conducting and considering the results of the study evaluating the regulation, that such regulation is neither “appropriate” nor “necessary.”⁸⁹ By mid 2005, emphasizing that the Act only required it to “consider” the findings of the study,⁹⁰ the EPA determined that it was not really “necessary” and “appropriate” to regulate mercury from EGUs under section 112 after all, and removed EGUs from the list of major sources under section 112(c). The EPA interprets “appropriate” to mean that regulating EGUs under section 112(c) is “especially suitable or compatible” to the problem of mercury emissions if the “level of utility HAP emissions remaining after imposition of the Act would result in hazards to public health.”⁹¹

The EPA justified its reversal of its previous “appropriate” finding on many levels. First, it declared the results of the 1998 study overly broad because the study considered the hazards of mercury to the environment as a whole and did not confine itself to the effects on human health—the minimal requirement of section 112(n)(1)(A).⁹² Second, it claimed that the 1998 study overestimated the effects of mercury emissions on human health because it did not take into consideration the mercury reductions that would naturally occur from the implementation of new rules and revised performance standards that are expected to significantly reduce

⁸⁵ 42 U.S.C. § 7412(d)(2) (2000).

⁸⁶ U.S. Envtl. Prot. Agency, National Air Toxins Program: The Integrated Urban Strategy Report to Congress 4-16, 4-17 (July 2000). *See also* CAMR, *supra* note 7; Removal, *supra* note 1, at 1-2.

⁸⁷ U.S. Envtl. Prot. Agency, National Air Toxins Program: The Integrated Urban Strategy Report to Congress (July 2000).

⁸⁸ *Id.* at ES-4.

⁸⁹ 42 U.S.C. § 7412(n)(1)(A) (2000).

⁹⁰ Removal, *supra* note 1, at 23.

⁹¹ *Id.* at 35-36.

⁹² *Id.* at 47.

nitrogen oxide and sulfur dioxide in the atmosphere.⁹³

To explain the change in its “necessary” finding, the EPA interpreted “necessary” in a new way. Instead of requiring the EPA to regulate utility units under section 112 “if there are no other authorities under the CAA that would adequately address utility HAP emissions,” it interpreted necessary to mean “only if there are no other authorities available under the CAA that would, if implemented, effectively address the *remaining* HAP emissions from utility units.”⁹⁴ The EPA factored in the mercury emission reductions that would be a co-benefit of another provision in the CAA. The Clean Air Interstate Rule (“CAIR”) requires twenty-eight states to promulgate and enforce performance standards to reduce nitrogen dioxide and sulfur dioxide emissions from utility units.⁹⁵ With the implementation of the cap and trade program under CAIR, MACT for utility units was deemed no longer necessary.⁹⁶

Once utility units were removed from the 112(c) list, the EPA considered itself legally authorized to regulate mercury emissions from EGUs under section 111. Section 111 creates “standards of performance” for eligible units,⁹⁷ which establish standards for emissions of air pollutants which reflect “the degree of emission limitation achievable through the application of the best system of emission reduction, which—taking into account the cost of achieving such reduction, any non-air quality health and environmental impacts and energy requirements—the Administrator determines has been adequately demonstrated.”⁹⁸ Under CAMR, the EPA will allocate specified amounts of mercury emission “allowances” to all fifty states. Participation in the trading program is optional, but the EPA assumes that most if not all states will participate.⁹⁹ If a state decides to participate, it will be responsible for creating individual plans containing emission standards and compliance schedules for EGUs located within their borders. A state must demonstrate that its plan will result in compliance with its annual EGU mercury “budget.”¹⁰⁰ “No utility will be able to emit beyond the amount of its allowances without triggering significant automatic penalties.”¹⁰¹

⁹³ *Id.* at 51-55.

⁹⁴ *Id.* at 39 (emphasis added).

⁹⁵ Requirements for Preparation, Adoption, and Submittal of Implementation Plans, 40 CFR 51, §123 (c).

⁹⁶ CAMR, *supra* note 7, at 62-63.

⁹⁷ Eligible sources are those that combust fossil fuels for electrical power, process operations, or heating. The applicability of the rules differ with respect to the size of the unit (megawatts electric (MWe) or British thermal unit per hour (Btu/hr)) they regulate, the boiler/furnace technology they employ, or the portion of their electrical output (if any) for sale to any utility power distribution systems. CAMR, *supra* note 7 at 16.

⁹⁸ Clean Air Act §111(a)(1), 42 U.S.C. § 7411(a)(1) (2000).

⁹⁹ CAMR, *supra* note 7, at 177.

¹⁰⁰ *Id.* at 82.

¹⁰¹ Robert M. Sussman & Jon M. Queen, *EPA's Mercury Rulemaking: Expanding CAA Trading Programs*, NATURAL RESOURCES & ENERGY 15 (Summer 2005).

However, polluters will be able to trade their mercury allowances—each equivalent to one ounce of mercury—so that even if an individual polluter emits more than the allowance the EPA has assigned it, the national mercury cap is not exceeded.¹⁰² The EPA believes the cost of implementing MACT programs outweighs the benefits,¹⁰³ and that a cap and trade scheme is more fiscally prudent than MACT and will provide an incentive to industry to meet high standards of performance.¹⁰⁴

The functional difference between MACT and standards of performance is one of degree. If the EPA's mercury rule required MACT to be implemented for EGUs, mercury emissions would have fallen to five tons per year,¹⁰⁵ avoiding 380 tons of pollution between 2008 and 2020.¹⁰⁶ In contrast, the EPA projects that the implementation of CAMR, in conjunction with CAIR, will reduce mercury emissions from EGUs to twenty-five tons per year by 2020¹⁰⁷—projected emissions are higher than the set cap because EPA modeling assumes utilities will bank excess mercury reductions in the 2010 to 2017 timeframe.¹⁰⁸

The EPA acknowledges that the primary means by which human health is affected by mercury emissions from EGUs is through fish consumption.¹⁰⁹ The EPA has established a level of methylmercury concentration in fish tissue below which it is assumed the fish is safe for consumption.¹¹⁰ That figure is set at 0.3 milligrams of methylmercury per kilogram of wet-weight fish tissue (0.3mg/kg).¹¹¹ In setting the methylmercury criterion, the EPA assumed a “default” level of fish consumption of 17.5 grams per day—i.e., two eight ounce meals a month—of freshwater, estuarine and marine finfish and shellfish combined.¹¹² Put another way, assuming people consume an average of 17.5 grams of fish per day, the methylmercury concentration in fish cannot be higher than 0.3mg per kg if health impacts are to be avoided.¹¹³ Therefore, in conducting its exposure analysis, the EPA assumes that the general population consumes 17.5 grams per day of all fish,¹¹⁴ and that at this level of consumption, individuals will not exceed the RfD

¹⁰² CAMR, *supra* note 7, at 1.

¹⁰³ *Id.* at 37.

¹⁰⁴ CAMR, *supra* note 7, at 1, 61, 169.

¹⁰⁵ Trasande, *supra* note 51, at 591; NRDC, *supra* note 16, at 56.

¹⁰⁶ NRDC, *supra* note 16, at 56.

¹⁰⁷ Removal, *supra* note 1, at 126.

¹⁰⁸ *Id.* at 120.

¹⁰⁹ *Id.* at 93.

¹¹⁰ *Id.* at 149.

¹¹¹ *Id.*

¹¹² Removal, *supra* note 1, at 107.

¹¹³ In Re Petition for Reconsideration: Revision of December 2000 Regulatory Finding on the Emissions of Hazardous Air Pollutants from Electric Utility Steam Generating Units and the Removal of Coal- and Oil-Fired Electric Utility Steam Generating Units from the Section 112(c) list 70 Fed. Reg. 15994 (March 29, 2005). The States of New Jersey, California, Connecticut, Delaware, Illinois, Maine, Massachusetts, New Hampshire, New Mexico, New York, Pennsylvania, Rhode Island, Vermont, and Wisconsin (May 31, 2005) at 39-40.

¹¹⁴ Removal, *supra* note 1, at 107.

for mercury.¹¹⁵ However, the EPA acknowledges that “at very high consumption levels, even relatively small concentrations of methylmercury in fish may result in exposures that exceed the RfD.”¹¹⁶ In recognition of this reality, it projected mercury exposure levels and related impacts for high-end consumers—those likely to be consuming fish in the higher percentile range. The groups most at risk were identified as female members of subsistence fishing groups, low-income populations, and certain ethnic groups.¹¹⁷

The EPA focused its exposure analysis on the segment of the population who consume recreationally caught freshwater fish.¹¹⁸ Estimating that there are approximately 27.9 million recreational freshwater fishers in the United States, and based on application of a “consuming” factor and a “sharing” factor—sharing between the consumer and the actual angler who caught the fish—it estimates that approximately 58.6 million Americans consume recreationally-caught freshwater fish.¹¹⁹ Of these people, the EPA estimates approximately 7.5 to 10.5 million are women of child-bearing age, and about 500,000 will give birth in any one year.¹²⁰ Using these numerical assumptions, the EPA devised a base rate of consumption of self-caught freshwater fish among recreational anglers. The EPA estimates the mean consumption rate for women in this group is normally distributed at eight grams per day and twenty-five grams per day at the 95th percentile.¹²¹ The EPA relies on a higher exposure estimate for Asian and Native American women. Based on studies of Hmong and Chippewa populations in Minnesota, Wisconsin and Michigan, the EPA set the averaged daily fish consumption for Native populations at roughly twenty grams/day for its exposure analysis,¹²² and 393.8 grams/day at the 95th percentile, for its sensitivity analysis.¹²³

The EPA's exposure analysis alternates between and, where possible, blends two distinct models. The “population centroid approach” first estimates the number of recreational fishers within each U.S. Census block group and then predicts fishing activity in the form of trip-travel distances out to different fishing

¹¹⁵ *Id.* at 149-150.

¹¹⁶ *Id.* at 142.

¹¹⁷ U.S. Envtl. Prot. Agency, Office of Air Quality Planning and Standards, Air Quality Strategies and Standards Division, *Regulatory Impacts Analysis for the Final Clean Air Mercury Rule* 10-103, 10-103 – 10-134 (2005) [hereinafter RIA]. The EPA explains “[t]wo groups of women of childbearing age are of concern: (1) those who eat more than 10 grams of fish a day and (2) those who eat fish with higher methylmercury levels. Ten grams of fish is a little over one-quarter cup of tuna per week or about one fish sandwich per week.”

¹¹⁸ RIA, *supra* note 117, at 10-1.

¹¹⁹ Removal, *supra* note 1, at 97.

¹²⁰ *Id.*

¹²¹ RIA, *supra* note 117, at 10-98.

¹²² *Id.* at 10-123.

¹²³ Sensitivity analysis is used to calibrate high-end conditions for a distributional analysis of exposure within a given population, and should represent high-end (near bounding) behavior. *Id.* at 10-133.

trip-travel rings—10, 20, 50 and 100 mile rings.¹²⁴ The “angler destination approach” focuses on identifying specific watersheds where anglers fish and does not consider the anglers’ residential location.¹²⁵ Both approaches are criticized both internally and by independent researchers. These criticisms are summarized in the next section. After considering the results of its risk analysis, the agency regards the projected emission caps as non-hazardous to human health even at the highest consumption levels, and thus, non-hazardous to the vast majority of women.¹²⁶ Environmentalists, doctors and independent scientists disagree.¹²⁷

IV. CRITICISMS OF THE CAMR

The EPA received roughly 6,000 public comments in the period between releasing its proposed rule and the Final CAMR.¹²⁸ Critics took issue with the assumptions that formed the basis of the emissions modeling and the uncertainty of the EPA’s emissions predictions. The Natural Resource Defense Council, in its *Petition for Reconsideration*, called the EPA’s estimate “so rife with uncertainty that it is arbitrary and capricious to rely upon it as the sole basis for concluding that section 112 regulation is inappropriate.”¹²⁹ One of the “real world” factors¹³⁰ that the EPA failed to acknowledge is the optional nature of the trading system under CAIR. The assumption that most if not all states will choose to implement CAIR is optimistic at best, particularly in light of a lawsuit filed by the Attorneys General in fifteen states and the District of Columbia, now pending in the District of Columbia Court of Appeals.¹³¹ If not all states participate in CAIR, the assumed co-benefit of mercury reduction is necessarily exaggerated. In response to the comments and petitions for review which it received, the EPA made only two substantive changes: the EPA revised the state mercury (Hg) allocations, and modified the new source pollution standards (NSPS).¹³²

A. The EPA’s Cost-Benefit Analysis Disregards Reliable Research in Finding CAMR More Economically Prudent than MACT

The EPA’s cost-benefit analysis is also controversial. The EPA measures costs and benefits of various mercury regulatory scenarios by measuring the

¹²⁴ *Id.* at 10-7.

¹²⁵ *Id.* at 10-23.

¹²⁶ *See* Removal, *supra* note 1, at 156; *See generally* RIA, *supra* note 117.

¹²⁷ *Infra* Section VI.

¹²⁸ A complete list of public comments can be found at <http://docket.epa.gov>, searching under Docket ID “OAR-2002-0056”.

¹²⁹ NRDC, *supra* note 16, at 42.

¹³⁰ *Id.*

¹³¹ *State of New York et. al. v. United States Environmental Protection Agency*, Case No. 03-1380, *Petition for Review of Final Action*, Opening Brief of Government Petitioners (Sept. 8, 2005) [hereinafter *Petition for Review*].

¹³² Revision of December 2000 Clean Air Act Section 112(n), 40 CFR § 60 (2005).

reduction in per capita Intelligence Quotient (I.Q.) scores among exposed populations as a result of the regulation, and the corresponding cost of avoiding such decrements.¹³³ The agency values the health benefits of CAMR at no more than \$50 million a year¹³⁴ and the cost to industry at \$750 million a year.¹³⁵ Yet a Harvard study concluded that instituting an annual cap of fifteen tons—the 2018 cap under CAMR—could save the public up to \$4.9 billion a year through reduced social and medical costs associated with neurological and cardiac harm, almost 100 times the benefit EPA projects.¹³⁶ The Harvard study finds a much greater benefit from CAMR than the EPA acknowledges, sharply contrasting the agency's inferred position that the benefits of regulating mercury emissions in *any form* are relatively insignificant.¹³⁷ Similarly, another study found that the cost to implement CAMR is greater than the EPA suggests. By factoring the social impact of the new rule into its calculations, the study concluded that mercury emissions from American power plants actually cost the nation \$1.3 billion each year in lost productivity, primarily due to the decreased earning power of children exposed to methylmercury in utero.¹³⁸ Additionally, the cost to implement MACT is less than the EPA assumes, as new technologies exist that can reduce mercury emissions at the source with greater success and at lower cost than the EPA acknowledges.¹³⁹ A report by Northeast States for Coordinated Air Use Management showed that reductions in mercury emissions up to 90% below current levels were possible with existing control technologies, at a cost that is comparable to reducing nitrogen dioxide.¹⁴⁰ Finally, CAMR will not be fully implemented until 2020, a full fifteen years after the rule goes into effect and many years later than similar results would be seen under a MACT scheme.¹⁴¹ In the interim 15 years, adverse effects on human

¹³³ RIA, *supra* note 117, at 10-8.

¹³⁴ *Id.* at 10-10.

¹³⁵ CAMR, *supra* note 7, at 175.

¹³⁶ Glenn Rice & James K. Hammitt, *Economic Valuation of Human Health Benefits of Controlling Mercury Emissions from U.S. Coal-Fired Power Plants* xix, Harvard Center for Risk Analysis (2005), Docket ID No. 5749.

¹³⁷ Shankar Vedantam, *New EPA Mercury Rule Omits Conflicting Data*, WASH. POST, March 22, 2005, at A1.

¹³⁸ *See generally* Trasande, *supra* note 51.

¹³⁹ *See e.g.*, public comment from Carl Johnson, Deputy Commissioner, Office of Air & Waste Management, NY Department of Environmental Conservation, Docket ID No. OAR-2002-0056-5458 at 4 (“EPA fails to acknowledge the ongoing work being conducted under the United States Department of Energy/National Energy Technology Laboratory (DOE/NETL) Mercury Control Technology Research Program on coal fired power plants. Four full-scale demonstration projects have tested the effectiveness of carbon injection in tandem with conventional criteria air pollution control devices currently in use at utilities.”); *see* Public comment from Laurel O’Sullivan and Abigail Corso, Delta Institute, Docket ID No. OAR-2002-0056-2219 at 2 (“Numerous pilot studies and tests have demonstrated that it is possible to achieve over 90% reduction in mercury emissions by installing individual control technology”).

¹⁴⁰ Praveen Amar, *Mercury Emissions from Coal-Fired Power Plants: The Case for Regulatory Action* 4-9, NORTHEAST STATES FOR COORDINATED AIR USE MGMNT. (2003).

¹⁴¹ NRDC, *supra* note 16, at 56.

health will persist, and the cost of this health risk has not been factored into the EPA's cost-benefit analysis.¹⁴²

B. The EPA's Exposure Analysis is Fraught with Acknowledged Uncertainties and Fails to Protect Women of Child-Bearing Age

The most relevant criticism of CAMR for the purposes of this article centers on the EPA's exposure analysis and the resulting risk that will be assumed by women of child-bearing age both in the general population and among the most vulnerable subpopulations. The EPA has acknowledged that the two primary approaches it uses to assess exposure among women of child-bearing age in vulnerable subpopulations rely on unconfirmed assumptions. In its Regulatory Impacts Assessment, the EPA notes:

The population centroid approach assumes that, in each block group, the percentage of women who live in freshwater angler households (i.e., households with at least one freshwater angler) is equal to the percentage of the state adult population that fishes... [U]sing individual-based fishing participation rates to approximate household rates is likely to underestimate the percentage of women living in freshwater angler households. Unfortunately data on household participation levels in freshwater fishing are not readily available... In the angler destination approach, it is assumed that the percentage of self-caught fish from a HGU [demarcate USGS watershed area] that goes to households with women of childbearing age is equal to the sum of (1) the state-level percentage of anglers who are women of childbearing age plus (2) the state-level percentage of anglers who are male, married, and in the same age range as women of childbearing age... [o]n the one hand, this approach may not capture women who receive noncommercial fish from other individuals (besides husbands younger than 45), in which case it would underestimate the size of the exposed population. On the other hand, and probably more importantly, this approach is likely to double count women of childbearing age who meet both criteria (anglers and married to angler men younger than 45). The extent of this double counting is not known, but it would lead to an overestimation of the exposed.¹⁴³

While the EPA maintains that the angler destination approach may

¹⁴² *Id.* See Petition for Review, *supra* note 131 at 28-29. See Lisa Heinzerling & Reina Steinzor, *Mercury and the Bush Administration*, 30 ABA'S ADMIN. & REG. LAW NEWS 2, 8 (2005) (arguing that the MACT program could have reduced mercury emissions by as much as 90% within the three year deadline provided by section 112); Office of New York State Attorney General, Press Release: *Nine States File Suit Challenging EPA Mercury Rule*, (2005) (Arguing that MACT controls would reduce mercury emissions at each facility by about 90%, reducing total mercury emissions from power plants to about 5 tons per year) available at http://www.oag.state.ny.us/press/2005/mar/mar29c_05.html.

¹⁴³ RIA, *supra* note 117, at 10-139.

overestimate fish consumption by double counting women who meet both definitional criteria, studies of fishing patterns among various subsistence and angler cultures reveal that the primary angler in the home is usually male.¹⁴⁴ As such, it is more likely that both of the EPA's models underestimate exposure by women of child-bearing age.

The EPA seems satisfied to promulgate the new mercury rule relying on limited studies of fishing patterns among vulnerable subpopulations. It explains its reliance on limited data for Native Americans by stating offhandedly that:

[p]eer reviewed study data on these populations is relatively limited... [m]any of the high consumption groups that have been studied are located near the ocean and consequently have a significant fraction of their overall exposure comprised of saltwater fish. In addition, some of these studies provide details on seasonal consumption rates but do not integrate these rates to provide an overall mean annual-averaged consumption rate relevant to an RfD-based analysis.¹⁴⁵

Similarly, the EPA dismisses a large body of research on fishing patterns among low-income individuals, remarking “[a]lthough studies have documented these types of behaviors among low income groups in specific locations in the U.S.... a broad definition of this behavior at the national level is not available.”¹⁴⁶

C. CAMR Will Create Local Hot Spots Which Disproportionately Impact Women

Critics of cap-and-trade programs have long argued that while market-based programs can be effective at reducing overall pollution levels, they can create toxic “hot spots” of pollution.¹⁴⁷ A toxic “hot spot” refers to the area surrounding a facility that contains elevated concentration of pollutants from utility emissions compared to either the larger geographic region covered by the regulatory scheme, or the agency's predetermined safe concentration level.¹⁴⁸ Because of the varying deposition patterns of different pollutants, this problem is more likely to occur with

¹⁴⁴ See e.g., David K. Anderson & Robert B. Ditton, *Demographics, Participation, Attitudes, and Management Preferences of Texas Anglers I*, Dept. of Wildlife and Fisheries Sciences, Texas A&M Univ. (2004) (“Most (84%) licensed, resident freshwater anglers are males.”); Jason Corburn, *Combining Community-Based Research and Local Knowledge to Confront Asthma and Subsistence-Fishing Hazards in Greenpoint/Williamsburg, Brooklyn, New York*, 110 ENVTL HEALTH PERSPECTIVES SUPPLEMENTS 2, (2002) (“The Watchperson Project also found that almost all the anglers were males between 16 and 60 years of age.”) available at <http://ehp.niehs.nih.gov/members/2002/suppl-2/241-248corburn/corburn-full.html#angl>; Koenraad Mariën, *Exposure Analysis of Five Fish Consuming Populations for Overexposure to Methylmercury* 29, WASH. STATE DEPT. OF HEALTH (2001) (90% of anglers surveyed were male), available at <http://www.doh.wa.gov/ehp/oehas/publications%20pdf/Hg00rprt.pdf>.

¹⁴⁵ Removal, *supra* note 1, at 142.

¹⁴⁶ RIA, *supra* note 117, at 10-111.

¹⁴⁷ See generally Johnson, *supra* note 11; Pamela D. Harvey & C. Mark Smith, *The Mercury's Falling: The Massachusetts Approach to Reducing Mercury in the Environment*, 30 AM. J. L. AND MED. 245, 263 (2004).

¹⁴⁸ Removal, *supra* note 1, at 162.

heavier elements that deposit close to the source of emission. While mercury disperses regionally and globally, EPA estimates that one-third of mercury emissions, specifically oxidized and particulate mercury, settle within twenty-five kilometers of emitting plants.¹⁴⁹ Despite this, EPA modeling does not show that CAMR, once implemented in conjunction with CAIR, will create local hot spots.¹⁵⁰ Studies of deposition patterns have led critics to the opposite conclusion. Many believe that under the CAMR, where emission limits are set at the state level rather than at the utility level, methylmercury hot spots will arise near facilities that opt to increase emissions by purchasing credits.¹⁵¹ Research on existing hot spots shows that local sources within a state account for fifty percent to eighty percent of total mercury deposition.¹⁵² Native American advocates project that by 2020, emissions will be higher under CAMR than under MACT's best case for almost every source of mercury emissions—polluting utilities—in the upper Great Lakes states of Michigan, Minnesota, and Wisconsin.¹⁵³ The increase in emissions, along with a high water body to land ratio, and mercury sensitive waters in the area, is predicted to create mercury hot spots that will be particularly deleterious to Native tribes who fish the region's lakes.¹⁵⁴ A recent study in Florida indicated that when local sources of mercury were controlled, fish in local waters exhibited reduced tissue mercury levels in nearly equal parts.¹⁵⁵ This lends credence to the theory that local utilities contribute a significant portion of total mercury deposits in local water bodies, and that an increase in emissions from a particular utility can create local hot spots.¹⁵⁶

The problem of local mercury hot spots is particularly relevant to women living below the poverty line. Heavily polluting industrial facilities—the facilities that are more likely to purchase pollution credits—are more apt to be situated in low-income, urban areas than in middle to upper-income, suburban areas.¹⁵⁷ Low-

¹⁴⁹ Sussman & Queen, *supra* note 101 at 19; Removal, *supra* note 1, at 162.

¹⁵⁰ Removal, *supra* note 1, at 171.

¹⁵¹ Sussman & Queen, *supra* note 101, at 19.

¹⁵² Michael Shore, *Out of Control and Close to Home: Mercury Emissions from Power Plants* 12, ENVTL. DEFENSE (2003),

http://www.environmentaldefense.org/documents/3370_MercuryPowerPlants.pdf.

¹⁵³ Catherine A. O'Neill, *Mercury, Risk & Justice* 3, CTR. FOR PROGRESSIVE REGULATION (2004), http://www.progressiveregulation.org/articles/Mercury_2004.pdf.

¹⁵⁴ *Id.*

¹⁵⁵ Fl. Dept. of Envtl. Protection, *Integrating Atmospheric Mercury Deposition with Aquatic Cycling in South Florida* ii-iii (2003) available at http://www.dep.state.fl.us/secretary/news/2003/nov/pdf/mercury_report.pdf.

¹⁵⁶ For an alternative perspective see Byron Swift, *U.S. Emissions Trading: Myths, Realities, and Opportunities* 7, NATURAL RESOURCES & ENERGY (Summer 2005) (“[A]n assessment of the actual performance of trading programs shows that the choice of regulatory method has little to no environmental impact on hot spots.”).

¹⁵⁷ See e.g., Reps. Alcee Hastings and Hilda Solis, *With Clear Skies, Who are the Winners and who are the Losers?; Minorities Face Greatest Threat From Pollution*, ROLL CALL (April 21, 2005) (“5.5 million Latinos live within 10 miles of a coal powered plant, and 68 percent of all African Americans

income communities may lack the political power to influence local industry to adopt new pollution controls, and may fear that doing so will force the industry to close, depriving the community of essential jobs and tax revenue.¹⁵⁸ Therefore, low-income communities may be disproportionately affected by mercury pollution if a local plant chooses to buy pollution credits rather than limit its emissions to the number of credits it has been allotted. The EPA has dismissed this notion stating that large utilities are more likely to over-control their emissions and sell resulting emission allowances than smaller utilities, which are less likely to be the sources of hot spots.¹⁵⁹

Women have historically and consistently experienced poverty in greater numbers than men,¹⁶⁰ and census data indicate that a family is more likely to experience poverty if the head of household is a single woman.¹⁶¹ While EPA claims to lack sufficient data on consumption patterns among low-income communities,¹⁶² evidence exists that low-income individuals eat greater quantities of fish than all other groups.¹⁶³ To the extent that women have disproportionate

in the United States live within 30 miles of a coal powered plant, the distance within which the health impacts are most acute. More than 70 percent of all African Americans and Latinos live in counties that violate federal air pollution standards, compared to 58 percent of whites.”); Gauna et. al., *supra* note 23, at (“Whereas 15.3 percent of non-Hispanic white women of childbearing age have mercury in their blood at levels that pose a risk to a developing fetus, this number climbs to 31.5 percent for women of childbearing age who identify themselves as ‘Other,’ a category comprised primarily of Native Americans, Pacific Islanders, those “of Asian origin,” or those of “mixed race.”), available at http://www.progressiveregulation.org/articles/EJ_505.pdf; Uma Outka, *Environmental Injustice and the Problem of the Law*, 57 ME. L. REV. 209, 213 (2005) (“[A] study of the distribution of toxic chemicals registered and reported in the Toxics Release Inventory (TRI) found that ‘all other things being equal, residential areas with large concentrations of African-Americans and Hispanics are exposed to substantially higher levels of TRI pollutants’”) (citing Evan J. Ringquist, *Equity and the Distribution of Environmental Risk: The Case of TRI Facilities*, 78 SOC. SCI. Q. 811, 824 (1997)). See also, Verchick, *supra* note 19.

¹⁵⁸ Johnson, *supra* note 11, at 131.

¹⁵⁹ Removal, *supra* note 1, at 169.

¹⁶⁰ U.S. ENVTL. PROT. AGENCY (1999), *supra* note 38; Krupp, *supra* note 67, at 117.

¹⁶¹ 10.1% of all families live below the poverty line while 29.2% of families headed by women live below the poverty line. The disparity only increases when the average age of all related children living in the house are factored in. 37.6% of female-headed households where the average age of related children is under 18 years live below the poverty line, while 46.2 % of female-headed households with related children under 5 years live below the poverty line. See U.S. Census Bureau: Selected Economic Indicators: 2004, available at http://factfinder.census.gov/servlet/ADPTTable?_bm=y&-geo_id=01000US&-qr_name=ACS_2004_EST_G00_DP3&-ds_name=ACS_2004_EST_G00_&-_lang=en&-_sse=on.

Brian Israel points out that “because the birth rate among many minority groups is higher than that of the general population, minority populations have larger percentages of children and pregnant women, suggesting that the health effects of methylmercury toxicity on pregnant women will be greater in minority populations than in the general population.” Brian D. Israel, *An Environmental Critique of Risk Assessment*, 3 N.Y.U. ENVTL. L.J. 469, 508-509 (1995). The predominance of women living in poverty is an international phenomenon as well. See Jacqueline Sims & Maureen E. Butter, *Gender Equity and Environmental Health*, 10 HARVARD CTR. FOR POPULATION AND DEV. 6 (June 2000).

¹⁶² RIA, *supra* note 117, at 10-111.

¹⁶³ P.C. West, J.M. Fly, R. Marans, F. Larkin, 1991-1992 *Mich. Sport Anglers Fish Consumption Study 4- 5* (1992), available at <http://www.epa.gov/ncea/pdfs/efh/references/AG.PDF#search=%22%22West%22%20%2292%20Mi>

membership in communities that surround hot-spots, low-income women may be more the most likely group to consume contaminated fish.

D. The EPA's Exposure Analysis is Based on False Assumptions that Underestimate Risk to Women of Child-Bearing Age

To calculate the potential for mercury toxicity attributable to the EGUs, the EPA calculated the average quantity of fish consumed by recreational anglers that was caught in fresh waters, and used this figure—eight grams per day—as the average consumption level of potentially hazardous fish among the general population. The base rate of eight grams per day consists only of self-caught freshwater fish, while the default rate of 17.5 grams per day—discussed above—approximates the total amount of all fish consumed by the general public. While limiting its impact analysis to freshwater fish may at first appear consistent with the EPA's congressional mandate—the Food and Drug Administration is responsible for regulating the safety of commercially caught fish¹⁶⁴—critics feel that controlling mercury emission from American EGUs falls under the EPA's broader mandate to protect human health under the Clean Air Act, and thus, the impact of such emissions on coastal waters should be factored into the EPA calculations as well.¹⁶⁵ The EPA never adequately explains why the study excludes all other sources of fish, such as commercial sources—including saltwater and freshwater fish from domestic and foreign producers—recreationally caught marine fish, recreationally caught estuarine fish, and farm raised fish.¹⁶⁶

Marine fish contribute a greater proportion of methylmercury to the human diet than freshwater fish.¹⁶⁷ The EPA has acknowledged that ocean species such as tuna, pollock, shrimp and halibut account for two-thirds of the mercury Americans consume. In contrast, catfish, the largest source of mercury among freshwater fish, accounts for only three percent.¹⁶⁸ Additionally, the vast majority of U.S. commercial fish are caught close to shore—approximately thirty-six percent are caught within three miles of shore, and ninety-seven percent are caught within two hundred miles¹⁶⁹—and seventy-one percent of all coastal waters of the contiguous forty-eight states have mercury fish consumption advisories.¹⁷⁰ This suggests that consumers eating commercially caught fish or recreationally caught fish from ocean waters are just as likely—if not more likely—to be exposed to methylmercury as

chigan%20Sport%22%22.

¹⁶⁴ The FDA's seafood safety program operates under the authority of the Federal Food, Drug and Cosmetic Act, 21 U.S.C. §§ 341-350, 376 (2000).

¹⁶⁵ 42 U.S.C. § 7412(n)(1)(A) (2000).

¹⁶⁶ NRDC, *supra* note 16, at 49.

¹⁶⁷ CAMR, *supra* note 7, at 209.

¹⁶⁸ Vedantam, *supra* note 137.

¹⁶⁹ RIA, *supra* note 117, at 4-9; Petition for Review, *supra* note 131, at 34-35.

¹⁷⁰ NRDC, *supra* note 16, at 51.

those fishing freshwaters, to whom the EPA limits its exposure analysis. The NRDC argues that when compared to the total population of fish consumers in the United States—184 million—the decision to limit risk assessment to the estimated 58.6 million individuals in the United States population who consume recreationally-caught freshwater fish is arbitrary and capricious.¹⁷¹ The exclusion of recreationally caught saltwater fish is particularly troubling from an environmental justice perspective, because a significant portion of the waters in which subsistence, tribal and low-income anglers fish are coastal waters.¹⁷² By reducing the size of the affected population, the adverse impact on the general population and women of child-bearing age in particular, is necessarily underestimated.

The EPA's default rate of fish consumed by the general population from all sources has been criticized as arbitrarily low by the Attorneys General of fourteen states.¹⁷³ While the EPA uses a rate of 17.5 grams per day, a study conducted in New Jersey estimated that the average fish consumption among fish consumers in New Jersey was 50.2 grams per day, and the average in the population of women of childbearing age was 41.0 grams per day.¹⁷⁴ Studies also call into question the EPA's base rate for consumption of recreationally-caught sport fish; a 1990's Michigan study found an average consumption rate of 14.5 grams per day, a 1989 Wisconsin study found an average consumption rate of 12.3 grams per day, and a 1988 Michigan study found an average consumption rate of 42.3 grams per day.¹⁷⁵ The EPA has also been criticized for underestimating exposure in Native American tribes. For example, a survey by the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) indicates that during spearing seasons, Ojibwe tribal fishers tend to eat an "average" meal ranging from 369-766 grams, suggesting that the EPA's conclusion that 393.8 grams per day represents the upper bound of average daily fish consumption for Native populations may actually be on the low end of the range.¹⁷⁶

Many of the criticisms submitted in the EPA rulemaking echo observations

¹⁷¹ *Id.* at 50. Researchers at the Survey Research Center at the University of Georgia asked 16,000 individuals by telephone about their water-based recreation activities. Of the 3,257 respondents in the survey who had fished in the previous year, 22 % indicated that their last trip was to a coastal area. Assessment of Mercury Exposures to Women of Childbearing Age From Consumption of Noncommercial Freshwater Fish in the U.S., Revised Methodology Report 3-6 (2004), EPA Docket No. 2002-0056-5196.

¹⁷² Nat'l. Envtl. Justice Advisory Council, *supra* note 76, at 67.

¹⁷³ State of New Jersey et. al., In Re Petition for Reconsideration: Revision of December 2000 Regulatory Finding on the Emissions of Hazardous Air Pollutants from Electric Utility Steam Generating Units and the Removal of Coal- and Oil-Fired Electric Utility Steam Generating Units from the Section 112(c) List, 70 Fed. Reg. 15,994 (May 31, 2005) at 39.

¹⁷⁴ *Id.* at 40.

¹⁷⁵ *Id.* at 39.

¹⁷⁶ Public comment from Christine Berini, Fond du Lac Band Environmental Program Manager, Docket ID No. OAR-2002-0056-5455 (Jan. 3, 2004) at 2.

from academia that traditional forms of risk analysis fail to take into account gender-specific harms, and as such, underestimate the actual risk of regulations to women. One criticism of the gender-bias in risk assessment has been that health impacts are calculated based on the “average person” who really represents the average white male.¹⁷⁷ The average person is assumed to have a bodyweight of seventy kilograms¹⁷⁸—an estimate closer to the weight of an average man than an average woman—and critics argue that this reliance on this figure dilutes the health impacts of toxins on adult women.¹⁷⁹ In the Final CAMR, the EPA did use a bodyweight estimate of sixty-four kilograms,¹⁸⁰ which more closely reflects the average woman, however its fish advisory is still based on a seventy kilogram consumer.¹⁸¹ Critics also argue that the reliance on the average person fails to adequately represent diversity among individuals, particularly women.¹⁸² One oft-cited study found that two women eating the exact same fish could get a dose of mercury different by a factor of seventy, and that one in every one hundred women would be expected to retain in her body three times the methylmercury that an average woman would retain.¹⁸³ The assumption of homogeneous health effects may underestimate the true risk of mercury exposure to individual women. The Environmental Working Group and State PIRGs conducted risk analysis for fish consumption using a model that accommodates a range of bodyweights, and concluded that a woman eating twelve ounces of fish per week has a twenty-two times greater chance of exceeding the safe blood level of mercury for any period of time during her pregnancy than the EPA concluded using its traditional risk analysis model.¹⁸⁴

There is strong support for regulatory decisions that take into consideration women’s subjective perceptions of risk, regardless of whether or not women are particularly vulnerable to environmental harms.¹⁸⁵ Many studies have documented sizable differences between risk perceptions of men and women, with men tending to judge risks as smaller and less problematic than women do, and white men

¹⁷⁷ Robert R. Kuehn, *The Environmental Justice Implications of Quantitative Risk Assessment*, U. ILL. L. REV. 103, 125 (1996).

¹⁷⁸ Technical Memorandum: Origin of 1 Meal/Week Noncommercial Fish Consumption Rate in National Advisory for Mercury, U.S. Envtl. Prot. Agency (2004) available at <http://www.epa.gov/waterscience/fishadvice/1-meal-per-week.pdf> [hereinafter EPA Technical Memorandum].

¹⁷⁹ Carl Cranor, *Risk Assessment, Susceptible Subpopulations, and Environmental Justice*, in THE LAW OF ENVIRONMENTAL JUSTICE: THEORIES AND PROCEDURES TO ADDRESS DISPROPORTIONATE RISKS 325 (Michael B. Gerrard, ed., American Bar Association 1999); Kuehn, *supra* note 177, at 125; Krupp, *supra* note 67, at 129.

¹⁸⁰ Removal, *supra* note 1, at 140.

¹⁸¹ EPA Technical Memorandum, *supra* note 178.

¹⁸² Kuehn, *supra* note 177, at 125; Cranor (1999), *supra* note 179, at 325.

¹⁸³ Alan H. Stern, *Estimation of the Interindividual Variability in the One-Compartment Pharmacokinetic Model for Methylmercury: Implications for the Derivation of a Reference Dose*, 25 REGULATORY TOXICOLOGY & PHARMACOLOGY 277-288 (1997), in Baumann et. al., *supra* note 15 at 25.

¹⁸⁴ *Id.* at 28.

¹⁸⁵ Cranor (1999), *supra* note 179, at 327-328.

perceiving the smallest amount of risk compared with all other groups—African American men and women, Hispanic men and women, white women.¹⁸⁶ The argument for considering subjective perceptions of risk in a regulatory scheme is that they are the only way to counterbalance the perceptions of risk that inherently underlie the regulatory decisions made at the agency level, predominantly by white males.¹⁸⁷ In the case of mercury toxicity through fish consumption, there is no lack of scientific evidence correlating methylmercury toxicity with cognitive damage, so one might argue that there is no need to integrate subjective perceptions into risk analysis since hard science can paint an accurate and complete picture. However, underlying the debate between the EPA and its critics over how much mercury is likely to end up in fish as a result of various regulatory schemes, endures a more subtle debate over just how much risk—and uncertainty of risk—is acceptable. Those who advocate integrating subjective perception into the equation would answer that question, rhetorically: “acceptable to whom?” If women’s heightened concerns and fears of environmental harms were factored into EPA’s risk analysis, perhaps the vast uncertainties that run through its entire analysis would, in balance, not be tolerable to the agency, and revisions would be worked into the CAMR. On the other hand, perhaps even taking into account heightened risk perception, the EPA would not revise the CAMR, instead choosing to place the onus of managing uncertainty on the consumer, as it has done for years through its national fish advisory.

V. FISH ADVISORIES FALL SHORT OF A REAL SOLUTION

Fish advisories fall into a category of risk management that scholars refer to as “risk avoidance.”¹⁸⁸ Risk avoidance strategies aim to manage exposure to

¹⁸⁶ See James Flynn, Paul Slovic & C.K. Mertz, *Gender, Race, and Perception of Environmental Health Risks*, 14 RISK ANALYSIS 6, 1101-1108 (1994). White males were always less likely to rate one of the study’s enumerated health hazards as posing a “high risk.” Notably, out of twenty-five health hazards (including non-environmental hazards such as “AIDS” and “commercial air travel”) the differences between white males’ perception and all others for the risk associated with “coal/oil burning plants” was the fifth smallest. *Id.* at 1105. Kalof et. al. conducted two national telephone surveys to measure four major values on environmentalism: altruism, self-interest, traditionalism and openness to change. For minority groups, they did not find significant differences between men and women’s attitudes, but they found very significant differences between white women and white men. White men as a group emerged as significantly different from other groups’ responses—e.g. Black women, Hispanic men, Black men, etc. Linda Kalof, Thomas Dietz, Gregory Guagnano, & Paul C. Stern, *Race, Gender and Environmentalism: The Atypical Values and Beliefs of White Men*, 9 RACE, GENDER & CLASS 2, 1-19 (2002).

¹⁸⁷ Krupp, *supra* note 67 at 125-126.

¹⁸⁸ See generally Catherine O’Neill, *The Perils of Risk Avoidance*, 20 ABA NATURAL RESOURCES & ENVT. 3 (Winter 2006); O’Neill (2003) *supra* note 22; Leticia M. Diaz, *Hormone Replacement Therapy, or Just Eat More Meat: The Technological Hare vs. The Regulatory Tortoise*, 27 B.C. ENVTL. AFF. L. REV. 391, 420 (2000) (arguing that FDA should reinstate the zero-tolerance approach of the Delaney Clause, because consumers should not have to pay “a hefty price for safe food. The simpler solution would be to discontinue the use of hormones and chemicals in animals and plant products. Americans should not have to pay a beefy price for an unpolluted cut of beef.”).

environmental harms by encouraging active avoidance of such harms by potential victims. Risk avoidance is at the opposite end of the regulatory spectrum from risk reduction strategies, which look to risk-producers to prevent or eliminate contamination in order to reduce these harms.¹⁸⁹ Agencies generally refer to advisories as regrettably temporary solutions to long-term problems,¹⁹⁰ but their prominence in the EPA's campaign to manage mercury belies their provisional nature. Fish advisories, issued by states and the federal agencies, are meant to reduce the risk of mercury toxicity that inevitably remains after the implementation of regulations. Even though EPA concludes that under CAMR the risk of any given woman exceeding the RfD is negligible, and that the number of women to whom this might occur is likewise limited, the EPA acknowledges that some form of protection in excess of the CAMR is warranted, because nearly all fish and shellfish contain traces of mercury.¹⁹¹ Now that CAMR has supplanted a MACT program, and overall levels of mercury in the environment will remain higher for a longer period of time, fish advisories will have a greater role to play in a risk reducing strategy.

The EPA recognizes both the risks of mercury toxicity and the benefits of fish for a healthy diet for women of child-bearing age.¹⁹² For this reason, it has endeavored to promote a consciousness among women regarding safe levels of fish consumption.¹⁹³ The advisory states “[d]o not eat Shark, Swordfish, King Mackerel, or Tilefish because they contain high levels of mercury” and recommends women of child-bearing age eat up to twelve ounces—two “average” sized meals—a week of a variety of fish and shellfish that are lower in mercury such as shrimp, canned light tuna, salmon, pollock, and catfish.¹⁹⁴ However, the advice for albacore tuna and tuna steaks is to eat only six ounces per week.¹⁹⁵ For all other fish, the advisory recommends its audience consult their state fish advisories, and if no advice is available, “eat up to 6 ounces (one average meal) per week of fish you catch from local waters, but don’t consume any other fish during that week.”¹⁹⁶

The EPA provides guidance to state agencies on issuing fish advisories, and states have the responsibility for issuing advisories for specific fish caught within

¹⁸⁹ O’Neill (2006), *supra* note 188, at 9.

¹⁹⁰ *Id.* at 10; Nat’l Env’tl. Justice Advisory Council, *supra* note 76 at 98.

¹⁹¹ See Joint Federal Advisory *supra* note 21.

¹⁹² *Id.*

¹⁹³ *Id.* (acknowledging “FDA and EPA want to ensure that women and young children continue to eat fish and shellfish because of the nutritional benefits and encourage them to follow the advisory so they can be confident in reducing their mercury exposure as well.”). See also EPA’s Mercury Update: Impact on Fish Advisories, <http://epa.gov/ost/fishadvice/mercupd.pdf> (last visited Sept. 23, 2006).

¹⁹⁴ Joint Federal Advisory, *supra* note 21.

¹⁹⁵ *Id.*

¹⁹⁶ *Id.*

their borders.¹⁹⁷ In 2003, two years after the FDA/EPA federal advisory was first issued, 22% of all river miles and 32% of all lake acres were under a mercury advisory.¹⁹⁸

The EPA recognizes that advisories have little measurable effect on fishing behavior among the most vulnerable—high-end—consumers.¹⁹⁹ For this express reason, the EPA did not factor any effects of fish advisories into the exposure estimates for high-end consumers used to promulgate the CAMR.²⁰⁰ However, it is less clear what effect, if any, the EPA projects fish advisories will produce among the general population. The EPA assumes that the general population consumes 17.5 grams per day of all types of fish.²⁰¹ On the other hand, the EPA's advisory recommends women consume “up to 12 ounces per week” of a variety of fish “low in mercury,” which equates to 49 grams per day.²⁰² If women followed the advisory and consistently ate 49 grams of a variety of fish per day, they would exceed the “default” level of fish consumption of 17.5 grams per day by a factor of nearly three.²⁰³ Unless the EPA is willing to concede that more than 17.5 grams per day of all fish and shellfish can be safely consumed without exceeding the RfD—that is, that the methylmercury criterion is actually higher than 0.3 mg/kg—the paradoxical conclusion is that women should *not* follow the advisory. Nonetheless, the EPA has stated repeatedly that following its, and the FDA's, advice to limit overall fish consumption and eat less of certain species will reduce the proportion of women who are exposed to methylmercury at levels over the reference dose.²⁰⁴

Even if the scientific community agreed that the advisory would reduce risk of

¹⁹⁷ Zachary Corrigan, *Fishing for Trouble: How Toxic Mercury Contaminates Our Waterways and Threatens Recreational Fishing*, U.S. PUB. INTEREST RESEARCH GROUP EDUCATION FUND 8 (2004).

¹⁹⁸ *Id.* at 4.

¹⁹⁹ Nat'l Envtl. Justice Advisory Council, *supra* note 76, at 106; RIA, *supra* note 117, at 10-140, 10-141.

²⁰⁰ EPA estimates an average consumption rate of 8 gm/day of locally caught fish. *Id.* at 10-140, 10-141.

²⁰¹ Removal, *supra* note 1, at 107.

²⁰² See New Jersey Petition for Reconsideration, *supra* note 173, at 40.

²⁰³ See e.g., EWG Appeal Requesting Correction of FDA Seafood Advisory Entitled “*What You Need to Know About Mercury in Fish and Shellfish: 2004 FDA and EPA Advice for Women who Might Become Pregnant, Women who are Pregnant, Nursing Mothers, and Children*” 7 [hereinafter EWG APPEAL], (2005) (“If the average pregnant woman in America followed FDA's advice to the letter and ate 6 ounces of albacore tuna and 6 ounces of any other fish each week, her baby would be exposed to mercury at levels greater than the reference dose, *not* just for a single day, *not* just for several days, but for every day of the pregnancy.”), available at <http://aspe.hhs.gov/infoquality/request&response/11c.pdf> (last visited 9/23/06); Pittle et. al., *supra* note 63, at 3 (indicating that studies show that an average woman weighing 60 kg, eating six ounces of albacore canned tuna in a week would exceed the RfD by about 50 %).

²⁰⁴ Food and Drug Administration, Information Requests for Corrections and HHS' Responses to Environmental Working Group (2005), available at <http://aspe.hhs.gov/infoquality/request&response/11d.shtml>.

methylmercury toxicity if it were properly followed,²⁰⁵ it is far from clear that women are following the advice. A recent study by the University of Maryland found that Americans are confused about the central message of the national advisory.²⁰⁶ When asked to whom the advisory applies, forty-five percent of respondents identified the elderly, thirty-five percent identified pre-teens and teenagers, twenty-nine percent identified men, and nearly one third believed the advisory applies to all Americans.²⁰⁷

Assuming that the EPA's fish advisory were effective in reducing risk, a larger question looms: is this approach to risk management fair? Should the burden of limiting residual environmental harms after the implementation of federal regulations be imposed on the most vulnerable individuals? Arguably, it is not fair to place this burden on the public, particularly on heavily affected communities, who often lack the resources to hire the lawyers, expert witnesses, and doctors needed to prove harm.²⁰⁸ There are two assumptions that underlie fish advisories. First, it is assumed that susceptibility to the particular harm in question is dependent on lifestyle factors, which can be controlled, as opposed to "intrinsic factors," which an individual acquires at birth.²⁰⁹ In this paradigm, it is reasonable for a regulatory agency to expect individuals to bear responsibility for preserving their own well-being when such a task is within the individual's control, but less reasonable when the factors that threaten well-being are outside of the individual's control. Such a distinction promotes autonomy, personal responsibility, and fosters an informed citizenry. However, in the case of mercury toxicity, it is not entirely clear that the harm is a result of individual choice. Biological factors beyond human control play a significant role in women's susceptibility to

²⁰⁵ Critics have also taken issue with the number of species on the national advisory, arguing that it must be expanded if it is to alert women to real risks, and be effective. Baumann et. al., *supra* note 15, at 5 (urging the FDA to add the following fish to the list of fish to avoid if pregnant: tuna steaks, sea bass, oysters (Gulf of Mexico), marlin, halibut, pike, walleye, white croaker, largemouth bass, and to name the following fish when advising women to restrict consumption to no more than one meal per month for all species combined: canned tuna, mahi mahi, blue mussels, eastern oysters, cod, pollock, salmon from the Great Lakes, blue crab from the Gulf of Mexico, channel catfish (wild), lake whitefish."); EWG APPEAL, *supra* note 203, at 6 (arguing that the FDA should at a minimum publish advice for grouper, orange roughy, tuna steaks, freshwater trout, red snapper, and lobster similar to that for albacore tuna).

²⁰⁶ The new survey was based on telephone interviews with 1,040 adult Americans—522 men, 518 women—using a national probability sample of individuals eighteen years of age and older, living in private households in the continental United States. Interviewing was completed during the period of June 23-26, 2005. University of Maryland, *Attitudes and Beliefs About Eating Fish: A National Opinion Survey Conducted for The Center for Food, Nutrition and Agriculture Policy*, http://www.realmercuryfacts.org/survey_findings/index.htm (last visited Sept. 23, 2006).

²⁰⁷ *Id.*

²⁰⁸ Clifford Rechtschaffen, *Advancing Environmental Justice Norms*, 27 ENVIRONS ENVTL. L. & POL'Y J. 95, 112 (2003).

²⁰⁹ Carl F. Cranor, *Eggshell Skulls and the Loss of Hair from Fright: Some Moral and Legal Principles that Protect Susceptible Subpopulations*, 4 ENVTL TOXICOLOGY & PHARMACOLOGY, 239-245 (1997).

methylmercury.²¹⁰ Placing the burden of avoiding exposure to mercury on a subpopulation whose vulnerability is independent of individual choice is unethical to the extent that it assigns greater moral standing to healthier individuals.²¹¹ Second, fish advisories are based on the assumption that adhering to agency advice will be no great sacrifice to fish consumers. The assumption is that adequate substitutes are readily available for the quantity and variety of fish that advisories caution against. If this were true, an advisory may not be particularly offensive. However, for subsistence fishers, particularly Native Americans, altering fish consumption patterns to conform to EPA recommendations presents a very real social, cultural, and economic burden.²¹²

Today, the consequences of not following the EPA's advisory are more serious than they were under a MACT program. The new rule will delay reductions in mercury emissions until more than a dozen years beyond what was expected under the old scheme.²¹³ Because of this, levels of mercury in fish will remain elevated, and adverse health effects in the period before CAMR is fully implemented will be higher than is otherwise achievable. The increased necessity of following an advisory that many in the scientific community doubt will actually protect women is ethically troublesome, particularly in light of the fact that the legal remedies for mercury toxicity are quite limited.

VI. REMEDIES FOR MERCURY TOXICITY ARE LIMITED

Mercury accumulates in the blood, central nervous system, and renal tissues and is very slowly eliminated.²¹⁴ While there are treatments proven to speed up the detoxification process in cases of acute mercury poisoning,²¹⁵ and their effectiveness is limited.²¹⁶ Therefore, if a woman of child-bearing age is exposed to levels of methylmercury at which neurological damage to her unborn child can be expected, she is limited with respect to medical remedies. As I will explain, such a woman is equally limited with respect to the legal or administrative remedies she

²¹⁰ EFFECTS, *supra* note 43, at 72-74.

²¹¹ *Id.* at 239 (“[I]ndividuals with special sensitivities or susceptibility to disease have moral standing equal to that of normally healthy people to warrant protection from toxic substances”).

²¹² While subsistence fishing is generally regarded as an economic necessity, many Native American tribes fish for both economic and cultural reasons. See Nat'l Envtl. Justice Advisory Council, *supra* note 76, at 5-6; O'Neill (2003), *supra* note 22.

²¹³ NRDC, *supra* note 16, at 56.

²¹⁴ Lynn R. Goldman & Michael W. Shannon, *Technical Report: Mercury in the Environment: Implications for Pediatricians*, PEDIATRICS Vol. 108 No. 1, 202 (July 2001) available at http://aappolicy.aappublications.org/cgi/reprint/pediatrics;108/1/197.pdf#search=%22%22Baum%22%20%22Treatment%20*%20mercury%20intoxication%22%22.

²¹⁵ *Id.* (“[C]helation therapy is typically reserved for those with evidence of a large mercury burden demonstrated by biological monitoring (eg, measurement in hair, urine, or blood) or clinical manifestations of severe poisoning.”)

²¹⁶ *Id.* (“Chelating agents increase urinary mercury excretion, but their efficacy is uncertain. . . [c]ompared with other forms of mercury, organic mercury is significantly more resistant to removal from the body.”).

may pursue to compensate her for the resulting damage to her own or her child's health.

The EPA has created a Civil Rights Office to handle allegations of disparate impact by individual citizens.²¹⁷ Civil rights actions can be filed under Title VI, Section 504 of the Rehabilitation Act of 1973, Section 13 of the Federal Water Pollution Control Act Amendments of 1972, Title VIII of the Civil Rights Act of 1968, Title IX of the Education Act amendments of 1972, and the Age Discrimination Act of 1975.²¹⁸ These laws can be used to pursue administrative remedies against alleged violators of EPA regulations.

Title VI of the Civil Rights Act of 1964 prohibits recipients of federal financial assistance from discriminating on the basis of race, color, or national origin in their programs or activities.²¹⁹ In 2001, the Supreme Court held that Title VI only allows private citizens to bring lawsuits in cases of intentional discrimination.²²⁰ However, under the EPA's Title VI implementing regulations, the EPA-funded agencies are prohibited from taking actions, including permitting actions that are intentionally discriminatory or have a discriminatory effect based on race, color, or national origin.²²¹ Title VI does not provide such a right to individuals claiming discriminatory effect based on gender, nor does it create a special right for children as a class. Even if women or children were protected by Title VI, it would be unlikely that women would succeed with this strategy, as citizen complaints to the EPA under Title VI have never been successful.²²²

Claims under the Clean Water Act (CWA) may be more fruitful than Title VI claims. The CWA provides that,

[n]o person in the United States shall on the ground of sex be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal assistance under the Federal Water Pollution Control Act, as amended, including the Environmental Financing Act of 1972.²²³

While private actions under the Clean Water Act are generally regarded as

²¹⁷ Civil Rights, External Complaints and Compliance Program, <http://epa.gov/civilrights/extcom.htm> (last visited Sept. 23, 2006).

²¹⁸ *Id.*

²¹⁹ Civil Rights Act of 1964, *as amended*, 42 U.S.C. §§ 2000d to 2000d-7 (2000).

²²⁰ *Alexander v. Sandoval*, 532 U.S. 275 (2001).

²²¹ U.S. Env'tl. Prot. Agency, EPA's Program to Implement Title VI of the Civil Rights Act of 1964, <http://epa.gov/civilrights/t6home.htm> (last visited Sept. 22, 2006).

²²² As of Nov. 21, 2003 a total of 143 Title VI complaints had been filed with the EPA since 1993. Of these, 114 are closed and 29 are still pending. Of the 114, 82 were rejected outright without further investigation, and 20 decisions were issued. While there were no victories for the plaintiffs, a few lawsuits have yielded collateral benefits. Michael B. Gerrard, *Environmental Law: EPA Dismissal of Civil Rights Complaints*, *NEW YORK L. J.* (November 28, 2003). As of July 15, 2005, 161 Title VI complaints have been filed with EPA. See <http://epa.gov/civilrights/docs/t6csjuly05.pdf> (last visited Sept. 23, 2006).

²²³ 40 C.F.R. § 7.30 (2006).

being easier to prosecute than under other environmental regulations,²²⁴ the likelihood of success in a private action against a point source polluter for the injury of mercury toxicity through consumption of contaminated fish is speculative at best.²²⁵ Similarly, the question of standing has not been affirmatively decided with respect to private actions brought under Section 1983.²²⁶

If a member of the public raises a concern that the EPA itself has acted in a manner that is discriminatory, that the issue is referred to the EPA's Office of Environmental Justice, which works to ensure that the EPA's actions are in compliance with Executive Order 12,898.²²⁷ However, Executive Order 12,898 Section 6-609 expressly states that the order is intended only to "improve the internal management of the executive branch and is not intended to, nor does it create any right, benefit, or trust responsibility, substantive or procedural, enforceable at law or equity by a party against the United States, its agencies, its officers, or any person."²²⁸ More importantly, like Title VI, Executive Order 12,898 does not provide special protections on the basis of gender or youth.

Despite the overwhelming failures of individual plaintiffs in obtaining redress for environmental harms under civil rights law and Executive Order 12,898, there may be other sources of law that women can use to seek redress. Tort law may provide individual women with a remedy for mercury toxicity against individual polluters. One author has proposed the novel and untested thesis that loss of consortium can be a viable cause of action for women who have been made infertile from toxic chemicals known as endocrine disruptors.²²⁹ While a loss of consortium claim would not fit precisely the case of mercury toxicity, as mercury toxicity does not affect the ability to procreate, it presents an intriguing example of the creative ways in which women can use tort law to protect themselves and their families from environmental harms. A full investigation of the possible avenues for women to pursue redress for mercury toxicity is beyond the scope of this paper, but presents a compelling research topic in light of the CAMR.

CONCLUSION

We can look forward in the upcoming year to a judicial decision on the

²²⁴ Heidi Gorovitz Robertson, *Controlling Existing Facilities* 494, in *THE LAW OF ENVIRONMENTAL JUSTICE: THEORIES AND PROCEDURES TO ADDRESS DISPROPORTIONATE RISKS* (Michael B. Gerrard, ed., American Bar Association 1999).

²²⁵ Gerrard (2003), *supra*, note 222.

²²⁶ See Outka, *supra* note 157, at 228-231; Gauna et. al., *supra* note 23, at n.13 ("Currently, there is a split in the federal circuits whether disparate impact claims can be brought through Section 1983").

²²⁷ U.S. Envtl. Prot. Agency. Environmental Justice,
<http://www.epa.gov/compliance/environmentaljustice/index.html>.

²²⁸ 42 U.S.C. § 4321, 6-609 (2000).

²²⁹ Leah Weldon, Note, *Infertility Caused by Exposure to Environmental Endocrine Disruptors*, 12 PENN. ST. ENVTL. L. REV. 525, 526 (2004).

question of whether or not it is “appropriate and necessary” for the EPA to regulate coal fired power plants using maximum achievable control technologies, and whether the EPA has the legal authority to regulate such facilities using a cap and trade program. However, the more important question looms as to what negative effects the new regulatory scheme will have on women’s health. It will be years, perhaps decades, before scientists will be able to document the environmental and health impacts of the new rule. Nonetheless, the evidence that the new rule will, at the very least, slow the improvement in human health is strong enough today to give thousands of Americans pause. One is left wondering why the EPA, which agreed less than five years ago with the prevailing science that mercury emissions from power plants were a significant risk to human health, would dismiss all the research it had relied upon and change so quickly, without even piloting the program it proposed.

When a scientific and legal battle rages over the most appropriate method of regulating toxic chemicals, ethical principles are useful in guiding agency decisions. Scientific uncertainty is guaranteed to pervade and often hamper the aggressive pursuit of solutions to the most controversial environmental problems facing our country. One of the oldest principles in environmental ethics is the precautionary principle,²³⁰ under which government actors are urged to make regulatory decisions that minimize the possibility of harm when the safety of specific chemicals or industrial processes has yet to be conclusively proven.²³¹ This principle discourages regulation where harm has not been *disproven*, in contrast to the prevailing strategy of implementing a regulation where a particular harm has not been conclusively proven.²³²

Equally important, the precautionary principle also seeks to shift the burden of risk assessment, monitoring, and data collection onto those who may engage in the potentially hazardous activity.²³³ Such an approach is warranted where legitimate peer reviewed evidence predicts that harm will result from a given industrial process, until and unless further research can establish, by a preponderance of the evidence, that an identified harm will *not* result. The EPA has not established by a preponderance of the evidence that the harm to women of child-bearing age and developing children will not be exacerbated by its new mercury rule.²³⁴ The quality and quantity of research indicating that resulting

²³⁰ See Rachel Morello-Frosch, Manuel Pastor Jr., & James Sadd, *Integrating Environmental Justice and the Precautionary Principle in Research and Policy Making: The Case of Ambient Air Toxics Exposures and Health Risks among Schoolchildren in Los Angeles*, 584 ANNALS 47 (2002); Rechtschaffen, *supra* note 208, at 112-113.

²³¹ Morello-Frosch, *supra* note 230, at 50.

²³² *Id.* (“[T]he absence of evidence of harm is not the same thing as evidence of the absence of harm”) (citing Kriebel, et. al., *The Precautionary Principle in Environmental Health Science*. 109 ENVTL. HEALTH PERSPECTIVES 873 (2001)).

²³³ Morello-Frosch, *supra* note 230, at 50.

²³⁴ See *e.g.*, Johnson, *supra* note 11.

harm from the CAMR is more significant than EPA projects, and that alternative forms of regulation will not only reduce harm to a greater extent but will do so more cost-effectively, warrant the use of the precautionary principle in the regulation of mercury from coal-fired electric utility plants.²³⁵ The precautionary principle would be satisfied if mercury emissions from coal-fired electric utility plants were regulated under maximum achievable control technologies. Where the EPA does not recognize the value of this approach, the decision to implement heightened standards to protect human health is left to the States.²³⁶

²³⁵ See Todd Stedeford et. al., *Environmental Quality and Health Got Merc? Regulating, Mitigating, and Litigating Mercury Levels for the Fish We Eat: Approaches of Public Health and Regulatory Agencies for Establishing Safe Levels of Exposure to Methylmercury*, 20 J. LAND USE & ENVTL. LAW 503, 516 (2005) (“[A] conservative approach in establishing guidance numbers for methylmercury is warranted because the time at which neurological damage might manifest is uncertain”).

²³⁶ Michael Janofsky, *Groups Propose Alternative to E.P.A. Rules on Mercury*, N.Y. TIMES, Nov. 14, 2005, at A17.

