



THE  
**ENVIRONMENTAL**  
**SOURCE**

---

SECOND EDITION

EDITED BY ANGELA LOGOMASINI, PH.D.



COMPETITIVE ENTERPRISE INSTITUTE

# **The Environmental Source 2008**

Edited by Angela Logomasini, Ph.D.

Competitive Enterprise Institute



Competitive Enterprise Institute  
1001 Connecticut Avenue, NW, #1250  
Washington, D.C. 20036  
Ph: (202) 331-1010  
Fax: (202) 331-0640  
<http://cei.org>

Copyright © 2008 by Competitive Enterprise Institute

# Table of Contents

## **General Topics**

A Vision for Environmental Policy	3
Environmental Trends	7

## **Agricultural Biotechnology**

Agricultural Biotechnology Overview	17
Agricultural Biotechnology Regulation	23

## **Chemical Risk**

Chemical Risk Overview	37
Cancer Trends	43
The True Causes of Cancer	51
Endocrine Disrupters	57
Methylmercury Science	65

## **Clean Air Act**

Clean Air Act Overview	75
The Clean Air Act and High Gasoline Prices	79
Mercury Pollution and Regulation	83

<b>Energy</b>	
Automobile Fuel Economy Standards	91
Accessing Energy Resources on Public Lands	97
<b>Global Warming</b>	
An Issue of Science and Economics	107
<b>International Policy</b>	
International Policy Overview	123
Population	125
The Convention on Persistent Organic Pollutants	129
REACH: The EU's Chemical Policy	135
The Strategic Approach to International Chemicals Management	141
International Fisheries	147
<b>Lands and Wildlife</b>	
Measuring the Scope of Federal Land Ownership	155
<b>Pesticide Regulation</b>	
Pesticide Regulation Overview	165
Food Quality Protection Act	169
Pesticides and Agriculture	175
Pesticides and Public Health	181
Pesticides in Schools	187
<b>Safe Drinking Water Act</b>	
Safe Drinking Water Act Overview	195
Arsenic	201
Chlorine and Disinfection Byproducts Rule	207
Radon	211
Rural Drinking Water	215
Lead in Drinking Water	219
<b>Solid and Hazardous Waste</b>	
Solid and Hazardous Waste Overview	225
Superfund	227
Brownfields	233
Interstate Waste Commerce	239
Toxics Release Inventory	243
Solid Waste Management	251
Electronic Waste	257

---

# **General Topics**

---



# A Vision for Environmental Policy

Fred L. Smith

As America begins to address the problems of the 21st century, few issues loom as large or as contentious as environmental policy. The debate, however, is not new: it builds on policy debates on the environment that evolved throughout the 20th century.

During that century, two different policy attitudes dominated. In the first half, the focus was on promotional policies. The role of government, it was argued, was to “assist” in the rapid development of resources—forests, minerals, energy, and water. Government would either own or regulate these “national” resources, and taxpayers would subsidize their development.

The results of these interventionist policies were detrimental to the environment. Lawmakers tended to neglect both the risks and the costs of such development. Whether the Ten-

nessee Valley Authority, the Bonneville Power Administration, subsidized grazing and forestry, or unsustainable western water policies, government programs emphasized expanded supply—regardless of costs to the environment and to society.

Partly as a reaction to these problems, precautionary policies dominated the second half of the century. These policies tended to focus on preserving and conserving everything and to emphasize the value of the status quo over change. That emphasis led to the enactment of the Endangered Species Act and to the establishment of wilderness areas, nonattainment policies, smart growth, and other antidevelopment programs, as well as to a general disregard for the impact of such programs on local economic conditions.



America is ready for an integrative environmental vision. In *The Environmental Source*, the Competitive Enterprise Institute outlines steps that would advance that vision. The magnitude of this reform, however, cannot be underestimated: thoughtful analyses and effective communications strategies will be essential.

Many policy proposals have focused on elements such as cost-benefit analyses, sound science, and risk assessment. To the American public, however, these approaches often seem cold and uncaring. Reformers are asked, “How can you put a price tag on the environment? Don’t you care about the children?” Technocratic answers to these concerns cause policymakers to appear out of touch and, on occasion, even heartless.

Yet there is a morally defensible, principled vision—one that appeals to American values without sacrificing free-market principles or environmental ideals. Taking the environment seriously means also taking private property and other market institutions seriously.

### **The Welfare Reform Model**

In crafting an environmental reform program, we should look to areas where positive change already has been undertaken. Welfare reform, for example, resulted from extensive research as well as from a series of measures that encouraged state flexibility.

Author Marvin Olasky played a key role in changing perceptions of these issues. He argued that while there might be a role for federal welfare programs, the primary hope for people dependent on them rested in the revitalization of America’s decentralized system of state and voluntary institutions.

Like today’s environmental policy, federal welfare programs were highly centralized and

inflexible. Under the new regime, some states—most notably Wisconsin and Michigan—explored a variety of welfare alternatives. Some of these initiatives worked well, encouraging further reform, and eventually resulted in the bipartisan federal welfare reform bill enacted in 1996.

Environmental policy is at an earlier stage. To date, little public attention has been paid to creative private efforts to improve environmental conditions or to the responsibility of the federal government itself for harmful conditions.

Environmental policymakers must recognize the importance of these private efforts. For instance, they could allow extended leases or outright ownership of offshore reefs or create private fishing rights in rivers, while also providing incentives, rather than penalties, for promoting environmental conservation. Actions such as these would empower individuals to play a positive role in environmental protection.

### **A Balanced Approach to Environmental Risk**

Another aspect of the environmental question is how to manage risk. Again, we must move beyond the biases that have characterized the promotional and the precautionary approaches of the 20th century. The institutional framework for making decisions about projects and technologies that should go ahead or be delayed or blocked must be established by those who face the risks of innovation and of stagnation.

Precautionary regulations now dominate the rate and direction of technological change in many areas—biotechnology, environmental cleanup, power technology, pest control—and

have focused exclusively on the risks that change might pose to some environmental value. They have placed little emphasis on the risks posed by the failure to innovate. Such risks (while unseen) may be far more significant economically and environmentally.

Current pollution policy tends to rely on centralized bureaucracies mandating a zero-risk world. Ignoring the impossibility of their goal, proponents of this approach view a zero-risk world as one with zero technology, zero industry, and zero human-made chemicals. The result is an antitechnology bias, whereby groups and agencies seek to deny the use of new products until they can be proven safe. They call this position the *precautionary principle*.<sup>1</sup> Because no one can prove a negative, the principle slows adoption of new technology.

For example, some environmental activists want to eliminate risks to children by regulating pesticides, but they neglect the far greater risks posed by the pests themselves. A report by the Institute of Medicine warns that pesticide regulation is making it harder to control vector-borne disease risks that now appear to be on the rise.<sup>2</sup>

These attitudes can have fatal results for people in the developing world. Annually, at least 1 million people die and more than 500 million people suffer from malaria.<sup>3</sup>

1. This definition is one of many interpretations. For more information on the precautionary principle, see Julian Morris, *Rethinking Risk and the Precautionary Principle* (London: Butterworth Heinmann, 2000).

2. Institute for Medicine, *Emerging Infections: Microbial Threats to Health in the United States* (Washington, DC: National Academies Press, 1992).

3. World Health Organization, “Malaria,” Fact Sheet No. 94, Geneva: World Health Organization, updated May 2007), <http://www.who.int/mediacentre/factsheets/fs094/en/index.html>.

Many of these victims are children. Those who have demonized the use of pesticides—DDT (dichloro-diphenyl-trichloroethane) in particular—have exacerbated the plight of these victims.<sup>4</sup>

### Principles for Successful Environmental Policy

This book contains a number of recommendations to guide America’s environmental policy. The recommendations are based on the following principles:

- *Economic growth is key to environmental protection.* Wealthier nations have greater resources to protect the environment and, thus, are better able to achieve the level of environmental protection desired by all. By contrast, poor nations lack resources and must struggle to meet basic needs.
- *Environmental risks must be examined in a balanced, risk-risk institutional framework.* Many activities—operating a factory, transporting materials, using technology—carry environmental risks with them, but delaying, blocking, or eliminating such activities also carries environmental risks.
- *The government should “do no harm” when it comes to the environment.* In addition to providing perverse incentives, numerous government programs adversely affect the environment. For example: excessive government dam projects have harmed wildlife; farm subsidies have promoted overfarming, and mismanagement of public lands has contributed to forest fires.

4. Richard Tren and Roger Bate, *When Politics Kills: Malaria and the DDT Story* (Washington, DC: Competitive Enterprise Institute, December 2000), <http://www.cei.org/pdfs/malaria.pdf>.

- *Private property owners are better stewards of resources than are public officials.* The principle is simple: if an individual owns a resource, he or she has a stake in its management and protection, and cares for it accordingly. Government property lacks individual stewards and is managed by the dictates of politics, which usually lead to environmental damage.
- *Private property owners should be compensated for regulatory takings.* Private property is the essential element for conservation and the key to the American dream. Federal, state, and even local bureaucracies threaten that dream by restricting private management. At a bare minimum, government agencies should compensate landowners when regulations reduce property values.

## Conclusion

Environmental policy in the 20th century swung between promotional and precautionary approaches. Throughout, policymakers neglected the ability of private parties to advance environmental values. As a result, streams, airsheds, aquifers, and wildlife have suffered far more harm than otherwise would have occurred.

Elements of a private environmental protection system already exist, helping empower people to play a direct role in environmental conservation. The challenge, as in welfare reform, is less to proscribe than to empower. It is not to decide the optimal, but to encourage exploration and innovation and to unleash the creative energies of the American people toward solving our environmental problems. We believe the policies outlined in this book will move us closer to that ideal.

# Environmental Trends

Jennifer Zambone  
(with updates by Angela Logomasini)

For the past 30 years, prognosticators have predicted an imminent environmental apocalypse. Comparing actual events to the predictions reveals a different picture.

## Human Life Span

The prognosticators often suggest that modern human-made chemicals undermine public health. Yet as chemical use has increased, the lives of humans have lengthened:

---

This brief provides only a sampling of key environmental trends. For additional information, see the other topical briefs in *The Environmental Source*, particularly the sections on air, water, drinking water, population, pesticides and agriculture, and chemical risk.

- In 1900, the average life expectancy in the United States was 50 years.<sup>1</sup> Now it is 77.9 years.<sup>2</sup>
- Cancer mortality has declined sharply since 1990 because of a precipitous decline in lung cancer. Mortality caused by all forms of cancer besides lung cancer has declined since 1950.<sup>3</sup>

---

1. Steven Moore and Julian L. Simon, *It's Getting Better All the Time* (Washington, DC: Cato Institute, 2000), 26.

2. Arialdi M. Miniño, Melonie Heron, and Betty L. Smith, "Deaths: Preliminary Data for 2004," Health E-Stats, National Center for Health Statistics, Hyattsville, MD, April 19, 2006, <http://www.cdc.gov/nchs/products/pubs/pubd/hestats/prelimdeaths04/preliminarydeaths04.htm#fig1>.

3. Brad Rodu and Philip Cole, "The Fifty-Year Decline of Cancer in America," *Journal of Clinical Oncology* 19, no. 1 (2001): 239–41. See also the brief on cancer trends, also in *The Environmental Source*.

## Land

Today some complain that we are carelessly destroying our habitat by destroying natural resources at ever-increasing rates. The data indicate otherwise:

- In the early part of the 20th century, people cut down twice as many trees as they planted. Today the United States grows 36 percent more trees than it harvests.<sup>4</sup>
- Some researchers estimate that there are more trees in North America now than when Columbus arrived in 1492.<sup>5</sup>
- Part of the reason for this surge in forest growth is decreased dependence on wood for fuel and construction. Per capita, Americans now consume half the wood they consumed in 1900.<sup>6</sup>
- In the six forest inventories taken between 1950 and the present, net forest growth in the United States, the world's number one timber producer, always exceeded harvests.<sup>7</sup>

## Food Production

Changes in agriculture, such as improved plants and the use of pesticides and fertiliz-

ers, have created a worldwide boom in food production:<sup>8</sup>

- The United States feeds three times the number of people that it fed in 1900, but it uses 33 percent less farmland to do so.<sup>9</sup>
- Worldwide, the amount of food produced per acre has doubled in the past 50 years. Even though global population increased by 250 percent in those years, the amount of cropland increased by only 90 percent.<sup>10</sup>
- Enough food exists to distribute more than four pounds to each person on Earth every day.<sup>11</sup>
- Fewer people died from famine in the 20th century than they did in the 19th century, even though the world population was four times greater at the close of the 20th century than at its beginning.<sup>12</sup>

## Wildlife

Making land more productive through modern agricultural practices has freed more land for wildlife uses:<sup>13</sup>

- The number of documented animal extinctions has declined since 1930.<sup>14</sup>

4. Roger A. Sedjo and Marion Clawson, "Global Forests Revisited," in *The State of Humanity*, ed. Julian Simon (Cambridge, MA: Blackwell, 1995), 328–45.

5. Ibid.

6. Lynn Scarlett, "Doing More with Less: Dematerialization—Unsung Environmental Triumph?" in *Earth Report 2000*, ed. Ronald Bailey (New York: McGraw-Hill, 2000), 42.

7. Roger A. Sedjo, "Forests: Conflicting Signals," in *True State of the Planet*, ed. Ronald Bailey (New York: Free Press, 1995), 177–209.

8. Dennis Avery, "Saving the Planet with Pesticides," in *True State of the Planet*, ed. Ronald Bailey (New York: Free Press, 1995), 50–82.

9. Moore and Simon, *It's Getting Better All the Time*, 94.

10. Ibid., 196.

11. Ibid.

12. Ibid., 8.

13. Avery, "Saving the Planet with Pesticides," 71–73.

14. Stephen R. Edwards, "Conserving Biodiversity," in *True State of the Planet*, ed. Ronald Bailey (New York: Free Press, 1995), 212.

- Three-fourths of all species extinctions have occurred on islands. Very few extinctions have occurred in continental tropical forest habitats.<sup>15</sup>
- Seventy-five percent of the land on every continent except Europe is available for wildlife.<sup>16</sup>

### Air Quality

In the past 20 years, air quality in the United States has undergone impressive improvements:

- Between 1990 and 2002, toxic air emissions declined by 35 percent.<sup>17</sup>
- According to the U.S. Environmental Protection Agency (EPA), between 1970 and 2006, gross domestic product increased by 203 percent, vehicle miles traveled increased by 177 percent, energy consumption increased by 49 percent, and the U.S. population grew by 46 percent. During the same time period, total emissions of the six principal air pollutants dropped by 54 percent.<sup>18</sup>
- Nitrogen dioxide emissions decreased by 41 percent between 1980 and 2006.<sup>19</sup>
- Volatile organic compound emissions decreased by 51 percent between 1980 and 2006.<sup>20</sup>

- Sulfur dioxide emissions decreased by 47 percent between 1980 and 2006.<sup>21</sup>
- Particulate matter (size at 10 micrograms per liter) emissions decreased by 38 percent between 1980 and 2006.<sup>22</sup>
- Particulate matter (2.5 micrograms per liter) emissions decreased by 44 percent between 1990 and 2006.<sup>23</sup>
- Carbon monoxide emissions decreased by 50 percent between 1980 and 2006.<sup>24</sup>
- Lead emissions decreased by 96 percent between 1980 and 2006.<sup>25</sup>

These changes can all be attributed to the Clean Air Act, right? Not necessarily: as Paul Portney, president of Resources for the Future notes, it is “extremely difficult to isolate the effects of regulatory policies on air quality, as distinct from the effects of other potentially important factors, because some measures of air quality were improving at an impressive rate before 1970.”<sup>26</sup> Indur Goklany, an analyst at the U.S. Department of the Interior, expands on this point in *Clearing the Air*. Through analysis of emissions per capita per unit of the gross national product (GNP), Goklany reveals that the cleanup of the air began well before the passage of the Clean Air Act. In fact, Goklany estimates that about 70 percent of the reduction of emissions per unit of GNP occurred before the federalization of clean air. Economic growth and new technologies, as well as state and local

15. Ibid., 218.

16. Ibid., 223.

17. U.S. Environmental Protection Agency, “Air Emissions Trends—Progress Continues in 2006,” Washington, DC, EPA, <http://www.epa.gov/airtrends/econ-emissions.html>.

18. Ibid.

19. U.S. Environmental Protection Agency, “Air Trends: Basic Information,” Washington, DC, EPA, <http://www.epa.gov/airtrends/sixpoll.html>.

20. Ibid.

21. Ibid.

22. Ibid.

23. Ibid.

24. Ibid.

25. Ibid.

26. Paul R. Portney, “Air Pollution Regulation,” in *Public Policies for Environmental Protection*, ed. Paul R. Portney, (Washington, DC: Resources for the Future, 1990), 40.



laws, brought about this reduction in pollution, which likely would have continued even if the federal government hadn't intervened.<sup>27</sup>

### Water Quality

The EPA's National Water Quality Inventory (NWQI) provides the best available data for water quality. According to the EPA report, 46 percent of the lakes and ponds sampled, 47 percent of the estuaries and 55 percent of the streams and rivers are clean enough for any use.<sup>28</sup> However, there are severe problems with these data. Unlike air quality data in the United States, water quality data lack "consistent measurement standards to enable evaluation of progress over time."<sup>29</sup> The number of water bodies assessed—indeed, the estimated number of water bodies—in a state varies widely from year to year. The EPA itself admits that the data collected under its own NWQI "cannot be used to determine trends in national water quality or to compare water quality among the individual states."<sup>30</sup> The U.S. Geological Survey

also has complained about the deficient data and practices.<sup>31</sup>

In the past 30 years, the United States has spent almost \$600 billion on improving water quality, so it would be surprising if water quality hadn't improved in those decades,<sup>32</sup> especially as industrial water pollution has decreased considerably since 1980. The discharge of toxic organics and metal plummeted by 99 percent and 98 percent, respectively, and the discharge of organic wastes fell by 46 percent.<sup>33</sup> Just as the lack of overall data quality hampers a true assessment of water quality, it also obscures the evaluation of water pollution remedies.

### Drinking Water

The quality of U.S. drinking water has improved dramatically since the beginning of the 20th century, thanks to technology developed by the private sector and implemented by private utilities and local governments. By the time the federal government began to regulate drinking water, the private sector and local governments had largely addressed the most serious water problems. The development of chlorination to disinfect water has particularly transformed water quality:

- As one researcher notes, "disinfection ranks with the discovery of antibiotics as one of the major public health accomplishments of the 20th century. In terms of risk, chlorina-

27. Indur M. Goklany, *Clearing the Air: The Real Story of the War on Air Pollution* (Washington, DC: Cato Institute, 1999), 133–39. Goklany does give some credit to federal law for the amount and pace of the pollution reduction occurring after 1970.

28. U.S. Environmental Protection Agency, "Water Quality Conditions in the United States: A Profile from the 1998 National Water Quality Inventory," EPA8-41-F-00-006, Washington, DC, EPA, June 2006, <http://www.epa.gov/305b/98report/98summary.pdf>.

29. Laura Steadman, "Water Quality," in *Index of Leading Environmental Indicators 2000*, ed. Steven Hayward, Elizabeth Fowler, and Laura Steadman (San Francisco: Pacific Research Institute for Public Policy, April 2000), 29, <http://www.pacificresearch.org>.

30. Ibid.

31. Ibid.

32. Ibid., 31.

33. Steven Hayward, Erin Schiller, and Elizabeth Fowler, eds., *1999 Index of Leading Environmental Indicators* (San Francisco: Pacific Research Institute for Public Policy, April 1999), 28–29, <http://www.pacificresearch.org>.

tion has allowed people to live long enough to worry about cancer.”<sup>34</sup>

- Since the 1880s, when local engineers and industry introduced chlorination, deaths in the United States related to waterborne causes dropped from 75 to 100 per 100,000 people to less than 0.1 deaths per 100,000 annually by 1950.<sup>35</sup>
- In 1900, 25,000 people in the United States died from typhoid and cholera. Because of water disinfection programs, typhoid killed only 20 people in 1960. Today typhoid deaths in the United States are practically nonexistent.<sup>36</sup>
- The inability of developing nations to afford basic sanitation and disinfection means that the quality of drinking water remains a serious environmental and public health concern in many areas. Such realities show that development and subsequent wealth creation are critical to achieving environmental goals and public health.

### Energy

Improved exploration and extraction techniques have increased the size of fossil fuel reserves and lowered the price of energy during the 20th century:

34. I. H. Suffet, “Drinking Water Quality,” in *Southern California Environmental Report Card 2000*, ed. Richard Berk and Arthur Winer (Los Angeles: University of California–Los Angeles Institute for the Environment, 2000), <http://www.ioe.ucla.edu/publications/report00/html/drinkingquality.html>.

35. Michael J. LaNier, “Historical Development of Municipal Water Systems in the United States, 1776 to 1976,” *Journal of the American Water Works Association* 68, no. 4 (1976): 177

36. Jefferson Parish Water Department, *Jefferson Parish Annual Water Quality Report* (Jefferson, LA: Jefferson Parish Water Department, 2001).

- Recent evaluations demonstrate that proven reserves of natural gas and oil are larger than they were 30 years ago.<sup>37</sup>
- Since 1929, it has taken 1 percent less energy each year to produce the same amount of goods and services. By 1989, the amount of energy needed to produce \$1 of GNP was 50 percent less than the amount of energy needed 60 years earlier.<sup>38</sup>

### Population

Since 1798, when the Reverend Thomas Malthus wrote *An Essay on the Principle of Population*, if not before, doomsayers have predicted that the sheer number of people in the world would destroy the Earth. Not only have these dire predictions failed to acknowledge the positive contributions that human capital has made to our lives, but they also have been proven wrong time and time again. And as humans provide for themselves, trends in population growth are beginning to level off:

- The world population growth rate has dropped to 1.3 percent a year from its peak of 2.2 percent in the 1960s.<sup>39</sup>
- Demographers believe that half of the world’s population lives in countries that

37. Jerry Taylor and Peter Van Doren, “Soft Energy versus Hard Facts: Powering the Twenty-First Century,” in *Earth Report 2000*, ed. Ronald Bailey (New York: McGraw-Hill, 2000), 121.

38. Ibid., 192; see also, Eugene Gholz and Daryl G. Press, *Energy Alarmism The Myths That Make Americans Worry about Oil*, Policy Analysis no. 589 (Washington, D.C.: Cato Institute: April 5, 2007), <http://www.cato.org/pubs/pas/pa589.pdf>.

39. Nicholas Eberstadt, “World Population Prospects for the Twenty-First Century: The Specter of ‘Depopulation?’” in *Earth Report 2000*, ed. Ronald Bailey (New York: McGraw-Hill, 2000), 66.



have subreplacement fertility levels. Fertility rates also are falling in countries that have above-replacement rates. Total fertility rates in Asia and Latin America have declined by half since the 1960s.<sup>40</sup>

## Wetlands

Despite claims that fewer and fewer wetlands exist, trends are far more positive:

- *Status and Trends of Wetlands in the Conterminous United States, 1986 to 1997*, a report by the Fish and Wildlife Service of the Department of the Interior, estimates that the annual loss is 58,500 acres, an 80 percent reduction compared with loss in the previous decade.<sup>41</sup>
- The *National Resources Inventory* of the United States Department of Agriculture found an average annual net loss from all sources of 32,600 acres of wetlands.<sup>42</sup>
- When the buffered uplands that form part of the wetlands ecosystem are taken into account, the results are even more heartening: the United States seems to have achieved no net loss of wetlands.<sup>43</sup>

In 1995, regulatory programs restored about 46,000 acres of wetlands. However, voluntary

or incentive-based programs, such as Wetland Reserve, Waterfowl Management Plan, and Partners for Wildlife, restored 208,000 acres. Thus, economic incentive programs, and not regulatory measures, led the way to no net loss of wetlands.<sup>44</sup>

## Future Challenges

Despite these gains, legitimate environmental and human problems exist, particularly in the developing world:

- Air pollution remains a serious issue in countries where the technologies of energy production lag those of the developed world. Of particular concern is indoor air pollution. Many people in poor countries still use biomass fuels, such as wood, as the energy source in houses without adequate ventilation. Such practices have severe effects on the health of those populations.<sup>45</sup>
- Unclean drinking water and inadequate sanitation also remain major problems in the developing world. Four billion children a year contract diarrhea; 2.2 million die. Estimates indicate that improved water and sanitation would reduce the number of cases of diarrhea by at least one-fourth.<sup>46</sup>

40. Ibid.

41. Thomas E. Dahl, *Status and Trends of Wetlands in the Conterminous United States 1986 to 1997* (Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service, 2000), 9, [http://training.fws.gov/library/Pubs9/wetlands86-97\\_lowres.pdf](http://training.fws.gov/library/Pubs9/wetlands86-97_lowres.pdf).

42. U.S. Department of Agriculture, *National Resources Inventory* (Washington, DC: National Resources Conservation Service, 2000), 8, [http://www.nrcs.usda.gov/TECHNICAL/NRI/1997/summary\\_report/](http://www.nrcs.usda.gov/TECHNICAL/NRI/1997/summary_report/).

43. Jonathan Tolman, *Swamped: How America Achieved No Net Loss* (Washington, DC: Competitive Enterprise Institute, April 1997), 2.

44. Ibid., 1–2.

45. Nigel Bruce, “Indoor Air Pollution: A Neglected Health Problem for the World’s Poorest Communities,” *Urban Health and Development Bulletin* 2, no. 2 (1999): 21–29. See also Ksenya Lvovsky, “Health and the Environment,” Strategy Paper no 1. (Washington, D.C.: World Bank: October 2001), 5–6.

46. World Health Organization, *Global Water Supply and Sanitation Assessment 2000 Report* (Geneva: WHO and UNICEF, 2000), [http://www.who.int/water\\_sanitation\\_health/monitoring/globalassess/en/](http://www.who.int/water_sanitation_health/monitoring/globalassess/en/), 2.

- Vector borne disease continues to be another detriment to the health of people in the developing world.<sup>47</sup> Malaria alone kills more than 1 million people a year, most of whom are children. According to the World Health organization that amounts to a child dying from malaria 30 seconds.<sup>48</sup>

History demonstrates that answers to these problems are to be found not through more ineffective regulatory programs, but through increasing human potential. Wealthier is healthier for people and for the environment. And the fastest way to make a nation wealthy is not by restricting commerce and trade, but by freeing it.

### Recommended Readings

- Bailey, Ronald. *Global Warming and Other Eco-myths*. Roseville, CA: Prima Publishing, 2002.
- Hayward, Steven. *Index of Leading Environmental Indicators 2006: The Nature and Sources of Ecological Progress in the United States and the World*. Washington, D.C.: American Enterprise Institute, 2006, [http://www.aei.org/books/filter.all,bookID.854/book\\_detail.asp](http://www.aei.org/books/filter.all,bookID.854/book_detail.asp)
- Moore, Steven, and Julian L. Simon. *It's Getting Better All the Time*. Washington, DC: Cato Institute, 2000.

---

47. Duane J. Gubler, "Resurgent Vector-Borne Diseases as a Global Health Problem," *Emerging Infectious Diseases* 4, no. 3 (1998): 442–50, <http://www.cdc.gov/ncidod/eid/vol4no3/gubler.htm>.

48. World Health Organization, "Malaria," Fact Sheet No. 94, Geneva: World Health Organization, updated May 2007), <http://www.who.int/mediacentre/factsheets/fs094/en/index.html>.



---

# **Agricultural Biotechnology**

---



# Agricultural Biotechnology Overview

Gregory Conko

Every year, millions of people worldwide die from starvation and nutritional deficiencies. Although these challenges remain significant, we are making some progress. During the past 50 years, agricultural technologies have increased food availability and caloric intake on a per capita basis in nearly every nation of the world. Much is left to be done, however. Some 740 million people go to bed daily on empty stomachs, and nearly 40,000 people—half of them children—die every day from hunger or malnutrition-related causes.<sup>1</sup> Two significant and interrelated challenges are (a) to increase farm productivity in less developed countries, where

food is most needed, so that today's subsistence farmers can use agriculture for their own economic development and (2) to increase per-acre yields so that the amount of food harvested can rise without having to bring undeveloped land into agricultural production.

Technology has transformed agriculture, medicine, and other industries; the record of agricultural progress during the past century speaks for itself. Those countries that developed and embraced improved farming technologies have brought unprecedented prosperity to their people, made food much more affordable and abundant, helped to stabilize farm yields, and reduced the destruction of wild lands.<sup>2</sup> But con-

---

1. Per Pinstrup-Andersen and Rajul Pandya-Lorch, eds., *The Unfinished Agenda: Perspectives on Overcoming Hunger, Poverty, and Environmental Degradation* (Washington, DC: International Food Policy Research Institute, 2001).

---

2. Norman Borlaug, "Ending World Hunger: The Promise of Biotechnology and the Threat of Antiscience Zealotry," *Plant Physiology* 124 (October 2000): 487–90.

tinued technological development—including, in many cases, the use of agricultural biotechnology—is crucial if we want to further reduce starvation and malnutrition and meet the needs of growing populations while also lightening humankind’s environmental impact.

Unfortunately, misperceptions about biotechnology—known variously as bioengineering, gene splicing, genetic modification, and recombinant DNA (deoxyribonucleic acid) technology—have led to activist calls for heavy restrictions or outright bans. In the United States, the introduction of new bioengineered crop varieties has slowed in the past few years because of duplicative and costly regulations and because of farmers’ concerns that they would be unable to sell harvested bioengineered crops in major export markets. In Europe and parts of Asia, antibiotechnology movements are strong and have succeeded in generating stringent national regulations and international trade restrictions. While industrial nations are already using forms of innovative agricultural technologies and may be able to absorb the costs of such restrictive policies, people in less developed countries will pay a high price for imprudent regulation because many continue to suffer from food shortages and malnutrition.

### What Is Biotechnology?

The term *biotechnology* has been used for nearly 100 years to describe any application of living organisms to create consumer or industrial products.<sup>3</sup> That definition encompasses old and new processes such as the use of *Penicillium*

3. Henry I. Miller and Gregory Conko, *The Frankenfood Myth: How Protest and Politics Threaten the Biotech Revolution* (Westport, CT: Praeger, 2004).

*chrysogenum* mold to produce penicillin or the addition of natural enzymes to laundry detergents. Biotechnology also could describe many traditional types of plant breeding. Recently, however, the term has come to represent only the most advanced recombinant DNA (rDNA) techniques. In this policy brief, *biotechnology* has the latter, more specific meaning.

Agricultural biotechnology uses advances in genetics and cell biology to move useful traits from one organism to another. Scientists scan the genome of various organisms—most often other plants or microorganisms—to identify individual genes that produce useful traits. The genes are then cut out of the host organism’s DNA and moved to the genome of a crop plant, thereby transferring the useful trait. A gene from the harmless soil bacterium *Bacillus thuringiensis* allows plants to better protect themselves from insect pests.<sup>4</sup> Other genes help farmers more effectively combat weeds, plant diseases, and environmental stresses such as poor soils and temporary drought.<sup>5</sup> Biotechnology also has been used to improve the nutritional quality of staple foods like corn and rice by adding healthful vitamins and minerals.<sup>6</sup> Unfortunately, many of these plant varieties remain uncommercialized due to excessive regulatory burdens and politicized approval processes.

The scientific literature is filled with hundreds of peer-reviewed studies describing the

4. Janet Carpenter, Allan Felsot, Timothy Goode, Michael Hammig, David Onstad, and Sujatha Sankula, *Comparative Environmental Impacts of Biotechnology-Derived and Traditional Soybean, Corn, and Cotton Crops* (Ames, IA: Council on Agricultural Science and Technology, 2002).

5. Ibid.

6. Dean Della Penna, “Nutritional Genomics: Manipulating Plant Micronutrients to Improve Human Health,” *Science* 285, no. 5426 (1999): 375–79.

safety of bioengineered crops and foods. And a review of 81 separate research projects, conducted over 15 years and funded by the European Union found that bioengineered crops and foods are as safe for the environment and for human consumption as conventional ones—and in some cases even safer, because the genetic changes in the plants are much more precise.<sup>7</sup> This confidence has been validated by the excellent safety record of biotech crops and the food derived from them since their commercial introduction more than a decade ago.<sup>8</sup>

In 2005, 8.5 million farmers in 21 countries planted more than 220 million acres with bioengineered crops—primarily soybeans, cotton, corn, and canola.<sup>9</sup> It's easy to see why. In 2001 alone, biotechnology-derived plants increased U.S. food production by approximately 4 billion pounds, saved \$1.2 billion in production costs, and decreased pesticide use by about 46 million pounds.<sup>10</sup> They have improved air, soil, and water quality as a consequence of reduced tillage, less chemical spraying, and fuel savings, and they have enhanced biodiversity because of

lower insecticide use.<sup>11</sup> Not surprisingly, farmers have a very favorable view of biotech seeds. By 2006, 61 percent of all corn, 89 percent of all soybeans, and 83 percent of all upland cotton grown in the United States were bioengineered varieties.<sup>12</sup>

Unremarkably, most commercially available biotech plants were designed for farmers in the industrial world. However, the increasing adoption of bioengineered varieties by farmers in less developed countries over the past few years has shown that these farmers can benefit at least as much as, if not more than, their counterparts in industrial countries.<sup>13</sup>

The productivity of farmers everywhere is limited by crop pests and diseases—and they are often far worse in tropical and subtropical regions than in temperate zones. About 20 percent of plant productivity in the industrial world—but up to 40 percent in Africa and Asia—is lost to insect pests and pathogens, despite ongoing use of copious amounts of pesticides.<sup>14</sup> The European corn borer destroys approximately 7 percent, or 40 million tons, of the world's corn crop each year—a sum equivalent to the annual food supply in calories for 60 million people.<sup>15</sup> It should come as no surprise that, when per-

7. Charles Kessler and Ioannis Economidis, eds., *EC-Sponsored Research on Safety of Genetically Modified Organisms: A Review of Results* (Brussels: Office for Official Publications of the European Communities, 2001).

8. National Research Council, *Safety of Genetically Engineered Foods: Approaches to Assessing Unintended Health Effects* (Washington, DC: National Academies Press, 2004).

9. Clive James, "Global Status of Commercialized Biotech/GM Crops: 2005," ISAAA Brief 34-2005, International Service for the Acquisition of Agri-biotech Applications, Ithaca, NY, 2005.

10. Leonard Giannessi, *Plant Biotechnology: Current and Potential Impact for Improving Pest Management in U.S. Agriculture: An Analysis of 40 Case Studies* (Washington, DC: National Center for Food and Agricultural Policy, 2002).

11. Carpenter et al., *Comparative Environmental Impacts*.

12. National Agricultural Statistics Service, *Acreage* (Washington, DC: U.S. Department of Agriculture, June 30, 2006).

13. James, "Global Status of Commercialized Biotech/GM Crops."

14. Chris Sommerville and John Briscoe, "Genetic Engineering and Water," *Science*, 292, no. 5525 (2001): 2217.

15. C. S. Prakash and Gregory Conko, "Agricultural Biotechnology Caught in a War of Giants," in *Let Them Eat Precaution: How Politics Is Undermining the Genetic Revolution in Agriculture*, ed. Jon Entine (Washington, DC: American Enterprise Institute, 2006), 35–55.



mitted to grow bioengineered varieties, poor farmers in less developed nations have eagerly snapped them up. Although industrial countries still grow the most, nearly 40 percent of biotech crop acreage is in less developed countries. And 90 percent of the farmers growing bioengineered varieties are resource-poor farmers in countries such as China, India, the Philippines, and South Africa.<sup>16</sup>

### Is Crop Biotechnology Safe?

Many biotechnology skeptics contend that such engineering is unsafe because it is “unnatural,” or because the technology is so new that plant breeders cannot anticipate all the potentially negative effects. As a result, they call for special regulations on biotech food, as well as on the gene-splicing process itself. Ironically, biotechnology is actually an improved method for plant breeding that gives researchers greater control and better understanding of the final plant product.

For thousands of years farmers changed the genetic characteristics of plants simply by selecting seeds from the best plants for propagation the following year. Hybridization—the mating of different plants of the same species—assimilates desirable traits from several varieties into elite specimens. Although most people believe that conventional plant breeding amounts to nothing more than simple selection and hybridization, nothing could be further from the truth.<sup>17</sup>

When desired characteristics are unavailable in cultivated plants, genes can be liber-

ally borrowed from wild relatives and introduced into crop varieties, often of different but related species. For example, wheat, rye, and barley are regularly mated with wild grass species to introduce new traits.<sup>18</sup> Such wide crosses between crop and wild varieties typically do not produce offspring, however, because the embryos die before they mature into seeds. Therefore, the embryos must be “rescued” and cultured in a Petri dish. Even then, the rescued embryos typically produce sterile seed, which can be made fertile again only by using chemicals that cause the plants to mutate and produce a duplicate set of chromosomes. Successive generations then have to be carefully screened to eliminate unwanted traits accidentally transferred from the wild plants, such as toxins common in most wild species. Triticale, an artificial hybrid of wheat and rye, is one example of a wide-cross hybrid made possible solely by embryo rescue and chromosome-doubling techniques. Triticale is now grown on more than 3 million acres worldwide, and dozens of other products of wide-cross hybridization are common.

When a desired trait cannot be found within the gene pool of related plants, breeders can create new variants by intentionally mutating plants with radiation or chemicals or by simply culturing clumps of cells in a Petri dish and leaving them to mutate spontaneously during cell division. Mutation breeding has been common since the 1950s, and more than 2,250 known mutant varieties have been bred in at least 50 countries, including Australia, France, Germany, Japan, the United Kingdom, and the

16. James, “Global Status of Commercialized Biotech/GM Crops.”

17. C. S. Prakash, “The Genetically Modified Crop Debate in the Context of Agricultural Evolution,” *Plant Physiology* 126 (May 2001): 8–15.

18. Robert M. Goodman, Holly Hauptli, Anne Crossway, and Vic C. Knauf, “Gene Transfer in Crop Improvement,” *Science* 236, no. 4797 (1987): 48–54.

United States.<sup>19</sup> New mutant crop varieties are commercialized frequently, and mutant wheat, rice, and canola varieties have been introduced in the United States, Canada, and Australia, in recent years.<sup>20</sup>

More important, wide-cross hybridization and mutation breeding are among the methods considered to be conventional breeding, so they are not opposed by antibiotechnology activists, nor are they subject to regulation in most of the world. Still, conventional breeding involves gross manipulation of plant genetic material, which is why scientists view modern biotechnology, using rDNA methods, as an extension of conventional techniques, not a totally new approach.<sup>21</sup> The primary difference is that the development of modern bioengineered crops involves a precise transfer of

one or two known genes into plant DNA—a surgical alteration of a tiny part of the crop’s genome compared with the traditional sledgehammer approaches whose genetic changes are mostly unknown and unpredictable.

The National Research Council summarized this issue neatly in a 1989 report:

With classical techniques of gene transfer, a variable number of genes can be transferred, the number depending on the mechanism of transfer; but predicting the precise number or the traits that have been transferred is difficult, and we cannot always predict the [behavior] that will result. With organisms modified by molecular methods [i.e., biotechnology], we are in a better, if not perfect, position to predict [their behavior].<sup>22</sup>

---

19. M. Maluszynski, K. Nichterlein, L. Van Santen, and B. S. Ahloowalia, *Officially Released Mutant Varieties: The FAO/IAEA Database* (Vienna, Austria: Joint FAO-IAEA Division, International Atomic Energy Agency, December 2000).

20. Clearfield Production System (BASF Corporation, Research Triangle Park, NC, 2005). Available at, [http://www.agro.basf.com/p02/AP-Internet/en\\_GB/function/conversions:/publish/upload/CLEARFIELD-Brochure.pdf](http://www.agro.basf.com/p02/AP-Internet/en_GB/function/conversions:/publish/upload/CLEARFIELD-Brochure.pdf).

21. National Research Council, *Safety of Genetically Engineered Foods*.

---

22. National Research Council, *Field Testing Genetically Modified Organisms: Framework for Decisions* (Washington, DC: National Academies Press, 1989), 13–14.



# Agricultural Biotechnology Regulation

Gregory Conko

For conventionally bred plants, regulators rely on plant breeders to conduct appropriate safety testing and to be the first line of defense against genetic alterations that might prove dangerous. They are not subject to any government premarket review, and regulation of conventionally derived food products amounts to little more than monitoring the marketplace for contaminated or misbranded products. Numerous scientific bodies have concluded that there is no scientific reason for holding bioengineered and conventional crops to different regulatory standards. However, despite this long-standing consensus of the scientific community,<sup>1</sup> biotech-derived plants are subject to very strict

government oversight in the United States and abroad.

In a 1989 report, the National Research Council (NRC) concluded, “Information about the process used to produce a genetically modified organism is important in understanding the characteristics of the product. However, the nature of the process is not a useful criterion for determining whether the product requires less or more oversight.”<sup>2</sup> Another NRC panel repeated this conclusion in a 2004 report.<sup>3</sup> And an expert

---

1. See the policy brief titled “Agricultural Biotechnology Overview” for a description of agricultural biotechnology.

---

2. National Research Council, *Field Testing Genetically Modified Organisms: Framework for Decisions* (Washington, DC: National Academies Press, 1989), 14–15.

3. National Research Council, *Safety of Genetically Engineered Foods: Approaches to Assessing Unintended Health Effects* (Washington, DC: National Academies Press, 2004).

committee of the Institute of Food Technologists (IFT) concluded unequivocally that neither existing empirical data nor theoretical considerations support more stringent safety standards than those that apply to conventional foods. According to the IFT, the evaluation of bioengineered organisms and the food derived from them “does not require a fundamental change in established principles of food safety; nor does it require a different standard of safety, even though, in fact, more information and a higher standard of safety are being required.”<sup>4</sup>

For thousands of years, human hands have used both crude and sophisticated techniques to generate both subtle and gross genetic changes in the food crops on which we rely. All of the known risks of biotechnology are also known to exist in conventional plant breeding methods. In almost all cases, these risks can be managed easily and effectively without any need for government oversight. Consequently, the disproportionate attention paid to biotechnology ignores the lessons of both biology and the history of agriculture.<sup>5</sup>

In some cases, certain products of conventional or biotech modification might pose substantial risk and therefore could warrant heightened government oversight. However, focusing only on recombinant DNA (deoxyribonucleic acid) techniques, and treating all bioengineered products as if they are uniquely risky, is counterproductive. Instead, regulatory efforts should be redirected to focus oversight on new organisms

that express characteristics likely to pose significant risk, regardless of the methods used in their development, while leaving relatively low-risk traits of both conventional and recombinant DNA modification unburdened by costly regulation.<sup>6</sup>

Introducing any new living organism into the environment or the food supply cannot be said to be risk-free, but assessment of the risks of bioengineered organisms should focus on the nature of the organism and of the environment into which the organism is to be introduced, independent of the breeding method used.<sup>7</sup> Whether an organism is bioengineered, conventionally bred, or unmodified, safety evaluations should be based on three considerations: familiarity, or the sum total of knowledge about the traits of the organism and the new environment; the ability to confine or control the organism; and the likelihood of harmful effects if the organism should escape control or confinement.

Naturally, with conventional and biotech modification, breeders must be vigilant to ensure that newly introduced plants do not pose human health problems, become invasive, or injure natural biodiversity as a result of intentional or accidental genetic changes. But neither the introduction of one, two, or several genes, judged against the background of tens or hundreds of thousands of the host organism’s own genes, nor the transformation process itself creates any risk that is novel, unique, or in some way difficult to manage.

How novel is a corn plant, for example, that contains a newly inserted gene for a bacterial

4. Institute of Food Technologists, *IFT Expert Report on Biotechnology and Foods* (Chicago: Institute of Food Technologists, 2000), 23.

5. Kent J. Bradford, Allen Van Deynze, Neal Gutterson, Wayne Parrott, and Steven H. Strauss, “Regulating Transgenic Crops Sensibly: Lessons from Plant Breeding, Biotechnology, and Genomics,” *Nature Biotechnology* 23, no. 4 (2005), 439–44.

6. See, for example, Henry I. Miller and Gregory Conko, *The Frankenfood Myth: How Protest and Politics Threaten the Biotech Revolution* (Westport, CT: Praeger, 2004), and Bradford et al., “Regulating Transgenic Crops Sensibly.”

7. National Research Council, *Field Testing Genetically Modified Organisms*, and National Research Council, *Safety of Genetically Engineered Foods*.

protein that is toxic only to certain insect larvae when one considers that every crop plant already has hundreds or thousands of its own natural pest-resistance genes? How novel is a gene-spliced canola plant enhanced to withstand a particular herbicide, given that conventional herbicide-tolerant canola plants have been produced and used commercially for more than two decades?

Only when an identifiable high-risk trait is involved should formal government oversight be required. Fortunately, recombinant DNA (rDNA) techniques actually make it easier to identify such risky traits.

### The Current Regulatory Scheme

When the early research on plant biotechnology was being conducted in the 1980s, the White House Office of Science and Technology Policy coordinated efforts of various regulatory agencies to outline a regulatory framework that aligned with scientific recommendations. Because conventional and biotech breeding methods pose the same kinds of risks, no new regulatory apparatus was thought to be needed. Existing federal agencies would regulate bioengineered organisms on the basis of their characteristics, not the method of production.<sup>8</sup> At least in theory, bioengineered organisms would not require extra scrutiny simply because rDNA methods were used to produce them. Instead, individual products would be subject to heightened scrutiny only if they expressed characteristics that posed some conceptually heightened risk.

This coordinated framework for the regulation of biotechnology divided regulatory jurisdiction among agencies already involved in ag-

ricultural, food, and environmental regulation. These agencies include the U.S. Department of Agriculture (USDA), the U.S. Environmental Protection Agency (EPA), and the U.S. Food and Drug Administration (FDA). Although each of these agencies considers the characteristics of individual products in their regulation, only the FDA follows the general scientific thinking that bioengineered and conventional products should be regulated similarly. Both the USDA and the EPA automatically subject all bioengineered plants as a class to premarket approval requirements not ordinarily applied to conventionally bred plants.

More important, the supposed justification for special regulation is that the process of inserting a novel gene into a crop plant, not just the presence of a novel gene, could be uniquely risky. This supposition has been debunked,<sup>9</sup> but each time a particular gene is put into a particular plant variety, the resulting “transformation event” is regulated as a unique product. If a single researcher puts one particular gene (conferring insect resistance, for example) into four different corn plants, all four are considered to be individual transformation events. Each event is regulated separately, and, in general, safety studies conducted on any one of the plants are not used in the review of the others.

### Department of Agriculture

The USDA’s primary concerns are the creation of weeds, the spread of plant and animal pathogens, and ecological disruption that would interfere with American agriculture. The department regulates the release of all bioengineered plants under statutes giving the Animal and Plant Health

8. Office of Science and Technology Policy, “Coordinated Framework for Regulation of Biotechnology; Announcement of Policy and Notice for Public Comment,” *Federal Register* 51 (June 26, 1986): 23302–50.

9. Bradford et al., “Regulating Transgenic Crops Sensibly.”



Inspection Service (APHIS) of USDA authority to control plants that may be or may become weeds or other nuisances—what the statutes call “plant pests.”<sup>10</sup> Although the rules apply in a general sense to novel or exotic varieties of both bioengineered and conventional plants, APHIS typically requires field testing of conventional plants only if they are new to a particular U.S. ecosystem (transplanted from another continent, for example) or if the plant itself is known to be a problematic weed or to harbor a plant disease.

When the introduction of conventionally bred or new but unmodified plants is being considered, the species is subject to regulation only if it appears on a list of known plants pests. If the plant species in question is not on the proscribed list, it is exempt from all USDA regulation. However, this straightforward approach is risk-based in that the organisms required to undergo case-by-case governmental review are a known enhanced-risk group.

APHIS treats all new bioengineered plants as presumptive plant pests, no matter how safe or hazardous individual varieties may be.<sup>11</sup> Each new bioengineered variety (or transformation event) is considered to be a “regulated article” that requires repeated and often redundant field testing until the agency decides that it is not a plant pest, at which time it may be deregulated.

10. 7 CFR §§340.3 et seq.

11. APHIS, “Introduction of Organisms and Products Altered or Produced through Genetic Engineering Which Are Plant Pests or Which There Is Reason to Believe Are Plant Pests,” *Federal Register* 52 (June 16, 1987): 22892–915; APHIS, “Genetically Engineered Organisms and Products; Notification Procedures for the Introduction of Certain Regulated Articles; and Petition for Nonregulated Status,” *Federal Register* 58 (March 31, 1993): 17044–59; and APHIS, “Genetically Engineered Organisms and Products; Simplification of Requirements and Procedures for Genetically Engineered Organisms,” *Federal Register* 62 (May 2, 1997): 23945–58.

Consequently, a new variety of wheat produced with conventional or wide-cross hybridization or mutation breeding<sup>12</sup> requires no government-mandated field testing—even though wide-cross hybridization introduces thousands of unknown and uncharacterized genes into the crop and despite the fact that mutation breeding randomly scrambles the DNA of a crop plant in unpredictable ways. But all new varieties of bioengineered wheat are subject to government-mandated field testing, even though there is no logical reason for the regulatory disparity.

For most bioengineered plants, APHIS requires the company producing the plants to submit notice detailing the gene or genes that have been inserted, the place where the plants will be tested, and other relevant characteristics of the plant before receiving permission to conduct the field trials. A new permit is needed whenever the size of a field trial is increased or a new site is added. Once the company completes field testing, APHIS reviews the results and makes a determination on whether the product should be deregulated and can be released into the market.<sup>13</sup> Because of the added time and expense of waiting for permits and conducting often unnecessary tests, APHIS regulations can make testing a bioengineered plant 10 to 20 times more costly than testing a conventionally bred plant.<sup>14</sup>

12. For a description of these methods, see the policy brief titled “Agricultural Biotechnology Overview.”

13. Donna Vogt and Mickey Parish, “Food Biotechnology in the United States: Science, Regulation, and Issues,” Congressional Research Service, Washington, DC, June 2, 1999, <http://fpc.state.gov/fpc/6176.htm>.

14. Susanne L. Huttner and Henry I. Miller, “USDA Regulation of Field Trials of Recombinant-DNA-Modified Plants: Reforms Leave Severe Flaws,” *Trends in Biotechnology* 15, no. 10 (1997): 387–89.

## Environmental Protection Agency

The EPA draws its authority to regulate most bioengineered plants from the Federal Insecticide, Fungicide, and Rodenticide Act, which encompasses pesticides, growth modulators, and related substances.<sup>15</sup> In 1994, EPA first proposed a rule for the regulation of bioengineered plants altered to mediate “host plant resistance” to pests or diseases, treating such plants as if they were the same as chemical pesticides.<sup>16</sup> Any bioengineered plant that either produces a substance directly used to protect the plant from pests—such as a protein that makes the plant resistant to insects, viruses, or fungi—or facilitates other pest management practices—such as a trait for herbicide tolerance—were dubbed “plant pesticides” and covered by the regulation.<sup>17</sup> It is worth noting that, to agronomists, even weeds are considered pests. Thus, a plant that is bioengineered to help farmers facilitate weed control is regulated by EPA under the pesticide statute.

When the EPA rule was first proposed, it was widely criticized by scientific bodies and individual scientists as scientifically indefensible.<sup>18</sup> Many scientists “argued that EPA should

not be in the business of regulating genetically engineered plants at all.”<sup>19</sup> Consequently, the agency revised its proposal several times and did not finalize the regulation until 2001.<sup>20</sup> When the final regulation was published, the agency changed the term *plant pesticide* to *plant-incorporated protectant* (PIP) but left the substance of the original proposal essentially unchanged. Bioengineered pest-protected plants must be approved by the EPA before commercialization in much the same way that chemical pesticides are. The submission required for EPA’s regulatory review includes copious data on the parental plant, the genetic construction and behavior of the test plant, and so on.

During the course of research and development on a bioengineered plant variety that contains a PIP, the EPA conducts repeated case-by-case reviews—before the initial trial, again when trials are scaled up to larger size or to additional sites (even if minor changes

15. 7 USC §§136–36(u).

16. EPA, “Plant-Pesticides Subject to the Federal Insecticide, Fungicide, and Rodenticide Act; Proposed Rule,” *Federal Register* 59 (November 23, 1994): 60496–547; see also, EPA, “Plant-Pesticides; Supplemental Notice of Proposed Rulemaking,” *Federal Register* 62 (May 16, 1997): 27131–42.

17. Ibid.

18. American Institute of Biological Sciences, American Phytopathological Society, American Society for Horticultural Science, American Society for Microbiology, American Society of Agronomy, American Society of Plant Physiologists, Crop Science Society of America, Entomological Society of America, Institute of Food Technologists, Society of Nematologists, and Weed Science

Society of America, “Appropriate Oversight for Plants with Inherited Traits for Resistance to Pests,” Institute of Food Technologists, Chicago, July 1996. See also, Council for Agricultural Science and Technology, “The Proposed EPA Plant Pesticide Rule,” Council for Agricultural Science and Technology, Ames, IA, October 1998.

19. Larry D. Schulze, “Eleven Societies Oppose EPA Regulating Plant Pesticides,” *Label 8*, no. 8 (1996), <http://pested.unl.edu/thelabel/tlaug96.htm>.

20. EPA, “Regulations under the Federal Insecticide, Fungicide, and Rodenticide Act for Plant-Incorporated Protectants (Formerly Plant-Pesticides),” *Federal Register* 66 (July 19, 2001): 37772–817; EPA, “Exemption from the Requirement of a Tolerance under the Federal Food, Drug, and Cosmetic Act for Residues of Nucleic Acids That Are Part of Plant-Incorporated Protectants (Formerly Plant-Pesticides),” *Federal Register* 66 (July 19, 2001): 37817–830; and EPA, “Exemption from the Requirement of a Tolerance under the Federal Food, Drug, and Cosmetic Act for Residues Derived through Conventional Breeding from Sexually Compatible Plants of Plant-Incorporated Protectants (Formerly Plant-Pesticides),” *Federal Register* 66 (July 19, 2001): 37830–54.



are made in the genetic construct), and again at commercial scale. Biotech products face substantial regulatory hurdles, even though PIPs developed through conventional breeding are exempt from these requirements.<sup>21</sup>

EPA also regulates other organisms—such as bioengineered microbes used for bioremediation or “bio-rational” pesticides—under the Toxic Substances Control Act, which provides oversight of “non-natural” and “new” substances, and mixtures of substances, intended for use in commerce and that are not regulated elsewhere.<sup>22</sup> Because research with bioengineered microorganisms is subject to very heavy regulatory burdens with highly uncertain approval standards, the U.S. bioremediation industry has largely restricted itself to research on naturally occurring and conventionally modified organisms that are essentially exempt from the regulations. Today the use of biotech organisms for bioremediation or to develop microbial pesticides is almost nonexistent.

### Food and Drug Administration

The FDA is responsible for ensuring that food items, including foods derived from bioengineered plants, are safe to eat. Under various statutes, including the Food, Drug, and Cosmetics Act, the FDA regulates food additives (such as artificial sweeteners and preservatives) through a premarket review process. The vast

21. Staff of the Subcommittee on Basic Research of the Committee of Science, 106th Congress, 2nd Session, “Seeds of Opportunity: An Assessment of the Benefits, Safety, and Oversight of Plant Genomics and Agricultural Biotechnology,” U.S. House of Representatives, Washington, DC, 2000.

22. 40 CFR Parts 700, 720, 721, 723, and 725; EPA, “Microbial Products of Biotechnology; Final Regulation under the Toxic Substances Control Act,” *Federal Register* 62 (April 11, 1997): 17910–58.

majority of what we eat, however, including both fresh and processed foods, is not subject to premarket testing, review, or inspection by the FDA. Instead, the agency simply polices the marketplace. Food products found to be *adulterated* (containing any addition “which may render [them] injurious to health”) or *misbranded* (falsely or misleadingly labeled) may be removed from commerce.<sup>23</sup>

Following the general regulatory framework that emphasizes product regulation rather than process regulation, the FDA rightly does not treat foods derived from bioengineered plants as inherently unsafe.<sup>24</sup> Food producers are not required to seek premarket approval from the FDA unless there is a substantive reason to believe that the novel trait or traits in the food pose a safety question.<sup>25</sup> As in the case of conventionally bred food crops, the initial determination of safety is left to the producer.<sup>26</sup> However, the FDA has encouraged producers to consult with agency scientists before marketing a food produced with biotechnology to ensure that the appropriate determination is made. In 2001, the FDA published a proposed rule that would require producers to notify the agency

23. 21 USC §§342–43.

24. FDA, “Statement of Policy: Foods Derived from New Plant Varieties,” *Federal Register* 57 (May 29, 1992): 22984–3005.

25. The FDA has established a risk-based decision tree that plant developers and food manufacturers apply to all foods to determine the safety of any new product, be it genetically engineered or produced through traditional methods. See FDA, “Statement of Policy.”

26. FDA, “Statement of Policy,” 22986–88. For example, the FDA does require notification when the nutritional or toxicological profile of the plant is changed significantly from what a consumer would reasonably expect from the conventional equivalent or when genes coding for the proteins of known allergenic foods such as eggs, wheat, and tree nuts are transferred.

at least 120 days before marketing a new bioengineered crop plant,<sup>27</sup> but the proposal was later withdrawn. Instead, the FDA published a guidance document that advised crop breeders to seek voluntary safety evaluations of the new proteins produced by bioengineered plants before the plants were grown in field trials.<sup>28</sup> If the safety of such proteins could be determined before the field trial stage, there would be no reason for concern if an experimental crop were accidentally introduced into the food supply.

Finally, the FDA requires labeling of foods derived from biotechnology only when their composition differs significantly from that of their conventional counterparts. Such differences would need to be risk-related factors, including the presence of a substance that was completely new to the food supply, an allergen presented in an unusual or unexpected way, changes in the levels of major dietary nutrients, increased levels of natural plant-produced toxins normally found in foods, or even a change in the expected storage or preparation characteristics of the food.<sup>29</sup>

## Labeling

Some activists argue that the government should mandate labeling of all bioengineered foods. They assert that consumers have a right to know how their foods have been altered and point to public opinion surveys in which

27. FDA, "Premarket Notice Concerning Bioengineered Foods," *Federal Register* 66 (January 18, 2001): 4706–38.

28. FDA, "Guidance for Industry; Recommendations for the Early Food Safety Evaluation of New Non-Pesticidal Proteins Produced by New Plant Varieties Intended for Food Use," *Federal Register* 71 (June 21, 2006): 35688–89.

29. FDA, "Statement of Policy," 22991.

majorities of respondents agree that labeling would be a good idea.<sup>30</sup>

Biotechnology advocates have argued against mandatory labeling because such requirements raise food costs—something that mostly harms low-income Americans and those on fixed budgets. Perhaps more important, while biotech products are not substantially different from other products, special labels would likely make consumers think they were more dangerous.<sup>31</sup> Hence, rather than serving educational or right to know purposes, such labels promise simply to confuse consumers.

In one typical survey, for example, 70 percent of respondents agreed that "the words genetically engineered should appear on the label of a food product where one or more ingredients were genetically engineered." However, 25 percent of respondents admitted that they were "not at all familiar" with bioengineered foods, 30 percent said "not very familiar," 38 percent said "somewhat familiar," and only 5 percent said they were "extremely familiar."<sup>32</sup> What are we to make of largely uninformed opinions about complex public policy issues?

30. See, for example, Campaign to Label Genetically Engineered Foods website, <http://www.thecampaign.org>, and Center for Science in the Public Interest, "National Opinion Poll on Labeling of Genetically Modified Foods," Center for Science in the Public Interest, Washington, DC, 2001, [http://www.cspinet.org/reports/op\\_poll\\_labeling.html](http://www.cspinet.org/reports/op_poll_labeling.html).

31. Henry I. Miller, "Genetic Engineering: A Rational Approach to Labeling Biotech-Derived Foods," *Science* 284, no. 5419 (May 28, 1999): 1471–72; Subcommittee on Basic Research of the Committee of Science, "Seeds of Opportunity, 53–55; Gregory Conko, *Eat, Drink, and Be Merry: Why Mandatory Biotech Food Labeling Is Unnecessary* (Portland, OR: Cascade Public Policy Institute, October 2002).

32. Center for Science in the Public Interest, "National Opinion Poll on Labeling of Genetically Modified Foods."

In that same survey, 40 percent of respondents agreed that foods “made from cross-bred corn” should be labeled.<sup>33</sup> But virtually all the corn grown in the United States is from cross-bred, or hybrid, varieties. Labeling in this case would, therefore, convey no useful information and make absolutely no sense. It would be tantamount to labeling bottled water to inform consumers that the products contain hydrogen and oxygen. In any case, we wonder how many of the respondents who say they support biotechnology labeling know the substance of existing FDA policies for food labeling in general or biotech foods in particular.

Currently, FDA policy mandates labels on any new food products in which a “material” change has been made to a health- or safety-related characteristic.<sup>34</sup> This risk-based labeling requirement applies to all foods, whether they have been developed through conventional breeding methods or the more advanced bioengineering techniques, and it is therefore consistent with the scientific consensus that regulation should be based on the specific characteristics of the products that could make them more or less safe, not how they were created. Consequently, the biotech labeling policy of the FDA has been endorsed by scientific organizations such as the American Medical Association<sup>35</sup> and the Institute of Food Technologists.<sup>36</sup>

In a series of polls commissioned by the International Food Information Council (IFIC), respondents were read a summary of current

FDA policy on labeling and asked if they supported or opposed it. In each survey, a majority of respondents agreed with the FDA labeling policy.<sup>37</sup> Because respondents were given a summary understanding of the FDA’s current policy before they were asked to comment on it, the results of the IFIC surveys should be given more credence than surveys of uninformed members of the public. Given the limited level of background knowledge on which other research on public attitudes is based, there is no evidence that the public genuinely supports mandatory labeling.

A government-mandated label on all genetically engineered foods also would raise important First Amendment free speech issues. In 1996, the U.S. Second Circuit Court of Appeals, in the case of *International Dairy Foods Association, et al. v. Amestoy*, ruled unconstitutional a Vermont statute requiring the labeling of dairy products from cows treated with a genetically engineered growth hormone, noting that food labeling cannot be mandated simply because some people would like to have the information: “Absent ... some indication that this information bears on a reasonable concern for human health or safety or some other sufficiently substantial governmental concern, the manufacturers cannot be compelled to disclose it.”<sup>38</sup> In other words, to be constitutional, labeling must be confined to disclosure of information for which a legitimate governmental interest exists, such as that relevant to health or nutrition. This is decidedly not the case when it comes to generic labeling of all bioengineered foods.

33. Ibid.

34. FDA, “Statement of Policy.”

35. American Medical Association, “Report 10 of the Council on Scientific Affairs (I-00): Genetically Modified Crops and Foods,” American Medical Association, Chicago, 2000.

36. Institute of Food Technologists, *IFT Expert Report on Biotechnology and Foods*.

37. IFIC, “IFIC Survey: Food Biotechnology Not a Top-of-Mind Concern for American Consumers,” IFIC, Chicago, June 2005, <http://www.ific.org/research/upload/2005BiotechSurvey.pdf>.

38. 92 F.3d 67 (2nd Cir. 1996).

Furthermore, consumers need not rely on mandatory labeling of bioengineered foods to truly have a choice. Real-world examples show that market forces are fully capable of supplying information about process attributes (such as kosher and organic production standards) that consumers truly demand. The same can be said about nonengineered foods. Numerous products voluntarily labeled as containing no genetically engineered ingredients can be found on grocery store shelves, and several antibiotech organizations tout their own guides to buying “non-GM” products.<sup>39</sup> And, in 2001, FDA published a draft guidance to assist producers in voluntarily labeling both genetically engineered foods and foods that are not genetically engineered.<sup>40</sup> In addition, the USDA rule published for organic certification necessarily excludes biotech products from organic food production.<sup>41</sup> Consequently, consumers wishing to purchase nonbiotech foods need look only for certified organic products or others specifically labeled as not developed using bioengineering techniques.

### International Trade

Although U.S. consumers do not appear to be strongly opposed to biotech foods (in fact, they seem rather indifferent), a strong anti-biotechnology movement has arisen in several

European and Asian countries in the past decade. The European Union (EU) has established strong restrictions on the commercial planting of genetically engineered crops,<sup>42</sup> and European food processors and retailers are reluctant to import harvested agricultural products derived from biotechnology.

After approving two biotech varieties for commercialization in the mid-1990s, EU policymakers imposed an unofficial moratorium from 1998 to 2004 on the approval of additional biotech crops. Six EU member countries—Austria, France, Germany, Greece, Italy, and Luxembourg—banned all commercial planting and sale of bioengineered varieties. In 2006, the World Trade Organization (WTO) ruled that the moratorium and national bans violated global trade treaties.<sup>43</sup> However, the victory for the United States, Canada, and Argentina, which jointly filed the case, was largely symbolic because the WTO decision left the underlying regulatory policy of the European Union unchallenged. The trade panel did not object to how biotech products were regulated in the

39. Institute for Responsible Technology, “How to Buy Non-GM,” Institute for Responsible Technology, Fairfield, Iowa, available at <http://www.responsibletechnology.org/GMFree/AboutGMFoods/HowtoBuyNon-GM/index.cfm>.

40. FDA, “Draft Guidance for Industry: Voluntary Labeling Indicating Whether Foods Have or Have Not Been Developed Using Bioengineering; Availability” *Federal Register* 66 (January 18, 2001): 4839–42.

41. 7 CFR Part 205.

42. European Parliament and the Council of the European Union, “Regulation (EC) No. 1829/2003 on Genetically Modified Food and Feed,” *Official Journal of the European Union* L268 (2003): 1–23; European Parliament and the Council of the European Union, “Regulation (EC) No. 1830/2003 Concerning the Traceability and Labeling of Genetically Modified Organisms and the Traceability of Food and Feed Products from Genetically Modified Organisms and Amending Directive 2001/18/EC,” *Official Journal of the European Union* L268 (2003): 24–28; European Parliament and the Council of the European Union, “Commission Regulation (EC) No 65/2004 of 14 January 2004 Establishing a System for the Development and Assignment of Unique Identifiers for Genetically Modified Organisms,” *Official Journal of the European Union* L10 (2004): 5–10.

43. WTO, “European Communities—Measures Affecting the Approval and Marketing of Biotech Products: Reports of the Panel,” WT/DS291/R, WT/DS292/R, WT/DS293/R, WTO, Geneva, September 29, 2006.



EU; it held only that European officials were not following their own regulations by “unduly delaying” final approval of otherwise complete applications for 25 food biotech products for transparently political reasons.<sup>44</sup>

EU regulatory policies, however, are themselves problematic.<sup>45</sup> First, there is no relationship between regulation and risk in EU biotech policies, so very safe products are held to extreme regulatory scrutiny. And, second, once biotech foods are approved for commercial use, EU policy requires both labeling and traceability. Every single bioengineered variety (or transformation event) and every food ingredient derived from it must be labeled with a unique identifier, regardless of whether it can be distinguished from conventionally produced foods. Then, every link in the vast food chain—from seed breeders to farmers, shippers, processors, wholesalers, and retailers—is required to keep detailed records identifying from whom each ingredient was received and to whom it was sent, so that every ingredient can be traced back to the farm on which it was grown.

At the time this chapter was written, it was not clear how the global commodity system would accommodate the traceability regime, but compliance was expected to be very costly. Thus, even European food processors and retailers that sold some bioengineered foods

before implementation of the labeling and traceability rules were reluctant to continue selling biotech products. Consequently, the European market is no more open to bioengineered crops today than before the WTO case was decided.

In addition, the very strong restrictions included in the Cartagena Protocol on Biosafety,<sup>46</sup> which was finalized in January 2000, are beginning to spread European-style biotech regulation based on the precautionary principle around the world. Many less developed country governments are reluctant to approved bioengineered crops for their own farmers as long as major export markets in Europe are closed to such crops.<sup>47</sup> Others have been convinced by European policymakers and environmental activists that such regulation is warranted. However, while the EU continues to assert that the precautionary principle is an unbiased risk management philosophy, critics have shown that its lack of definition and evidentiary standards makes it easy to abuse for the purpose of masking trade protectionism and that its inherently flawed risk management approach may, in fact, increase net risk.<sup>48</sup>

44. Ibid. See also Gregory Conko, “New Era, or Ancien Régime, for European Biotech?” *Planet* (May 2006): 1, 3.

45. See generally Henry I. Miller and Gregory Conko, *The Frankenfood Myth*; Tony Gilland, “Trade War or Culture War? The GM Debate in Britain and the European Union,” in *Let Them Eat Precaution: How Politics Is Undermining the Genetic Revolution in Agriculture*, ed. Jon Entine (Washington, DC: American Enterprise Institute, 2006); Neville Craddock, “Flies in the Soup—European GM Labeling Legislation,” *Nature Biotechnology* 22 (April 2004): 383–84.

46. Secretariat of the Convention on Biological Diversity, *Cartagena Protocol on Biosafety to the Convention on Biological Diversity: Text and Annexes* (Montreal: Secretariat of the Convention on Biological Diversity, 2000).

47. Robert Paarlberg, *The Politics of Precaution: Genetically Modified Crops in Developing Countries* (Baltimore, MD: Johns Hopkins University Press, 2001); Robert Paarlberg, “African Famine, Made in Europe,” *Wall Street Journal*, August 23, 2002, A12; Gregory Conko, “Rethinking the Regulation of Bioengineered Crops: Why European and American Biotechnology Rules Are Bad for Less Developed Countries,” paper presented at the U.S. State Department conference on Agricultural Biotechnology and Developing Countries, Arlington, VA, May 23, 2003.

48. Gregory Conko, “Safety, Risk, and the Precautionary Principle: Rethinking Precautionary Approaches to the

## Conclusion

Even as farmers in underdeveloped nations clamor for biotechnology applications, and even as countries like China continue to experiment with and use agricultural biotechnology,<sup>49</sup> opponents of agricultural biotechnology in the West, particularly Europe, attack it as an unnatural process that will destroy the world, not improve it. They argue that biotechnology should be heavily regulated, if not banned.

Genetically engineered plants already are subject to strict regulatory oversight that is equal to or greater than that advocated by the vast majority of scientific specialists. Additional regulation will slow down their further research and development, keep beneficial products off the market, and raise the cost of products that do make it to consumers. Furthermore, the inclusion of similar restrictions—or inclusion of the precautionary principle—in international agreements will greatly affect the international trade of agricultural goods and delay their introduction into the marketplace. Each of these problems could prevent the benefits of this technology from being introduced to industrial nations and, more importantly, to the developing world.

## Key Experts

Gregory Conko, Senior Fellow, Competitive Enterprise Institute, gconko@cei.org

Henry Miller, Fellow, Hoover Institution, miller@hoover.stanford.edu

## Recommended Reading

Miller, Henry I., and Gregory Conko. 2004. *The Frankenfood Myth: How Protest and Politics Threaten the Biotech Revolution*. Westport, CT: Praeger.

Bradford, Kent J., Allen Van Deynze, Neal Gutterson, Wayne Parrott, and Steven H. Strauss. 2005. “Regulating Transgenic Crops Sensibly: Lessons from Plant Breeding, Biotechnology, and Genomics,” *Nature Biotechnology* 23, no. 4, 439–44.

Institute of Food Technologists. 2000. *IFT Expert Report on Biotechnology and Foods*. Chicago: Institute of Food Technologists.

National Research Council. 1989. *Field Testing Genetically Modified Organisms: Framework for Decisions*. Washington, DC: National Academies Press.

Regulation of Transgenic Plants,” *Transgenic Research* 12, no. 6 (2003): 639–47; Henry I. Miller and Gregory Conko, “The Perils of Precaution,” *Policy Review* 107 (June/July 2001): 25–39.

49. Jikun Huang and Qinfang Wang, “Agricultural Biotechnology Development and Policy in China,” *AgBioForum*, 5, no. 4 (2002): 122-135.



---

# **Chemical Risk**

---





# Chemical Risk Overview

Angela Logomasini

Worldwide, the average human life span has increased from about 30 years at the beginning of the 20th century to more than 60 years today, and it continues to rise.<sup>1</sup> In the United States, it has reached 76 years according to a recent estimate (figure 1).<sup>2</sup> The freedom to develop and put to use thousands of man-made chemicals has played a crucial role in that progress by making possible such things as pharmaceuticals, safe drinking water, and pest control.

---

1. Nicholas Eberstadt, "World Population Prospects for the Twenty-First Century: The Specter of 'Depopulation'?" in *Earth Report 2000*, ed. Ronald Bailey (New York: McGraw Hill, 2000), 65.

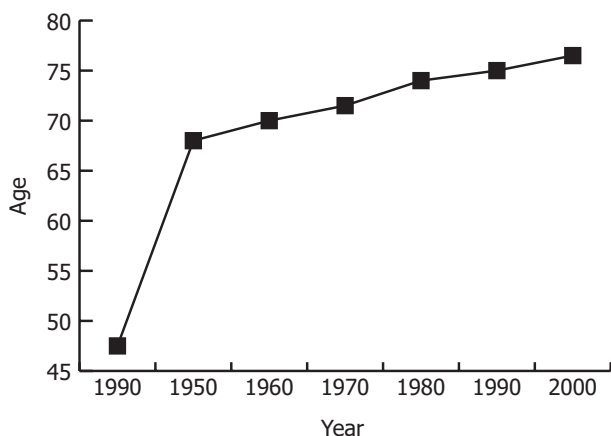
2. U.S. Department of Labor, U.S. Census Bureau, *Health, United States, 2000: Adolescent Health Chartbook* (Washington, DC: Centers for Disease Control and Prevention, 2000), 7, <http://www.cdc.gov/nchs/data/hus/hus00cht.pdf>.

Yet the public perception is that man-made chemicals are the source of every possible ill, from cancer to ozone depletion and from infertility to brain damage. Ignoring that nature produces far more chemicals at far higher doses<sup>3</sup> and that most chemicals are innocuous at low doses, activists capitalize on those fears. They scare the public by hyping the risks to ensure that the government passes volumes of laws and regulations focused on eliminating chemicals without much regard for the tradeoffs.

Advocates of such limits want the government to make sure every chemical is safe before

---

3. Bruce N. Ames and Lois Swirsky Gold, "Environmental Pollution, Pesticides, and the Prevention of Cancer: Misconceptions," *FASEB Journal* 11, no. 13 (1997): 1041–52, <http://socrates.berkeley.edu/~mutagen//AmesGold.pdf>.

**Figure 1. Life Expectancy**

Source: National Center for Health Statistics.

exposing the public. In his 2000 book *Pandora's Poison*, Greenpeace's Joe Thornton calls on society to follow the "precautionary principle," which says "we should avoid practices that have the potential to cause severe damage, even in the absence of scientific proof of harm."<sup>4</sup> We should shift the burden of proof, he continues. Those individuals or firms introducing new chemicals must prove the chemicals are safe before introducing them into commerce, and those chemicals already in commerce which fail to meet this standard "should be phased out in favor of safer alternatives."<sup>5</sup>

The problem is that no one can ever prove that anything is 100 percent safe. Not surprisingly, Thornton also advocates a "zero discharge" policy, which calls for the elimination of all bioaccumulative chemicals.<sup>6</sup> In particular, he

4. Joe Thornton, *Pandora's Poison: Chlorine, Health, and a New Environmental Strategy* (Cambridge, MA: MIT Press, 2000), 10.

5. Ibid.

6. For more information on bioaccumulative chemicals, see Michael Kamrin, *Traces of Environmental Chemicals in the Human Body: Are They a Risk to Health?* (New

York: American Council on Science and Health, 2003). [http://www.acsh.org/docLib/20041110\\_traces\\_2003.pdf](http://www.acsh.org/docLib/20041110_traces_2003.pdf).

7. Ivan Amato, "The Crusade against Chlorine," *Science* 261, no. 5118 (1993): 153. For more information on chlorine issues, see Michelle Malkin and Michael Fumento, *Rachel's Folly: The End of Chlorine* (Washington, DC: Competitive Enterprise Institute, 1996).

## The Dangers of Precaution

has long called for the elimination of chlorine. *Science* magazine quotes him as noting: "There are no known uses for chlorine which we regard as safe."<sup>7</sup> Perhaps in recognition that this standard is politically untenable, he suggested that chlorine use be continued for "some pharmaceuticals" and some "water disinfection," but only until other options become available.<sup>8</sup>

But before we call for zero discharge of anything, we should think about what that means. Like anything, chemicals may create new risks, but they have been used to eliminate others—many of which wreaked havoc on civilization for centuries. As the Competitive Enterprise Institute's Fred Smith notes, "Experience demonstrates that the risks of innovation, while real, are vastly less than risks of stagnation."<sup>9</sup> Indeed, he asks, what would the world be like if medical researchers had never introduced penicillin because they could not prove it was 100 percent safe?

## Chemicals Transform Our Everyday Lives

Although we don't think much about them, man-made chemicals are essential to almost ev-

8. Thornton, *Pandora's Poison*, 14.

9. Fred L. Smith, "The Dangers of Precaution," *European Voice* 6, no. 7 (February 17, 2000): 1, <http://www.cei.org/pdf/3845.pdf>.

everything we do. They make our cars run; they clean everything from our teeth to our dishes; they reduce illness by disinfecting bathrooms at home and operating rooms in hospitals; they are used on food products, such as poultry, to eliminate *E. coli* and other deadly pathogens; and they keep our computers, television sets, and other electronic products running. Consider just a few of the critical functions they perform in making our lives better:

- Chlorination of water supplies has saved millions of lives. For example, since local engineers and industry introduced chlorination in the 1880s, waterborne-related deaths in the United States dropped from 75 to 100 deaths per 100,000 people to fewer than 0.1 death per 100,000 annually in 1950.<sup>10</sup>
- Rather than curtailing the use of chlorination as Thornton suggests, we should be expanding access. According to the World Health Organization, because of such problems as poor sanitation and unsafe drinking water diarrheal diseases (such as cholera and dysentery) kill about 2.2 million people a year, most of whom are children under five years of age.<sup>11</sup>
- The U.S. Centers for Disease Control and Prevention notes that fluoridation of water (fluoride is yet another chemical targeted by

environmentalists) has proven a tremendous benefit for oral hygiene.<sup>12</sup>

- Nearly 85 percent of pharmaceuticals currently in use require chlorine to be used in their production.<sup>13</sup>
- Thanks to chemicals used for pharmaceuticals, combination drug therapy reduced AIDS deaths by more than 70 percent from 1994 to 1997.<sup>14</sup> And more recently, researchers estimated that AIDS drug treatments have saved a total of 3 million years of life in the United States since 1989.<sup>15</sup>
- Fifty percent of the reductions of heart disease-related deaths between 1980 and 1990 (total death rate decline of 30 percent) are attributable to medicines and the chemicals that are in them.<sup>16</sup>

10. J. Michael LaNier, "Historical Development of Municipal Water Systems in the United States, 1776–1976," *Journal of the American Water Works Association* 68, no. 4 (1976): 177.

11. "Water-Related Diseases: Diarrhoea," World Health Organization website, [http://www.who.int/water\\_sanitation\\_health/diseases/diarrhoea/en/](http://www.who.int/water_sanitation_health/diseases/diarrhoea/en/), access November 29, 2007.

12. "Ten Great Public Health Achievements—United States, 1900–1999," *Morbidity and Mortality Weekly Report* 48, no. 12 (1999): 241–43.

13. Gordon W. Gribble, "Chlorine and Health: Evaluating Chlorine and Chlorinated Compounds" (New York: American Council on Science and Health, 1995), [http://www.healthfactsandfears.net/docLib/20040503\\_chlorine.pdf](http://www.healthfactsandfears.net/docLib/20040503_chlorine.pdf).

14. Frank J. Palella, Kathleen M. Delaney, Anne C. Moorman, Mark O. Loveless, Jack Fuhrer, Glen A. Satten, Diane J. Aschman, and Scott D. Holmberg, "Declining Morbidity and Mortality among Patients with Advanced HIV Infection," *New England Journal of Medicine* 338, no. 13 (1998): 853–60, <https://content.nejm.org/cgi/content/abstract/338/13/853>.

15. Rochelle P. Walensky, et al., "The Survival Benefits of AIDS Treatment in the United States," *Journal of Infectious Diseases* 194, no. 1 (July 1, 2006): 11–19

16. M.G. Hunink, L. Goldman, A. N. Tosteson, M. A. Mittleman, P. A. Goldman, L. W. Williams, J. Tsevat, and M. C. Weinstein, "The Recent Decline in Mortality from Coronary Heart Disease, 1980–1990," *Journal of the American Medical Association* 277, no. 7 (1997): 535–42, abstract available at [http://www.ncbi.nlm.nih.gov/80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list\\_uids=9032159&dopt=Abstract](http://www.ncbi.nlm.nih.gov/80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9032159&dopt=Abstract)

- Chemicals called *phthalates* (there are several kinds of phthalates) are used in polyvinyl chloride (PVC)—a type of vinyl used for medical tubing, blood bags, and numerous other products. Although environmentalists have tried to ban these products,<sup>17</sup> vinyl medical devices provide numerous lifesaving benefits. PVC is a safe, durable, sterile product that can withstand heat and pressure, as well as produce tubing that doesn't kink. It is particularly beneficial for vinyl blood bags because it stores blood twice as long as the next best alternative and doesn't break as glass alternatives do. With blood shortages looming, PVC blood bags are an essential tool in maintaining and transporting supply.<sup>18</sup>
- Biocidal chemicals may soon find their way into hospital uniforms and other textiles used in hospitals, thereby helping to prevent such materials from carrying bacteria and transmitting them to patients. Diseases acquired in hospitals account for as many as 80,000 deaths a year, and studies have found that bacteria can survive long periods on worker's uniforms—making them vehicles for infection.<sup>19</sup> If antitechnology activists don't try to ban them first, biocidal chemicals may soon help save thousands of lives every year.
- Thanks to modern farming with chemicals, food production has outpaced population growth—providing people in both developed and developing countries with more food per capita. Per capita grain supplies have grown by 27 percent since 1950, and food prices have declined in real terms by 57 percent since 1980.<sup>20</sup>
- Using herbicides to control weeds decreases the need for tilling soil, which, in turn, reduces soil erosion by 50 to 98 percent.<sup>21</sup>
- Because of high-yield farming (which uses chemical fertilizers, pesticides, herbicides, etc.), farmers feed more people while farming less land—leaving more land for wildlife. If farmers continued to use 1950s technology—when most of the world did not use pesticides and fertilizers—they would have to plant 10 million square miles of additional land to generate the food that produced today.<sup>22</sup> That's more land than all of North America (which is about 9.4 million square miles and almost as much as all the land in Africa (which is about 11.7 million square miles).
- Many of us enjoy drinks with artificial sweeteners to avoid extra calories. These chemicals are an important benefit to diabetics. The American Diabetes Association notes the importance of artificial sweeteners—including saccharin—in improving quality of life for diabetics. “Artificial sweeteners are ‘free foods,’” says the American Diabetes Association in literature to diabetics. “They make our food taste sweet, but they have

17. Bill Durodié, “Poisonous Propaganda: Global Echoes of an Anti-Vinyl Agenda” Competitive Enterprise Institute, Washington, DC, July 2000.

18. See Angela Logomasini, “Blood Supply Besieged,” *Washington Times*, A14, August 10, 2000, <https://www.cei.org/gencon/019,01811.cfm>.

19. Gang Sun and Jeffrey F. Williams, “Dressing to Kill: Incorporating Biocidal Agents into Textiles Gives Added Protection against Infectious Diseases,” *Chemistry and Industry* 17 (1999): 658–71.

20. Dennis Avery, “Saving the Planet with Pesticides,” in *The True State of the Planet*, ed. Ronald Bailey (New York: Free Press, 1995), 52–54.

21. *Ibid.*, 74–76.

22. *Ibid.*, 71.

no calories and do not raise blood glucose levels. ... They can be added to your meal plan rather than substituted.”<sup>23</sup>

- Mercury—a heavy metal that is often a target of environmentalists—is a key component of the amalgam fillings that have eliminated and prevented billions of toothaches during more than four decades of use.<sup>24</sup>

Disregarding such benefits, most of the key U.S. environmental regulatory statutes follow the lead of groups like Greenpeace, focusing on the elimination of chemicals without considering the dangers of not having these technologies. The Clean Water Act, for example, makes the unattainable pledge: “It is the national goal that the discharge of pollutants into the navigable waters

23. “Sugars and Artificial Sweeteners,” American Diabetes Association, Alexandria, VA, <http://diabetes.org/nutrition-and-recipes/nutrition/sweeteners.jsp>, accessed November 27, 2007. As with so many chemicals, activists once tried to ban saccharin by claiming it was a carcinogen. That myth was dispelled in May 2000 when the Department of Health and Human Services announced that saccharin is not a human carcinogen. Despite that finding, activists complained when Congress eliminated the law that saccharin carry a cancer warning label. See Public Health Service, National Toxicology Program, *9th Report on Carcinogens 2000* (Washington, DC: U.S. Dept. of Health and Human Services, 2000), <http://ntp.niehs.nih.gov/index.cfm?objectid=06F2C37B-F88F-23D5-468CA8B9F7C2827B>.

24. Mercury has long been a key target of antichemical activists. However, in the early 1990s, public health providers and government researchers debunked claims about the dangers of mercury in amalgam fillings. The American Dental Association called such claims fraudulent, and some doctors had their licenses suspended and paid hefty legal compensation in cases where they had convinced patients to remove fillings on such dubious grounds. For a good overview of the case, see Stephen Barrett, “The Mercury Amalgam Scam,” December 23, 1999, <http://www.quackwatch.org/01QuackeryRelatedTopics/mercury.html>.

be eliminated by 1985.”<sup>25</sup> Although we can meet reasonable clean water goals, we can’t meet a zero discharge without forcibly halting industrial processes that bring us lifesaving medicine, a safe food supply packaged to ensure that it will last, or even clothing. Likewise, regulations that the Environmental Protection Agency (EPA) issued under the Safe Drinking Water Act actually set zero as the goal for certain chemical contaminants in drinking water—something that is virtually impossible and is totally unnecessary for public health purposes. With such goals, drinking water standards for chemicals are extremely stringent. For example, one standard demands that drinking water not contain any more than 0.03 parts per *trillion* of a contaminant.<sup>26</sup> The high costs of such onerous standards mean that financial resources are diverted from other, more essential needs such as infrastructure upgrades and microbial contamination.<sup>27</sup>

Other statutes simply assume that because an industrial process uses chemicals it is somehow suspect. Under the Toxic Release Inventory (TRI),<sup>28</sup> firms must report all chemical

25. 33 USC §1251(a)(1).

26. This is the standard for dioxin (see EPA’s listing of drinking water standards at <http://www.epa.gov/safewater/mcl.html>). Dioxin is released into the air from both natural processes (such as forest fires) and industrial processes. Very low (and safe) levels find their way into most foods. For example, Ben & Jerry’s ice cream contains  $0.79 \pm 0.38$  parts per trillion of dioxin (see <http://www.junkscience.com/dec99/benjerr2.html>). Although dioxin is a key target of environmentalists, it has never been shown to cause any illness other than a skin disorder among very highly exposed individuals. See Michael Gough, “Reevaluating the Risks from Dioxin,” *Journal of Regulation and Social Costs* 1, no. 3 (June 1991): 5–23.

27. See the policy brief titled “Safe Drinking Water Act Overview.”

28. TRI is a program created by the Emergency Planning and Community Right to Know Act, 42 USC §§11001 et seq.

“releases,” chemical uses, and processes that use chemicals. Environmentalists say this law encourages firms to reduce pollution. But not all releases constitute pollution,<sup>29</sup> and not all pose public health consequences. At question should not be whether firms use chemicals, but whether they use chemicals responsibly and what is gained in return. Firms can reduce chlorine in attempts to appease environmentalists, but are we willing to drink water swimming with microbial contaminants and give up life-saving pharmaceuticals?

This section of the *Environmental Briefing Book* will open with briefs on two fundamental areas in the risk debate. The first addresses allegations that chemicals are causing a cancer epidemic. The second addresses a newer debate: are chemicals disrupting our endocrine systems and thus causing developmental and reproductive problems? Following those briefs, is an overview of the science underlying methylmercury, which has garnered much news coverage in recent years. Other risk related statutes are found in their sections on water, pesticides, and air quality.

---

29. For example, releases include materials that have been recycled, chemicals that are properly disposed of in modern landfills, wastes safely managed at the site of a facility, and liquids (such as water) pumped from the ground and reinjected into the ground during oil drilling operations. Though none of these activities would constitute pollution to most people, TRI counts the movements of such materials as pollution. See the policy brief titled “Toxics Release Inventory.”



# Cancer Trends

Angela Logomasini

In recent decades, many have claimed that cancer is rising because of increased use of human-made chemicals. But if chemicals were a source of health problems, one might expect that as chemical use increased around the world, there would be a measurable adverse effect on life expectancy, cancer rates, or other illnesses. Yet in developed nations, where chemical use has greatly increased, people are living longer, healthier lives. According to the the World Health Organization (WHO), the average worldwide human life span has increased from 45 years in 1950 to about 66 in 2000, and it will most likely continue to increase to 77 years by 2050.<sup>1</sup> According to the Centers for Disease

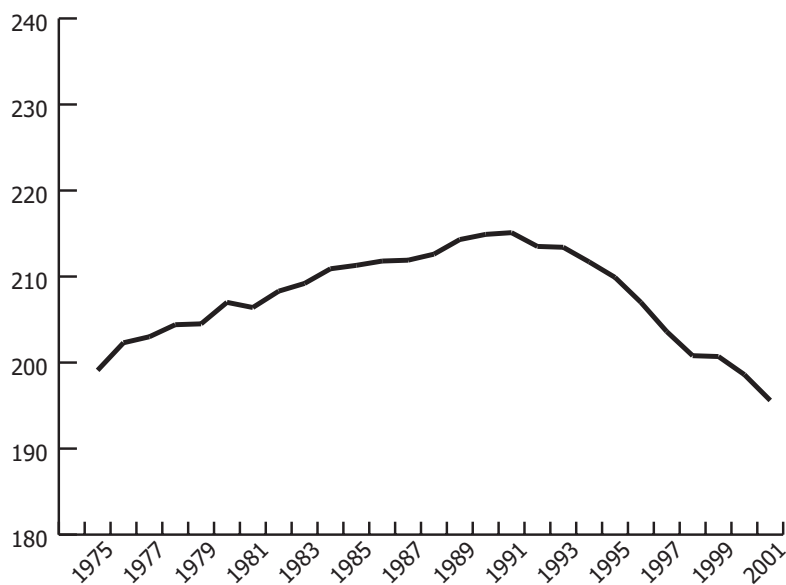
1. Bernard W. Stewart and Paul Kleihues, eds., *World Cancer Report* (Lyon, France: World Health Organization/IARC Press, 2003), 320.

Prevention and Control, U.S. life expectancy reached 77.8 years in 2004.<sup>2</sup>

Moreover, cancer trends are anything but alarming. Scientists Richard Doll and Richard Peto note in their landmark study on cancer that rates remained nearly constant in the United States during the 20th century except for increases caused by smoking. Improvements in medical technology, more accurate identification and reporting of cancer cases, and—most important—increasing life expectancies that result in more people in the older age groups (in which cancer is more likely) only make it

2. Arialdi M. Miniño, Melonie P. Heron, Sherry L. Murphy, and Kenneth D. Kochanek, “Deaths: Final Data for 2004,” *National Vital Statistics Reports* 55 no. 19 (August 21, 2007), [http://www.cdc.gov/nchs/data/nvsr/nvsr55/nvsr55\\_19.pdf](http://www.cdc.gov/nchs/data/nvsr/nvsr55/nvsr55_19.pdf).

**Figure 1. U.S. Cancer Mortality Age-Adjusted Cases per 100,000 Individuals**



Source: National Cancer Institute.

appear as if rates have increased.<sup>3</sup> Scientists Bruce Ames and Lois Swirsky Gold report that overall cancer rates, excluding lung cancer, have declined 16 percent since 1950. This increase in cancer among the elderly is best explained by improved screening.<sup>4</sup>

The National Cancer Institute (NCI), in its annual report on cancer, has also reported that rates for overall cancer are down in recent years (see figure 1). Rates for almost all specific cancers also are falling. Researchers report that even lung cancer is falling, as a

result of reduced smoking rates over the past 25 years.<sup>5</sup> They do not mention environmental exposures in the discussion of cancer trends.

It is true that developed nations have higher cancer rates than developing nations and that there was an increase in cancer incidence during the 20th century. The WHO reports that developed nations face cancer rates that are more than twice as high as that of developing nations.<sup>6</sup> The data clearly indicate, however, that chemical use and related pollution are not sources of this problem. Other factors better explain these trends. In particular, cancer is largely a disease related to aging, which means that along

with the improvements in life expectancy come increased cancer rates. Also, rates will appear even larger because the median age of the population is getting older. Not surprisingly, the WHO reports that cancer deaths and incidence grew 22 percent between 1990 and 2000. Those trends are expected to continue regardless of chemical use because, as the WHO reports, the number of individuals older than 60 will triple by 2050.

In addition, developed nations experienced a dramatic increase of cancer incidences in the past century because of an increase in smok-

3. Richard Doll and Richard Peto, "The Causes of Cancer: Quantitative Estimates of Avoidable Risks of Cancer in the United States Today," *Journal of the National Cancer Institute* 66, no. 6 (1981): 1257.

4. Bruce N. Ames and Lois Swirsky Gold, "Environmental Pollution, Pesticides, and the Prevention of Cancer: Misconceptions," *FASEB Journal* 11, no. 13 (1997): 1041–52, <http://socrates.berkeley.edu/mutagen//AmesGold.pdf>.

5. Phyllis A. Wingo, Lynn A. G. Ries, Gary A. Giovino, Daniel S. Miller, Harry M. Rosenberg, Donald R. Shopland, Michael J. Thun, and Brenda K. Edwards, "Annual Report to the Nation on the Status of Cancer, 1973–1996, with a Special Section on Lung Cancer and Tobacco Smoking," *Journal of the National Cancer Institute* 91, no. 8 (April 1999): 675.

6. Stewart and Kleiheus, *World Cancer Report*.

ing, which causes several types of cancer in addition to lung cancer. The WHO says that tobacco is the main known cause of cancer, producing up to 30 percent of all cancers in developed nations.<sup>7</sup> A large portion of cancer rate increases in developed nations occurred during the previous century because of increases in the rate of smoking earlier that century.

For example, Brad Rodu and Philip Cole, researchers from the University of Alabama Schools of Medicine and Public Health, report that in the United States smoking is responsible for making what was once a rare occurrence—lung cancer—one of the most common cancers today. Rodu and Cole note, however, that “when the mortality from all smoking-related cancers is excluded, the decline in other cancer from 1950 to 1998 was 31 percent (from 109 to 75 deaths per 100,000 person years).”<sup>8</sup> They continue, “A typical commentary blamed ‘increasing cancer rates’ on ‘exposure to industrial chemicals and run-away modern technologies whose explosive growth had clearly outpaced the ability of society to control them.’” But their research finds: “There is no denying the existence of environmental problems, but the present data show that they produced no striking increase in cancer mortality.”<sup>9</sup>

To get a better idea about specific cancer trends, one must consider how cancer rates are reported. Age-adjusted cancer data offer a clearer understanding about risk and actual trends than do non-age-adjusted data. Age adjusting involves controlling for the fact that the number of older people in a population may

be increasing or decreasing. Because cancer is a disease that occurs at older ages, the number of cancer cases will increase when a larger share of the population is older, though the risk per individual might be declining or remaining constant. Hence, when researchers adjust for such changes in the population, they get a better idea of whether cancer risks are increasing or declining. In addition, as a population grows larger, so does the number of cancers. So even if cancer risks to the individual are declining, absolute number of cancers for the population could be increasing. Hence, risk is better measured by counting the number of cancers per 100,000 individuals.

The NCI produces an annual report on cancer trends, published in the *Journal of the National Cancer Institute*, which offers some of the best analysis in the world. A special report in the *European Journal of Cancer* offers a similarly impressive analysis on cancers around the world, using data adjusted for age and population size.<sup>10</sup> Both sources offer valuable analysis and explanations of the data that—when absent—can facilitate attempts to mislead the public and policymakers about what the data reveal about cancer risks.

The *European Journal of Cancer* article notes that rates for cancer are increasing overall because of various circumstances around the world that are not easily lumped into a single category. None of these circumstances include exposure to trace levels of chemicals. Yet in some places, both mortality and incidence are declining, particularly in industrial nations where chemicals are used widely.<sup>11</sup> Likewise, the NCI reports:

7. Ibid., 22.

8. Brad Rodu and Philip Cole, “The Fifty-Year Decline of Cancer in America,” *Journal of Clinical Oncology* 19, no. 1 (2001): 240–41.

9. Ibid., 239–41.

10. D. M. Parkin, F. I. Bray, and S. S. Devesa, “Cancer Burden in the Year 2000: The Global Picture,” *European Journal of Cancer* 37, supplement 8 (2001): S4–66.

11. Ibid.

Cancer incidence for all sites combined decreased from 1992 through 1998 among all persons in the United States, primarily because of a decline of 2.9 percent per year in white males and 3.1 percent per year in black males. Among females, cancer incidence rates increased 0.3 percent per year. Overall, cancer death rates declined 1.1 percent per year.<sup>12</sup>

The NCI report shows that the incidence has increased among women, largely as a result of increased rates of smoking among women.

### Breast Cancer Trends

In recent years, breast cancer among women has risen, particularly in developed nations, but chemicals have not been found to be the likely cause. The NCI notes that breast cancer rates appear to be higher in part because better screening and increased detection are finding more cancers.<sup>13</sup> The percentage of women age 40 to 49 who obtained mammograms doubled between 1987 and 1998 from 32 percent to 63 percent. The percentage of women age 50 to 64 who received a mammogram increased from 31 percent to 73 percent in that same time

period.<sup>14</sup> One finds similar trends in other developed nations. In the United Kingdom, researchers note, “the most notable change [in breast cancer incidence rates] has been acceleration in the slow increases noted in the 1970s following the introduction of screening in approximately 1988.”<sup>15</sup> Others report similar findings in Denmark, the Netherlands, and Norway.<sup>16</sup>

However, screening doesn’t explain all incidence increases in breast cancer. Both the NCI and the *European Journal of Cancer* report other factors. Risk factors associated with breast cancer are related to lifestyle choices available to women in industrial societies—which explains why breast cancer is more common in Western nations. These include dietary choices such as consumption of too much fat, alcohol, or both; obesity among children (which increases risks as it can affect hormone levels and produce early menstruation); weight gain after menopause (which may increase risks by 2 percent per unit of body mass index); and weight gain after 18 years of age. Delaying or refraining from child-bearing can also affect hormone levels, thereby increasing breast cancer risks. And finally, the use of hormones for birth control and menopause treatment may slightly increase risks.<sup>17</sup>

As developing nations experience economic growth, we should expect breast cancer rates to increase with the introduction of risk factors associated with the lifestyles in developed

12. Holly L. Howe, Phyllis A. Wingo, Michael J. Thun, Lynn A. G. Ries, Harry M. Rosenberg, Ellen G. Feigal, and Brenda K. Edwards, “Annual Report to the Nation on the Status of Cancer (1973 through 1998), Featuring Cancers with Recent Increasing Trends,” *Journal of the National Cancer Institute* 93, no. 11 (2001): 824–42.

13. Ibid. See also, Hannah K. Weir, Michael J. Thun, Benjamin F. Hankey, Lynn A. G. Ries, Holly L. Howe, Phyllis A. Wingo, Ahmedin Jernal, Elizabeth Ward, Robert N. Anderson, and Brenda K. Edwards. “Annual Report to the Nation on the Status of Cancer, 1975–2000, Featuring the Uses of Surveillance Data for Cancer Prevention and Control,” *Journal of the National Cancer Institute* 95, no. 17 (2003): 1276–99.

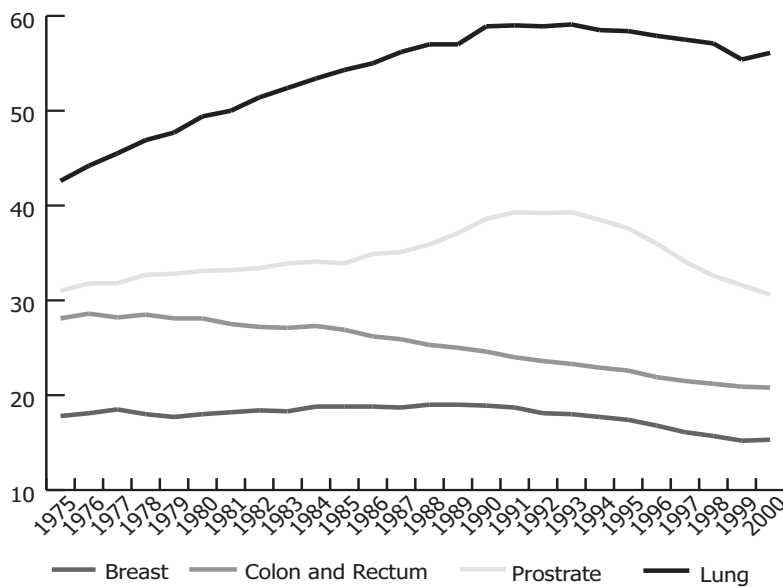
14. U.S. Centers for Disease Control and Prevention, *CDC Fact Book 2000/2001* (Washington, DC: CDC, 2000), 46, <http://www.csctulsa.org/images/CDC%20Fact%20Book%202000%202001.pdf>.

15. Ibid.

16. Parkin, Bray, and Devesa, “Cancer Burden in the Year 2000.”

17. Howe et al., “Annual Report to the Nation on the Status of Cancer,” and Parkin, “Cancer Burden in the Year 2000.”

**Figure 2. Deaths by Type of Cancer, Age-Adjusted Cancers per 100,000 Individuals**



Source: National Cancer Institute.

nations. Such increases should not be confused with—or exploited to claim—the existence of a chemically caused cancer epidemic.

In addition, studies assessing alleged chemically caused breast cancers are not finding much of a link. U.S. researchers produced one of the largest studies among women in Long Island, New York, which was unable to establish a link between the chemicals most often cited as a potential cause of breast cancer—DDT (dichlorodiphenyl-trichloroethane) and other pesticides as well as PCBs (polychlorinated biphenyls)—and an elevated level of cancers in that area.<sup>18</sup>

18. Marilie D. Gammon, Regina M. Santella, Alfred I. Neugut, Sybil M. Eng, Susan L. Teitelbaum, Andrea Paykin, Bruce Levin, Mary Beth Terry, Tie Lan Young, Lian Wen Wang, Qiao Wang, Julie A. Britton, Mary S. Wolff, Steven D. Stellman, Maureen Hatch, Geoffrey C. Kabat, Ruby Senie, Gail Garbowski, Carla Maffeo, Pat Montalvan, Gertrud Berkowitz, Margaret Kemeny, Marc Citron, Freya Schnabel, Allan Schuss, Steven Hajdu, and Vincent Vinceguerra, “Environmental Toxins and Breast

Not emphasized by anti-chemical activists is the fact that modern medicine—and its many chemicals—are *saving* women from breast cancer. Because of improvements in treatment, death rates in the United States from breast cancer decreased from 1989 through 1995 by 1.6 percent for all races combined (see figure 2). Between 1995 and 1998, the death rate declined even faster at a rate of 3.4 percent.<sup>19</sup> In Europe, likelihood of survival after one year is 91 percent. Likelihood of survival after five years is 65 percent. Survival in the United Kingdom increased nearly 3 percent a year between 1978 and 1985.<sup>20</sup> Other European nations appear to be at an earlier stage in reducing rates, but there seems to be declining mortality among younger generations.<sup>21</sup>

### Prostate Cancer Trends

Prostate cancer increases have also been attributed by some to the use of chemicals. Prostate cancer has in fact risen in recent years in both the United States and Europe, but it has since leveled off on both sides of the Atlantic. Better technology for detecting prostate cancer has increased rates because it has improved detection. The NCI reports that prostate cancer incidence increased

Cancer on Long Island: I. Polycyclic Aromatic Hydrocarbon DNA Adducts,” *Cancer Epidemiology Biomarkers Prevention* 11, no. 8 (2002): 677–85.

19. Howe et al., “Annual Report to the Nation on the Status of Cancer.”

20. Parkin et al., “Cancer Burden in the Year 2000.”

21. *Ibid.*



after 1973 at a rate of 2.9 percent annually and then at a steeper rate when improved screening methods identified more cases. Nonetheless, prostate cancer cases began to decline by 11 percent annually between 1992 and 1995, and they have since leveled off. Mortality follows a similar trend, declining between 1995 and 1998 at a rate of 4.7 percent for white males and 3 percent for African American males. European cancer researchers reported that such rate increases and recently reduced mortality are “consistent with a favorable role of improved diagnosis, but mainly of advancements of therapy.”<sup>22</sup>

However, better detection probably doesn’t explain all of the increase in prostate cancer. Environmental factors may be causing some additional cancers, but exposure to trace levels of chemicals is not among the likely or documented causes. Instead, dietary factors, such as increased intake of animal fats or increased infections related to more sexual promiscuity, are more likely sources. Occupational exposure to pesticides (which is far higher than public exposure) is noted as a possibility by the NCI, but it is not a strong probability as “it is unclear if this finding is the result of occupational factors or [of] concomitant lifestyle factors.”<sup>23</sup> Occupational exposures to other chemicals show only “weak associations” and are far from conclusive.<sup>24</sup>

### Brain Cancer Trends

Anti-chemical activists have also claimed that chemical use is somehow linked to a sup-

posedly alarming increase of brain and other cancers among children. The Center for Children’s Health and the Environment has run an advertising campaign against chemicals. In one advertisement, it proclaims, “More children are getting brain cancer. Why? Toxic chemicals appear to be linked to rising cancer rates.”<sup>25</sup>

But policymakers should not fall for such claims. First, because childhood cancer is rare, an increase of even a relatively small number of cancer cases will appear more substantial when expressed on a percentage basis. Moreover, according to the NCI, the trends related to childhood cancer are anything but alarming in the United States. Cancer incidence among children is stable. And the NCI attributes brain cancer increases to improved detection technology. It concluded:

There was no substantial change in incidence for major pediatric cancers, and rates have remained relatively stable since the mid-1980s. The modest increases that were observed for brain/CNS [central nervous system] cancers, leukemia, and infant neuroblastoma [cancer of the sympathetic nervous system] were confined to the mid-1980s. The patterns suggest that the increases likely reflected diagnostic improvements or reporting changes. Dramatic declines in childhood cancer mortality represent treatment-related improvement in survival ... [and] recent media reports suggest that incidence is increasing and that the increases may be due to environmental exposures. However, these reports have not generally taken into consideration the timing of changes in childhood cancer rates,

22. Fabio Levi, Franca Lucchini, Eva Negri, Peter Boyle, and Carlo La Vecchia, “Leveling of Prostate Cancer Mortality in Western Europe,” *Prostate* 60, no.1 (2004): 46–52.

23. Richard B. Hayes, “Prostate,” in *Cancer Rates and Risks* (Washington, DC: National Cancer Institute), [http://rex.nci.nih.gov/NCI\\_Pub\\_Interface/raterisk/risks185.html](http://rex.nci.nih.gov/NCI_Pub_Interface/raterisk/risks185.html).

24. Ibid.

25. The advertisement is available online: <http://www.childenvironment.org/images/ad2big.pdf>.

or important development in the diagnosis classifications of childhood cancers.<sup>26</sup>

European studies also report that better detection technology and improvements in the cancer registries played important roles in the increase of reported childhood brain cancers.<sup>27</sup>

Fortunately, researchers report that childhood mortality associated with cancer in general is declining dramatically in developed nations. The NCI reports “dramatic declines” in childhood cancer mortality overall.<sup>28</sup> According to one report, mortality from childhood cancers has declined 50 percent in Western Europe and is also declining in Eastern Europe, but at a slower rate.<sup>29</sup>

## Conclusion

Despite many claims to the contrary, cancer trends in developed nations—measured in both incidence and mortality—do not indicate that human-made chemicals play much of a role in increasing cancer rates. In fact, cancer incidence trends reveal areas of great improvement and opportunities to make further improvements by encouraging people to make lifestyle changes. Mortality trends indicate important public health achievements, many of which are made possible by the use of modern technology and chemicals.

---

26. Martha S. Linet, Lynn A. G. Ries, Malcolm A. Smith, Robert E. Tarone, and Susan S. Devesa, “Cancer Surveillance Series: Recent Trends in Childhood Cancer Incidence and Mortality in the United States,” *Journal of the National Cancer Institute* 91, no. 12 (1999): 1051–58.

27. For example, see Ann Charlotte Dreifaldt, Michael Carlberg, and Lennart Hardell, “Increasing Incidence Rates of Childhood Malignant Diseases in Sweden during the Period 1960–1998,” *European Journal of Cancer* 40, no. 9 (2004): 1351–60; Ardine M. J. Reedijk, Maryska L. G. Janssen-Heijnen, Marieke W. J. Louwman, Yvonne Snepvangers, Wim J. D. Hofhuis, Jan Willem W. Coebergh, “Increasing Incidence and Improved Survival of Cancer in Children and Young Adults in Southern Netherlands, 1973–1999,” *European Journal of Cancer* 41, no. 5 (2005): 760–69; and Cancer Research UK, “Trends in Childhood Cancer Incidence and Mortality Rates Over Time,” last updated on September 2005, <http://info.cancerresearchuk.org/cancerstats/childhoodcancer/trends>.

28. Linet et al., “Cancer Surveillance Series,” 1051.

29. F. Levi, C. La Vecchia, E. Negri, and F. Lucchini, “Childhood Cancer Mortality in Europe, 1955–1995,” *European Journal of Cancer* 37, no. 6 (2001): 785–809.





# The True Causes of Cancer

By Angela Logomasini

Environmental activists have long claimed that man-made chemicals are causing rampant cancer rates that could be addressed only by government regulation. Accordingly, lawmakers have passed laws directing government agencies to study environmental causes of cancer, estimate the number of lives allegedly lost, and devise regulations to reduce death rates. However, lawmakers should be aware of some key problems with how this system has worked in practice. First, the claim that chemical pollution is a major cancer cause is wrong. Second, agencies have relied on faulty scientific methods that grossly overestimate potential cancer deaths from chemicals and potential lives saved by regulation. As a result, regulatory policy tends to divert billions of dollars from other life-saving uses or from other efforts to

improve quality of life to pay for unproductive regulations.

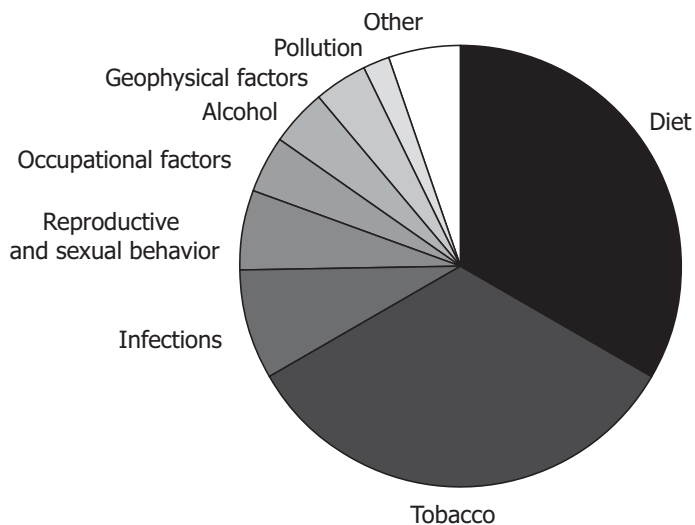
## True Causes of Cancer

In their landmark 1981 study of the issue, Richard Doll and Richard Peto set out to determine the causes of preventable cancer in the United States.<sup>1</sup> According to Doll and Peto, pollution accounts for 2 percent of all cancer cases, and geophysical factors account for another 3 percent (see figure 1). They do note that 80 percent to 90 percent of cancers are caused by “environmental factors.” Although activists

---

1. Richard Doll and Richard Peto, “The Causes of Cancer: Quantitative Estimates of Avoidable Risks of Cancer in the United States Today,” *Journal of the National Cancer Institute* 66, no. 6 (1981): 1191–308.

**Figure 1. Causes of U.S. Cancer-Related Deaths**



Source: Doll and Peto, “The Causes of Cancer.”

often trump this figure as evidence that industrial society is causing cancer, Doll and Peto explained that environmental factors are simply factors other than genetics—not pollution alone. Environmental factors include smoking, diet, occupational exposure to chemicals, and geophysical factors. Geophysical factors include naturally occurring radiation, man-made radiation, medical drugs and medical radiation, and pollution. Tobacco use accounts for about 30 percent of all annual cancer deaths. Dietary choices account for 35 percent of annual cancer deaths.

Bruce Ames and Lois Swirsky Gold have come to similar conclusions, noting that smoking causes about a third of all cancers.<sup>2</sup> They

2. Bruce N. Ames and Lois Swirsky Gold, “Environmental Pollution, Pesticides, and the Prevention of Cancer: Misconceptions,” *FASEB Journal* 11, no. 13 (1997): 1041–52, <http://socrates.berkeley.edu/mutagen//AmesGold.pdf>.

underline the importance of diet by pointing out that the quarter of the population eating the fewest fruits and vegetables had double the cancer incidence than those eating the most. Finally, they conclude: “There is no convincing evidence that synthetic chemical pollutants are important as a cause of human cancer.”<sup>3</sup>

### The Dose Equals the Poison

Before government officials, both domestic and international, advocate or issue regulations, they need to justify the regulations on the basis of public health benefits. Accordingly, regulators and scientists at international organizations have developed various tests to assess risks. Although

those tests have a tremendous effect on which chemicals are chosen to be regulated and to what degree, there are serious problems with the methodologies and the claims that researchers make about their findings.

During much of history, scientists contended, “the dose makes the poison.” Indeed, at small levels, substances can be helpful or benign, but at high levels, they can sicken or kill. But in the later part of the 20th century, regulators, many in the environmental community, and a few scientists abandoned that idea. They contended that many chemicals can have adverse effects at any level and that risks increase linearly with any dose above zero. On the basis of those assumptions, regulatory policy around the world has focused on ways to regulate chemicals to reduce exposure to as close to zero as possible. But many scientists question whether such linearity

3. *Ibid.*, 1041.

even exists. They contend that the old way of thinking was correct: many chemicals are safe under a given threshold or exposure level, with each chemical having its own threshold:

- Scientist Philip Abelson notes that the “error in this approach is becoming increasingly apparent through experiments that produce data that do not fit the linear model.” Indeed, he argues, “Pharmacologists have long stated that it is the dose that makes the poison.”<sup>4</sup>
- Others note that the low-dose linearity model ignores the fact that the human body may create defense mechanisms against chemicals when we are exposed to them at low doses, which means low-level exposures might help us fight off cancer and other illnesses. Scientist Jay Lehr notes that studies have found cases in which people exposed to low-levels of radiation actually experienced less incidence of leukemia than the general population, whereas highly exposed individuals experienced elevated rates of leukemia.<sup>5</sup>
- Another study found that increasing levels of low-level radon exposure are linked to *decreasing* cancer rates.<sup>6</sup>
- Increasingly, the idea that all chemicals are unsafe at any level is losing credibility.<sup>7</sup> In

4. Philip Abelson, “Radon Today: The Role of Flimflam in Public Policy,” *Regulation* 14, no. 4 (1991): 97.

5. Jay Lehr, “Good News about Radon: The Linear Nonthreshold Model Is Wrong,” Environmental Education Enterprises, Ostrander, OH, May 1996, <http://www.junkscience.com/news/lehr.html>.

6. Bernard L. Cohen, “Test of the Linear–No Threshold Theory of Radiation Carcinogenesis for Inhaled Radon Decay Products,” *Health Physics* 68, no. 2 (1995): 157–74.

7. For a discussion of thresholds, see James D. Wilson, “Thresholds for Carcinogens: A Review of the Relevant Science and Its Implications for Regulatory Policy,” in

fact, the U.S. Environmental Protection Agency (EPA) proposed a rule that would have applied threshold assumptions in 1998. When the EPA reversed its position, a federal court vacated the rule because the EPA did not use the best peer-reviewed science as required by the Safe Drinking Water Act.<sup>8</sup>

### Mice, Men, and Carcinogens

When environmentalists and government agencies label chemicals as carcinogens, they often point to rodent tests. However, the tests have been proven seriously flawed. They entail administering massive amounts of chemicals to rodents bred to be highly susceptible to cancer. Then researchers extrapolate the possible effects of such chemicals on humans, who may be exposed to small amounts of the same chemical over their lifetimes.

First, we should ask, “Are the impacts on rodents relevant to humans?” Doll and Peto note that some chemicals found to be carcinogenic in humans have not produced cancerous tumors in rodent experiments. In fact, for many years, cigarette smoke failed to produce malignant tumors in laboratory animals even though tobacco is perhaps the leading cause of cancer in the United States. These discordant effects of chemicals in animals and humans underline the difficulty of relying on animal results to estimate human risks.<sup>9</sup>

Second, researchers question whether the extremely high doses administered in the lab

*What Risk?* ed. Roger Bate (Boston: Butterworth-Heinemann, 1997), 3–36.

8. See the policy brief titled “Safe Drinking Water Overview.”

9. Doll and Peto, “The Causes of Cancer,” 1192–308.

are relevant even to low-level exposures in the real world. Ames and Gold demonstrate why we need not be concerned about low-level exposure to “rodent carcinogens.”<sup>10</sup> Ames and Gold found that such chemicals pose no more risk than that posed by the many natural, unregulated substances that are common and accepted parts of a healthy diet:

- Although 212 of 350 of the synthetic chemicals examined by various agencies were found to be carcinogenic at the massive doses given to rodents, 37 out of 77 of the natural substances tested were also found carcinogenic in rodent studies employing the same methodology.<sup>11</sup>
- We safely consume thousands of natural chemicals every day at much higher levels than chemicals that have been labeled carcinogens because they caused cancer when administered in massive doses to rodents. For example, humans consume thousands of natural pesticides, which plants naturally produce as a biological defense mechanism.<sup>12</sup>
- Ames and Gold estimate that 99.99 percent (by weight) of the pesticides humans consume are natural pesticides.<sup>13</sup>
- The average intake of natural carcinogens found in plant foods is about 1,500 milligrams per person each day, while the average intake of human-made pesticides is 0.09 milligrams per day.<sup>14</sup>
- The commonness of exposures to chemicals is demonstrated by the identification

of 826 volatile chemicals in roasted coffee. Although only 21 of those chemicals have been put through laboratory risk assessments, all but 5 were found to be carcinogenic in laboratory rat tests. A cup of coffee contains at least 10 milligrams of “carcinogenic” chemicals.<sup>15</sup>

- Carcinogens that cause cancer in rodent studies exist in apples, bananas, carrots, celery, coffee, lettuce, orange juice, peas, potatoes, and tomatoes at levels thousands of times greater than exposures found in drinking water.<sup>16</sup>

There is neither convincing evidence nor solid biological theory to support the contention that low-level, environmental exposure to natural or human-made chemicals is a significant cause of human cancers. Regulation of environmental exposures to chemicals can be expected to have no discernible effect on human health. The open question is how much money and effort are to be spent on those efforts and how many lives will be lost as regulation impedes life-saving technology.

### What about Cancer Clusters?

In recent years, Hollywood produced two major motion pictures—*A Civil Action* and *Erin Brockovich*—on the alleged effects of chemicals on various communities. In both cases, tort lawyers claimed that drinking water contaminated by industrial facilities caused health-related problems in nearby areas.

10. Bruce N. Ames and Lois Swirsky Gold, “Too Many Rodent Carcinogens: Mitogenesis Increases Mutagenesis,” *Science* 249, no. 4976 (August 31, 1990): 1487.

11. *Ibid.*

12. *Ibid.*

13. *Ibid.*

14. *Ibid.*

15. *Ibid.*

16. See Appendix A of National Research Council, Committee on Comparative Toxicology of Naturally Occurring Carcinogens, *Carcinogens and Anticarcinogens in the Human Diet: A Comparison of Naturally Occurring and Synthetic Substances* (Washington DC: National Academies Press, 1996).

Such cases raise public awareness about *cancer clusters*—geographic areas where cancer rates exceed (or appear to exceed) that of the general population. But despite the ability of trial lawyers to win such cases, it is nearly impossible to pin down the causes of such clusters. In 1990, the Centers for Disease Control and Prevention reported on 22 years of studies that covered clusters in 29 states and 5 foreign countries. They could not establish a clear cause for any cluster.<sup>17</sup>

Part of the problem is that many clusters occur by mere chance. Raymond R. Neutra of the California Department of Health Services finds that we can expect 4,930 such random cancer clusters to exist in any given decade in United States.<sup>18</sup> Cancer cluster surveillance systems also mistakenly focus on low-level exposure to chemicals in the environment when such risks may be impossible to detect.

### How Many Cancers Can EPA Regulate Away?

Some of the EPA's proposed regulations promise to save thousands from dying of cancer. When the promises of all of the hundreds of proposed regulations are added together, the lives claimed to be saved likely would total in the millions. But compared with the actual number of deaths and likely causes, do those claims hold water?

Scientist Michael Gough demonstrates that we should consider such EPA claims as sus-

17. Glyn G. Caldwell, "Twenty-Two Years of Cancer Cluster Investigations at the Centers for Disease Control," *American Journal of Epidemiology* 132, suppl. 1 (1999): S43–47.

18. Lori M. Kase, "Why Community Cancer Clusters Are Often Ignored," *Scientific American* 275, no. 3 (1996): 85–86.

pect.<sup>19</sup> In 1990, Gough analyzed the findings of the landmark Doll and Peto study on the causes of cancer along with cancer risks estimated in EPA's report *Unfinished Business*.<sup>20</sup> Gough came to conclusions similar to those of Doll and Peto. He noted that between 2 percent and 3 percent of all cancers could be associated with environmental pollution. Determining such numbers helps us understand exactly what the EPA can expect to accomplish when regulating pollutants for the purposes of reducing cancer. Gough notes that the EPA action could address only a very small percentage of cancers: If the EPA risk assessment techniques were accurate and all identified carcinogens amenable to EPA regulations were completely controlled about 6,400 cancer deaths annually (about 1.3 percent of the annual total of 485,000 cancer deaths when Gough did the analysis) would be prevented. When cancer risks are estimated using a method like that employed by the Food and Drug Administration, the number of cancers that can be regulated is smaller—about 1,400 (about 0.25 percent).<sup>21</sup>

### Key Experts

Michael Gough, mgough@bellatlantic.net  
 Angela Logomasini, Director of Risk and Environmental Policy, Competitive Enterprise Institute, alogomasini@cei.org

19. Michael Gough, "How Much Cancer Can EPA Regulate Away?" *Risk Analysis* 10, no. 1 (1990): 1–6. See also Michael Gough, "Estimating Cancer Mortality," *Environmental Science and Technology* 23, no. 8, (1989): 925–30.

20. EPA, *Unfinished Business: A Comparative Assessment of Environmental Problems—Overview Report* (Washington, DC: EPA, 1987).

21. Gough, "How Much Cancer Can EPA Regulate Away?" See also Gough, "Estimating Cancer Mortality."

### Recommended Reading

- American Council on Science and Health. 1995. *Update: Is There a Cancer Epidemic in the United States?* New York: American Council on Science and Health.
- Ames, Bruce N., and Lois Swirsky Gold. 1997. "Environmental Pollution, Pesticides, and Prevention of Cancer: Misconceptions." *FASEB Journal* 11, no. 13: 1041–52. <http://socrates.berkeley.edu/mutagen//AmesGold.pdf>.
- Doll, Richard, and Richard Peto. 1981. "The Causes and Prevention of Cancer: Quantitative Estimate of Avoidable Risks of Cancer in the United States Today." *Journal of the National Cancer Institute* 66, no. 6, 1191–308.
- Gough, Michael. 1990. "How Much Cancer Can EPA Regulate Away?" *Risk Analysis* 10, no. 1: 1–6.
- . 1999. "Cancer Testing." *Technology* 6: 23–42.



# Endocrine Disrupters

By Angela Logomasini

Having largely lost the intellectual debate on cancer (although their spurious claims still adversely affect policy), anti-chemical activists have decided to add more tools to their arsenal. Among their most powerful tools is the claim that chemicals are causing widespread problems by disrupting the endocrine systems of humans and wildlife. Accordingly, activists argue that we should ban or heavily regulate various chemicals, particularly pesticide products, on the basis of assertions that such chemicals may have an endocrine-related effect.

Endocrine systems in both humans and animals consist of a series of glands that secrete hormones and send messages throughout the body. Working in conjunction with the nervous system, these messages trigger various responses, such as growth, maturation of reproductive

systems, and contractions during pregnancy. Foreign chemicals can disrupt proper functioning of the endocrine system and lead to health problems. Environmentalists refer to such external chemicals as *endocrine disrupters*, but others use more neutral terms because not all effects are negative or substantial. The American Council on Science and Health (ACSH) calls them *endocrine modulators*, which is the term used in the subsequent discussion.<sup>1</sup> The National Research Council calls them “hormonally active agents.”<sup>2</sup>

---

1. ACSH, *Endocrine Disrupters: A Scientific Perspective* (New York: ACSH, 1999), 9.

2. National Research Council, *Hormonally Active Agents in the Environment* (Washington, DC: National Academies Press, 1999).

The endocrine disrupter alarm tactic focuses primarily on synthetic chemicals. Allegedly, because we have used and continue to use man-made chemicals—particularly a class of chemicals called *organochlorines*, such as DDT (dichloro-diphenyl-trichloroethane) and PCBs (polychlorinated biphenyls)—the public and wildlife are widely suffering with everything from infertility and cancer to neurological disorders and developmental problems. But before rushing to ban and regulate all man-made chemicals, policymakers should review some facts.

To help place the issue in perspective, this section gives an overview of the following key points:

- Scientific studies have not found any definitive adverse impacts to humans related to endocrine modulators in the environment.
- There are other, more significant sources of endocrine modulators than industrial chemicals, indicating that the risks of industrial chemicals are tiny in comparison.
- Effects on wildlife from industrial chemicals appear to have occurred, but they have been isolated events rather than widespread phenomena, and they have been related to relatively high-level exposures.
- Cases in which wildlife may have been affected have declined considerably because the level of industrial endocrine modulators in the environment has declined, thereby reducing problems for wildlife.

### Questionable Relevance of DES

Concerns about endocrine disrupters arose in part after women who took the drug diethylstilbestrol (DES) experienced higher incidences of reproductive tract problems. Between 1940 and 1970, many women took DES to prevent

miscarriages. The relevance of these cases to low-level environmental exposures or to other potential endocrine modulators is highly tenuous, as many researchers have pointed out:

- Toxicologist Stephen Safe notes: “DES is not only a potent estrogen, but it was administered at relatively high doses.... In contrast, synthetic environmental endocrine-disrupting compounds tend to be weakly active.”<sup>3</sup>
- A panel of scientists reported to the American Council on Science and Health: “Aside for exposure itself, perhaps the two most important factors are potency and dose.”<sup>4</sup> The ACSH report notes that putting environmental exposures to synthetic chemicals in perspective requires that we compare the potency of such chemicals to that of the man-made estrogen, 17 $\beta$ -estradiol. Scientists have found the synthetic chemicals DDT and PCBs (the most studied chemicals claimed to be endocrine disruptors) to be up to 1 million times less potent than 17 $\beta$ -estradiol.<sup>5</sup>
- The National Research Council reported that it lacks data showing that “hormonally active” compounds cause any adverse impacts.<sup>6</sup>

### Declining Sperm Counts More Myth Than Reality

Yet more consternation resulted when Danish researchers conducted a statistical analysis

3. Stephen Safe, “Endocrine Disrupters: New Toxic Menace?” in *Earth Report 2000* (New York: McGraw-Hill, 2000), 192.

4. ACSH, *Endocrine Disrupters: A Scientific Perspective*, 11.

5. *Ibid.*, 14–15.

6. National Research Council, *Hormonally Active Agents in the Environment*.

of 61 papers that included data on male sperm counts.<sup>7</sup> They reported a “significant decline in mean sperm count” between 1940 and 1990.<sup>8</sup> But they noted that whether environmental estrogens were involved remained to be determined.

Adding fuel to the fire, researchers Richard Sharpe and Niels E. Skakkebaek made stronger suggestions that endocrine modulators play a role in alleged sperm count declines. In one article, the authors asserted that “a strong mechanistic case can be made” to explain how endocrine modulators could affect male reproductive functions.<sup>9</sup> Although merely a series of speculations, this article and subsequent statements by the authors have sparked continued mainstream press coverage and have become key sources for those who claim that man-made chemicals are reducing sperm counts. But problems with these papers abound:

- First, the 1992 Danish meta-analysis, which is the basis of the declining sperm count claims, garnered criticism for numerous flaws, including the authors’ selection of data that left out low sperm counts in the early dates, simply creating the illusion that sperm counts in the later dates were lower.<sup>10</sup>

7. This analysis and others that combine data from several studies are referred to as *meta-analyses*.

8. Elisabeth Carlsen, Aleksander Giwercman, Niels Keiding, and Niels E. Skakkebaek, “Evidence for Decreasing Quality of Semen during the Past 50 Years,” *British Medical Journal* 305, no. 6854 (1992): 609.

9. Richard M. Sharpe and Niels E. Skakkebaek, “Are Oestrogens Involved in Falling Sperm Counts and Disorders of the Male Reproductive Tract?” *Lancet* 341, no. 8857 (1993): 1392.

10. Peter Bromwich, Jack Cohen, Ian Stewart, and Andrew Walker, “Decline in Sperm Counts: An Artefact of Changed Reference Range of ‘Normal’?” *British Medical Journal* 309, no. 6946 (1992): 19.

- Others suggested that problems with data emerged because the authors included studies with samples that were far too small and that “would not normally be admissible as evidence.”<sup>11</sup>
- Claims drawn from the 61 study meta-analysis grew even more suspect when other researchers conducted their own analysis of a subset of those studies. This analysis considered the 48 studies published since 1970, leaving out some of the earlier studies because the data were too few to produce a useful analysis. This approach found that male sperm counts have actually increased between 1970 and 1990—contradicting claims that sperm counts were decreasing in recent decades.<sup>12</sup>
- To complicate matters further, although some additional studies do suggest falling sperm counts,<sup>13</sup> other studies have undermined those findings by reporting no change or an increase in sperm counts.<sup>14</sup>

11. Stephen Farrow, “Falling Sperm Quality: Fact or Fiction?” *British Medical Journal* 309, no. 6946 (1994): 1.

12. Anna Brake and Walter Krause, “Decreasing Quality of Semen; Letter: Comment,” *British Medical Journal* 305, no. 6867 (1992): 1498, <http://www.pubmedcentral.nih.gov/pagerender.fcgi?artid=1884126&pageindex=1>.

13. Stuart Irvine, Elizabeth Cawood, David Richardson, Eileen MacDonald, and John Aitkin, “Evidence of Deteriorating Semen Quality in the United Kingdom: Birth Cohort Study in 577 Men in Scotland over 11 Years,” *British Medical Journal* 312, no. 7029 (1996): 467.

14. L. Bujan, A. Mansat, F. Fontonnier, and R. Mieusset, “Time Series Analysis of Sperm Concentration in Fertile Men in Toulouse, France, between 1977 and 1992,” *British Medical Journal* 312, no. 7029 (1996): 417. See also Geary W. Olsen, Charles E. Ross, Kenneth M. Bodner, Larry I. Lipshultz, and Jonathan M. Ramlow, “Have Sperm Counts Been Reduced 50 Percent in 50 Years? A Statistical Model Revisited,” *Fertility and Sterility* 63, no. 4 (1995): 887–93.

- Claims of declining sperm counts remain largely speculative. Even Sharpe, one of the strongest believers in potential sperm declines, notes “it is only a hypothesis.” He defends the hypothesis only on the idea that “all the facts fit” (despite many findings to the contrary).<sup>15</sup>

### Dubious Breast Cancer Claims

As in the prior case, concerns about breast cancer caused by endocrine modulators arose with the publication of one key study. This time, it was a 1993 study led by Mount Sinai Medical School Professor Mary Wolff that compared DDT levels in the body fat of 58 women diagnosed with breast cancer with 171 control subjects.<sup>16</sup> Although the sample was still small, the Wolff study was larger than prior studies, only one of which had more than 20 subjects. Wolff and her colleagues found higher levels of DDE (dichloro-diphenyl-dichloroethylene, the metabolite of DDT) in breast cancer victims, indicating an association between the two phenomena.

Although it included phrases of caution (“these findings are novel” and “require confirmation”), the study was full of other, more explosive rhetoric. In the conclusion, the authors make strong statements about their “findings” (which lump together all organochlorine substances even though the study focused only on

DDT metabolites) and make a plea for government action:

Our observations provide important new evidence related to low-level environmental contaminants with organochlorine residues to the risk of breast cancer in women. Given widespread dissemination of organochlorines in the environment, these findings have immediate and far-reaching implications for public health intervention worldwide.”<sup>17</sup>

As Stephen S. Sternberg, pathologist with Sloan-Kettering Cancer Center, noted, “With these statements, one can hardly consider that the investigators reported their conclusions cautiously.” The result was media hype about breast cancer risks. “The jury isn’t in, yet you would never know it from the media reports,”<sup>18</sup> said Sternberg. Further criticism of the study quickly appeared in the scientific literature:

- Regarding the key breast cancer study alleging endocrine risks, one group of researchers noted: “Their literature review excluded substantial conflicting evidence, their discussion of the Serum DDE and PCB measurements and the case-control analysis excluded important details, and their dose-response analysis, given their data used an inappropriate method. Also we do not believe that their data support their conclusion of a relationship between breast cancer and organochlorines as a class.”<sup>19</sup>

15. As quoted by Gail Vines, “Some of Our Sperm Are Missing: A Handful of Six Chemicals Are Suspected of Disrupting Male Sex Hormones, but Are These Oestrogens Really the Environmental Evil They Seem?” *New Scientist*, August 26, 1995, 23.

16. Mary S. Wolff, Paolo G. Toniolo, Eric W. Lee, Marilyn Rivera, and Neil Dubin, “Blood Levels of Organochlorine Residues and Risk of Breast Cancer,” *Journal of the National Cancer Institute* 85, no. 8 (1993): 648–52.

17. Ibid.

18. Stephen S. Sternberg, “DDT and Breast Cancer, Correspondence,” *Journal of the National Cancer Institute* 86 no. 14 (1994): 1094–96.

19. John F. Acquavella, Belinda K. Ireland, and Jonathan M. Ramlow, “Organochlorines and Breast Cancer, Cor-

- The National Research Council also noted the following problems with the breast cancer study: the size of the study was too small to provide much conclusive information, methodological problems could mean that the disease was causing higher levels of DDE rather than the other way around, and adjustments that the Wolff study made to account for alleged losses of DDE levels because of lactation may have been inappropriate (controlling for these variables substantially increased estimated DDE levels in cancer victims).<sup>20</sup>
- Ironically, Wolff, who remains an advocate of the view that organochlorines likely play a role in breast cancer and other diseases,<sup>21</sup> participated in other studies that failed to find associations.<sup>22</sup>
- The National Research Council concluded that the Wolff study and all the ones published before 1995 “do not support an association between DDT metabolites or PCBs and the risk of breast cancer.”<sup>23</sup>
- Subsequent studies further undermine cancer claims.<sup>24</sup> Key among those was a study

of 240 women with breast cancer and a control group of the same size, which could not find a link.<sup>25</sup>

- Another study of more highly exposed populations in Mexico, where DDT had been used for insect control, found no significant difference in DDE levels among control and breast cancer groups.<sup>26</sup>
- Accordingly, the National Research Council concluded the following about the studies conducted after 1995: “Individually, and as a group, these studies do not support an association between DDE and PCBs and cancer in humans.”<sup>27</sup>

### Nature’s Hormone Factory<sup>28</sup>

Ironically, the entire theory that industrialization is causing severe endocrine disruption falls apart when you consider exposures to naturally occurring endocrine modulators. Plants naturally produce endocrine modulators called *phytoestrogens*, to which we are exposed

responsiveness,” *Journal of the National Cancer Institute* 85, no. 22 (1993): 1872–75.

20. National Research Council, *Hormonally Active Agents in the Environment*, 248–49.

21. For example, see Mary S. Wolff and Ainsley Weston, “Breast Cancer Risk and Environmental Exposures,” *Environmental Health Perspectives* 105, suppl. no. 4 (1997): 891–96.

22. Nancy Krieger, Mary S. Wolff, Robert A. Hiatt, Marilyn Rivera, Joseph Vogelmann, and Norman Orentreich, “Breast Cancer and Serum Organochlorines: A Prospective Study among White, Black, and Asian Woman,” *Journal of the National Cancer Institute* 86, no. 8 (1994): 589–99.

23. National Research Council, *Hormonally Active Agents in the Environment*, 250.

24. For an overview of many key studies, see Stephen Safe, “Endocrine Disrupters and Human Health: Is There

a Problem? An Update,” *Environmental Health Perspectives* 108, no. 6 (2000): 487–93.

25. David J. Hunter, Susan E. Hankinson, Francine Laden, Graham A. Colditz, JoAnn E. Manson, Walter C. Willett, and Frank E. Speizer, “Plasma Organochlorine Levels and the Risk of Breast Cancer,” *New England Journal of Medicine* 337, no. 18 (1997): 1253–58.

26. Lizbeth López-Carrillo, Aaron Blair, Malaquías López-Cervantes, Mariano Cebrián, Celina Rueda, Raúl Reyes, Alejandro Mohar, and Jaime Bravo, “Dichlorodiphenyltrichloroethane Serum Levels and Breast Cancer Risk: A Case-Control Study from Mexico,” *Cancer Research* 57, no. 17 (1997): 3728–32.

27. National Research Council, *Hormonally Active Agents in the Environment*, 272.

28. This title is borrowed from Jonathan Tolman, *Nature’s Hormone Factory: Endocrine Disrupters in the Natural Environment* (Washington DC: Competitive Enterprise Institute, March 1996).



at levels that are thousands and sometimes millions of times higher than those of synthetic chemicals. Humans consume these chemicals every day without adverse effects, and some contend that these chemicals promote good health. Consider these facts:

- Hundreds of plants appear to contain endocrine modulators, and lab tests have discovered endocrine modulators in 43 foods in the human diet, including corn, garlic, pineapple, potatoes, and wheat.<sup>29</sup>
- Soy products, particularly soybean oil, are found in hundreds of products, many of which we safely consume on a regular basis.<sup>30</sup>
- Although we safely consume them, phytoestrogens, are 1,000 to 10,000 times more potent than synthetic estrogens. Because we consume far more phytoestrogens in our diet, the estrogenic effects of the total amount we consume are as much as 40 million times greater than those of the synthetic chemicals in our diets. Nevertheless, they are safe.<sup>31</sup>

In addition, the estrogen that our bodies create, 17b-estradiol, which is included in oral contraceptives, may be entering waterways by passing through sewage treatment facilities. The effects of this chemical on wildlife are not yet clear. However, recent studies in some British rivers showed that natural hormones (17b-estradiol and estrone) and a component of birth control pills (ethynylestradiol) were responsible

for estrogenized male fish.<sup>32</sup> Even though they may have a greater impact on wildlife because they are far more potent, natural hormones are not a large part of the debate related to environmental estrogens.

In fact, when the U.S. Environmental Protection Agency (EPA) set standards for its program to screen environmental estrogens (a program required under the Food Quality Protection Act), the committee refused to consider phytoestrogens and has delayed considering effects from contraceptives. Instead, it will screen and test only “pesticide chemicals, commercial chemicals, and environmental contaminants.”<sup>33</sup> When and if it considers the impacts of oral contraceptives as environmental contaminants, the EPA says its consideration will be limited because pharmaceutical regulation is a Food and Drug Administration concern.

As a result, the EPA’s program will focus on the smallest possible part of endocrine exposure and the lowest area of risk. It serves regulators’ interests to leave consideration of both naturally occurring estrogens as well as oral contraceptives out of the picture. If they did screen for them, the massive amounts would dwarf those of pesticides and other chemicals they regulate, demonstrating that low-level exposure to commercially related endocrine modulators is relatively insignificant—a fact that would undermine the EPA’s ability to regulate commercial products on the allegation that they are a significant source of endocrine disruption.

29. Tolman, *Nature’s Hormone Factory*, 4–5.

30. *Ibid.*, 5.

31. Tolman, *Nature’s Hormone Factory*, 8. Figures are derived from research of Stephen Safe, “Environmental and Dietary Estrogens and Human Health: Is There a Problem?” *Environmental Health Perspectives* 103, no. 4 (1995): 349.

32. C. Desbrow, E. J. Routledge, G. C. Brighty, J. P. Sumpter, and M. Waldock, “Identification of Estrogenic Chemicals in STW Effluent,” *Environmental Science and Technology* 32, no. 11 (1998): 1549–58.

33. EPA, Office of Science Coordination and Policy, *Endocrine Disruptor Screening Program: Report to Congress* (Washington, DC: EPA, August 2000) 6, <http://www.epa.gov/endo/pubs/reporttocongress0800.pdf>.

## Wildlife-Related Problems: Isolated to High-Level Exposures

Certain wildlife appears to have been affected by high exposures to certain man-made chemicals, leading to developmental and reproductive problems. In one study, alligators in Lake Apopka that were exposed to very high levels of sulfuric acid and pesticides from a nearby spill suffered from reduced hatching, small phallus size, and reduced life spans.<sup>34</sup> Other studies have found similar problems in the Great Lakes. However, one should look at these studies with caution before concluding that such problems are widespread or that man-made chemicals cause every endocrine-related problem. For example, many studies have claimed that pesticides are causing deformities in frogs in various places around the country, but other factors may come into play. One study revealed another possible cause: parasites.<sup>35</sup>

Also of note, phytoestrogens can have similar effects. Agricultural researchers and farmers have discovered some problems and have mitigated the effects of such chemicals to protect their livestock. For example, Competitive Enterprise Institute's Jonathan Tolman noted that the Australian Department of Agriculture dis-

covered in 1946 that natural endocrine modulators in clover had caused sheep sterility.<sup>36</sup>

Fortunately, cases of wildlife being affected by endocrine modulators are relatively isolated. Moreover, the amount of certain endocrine modulators—those that environmental activists hype the most—are becoming less concentrated in the environment. This is happening despite the fact that environmentalists have claimed these products were persistent, meaning they would not dissipate. The National Research Council reports that, while there are some exceptions, concentrations are in fact declining:

The concentrations of some regulated halogenated organic compounds have decreased since the 1970s. For many other chemicals, there are inadequate data upon which to evaluate trends. The most studied chemicals are PCBs and DDT and the production of these has been banned in the United States for the past 20 years, resulting in declines in environmental concentrations. Examples include progressive and substantial decline in PCBs and DDT found in eggs taken from bird colonies in the Canadian Atlantic region between 1972 and 1978 and decrease in PCBs and DDT in Bering Sea fish from 1982 to 1992.<sup>37</sup>

34. Louis J. Guillette Jr., Timothy S. Gross, Greg R. Masson, John M. Matter, H. Franklin Percival, and Allan R. Woodward, "Developmental Abnormalities of the Gonad and Abnormal Sex Hormone Concentrations in Juvenile Alligators from Contaminated and Control Lakes in Florida," *Environmental Health Perspectives* 102, no. 4 (1994): 680–88.

35. Pieter T. J. Johnson, Kevin B. Lunde, Euan G. Ritchie, and Alan E. Launer "The Effect of Trematode Infection on Amphibian Limb Development and Survivorship," *Science* 284, no. 5415 (1999): 802–4. For an overview of the issue, see Brian Doherty, "Amphibian Warfare," *Weekly Standard*, May 24, 1999, 16–18.

36. Tolman, *Nature's Hormone Factory*, 1.

37. National Research Council, *Hormonally Active Agents in the Environment*, 66–67.





# Methylmercury Science

Gregory Conko and Morgan Wildermuth

During the past few years, environmental activists, public health officials, and the media have become increasingly concerned about consumers' exposure to mercury, primarily methylmercury in fish. In response to exaggerated risk estimates, many consumers have been advised to reduce their fish consumption. However, the most reliable scientific analyses continue to show that eating at least two servings of fish each week produces health benefits that substantially outweigh any hypothesized risk—even for young children and pregnant mothers.

The advisory warnings that spawned this unhealthy trend were not created on a scientific or nutritional basis. Rather, they were created for political reasons. Environmental activists have buoyed the fish scare in an attempt to increase regulation of mercury emissions from electric

power plants. The theory is that methylmercury in fish is unhealthy for pregnant women and children and that mercury emissions must therefore be significantly reduced.

A substantial body of evidence indicates, however, that (a) the amount of mercury in the American diet is so low that it has little or no health effect on even at-risk populations, and (b) even sizable reductions in mercury emissions would have no appreciable effect on American exposure to mercury. Furthermore, the cost of complying with new power plant emissions regulations is estimated to have a large human impact.

## **Mercury Exposure and Health Effects**

Very large doses of mercury are known to have substantial adverse health effects, includ-

ing impacts on neurodevelopment in both adults and children.<sup>1</sup> Effects on developing fetuses are of special concern, because mercury in the diet of pregnant women can affect the hearing, intelligence, and other cognitive functions of those children. However, all that we currently know about the health effects of methylmercury exposure is derived from (a) the study of mass poisonings in Iraq and Japan, (b) epidemiological studies conducted with populations that are different from Americans in important ways, and (c) experimental studies on lab animals. Each of these sources suffers from shortcomings, but the existing science suggests that methylmercury exposure at the very small current dietary levels does not pose a genuine health or developmental risk.

The dangerous effects of methylmercury exposure were first highlighted when, from the 1930s to the 1960s, people living around Minamata Bay, Japan, ate fish heavily contaminated with mercury wastes discharged from a plastics factory.<sup>2</sup> Hundreds died, and thousands more were left with varying degrees of neurological damage. The precise level of mercury exposure was never accurately calculated, but it is generally believed to be far higher—perhaps several hundreds of times higher—than current U.S. dietary exposure from fish. A similarly tragic case, resulting from mercury-contaminated grain in Iraq, occurred in the 1970s—again, however, with mercury exposure thousands of times greater than seen today with normal dietary fish consumption.<sup>3</sup> Because the exact dos-

age is important in determining whether exposure to a substance will be harmful, these mass poisoning scenarios have little or no relevance for determining whether fish consumption, under normal circumstances, poses any legitimate health threat.

Researchers have instead turned to epidemiological studies of various fish-eating populations to determine whether typical dietary mercury exposure poses a real risk. Several different study populations have been examined, but the two largest and most extensive studies have considered populations in the Faroe Islands and the Seychelles Islands. Researchers conducting the Faroe Islands study claim to have found a link between small dosages of mercury and negative health impacts, whereas authors of the Seychelles study are convinced there is no such link.

### Faroe Islands

The Faroe Islands study examined 917 children, and the researchers reported an association between prenatal methylmercury exposure (as measured in maternal umbilical cord blood at birth) and subtle neuropsychological changes.<sup>4</sup> However, several important factors call this finding into question. Perhaps most important, the major source of methylmercury in the Faroe Islanders' diet was not fish, but pilot whale meat. However, whale meat is also known to contain very high levels of PCBs (polychlorinated biphenyls) and other synthetic chemicals, none of which were taken into consideration in the study. One of the authors, Philippe Grandjean, acknowledges that such high levels of

1. Mark Wheeler, "Mercury," *Environmental Health Perspectives* 104, no. 8 (1996): 826–30.

2. Judith E. Foulke, "Mercury in Fish: Cause for Concern?" *FDA Consumer* 28 (September 1994), <http://www.fda.gov/fdac/reprints/mercury.html>.

3. H. Rustam and T. Hamdi, "Methyl Mercury Poisoning in Iraq: A Neurological Study," *Brain* 97, no. 3 (1974): 499–510.

4. Nicolina Sorensen, Katsuyuki Murata, Esben Budtz-Jorgensen, Pal Weihe, and Philippe Grandjean "Prenatal Methylmercury Exposure as a Cardiovascular Risk Factor at Seven Years of Age," *Epidemiology* 10, no. 4 (1999): 370–75.

other chemicals makes accurate interpretation of the study's data very complicated.<sup>5</sup>

Some scientists also question the study's use of maternal cord blood as the indicator of mercury exposure, because blood mercury levels can vary dramatically from day to day and do not give an accurate picture of total exposure throughout a pregnancy. The World Health Organization, for example, indicates that mercury levels in the mother's hair are the most accurate reflection of fetal mercury exposure.<sup>6</sup> When hair methylmercury levels were used, however, no link was found between developmental delays and methylmercury exposure in the Faroe children.<sup>7</sup>

In addition, though 17 neuropsychological tests were conducted on the Faroe Islands children, the results of only 3 of the tests were statistically significant.<sup>8</sup> Of those three tests,

the results of only one test clearly indicated neurodevelopmental problems, while another showed a beneficial association with increased mercury exposure, and the third was indeterminate. Consequently, a number of scientists, including Kenneth Poirier and Michael Dourson, former co-chairmen of the U.S. Environmental Protection Agency (EPA) Reference Dose/Reference Concentration Work Group, have advised the EPA and the U.S. Food and Drug Administration (FDA) that the Faroe Islands study is not useful for determining a safe level of exposure to methylmercury.<sup>9</sup>

### Seychelles Islands

The most exhaustive study of methylmercury exposure has been an ongoing study begun in 1989 in the Seychelles, an island chain off the coast of eastern Africa. Seychelles residents generally eat fish 12 times a week, which is believed to be the highest per capita consumption of fish in the world.<sup>10</sup> The methylmercury exposures in the Seychelles children studied were 10 to 20 times that of their U.S. counterparts, yet not a single test showed any negative effects from the exposure to mercury in their diet.<sup>11</sup> The study authors concluded, "There is no evidence of neurodevelopmental risk from prenatal meth-

5. Food and Drug Administration, "Methylmercury," Transcript of the Center for Food Safety and Nutrition, Food Advisory Committee Methylmercury Meetings, Beltsville, MD, July 23–24, 2002, <http://www.fda.gov/OHRMS/DOCKETS/ac/02/transcripts/3872t2.htm>.

6. E. Cernichiari, R. Brewer, G. Myers et al., "Monitoring Methylmercury during Pregnancy: Maternal Hair Predicts Fetal Brain Exposure," *Neurotoxicology* 16, no. 4 (1995): 705–10. See also Gary Myers, "Statement of Dr. Gary Myers, Pediatric Neurologist and Professor, University of Rochester," Senate Committee on Environment and Public Works, Senate Hearing 108-359, *Climate History and the Science Underlying Fate, Transport, and Health Effects of Mercury Emissions*, 108th Congress (July 29, 2003), 299–308.

7. Philip W. Davidson, Gary J. Myers, Christopher Cox, Elsa Cernichiari, Thomas W. Clarkson, and Conrad Shamlaye, "Effects of Methylmercury Exposure on Neurodevelopment," *Journal of the American Medical Association* 281, no. 10 (1999): 897.

8. Center for Science and Public Policy, "Critical Comments on EPA's Proposed National Emission Standards for Hazardous Air Pollutants; and, in the Alternative, Proposed Standards of Performance for New and Existing Utility Steam Generating Units: Notice of Data Avail-

ability," Center for Science and Public Policy, Washington, DC, December 2004. <http://ff.org/centers/csspp/pdf/EPANODAComments-121804.pdf>.

9. Michael Dourson, Andrea Wullenweber, and Kenneth Poirier, "Uncertainties in the Reference Dose for Methylmercury," *Neurotoxicology* 22, no. 5 (2001): 677–89.

10. Gary J. Myers, Philip W. Davidson, Christopher Cox, Conrad F. Shamlaye, Donna Palumbo, Elsa Cernichiari, Jean Sloane-Reeves, Gregory E. Wilding, James Kost, Li-Shan Huang, and Thomas W. Clarkson, "Prenatal Methylmercury Exposure from Ocean Fish Consumption in the Seychelles Child Development Study," *Lancet* 361, no. 9370 (2003): 1686–92.

11. *Ibid.*

ylmercury exposure resulting solely from ocean fish consumption.”<sup>12</sup>

What perhaps makes the Seychelles study most relevant to Americans is that Seychelles residents eat the same fish varieties commonly eaten in the United States, and, unlike the Faroe Islands study, there are no other health, educational, environmental, or dietary differences that might make the results unreliable. The only important dietary difference is that typical Seychelles residents consume much more fish than do typical Americans—the exposure of both mothers and children ranged from about the same to 27 times greater than the typical American consumer. Furthermore, unlike the Faroe study, testing has remained double-blind—meaning neither the children nor the scientists administering and scoring the neurodevelopmental tests knew any one child’s methylmercury level—which tends to make a study more accurate and less prone to researcher bias.<sup>13</sup> The Faroe Islands study, on the other hand, ceased being double-blind once the children were tested at age 7.

Finally, the Seychelles researchers tested their subjects at 6, 16, 29, 66, and 107 months of age. They evaluated the children on 57 different measurements of neurocognitive, language, memory, motor, perceptual, and behavioral functions, making this research the most comprehensive study ever done of mercury exposure. The ultimate finding, according to lead investigator Gary Myers, a professor of neurology and pediatrics at the University of Rochester Medical Center, is that “These children show no adverse effects through nine years

of age, suggesting that eating ocean fish, when there is no local pollution, is safe.”<sup>14</sup> And Constantine Lyketsos of Johns Hopkins Hospital and Health System concludes that “the existing evidence suggests that methylmercury exposure from fish consumption during pregnancy, of the level seen in most parts of the world, does not have measurable cognitive or behavioral effects in later childhood.”<sup>15</sup>

### New Zealand

A third major study was conducted in New Zealand<sup>16</sup> but has generally not been considered methodologically sufficient, on its own, to support conclusions about the effect of mercury on health.<sup>17</sup> The New Zealand researchers did find mixed evidence, with some tests indicating a negative effect from mercury exposure. But the study investigated only 38 mother–child pairs found to have high hair mercury levels, making the sample too small a source from which to estimate a safe exposure level. In addition, the principal source of dietary mercury exposure in New Zealand is through the consumption of shark meat, which tends to be much higher in mercury concentration than the typical fish species consumed in the United

12. Ibid.

13. Sandy Szwarc, *Fishy Advice: The Politics of Methylmercury in Fish and Mercury Emissions* (Washington, DC: Competitive Enterprise Institute, 2004).

14. Myers, “Statement of Dr. Gary Myers.”

15. Constantine G. Lyketsos, “Should Pregnant Women Avoid Eating Fish? Lessons from the Seychelles,” *Lancet* 361, no. 9370 (2003): 1668.

16. K. S. Crump, T. Kjellström, A. M. Shipp, A. Silvers, and A. Stewart, “Influence of Prenatal Mercury Exposure upon Scholastic and Psychological Test Performance: Benchmark Analysis of a New Zealand Cohort,” *Risk Analysis* 18, no. 6 (1998): 701–13.

17. Gary J. Myers, Philip W. Davidson, and Conrad F. Shamlaye, “A Review of Methylmercury and Child Development,” *Neurotoxicology* 19, no. 2 (1998): 313–28. See also National Research Council, *Toxicological Effects of Methylmercury* (Washington, DC: National Academies Press, 2000), 128–29.

States. Thus, the study subjects were exposed to much higher levels of methylmercury than are typical Americans.

### EPA's Risk Assessment

Despite the relative merits of the Seychelles research, and the comparative shortcomings of the Faroe research, the EPA's "reference dose" (or estimated safe exposure level) for methylmercury is based solely on the Faroe Islands study. At the EPA's request, a National Research Council (NRC) committee was impaneled to advise the agency on developing the reference dose.

The committee conclude[d] that there do not appear to be any serious flaws in the design and conduct of the Seychelles, Faroe Islands, and New Zealand studies that would preclude their use in a risk assessment. However, because there is a large body of scientific evidence showing adverse neurodevelopmental effects, ... the committee conclude[d] that [a reference dose] should not be derived from a study, such as the Seychelles study, that did not observe an association with [methylmercury].<sup>18</sup>

Thus, merely because the Seychelles study found that dietary exposure to methylmercury at levels as much as 10 times greater than seen in the United States appear to be safe, the NRC panel refused to consider it. But almost all of the "large body of scientific evidence," on which the committee based its decision, is evidence only of extremely high mercury exposures that

bear no useful relationship to current dietary intake.

Once the NRC committee hand-selected the data it would use, it identified a *benchmark* dose, which is the lowest dose thought to cause zero harm over a lifetime of daily exposure in the most sensitive population of children. Using data from the Faroe Islands study, the NRC committee recommended setting the benchmark dose at 58 micrograms per liter in a person's blood, and the EPA agreed. Even this number is much lower than evidence from the Seychelles study and other recent research would indicate to be safe. Yet, to build in another large margin of safety, the NRC then set the *reference dose* used for establishing regulatory policy an order of magnitude lower: a daily intake of one-tenth of one microgram of mercury per kilogram of the consumer's body weight.<sup>19</sup>

This reference dose is the most restrictive safety threshold in the world, and most other scientific bodies—including the United Nation's Food and Agriculture Organization and World Health Organization, the governments of Canada and the United Kingdom, and even the Agency for Toxic Substances and Disease Registry of the U.S. Department of Health and Human Services—have established minimum recommended exposure levels that are several times higher than the EPA's reference dose.<sup>20</sup> Nevertheless, a U.S. Centers for Disease Control and Prevention (CDC) study of American children and women of childbearing age found that, in 1999 and 2000, a mere 8 percent of the studied population had blood mercury levels

18. National Research Council, *Toxicological Effects of Methylmercury*, 6.

19. *Ibid.*, 21.

20. Harold M. Koenig, *Mercury in the Environment: The Problems, the Risks, and the Consequences* (Annapolis, MD: Annapolis Center for Science-Based Public Policy, 2003). See also Ken Ogilvie, *Mercury in the Environment: A Primer* (Toronto, ON: Pollution Probe, 2003).



above the extra safe reference dose.<sup>21</sup> A follow-up study in 2001 and 2002 found that only 4 percent were above the reference dose level.<sup>22</sup> None were even close to the very conservative benchmark dose that EPA estimates will cause zero harm over a lifetime of exposure. But by warning consumers—especially women of childbearing age—to be concerned about mercury exposure from eating seafood, the EPA and the FDA are actually putting American lives at risk.

### Importance of Fish for Good Health

The most important problem with EPA's extraordinarily low reference dose for methylmercury exposure is that it has led the EPA and the FDA to jointly warn American consumers that eating too much of certain kinds of fish may be harmful to their health. Unfortunately, exactly the opposite is the case. A vast body of scientific research clearly indicates that, even if current dietary levels of mercury exposure were to pose some risk, the benefits obtained by consuming fish vastly outweighs that risk. According to Walter Willett, professor of nutrition at the Harvard School of Public Health, the benefits of eating seafood "are likely to be at least 100-fold greater than the estimates of harm, which may not exist at all."<sup>23</sup>

21. Kathryn Mahaffey, Robert Clickner, and Catherine Bodurow, "Blood Organic Mercury and Dietary Mercury Intake: National Health and Nutrition Examination Survey, 1999 and 2000," *Environmental Health Perspectives* 112, no. 5 (2003): 562–70.

22. R. L. Jones, T. Sinks, S. E. Schober, and M. Pickett, "Blood Mercury Levels in Young Children and Childbearing-Aged Women—United States, 1999–2002," *Morbidity and Mortality Weekly Report* 53, no. 43 (2004): 1018–1020.

23. Sally Squires, "Good Fish, Bad Fish: Sorting Seafood's Benefits from Risks Can Leave Consumers Floundering,"

Instead of improving consumer health, EPA and FDA mercury advisories have needlessly frightened consumers away from eating a food that is actually very good for them. The agencies have issued increasingly complicated and extensive mercury advisory notices that appear to be confusing consumers about which fish species are safe and which are dangerous. A joint FDA–EPA advisory issued in March 2004 warns women of childbearing age to avoid swordfish, shark, king mackerel, and tilefish from the Gulf of Mexico (but not tilefish from the Atlantic Ocean).<sup>24</sup> It then suggests that women eat 12 ounces per week of a variety of fish species, and it lists several fish types that are especially low in methylmercury—including canned light tuna. However, the advisory distinguishes among canned tuna varieties, indicating that, if women eat six ounces of albacore tuna, they should then eat no more than six ounces of any other fish that week. It's no wonder that many consumers have become concerned about eating any fish at all. The health benefits of fish consumption are both very large and well established, however.

Fish, especially species such as tuna and salmon, are inexpensive sources of protein that are also rich in important minerals and beneficial omega-3 fatty acids.<sup>25</sup> Consumption of as little as one or two servings of fish each week is associated with a substantial reduction in the

*Washington Post*, August 8, 2006, F1, 5.

24. FDA and EPA, "What You Need to Know About Mercury in Fish and Shellfish: Advice for Women Who Might Become Pregnant, Women Who Are Pregnant, Nursing Mothers, Young Children," FDA and EPA, Washington, DC, March 2004, <http://www.epa.gov/waterscience/fishadvice/advice.html>.

25. British Nutrition Foundation, "n-3 Fatty Acids and Health," BNF Briefing Paper, British Nutrition Foundation, London, 2000.



risk of stroke and heart disease, lowering the probability of death from coronary disease by more than one-third and lowering total mortality by 17 percent.<sup>26</sup> And these benefits exist despite any potential health risk of methylmercury consumption. Yet, at the same time that the American Heart Association and American Dietetic Association have been recommending that consumers *increase* consumption of fish,<sup>27</sup> the public has been led to believe that they should instead reject most fish.

Despite beliefs to the contrary, pregnant women and their children also reap numerous benefits from fish consumption, because fish are a good source of the n-3 fatty acids docosahexaenoic acid and eicosapentaenoic acid. These two nutrients are known to contribute to healthy pregnancy outcomes and fetal growth and to reduce the risk of preeclampsia and premature labor. But a Harvard University study found that, after publication of the FDA's 2001 mercury advisory, pregnant women reduced

their fish intake dramatically because of confusing advisories.<sup>28</sup>

## Conclusion

The mercury advisory warnings issued in recent years have spawned an unhealthy trend toward lower fish consumption. However, a substantial body of evidence indicates that the amount of mercury in the American diet is so low that it has little or no health effect on even at-risk populations, such as pregnant women and children. The basis for these mercury advisories is a single, unreliable study chosen solely for the reason that it purportedly found negative health consequences of low-level mercury exposure. Even if that study was accurate, however, further research by the CDC indicates that no American women of childbearing age have dietary mercury exposure anywhere near those allegedly harmful levels.

The policy brief entitled “Mercury Pollution and Regulation” in this volume’s “Clean Air” section further discusses the politicization of the mercury debate and the high cost of complying with new power plant emissions regulations, which could have their own substantial impact on humans.

## Key Experts

Gregory Conko, Senior Fellow, Competitive Enterprise Institute, [gconko@cei.org](mailto:gconko@cei.org).

Iain Murray, Senior Fellow, Competitive Enterprise Institute, [imurray@cei.org](mailto:imurray@cei.org).

26. Dariush Mozaffarian and Eric B. Rimm, “Fish Intake, Contaminants, and Human Health: Evaluating the Risks and the Benefits,” *Journal of the American Medical Association* 296, no. 15 (2006): 1885–99. See also Hiroyasu Iso, Kathryn M. Rexrose, Meir J. Stampfer, JoAnn E. Manson, Graham A. Colditz, Frank E. Speizer, Charles H. Hennekens, and Walter C. Willett, “Intake of Fish and Omega-3 Fatty Acids and Risk of Stroke in Women,” *Journal of the American Medical Association* 285, no. 3 (2001): 304–12, and Penny Kris-Etherton, W.S. Harris, and Lawrence J. Appel, “Summary of the Scientific Conference on Dietary Fatty Acids and Cardiovascular Health, Nutrition Committee of the American Heart Association,” *Circulation* 103, no. 7 (2001): 1034–39.

27. American Heart Association, “At-a-Glance: American Heart Association’s Dietary Recommendations for Children and Adolescents,” October 30, 2006, American Heart Association, Dallas, TX, <http://www.americanheart.org/presenter.jhtml?identifier=3034000>.

28. Emily Oken, Ken P. Kleinman, Wendy E. Berland, Steven R. Simon, Janet W. Rich-Edwards, and Matthew W. Gillman, “Decline in Fish Consumption among Pregnant Women after a National Mercury Advisory,” *Journal of Obstetrics and Gynecology* 102, no. 2 (2003): 346–51.

### Recommended Readings

Mozaffarian, Dariush, and Eric B. Rimm. 2006. "Fish Intake, Contaminants, and Human Health: Evaluating the Risks and the Benefits." *Journal of the American Medical Association* 296, no. 15 (2006): 1885–99.

Szwarc, Sandy. 2004. *Fishy Advice: The Politics of Methylmercury in Fish and Mercury*

*Emissions*. Washington, DC: Competitive Enterprise Institute.

U.S. Congress. 2003. Senate Committee on Environment and Public Works, Senate Hearing 108-359. *Climate History and the Science Underlying Fate, Transport, and Health Effects of Mercury Emissions*. 108th Congress, July 29.

---

# Clean Air Act

---



# Clean Air Act Overview

Ben Lieberman

Enacted in 1970, the Clean Air Act (CAA) is the most complex, comprehensive, and costly environmental statute in existence. Amended in 1977 and again in 1990, the CAA has spawned thousands of pages of regulations covering numerous sources of air emissions.<sup>1</sup> The CAA is divided into the following six titles:

- Title I regulates the six so-called criteria pollutants (particulate matter, sulfur dioxide, carbon monoxide, nitrogen oxides, ozone, and lead). The U.S. Environmental Protection Agency (EPA) sets National Ambient Air Quality Standards (NAAQS) for these six pollutants. Each state must submit State

Implementation Plans to the EPA spelling out how it will meet the NAAQS. States with areas that exceed these standards are subject to additional requirements and potential penalties. Title I also contains the air toxics program, which deals with a long list of so-called hazardous pollutants.

- Title II covers mobile sources of pollution: motor vehicles and fuels. The EPA has promulgated a large number of costly rules affecting the composition of motor fuels and vehicle emissions.
- Title III contains general provisions and authorizes lawsuits against the agency for failing to meet the statute's hundreds of requirements.
- Title IV addresses industrial emissions that are believed to contribute to acid rain.

---

1. 42 USC §§7401–671(q).

- Title V created an air emissions permitting program, which is operated by the states under EPA supervision.
- Title VI regulates the production and use of chemicals that are believed to deplete the stratospheric ozone layer, such as chlorofluorocarbons (CFCs).

During the 30-year existence of this federal regulatory scheme, the quality of air has improved dramatically.<sup>2</sup> These gains improve on trends that had begun prior to 1970, indicating that technological advances and state and local controls were having a positive effect before federal involvement.<sup>3</sup> The extent to which air quality improvements likely would have continued (under state and local law and through private sector efficiency improvements) had Congress not passed the CAA is subject to debate. What is clear is that the law has proved very costly—quite possibly more than necessary to achieve its goals. The EPA estimates direct costs at approximately \$21 billion annually, increasing to \$28 billion annually by 2010.<sup>4</sup> Others believe the actual costs, including the indirect ones, may be much higher.<sup>5</sup>

2. EPA, “National Air Quality and Emissions Trends Report: 2003 Special Studies Edition,” September 2003, EPA, Washington, DC. See also Steven F. Hayward, *Index of Leading Environmental Indicators: 2006* (San Francisco: Pacific Research Institute, 2006), 47–53.

3. Indur Goklany, *Clearing the Air: The Real Story of the War on Air Pollution* (Washington, DC: Cato Institute, 1999).

4. EPA, “Executive Summary,” in *The Benefits and Costs of the Clean Air Act*, (Washington, DC: EPA, June 1999).

5. Randall Lutter and Richard Belzer, “EPA Pats Itself on the Back,” *Regulation* 23, no. 3 (2000): 23–28.

Most notable is the 53 percent decline since 1970 of emissions of the six criteria pollutants.<sup>6</sup> Technological advances have greatly contributed to these positive trends. For example, automobiles manufactured today pollute approximately 25 times less than their 1970s counterparts.<sup>7</sup> These positive trends likely will continue even if no new regulations are enacted.<sup>8</sup>

Nevertheless, the EPA continues to tighten existing requirements and to add new ones, always claiming that much more needs to be done. Generally, these new initiatives provide fewer benefits but impose higher costs than previous ones. Unfortunately, the statute never answers this question: “How clean is clean?” Hence, its open-ended provisions continue to be tightened. For example, the agency is required to revisit the NAAQS every five years and set new standards if deemed necessary to protect public health with what the agency considers an adequate margin of safety. In 1997, this process led to costly and controversial new ozone and particulate matter standards. Even as those provisions are now being implemented, the agency is in the process of tightening them yet again.

More than ever before, Congress needs to pay close attention to new EPA regulations under the CAA and to use its authority to block those regulations that are not in the interest of the American people or the environment. In

6. EPA, “Air Emissions Trends—Continued Progress through 2005,” EPA, Washington, DC, [http://www.epa.gov/air/airtrends/2006/emissions\\_summary\\_2005.html](http://www.epa.gov/air/airtrends/2006/emissions_summary_2005.html).

7. Joseph Bast and Jay Lehr, “The Increasing Sustainability of Cars, Trucks, and the Internal Combustion Engine,” Policy Study 95, Heartland Institute, Chicago, June 22, 2000).

8. Joel Schwartz, *No Way Back: Why Air Pollution Will Continue to Decline* (Washington, DC: American Enterprise Institute, 2003).

addition, as Congress takes up reauthorization of the CAA, it needs to consider placing sensible limits on the EPA's power to generate new provisions.

### **Recommended Readings**

EPA. 2003. "National Air Quality and Emissions Trends Report: 2003 Special Studies Edition." EPA, Washington, DC, September.

Fumento, Michael. 1997. *Polluted Science: The EPA's Campaign to Expand Clean Air Regulations*. Washington, DC: American Enterprise Institute.

Goklany, Indur. 1999. *Clearing the Air: The Real Story of the War on Air Pollution*. Washington, DC: Cato Institute.

Schwartz, Joel. 2003. *No Way Back: Why Air Pollution Will Continue to Decline*. Washington, DC: American Enterprise Institute.





# The Clean Air Act and High Gasoline Prices

Ben Lieberman

The high price of gasoline has emerged as a major issue in recent years. The increased cost of crude oil is the main contributor to the pain consumers feel at the pump, but federal environmental regulations under the Clean Air Act (CAA) also are taking a substantial toll. This regulatory burden likely will increase in the years ahead.

Under the 1990 Amendments to the CAA, the EPA has regulated the composition of gasoline heavily. This effort includes the reformulated gasoline (RFG) program, which applies to nearly one-third of the nation's fuel supply, as well as other requirements. These specialized fuel formulations cost more than conventional gasoline.<sup>1</sup> Conventional gasoline is regulated

as well. The EPA has broad authority to revisit these regulations and to tighten them, which it has done on several occasions.

More fuel-related rules are constantly being added to the existing burden. For example, the EPA currently is phasing in tough new standards for sulfur in gasoline and diesel fuel, and new mobile source air toxics rules also are pending.

Several rules are specific to certain states or localities, resulting in the balkanization of the nation's fuel supply.<sup>2</sup> As these so-called boutique fuel requirements were taking effect in the

---

1. Federal Trade Commission, *Gasoline Price Changes: The Dynamic of Supply, Demand, and Competition*,

---

(Washington, DC: Federal Trade Commission, 2005), 56–58.

2. EPA, “Study of Unique Fuel Blends (‘Boutique Fuels’), Effects on Fuel Supply and Distribution, and Potential Improvements,” Staff White Paper, EPA, Washington, DC, October 24, 2001, pp. 9–11.

1990s, the U.S. Energy Information Administration warned that “the proliferation of clean fuel requirements over the last decade has complicated petroleum logistics” and presciently predicted that “additional clean fuels programs could make the system more vulnerable to local shortages and price spikes.”<sup>3</sup>

Although high gasoline prices were a major impetus behind the massive Energy Policy Act of 2005, the act’s provisions were a mixed bag at best. It did amend the CAA by repealing one of the provisions that made the RFG program more costly than necessary, but it also added an ethanol mandate, which required that 4.0 billion gallons of this corn-derived fuel additive be blended into the nation’s fuel supply in 2006, increasing to 7.5 billion gallons in 2012. Ethanol costs considerably more than gasoline, so the mandate benefits Midwestern corn farmers and the ethanol industry at the expense of the driving public. In addition, the logistical difficulties of incorporating ethanol into the nation’s fuel supply also have added to costs. In effect, the ethanol mandate is yet one more costly federal fuel requirement piled on to an overly complex regulatory scheme and has proved to be a step in the wrong direction.

The most recent energy bill increases the ethanol mandate five-fold, from 7.5 billion gallons to 36 billion by 2022.

Other CAA rules have affected the price of gasoline in less direct ways. For example, the EPA’s aggressive implementation of the New Source Review (NSR) program, along with other regulations, has made it very difficult to build new refineries or even to upgrade existing ones. Currently, refinery capacity is proving

inadequate to the task of providing the quantity and variety of fuels now required; yet the last American refinery was built in the 1970s, and expansions of existing facilities struggle to keep pace. The Bush administration’s efforts to streamline the NSR program will help but are being delayed by legal challenges. The NSR and other CAA regulations have added tens of billions of dollars to refining costs without increasing output. That situation leaves the refining sector with considerably fewer resources to invest in expanding capacity and makes those expansions considerably more expensive.<sup>4</sup>

Air quality has improved dramatically over the past 30 years, in large part as a result of reductions in motor vehicle emissions.<sup>5</sup> But most of the credit goes to improvements in the vehicles themselves, not to recent federal micro-management of the makeup of fuels.<sup>6</sup> Indeed, costly fuel regulations like the RFG program have proved to be environmentally unjustified and even counterproductive.<sup>7</sup>

To protect the driving public from further unnecessary costs, Congress must take a more aggressive role regarding new EPA regulations affecting gasoline and must reconsider existing rulemaking authority that is doing more economic harm than environmental good.

3. U.S. Department of Energy, Energy Information Administration, *Demand and Price Outlook for Phase 2 Reformulated Gasoline, 2000* (Washington, DC: U.S. Department of Energy, 1999), 8.

4. National Petroleum Council, *Observations on Petroleum Product Supply*, (Washington, DC: National Petroleum Council, 2004), 16–18.

5. Joseph Bast and Jay Lehr, “The Increasing Sustainability of Cars, Trucks, and the Internal Combustion Engine,” Policy Study 95 Heartland Institute, Chicago, June 22, 2000.

6. Joel Schwartz, *No Way Back: Why Air Pollution Will Continue to Decline* (Washington, DC: American Enterprise Institute, 2003).

7. National Research Council. *Ozone-Forming Potential of Reformulated Gasoline* (Washington, DC: National Academies Press, 1999).

### Key Expert

Ben Lieberman, Senior Political Analyst,  
blieberman@heritage.org.

### Recommended Readings

Bast, Joseph, and Jay Lehr. 2000. "The Increasing Sustainability of Cars, Trucks, and the Internal Combustion Engine." Policy Study 95. Heartland Institute, Chicago, June 22, 2000.

EPA. 2001. "Study of Unique Gasoline Fuel Blends ('Boutique Fuels'), Effects on Fuel Supply and Distribution, and Potential Improvements." Staff White Paper, EPA, Washington, DC, October 24.

Federal Trade Commission. 2005. *Gasoline Price Changes: The Dynamic of Supply,*

*Demand, and Competition.* Washington, DC: Federal Trade Commission.

National Petroleum Council. 2004. *Observations on Petroleum Product Supply.* Washington, DC: National Petroleum Council.

National Research Council. 1999. *Ozone-Forming Potential of Reformulated Gasoline.* Washington, DC: National Academies Press.

Schwartz, Joel. 2003. *No Way Back: Why Air Pollution Will Continue to Decline.* Washington, DC: American Enterprise Institute.

U.S. Department of Energy, Energy Information Administration (EIA). 2000. *Demand and Price Outlook for Phase 2 Reformulated Gasoline.* Washington, DC: U.S. Department of Energy. <http://www.eia.doe.gov/emeu/steo/pub/special/rfg4.html>.



# Mercury Pollution and Regulation

Gregory Conko and Morgan Wildermuth

Health issues related to methylmercury in fish—which are discussed in the “Chemical Risk” section of *The Environmental Source*—are only half of the mercury policy debate. Of equal concern to many is the source of that mercury. Some see the alleged consumer health risk from mercury exposure as a justification for restricting mercury emissions from coal- and oil-fueled electric utility power plants. Because methylmercury in fish is unhealthy for consumers, critics argue, mercury power plant emissions must be significantly reduced in order to improve public health.

However, even if the amount of mercury in the American diet did pose some genuine health risk, it still is not clear that even sizable reductions in mercury emissions from U.S. power plants would have an appreciable effect on ex-

posure to methylmercury. In contrast, the cost of complying with new power plant emissions regulations is estimated to have a large human impact.

## Origins of Mercury in the Environment

Mercury is a naturally occurring element that appears in the environment in elemental form, as well as in organic and inorganic compounds. In its various forms, mercury cycles through the environment—in air, land, and water—and is circulated and modified by both natural and human (anthropogenic) activities.<sup>1</sup>

---

1. United Nations Environment Programme, *Global Mercury Assessment* (Geneva: United Nations Environment Programme Chemicals, 2002). See also Mark

Most of the mercury in power plant emissions is in either elemental or inorganic form. It is the organic compound methylmercury, however, that accumulates in fish and other animals. Methylmercury is created in two primary ways. First, elemental mercury can bind with dissolved organic carbon in oceans and other waterways. Second, certain microorganisms in soil and water can ingest inorganic mercury and add carbon atoms to the molecules in a process called *methylation*. The elemental and inorganic mercury in power plant emissions *can* be converted into methylmercury in each of these ways. However, extensive study of the mercury cycle shows that only a small portion of the mercury from anthropogenic sources is converted to methylmercury.<sup>2</sup>

Organic compounds such as methylmercury readily bind to proteins, and methylmercury binds easily with fats in the tissues of living organisms. Once it begins to accumulate in aquatic organisms such as algae and plankton, methylmercury becomes more concentrated as it bioaccumulates up the food chain. Small fish eat the algae and plankton, amassing greater methylmercury levels, and larger fish accumulate still higher levels by eating small fish.

Wheeler, "Measuring Mercury," *Environmental Health Perspectives* 104, no. 8 (1996): 826–31.

2. Leonard Levin, "Mercury Sources, Transport, and Fate in the Atmosphere," in U.S. Department of Energy, National Technology Laboratory, *Proceedings of the Mercury Control Technology R&D Program Review Meeting* (Washington, DC: U.S. Department of Energy), and Leonard Levin, "Prepared Statement of Leonard Levin, Ph.D., Technical Leader, EPRI, Palo Alto, California," Senate Committee on Environment and Public Works, Senate Hearing 108-359, *Climate History and the Science Underlying Fate, Transport, and Health Effects of Mercury Emissions*, 108th Congress (July 29, 2003), 211–15.

Historical records show that fish have always had trace amounts of methylmercury, however, and that the amounts have remained relatively stable throughout the years, despite large increases in mercury emissions in the latter half of the 20th century.<sup>3</sup> French scientists, for example, recently found that methylmercury levels measured in Yellowfin tuna were the same in 1998 as they were in 1971, despite a prediction of a 9 to 26 percent increase that would have corresponded with increases in global mercury emissions.<sup>4</sup> Fish caught during the late 19th and early 20th centuries—and preserved at the Smithsonian Institution—have average methylmercury levels more than three times higher than a similar sample of fish today.<sup>5</sup> Similarly, the amount of methylmercury in human bodies today is within the same range as

3. Matthew Barber, "Survey of Metals and Other Elements," Food Service Information Sheet 48/04, U.K. Food Standards Agency, London, March 2004, <http://www.foodstandards.gov.uk/science/surveillance/fsis-2004branch/fsis4804metals>. See also U.S. Department of Human Health Services and U.S. Environmental Protection Agency, "Mercury Levels in Commercial Fish and Shellfish," U.S. Department of Human Health Services and U.S. Environmental Protection Agency, Washington, DC, February 2006, <http://vm.cfsan.fda.gov/~frf/sea-mehg.html>.

4. Anne M. Kraepiel, Klaus Keller, Henry B. Chin, Elizabeth G. Malcolm, and François M. Morel, "Sources and Variations of Mercury in Tuna," *Environmental Science and Technology* 37, no. 24 (2003): 5551–58.

5. G.E. Miller, P.M. Grant, R. Kishore, F. J. Steinkruger, F. S. Rowland, and V. P. Guinn, "Mercury Concentrations in Museum Specimens of Tuna and Swordfish," *Science* 175, no. 4026 (1972): 1121–22. See also C. D. Carlington, G. M. Cramer, and P. M. Bolger, "A Risk Assessment for Methylmercury in Tuna," *Water, Air and Soil Pollution* 97, nos. 3–4 (1997): 273–83; National Fisheries Institute, "NFI Position Statement on Joint FDA/EPA Mercury Advisory," National Fisheries Institute, McLean, VA, March 2004, <http://www.nfi.org/?a=news&b=eMedia+Kit&c=&x=3050>; and U.S. Department of Human Health Services and U.S. Environmental Protec-



that in preserved human corpses from several centuries ago.<sup>6</sup> Thus, ample evidence shows that the range of methylmercury to which humans are exposed has remained essentially constant or falling over the past century, despite steadily rising levels of anthropogenic mercury emissions during that time.

### Mercury Power Plant Emissions

A large proportion of mercury added to the environment each year comes from natural earth processes, not human processes.<sup>7</sup> And anthropogenic sources in the United States represent less than one percent of the total annual mercury deposition. The U.S. Environmental Protection Agency (EPA) estimates that 4,400 to 7,500 tons of mercury are emitted into the atmosphere each year from both natural and human-generated sources.<sup>8</sup>

Natural sources of mercury emissions include volatilization from the Earth's crust and the oceans, volcanic action, and erosion. Anthropogenic sources are estimated to make up 50 to 75 percent of the total atmospheric deposition, but that includes a variety of sources, such as the mining of elemental mercury for use in such things as thermometers and sphygmo-

manometers, not just power plant emissions.<sup>9</sup> Furthermore, most of the mercury from power plant emissions is generated not in industrial countries such as the United States, but in poorer countries with few pollution controls.<sup>10</sup>

The EPA indicates that U.S. power plant emissions account for approximately 48 tons per year of mercury deposition, a level that has been falling over time.<sup>11</sup> And only an estimated 1 percent or less of mercury that ends up in a body of water is converted into methylmercury.<sup>12</sup> Consequently, even a total elimination of mercury emissions from U.S. power plants would be expected to have much less than a 1 percent effect on human dietary exposure to methylmercury.

Despite this sobering information, the environmental activist community continues to scare consumers and the media into believing that more stringent emissions regulations are necessary to address the alleged problem of methylmercury in fish.<sup>13</sup> In 2003, when the EPA proposed a simplification of Clean Air Act (CAA) regulations that would relax emissions standards for a group of Midwestern power plants while simultaneously requiring a two-thirds reduction

---

tion Agency, "Mercury Levels in Commercial Fish and Shellfish."

6. Food and Drug Administration, "Methylmercury," Transcript of the Center for Food Safety and Nutrition, Food Advisory Committee Methylmercury Meetings, Beltsville, MD, July 23–24, 2002, <http://www.fda.gov/OHRMS/DOCKETS/ac/02/transcripts/3872t2.htm>.

7. U.S. Environmental Protection Agency, "Clean Air Mercury Rule: Basic Information," March 2, 2006, U.S. Environmental Protection Agency, Washington, DC, <http://www.epa.gov/air/mercuryrule/basic.htm>.

8. Ibid.

---

9. United Nations Environment Programme, *Global Mercury Assessment*.

10. Richard Carlton, Paul Chu, Leonard Levin, et. al., "[Electric Power Research Institute] Comments on EPA-Proposed Emission Standards/Proposed Standards of Performance, Electric Utility Steam Generating Units: Mercury Emissions," Electric Power Research Institute, Palo Alto, CA, June 16, 2004.

11. EPA, "Clean Air Mercury Rule."

12. Harold M. Koenig, *Mercury in the Environment: The Problems, the Risks, and the Consequences* (Annapolis, MD: Annapolis Center for Science-Based Public Policy, 2003).

13. Natural Resources Defense Council, "Mercury Contamination in Fish: A Guide to Staying Health and Fighting Back," Natural Resources Defense Council, New York, <http://www.nrdc.org/health/effects/mercury/index.asp>.

in overall mercury emission levels, environmental organizations and their allies misrepresented the proposal as one that would poison the food supply.<sup>14</sup> But the facts suggest otherwise.

### Emissions Regulation and Politics

One provision of the 1990 CAA amendments required the EPA to study the effects of mercury and other substances in electric power plant emissions in order to determine whether any of those emissions should be subject to more stringent regulation.<sup>15</sup> The Clinton administration committed the EPA to setting such rules by December 2004 (later extended to March 2005). In doing so, the administration recommended a conventional policy that would set an upper-bound limit on the amount of mercury any facility could emit and would require every power plant in the country to adopt the maximum available control technology (MACT)—that is, install new equipment that would achieve the greatest possible reduction in mercury emissions.<sup>16</sup> Proponents of that option claimed that a MACT requirement could be stringent enough to reduce mercury emissions by as much as 90 percent by 2008.<sup>17</sup> The

U.S. Department of Energy disputed that claim, however, indicating that no proven technologies were capable of achieving such reductions, and it suggested that actually attaining a 90 percent reduction might require technologies that had not yet been developed.<sup>18</sup>

After George W. Bush became president in 2001, the EPA reconsidered the Clinton administration's recommendation and proposed two possible approaches for regulating mercury emissions.<sup>19</sup> The first option was a MACT approach similar to the Clinton administration's plan. It would have achieved an estimated 30 percent reduction in mercury emissions by 2008 by setting uniform emissions limits for existing facilities and more restrictive limits for new ones.

The second option paired mandatory emissions reductions with an emissions credit trading program—a combination known as “cap and trade.” It would achieve an estimated 20 percent reduction in mercury emissions by 2010 by piggybacking on reductions that would coincide with on-going declines in other emissions, such as sulfur. The cap and trade approach would then mandate a 70 percent reduction by 2018—setting combined emissions limits for all the facilities in a given state—paired with the emissions credit trading system. Facilities that achieved greater reductions than those mandated by the upper-bound limit could sell the

14. Mercury Policy Project, “Hold the Tuna Charlie: Pres. Bush’s Mercury Moves Gift Industry,” E-Wire press release, Washington, DC, November 15, 2003, [http://www.ewire.com/display.cfm/Wire\\_ID/1919](http://www.ewire.com/display.cfm/Wire_ID/1919).

15. 40 CFR Part 63, codifying Clean Air Act Amendments of 1990, §112(n)(1)(A).

16. EPA, “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,” *Federal Register* 70, no. 59 (2005): 15995.

17. Natural Resources Defense Council, “New EPA ‘Do-Nothing’ Mercury Pollution Rules Dangerous to Public Health,” *NRDC Press Backgrounder*, March 24, 2005.

18. U.S. Department of Energy, Energy Information Administration, *Analysis of Alternative Mercury Control Strategies* (Washington, DC: U.S. Department of Energy, 2005).

19. EPA, “Proposed National Emission Standards for Hazardous Air Pollutants; and, in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units—Proposed Rule,” *Federal Register* 69, no. 20 (2004): 4652–752.

“right” to emit the difference to another facility in the same state.

The Bush administration clearly preferred the cap and trade alternative. However, because an emissions credit trading system would allow some facilities to make little or no emissions reductions, and because it provided for a slower phase-in of reduction mandates, opponents claimed that it would slash environmental and public health protections.<sup>20</sup> Rep. Richard Gephardt (D-MO) characterized the cap and trade proposal as “the most alarming rollbacks in environmental efforts that we have ever seen.”<sup>21</sup> In that environment, the concern about methylmercury in fish began to emerge as a serious political issue. The subtext of most reporting on the fish safety issue was, invariably, that very stringent mercury emissions restrictions were needed to promote consumer safety.

### **Alleged Health Gains from Regulation**

On the basis of its very conservative assumptions—derived primarily from the Faroe Islands methylmercury study (see the policy brief titled “Methylmercury Science)—the EPA insisted that significant reductions in U.S. emissions would result in improved human health, a reduction in early mortality, a very small increase in children’s intelligence (an average of less than 0.025 IQ points per affected child), and positive effects on wildlife.<sup>22</sup> The monetized

benefit from the slightly higher projected IQ levels was estimated to be less than \$5 million a year, and the total benefit for all mercury reductions (from the power plant emissions rule and other EPA regulations) was estimated to be approximately \$50 million a year.

However, because the harmful effects of current mercury exposure levels are subject to serious doubt, and because the elimination of most (or even all) U.S. mercury emissions from power plants would have almost no impact on those levels, many critics argued that neither proposal would produce measurable benefits. Nevertheless, even assuming that the EPA’s benefit estimates were correct, the agency’s own analysis indicated that annual costs for implementing the cap and trade rule would be about \$750 million a year, or \$3.9 billion from 2007 to 2025.<sup>23</sup>

The EPA adopted the cap and trade approach and published its final Clean Air Mercury Rule in March 2005.<sup>24</sup> Although the costs of implementing either proposal were expected to vastly outweigh any benefits derived, the cap and trade option was estimated to achieve roughly the same emissions reduction at approximately \$15 billion less than the MACT option.<sup>25</sup>

Although the monetized cost of the EPA’s Clean Air Mercury Rule is substantial, what is missing from that calculation is the total human cost of the requirements; the rule shifts resources away from expenditures that produc-

20. Gregg Easterbrook, “Everything You Know about the Bush Environmental Record Is Wrong,” Working Paper 02-6, AEI-Brookings Joint Center for Regulatory Studies, Washington, DC, April 2002.

21. Ibid.

22. EPA, Office of Air Quality Planning and Standards, Air Quality Strategies and Standards Division, *Regulatory Impact Analysis of the Clean Air Mercury Rule: Fi-*

*nal Report*, EPA-452/R-05-003 (Research Triangle Park, NC: EPA, 2005).

23. Ibid.

24. EPA, “Revision of December 2000 Regulatory Finding.”

25. Ted Gayer and Robert Hahn, “The Political Economy of Mercury Regulation,” *Regulation* 28, no. 2 (2005): 26–33.

ers and consumers prefer in order to address a small and possibly nonexistent risk. The new mercury emissions limits will make it more expensive to produce electric power from coal and oil. And because some amount of power generation will shift from coal and oil to other fuels, the indirect effects will ripple throughout the economy.

A U.S. Department of Energy study estimated that the emissions restrictions would result in an average of 32 percent higher electric power rates and 17 percent higher natural gas rates.<sup>26</sup> In addition, higher prices for all fuels and for electricity will directly affect the costs borne by other producers, which, in turn, will affect the costs of consumer and industrial products. These higher costs will fall most heavily on lower-income earners, who, in turn, will have less disposable income for purchasing other essential goods and services such as nutritious foods and health care.

### Conclusion

From the start, the Clean Air Mercury Rule has been a solution in search of a problem. A substantial body of evidence indicates that the amount of mercury in the American diet is so low that it has little or no health effect on even at-risk populations, such as pregnant women and children. Even if the EPA's overly pessimistic risk assessment is accurate, however, other research indicates that no American women of childbearing age have dietary mercury exposure anywhere near the level at which there is any evidence of harm.

---

26. U.S. Department of Energy, Energy Information Administration, *Analysis of Strategies for Reducing Multiple Emissions from Electric Power Plants with Advanced Technology Scenarios*, SR/OIAF/2001-05 (Washington, DC: U.S. Department of Energy, 2001).

Furthermore, the substantial reduction in mercury emissions will have almost no real effect on human dietary exposure, because U.S. power plant emissions of mercury represent considerably less than 1 percent of total global mercury deposition. The Clean Air Mercury Rule will, however, come at a substantial cost, which can be measured not only in dollars, but also in decreased health and welfare for millions of Americans.

### Key Experts

Gregory Conko, Senior Fellow, Competitive Enterprise Institute, [gconko@cei.org](mailto:gconko@cei.org).

Iain Murray, Senior Fellow, Competitive Enterprise Institute, [imurray@cei.org](mailto:imurray@cei.org).

### Recommended Readings

Koenig, Harold M. 2003. *Mercury in the Environment: The Problems, the Risks, and the Consequences*. Annapolis, MD: Annapolis Center for Science-Based Public Policy.

Szwarc, Sandy. 2004. *Fishy Advice: The Politics of Methylmercury in Fish and Mercury Emissions*. Washington, DC: Competitive Enterprise Institute.

U.S. Congress. 2003. Senate Committee on Environment and Public Works, Senate Hearing 108-359. *Climate History and the Science Underlying Fate, Transport, and Health Effects of Mercury Emissions*. 108th Congress, July 29.

---

# Energy

---



# Automobile Fuel Economy Standards

Sam Kazman

The federal government's fuel economy standards for new cars are a prime example of a program whose unintended consequences far outweigh its regulatory goals. The program, popularly known as CAFE (Corporate Average Fuel Economy), was enacted in 1975 in the wake of the Middle East oil shocks. Its purpose was to reduce U.S. consumption of gasoline and dependence on foreign oil by setting minimum standards for the fuel efficiency of new cars. Over the years, that purpose has expanded. Today, the alleged threat of climate change is one of the major arguments in support of making CAFE standards more stringent.

Since the CAFE program's enactment, fuel economy for new cars has doubled. Much of that increase, however, was due not to CAFE standards but to rising gasoline prices, which

increased consumer demand for more fuel-efficient cars. Moreover, the CAFE program has had a number of side effects that have reduced its fuel-saving effect. For example, by restricting the availability of large passenger cars, the CAFE program has boosted consumer demand for even less fuel-efficient vehicles, such as vans and sport utility vehicles (SUVs), which fall into a less regulated vehicle category. Moreover, higher fuel-efficiency mandates tend to stimulate more driving by reducing the cost of each additional mile.

Most important, the program's fuel savings have imposed a human toll that proponents refuse to acknowledge: CAFE standards kill people. They cause new cars to be downsized—that is, to be made smaller and lighter. Smaller cars generally get more miles per gallon than



larger cars, but they are also less crashworthy. The result is that the CAFE program has increased traffic fatalities by 1,000 or more deaths per year. Given that this program has been in effect for over a quarter of a century, the cumulative death toll may well make it the federal government's deadliest regulatory program.

Government mandates to reduce gasoline use rest on a very questionable principle. Why shouldn't people be able to use as much gasoline as they are willing to pay for? After all, we derive benefits from natural resources. Mobility empowers us. It allows us to structure our lives, giving us flexibility in choosing our communities and our jobs and in handling our family and professional responsibilities. As long as the price we pay for gasoline at the pump is not subsidized by the government, any attempt to restrict our mobility should be subject to serious question.

If the government is going to restrict gasoline consumption (and that is a big *if*, the validity of which we question), then higher gasoline taxes are the most efficient way of doing so. They immediately affect all consumers, compared to the many years that it takes for CAFE to affect the production of new cars. More important, a tax increase is far more politically honest than the CAFE standards, because its magnitude is readily apparent to the public. The CAFE program's effects, in contrast, are relatively invisible. That is what makes the program so attractive to politicians and government regulation advocates—and so dangerous to the public at large.

### **Background**

The CAFE program established an initial series of congressionally mandated fuel economy

standards for the nation's new-car fleet, with an eventual goal of 27.5 miles per gallon for 1985. It authorized the U.S. Department of Transportation (DOT) to set car standards for subsequent years, subject to a statutory maximum of 27.5 miles per gallon, and also to establish fuel economy standards for light trucks, a vehicle category that includes vans and SUVs. The current new-car standard is 27.5 miles per gallon. The more lenient standard for light trucks, which is not subject to a statutory cap, is currently 21.6 miles per gallon, and it is set to increase to 24 miles per gallon by the 2011 model year.

The CAFE standards must be met by every carmaker's new vehicles sold within a given model year. Individual vehicles can fall below the standard, but they must be offset by a company's sales of other vehicles that exceed the standard or by a company's use of CAFE credits earned in other years.

The Clinton administration generally favored higher CAFE standards, but a series of congressional appropriation freezes barred DOT from raising those standards. The Bush administration raised the light truck standard and also began a reform of the CAFE program aimed at reducing its adverse safety effects. With the Democrats taking control of Congress in 2007, there is more impetus to drastically increase both the car and light truck standards. The intensification of the global warming debate will give such proposals even more prominence than they have had in the past.

Although much of this debate will center on appropriate CAFE levels, the real issue is the wisdom of the CAFE program itself. As the following sections indicate, the program's underlying premises are in need of basic reconsideration.

## A Questionable Effect on Gasoline Consumption

Since the passage of CAFE standards, the fuel efficiency of new cars has nearly doubled. Much of this increase, however, is due not to the standards but to the auto market's response to rising oil prices. For example, in the years immediately following CAFE's enactment, new-car fuel economy increased to levels even higher than those required by statute, as consumers, faced with steadily rising gasoline prices, demanded far more fuel-efficient cars than they had in the past. Only in the mid-1980s and later, when gas prices first stabilized and then actually began to decline, did CAFE itself exert a real effect on car design and on the mix of models available. The drop in gas prices, however, meant that conservation had become a less pressing need. Similarly, during the post-Katrina increase in gasoline prices, from late 2005 through the summer of 2006, sales of large SUVs declined drastically while smaller SUVs and hybrids boomed in popularity. These changes took place far more quickly than anything that the CAFE program might have accomplished.

Although CAFE has forced some changes in the new-car fleet, many of its effects have actually *increased* fuel consumption. The restriction on large cars caused consumers to hang onto their older, less efficient cars for longer periods of time. Because consumers were limited in their choice of new cars, demand for larger vehicles, such as vans, minivans, and SUVs, was boosted. These vehicles, which were subject to the less stringent light truck CAFE standard, were often less fuel efficient than the cars they replaced. Finally, because fuel efficiency reduces the costs of driving, the CAFE program actually encourages more driving.

## Increases in Traffic Fatalities

Vehicle downsizing is one of the most effective means of increasing fuel economy. Downsized vehicles, however, are less crashworthy than similarly equipped large cars in practically every type of accident. As a result, the CAFE program increases highway fatalities. A 1989 Harvard-Brookings Institute study calculated that the CAFE program's 500-pound downsizing effect on new cars caused a 14 to 27 percent increase in occupant fatalities—or 2,200 to 3,900 additional traffic deaths per year.<sup>1</sup> More recently, a 2002 National Academy of Sciences study estimated that the program's downsizing effect contributed to between 1,300 and 2,600 additional deaths per year.<sup>2</sup>

Ironically, the CAFE program is administered by the National Highway Traffic Safety Administration (NHTSA), a unit of DOT. Even though its middle name is *Safety*, NHTSA has

1. The earliest and still one of the foremost analyses of this issue can be found in Robert W. Crandall and John D. Graham, "The Effect of Fuel Economy Standards on Automobile Safety," *Journal of Law and Economics* 32, no. 1 (1989): 97–118. For other analyses that reach similar conclusions, see National Highway Traffic Safety Administration, *Relationship of Vehicle Weight to Fatality and Injury Risk in Model Year 1985–93 Passenger Cars and Light Trucks* (Washington, DC: National Highway Traffic Safety Administration, 1997); James R. Healey, "Death by the Gallon," *USA Today*, July 2, 1999, section B. For an application of the Crandall-Graham analysis to recent traffic statistics, see "CAFE's Yearly Death Toll: State by State" Competitive Enterprise Institute, Washington, DC, 2002, <http://www.cei.org/gencon/025,02407.cfm>.

2. Committee on the Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards, National Research Council, *Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards* (Washington, DC: National Academies Press, 2002), 3, <http://books.nap.edu/books/0309076013/html/3.html#pagetop>.

largely failed to assess the safety effect of this program. In 1989, a federal appeals court, ruling in the case of *Competitive Enterprise Institute and Consumer Alert v. NHTSA*, found that the agency had engaged in “decisional evasion” and “statistical legerdemain” in dealing with this issue.<sup>3</sup>

Proponents of higher CAFE standards argue that new technologies have replaced downsizing as means of enhancing fuel economy. The CAFE program, however, imposes a safety tradeoff on vehicles regardless of how technologically sophisticated they may be. Take the most high-tech car imaginable: if you then make it larger and heavier, it will be safer, but it will also be less fuel efficient. Because the CAFE program prevents such cars from being “upsized,” it continues to impose its lethal effect.

### **No Reduction in Automobile Emissions**

Proponents of higher CAFE standards claim that the standards will reduce the threat of global warming. Fuel-efficient cars do emit less carbon dioxide per mile traveled, but this effect will be diminished by the program’s stimulus to increase driving. Moreover, new vehicles constitute a miniscule source of overall carbon dioxide emissions. Finally, as explained elsewhere in *The Environmental Source*, the evidence in support of a threat of global warming is extremely speculative.

As for pollutants, all vehicles are subject to the same U.S. Environmental Protection Agency emissions standards in terms of allowable grams per mile. In this respect, cars with high

fuel economy and cars with low fuel economy perform the same. More important, most vehicle emissions come not from new cars but from older ones. Because the CAFE program results in these cars being kept on the road even longer, the result may well be more—rather than less—air pollution.

### **Little Reduction in U.S. Dependence on Foreign Oil**

Despite the CAFE program, oil imports currently account for 60 percent of U.S. oil consumption, as compared with 35 percent in 1975.<sup>4</sup> Half of those imports, however, come from other Western Hemisphere nations, and our single largest foreign source of oil is Canada.<sup>5</sup>

America’s dependence on foreign oil is essentially determined not by the fuel economy of our cars, but by world oil prices. Our domestic oil sources are relatively high cost in nature. When world oil prices are low, the United States tends to increase its imports of low-cost foreign oil. If Congress wishes to reduce such imports (a goal whose wisdom is itself debatable), the best way to do so is to eliminate the extensive federal restrictions on domestic oil exploration and development.

3. *Competitive Enterprise Institute and Consumer Alert v. NHTSA*, 956 F.2d 321 (D.C. Cir. 1992).

4. U.S. Department of Energy, Energy Information Administration, *Oil Market Basics* (Washington, DC: U.S. Department of Energy), [http://www.eia.doe.gov/pub/oil\\_gas/petroleum/analysis\\_publications/oil\\_market\\_basics/default.htm](http://www.eia.doe.gov/pub/oil_gas/petroleum/analysis_publications/oil_market_basics/default.htm).

5. U.S. Department of Energy, Energy Information Administration, “Crude Oil and Total Petroleum Imports Top 15 Countries,” U.S. Department of Energy, Washington, DC, [http://www.eia.doe.gov/pub/oil\\_gas/petroleum/data\\_publications/company\\_level\\_imports/current/import.html](http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/company_level_imports/current/import.html).

### **Key Experts**

Sam Kazman, General Counsel, Competitive Enterprise Institute, skazman@cei.org

### **Recommended Readings**

Competitive Enterprise Institute. CAFE Café website. <http://www.cei.org/pages/cafecafe/opeds/index.cfm>.

Kazman, Sam. 2005. "CAFE Is Bad for Your Health," *Wall Street Journal*, November 14. <http://www.cei.org/gencon/019,04970.cfm>.

Nivola, Pietro S., and Robert W. Crandall. 2002. *The Extra Mile: Rethinking Energy Policy for Automotive Transportation*. Washington, DC: Brookings Institution Press.



# Accessing Energy Resources on Public Lands

Angela Logomasini

Federal land ownership affects the ability of energy developers to access energy and mineral resources. In recent decades, the energy industry and other parties have complained that environmental regulations have led to a continually shrinking level of access to such resources. In contrast, environmental groups maintain that energy industry access to public lands is extensive and growing. A review of these perspectives indicates that energy development on public lands has, in fact, declined significantly.

## Energy Development on Public Lands

According to the American Petroleum Institute (API), the federal government owns 78 percent of the nation's oil and 62 percent of its

gas resources.<sup>1</sup> The API claims that the federal government limits access to 90 percent of offshore areas of the outer continental shelf and that litigation and permitting delays limit access to onshore lands. It also notes that in 1999 4.5 percent of oil and gas leases were challenged in court, but now nearly 50 percent are. Permit restrictions also complicate drilling and make it impossible in some leased areas.<sup>2</sup>

In contrast, the Environmental Working Group (EWG) claimed in 2005 that oil and gas development on those lands was out of control

1. API, "Why We Need Expanded Access for Drilling on Government Lands and Offshore," API, Washington, DC, 2006, <http://www.api.org/policy/exploration/expanded-access.cfm>.

2. API, "Access to Federal Lands," API, Washington, DC, 2006, <http://www.api.org/aboutoilgas/facts/index.cfm>.

and that this development affected one in three acres of federal land. To make its point, EWG used an elaborate computer mapping program that cross-referenced data from a federal Bureau of Land Management database with additional data collected from several other sources that included locations of oil and gas operations around the nation. After comparing this database with the location of federal lands, it reported: “We electronically plotted the 3.45 million tracts of Western public land currently or formerly drilled, mined, offered to, or otherwise controlled by mining, oil and gas interests, as detailed in the three data sources described above.”<sup>3</sup>

The EWG report further states:

A two-and-a-half year Environmental Working Group (EWG) computer investigation has found that metal mining and oil and gas industries actively control land in and around more than two-thirds of 1,855 parks, wilderness areas, wildlife refuges, wild and scenic rivers, forests, and other treasured public lands in the American West. If present trends continue, within 20 years, metal mining and oil and gas companies will actively mine, drill, or otherwise control public lands inside or within five miles of every one of these natural treasures. EWG’s investigation of millions of federal government records belies industry claims that excessive emphasis on environmental

protection has locked companies out of public lands.<sup>4</sup>

A review of the EWG methodology, however, reveals serious flaws. The data are not organized in a way that reveals trends that could support the idea that industry claims about shrinking resource access are inaccurate. The report simply includes a collection of activities from several databases covering several different years. Moreover, the data are incapable of measuring the environmental impact because they simply do not contain information on the impacts of these operations. Instead, EWG notes that mining activities can theoretically affect wildlife and the environment within 100 miles of the operation. But it is also possible—in fact, quite likely—that most of these operations can be pursued without serious adverse environmental impacts. As an example, the Audubon Society drills for oil and gas on its lands, which it claims to do in a manner that is consistent with its wildlife protection goals.

Perhaps most important, EWG’s data include large numbers of development activities that were not on federal land because the group counted all activities on nonfederal lands (including private or state lands) within five miles of a federal property. One should expect that a large number of activities would reside near federal lands, given that a high percentage of the resources are mined in western states, where much of the land is owned by the government. In fact, the federal government owns more than 50 percent of the land in five

3. EWG, “Methodology,” in *Who Owns the West?: Losing Ground* (Washington, DC: EWG, 2005); EWG appears to have removed this information from its site, but it can be found in the Internet Archive at <http://web.archive.org> use the search engine to find [www.ewg.org/reports/losingground/methodology.php](http://www.ewg.org/reports/losingground/methodology.php).

4. EWG, “Executive Summary,” in *Who Owns the West?: Losing Ground* (Washington, DC: EWG, 2005), EWG appears to have removed this information from its site, but it can be found in the Internet Archive at <http://web.archive.org> use the search engine to find [www.ewg.org/reports/losingground/methodology.php](http://www.ewg.org/reports/losingground/methodology.php).



**Table 1. Environmental Working Group Mining Data Categories**

Type of control	Source of information	Located on federal land (number of leases or claims)
Active and proposed mines (type 1)	Active mining plans and notices from the Bureau of Land Management's LR2000 database and various industry sources	334
Active oil and gas drilling and production (type 1)	Active leases in current production according to the Bureau of Land Management's LR2000 database	13,679
Active mining claims (type 2)	Active claims according to the Bureau of Land Management's LR2000 database	70,833
Active oil and gas leases (type 2)	Active leases not in current production, according to the Bureau of Land Management's LR2000 database	20,080
<b>Total</b>		<b>104,926</b>

Source: U.S. Bureau of Land Management.

of those states, including Nevada, of which the federal government owns 80 percent.<sup>5</sup> By counting activities on nearby nonfederal lands, EWG inflates the number of tracts of land affected by 67 percent.<sup>6</sup>

In addition, EWG counts all development-related activities—ongoing, proposed, potential, or past—as the same. Accordingly, its data set includes active drilling and mining operations, potential drilling or mining, potential leasing opportunities, and abandoned mining operations. Yet many of these activities do not accurately reflect development on public lands. For example, the fact that lands are available for leasing now (or in the past) does not mean

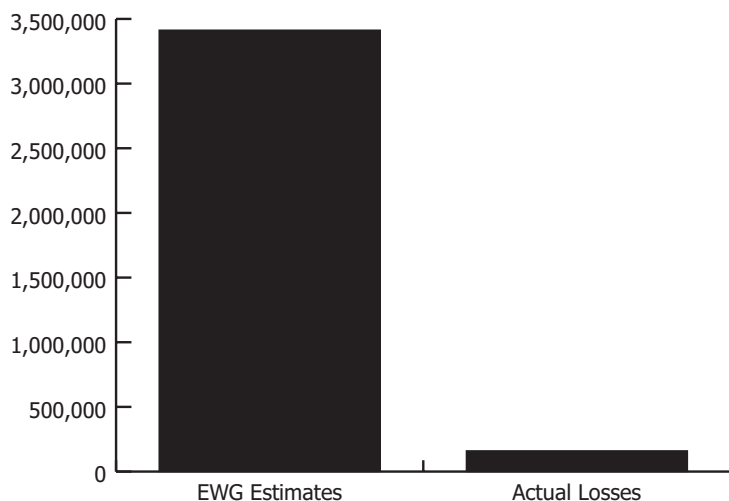
they will be (or were) ever used for resource extraction. Lease restrictions may make such activities unlikely or even impossible in some cases, and the land might simply not be suitable for such use.

EWG does categorize the data into types. *Type 1* includes lands with active and proposed mines, as well as active oil and gas drilling and production. *Type 2* counts lands with active mining claims and active oil and gas leases. *Type 3* counts lands containing abandoned or closed mines and abandoned or closed drilling operations. *Type 4* counts closed mining claims, closed oil and gas leases, tracts of land offered for lease by the government, and leases offered and refused by industry (see table 1).

It does not make sense to count types 3 and 4 in an assessment of activities affecting lands today. Those types involve closed operations, closed claims or leasing rights, and refusals by industry to access resources on the lands. Accordingly, these data provide little information about existing land-use activities, and because they are aggregated, they provide no meaning-

5. U.S. General Accounting Office, *Land Ownership* (Washington, DC: U.S. General Accounting Office, 1996), 24.

6. According to the EWG data, there were 3,413,627 tracts of land (the total of types 1 to 4) involved in active or potential mining in the western United States. Of that total, EWG reports that 2,294,570 of them—67 percent—consisted of land actually outside the boundaries of government land. See EWG, “Methodology.”

**Figure 1. EWG Estimates versus Actual Oil and Gas Leases**

ful information on future trends. It is true that some of the past activities might have had environmental impacts, but EWG presents no data on such impacts and does not reveal how they relate to current or future activities.

The only relevant items for assessing existing federal activities and potential ones on federal lands would be within types 1 and 2. But type 2 represents only *potential* development. Reliance on type 1 and 2 lands indicates that ongoing and potential activities of mining operations on federal lands are much lower than what EWG claims. In fact, it decreases the total number of oil, gas, and mining activities from 3,413,627 to 160,893—reducing EWG’s total by nearly 97 percent. The final tally for active and proposed oil, gas, and mining activities is 104,926 (see figure 1).

EWG’s data do not reveal how many acres are involved in these projects, but somehow EWG extrapolates that projects affect one in three acres of western land. Given that 97 per-

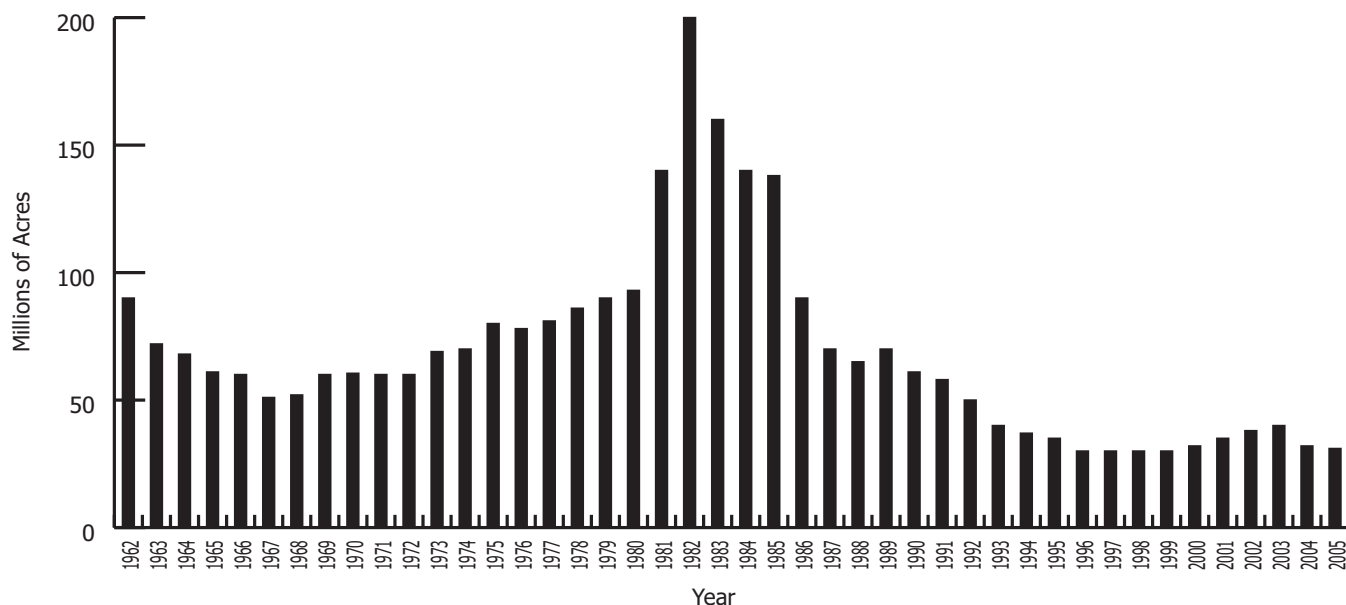
cent of its data are not particularly applicable, energy development on federal lands is likely much less than predicted.

One possible way to assess the percentage of land actually involved in such activities is to compare total acreage owned by the four environmental agencies with the acres containing leases for existing and potential oil, gas, and mining operations. The four agencies own about 629 million acres of land.<sup>7</sup> The U.S. Bureau of Land Management’s most recent annual report, *Public Land Statistics 2005*, indicates that the total acreage of federal lands subject to active oil and gas leases amounted to about 35 million acres.<sup>8</sup> All other

mineral leases—such as coal, geothermal, and hard rock leases—amount to about 1.2 million acres. Combined, that’s less than 6 percent of

7. Data are based on estimates for each agency: U.S. Forest Service, “About Us,” U.S. Forest Service, Washington, DC, June 8, 2006, <http://www.fs.fed.us/aboutus>; U.S. Fish and Wildlife Service, “President Seeks More than \$2 Billion for U.S. Fish and Wildlife Service in 2007 Budget,” press release, U.S. Fish and Wildlife Service, Washington, DC, February 6, 2006, <http://www.fws.gov/budget/2007/FY07%20press%20release.htm>; and National Park Service, “The National Park System Acreage,” National Park Service, Washington, DC, June 8, 2006, <http://www.nps.gov/legacy/acreage.html>. According to the National Park Service, it was responsible for managing “83.6 million acres [in 2006], of which more than 4.3 million acres remain in private ownership,” meaning 79.3 million acres were government owned.

8. U.S. Bureau of Land Management, *Public Land Statistics 2005* (Washington, DC: Department of the Interior, 2005), <http://www.blm.gov/natacq/pls05/PLScov06web.pdf>. Grand totals for acreage are in charts 3-13 and 3-14.

**Figure 2. Oil and Gas Leasing on Public Lands**

Source: U.S. Bureau of Land Management, *Public Land Statistics*, various years.

Note: The Bureau of Land Management has reported in different formats over the years, which required that the total of existing leases for each be tallied from several tables in some cases. From 1962 to 1980, the totals were reported in one chart and required no calculations. From 1981 to 1985, the numbers were reported in three charts (competitive leases issued that year, noncompetitive leases issued that year, and all other leases continuing that year) and tallied accordingly. From 1986 through 2005, the leases were reported in two charts (all existing competitive leases and all existing noncompetitive leases), requiring the tallying of the two totals.

federal properties—far less than the EWG estimate of one in three acres.<sup>9</sup>

It should be noted that these data simply reflect existing leases—not active operations—which are a fraction of the number of leases. For example, although there were 34.6 million acres under lease in 2004, the Bureau of Land Management reports only 11.6 million “acres in producing status” for that year—about one-third of the lands leased.<sup>10</sup>

9. See U.S. Bureau of Land Management, *Public Land Statistics 2005*. The number of leases related to mining for all other resources was tallied from leasing totals in charts 3-13 and 3-14 (for geothermal leasing) and charts 3-18 and 3-19 for all other lease totals.

10. The figure for 2004 is used here because the 2005 report did not include statistics on acres in producing status, but the ratio would be similar. See charts 3-13 and

The Bureau of Land Management’s annual reporting of public land statistics can also provide some insight into leasing trends. The Bureau of Land Management has produced an annual statistics report every year since 1962, from which figure 2 on oil and gas leasing trends was developed. The figure shows increasing acreage under lease during the 1980s, but historically low leasing starting in the 1990s and from 2000 onward.

Figure 2 indicates that environmental claims that oil and gas leasing and drilling on public lands are growing in recent years do not hold water. In fact, it would better support the con-

3-17 in U.S. Bureau of Land Management, *Public Land Statistics 2004* (Washington, DC: U.S. Department of the Interior, 2004).

tention that industry is experiencing reduced access to these lands. However, oil and gas drilling on public lands may have declined for other reasons; hence the conclusion that environmental regulation is largely responsible cannot be drawn with any certainty. But Figure 2 does undermine claims that such access has reached historic highs. Greater support for the idea that access has been reduced comes from policy changes that have limited the scope of commercial activities on these lands. For example, the increase in federal lands designated as “wilderness” limits commercial activities on these lands.<sup>11</sup>

A report produced by the U.S. Department of Energy’s Energy Information Administration shows that policy changes related to environmental concerns also have significantly reduced access to oil and gas resources.<sup>12</sup> The federal government owns and controls access to all offshore lands—the lands referred to as the *continental margins*. Of the three categories of these lands, the first is the *continental shelf*. It includes the shallowest regions, which run to a depth of about 650 feet and extend off the coasts 12 to 250 miles. The second is the *continental slope*, which is essentially a transitional point at which the ocean floor slopes down to depths of up to three miles. At the bottom of the slope begins the third category, the *continental rise*, where the ocean floor dips down gradually and where sediment from the slope remains.

According to the Energy Information Administration, the continental margin is impor-

tant because increasingly it is becoming the key source of oil and gas production. Natural gas production in these areas accounted for about 20 percent of all U.S. natural gas production in 2004; crude oil accessed there amounted to about 29 percent of national production.<sup>13</sup> Production from those areas could be much higher, but it is limited by various federal regulations—most of them environmental in nature.

The federal government maintains jurisdiction over nearly all of the lands of the continental shelf. Under the Submerged Lands Act of 1953, states own the lands within four miles of the coast, except that Texas and Florida own lands within nine miles of their coasts. The federal government owns and controls resource use on the rest. Originally approved in 1953, the Outer Continental Shelf Lands Act (OCSLA) governs federal management of submerged lands, setting up a system for federal leasing to oil and gas firms of access to the resources contained in those lands and for setting environmental standards for resource extraction. President Ronald Reagan set the international boundaries of these lands in 1983 when he declared the U.S. Exclusive Economic Zone, which runs 200 miles from U.S. shorelines. In 1994, the International Law of the Sea Treaty recognized similar rights of all other nations of the world.

With the emergence of the environmental movement in the 1970s, OCSLA has been amended six times, reflecting environmentalist desires for increasingly restrictive leasing policies and more environmental regulation where resource extraction continues. The 1978 amendments further increased environmental considerations. It set up a system for five-year

11. Angela Logomasini, *The Green Regulatory State* (Washington, D.C.: Competitive Enterprise Institute, 2007), <http://www.cei.org/pdf/6106.pdf>, 14-20.

12. U.S. Department of Energy, Energy Information Administration, “Overview of U.S. Legislation and Regulation Affecting Offshore Natural Gas and Oil Activity,” U.S. Department of Energy, Washington, DC, September 2005.

13. U.S. Department of Energy, Energy Information Administration, “Overview of U.S. Legislation and Regulation Affecting Offshore Natural Gas and Oil Activity,” 4.

**Table 3. Moratoria on Drilling on the Outer Continental Shelf**

<b>Year</b>	<b>Acreage removed from drilling</b>
1983	35 million
1984	54 million
1985	45 million
1986 and 1988	8 million
1989	33 million
1990	84 million
1990	Bush blanket moratorium (effective through 2000)
2000	Clinton extension of Bush blanket moratorium (effective through 2012)

*Source:* U.S. Department of Energy, Energy Information Administration.

leases and held that such leasing could not continue unless the federal government had obtained information on the “environmental, social, and economic effects” of such activities.<sup>14</sup> In addition, the amendments called for balancing environmental concerns against the economic benefits of resource extraction.

In addition to regulations in the OCSLA, the Energy Information Administration noted the following:

During the 1960s, increasing environmental awareness set the stage of development of numerous environmental laws, regulations, and executive orders that have affected natural gas and oil activities on federal offshore areas. All natural gas and oil activities must now pass through a large number of environmental reviews by federal, state, and local agencies.

The laws involved include the National Environmental Policy Act, the Clean Air Act,

14. *Ibid.*, 8.

the Coastal Zone Management Act, the Endangered Species Act, the Clean Water Act, and the National Fishing Enhancement Act.

As a result, an increasing number of areas of the continental shelf have been placed off limits for any drilling. Most of these restrictions began as moratoria on drilling included in the annual interior appropriations bill. In 1982, the first of such moratorium addressed 736,000 acres off the coast of California; more land was removed from drilling in the years that followed (see table 2).

After lands were removed from leasing for about a decade under these measures, President George H. W. Bush issued a presidential directive that placed a blanket moratorium over drilling on unleased areas off the coasts of California (with the exception of 87 tracts in southern California), Washington, Oregon, the North Atlantic, and the Eastern Gulf of Mexico, which President Clinton extended in 2000. In 2006, Congress did make a modest change, opening 8.3 million acres off the Gulf of Mexico. However, this relatively small change may have done more harm than good in the view of

those who seek opening more of the OCS lands, as it has effectively shut down debate on the issue for many years to come, leaving the vast areas closed to development for the foreseeable future.<sup>15</sup>

This history clearly shows that the desire of environmental groups to limit access to energy resources on public lands—a desire that is now reflected in public land-use policies, particularly on the outer continental shelf.

---

15. Ben Geman, “Leasing Bans are Likely Untouchable in Current Congress -- Bingaman,” *E&E Daily*, January 26, 2007.

---

# **Global Warming**

---





# An Issue of Science and Economics

Iain Murray

Abundant and affordable energy is one of the great boons of modern industrial civilization and the basis of our standard of living. Energy makes people's lives brighter, safer, more comfortable, and more mobile. Unfortunately, billions of people in poor countries still do not have access to energy. For example, India's per capita consumption of electricity is one-twentieth that of the United States. Hundreds of millions of Indians live "off the grid"—that is, without electricity—and many still use cow dung as a fuel for household cooking, a practice that contributes to half a million premature deaths every year. This continuing reliance on preindustrial energy sources is also one of the major causes of environmental degradation.

Whether poor people around the world ever gain access to energy depends on a number of factors, such as the development of secure property rights in developing countries and continuing technological progress. One potential obstacle, however, could thwart any efforts to provide more energy. That threat is political pressure to reduce energy use worldwide for fear of global warming. The hydrocarbons—coal, petroleum, and natural gas—that are the source of anthropogenic greenhouse gas emissions provide over three-fourths of the world's total energy. Although many alternative sources of energy exist, all of these sources combined cannot begin to substitute for hydrocarbons without further significant technological innovations and massive capital investments. This

is not the work of a few years, but of several decades.<sup>1</sup>

Yet environmental activist groups and their supporters in legislatures around the world, backed by activist scientists eager to use the political process to advance their ideological agendas, demand action *now*. They propose massive, mandated cutbacks in hydrocarbon use, while at the same time objecting to reliable, proven technologies, such as nuclear power, that could contribute to such cutbacks. Although even the European Union (EU) is failing to meet its targets under the Kyoto Protocol,<sup>2</sup> the activists and their political allies call for more ambitious targets. With every severe weather event touted as proof of global warming and shrill warnings about the world's being only a few years away from climate catastrophe, together with exploitation of national security worries, legislators are coming under extreme pressure to "do something."

Support for putting the world on an energy-starvation diet to avert catastrophic global warming has continued to gain traction among politicians, pundits, and public intellectuals in many countries. Notwithstanding this outcry, however, the scientific case for catastrophic global warming continues to be dubious. Moreover, environmental activists refuse to countenance adaptive strategies that would be demonstrably beneficial whether the world warms significantly or not.

---

1. For a general discussion of these issues, see Robert L. Bradley Jr., *Julian Simon and the Triumph of Energy Sustainability* (Washington, DC: American Legislative Exchange Council, 2000).

2. See European Environment Agency, *Annual European Community Greenhouse Gas Inventory 1990–2004 and Inventory Report 2006*, EEA Technical Report 6/2006 (Copenhagen: European Environment Agency, 2006).

Alarm over the prospect of Earth's warming is not warranted by the agreed science or economics of the issue. Global warming is happening, and humans are responsible for at least some of it. Yet this fact does not mean that global warming will cause enough damage to Earth and to humanity to require drastic cuts in energy use, a policy that would have damaging consequences of its own. Moreover, science cannot answer questions that are at heart economic or political, such as whether the Kyoto Protocol is worthwhile.

Predictions of a global warming catastrophe are based on models that rely on economics as much as on science. If the science of the greenhouse theory is right, then we can assess its consequences only by estimating future production of greenhouse gases from estimates of economic activity. This policy brief addresses questions regarding global warming as a political and economic, as well as scientific, issue.

### **Isn't There a Scientific Consensus That Global Warming Is Real and Bad for Us?**

There is no scientific consensus that global warming will cause damaging climate change. Claims regarding a consensus mischaracterize the scientific research of bodies such as the United Nations Intergovernmental Panel on Climate Change (IPCC) and the U.S. National Academy of Sciences.

### **What Do Scientists Agree On?**

Scientists do agree on the following:

- Global average temperature is about 0.6°C—or just over 1°F—higher than it was a century ago.

- Atmospheric levels of carbon dioxide have risen by about 30 percent over the past 200 years.
- Carbon dioxide, like water vapor, is a greenhouse gas whose increase is likely to warm Earth's atmosphere.<sup>3</sup>

### **Doesn't This Mean We Should Be Worried?**

As Richard Lindzen of the Massachusetts Institute of Technology (MIT) summarized in 2006,

These claims are true. However, what the public fails to grasp is that the claims neither constitute support for alarm nor establish man's responsibility for the small amount of warming that has occurred. In fact, those who make the most outlandish claims of alarm are actually demonstrating skepticism of the very science they say supports them. It isn't just that the alarmists are trumpeting model results that we know must be wrong. It is that they are trumpeting catastrophes that couldn't happen *even if the models were right* as justifying costly policies to try to prevent global warming.<sup>4</sup>

### **What Don't Scientists Know Yet?**

Scientists do not agree on whether:

- We know enough to ascribe past temperature changes to carbon dioxide levels.

---

3. Richard Lindzen, testimony before the U.S. Senate Environment and Public Works Committee, May 2, 2001, <http://www-eaps.mit.edu/faculty/lindzen/Testimony/Senate2001.pdf>.

4. Richard Lindzen, "Climate of Fear," *Wall Street Journal*, April 12, 2006.

- We have enough data to confidently predict future temperature levels.
- At what level temperature change might be more damaging than beneficial to life on Earth.

### **Didn't the National Academy of Sciences Say Greenhouse Gases Cause Global Warming?**

Not quite. The National Academy of Sciences reported the following in 2001:

Because of the large and still uncertain level of natural variability inherent in the climate record and the uncertainties in the time histories of the various forcing agents ... a causal linkage between the buildup of greenhouse gases in the atmosphere and the observed climate changes during the 20th century cannot be unequivocally established.<sup>5</sup>

The academy also noted that 20 years' worth of data is not enough to estimate long-term trends.

### **Hasn't Earth Warmed Precipitously over the Past 100 Years?**

The temperature rise of 0.6°C over the past century is at the bottom end of what climate models suggest should have happened. This finding suggests either that the climate is less sensitive to greenhouse gases than previously

---

5. Committee on the Science of Climate Change, National Research Council, *Climate Change Science: An Analysis of Some Key Questions* (Washington, DC: National Academies Press, 2001).

thought or that some unknown factor is depressing the temperature.<sup>6</sup>

### **Don't Climate Models Warn of Alarming Future Warming?**

Predictions of 6°C temperature rises over the next 100 years are at the extreme end of the IPCC range and are the result of faulty economic modeling, not science (discussed later in this brief).

### **What Are the Realistic Current Estimates of Future Warming?**

Both James Hansen of the National Aeronautics and Space Administration (NASA)—the father of greenhouse theory—and Richard Lindzen of MIT—the world's most renowned climatologist—agree that, even if nothing is done to restrict greenhouse gases, the world will see a global temperature increase of only about 1°C in the next 50 to 100 years. Hansen and his colleagues predict “additional warming in the next 50 years of  $0.5 \pm 0.2^\circ\text{C}$ , a warming rate of  $0.1 \pm 0.04^\circ\text{C}$  per decade.”<sup>7</sup>

### **What about Satellite Temperature Measurements?**

Evidence from satellite and weather balloon soundings suggests that the atmosphere

---

6. See testimony of Richard Lindzen to the U.K. House of Lords Committee on Economic Affairs, “Aspects of the Economics of Climate Change,” January 21, 2005, <http://www.publications.parliament.uk/pa/ld/lduncorr/econ2501p.pdf>.

7. Shan Sun and James E. Hansen, “Climate Simulations for 1951–2050 with a Coupled Atmosphere-Ocean Model,” *Journal of Climate* 16, no. 17 (2003): 2807–26.

has warmed considerably less than greenhouse theory suggests.<sup>8</sup> These measurements, which cover the whole atmosphere and show only a very slight warming, show a disparity with the surface temperature measurements, which cover only a small fraction of Earth but show sustained warming.

### **Hasn't the Disagreement between Satellite and Surface Temperatures Been Resolved?**

No. Substantial disagreement still exists between the midrange of the satellite measurements and the midrange of the surface measurements. This discrepancy presents a problem for climate models.

### **Do Other Human-Made Factors Besides Greenhouse Gases Influence Temperature?**

New research suggests that the role of greenhouse gases in warming has been overestimated, because factors such as atmospheric soot,<sup>9</sup> land-use change,<sup>10</sup> and solar varia-

---

8. John R. Christy and Roy W. Spencer, *Global Temperature Report: April 2003* (Huntsville, AL: Earth System Science Center, University of Alabama in Huntsville May 9, 2003).

9. Makiko Sato, James Hansen, Dorothy Koch, Andrew Lacis, Reto Ruedy, Oleg Dubovik, Brent Holben, Mian Chin, and Tica Novakov, “Global Atmospheric Black Carbon Inferred from AERONET,” *Proceedings of the National Academy of Sciences* 100, no. 11 (2003): 6319–24.

10. Roger A. Pielke, Gregg Marland, Richard A. Betts, Thomas N. Chase, Joseph L. Eastman, John O. Niles, Devdutta S. Niyogi, and Steven W. Running, “The Influence of Land-Use Change and Landscape Dynamics on the Climate System: Relevance to Climate-Change Policy beyond the Radiative Effect of Greenhouse Gases,” *Philosophical Transactions of the Royal Society of London* 360, no. 1797 (2002): 1705–19.

tion<sup>11</sup> all appear to have contributed significantly to recent warming.

### Is Earth Continuing to Warm?

The global average temperature has seen no net increase since 1998 in four of the five generally accepted measurement series (the exception being NASA's). Three of the series suggest Earth is even cooling.<sup>12</sup> Recent articles have admitted that natural processes are currently overwhelming anthropogenic climate forcings but have asserted that global warming will resume in 2009 or even 2015. Such findings strongly suggest that not enough is known about natural forcings to allow confidence in future projections of temperature.

### Is the World in Danger of Plunging into a New Ice Age?

No. The scenario presented in *The Day after Tomorrow* is physically impossible. Although research does suggest that the Gulf stream has switched on and off in the past, causing temperature drops in Europe, oceanographers are convinced that global warming does not present any such danger.<sup>13</sup>

11. Eigil Friis-Christensen and Knud Lassen, "Length of the Solar Cycle: An Indicator of Solar Activity Closely Associated with Climate," *Science* 254, no. 5032 (1991): 698–700. See also Peter Thejil and Knud Lassen, *Solar Forcing of the Northern Hemisphere Land Air Temperature: New Data*, DMI Report 99-9 (Copenhagen: Danish Meteorological Institute, 1999).

12. See Roger A. Pielke, "How to Make Two Decades of Cooling Consistent with Warming," Prometheus science policy blog, University of Colorado at Boulder, May 12, 2008, [http://sciencepolicy.colorado.edu/prometheus/archives/climate\\_change/001425how\\_to\\_make\\_two\\_deca.html](http://sciencepolicy.colorado.edu/prometheus/archives/climate_change/001425how_to_make_two_deca.html).

13. Andrew J. Weaver and Claude Hillaire-Marcel, "Global Warming and the Next Ice Age," *Science* 304,

### Is the World in Severe Danger from Sea-Level Rise, Perhaps by as Much as 20 Feet This Century?

No. Recent research from French scientists indicates that sea levels have risen steadily over the past 50 years at a rate of 1.5 millimeter per year, which translates to just 15 centimeters per century.<sup>14</sup> The IPCC foresees sea-level rise of between 0.18 and 0.59 meters this century and regards higher figures as unlikely. Earth experienced a sea-level rise of 0.2 meters over the past century with no noticeable ill effects.

Another study relevant to this controversy examined changes in ice mass "from elevation changes derived from 10.5 years (Greenland) and 9 years (Antarctica) of satellite radar altimetry data from the European Remote-sensing Satellites ERS-1 and -2."<sup>15</sup> The researchers report a net contribution of the three ice sheets to sea level of  $+0.05 \pm 0.03$  millimeters per year. CO2Science.Org puts this finding in perspective: "At the current sea-level-equivalent ice-loss rate of 0.05 millimeters per year, it would take a full *millennium* to raise global sea level by *just 5 cm*, and it would take fully *20,000 years* to raise it a *single meter*."

no. 5669 (2004): 400–2. See also Carl Wunsch, "Gulf Stream Safe If Wind Blows and Earth Turns," *Nature* 428, no. 6983 (2004): 601.

14. Muriel Bergé-Nguyen, Anny Cazenave, Alix Lombard, William Llovel, J. Viarre, and Jean-François Cretaux, "Reconstruction of Past Decades Sea Level Using Thermosteric Sea Level, Tide Gauge, Satellite Altimetry and Ocean Reanalysis Data," *Global and Planetary Change* 62, nos. 1–2 (2008): 1–13.

15. H. Jay Zwally, Mario B. Giovinetto, Jun Li, Helen G. Cornejo, Matthew A. Beckley, Anita C. Brenner, Jack L. Saba, and Donghui Yi, "Mass Changes of the Greenland and Antarctic Ice Sheets and Shelves and contributions to Sea-Level Rise: 1992–2002," *Journal of Glaciology* 51, no. 175 (2005): 509–27



## Are Extreme Weather Events Directly Attributable to Global Warming?

No provable link has been established between weather events such as Hurricane Katrina and global warming. Research by German scientists has demonstrated that the devastating floods in central Europe in 2002 were perfectly normal events when compared with the historical record.<sup>16</sup> Allegations that extreme weather has been more damaging recently do not take into account the fact that humans are now living and investing resources in more dangerous areas. Moreover, the World Meteorological Organization has acknowledged that increases in the recorded number of extreme weather events may be caused by better observation and reporting.<sup>17</sup> A top expert from the IPCC, Christopher Landsea, resigned in January 2005 to protest the misrepresentation of IPCC science by claims that the previous hurricane season was exacerbated by global warming.<sup>18</sup> Most hurricane

16. Manfred Mudelsee, Michael Börngen, Gerd Tetzlaff, and Uwe Grünwald, “No Upward Trends in the Occurrence of Extreme Floods in Central Europe,” *Nature* 425, no. 6954 (2003): 166–69.

17. Ken Davidson, director of the World Climate Program for the World Meteorological Organization, replied to a questioner in Geneva in 2003 as follows: “You are correct that the scientific evidence (statistical and empirical) are not present to conclusively state that the number of events have increased. However, the number of extreme events that are being reported and are truly extreme events has increased both through the meteorological services and through the aid agencies as well as through the disaster reporting agencies and corporations. So, this could be because of improved monitoring and reporting.” See “WMO Joins the IPCC Mantra,” *“Stop Press” Stories*, <http://www.john-daly.com/press/press-03b.htm>.

18. See “Chris Landsea Leaves IPCC,” open letter posted on the Prometheus science policy blog, University of Colorado at Boulder, January 17, 2005, [http://sciencepolicy.colorado.edu/prometheus/archives/science\\_policy\\_general/000318chris\\_landsea\\_leaves.html](http://sciencepolicy.colorado.edu/prometheus/archives/science_policy_general/000318chris_landsea_leaves.html).

scientists agree that Hurricane Katrina can in no way be blamed on global warming.

Other recently published research casts extreme doubt on the influence of warming on hurricanes. Philip Klotzbach of Colorado State University finds the following:

The data indicate a large increasing trend in tropical cyclone intensity and longevity for the North Atlantic basin and a considerable decreasing trend for the Northeast Pacific. All other basins showed small trends, and there has been no significant change in global net tropical cyclone activity. There has been a small increase in global Category 4–5 hurricanes from the period 1986–1995 to the period 1996–2005. Most of this increase is likely due to improved observational technology. These findings indicate that other important factors govern intensity and frequency of tropical cyclones besides SSTs [sea surface temperatures].<sup>19</sup>

## Is the Snow on Kilimanjaro Really Disappearing Because of Global Warming?

Not according to scientists who study Mount Kilimanjaro most closely. Kaser and colleagues “develop[ed] a new concept for investigating the retreat of Kilimanjaro’s glaciers, based on the physical understanding of glacier–climate interactions.” They write:

The concept considers the peculiarities of the mountain and implies that climatological processes other than air temperature

19. Philip J. Klotzbach, “Trends in Global Tropical Cyclone Activity over the Past Twenty Years (1986–2005),” *Geophysical Research Letters* 33 (2006): L10805.



control the ice recession in a direct manner. A drastic drop in atmospheric moisture at the end of the 19th century and the ensuing drier climatic conditions are likely forcing glacier retreat on Kilimanjaro.<sup>20</sup>

### **Is Global Warming Causing the Spread of Malaria?**

Climate is not a significant factor in the recent growth of vector borne diseases such as malaria. Most experts on this subject agree that malaria is more closely correlated with other factors. Deforestation, migration of lowland people (who have higher immunities but bring unknown diseases with them into their new areas of residence), construction of roads and dams, and proliferation of pools and ditches are much more important in predicting the future spread of these diseases.<sup>21</sup>

### **Are Claims Real That the U.S. Department of Defense Has Concluded Global Warming Poses a National Security Threat?**

The Pentagon is not convinced that global warming represents a major security threat to the United States. The “secret paper” that garnered much publicity in Europe was a self-admittedly speculative exercise that went beyond the bounds of measured research and had been

20. Georg Kaser, Douglas R. Hardy, Thomas Molg, Raymond S. Bradley, and Tharsis M. Hyera, “Modern Glacier Retreat on Kilimanjaro as Evidence of Climate Change: Observations and Facts,” *International Journal of Climatology*, 24, no. 3: 329–39.

21. Paul Reiter, Christopher J. Thomas, Peter M. Atkinson, Simon I. Hay, Sarah E. Randolph, David J. Rogers, G. Dennis Shanks, Robert W. Snow, and Andrew Spielman, “Global Warming and Malaria: A Call for Accuracy,” *Lancet Infectious Diseases* 4, no. 6 (2004): 323–24.

released to the press long before the sensationalist stories surfaced in Europe. Nor did the paper recommend “immediate action” beyond better climate modeling.<sup>22</sup>

### **Do Climate Models Show That We Are in Danger of Reaching a Tipping Point, Where Global Warming Will Become Much Worse?**

All the major climate models show that, once global warming starts, it will progress steadily, essentially in a straight line. They do not show exponential growth or any increased effect after certain temperatures are reached.

### **Haven’t the National Academies of All the Major Industrial Countries Agreed That Global Warming Is a Serious Threat?**

Claims have been made that the scientific consensus is represented by a statement drafted by the Royal Society of London and signed by the national scientific academies of the Group of Eight, plus those of India, Brazil, and China. But such claims ignore the politicized nature of the statement. The climate change committee of the Russian Academy of Sciences later said that its president should not have signed the statement, and the use to which the statement was put was condemned by the outgoing president of the U.S. National Academy of Sciences, Bruce Alberts, who called the Royal Society’s presentation of the statement “quite misleading.”<sup>23</sup>

22. Peter Schwartz and Doug Randall, “An Abrupt Climate Change Scenario and Its Implications for United States National Security,” paper submitted to the U.S. Department of Defense, October 2003.

23. Sam Knight, “Anti-Bush Gibe by Royal Society Sparks Climate Change Row,” *Times Online*, July 5, 2005,

### **Aren't Polar Bears Drowning Because of Melting Ice?**

These claims are overblown. A leading Canadian polar bear biologist wrote recently:

Climate change is having an effect on the west Hudson population of polar bears, but really, there is no need to panic. Of the 13 populations of polar bears in Canada, 11 are stable or increasing in number. They are not going extinct, or even appear to be affected at present.<sup>24</sup>

### **Isn't There a Scientific Consensus Such That One Researcher Found No Disagreement about Global Warming in the Literature?**

The research by Naomi Oreskes of the University of California, published in the journal *Science* in December 2004, was flawed.<sup>25</sup> She studied about 1,000 scientific abstracts but admitted to a sympathetic journalist that she made a major mistake in her search terms. In fact, she should have reviewed about 12,000 abstracts. Even taking her sample, another researcher who tried to replicate her study came to quite different conclusions.<sup>26</sup> In addition, the most recent survey of climate scientists

---

[http://business.timesonline.co.uk/tol/business/markets/united\\_states/article540543.ece](http://business.timesonline.co.uk/tol/business/markets/united_states/article540543.ece).

24. Mitchell Taylor, Department of the Environment, Government of Nunavut, as quoted by the *Toronto Star*, May 1, 2006.

25. Naomi Oreskes, "Beyond the Ivory Tower: The Scientific Consensus on Climate Change," *Science* 306 (5702): 1686.

26. Benny J. Peiser, Liverpool John Moores University, unpublished letter to *Science*, January 4, 2005, <http://www.staff.livjm.ac.uk/spsbpeis/Scienceletter.htm>.

by Dennis Bray of Cambridge University and Hans von Storch of Germany's Institute for Coastal Research, following the same methodology as a published study from 1996, found that although a move had occurred toward acceptance of anthropogenic global warming, only 9.4 percent of respondents "strongly agree" that climate change is mostly the result of anthropogenic sources. A similar proportion "strongly disagree." Furthermore, only 22.8 percent of respondents "strongly agree" that the IPCC reports accurately reflect a consensus within climate science.<sup>27</sup>

There is scientific agreement that the world has warmed and that humans are at least partly responsible for the warming—although no consensus exists on the precise extent of human-kind's effect on the climate. Scientific debate is ongoing about the parameters used by the computer models that project future climatic conditions. We cannot be certain whether the world will warm significantly, and we do not know how damaging—if at all—even significant warming will be.

### **Why Is Economics Important to the Study of Global Warming?**

Predictions of a global warming catastrophe are based on models that rely on economics as much as on science. If the science of the greenhouse theory is right, then we can assess its consequences only by estimating future production of greenhouse gases from estimates of economic activity.

---

27. Dennis Bray, "The Not So Clear Consensus on Climate Change," Heartland Institute, Chicago, <http://www.heartland.org/Article.cfm?artId=21311>.

### **Haven't Economists Agreed That Not Reducing Carbon Emissions Now Is More Costly Than Doing So?**

This common assertion is based on the report of Sir Nicholas Stern to the U.K. government on the economics of global warming, which is seriously flawed. It relies on a social cost of carbon emission that is considerably greater than the average of all the other literature in the field and also uses a very small discount rate, exaggerating the costs of future damages as well as the benefits of early action.<sup>28</sup>

Dr. Richard Tol of Hamburg University, the leading expert on the social cost of greenhouse gases, estimates the cost of carbon dioxide emissions at about \$2 per ton, not the \$86 per ton used by Stern. Even at a higher estimate of \$12 per ton, this translates to just 12 cents on a gallon of gasoline, far less than the dollar-a-gallon figure commonly suggested.

Dr. William Nordhaus of Yale estimates that 3°C of global warming would cost the world \$22 trillion this century. Stern's recommendations, based on immediate deep reductions in emissions on the basis of intergenerational equity, would reduce Nordhaus's estimate to \$9 trillion, but at a cost of \$26 trillion. Al Gore's package of measures, which calls on the United States to "join an international treaty within the next two years that cuts global warming pollution by 90 percent in developed countries and by more than half worldwide in time for the next generation to inherit a healthy Earth,"

28. See, for example, Richard S. J. Tol, "The Stern Review of the Economics of Climate Change: A Comment," Economic and Social Research Institute, Hamburg, Vrije, and Carnegie Mellon Universities, November 2, 2006, <http://www.fnu.zmaw.de/fileadmin/fnu-files/reports/sternreview.pdf>.

would reduce warming costs to \$10 trillion, at a cost of \$34 trillion.<sup>29</sup>

### **What Will the Kyoto Protocol Do to Reduce Warming?**

The Kyoto Protocol, most observers agree, will have virtually no effect on temperature increase, because it imposes no greenhouse gas emissions restrictions on major developing nations such as China and India. These nations have publicly refused to accept any restrictions now or in the future.<sup>30</sup>

### **Can't We Reduce Emissions without Affecting the Economy?**

Greenhouse gas emissions derive from energy use, which in turn derives from economic growth. Therefore, nations that restrict emissions are almost certain to reduce their rate of economic growth.

### **Isn't Global Warming All Cost and No Benefit?**

No. Even substantial global warming is likely to benefit the United States. Eminent Yale professor Robert Mendelsohn wrote this advice to the Senate in 2000:

Climate change is likely to result in small net benefits for the United States over the

29. William Nordhaus, *The Challenge of Global Warming: Economic Models and Environmental* (Yale University, New Haven, CT, 2007).

30. "CEI Drops Junk Science Lawsuit after White House Acknowledgment; Chinese Emissions Skyrocket; India Rejects Emissions Restrictions," *Cooler Heads Digest*, November 12, 2003, <http://www.globalwarming.org/article.php?uid=233>.

**Table 1. Effects of Kyoto Protocol on European Economies as Predicted by a General Equilibrium Model**

Country	Percentage of lost GDP	Jobs lost
Germany	5.2	1,800,000
Spain	5.0	1,000,000
United Kingdom	4.5	1,000,000
Netherlands	3.8	240,000

Source: Margo Thorning, *Kyoto Protocol and Beyond: Economic Impacts on EU Countries* (Brussels: International Council for Capital Formation, October 2002).

next century. The primary sector that will benefit is agriculture. The large gains in this sector will more than compensate for damages expected in the coastal, energy, and water sectors, unless warming is unexpectedly severe. Forestry is also expected to enjoy small gains. Added together, the United States will likely enjoy small benefits of between \$14 [billion] and \$23 billion a year and will only suffer damages in the neighborhood of \$13 billion if warming reaches 5°C over the next century. Recent predictions of warming by 2100 suggest temperature increases of between 1.5°C and 4°C, suggesting that impacts are likely to be beneficial in the U.S.<sup>31</sup>

### **Haven't Economic Models Predicted No Effect on Growth from Reducing Emissions?**

The models of the effect of greenhouse gas emission restrictions on the economy that suggest no effect are mostly European. They are sectoral models that look at the effects on

only one economic sector and therefore badly underestimate the negative effects of emission restrictions throughout the economy. General equilibrium models, which take into account the effects of emissions restrictions on other economic sectors, show much greater negative economic effects than do sectoral models.<sup>32</sup>

### **What Do the Better Economic Models Say Kyoto Will Do?**

Research from general equilibrium models suggests strongly negative impacts on European economies from adopting Kyoto targets (or going beyond the targets, as in the case of the United Kingdom). One model (see table 1) shows the economic effects by 2010 of adopting Kyoto targets. Remember that the protocol achieves virtually nothing in reducing global temperature.

The most recent measure proposed in the United States, the Lieberman-Warner Climate Security Act 2008, would have had the following effects, according to a detailed study by the Heritage Foundation:

31. Robert Mendelsohn, letter to Sen. John McCain, July 12, 2000, <http://64.233.179.104/search?q=cache:ctDw6sczNv0J:www.senate.gov/~commerce>.

32. Michael Canes, *Economic Modeling of Climate Change Policy* (Brussels: International Council for Capital Formation, October 2002).

- Cumulative gross domestic product (GDP) losses are at least \$1.7 trillion and could reach \$4.8 trillion by 2030 (in inflation-adjusted 2006 dollars).
- Single-year GDP losses hit at least \$155 billion and realistically could exceed \$500 billion (in inflation-adjusted 2006 dollars).
- Annual job losses exceed 500,000 before 2030 and could approach 1,000,000.
- The annual cost of emission permits to energy users will be at least \$100 billion by 2020 and could exceed \$300 billion by 2030 (in inflation-adjusted 2006 dollars).
- The average household will pay \$467 more each year for its natural gas and electricity (in inflation-adjusted 2006 dollars). That means that the average household will spend an additional \$8,870 to purchase household energy over the period 2012 through 2030.<sup>33</sup>

### **Isn't Europe on Track to Meet Its Kyoto Targets?**

Europe has found that the Kyoto targets are unrealistic. Regardless of announced targets, 11 of the 15 pre-enlargement EU countries are on course to increase their greenhouse gas emissions well beyond their individual Kyoto targets.<sup>34</sup> Those that are on track are largely

33. William W. Beach, David Kreutzer, Ben Lieberman, and Nick Loris, "The Economic Costs of the Lieberman-Warner Climate Change Legislation," Center for Data Analysis Report 08-02, Heritage Foundation, Washington, DC, May 12 2008, <http://www.heritage.org/research/EnergyandEnvironment/cda08-02.cfm>.

34. European Environment Agency, "EU15 Greenhouse Gas Emissions Decline after Two Years of Increases," press release, European Environment Agency, Copenhagen, July 15, 2004.

there because of economic decisions made before the signing of the Kyoto treaty, which was signed in 1997 but which uses 1990 as its baseline year.

### **Isn't President Bush to Blame for Holding Up Kyoto?**

President George W. Bush has not unilaterally held up ratification of the Kyoto treaty. The U.S. Senate must ratify any treaty signed by a president. In 1997, during Bill Clinton's presidency, the Senate voted 95 to 0 not to accept any Kyoto-style treaty that would significantly harm the U.S. economy and that did not include participation by major developing countries.<sup>35</sup> The U.S. president has no power to impose the Kyoto Protocol, or any other treaty, on an unwilling Senate.<sup>36</sup>

### **Isn't Global Warming a Worse Threat Than Terrorism?**

The charge that global warming is worse than terrorism in terms of damage to the world is pure hyperbole. The implausible and unverifiable claim of a large number of deaths owing to global warming each year—the figure is often put at 150,000—ignores the fact that most of those alleged deaths are caused by diseases such as malaria, which have historically existed even in cold climates and could easily be controlled if the environmental lobby dropped its opposition to the use of the pesticide DDT (dichloro-diphenyl-

35. Senate Resolution 98, 105th Congress, First Session, "Expressing the Sense of the Senate Regarding the Conditions for the United States Becoming a Signatory to Any International Agreement on Greenhouse Gas Emissions under the United Nations," 1997.

36. U.S. Constitution, article II, section 2, clause 2.



trichloroethane).<sup>37</sup> Moreover, that number is itself dwarfed by the number of people who meet early deaths because of poverty—a number that will increase if governments around the world suppress the use of energy. Moreover, given the clear and demonstrated link between wealth and health, replacing coal-generated electricity with more expensive alternatives would lead to almost 200,000 extra premature deaths in the United States alone.<sup>38</sup>

### **Can't We Replace Fossil Fuels Cheaply and Effectively with Renewable Energy?**

Alternative sources of energy, such as wind and solar power, are not yet cost-effective and come with environmental costs of their own (the veteran British environmentalist David Bellamy is leading opposition to wind farms).<sup>39</sup> The only currently cost-effective alternative to fossil fuel use is nuclear power, which produces nearly no emissions but which environmental activists continue to oppose in direct contradiction to their assertions that global warming is the gravest danger facing the planet.

### **Aren't Market-Based Solutions the Way to Reduce Emissions?**

“Cap and trade” schemes that allow firms and governments to trade the right to emit greenhouse gases up to certain limits are not economically efficient. By creating rent-seeking

37. Reiter et al., “Global Warming and Malaria.”

38. M. Harvey Brenner, “Health Benefits of Low-Cost Energy: An Econometric Case Study,” *EM* magazine, November 2005.

39. Glenn R. Schleede, “Facing up to the True Costs and Benefits of Wind Energy,” paper presented at the 2004 Annual Meeting of the Associated Electric Cooperative, St. Louis, MO, June 24, 2004.

opportunities, they promote the development of a carbon cartel seeking to exploit the system to make profits, as politically connected firms lobby for greater allocation of emission credits. The volatility of the carbon market in Europe shows how dependent such markets are on political considerations. A simple carbon tax would be much more economically efficient, although likely to prove unattractive to voters in democracies.<sup>40</sup>

### **Conclusion**

The world faces severe economic consequences from currently proposed strategies to deal with global warming. These approaches will produce job losses and consume scarce resources that could be better spent on handling other global problems, such as AIDS or lack of access to clean drinking water.<sup>41</sup> The economic consequences of the global warming mitigation strategies currently proposed will probably be worse than the effects of global warming itself. Therefore, adaptation and resiliency strategies should be considered as a more cost-effective alternative. In addition, “no regrets” strategies that will provide benefits from greater economic growth—especially greater resilience against natural disasters—whether global warming proves to be a problem or not, should be adopted at once.<sup>42</sup>

40. Ross McKittrick, “What’s Wrong with Regulating Carbon Dioxide Emissions?” briefing at the U.S. Congress, October 11, 2001, <http://www.cei.org/gencon/014,02191.cfm>.

41. See the work of the Copenhagen Consensus Center at <http://www.copenhagenconsensus.com>.

42. See, for example, Jonathan Adler, with Clyde Crews, Paul Georgia, Ben Lieberman, Jessica Melugin, and Mara-Lee Seivert, *Greenhouse Policy without Regrets: A Free Market Approach to the Uncertain Risks of Climate Change* (Washington, DC: Competitive Enterprise Institute, 2000).

### **Key Experts**

Iain Murray, Senior Fellow, Competitive Enterprise Institute, [imurray@cei.org](mailto:imurray@cei.org)

Marlo Lewis, Senior Fellow, Competitive Enterprise Institute, [mlewis@cei.org](mailto:mlewis@cei.org)

Myron Ebell, Director of Energy and Global Warming Policy, Competitive Enterprise Institute, [mebell@cei.org](mailto:mebell@cei.org)

Christopher Horner, Senior Fellow, Competitive Enterprise Institute, [chorner@cei.org](mailto:chorner@cei.org)

### **Recommended Reading**

Marlo Lewis. 2006. *A Skeptic's Guide to An Inconvenient Truth*. Washington, DC: Competitive Enterprise Institute. <http://ff.org/centers/csspp/pdf/skepticguide.pdf>.





---

# **International Policy**

---



# International Policy Overview

J. Bishop Grewell

Increased interactions among nations, especially in the areas of trade and commerce, have led to a tightly knit global community. At the same time, players on the world stage mistakenly have confused increased globalization as necessitating a call for increased international governance through treaties and international bodies. Nowhere is that more prevalent than in the call for international environmental policy. Both at home under U.S. foreign policy and abroad in international treaties, misguided environmental policies are leading the diplomatic corps astray from its traditional charges of promoting peace through reduced violent conflict and prosperity through free trade. The biggest victims of this “greening” of foreign policy, ironically, are the poor people living in developing na-

tions and the planet’s long-term environmental health.<sup>1</sup>

Consider, for example, the Kyoto Protocol. Already, tension over the protocol is evident as the United States demands that developing nations like China and India bear the same emissions reduction burdens as the developed world. Developing nations counter that they are just now entering their industrial revolution and deserve the same unhindered chance at prosperity that the developed world enjoyed. Developing nations have a point. The Kyoto Protocol will keep them impoverished not only

---

1. For information on how green politics have contributed seriously to human suffering, see Lorraine Mooney and Roger Bate, eds., *Environmental Health: Third World Problems—First World Preoccupations* (Boston: Butterworth Heinemann, 1999).

by barring them from using resources necessary to develop, but also by undermining the development of market economies.

Instead of international regulation, we should promote free trade, which improves environmental quality by increasing wealth:

- A 1992 study by economist Don Coursey of the University of Chicago found that a 10 percent increase in income results in a 25 percent increase in the demand for environmental amenities.<sup>2</sup>
- Economists Gene Grossman and Alan Krueger found similar evidence of a relationship between environmental quality and economic health. Their research discovered that countries increased sulfur dioxide emissions until reaching a per capita income of about \$9,000 (in 1998 dollars).<sup>3</sup> After that threshold was met, countries' sulfur dioxide emissions declined.
- The greening of foreign policy threatens the benefits of free trade by slowing, ending, and even reversing the trend toward free trade that developed over the course of the past century.

2. Don Coursey, "Demand for Environmental Quality," Business, Law, and Economics Center, Washington University, St. Louis, MO, 1992. See also Don Coursey and Christopher Hartwell, "Environmental and Public Health Outcomes: An International and Historical Comparison," Working Paper 00.10, Irving B. Harris Graduate School of Public Policy, University of Chicago, Chicago, [http://harrisschool.uchicago.edu/about/publications/working-papers/pdf/wp\\_00\\_10.pdf](http://harrisschool.uchicago.edu/about/publications/working-papers/pdf/wp_00_10.pdf).

3. Gene M. Grossman and Alan B. Krueger, "Economic Growth and the Environment," *Quarterly Journal of Economics* 110, no. 2 (May 1995): 353–77.

## Key Experts

Myron Ebell, Director of Energy and Global Warming Policy Competitive Enterprise Institute, [mebell@cei.org](mailto:mebell@cei.org).

Fran Smith, Adjunct Scholar, Competitive Enterprise Institute, [fran.smith@cei.org](mailto:fran.smith@cei.org).

## Recommended Readings

Anderson, Terry L., and J. Bishop Grewell. 1999. "Property Rights Solutions for the Global Commons: Bottom-Up or Top-Down?" *Duke Environmental Law and Policy Forum* 10, no. 1.: 73–101.

Anderson, Terry L., and J. Bishop Grewell. 2000. "The Greening of Foreign Policy." PERC Policy Series PS20, Property and Environment Research Center, Bozeman, MT. <http://www.perc.org/pdf/ps20.pdf>.

Anderson, Terry L., and Henry I. Miller, eds. 2000. *The Greening of U.S. Foreign Policy*. Stanford, CA: Hoover Institution Press.

Mooney, Lorraine and Roger Bate, eds. 1999. *Environmental Health: Third World Problems—First World Preoccupations*. Boston: Butterworth Heinemann.

Sheehan, James. 1998. *Global Greens: Inside the International Environmental Establishment*. Washington, DC: Capital Research Center.

# Population

Jennifer Zambone  
(with updates by Angela Logomasini)

In his 1798 *Essay on the Principle of Population*, Thomas Malthus argued that human population growth eventually would outstrip Earth's capacity to support humankind, leading to mass starvation.<sup>1</sup> Following that tradition, several prognosticators from the 1960s and 1970s predicted that a growing population would lead to increasing natural resource scarcity and rising commodity prices, causing severe environmental degradation and mass starvation in the near future.<sup>2</sup> The evidence shows,

however, that the doomsayers have been wrong on nearly every count. According to a recent United Nations report: "The global economy grew at 5.4 percent in 2006 ... The population grew 1.1 percent, increasing the average world per capita income by 4.3 percent. At this rate, world poverty will be cut in by more than half between 2000 and 2015."<sup>3</sup>

## Food Supply

Among the most popular claims of the doomsayers is that population will outstrip our capacity to grow food, but history has proved them wrong.

---

1. Thomas Malthus, *An Essay on the Principle of Population* (New York: Penguin, 1985).

2. Worst among these was Paul Erlich, who suggested that one solution could be to put chemicals into the water supply to involuntarily sterilize the population. See Paul Erlich, *The Population Bomb* (New York: Ballantine Books, 1968), 135–36.

---

3. Jerome C. Glenn and Theodore J. Gordon, *2007 State of the Future* (Geneva: World Federation of UN Associations, 2007), 1.

- Per capita grain supplies have increased by more than 22 percent since 1950,<sup>4</sup> and food prices have dropped, indicating abundance, not greater scarcity.
- Wheat prices have gone from \$256 per ton in 1950 to \$90 per ton in the 1990s (in constant dollars).<sup>5</sup>
- The drop in corn prices is equally impressive. A bushel of corn in 1950 would have cost \$10.72 in 2000 dollars, but in 2000, a bushel of corn sold for \$1.80.<sup>6</sup>
- These gains are not confined to industrial countries. Developing countries also have experienced impressive gains. The rate of increase in food production in poor countries has been more than double that of the rate of population growth.<sup>7</sup>

### Natural Resources

Anti-population activists have long claimed that we will run out of natural resources, but thanks to human ingenuity, we have been able to expand supply by discovering new resources and by using them more efficiently. Prices have declined in real terms as supply has increased.

- Relative to wages, prices for natural resources by the 1990s were about half that of 1980 and they were also three times less expensive than they were in the middle of the

century and eight times less expensive than they were at the turn of the 20th century.<sup>8</sup>

- In the 1970s, prognosticators predicted that we would run out of oil in the next 10 to 20 years. To the contrary, known oil resources have grown to 15 times the size recorded in 1948.<sup>9</sup> Discoveries of new oil deposits, as well as better extraction technologies, have played a major role in our ability to meet our present and future demands.<sup>10</sup>

### Environment and Population

Those impressive gains have not come at a cost to the environment. Technical advancements have allowed farmers to increase crop yields using fewer acres of cropland. In 1950, the average grain yield was only 1.1 tons per hectare.<sup>11</sup> By 1992, grain yield more than doubled to 2.8 tons per hectare.<sup>12</sup> To understand the true impact on the environment, consider that to grow the amount of food currently consumed using 1950s technologies, farmers would have had to plow under an additional 10 million square miles of wildlife habitat.<sup>13</sup>

4. Number derived from data from *FAO Production Yearbook 2000* (Rome: FAO, 2000).

5. Dennis Avery, "Saving the Planet with Pesticides," *The True State of the Planet*, ed. Ronald Bailey (New York: Free Press, 1995), 55–57.

6. Corn price data are taken from the U.S. Department of Agriculture's Feed Grains Database, available at <http://www.ers.usda.gov/data/feedgrains>.

7. Avery, 55.

8. Stephen Moore, "The Coming Age of Abundance," in *The True State of the Planet*, ed. Ronald Bailey (New York: Free Press, 1995), 110.

9. Jerry Taylor and Peter VanDoren, "Soft Energy versus Hard Facts: Powering the Twenty-First Century," in *Earth Report 2000*, ed. Ronald Bailey (New York: McGraw-Hill, 2000), 121.

10. Failure to meet energy needs in some markets (such as California) is driven by political failures to allow resource development. Instead, examples like California bolster arguments for pro-market and pro-technology policies that have led to resource abundance in other markets.

11. Food and Agricultural Organization, *FAO Production Yearbook 1970* (Rome: 1970).

12. Food and Agricultural Organization, *FAO Production Yearbook 2000*.

13. Avery, 50.



The trend, then, has been an ever-increasing crop yield using fewer and fewer acres, leaving more land available for wildlife habitat, exactly the opposite of what the doomsayers predicted.

### **Why Population Trends Are Not Alarming**

Although humankind has become healthier and more prosperous regardless of population growth, it has become evident to demographers that the rate of population growth is in gradual and long-term decline. Fertility rates in industrial countries have dropped below replacement level (the level to maintain the current population.)<sup>14</sup> Consider these facts:

- According to demographer Nicholas Eberstadt, the decline in the rate of population growth has extended “over more than a generation by a growing number of countries; and it has suddenly come amazingly close to describing the norm for childbearing the world over.”<sup>15</sup>
- In 1950, the average number of children born per woman stood at about five. By 2007, the estimate now stands at 2.59 children for woman.<sup>16</sup>

---

14. Nicholas Eberstadt, “World Population Prospects for the Twenty-First Century: The Specter of ‘Depopulation’?” in *Earth Report 2000*, ed. Ronald Bailey (New York: McGraw-Hill, 2000), 66.

15. Ibid.

16. United Nations Population Division, *2000 Revision of World Population Estimates and Projections* (New York: United Nations, 2000); 2007 number comes from: *World Fact Book* (Washington, D.C.: U.S. Central Intelligence Agency, 2007), accessed online edition at: <https://www.cia.gov/library/publications/the-world-factbook/index.html>.

- All regions of the world are experiencing a decline in fertility rates.<sup>17</sup>
- About 90 countries are experiencing sub-replacement levels of fertility.<sup>18</sup>
- The world’s less developed regions experienced a drop in fertility from six children per woman in 1960 to three per woman in 1990.<sup>19</sup>
- According to a 2007 United Nations report: “Global Population is changing from high mortality and high fertility to low mortality and low fertility. Population may increase by another 2.8 billion by 2050 before it begins to fall, after which it could be 5.5 billion by 2100—which is 1 billion fewer people than are alive today.”<sup>20</sup>
- The decline in the population growth rate continues to occur at about 30 percent per generation.<sup>21</sup>

Regardless of the projection, given our proven ability to continually increase the availability of resources and food, we doubtless will be able to provide for a much greater population than we have now.

### **Key Experts**

Myron Ebell, Director of Energy and Global Warming Policy, Competitive Enterprise Institute, [mebell@cei.org](mailto:mebell@cei.org)

---

17. See World Fact Book, “Field Listing—Total Fertility Rate,” <https://www.cia.gov/library/publications/the-world-factbook/fields/2127.html>.

18. Ibid.

19. United Nations Population Division, *1998 Revision of World Population Estimates and Projections* (New York: United Nations, 1998)..

20. Glenn and Gordon, *2007 State of the Future*,.

21. Eberstadt, “World Population Prospects for the Twenty-First Century,” 81.

Nicholas Eberstadt, Henry Wendt Scholar in Political Economy, American Enterprise Institute, eberstadt@aei.org

**Recommended Reading**

Bailey, Ronald. 2000. "The Progress Explosion: Permanently Escaping the Malthusian Trap." In *Earth Report 2000*, ed. Ronald Bailey. Washington, DC: McGraw-Hill.

Eberstadt, Nicholas. 2000. "World Population Prospects for the Twenty-First Century: The Specter of 'Depopulation?'" In *Earth Report 2000*, ed Ronald Bailey. New York: McGraw-Hill.

# The Convention on Persistent Organic Pollutants

Angela Logomasini

In 2001, the Bush administration signed the United Nations Environment Program's Stockholm Convention on Persistent Organic Pollutants, known as the *POPs treaty*. The treaty bans 12 chemicals—DDT (dichloro-diphenyl-trichloroethane), aldrin, dieldrin, endrin, chlordane, heptachlor, hexachlorobenzene, mirex, toxaphene, polychlorinated biphenyls (PCBs), dioxins, and furans—most of which are already banned in the United States. Several bills in Congress have focused on implementing the treaty, which members wanted to pass before the Senate ratification. The legislation promised to make a seriously flawed treaty even worse by allowing the U.S. Environmental Protection Agency (EPA) to ban and regulate additional substances unilaterally after unelected bureaucrats add chemicals to the treaty list. Legisla-

tion has stalled, but is likely to reemerge in a future congress.

## Current POPs Bans

The assumption behind the POPs treaty is that regulators—and, in this case, international negotiators—are well positioned to decide which products are valuable and which are too dangerous for public use. Although eliminating dangerous chemicals might sound reasonable, such decisions rarely are cut and dry—they often carry serious tradeoffs.

History shows that regulators are inferior to the marketplace in managing such risks. Market selection of products is driven by such concerns as price, utility, and quality. Those parties affected—manufacturers, buyers, sellers, and downstream

consumers—make decisions at the appropriate points in the process where they have access to information about the implications of their decisions. Markets manage risk in this fashion by allowing individuals to decide what level of risk is worth taking to gain the benefits of many products and activities. Although people do not always make perfect decisions, individuals in the marketplace are better positioned to make such decisions than are regulators.

Government bans, in contrast, are the result of a political process and focus instead on political payback rather than product price, utility, or quality. Decision makers often are distant and lack adequate information to make informed decisions about acceptable levels of risk and the appropriateness of certain products. As a result, political bans more often serve the politically organized at the expense of others—and too often they increase risk and reduce quality of life. In the end, the bans often harm consumers by increasing prices and denying access to desired products, and sometimes the bans have devastating consequences. The world's poor are often hit the hardest by such policies because they can least afford expensive alternatives, even when such alternatives are available.

Treaty regulations on the pesticide DDT demonstrate why we should not trust international—or any other—bureaucrats with such decisions. DDT is the most affordable and effective tool in fighting malaria around the world, and adverse human health impacts from DDT have never been demonstrated. In addition, limited use for malaria control has little impact on wildlife.<sup>1</sup> Yet misinformation about the public health impacts of DDT, which was advanced by environmental

activists, prompted public officials to ban the use of the substance around the world at the domestic level starting in the 1970s. In large part because of DDT use, malaria rates reached historic lows in the 1960s, but after nations banned the pesticide, cases skyrocketed. Currently, malaria kills more than 1 million people a year—mostly children—and makes 500 million more seriously ill.<sup>2</sup>

Such realities should have led officials to resume use of DDT. Indeed, public health officials from around the world signed a petition urging POPs treaty negotiators to include a public health exemption to the DDT ban. Instead POPs treaty negotiators worked to ban DDT globally—preventing a return to DDT use even though it could save millions of lives. Only under considerable pressure did negotiators agree to allow a temporary, limited exemption for DDT use for malaria control.<sup>3</sup> But even with this temporary, limited exemption, the treaty regulations governing use make access more expensive. Rather than advance bans under the POPs treaty, policymakers should seek ways to improve DDT access.

Other examples exist, as well. The POPs treaty also bans the use of PCBs, even though PCBs could have beneficial applications in industrial processes in developing nations. Yet the only health impacts that have been demonstrated scientifically are skin and eye irritations, which can be avoided with proper management of the substance.<sup>4</sup> Such unwarranted bans

1. Richard Tren and Roger Bate, *When Politics Kills: Malaria and the DDT Story* (Washington, DC: Competitive Enterprise Institute, December 2000). See also the policy brief titled “Pesticides and Public Health.”

2. World Health Organization, “Malaria,” Fact Sheet 94, May 2007, Geneva, World Health Organization, <http://www.who.int/mediacentre/factsheets/fs094/en>.

3. Malaria Foundation International, “DDT-Malaria: Open Letter,” Malaria Foundation International, Stone Mountain, GA, March 29, 1999, [http://www.malaria.org/ddtcover\\_english.html](http://www.malaria.org/ddtcover_english.html). The list of signatures is available online at [http://www.malaria.org/DDT\\_signatures.html](http://www.malaria.org/DDT_signatures.html).

4. William P. Kucewicz, *The Public Health Implications of Polychlorinated Biphenyls (PCBs) in the Envi-*

make development more expensive for people in developing nations—and make the transition from poverty less attainable for many people around the world.

### Additional Bans Ahead

Now that the POPs treaty has been ratified by enough nations to make it binding on the signatories, negotiators are meeting to discuss adding additional chemicals to the POPs list of banned and regulated substances. In the United States, ratification has been held up because members of Congress first want to pass legislation determining how the United States would implement the treaty and how it would address POPs listings. Implementation legislation would amend the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Toxic Substances Control Act (TSCA), directing EPA on how to implement treaty provisions.

In 2002, the Bush administration initially proposed implementation legislation, introduced by Sen. Bob Smith (R-NH) in May 2002 (S. 2507), that would allow EPA to regulate *only* the 12 chemicals listed in the treaty. At the time, others proposed empowering the agency to regulate any additional chemicals added to the POPs treaty without Senate ratification.

Each addition essentially constitutes a new treaty agreement by amendment, and each amendment demands Senate ratification according to the U.S. Constitution. Just as Congress cannot expect EPA to implement amendments to existing laws until after both Congress and the executive branch have approved them according to constitutional standards, EPA is not supposed

to act on treaties until after Senate ratification. Lawmakers must follow the constitutional process for good reason. In this case, sidestepping the Constitution would give international negotiators and EPA authority to deprive Americans of the right to engage in commerce—to distribute, use, and sell certain chemicals.

During the 109th Congress, several members offered bills that would amend FIFRA and TSCA to allow EPA to implement the POPs treaty. Rep. Paul Gillmor (R-OH) offered H.R. 4591, and Rep. Hilda S. Solis (D-CA) introduced a competing bill, H.R. 4800; both would amend TSCA. Rep. Frank Lucas (R-OK.) introduced H.R. 3849 to amend FIFRA, and Sen. Saxby Chambliss (R-GA) introduced a companion bill (S. 2042). Both the Gillmor and Lucas bills were reported out of committee, and there was discussion that they might be combined and passed as one bill, but that did not happen before the end of the Congress.

Rather than requiring Senate ratification, all bills set up a process for EPA to consider whether to issue rules regulating chemicals that negotiators add to the POPs list in the future. All bills set up notice and comment provisions for any regulations that EPA might issue under the POPs treaty, and the Gillmor, Lucas, and Chambliss bills mention some form of cost-benefit considerations when EPA considers whether to regulate newly listed POPs.

Of the bills, the Gillmor bill contains the strongest language. Specifically, it states that the EPA can issue regulations of POPs listed chemicals to “the extent necessary to protect human health and the environment in a manner that achieves a reasonable balance of social, environmental, and economic costs and benefits.”<sup>5</sup> In addition,

*ronment* (New York: American Council on Science and Health, 2005), [http://www.acsh.org/docLib/20050103\\_PCBs2005.pdf](http://www.acsh.org/docLib/20050103_PCBs2005.pdf).

5. U.S. Congress, H.R. 4591, 109th Congress, section 503(e)(1)(A)(ii).

when assessing the risks of a substance, the Gillmor bill would require EPA to use “sound and objective scientific practices” and to “determine the weight of the scientific evidence concerning such risks or effects based on the best available scientific information, including peer-reviewed studies, in the rulemaking record.”<sup>6</sup>

Some environmental activists have complained that the Gillmor bill would apply “onerous cost-benefit requirements that will make future U.S. action on these substances very unlikely.”<sup>7</sup> Yet following sound science and consideration of costs and benefits is critical given that POPs regulations could have serious adverse public health and economic impacts. However, those mandates alone do not make the Gillmor bill acceptable, because they do not guarantee that the agency will follow them sufficiently. Agencies often have incentives to regulate, and such incentives can undermine scientific objectivity. Elected officials in the Senate should ratify treaty changes and additions as the Constitution outlines.

All bills fall short when it comes to requiring Senate ratification or even presidential signature for any new agreement. The Gillmor bill comes closest to suggesting that ratification by the Senate might be applied, but it does not require such ratification. In several sections of the bill, it suggests that someone else in the federal government should consent before EPA regulations take effect, but the specifics of such approval are unclear. Under those vague provisions, unelected public officials from EPA or the State Department might be sufficient to bind the United States to new international agreements related to POPs.

For example, section 503(e)(1)(C) of the Gillmor bill states that the rules do not take effect “until the United States has consented to be bound” by the POPs listing decision, but the bill never defines what body of the United States government would consent or how it would indicate consent.<sup>8</sup> Again in section 504 (a), the bill states that it is “the sense of the Congress that the United States shall consent to be bound ... only after ... the United States has declared that such amendment shall enter into force upon ratification, acceptance, approval, or accession of the United States to such amendment.”<sup>9</sup> This time, the bill offers a menu of means for binding the United States to the POPs treaty amendments. Ratification is only one option and, hence, is not considered necessary under the bill. The section notes that the president must consult with congressional committees in both houses and they will conduct oversight. It does not say that the Senate should ratify any agreement or that the president should sign any agreement. Section 506 makes a similar pronouncement: “Any provision of this Act that establishes a requirement to comply with, or that is based on, a provision of the POPs Convention ... shall be effective only to the extent that the United States has consented to be bound by that provision.”<sup>10</sup>

Whether the Gillmor bill would pass constitutional muster in the Supreme Court is unclear, but there are good reasons it should not. If any of the implementation bills pass in the future, they likely would make the POPs treaty a vehicle for many more international bans of valuable chemical products. Our treaty partners might even use the treaty to reduce U.S. competitiveness. Their

6. *Ibid.*, section 503(e)(4).

7. Lauren Morello, “POPs Bills Still on Target for House Vote, Sponsors Say,” *Environment and Energy Daily*, September 20, 2006.

8. U.S. Congress, H.R. 4591, 109th Congress, section 503(e)(1)(C).

9. *Ibid.*, section 504(a).

10. *Ibid.*, section 506.



proposed bans likely would focus on products the treaty partners no longer use but that still would have value in the United States. Such bans would cost our competitors little, while imposing costs in the United States. Legitimate public health concerns likely would take a back seat to such political interests. After all, international negotiators were willing to impose a worldwide ban on DDT even though developing nations could use the product to save millions of people from malaria illness and death.

### Getting a Seat at the Table

Some have suggested that the United States needs to ratify the POPs treaty in order to “get a seat at the table” among POPs negotiators to ensure that U.S. interests are met. For example, while urging Congress to pass a POPs bill and ratify the treaty, EPA Administrator Steve Johnson lamented, “As a consequence of [the current U.S.] non-party status, we are limited to being observers.... Our absence from these treaties diminishes the voices of some of the best scientific and policy experts in the world.”<sup>11</sup> However, such arguments are based on the assumption that the POPs treaty is good public policy and hence will be valuable if implemented in the United States. This assumption is wrong. Rather than trying to get a seat at the table, the United States should oppose the growth of global controls that threaten human freedom and well-being.

### State Preemption

Environmentalists also criticize the Gillmor bill because it contains a provision that effec-

tively demands that states gain EPA approval to issue regulations on substances listed in the POPs treaty that are more stringent than EPA regulations. Allegedly, such regulations prevent states from protecting public health. In reality, such bans and regulations make as much sense at the state level as they do at the global or international level—which is very little. If anything, preemption of additional, more onerous regulations at the state level could mitigate some of the adverse effects of domestic bans and regulation. However, the benefits are not substantial enough to warrant the passage of any of the misguided POPs bills or ratification of the treaty.

### Conclusion

Ideally, policymakers should oppose ratification and implementation of the POPs treaty. The treaty represents a seriously flawed approach to managing chemical risks, as is clearly demonstrated by its provisions impeding access to the chemical DDT. By hindering malaria control efforts, such policies contribute to the misery and deaths of millions of people every year. American policymakers must provide the strong moral leadership necessary to fight the world malaria crisis. In addition to reversing the POPs treaty, they should pursue policies to allow greater freedom to access DDT for malaria control. In addition, imposing global regulations on other chemicals that may have public value and whose risks can be managed makes little sense. Finally, at a bare minimum, POPs implementation legislation should not allow international negotiators and unelected domestic officials to determine U.S. policy without complying with the constitutional mandate for a presidential signature and Senate ratification.

11. Lauren Morello, “EPA Chief Urges House Panel to Approve POPs Bill,” *Energy and Environment Daily*, July 21, 2006.





# REACH

## The EU's Chemical Policy

Angela Logomasini

Regulations enacted in the European Union (EU) increasingly are having worldwide effects, warranting greater attention among policymakers in the United States and around the world. Not only do EU directives affect the 27 EU member nations, but EU regulations also can become trade barriers and affect thousands of businesses around the globe that are directly or indirectly linked to the EU's substantial share in the world market through international trade. The EU's new chemicals policy—called REACH (Registration, Evaluation, and Authorization of Chemicals)—should be of special concern, as it will have serious worldwide impacts. REACH officially took effect in June 2007.

REACH uses the so-called precautionary principle by requiring companies to prove that their products are safe before their introduction

into commerce. Currently, government officials must bear the burden of proving that a product is unsafe before removing it from the market. REACH would reverse that burden, demanding that firms conduct extensive tests to demonstrate product safety. Because manufacturers cannot prove that anything is 100 percent safe, that policy would likely produce arbitrary bans on many relatively safe substances and would discourage innovation.

As the name implies, there are several regulatory components of REACH. The registration phase mandates that firms register products with the government when they produce or import them at levels of one metric ton or more per year. The second stage—evaluation—involves consideration of whether the government will demand further study of chemicals.

Chemicals deemed as substances of “special concern” during evaluation must undergo the next stage—authorization. After demanding further study and review of chemicals during authorization, regulators then decide which substances to ban or regulate and which to give final approval.

The REACH proposal includes some exemptions for things that are obviously safe, such as water, as well as some products regulated under other directives, such as medical products, food additives, cosmetics, and pesticides. In addition, REACH exempts most polymers, but the commission likely will try to include those in the program at a future date. Existing regulations currently cover only firms that manufacture chemicals. REACH covers anyone who produces, imports, or uses a regulated substance. REACH also covers downstream users, which include formulators (such as paint manufacturers) and firms that use chemicals in their production processes or as ingredients.

### Economic Scope

The cost estimates of the REACH program could be as high as €5.2 billion, according a European Commission–funded study.<sup>1</sup> However, nearly all the estimates likely understate the costs of the program, because they consider only a fraction of REACH costs—the registration costs. The study does not consider the costs of the latter, potentially more expensive, stages of the program: the evaluation and authoriza-

tion of chemicals. Nor does the study consider indirect impacts associated with the cancellation of chemicals under REACH. The European Chemical Industry Association, known as Cefic, has indicated that it expects that firms could stop producing as much as 30 percent of substances currently produced at relatively low levels (1 to 100 metric tons per year), because the costs of regulations may make such products unprofitable. In addition, REACH will reduce innovation significantly, because lower profits and the costs of registration will leave fewer resources for new product research and development. In addition, there may be fewer kinds and reduced amounts of raw materials available as importing costs grow substantially higher.

All studies acknowledge that REACH will lead manufacturers to stop producing some products rather than go through registration bureaucracy. The impacts associated with the elimination of just a few substances during the registration phase—not to mention the loss of products during the evaluation and authorization stages—could be substantial. According to a study by KPMG, “Formulators typically use a particular critical substance in many of their formulations. So the loss of only a few critical substances would affect a large part of their portfolio, resulting in large-scale reformulation.”<sup>2</sup>

In addition, cost studies have found that REACH will reduce innovation and harm businesses in the EU nations that need development the most—the newer EU members in Eastern

1. Joan Canton and Ch. Allen, *A Microeconomic Model to Assess the Economic Impacts of the EU’s New Chemicals Policy*, (Brussels: European Commission/DG Enterprise, November 2003), [http://europa.eu.int/comm/enterprise/reach/docs/reach/effects\\_new\\_chem\\_policy-2003\\_11\\_17.pdf](http://europa.eu.int/comm/enterprise/reach/docs/reach/effects_new_chem_policy-2003_11_17.pdf).

2. KPMG Business Advisory Services, *REACH—Further Work on Impact Assessment: A Case Study Approach* (Amstelveen, Netherlands: KPMG Business Advisory Services, April 2005), [http://europa.eu.int/comm/enterprise/reach/docs/reach/kpmg\\_summary.pdf](http://europa.eu.int/comm/enterprise/reach/docs/reach/kpmg_summary.pdf), p. 21.

Europe.<sup>3</sup> Small businesses throughout Europe also will have a particularly hard time, according to nearly all studies. One study notes, “The heaviest burden will be on SMEs [small and medium-sized enterprises] which cannot consistently fulfill the REACH requirements and so it is predicted that most of them may face financial troubles, may be taken over by bigger ones, or even shut down.”<sup>4</sup>

REACH’s impact isn’t going to fall only on Europe, because the United States and other nations are inextricably linked to the EU economy through trade. The United States exports more than \$20 billion in chemical products and invests more than \$4 billion in the EU chemical and related industry sectors annually. In addition, U.S. firms export more than \$400 billion in products containing chemicals, some of which may fall under the scope of REACH regulations. The United States also imports more than \$40 billion of chemicals from Europe each year.<sup>5</sup>

The U.S. government mission to the EU has pointed out that REACH is expected to adversely affect tens of billions of dollars of trade in chemicals and products. Affected sectors will probably include textiles, pharmaceuticals, electronics, automobiles, and advanced materials. According to the European Commission’s

own study, users of specialty chemicals likely will suffer serious repercussions.<sup>6</sup>

### Trade Implications

REACH also promises to have protectionist effects that likely will trigger World Trade Organization (WTO) disputes. In a presentation to the EU Parliament in January 2005, Marco Bronckers, chair of the WTO and international trade law professor at the Law University of Lieden, detailed many of REACH’s trade-related problems. For example, he noted that under international trade agreements, regulations must be “not more trade restrictive than necessary to fulfill a legitimate objective, taking account of the risks non-fulfillment would create.”<sup>7</sup> REACH’s volume-focused requirements are likely to violate this WTO requirement. Because low-risk substances will be regulated under REACH simply because of their high volume, the regulations may be deemed arbitrary.

### Questionable Benefits

Most of the claims made about REACH’s benefits involve speculative comments sprinkled throughout various studies. Those speculations have taken on the character of gossip; they gain credibility simply by being repeated, and some are embellished in subsequent reiterations. A review of underlying data finds either that references are lacking or that the

3. Institute for Prospective Technological Studies (IPTS), *Implementation of REACH in the New Member States* (Brussels: European Commission, 2005), [http://europa.eu.int/comm/enterprise/reach/docs/reach/ipts\\_summary.pdf](http://europa.eu.int/comm/enterprise/reach/docs/reach/ipts_summary.pdf).

4. *Ibid.*, 91.

5. Gary Litman, “Comments on the EU Commission Consultation Document Concerning the Registration, Evaluation, Authorization, and Restrictions of Chemicals (REACH),” U.S. Chamber of Commerce, Washington, DC, July 9, 2003.

6. *Ibid.*

7. Marco Bronckers, paper presented before the European Parliament, Joint Public Hearing, *A WTO Perspective: Imported Products*, January 19, 2004, [http://www.europarl.eu.int/meetdocs/2004\\_2009/documents/DV/Bronckers/bronckersen.pdf](http://www.europarl.eu.int/meetdocs/2004_2009/documents/DV/Bronckers/bronckersen.pdf).

claims greatly mischaracterize the research they cite.

For example, The European Commission's 2003 Extended Impact Assessment of REACH claims that REACH might save 4,500 lives, according to data provided in a World Bank study on environmental health risks around the world.<sup>8</sup> That claim is repeated in a study produced by Tufts University for the Nordic Council.<sup>9</sup> Similarly, that World Bank figure is used by the World Wildlife Fund's analysis,<sup>10</sup> which relies on that claim to arrive at a net benefit estimate for REACH.

Yet the World Bank report<sup>11</sup> relates to problems associated with high-level exposures to agrochemicals, most of which are related to improper use of chemicals. Acute poisoning is "the most often cited health consequence of

pesticides use." It notes that health problems usually "arise from improper application or container disposal."<sup>12</sup> REACH is not designed to address acute poisoning or misuse of chemicals whose properties are well known. In fact, many of the substances involved in the World Bank study are likely pesticides that will be exempted from REACH regulations. Hence, that statistic is completely irrelevant to REACH's benefits calculations—yet somehow REACH advocates have been able to use it to justify their program.

Another questionable set of benefits claims stems from a more formal benefits study produced for the European Commission by Risk Policy Analysts Limited (RPA), which purports to have produced hard numbers documenting REACH benefits in terms of occupational safety.<sup>13</sup> The report does one thing right: it acknowledges that REACH benefits will not result from better management of chemicals risks that governments manage today. Accordingly, the RPA study attempts to quantify work-related illnesses that are caused by unknown chemical sources. But if the causes are unknown, how can anyone deem them to be caused by chemicals used in the workplace?

Such ambiguity leads to some really slippery "science." The study's design is the first and most obvious problem. A good study collects data in a systematic and consistent way, using a clear set of scientific standards. In addition, the study's data should be made available to the public so that the study can

8. "Regulation of the European Parliament and the Council Concerning the Registration, Evaluation, Authorization, and Restrictions of Chemicals, Establishing a European Chemicals Agency and Amending Directive 1999/45/EC and Regulation (EC) [on Persistent Organic Pollutants]," Commission Staff Working Paper COM (2003) 644, Commission of the European Communities, Brussels, October 29, 2003), 30, [http://europa.eu.int/comm/enterprise/reach/docs/reach/eia-sec-2003\\_1171.pdf](http://europa.eu.int/comm/enterprise/reach/docs/reach/eia-sec-2003_1171.pdf).

9. Frank Ackerman and Rachel Massey, *The True Costs of REACH* (Medford, MA: Global Development and Environmental Institute, Tufts University, 2004), 51, [http://www.euractiv.com/29/images/TuftsStudyonREACH\\_tcm29-130918.pdf](http://www.euractiv.com/29/images/TuftsStudyonREACH_tcm29-130918.pdf).

10. David Pearce and Phoebe Koundouri, *The Social Costs of REACH: The Cost and Benefits of Future Chemicals Policy in the European Union* (Weyside Park, U.K.: World Wildlife Fund, May 2003), 28, <http://www.wwf.org.uk/filelibrary/pdf/socialcostofchemicals.pdf>.

11. Kseniya Lvovksy, *Health and Environment*, Environment Strategy Papers, Number 1, (Washington, D.C.: World Bank, November 2001), p. 35, [http://lnweb18.worldbank.org/ESSD/enext.nsf/41ByDocName/EnvironmentStrategyPaperNo1HealthandEnvironment2001361KBPDF/\\$FILE/ESP1Health&Environment2001.pdf](http://lnweb18.worldbank.org/ESSD/enext.nsf/41ByDocName/EnvironmentStrategyPaperNo1HealthandEnvironment2001361KBPDF/$FILE/ESP1Health&Environment2001.pdf).

12. *Ibid.*, p. 38.

13. *Assessment of the Business Impacts of New Regulations in the Chemicals Sector, Prepared for the European Commission Enterprise Directorate-General* (Norfolk, UK: Risk and Policy Analysts Limited, 2002), produced in association with Statistics Sweden, <http://www.chemicalspolicy.org/downloads/RPAreport.pdf>.

be reproduced, and the study should pass a peer review. None of those standards applies to RPA's REACH benefits study. RPA collected data from government agencies in various EU nations, and each of those nations used different data collection methods—some good, some not so good. In addition, rather than using one year as a sample year, RPA used different sample years for different nations based on what data each nation had available. The data also are not publicly available; hence, the study is difficult—if not impossible—to reproduce. The study then takes all the murky data for a limited set of countries and extrapolates risks for the entire European Union. When a study makes such extrapolations, it should at least have a reasonably representative sample. But the haphazard nature of RPA's data collection effort makes such extrapolations nothing more than a desperate attempt to generate something from nothing.

### Recent and Upcoming Issues

Between June and November in 2008 companies are required to pre-register their chemicals with the European Chemicals Agency, yet at least half are unprepared according to one survey.<sup>14</sup> Firms that preregister will then follow REACH's long-term registration schedule, which sets separate dates for various industry segments and that allows small businesses a longer time to comply. However, firms that fail to preregister by December 2008 will be required to register immediately. But REACH's bureaucratic mandates are so complicated that many firms and small businesses cannot determine if they must file and what they must report, and

14. "50 Percent of Firms 'Not Prepared' for REACH," *Chemical Week* 169, no. 37 (November 14, 2007), 5.

many are likely to miss the deadline, creating serious compliance problems for many. Such realities are likely to harm small firms the most, many of which may have to abandon business with Europe.<sup>15</sup>

In the United States, legislators are considering revisions to the Toxic Substances Control Act to reshape it into a REACH-styled program. Currently, the law allows the Environmental Protection Agency to regulate chemicals when it determines the substances pose unreasonable risks. A REACH-styled revision might apply the precautionary principle, shifting the burden by requiring industry to demonstrate safety. Senator Frank Lautenberg (D-NJ) commissioned the Government Accountability Office to study the issue and outline the differences between REACH and TSCA.<sup>16</sup> However, the Bush Administration has taken the issue in another direction, negotiating a voluntary agreement—under the Security and Prosperity Partnership (SPP)—with the governments of Canada and Mexico to increase research on chemicals. "In some ways, SPP is an unofficial response to REACH, by trying to do a better job of collecting risk assessment data on high priority chemicals," according to Bill Allmond of the Synthetic Organic Chemical Manufacturers Association.<sup>17</sup> Unfortunately, such volun-

15. "Many Small Companies May be Unaware of REACH Requirements," *Chemical Week* 169, no. 39 (November 28, 2007): 7.

16. *CHEMICAL REGULATION: Comparison of U.S. and Recently Enacted European Union Approaches to Protect against the Risks of Toxic Chemicals* (Washington, D.C.: USGAO, August 2007), <http://www.gao.gov/new.items/d07825.pdf>

17. Kara Sissell, "Global Regulations: The Burden Intensifies," *Chemical Week* 169, no. 36 (November 7, 2007): 1.

tary programs are often simply a forerunner to government regulation.

### **Conclusion**

Any serious analysis of the EU's REACH policy reveals that its economic effects are not good for Europe and its trade partners. REACH's effects could be particularly dire for new EU member nations, developing nations, and small businesses. Meanwhile, documented benefits of the program are nonexistent.

### **Key Contact**

Angela Logomasini, Director of Risk and Environmental Policy, Competitive Enterprise Institute, [alogomasini@cei.org](mailto:alogomasini@cei.org).

### **Recommended Readings**

- Logomasini, Angela. 2005. "Europe's Global REACH: Costly for the World, Suicidal for Europe." Institut Hayek, Louvain-la-Neuve, Belgium. [http://www.fahayek.org/gazette/imagesup/Reach\\_EN.pdf](http://www.fahayek.org/gazette/imagesup/Reach_EN.pdf).
- Logomasini, Angela. 2005. "EU Trade Union's OverREACHing Benefits Analysis." Institut Hayek, Louvain-la-Neuve, Belgium. [http://www.fahayek.org/index.php?option=com\\_content&task=view&id=345&Itemid=40](http://www.fahayek.org/index.php?option=com_content&task=view&id=345&Itemid=40).
- Logomasini, Angela. 2006. "Still OverREACHing: The European Union's Proposed Chemicals Policy Has Not Been Fixed." Institut Hayek, Louvain-la-Neuve, Belgium. [http://www.fahayek.org/index.php?option=com\\_content&task=view&id=1090&Itemid=1](http://www.fahayek.org/index.php?option=com_content&task=view&id=1090&Itemid=1).



# The Strategic Approach to International Chemicals Management

Angela Logomasini

The Strategic Approach to International Chemicals Management (SAICM) is a United Nations (UN) initiative designed to set up a global chemicals agency to coordinate management of chemicals, wastes, and other substances on a global scale. The program is dubbed as a voluntary initiative through which “stakeholders” will engage in efforts to ensure safe management of chemicals. Such efforts include information sharing, harmonization of chemical risk standards and labeling, and training. In addition, SAICM is supposed to ensure ratification and implementation of environmental treaties, but how those goals will be pursued is unclear. Proponents argue that centralization of chemical policy is important because of the number of chemicals in world commerce today—some estimates range up to 100,000—and because

of estimates that place chemical production as increasing by 80 percent within the next 15 years.<sup>1</sup>

## History and Background of SAICM

SAICM began as an item discussed in chapter 19 of *Agenda 21*,<sup>2</sup> an action plan agreed to at the UN Conference on Environment and

---

1. “Ministers Reach Global Agreement on Sound Management of Chemicals,” *European Report*, February 11, 2006.

2. United Nations Department of Economic and Social Affairs, “Environmentally Sound Management of Toxic Chemicals, Including Prevention of Illegal International Traffic in Toxic and Dangerous Products,” in United Nations Conference on Environment and Development, *Agenda 21: Earth’s Action Plan*, UN Doc. A/CONF.151/26, chapter 19 (New York: United Na-

Development, held in Rio de Janeiro, Brazil, in 1992. The conference also released the *Rio Declaration*, which outlined environmental goals. The *Agenda 21* action plan proposed a system for global chemicals management. Since then there have been three international meetings on SAICM, and during the last meeting, held in February 2006, several documents were finalized that form the SAICM program: the high-level policy declaration called the “Dubai Declaration,” the “Global Action Plan,” and the “Overarching Policy Strategy.”<sup>3</sup> Also during the 2006 meeting, the parties to the agreement established the Chemicals Secretariat in the UN to administer the program.

### SAICM and the Precautionary Principle

During the SAICM international meetings, the United States opposed language that set the “precautionary principle” as an object of the program—an approach that demands that products be proven safe before entering the marketplace. Domestically, U.S. regulators follow a more risk-based approach, assessing the risks of products and setting regulations that allow an “acceptable” level of risk. Under the present U.S. system, regulators must demonstrate that products are unsafe before removing them from the market. Although this approach often produces very restrictive regulations—including bans of many products—it provides some protection against arbitrary governmental coercion.

In contrast, the precautionary principle reduces regulatory accountability by shifting the burden of proof. It demands that manufactur-

ers prove that their products are safe before allowing them to enter into, or continue in, commerce. Because nothing in life is 100 percent safe, the precautionary principle means that governments can regulate products simply because they decide that products *might* pose public health risks—making regulation arbitrary and subject to political whims. During SAICM negotiations, policymakers removed language on the precautionary principle from the document, which now states that the program will “take into account” the wording of the Rio Declaration. Although this language creates some confusion as to whether the program will follow the precautionary principle, there is reason to believe that it eventually will take a precautionary approach, because the Rio Declaration endorses the principle.

### Policy Implications

SAICM represents a policy whose scope is as extensive as that of the Kyoto Protocol on climate change,<sup>4</sup> which seeks to control use of the world’s energy. SAICM covers the other half of the universe. Whereas the Kyoto Protocol attempts to regulate the world’s energy, SAICM seeks to manage matter—all nonliving physical objects on Earth. SAICM is seen as innocuous because it is considered a voluntary effort. Yet despite its nonbinding nature, SAICM is likely to possess a substantial policy role—setting global standards that will likely become models for governments to follow as the basis for environmental treaties and other international agreements that, unlike SAICM, will be binding.

tions, 2005) <http://www.un.org/esa/sustdev/documents/agenda21/english/agenda21chapter19.htm>.

3. These documents can be found online at <http://www.chem.unep.ch/saicm>.

4. The Kyoto Protocol to the United Nations Framework Convention on Climate Change was adopted on December 11, 1997. The text of the protocol can be found at [http://unfccc.int/essential\\_background/kyoto\\_protocol/items/2830.php](http://unfccc.int/essential_background/kyoto_protocol/items/2830.php).

In fact, one of SAICM's key goals is to ensure that all existing treaties related to chemical and waste disposal are ratified and become subject to implementing legislation in the various nations. The United States, a likely target of ratification and implementation efforts, has yet to ratify a number of treaties, including the Stockholm Convention on Persistent Organic Pollutants,<sup>5</sup> which bans a number of chemical internationally, and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal,<sup>6</sup> which regulates shipment of hazardous wastes.

SAICM's "Global Action Plan" offers an idea as to the program's ambitious agenda for chemicals. It includes nearly 300 "concrete measures" for the various stakeholders to pursue. Many of these measures are restrictive in nature, including, for example intentions to "restrict availability of" or "substitute" "highly toxic pesticides"; "promote substitution of hazardous chemicals"; "regulate the availability, distribution, and use of pesticides"; "halt the sale of and recall products" that pose "unacceptable risks"; and "eliminate the use" of certain "hazardous chemicals."<sup>7</sup>

### SAICM and REACH

Another reason to believe that SAICM will have a substantial regulatory role is that many

5. Stockholm Convention on Persistent Organic Pollutants, May 23, 2001, 40 I.L.M. 532, [http://www.pops.int/documents/convtext/convtext\\_en.pdf](http://www.pops.int/documents/convtext/convtext_en.pdf).

6. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, March 22, 1989, 28 I.L.M. 649, <http://www.basel.int/text/con-e-rev.pdf>.

7. Draft Global Plan of Action, SAICM, July 21, 2005, <http://www.chem.unep.ch/saicm/meeting/prepcom3/en/3-4%20GPA.pdf>.

proponents see it as the perfect vehicle for the European Union to globalize its REACH program, which became law in December 2006. REACH—which stands for Registration, Evaluation, and Authorization of Chemicals—applies a precautionary approach to chemical regulation that will be followed by government regulation, demanding that firms demonstrate safety through a complicated registration and information collection program that will inevitably result in the ban of some products.

### SAICM and Public Health

Although it is true that some of SAICM's goals are reasonable, such as ensuring that developing nations gain information regarding the proper handling of chemicals, the program is likely to fail when it comes to attaining these goals. It will fail for the same reasons that centralized economic planning has failed: government officials are too removed from the many diverse problems that individuals face in a society and lack the information necessary to solve those problems. Uniform policies will not work in the various situations around the world; such political processes tend to serve organized players rather than the common good, and policy goals are often based on misperceptions.

Market economies are better situated to address problems associated with chemicals management and some of the larger problems that hinder human well-being in developing nations. Indeed, many of the serious problems that SAICM proposes to address—such as developing nations' mismanagement of dangerous substances because of their lack of resources to pursue policies for proper handling—could be solved through the promotion of economic growth, not through expensive

global governance. The costs of SAICM will likely have the opposite result: SAICM will divert resources from more important issues and undermine commerce and economic development.

In fact, most of the world's serious environmental problems are the effects of poverty in developing nations. According to a 2001 World Bank study, *Environment Strategy Papers: Health and Environment*,<sup>8</sup> the most prevalent global environmental problem is inadequate sanitation, an issue that only economic growth can address through improved infrastructure and increased access to chemical disinfectants, such as chlorine. Next on the list of problems is limited access to modern energy sources, including electricity and fossil fuels. The lack of such amenities means that the rural poor around the world rely on burning biomass fuels—such as cow dung—in their homes as an energy source. Resulting pollution leads to an estimated 1.7 million deaths associated with respiratory illnesses each year.<sup>9</sup>

Meanwhile, UN bureaucrats fret that someone might consume trace levels of chemicals found in plastic packaging. Yet increased use of such packaging would actually benefit the world's poor—rather than increase risks. That is because the absence of such sanitary packaging and refrigeration in developing nations contributes to food spoilage (and shortages) and the spread of infectious agents, which kill tens of thousands of people every year.

SAICM is not the solution to such problems and arguably represents a serious misallocation of limited resources. Indeed, developing

nations cannot afford the regulatory burdens proposed by many of the world's environmental treaties, and many of these treaties promise to undermine economic growth. For example, a study by Liberty Institute in India shows that the Basel Convention has proved counterproductive and detrimental to development in poor nations.<sup>10</sup>

SAICM is also unlikely to improve public health in developed nations by reducing cancer rates as its proponents believe it will do. The section on chemical risk in *The Environmental Source* details why policies like SAICM are likely to have few public health benefits.

## Conclusion

SAICM represents a major international policy development, and businesses may soon be caught by surprise after the SAICM Secretariat begins to affect policy around the world. And even though SAICM is primarily intended to assist developing nations with the management of chemicals, developing nations stand to lose the most from the program, which seeks to impose burdensome regulations.

## Key Contact

Angela Logomasini, Director of Risk and Environmental Policy, Competitive Enterprise Institute, [alogomasini@cei.org](mailto:alogomasini@cei.org).

---

8. Kseniya Lvovsky, *Environment Strategy Papers: Health and Environment* (Washington, DC: World Bank, 2001).

9. Ibid.

---

10. Prasanna Srinivasan, "The Basel Convention 1989: A Developing Nation's Perspective," Liberty Institute, Delhi, September 24, 2001, [http://www.libertyindia.org/pdfs/basel\\_convention\\_srinivasan.pdf](http://www.libertyindia.org/pdfs/basel_convention_srinivasan.pdf).

### **Recommended Readings**

Logomasini, Angela. Earth Sense in the Balance. National Review Online, September 23, 2005, <http://www.cei.org/gencon/029,04853.cfm>.

Logomasini, Angela. *The U.N.'s Strategic Approach to International Chemicals Management Program Stealth Attempt at Global Regulation*. Washington, D.C.: Competitive Enterprise Institute; March 29, 2006, <http://www.cei.org/utills/printer.cfm?AID=5233>.



# International Fisheries

Michael De Alessi  
(with updates by Iain Murray)

The history of fisheries management in the United States largely is one of mismanagement, depletion, and what scientist Garrett Hardin once described as the “Tragedy of the Commons.”<sup>1</sup> In recent years, however, some progress has been made. A growing appreciation for what underlies most fisheries declines has resulted in some efforts to create positive incentives for marine conservation, most notably in Iceland and New Zealand. In the United States, however, such programs are rare and have even been prohibited in recent years under the 1996 reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act (the nation’s overarching

fisheries management legislation). On December 9, 2006, Congress again reauthorized the act to include compromises, including the authorization of such schemes.<sup>2</sup>

Fish stocks and other marine resources have suffered immeasurably from management regimes that pit fishers against regulators; the most common response to fishery depletion has been the use of regulations, such as limiting fishing seasons. Such regulations create incentives for harvesters to catch as many fish as they can, often as quickly as they can, even to the detriment of the resource—because if they don’t catch the fish, someone else will.

---

1. Garrett Hardin, “The Tragedy of the Commons,” *Science* 162, no. 3859 (1968): 1243–48.

---

2. Juliet Eilperin, “House Approves Overhaul of Rules for Fisheries,” *Washington Post*, December 10, 2006, p. A08.



In contrast, when fishers own a fishery or have some sort of property right to a certain harvest, they have incentives to maintain the long-term health of the fishery and will strive for sustainable harvests, making investments both to protect the resource and often even to enhance it. In New Zealand, for example, where harvesting rights are well defined, fishers have reduced harvests voluntarily, have invested heavily in scientific research, and in the case of the scallop fishery, also have invested in an ambitious reseeded and enhancement program.

The collapse of the once-rich fisheries along the Georges Bank off the coast of New England serves as a dramatic testimony to both the failure of fishery management in the United States and the fatal flaws of regulatory attempts to prevent overfishing. Traditional limits on seasons and fishing gear simply encourage harvesters to figure out ways around the restrictions. Limit the number of fishing days, for example, and fishing efforts will simply intensify during the permitted period. The quota- and subsidy-driven Common Fisheries Policy of the European Union (EU) is another example of failed management systems that purportedly protect resources but in fact deliver perverse incentives. Without any sense of ownership, individuals are not likely to attempt to conserve or enhance marine resources, because the benefits of doing so are diluted throughout the fishery. Fishers have no desire to destroy their own source of livelihood, but as long as the rules of the game reward overharvesting, fish stocks will continue to decline.

### Private Ownership

Privately owned marine resources are better protected. One well documented study that

compared public oyster beds in Maryland to privately leased oyster beds in Virginia shows how private management of marine resources is superior to its open-access and government-managed counterparts.<sup>3</sup> The study found that leased beds are better managed and far more productive. In places like Alabama, artificial reefs, despite becoming public property as soon as they hit the water, also have demonstrated the potential for private investment in marine conservation (knowing exactly where the reefs are offers enough of a sense ownership to reward investment).

Private rights developed in common also have conserved resources successfully in traditional communities like those of Maine lobster fishers, who have protected lobster grounds by informally marking out territories and limiting fishing access to a well-defined group. Defining their territories allows the members of the group to realize the benefits of stewardship, and studies have shown that conservation is markedly improved within those territories. Nothing would prevent those regimes from remaining or evolving under a system of private ownership of marine resources. From outright fee-simple ownership of oyster beds in Washington to proprietary ownership of artificial reefs in Alabama, marine habitat is being conserved and enhanced privately. Those with an interest in fisheries conservation should recognize the regimes that already exist and give fishers the ability to create new regimes, which would allow them to become stewards of the ocean environment.

---

3. Richard J. Agnello and Lawrence P. Donnelley, "Property Rights and Efficiency in the Oyster Industry," *Journal of Law and Economics* 18, no. 2 (1975): 521-33.

## The Role of Technology

Advanced technologies are often blamed for fisheries depletion, but they could protect and monitor marine resources. Consider that the oceans are similar to the American West in the early 1800s, when enclosing and monitoring land and cattle were unthinkable. But once private property rights were clearly allocated in the West, owners and entrepreneurs rapidly developed branding registries—and later, barbed wire—to effectively define and defend their property. Technologies already exist that could start “fencing” and “branding” marine resources, if only rights to them were clearly defined.

Technologies such as sonar (used to detect the presence of marine life using sound waves), satellites, and unmanned submersibles (used to monitor the whereabouts of specific animals or aggregations of marine life) are increasingly available and adaptable to fisheries management. To date, such technologies often have been used only to increase harvesting capacity, and with their use have come charges of vacuuming the sea. But blame should not be laid on technology. The real problem lies with open access to resources and inadequate regulatory schemes.

Indeed, recent technological developments have seen the introduction of selective gear that can extract particular species from mixed fisheries in an almost surgical fashion, leaving other species untouched. Technology is also solving the issue of undersized fish, allowing them to escape and survive. Such developments are in fact the reverse of vacuuming the sea. However, certain regulations, such as those in the EU’s Common Fisheries Policy, actively discourage—even penalize—the adoption of such technology.

## The Role of Subsidies

Production subsidies are commonly used in European and developing countries to encourage fishing and thereby “protect” traditional industries. Such subsidies merely contribute to the overfishing of resources and should be banned or opposed wherever possible. Moreover, the subsidies appear to be the subject of large-scale fraud.<sup>4</sup>

Proponents of subsidies also sometimes justify them by claiming that the political risks of fishery closure scare off private investment in the fishing industry. Reducing political risk by providing a stable, predictable framework for the industry based on genuine, tangible property rights that encourage conservation would satisfy that concern.

### Individual Transferable Quotas

In addition to full-fledged property rights schemes, some recent innovations, particularly the Individual Transferable Quota (ITQ) system, are now working toward changing fisher’s motivations. ITQs grant fishers a right to a percentage of a total harvest, so that healthier fish populations translate into rights to catch a greater number of fish and an increase in the value of that ITQ. Under an ITQ system, the rights are

4. See, for example, various reports from Oceana, such as, “In 2005 and 2006, Oceana documented numerous boats in the Mediterranean using illegal driftnets. Many of these boats were the recipients of subsidies from Italy and the European Union (EU) to convert to legal nets—a program that has given out more than \$200 million Euro (\$240 million)—yet were still using the illegal gear.” See Oceana, “Pirates and Plunder: Fisheries Subsidies Support Illegal or Rogue Fishing,” Oceana, Washington, DC, [http://www.oceana.org/fileadmin/oceana/uploads/dirty\\_fishing/cut\\_the\\_bait/2007\\_Subs\\_outreach\\_kit/Pirates\\_and\\_Plunder\\_FINAL.pdf](http://www.oceana.org/fileadmin/oceana/uploads/dirty_fishing/cut_the_bait/2007_Subs_outreach_kit/Pirates_and_Plunder_FINAL.pdf).

transferable, so owners can realize the gains from any improvements in the fishery, thereby encouraging owners to invest time, effort, and capital into research and stewardship. ITQs are not well suited to every fishery, and they do not translate directly into private ownership of actual fish or fish habitats (which would create even stronger stewardship incentives), but they definitely are a step in the right direction.

ITQs have proved effective in other countries and in the United States, and they can be an important acknowledgment of the power of private stewards to protect the environment. However, ITQs are only limited property rights. Legislative limitations on ownership and transferability will devalue rights and discourage conservation and stewardship because the motivation for those activities is to increase the value of the quota. Devalued quotas will mean that harvesters will have little interest in working to improve the fishery's health and productivity. Restrictions imposed by lawmakers could also lead ITQs to resemble "taxi cab medallions" more closely than private rights, which creates an interest in limiting competition and a vested interest in maintaining the status quo.

New Zealand and Iceland have the most extensive ITQ programs by far, and both programs have been in existence for more than 10 years. In both countries, fisheries management has improved dramatically, as have a number of fish stocks managed by ITQs. Problems persist, such as political wrangling and reallocation of quotas to recreational anglers, but the overall improvement has been remarkable. ITQs are not a panacea and will be ill suited in some cases, but they should not be dismissed entirely.

ITQs may well be unsuitable in areas where mixed fisheries predominate. The system creates

problems with bycatch discarding and encourages the practice of throwing back smaller and lower-value fish of targeted species in the hopes of catching larger ones—*high grading*, as it is known. Therefore, there may be areas where a system based on tradable days at sea, together with "incentive day" rewards for good practices (such as using better technology and not sending out ships with insufficient crew) and bycatch limits, would be preferable.<sup>5</sup> However, the central principle remains that of creating an ownership stake in a resource so as to encourage growth in the value of the underlying resource.

## Recommendations

Several recommendations can be made:

- Lawmakers should make sure that there are no explicit restrictions on the rights-based management tools available to fishery managers. If fishing interests can agree on a system of private or quasi-private rights to manage the marine resources they depend on for a living, managers should have the leeway to grant those rights.
- Lawmakers should implement policies that employ private property rights. Open access to valuable resources is an appealing concept but a proven failure. Access to all will leave a valuable resource for none. Under a system of property rights, everyone will still have an opportunity to fish, but with strong incentives to conserve fisheries and other marine resources.
- International negotiations should seek to reduce or eliminate subsidies that promote

5. See, for example, Owen Paterson, "Consultation on a National Policy on Fisheries Management in U.K. Waters," Conservative Party Green Paper, January 2005, <http://www.conservatives.com/pdf/fishinggreenpaper.pdf>.

overfishing by providing a stable, predictable framework that will encourage private investment in fisheries without the perverse incentives subsidies provide.

Reconciliation of competing commercial, recreational, and environmental concerns and prevention of further degradation of the marine environment require some form of private ownership rights. The exact specification of rights, which may take the form of anything from transferable fishing quotas to extensions of programs that allow for leasing of the sea for aquaculture or offshore oil exploration, is not important. What is important is that we start moving away from the “Tragedy of the Commons” toward stewardship.

### **Key Contacts**

Iain Murray, Senior Fellow, Competitive Enterprise Institute, [imurray@cei.org](mailto:imurray@cei.org).

### **Recommended Readings**

- Christy, Francis. 1996. “The Death Rattle of Open Access and the Advent of Property Rights Regimes in Fisheries.” *Marine Resource Economics* 11, no. 4: 287–304.
- De Alessi, Michael. 2000. “Fishing for Solutions: The State of the World’s Fisheries.” In *Earth Report 2000: Revisiting the True State of the Planet*, 85–114. ed., Ronald Bailey. New York: MacGraw-Hill.
- De Alessi, Michael. 2004. “Catching the Aquaculture Wave.” Grassroot Institute of Hawaii, Honolulu.
- Markels, Michael. “Fishing for Markets: Regulation and Ocean Farming.” *Regulation* 18, no. 3 (1995): 73–79, <http://www.cato.org/pubs/regulation/reg18n3h.html>.
- National Research Council. 1999. *Sharing the Fish: Toward a National Policy on Individual Fishing Quotas*. Washington, DC: National Academies Press.



---

# **Lands and Wildlife**

---





# Measuring the Scope of Federal Land Ownership

Angela Logomasini

During much of American history, land-use regulation was not a federal issue. The American system was biased against an active federal role in land ownership and long-term management. It focused instead on limiting federal powers to those specifically enumerated in the U.S. Constitution, such as individual rights and protection of private property. Accordingly, newly acquired federal lands were to be dispensed to the public, eventually becoming private lands that would be put to productive use. However, in modern times, these trends have been significantly reversed. Federal controls on public and private lands have grown and continue to expand, affecting private property, recreation, and small businesses involved in resource industries—putting many of them out of business.

## Background

After the Louisiana Purchase and acquisition of the western lands of the United States, the federal government owned about 80 percent of the total U.S. territory. Given the constitutional bias for private property, the government eventually transferred 1.1 billion acres to states and private parties under various federal programs.<sup>1</sup> In particular, the Homestead Act of 1862 granted freehold property to anyone who assumed control of 160 acres of government land, which they were to improve by growing crops or at least keeping a home on the property. An indi-

---

1. Betsy A. Cody, *Major Federal Land Management Agencies: Management of Our Nation's Lands and Resources* (Washington, DC: Congressional Research Service, 1995), <http://cnie.org/NLE/CRSreports/Natural/nrgen-3.cfm>.

vidual who worked or lived on such a plot for five years would then gain full ownership. Stewardship of these lands would result from private effort or state-level regulation at the most.

During the first half of the 20th century, the limited government philosophy gave way to progressivism in many areas, including environmental policy. Progressives ensured that their views were articulated in numerous public policies, shifting the federal focus from divestiture toward acquisition and management.

At the same time, land management policy moved away from resource use toward conservation and preservation goals, eventually limiting access for ranchers, foresters, recreationists, and those seeking access to energy resources. Such trends continue even though the federal government could facilitate resource use in a manner consistent with environmental goals. As an example, resource extraction can prove beneficial, particularly when it eliminates diseased trees and reduces fire risk.

### Scope of Federal Land Ownership and Control

One of the most comprehensive reviews of land management and ownership policy was produced by the General Accounting Office (now the Government Accountability Office—GAO) in 1996. It reported on ownership and use of federal lands managed by four agencies: the Department of Agriculture’s U.S. Forest Service and the Department of the Interior’s Bureau of Land Management, U.S. Fish and Wildlife Service, and National Park Service.

According to GAO, these four agencies have jurisdiction over and regulate 95 percent of federal lands. The Department of Defense controls the rest. Total federal land ownership is substantial, amounting to about 30 percent of

the U.S. landmass or about 650 million acres.<sup>2</sup> Most federal ownership is concentrated in the Western United States, exceeding 50 percent in 5 western states and 20 percent in 12. Hence, the impact of land-use regulations is very substantial in some markets.<sup>3</sup>

GAO reported that overall federal landownership between 1964 and 1994 for the four environmental agencies declined from 700.8 million acres to 622.8 million.<sup>4</sup> One might conclude that such a reduction indicates that federal land-use regulation has declined in at least one area. However, closer inspection reveals a different story.

Federal land ownership increased for three out of the four environmental agencies involved: U.S. Forest Service territory expanded by about 5 million acres, Fish and Wildlife Service territory expanded by about 65 million acres, and National Park Service territory expanded by about 49 million acres.<sup>5</sup>

The agencies that gained greater control over lands are those whose missions are more consistent with the progressive environmental movement’s emphasis on preservation than with a conservation emphasis that allows resource use and recreation. Based on these missions, a logical ranking of the agencies from most resource-use intensive to most focused on conservation seems as follows:

- Bureau of Land Management: “It is the mission of the Bureau of Land Management to sustain the health, diversity, and productiv-

2. U.S. General Accounting Office, *Land Ownership: Information on the Acreage, Management, and Use of Federal and Other Lands*, GAO/RCED-96-40: (U.S. General Accounting Office, Washington, DC, 1996), 14.

3. *Ibid.*, 23–24.

4. *Ibid.*, 2.

5. *Ibid.*, 19.

ity of the public lands for the use and enjoyment of present and future generations.”<sup>6</sup>

- U.S. Forest Service: “The mission of the USDA Forest Service is to sustain the health, diversity, and productivity of the Nation’s forests and grasslands to meet the needs of present and future generations.”
- U.S. Fish and Wildlife Service: The U.S. Fish and Wildlife Service describes its mission as “working with others, to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.”<sup>7</sup>
- National Park Service: “The National Park Service preserves unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations. The Park Service cooperates with partners to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout this country.”<sup>8</sup>

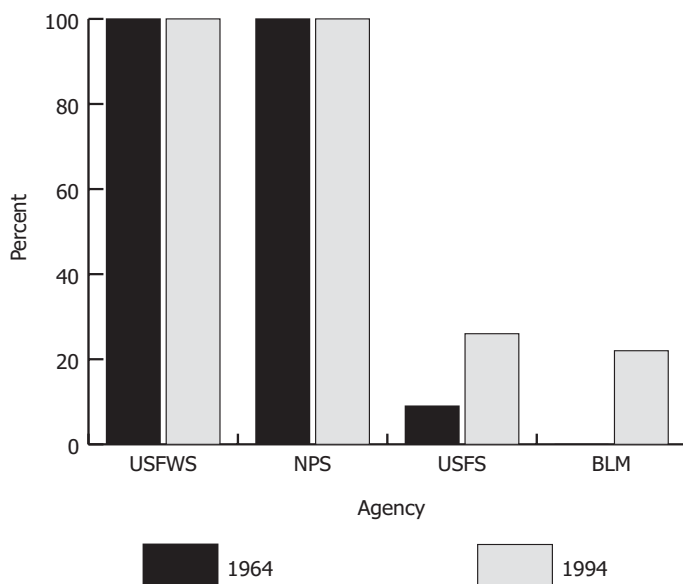
GAO confirms this ranking by assessing the amount of land that each agency has available

6. Bureau of Land Management, Office of Public Affairs, “BLM Facts,” Bureau of Land Management, Washington, DC, June 7, 2006, <http://www.blm.gov/nhp/facts/index.htm>.

7. U.S. Fish and Wildlife Service, “Who We Are,” U.S. Fish and Wildlife Service, Washington, DC, June 7, 2006, <http://www.fws.gov/who>.

8. National Park Service, “The National Park Service: Caring for the American Legacy,” November 25, 2007, <http://www.nps.gov/legacy/mission.html>.

**Figure 1. Federal Land Managed for Conservation**



Source: U.S. Government Accountability Office.

for conservation and preservation. The Bureau of Land Management is the least conservation focused, followed by the U.S. Forest Service. The National Park Service and the U.S. Fish and Wildlife Service, according to GAO, have always dedicated 100 percent of their property to conservation and preservation goals. Also of note, GAO shows a considerable shift from resource use to conservation between 1964 and 1994 (see figure 1).

Not surprisingly, the Bureau of Land Management—whose mission is the most focused on resource use—is the only agency that saw a decline in landholdings. It relinquished control of 197 million acres between 1964 and 1994. However, its reduced landholding is not indicative of reduced federal controls overall, nor does it indicate increased development of public lands. In fact, not much of this land was privatized or turned over for resource use. More than 113 million acres were simply transferred

to the state of Alaska and Native Alaskans. And even with that shift, GAO reports that in 1994, the federal government still owned 63 percent of the state of Alaska.<sup>9</sup>

Agencies with greater focus on preservation—reflecting progressive environmental ideals—gained the most. The more conservation-focused Fish and Wildlife Service received 49 million acres of Bureau of Land Management land; the National Park Service received 41 million acres.<sup>10</sup> Such shifts represent movement away from resource use policies toward more preservationist ones.

The growth of federal land control and ownership is apparent in most states. The number of acres managed by land agencies increased in 46 states and decreased in only 4. In some states—Arizona, California, Florida, Nevada, and Wyoming—the shift toward federal ownership was substantial, with more than 1 million acres becoming federal property. Federal ownership declined in Alaska, Idaho, New Mexico, and Utah.<sup>11</sup> These findings indicate that the federal government is in general accruing land in states that have higher-valued real estate, such as California and Florida, while dispensing with lands in lower-valued areas such as Utah and Alaska.

The amount of federal land managed for conservation purposes—that is “national parks, national wildlife refuges, wilderness and wilderness study areas, wild and scenic rivers, and areas of critical environmental concern”<sup>12</sup>—has grown by 66 million acres.<sup>13</sup> In total, more than

272 million acres out of 622.8 acres—or about 44 percent—were managed for conservation rather than resource use by 1994, according to GAO.<sup>14</sup> Again, this trend lends support to the contention that federal land policy has shifted in favor of environmental interests.

In addition to expanding conservation- and preservation-related territories, the federal government also increased its rights of use on 3 million acres of nonfederal land.<sup>15</sup> These rights include rights for the public or government agencies to cross lands owned by private parties, nonprofit organizations, or nonfederal government entities.

Also of note, GAO reports that between July 1964 and September 1994, environmental organizations transferred 3.2 million acres of land to the federal government.<sup>16</sup> Such transfers are indicative of environmentalist support for federal land management policies, because few such organizations would transfer lands unless they had some assurance that the federal government would promote the environmentalist agenda of preservation of such lands—shifting them away from resource use activities and public access.

Since 1994, total land ownership by the four environmental agencies has grown from 622.7 million acres to 629.3 million acres. The U.S. Forest Service grew from 191.6 million acres in 1994 to 193 million acres by 2006.<sup>17</sup> The U.S. Fish and Wildlife Service land management portfolio grew from 87.5 million acres in

9. U.S. General Accounting Office, *Land Ownership*, 24.

10. *Ibid.*, 20.

11. *Ibid.*

12. *Ibid.*

13. *Ibid.*, 6.

14. *Ibid.*, 24.

15. *Ibid.*, 6.

16. *Ibid.*, 7.

17. For the 1994 figures, see U.S. General Accounting Office, *Land Ownership*, 6; for the 2006 figure, see U.S. Forest Service, “About Us,” U.S. Forest Service, Washington, DC, January 30, 2007, <http://www.fs.fed.us/aboutus>.

1996 to 96 million acres of wildlife refuges in 2006.<sup>18</sup> The National Park Service land ownership grew from 76.6 million acres in 1994 to 79.3 million acres in 2006.<sup>19</sup> As occurred in the prior two decades, the Bureau of Land Management continued to lose property, while more conservation-focused agencies gained. Land managed by the Bureau of Land Management declined from 267.1 million acres in 1994 to 261 million acres by 2006.<sup>20</sup>

### Growth of Wilderness Regulation

Another way to demonstrate the trend toward preservation on public lands involves assessing the amount of land designated as wilderness in the past several decades. The National Wilderness Act of 1964 created the National Wilderness Preservation System, a network of public lands that receive special protections from development and other uses.

18. For the 1994 figures, see U.S. General Accounting Office, *Land Ownership*, 6; for the 2006 figure, see U.S. Fish and Wildlife Service, “President Seeks More than \$2 Billion for U.S. Fish and Wildlife Service in 2007 Budget,” press release, U.S. Fish and Wildlife Service, Washington, DC, February 6, 2006, <http://www.fws.gov/budget/2007/FY07%20press%20release.htm>.

19. For the 1994 figures, see U.S. General Accounting Office, *Land Ownership*, 6; for the 2006 figure, see National Park Service, “The National Park System Acreage,” National Park Service, Washington, DC, June 8, 2006, <http://www.nps.gov/legacy/acreage.html>. The National Park Service states that it was responsible for managing “83.6 million acres [in 2006], of which more than 4.3 million acres remain in private ownership,” meaning 79.3 million acres were government owned.

20. For the 1994 figures, see General Accounting Office, *Land Ownership*, 6; for the 2006 figure see Bureau of Land Management, Homepage, Bureau of Land Management, Washington, DC, June 8, 2006, <http://www.blm.gov/nhp/index.htm>.

Under the act, Congress periodically designates land as “wilderness.” The act declared that, once designated by Congress, wilderness areas “shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness.”<sup>21</sup> The intent of such designations was to reduce their use for resource industries and focus on “recreational, scenic, scientific, educational, conservation, and historical use.”<sup>22</sup> Although all resource use was not eliminated, wilderness designations can limit such use considerably; the growing number of wilderness areas reflects the emphasis on preservation over resource use.

Figure 2 shows a considerable and steady expansion of the amount of federal land designated as wilderness. In 1980, Congress added more than 56 million acres to the system with the passage of the Alaska National Interest Lands Conservation Act. Since then, Congress has continued to add land, but at a slower pace.

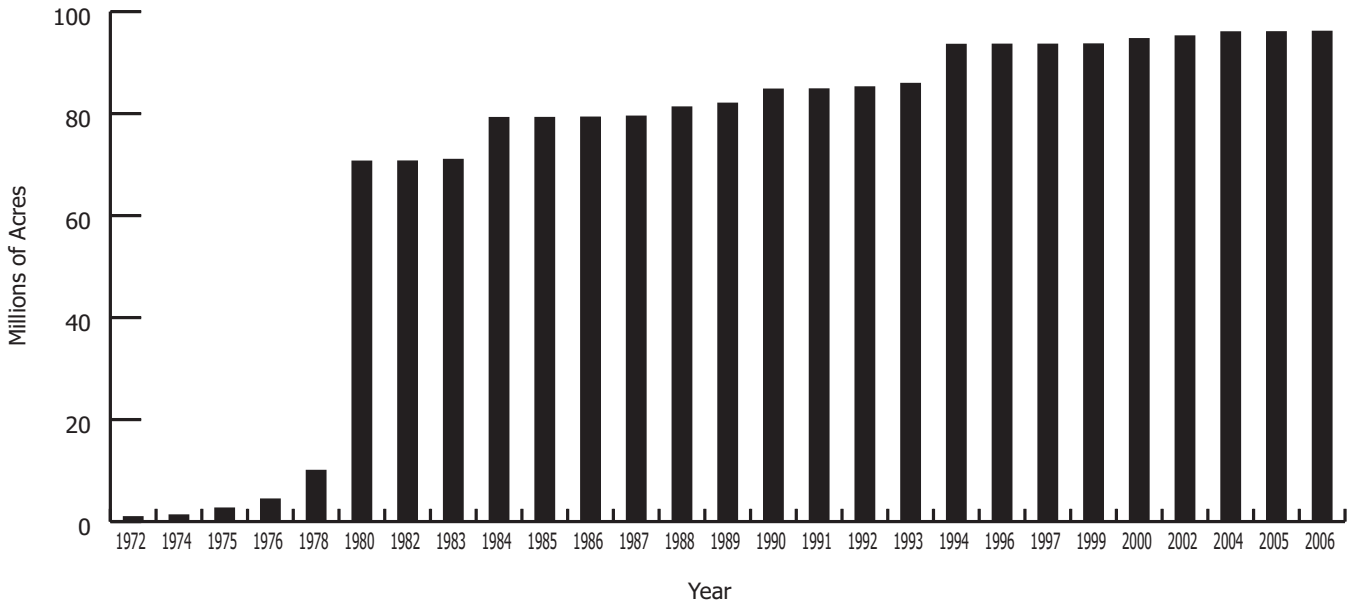
The federal government also implements a similar law for wild and scenic rivers. Congress can designate rivers for protection under the Wild and Scenic Rivers Act, which states that these rivers

shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations.

21. National Wilderness Act, Public Law 88-577, section 2(b).

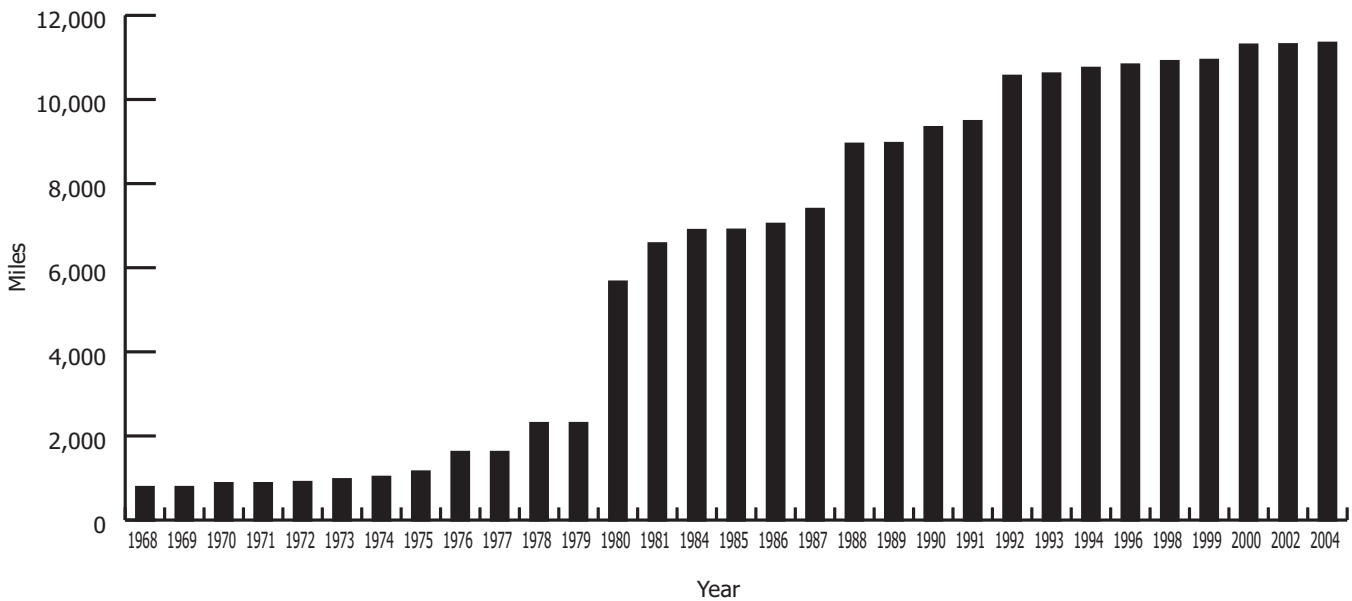
22. *Ibid.*, section 4(b).

**Figure 2. Wilderness Acreage by Year**



Source: *Wilderness.net*, a partnership of the University of Montana, the Wilderness Research Institute, and the National Wilderness Training Center.

**Figure 3. Miles of River Designated as Wild and Scenic**



Source: National Park Service.

The Congress declares that the established national policy of dam and other construction at appropriate sections of the rivers of the United States needs to be complemented by a policy that would preserve other selected rivers or sections thereof in their free-flowing condition to protect the water quality of such rivers and to fulfill other vital national conservation purposes.<sup>23</sup>

As with the wilderness designations, nearly every year since the Wild and Scenic Rivers Act was passed Congress has added more miles of

river to the list, expanding regulation and protection along them (see figure 3).

The data show that federal land-use controls are growing—in terms of both ownership and management. Subsequent policy briefs will show that such politically driven preservationist management over an increasing amount of land has actually undermined environmental goals substantially. In addition, other policy briefs document how privately managed lands suffer far less from serious environmental problems and are managed to allow long-term resource renewal.

---

23. Public Law 90-542, section 1(b).





---

# **Pesticide Regulation**

---



# Pesticide Regulation Overview

Angela Logomasini

Pesticide residues found on domestic and imported produce pose little, if any, risk to public health, particularly compared with the enormous public health benefits of pesticide use.<sup>1</sup> However, for more than a decade, federal pesticide policies have placed in jeopardy the ability to address the greater risks associated with insects and other pests. Applying federal

law, the U.S. Environmental Protection Agency (EPA) has banned numerous pesticides that are both safe and useful for farming, home pest control, and other public health purposes.

## Statutory Scheme

The EPA regulates pesticides under three laws:

- **Federal Food Drugs and Cosmetics Act (FFDCA).** The FFDCA is the law under which the EPA sets tolerances for pesticides. The EPA can essentially ban a pesticide by not setting a tolerance—the amount of pesticide residue that is allowed to legally remain on food. The Agricultural Marketing Service, an agency of the U.S. Department

---

1. According to one National Research Council report, “The great majority of individual naturally occurring and synthetic chemicals in the diet appear to be present at levels below which any significant adverse biological effect is likely, and so low that they are unlikely to pose any appreciable cancer risk.” See Committee on Comparative Toxicity of Naturally Occurring Carcinogens, Board on Environmental Studies and Toxicology, Commission on Life Sciences, National Research Council, *Carcinogens and Anticarcinogens in the Human Diet* (Washington, DC: National Academies Press, 1996), 336–37.

of Agriculture (USDA), is responsible for monitoring residue levels in or on food. The U.S. Department of Health and Human Service's Food and Drug Administration uses this information to enforce tolerances on imported and domestically produced food in interstate commerce. The USDA's Food Safety Inspection Service enforces tolerances for meat, poultry, and some egg products.

- **Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).** To sell a pesticide, a company must also register it with the EPA under FIFRA. For pesticides used on food, the EPA can register uses only for pesticides that have a tolerance. Pesticide registrants must register and gain EPA approval of their products as well as for each specific use (i.e., use indoors as a bug spray requires one registration and use outdoors for a specific crop requires another). The EPA must review registered pesticides on a 15-year cycle. To gain registration, applicants must submit scientific data and research demonstrating that the products pose minimal risk. The EPA can limit uses by denying registration for such uses.
- **Food Quality Protection Act (FQPA).** The FQPA amended the first two laws. Details on these changes follow.

### **Brief History of Pesticide Regulation and Legislation**

Before 1996, the FFDCA used two standards for setting tolerances. One standard allowed the EPA to regulate pesticide residues on raw produce using a cost-benefit approach. The agency could weigh the risks of using the pesticides versus the risks of not having them to help maintain the food supply. Under that legislative authority, the EPA applied what it called a

“negligible risk” standard, allowing produce to contain pesticide residues that did not exceed a one-in-a-million cancer risk.

However, the FFDCA set a separate standard for pesticide residues found in processed food. It applied the “Delaney Clause,” which prohibited the addition to food of any substance that caused cancer in laboratory animals. The Delaney Clause essentially set a zero-risk standard. It applied to pesticides used directly or indirectly in processed food. It also applied to pesticide residues found on raw agricultural products that were used in processed food, if the pesticide became more concentrated during processing.

As science became able to detect increasingly lower levels of residues, the Delaney Clause essentially demanded that the EPA ban many pesticides. In addition, having separate standards for raw produce and processed food created perverse effects, which the National Research Council (NRC)<sup>2</sup> noted could actually reduce safety. In a 1987 report, *Regulating Pesticides in Food: The Delaney Paradox*, the NRC highlighted problems with the existing policy.<sup>3</sup> The NRC raised concerns about alternative pest control practices that could pose greater risks or could prove inadequate to maintain food supplies and control disease-carrying pests. The NRC called on Congress to address this issue, suggesting that it set a single standard for raw and processed foods.

In 1988, the EPA began applying the negligible risk standard to processed foods without legislative authorization. But in 1992, environmental groups succeeded in suing the

2. The NRC is an affiliate of the National Academy of Sciences.

3. Board on Agriculture, National Research Council, *Regulating Pesticides in Food: The Delaney Paradox* (Washington, DC: National Academies Press, 1987).

agency for not applying the Delaney Clause. A federal court held that the agency was obligated to apply the Delaney Clause to processed food.<sup>4</sup>

Hence, for those who used and produced pesticide products, reforming the law became an urgent matter. With numerous bans likely, many crops—and ultimately our food supply—would be placed in jeopardy. In addition, concerns mounted about the increasing difficulty associated with controlling rising infectious diseases, carried by insects and other pests.<sup>5</sup>

Meanwhile, environmental groups worked to make the law more stringent. Their efforts were bolstered by a 1993 NRC report and the media hype that followed. The report, *Pesticides in the Diets of Infants and Children*, noted that children might be more susceptible to pesticides and hence they faced greater risks.<sup>6</sup> Despite media hype suggesting the contrary, the study did not conclude that existing exposures were unsafe for children. Specifically, the study noted that “exposures occurring earlier in life can lead to greater or lower risk of chronic toxic effects such as cancer than exposures occurring later in life.”<sup>7</sup> Just to be safe, the report recommended that EPA use a 10-fold safety factor when setting pesticide regulations.

4. *Les v. Reilly*, 968 F.2d 985 (9th Cir. 1992), cert. denied, 113 U.S. 1361 (1993).

5. See Joshua Lederberg, Robert E. Shope, and Stanley C. Oaks Jr., eds., *Emerging Infections: Microbial Threats to Health in the United States* (Washington, DC: National Academies Press, 1992), especially 163–67, <http://www.nap.edu/books/0309047412/html/index.html>.

6. Committee on Pesticides in the Diets of Infants and Children, National Research Council, *Pesticides in the Diets of Infants and Children* (Washington, DC: National Academies Press, 1993).

7. *Ibid.*, 359.

## Food Quality Protection Act Reforms

The FQPA attempts to address the conflicting standards within the first two pesticide laws. The FQPA changed the standard for setting tolerances. It applies a single standard for all pesticide uses and requires the EPA to show “reasonable certainty that no harm will result from aggregate exposure to the pesticide chemical residue, including all anticipated dietary exposures and all other exposures for which there is reliable information.”<sup>8</sup> The FQPA mandated that the EPA apply this standard to all pesticide registrations, new and old. Accordingly, the EPA is working to reregister the thousands of pesticides registered before the passage of the FQPA.

The bill was supported unanimously by both houses of Congress and lauded by members of agricultural states and farm interests. Many believed that it would dramatically improve pesticide approvals. But rather than solving these problems, the FQPA gave vital ground to those pushing for more stringent regulation. Not surprisingly, environmental groups supported the FQPA because they believed that it would prove even more stringent and would lead to many pesticide bans in the future.<sup>9</sup>

Following the advice of *Pesticides in the Diets of Infants and Children*, the reform included

8. 21 USC § 346a(b)(2)(A)(ii).

9. After passage of the FQPA, Competitive Enterprise Institute’s Jonathan Tolman noted in the *Wall Street Journal* that the 1996 law was more stringent than the old law and would lead to bans. A response by the Natural Resources Defense Council’s Albert Meyerhoff concurred that the law was more stringent and would enable environmental groups to pursue bans. See Jonathan Tolman, “The Real Pests Aren’t in the Food,” *Wall Street Journal*, September 18, 1996, A18, and Albert H. Meyerhoff, “Law Makes Food Safer for Children,” Letters to the Editor, *Wall Street Journal*, October 7, 1996, A23.

several new criteria that now apply very strong standards to both processed and raw foods. When setting standards under the new law, the EPA must consider (a) the impacts of the pesticide on infants and children, applying a 10-fold safety factor unless information is available to demonstrate safety; (b) the aggregate exposure (the total exposure of individuals to various sources of the pesticide); and (c) whether the cumulative effects of a combination of pesticides could increase health risks.<sup>10</sup>

In addition, the law created the Endocrine Disrupter Screening Program, under which the EPA must study pesticides that are potential

endocrine disrupters.<sup>11</sup> The program is designed to simply add to the body of research on endocrine disrupters, but the agency has indicated that the program will serve as a guide for regulatory decisions.<sup>12</sup>

The following briefs provide additional information on the FQPA and its implications. The first discusses some of the science and implementation issues in general. Two others address the impact that federal pesticide policy can have on public health and well-being related to agricultural productivity and control of disease-carrying pests. The final brief discusses the issue of pesticides in schools.

---

10. 21 USC § 346a.

---

11. For more information on endocrine disrupters, see the policy brief titled “Endocrine Disrupters.”

12. See *Draft User’s Guide for the Endocrine Disrupter Priority Setting Database* (Washington, DC: EPA and Eastern Research Group, 2000). A contractor produced this publication for the EPA. Page 1-1 states that the program will eventually help EPA “determine how best to regulate” chemicals.



# Food Quality Protection Act

Angela Logomasini

In 1996, the Food Quality Protection Act (FQPA) amended the two federal laws governing pesticides: the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Federal Food, Drugs, and Cosmetics Act (FFDCA). Congress's goal was to address disparities between the two laws governing pesticide regulation and to address concerns that federal pesticide regulations were overly stringent. At the time, the onerous pesticide standards were leading the U.S. Environmental Protection Agency (EPA) to cancel many vital pesticide uses.<sup>1</sup>

The hope was that the FQPA would ensure a more scientifically sound process that kept risks low while allowing continued use of many im-

portant products. However, the FQPA created new and unexpected problems and may, in fact, prove as onerous as the former law. Although many have claimed that the problems emanate from poor EPA implementation, problems have also resulted from new onerous standards written into the FQPA. Addressing these issues will likely require congressional action.

## Statutory Scheme

Before entering commerce, pesticides must gain registration for each specific use (e.g., use as indoor bug spray or on a specific crop) under FIFRA. To gain registration, registrants must provide data that demonstrate that does not pose an unreasonable safety risk. Without such EPA approval, firms may not sell any pesticidal

---

1. For an overview of the history before this law, see the policy brief titled "Pesticide Regulation Overview."

product, although EPA can allow for emergency uses of certain products. In addition, the FFDCA requires that the EPA set “tolerance levels” for pesticides used on foods (as opposed to other uses, such as to control insects, rodents, or microbes). Tolerance levels specify how much pesticide exposure the EPA will allow as residue on foods. For example, the EPA sets a level that it believes, on average, will limit individuals’ exposure to pesticide residues found on apples, assuming an individual eats a certain number of apples every day for 70 years.

The FQPA added some additional considerations. The law sets a general standard wherein the EPA must show “reasonable certainty” that a pesticide will “do no harm.”<sup>2</sup> The requirement alone is quite stringent. The language and the legislative history indicate that this standard is equivalent to a risk not greater than one in a million.<sup>3</sup> But that is just the beginning. The standards must be even more stringent because under the FQPA, the EPA must now also consider the following:

- **Aggregate exposure.** The “aggregate exposure” standard requires the EPA to consider all exposure pathways of a single pesticide when setting tolerances. For example, the EPA must consider whether a person eating an apple that contains specific pesticide residue also is exposed to the same pesticide from consumer products, such as bug sprays or household disinfectants. Hence, the tolerance level for a pesticide would have to include all conceivable exposures—reducing the amount of allowable residue.

2. 21 USC § 346a(b)(2)(A)(ii).

3. For an analysis, see Frank Cross, “The Consequences of Consensus: Dangerous Compromises of the Food Quality Protection Act,” *Washington University Law Quarterly* 75, no. 3 (1997): 1155–206.

- **Cumulative exposure.** Under the “cumulative exposure” standard, the EPA must consider the impact of groups of various pesticides. There are two aspects in particular. First, it must group pesticides that supposedly cause cancer in a similar way—pesticides that have a so-called common mechanism for toxicity. Second, it must add all the exposures— inhalation, oral, dermal—of these pesticides and limit exposure to them as a group. This task is very difficult because the science is not always clear on the mechanisms for causing cancer for all of these substances, nor is it clear whether cumulative exposures actually increase risk. Claims about such cumulative exposure risks gained steam with a study conducted by researchers at Tulane University. It claimed that, when combined, endocrine disruptors were 1,000 times more potent. When other researchers could not replicate this result, the Tulane researchers retracted the study.<sup>4</sup> Despite the retraction, the idea that synergistic effects of chemicals multiply potency prevails among activists. And the concept has even made its way into law. After the Tulane study was published in *Science*, Congress passed provisions in the 1996 FQPA calling on the EPA to consider such cumulative exposures when issuing regulations. Subsequently, several studies reported no synergistic interactions with the chemicals.
- **Safety Factor for Children.** The new law requires the EPA to consider risks to children

4. The original study was Steven F. Arnold, Diane M. Klotz, Bridgette M. Collins, Peter M. Vonier, Louis J. Guillette Jr., and John A. McLachlan, “Synergistic Activation of Estrogen Receptor with Combinations of Environmental Chemicals,” *Science* 272, no. 5267 (1996): 1489–92; the retraction is John A. McLachlan, “Synergistic Effect of Environmental Estrogens: Report Withdrawn,” *Science* 277, no. 5325 (1997): 459–463.

and to apply a 10-fold safety factor unless the EPA determines that a lower safety factor is acceptable. The EPA notes that it will apply this 10-fold factor in addition to the 100-fold safety factor it currently applies when setting standards. Hence, when the EPA applies the 10-fold safety factor for children, it will actually apply a 1,000-fold safety factor.

### Already Conservative Risk Estimates Become More Stringent

Even before Congress made the law more stringent with the FQPA, the EPA used very conservative risk estimates. Given EPA risk assessment methodologies, pesticide safety regulations already applied safety margins that ensured exposure levels were thousands of times lower than levels EPA deemed safe. For example:

- Bureaucrats set standards to ensure safe exposures even if a farmer applied the full legal limit of all pesticides licensed for use on a given crop. Yet farmers apply only a fraction of the legal limits and do not apply all pesticides licensed for a particular crop. For example, University of Texas Professor Frank Cross notes that one study shows that farmers in California use about 25 percent of their legal limit for tomatoes, and each farmer uses no more than 5 of 54 licensed pesticide products.<sup>5</sup>
- Frank Cross highlights a number of studies showing that the EPA's conservative risk estimates overstate pesticide exposure by as much as 99,000 to 463,000 times actual exposure levels.<sup>6</sup>

- When researchers recalculated risks by considering actual pesticide exposure levels measured by the U.S. Department of Agriculture (USDA), they found that risks were “from 4,600 to 100,000 times lower than EPA estimates.”<sup>7</sup>

### Applying the New Standards

The combination of “reasonable certainty” of “no harm,” “aggregate risk,” “cumulative effects,” and additional safety factors for children poses a host of new challenges for the EPA when conducting risk assessments for setting tolerances.

To assess aggregate exposure, the agency must estimate how much exposure the public has to a pesticide from the various pathways—on and in foods, in the home, and in drinking water. Then the agency must limit enough of those exposures to ensure that total exposure does not exceed the level it deems safe. To facilitate understanding of this process, the agency developed a theoretical construct called the “risk cup.” The cup represents the total amount of exposure to the public of a pesticide that the EPA will allow. The EPA then registers only the amount of pesticide uses that “fill” the cup. When filling the cup, the EPA considers all potential exposure pathways. For example, regulators will estimate that certain agricultural use will fill 50 percent of the cup, drinking water exposure will fill 1 percent, home consumer products will fill 29 percent, and “other” exposures (which they assume but do not specify) will fill the rest.

5. Cross, “The Consequences of Consensus,” 1174.

6. Ibid., 1177.

7. Sandra O. Archibald and Carl S. Winter, “Pesticides in Our Food,” in *Chemicals in the Human Food Chain*, ed. Carl K. Winter, James N. Seiber, and Carole Nuckton (New York: Van Nostrand Reinhold, 1990), 39.

Various groups have complained that the EPA has grossly exaggerated exposure levels. A key problem is that when the agency lacks data on actual exposures or when levels are below the agency's ability to detect them, regulators use default numbers that assume a certain amount of exposure. Hence, the cup fills, but it does not represent real risks to society. Once the cup is full, the EPA will not register any further uses of the pesticide.

When filling the cup, the EPA can consider the impacts of numerous pesticides—placing several in one cup. For example, the EPA has placed certain organophosphate products into one category and is working on a cumulative risk assessment for those products. Placing them all in one cup could demand dramatic reduction in registered uses. For example, home exterminators may not gain a registered use for many organophosphates, leaving them with fewer options for controlling pests such as cockroaches. Such changes can have serious public health impacts. In addition to carrying diseases, cockroaches are believed to contribute to asthma, a serious health ailment affecting many children.<sup>8</sup>

### “Minor Uses”

Ironically, a major problem relates to what people call “minor uses” of pesticides. Minor uses include key public health uses to control pests, ranging from disease-carrying mosquitoes to rodents. In addition, they include uses on many fruits and vegetables. These uses are anything but minor, yet the law has made many

of them an unprofitable enterprise for a couple of reasons. First is cost. The law requires that firms spend a considerable amount of resources—submitting data and paying very hefty registration fees—to obtain a registration. Such high costs basically make many markets unprofitable for companies, so they do not bother to register those uses. The total cost of pesticide registration is estimated to be more than \$50 million, and the process can take from 9 to 10 years.<sup>9</sup> Second, the FQPA standards limit the number of uses that the EPA will register for various products.

These factors serve as disincentives for the development of new minor use pesticides as well as for the reregistration of old ones. In fact, to continue business in more profitable markets, firms are negotiating the elimination of minor uses when they reregister products. Syngenta, for example, came to an agreement with the EPA in June 2000 to eliminate many of the minor uses—particularly home-related pest control—for the pesticide diazinon. Syngenta explained that the product was safe when used properly. Agreeing to phase out certain uses was purely a “business decision,” the company noted, because the product was no longer profitable for those uses.<sup>10</sup>

The FQPA's impact on minor uses promises to have serious public health outcomes because these products meet critical needs: to ensure affordable fruits and vegetables and to protect against disease-carrying pests. As one USDA official noted,

8. Floyd J. Malveaux and Sheryl A. Fletcher-Vincent, “Environmental Factors of Childhood Asthma in Urban Centers,” *Environmental Health Perspectives* 103, Suppl. 6 (1995): 59. See also the policy brief titled “Pesticides and Public Health.”

9. USDA, “EPA and Pesticide Registration Issues,” Agricultural Research Service, Washington, DC, <http://www.ars.usda.gov/is/np/mba/jan97/epa.htm>.

10. Glenn Hess, “EPA Phases out Pesticide Diazinon: Syngenta Cites Declining Margins.” *Chemical Market Reporter*, December 11, 2000.

Even though the FQPA provisions were intended by Congress to ensure that existing public health pesticide uses are not lost without economically effective alternatives, the provisions may not be adequate. If the FQPA results in cancellation of major agricultural uses of a pesticide that is also used in public health, it may become no longer profitable for the manufacturer to produce small quantities for mosquito control, thus ending production of the pesticide. Since adulticides used for mosquito control were registered decades ago, the data supporting their registrations may be insufficient to meet current requirements.<sup>11</sup>

### FQPA Impacts

The 1996 law has produced some serious impacts. For example, consider the effect of the law on products that use organophosphate pesticides. At the time the FQPA passed, there were 49 of these products on the market, representing about one-third of all pesticide sales.<sup>12</sup> The EPA picked this broad category of products in its first effort to implement the law's provisions on cumulative exposure. By the time the EPA released its draft cumulative risk assessment for these products in 2002, 14 products had already been canceled and 28 had to meet risk mitigation measures that include limitations on

use, voluntary cancellations, cancellations of certain uses, and other restrictions.

Recently, EPA completed a 10-year study of 230 organophosphates and carbonates pesticides. It concluded that the Food Quality Protection Act demands that the agency ban 3,200 uses of pesticide products in these categories and places restrictions on 1,200 other uses. It deemed 5,237 uses as "safe" under the act.<sup>13</sup> Hence, the Food Quality Protection Act could increase regulations on 46 percent of the uses of the 230 chemicals—a substantial increase. Among recommended the restrictions are bans on a majority of uses of carbofuran, a product used for a variety of crops. EPA also announced its intention to ban major agricultural uses of the product lindane, a product targeted by environmental groups.

Researchers at the University of California note problems with the elimination of so many products:

Economic theory suggests that these increased restrictions and cancellations from the eventual implementation of the FQPA will result in reduced supply of commodities currently relying on [organophosphate] pesticides for pest control. This will result in higher prices for consumers and lower quantity [of produce] sold ... . If consumers respond to the increased prices by reducing consumption of the affected fruits and vegetables (and perhaps consuming less nutritious foods), they may suffer a loss of health benefits association with the change in consumption.<sup>14</sup>

Indeed, the researchers note that another study assessing the impacts of such laws reveals

11. Robert I. Rose, "Pesticides and Public Health: Integrated Methods of Mosquito Management," *Emerging Infectious Diseases* 7, no. 1 (January–February 2001): 17–23; <http://www.cdc.gov/ncidod/eid/vol7no1/rose.htm>.

12. Sean B. Cash and Aaron Swoboda, "Food Quality Protection Act and California Agriculture," *Agricultural and Research Economics Update* 6, no. 4 (2003): 9–11, [http://www.agecon.ucdavis.edu/extension/update/articles/v6n4\\_3.pdf](http://www.agecon.ucdavis.edu/extension/update/articles/v6n4_3.pdf).

13. Kate Phillips, EPA Recommends Restrictions on Pesticide Usage, *Chemical Week* 168 no. 2 (August 9, 2006).

14. *Ibid.*, 10.

a potential negative health effect resulting from the FPQA.

**Key Expert**

Angela Logomasini, Director of Risk and Environmental Policy, Competitive Enterprise Institute, [alogomasini@cei.org](mailto:alogomasini@cei.org).

**Recommended Reading**

Cross, Frank B. “The Consequences of Consensus: Dangerous Compromises of the Food Quality Protection Act.” *Washington University Law Quarterly* 75, no. 3 (1997): 1155–206.



# Pesticides and Agriculture

Angela Logomasini and Jennifer Zambone

In 1989, environmental activists claimed that a chemical called Alar that was used to assist in the production of lush red apples had created what amounted to “poisoned apples.” They used this claim as part of a campaign to have the substance banned. Yet it turned out that these “poisoned” apples were as much of a fairy tale as the apple in Snow White. The Alar hysteria was completely debunked.<sup>1</sup> Nevertheless, Alar has never been used again on apples in the United States.<sup>2</sup> Moreover, the crusade against pesticide use on produce continues. Consumers Union, the group that produces *Consumer Reports*, produces a report on the content of pesticides in

children’s food<sup>3</sup> and another report on the pesticide residues in various foods.<sup>4</sup> These reports conclude that certain foods have unacceptably high pesticide residues and may well cause cancer.<sup>5</sup> The facts point in a very different direction.

## Beyond Safe

Pesticide levels rarely, if ever, approach unsafe levels. Even when activists cry wolf be-

---

1. Fredrick J. Stare and Elizabeth Whelan, *Fad-Free Nutrition* (Alameda, CA: Hunter House, 1998), 262.

2. Stare and Whelan, *Fad-Free Nutrition*, 262.

---

3. Edward Groth III, Charles Benbrook, and Karen Lutz, *Update: Pesticides in Children’s Foods* (Washington, DC: Consumers Union, 2000).

4. Edward Groth III, Charles Benbrook, and Karen Lutz, *Do You Know What You’re Eating?* (Washington, DC: Consumers Union, 1999), [http://www.consumer-union.org/food/do\\_you\\_know1.htm](http://www.consumer-union.org/food/do_you_know1.htm).

5. Groth, Benbrook, and Lutz, *Update*, 24.



cause residues exceed federal limits that does not mean the products are not safe. In fact, residues can be hundreds of times above regulatory limits and still be safe:

- According to one National Research Council (NRC) report, “the great majority of individual naturally occurring and synthetic chemicals in the diet appears to be present at levels below which any significant adverse biological effect is likely, and so low that they are unlikely to pose any appreciable cancer risk.”<sup>6</sup>
- The American Academy of Pediatrics notes, “The risks of pesticides in the diet are remote, long-term, and theoretical, and there is no cause for immediate concern by parents. The risks to children over their lifetime of experiencing the major chronic diseases associated with the typical American diet far exceed the theoretical risks associated with pesticide residues.”<sup>7</sup>
- Various government agencies test produce for residues to ensure that they meet safety standards. The U.S. Food and Drug Administration (FDA) and the state of California conduct the most comprehensive and regular testing. Both find not only that residue levels are far lower than any standard of the U.S. Environmental Protection Agency (EPA), but also that they are most often undetectable (see details in the next section).

6. Committee on Comparative Toxicity of Naturally Occurring Carcinogens, Board on Environmental Studies and Toxicology, Commission on Life Sciences, National Research Council, *Carcinogens and Anticarcinogens in the Human Diet* (Washington, DC: National Academies Press, 1996), 336–37.

7. International Food Information Council Foundation, *IFIC Review: On Pesticides and Food Safety* (Washington, DC: IFIC Foundation, January 1995).

- Residue levels decline even further when we wash produce. One study shows that washing fruits and vegetables can reduce exposure by 97 percent for some pesticides.<sup>8</sup>

### **FDA Residue Survey: Most Residues are Undetectable**

In its most recent survey, the FDA has made the following discoveries:

- “The findings for 2003 demonstrate that pesticide residue levels in foods are generally well below EPA tolerances, corroborating results presented in earlier reports.”<sup>9</sup>
- Sixty-two percent of domestic fruit and vegetable samples had no detectable pesticide residues.
- Eighty-three percent of imported fruit and vegetable samples had no detectable pesticide residues.
- Only 6 percent of imported fruit and vegetable samples contained residues in excess of federal standards. Only 2 percent of domestic fruit and vegetable samples exceeded standards.
- There were no pesticide residue tolerance violations on 92.9 percent of all imported fruit and vegetable samples.
- FDA reports no residue violations for domestic grains and violations for only 1.4 percent of imported grains.
- FDA found no violations for dairy and egg products and for seafood.
- FDA found no residue violations in baby foods.

8. Henry B. Chin, “The Effect of Processing on Residues in Foods,” in *Pesticide Residues and Food Safety: A Harvest of Viewpoints* (Washington, DC: American Chemical Society, 1991), 171.

9. *Ibid.*, 10.

## Eating Fruits and Veggies Trumps Pesticide Risks

The main cause of cancer is not pesticide residues, but rather the nutritional value of what a person eats.<sup>10</sup>

- In fact, a seminal study by Sir Richard Doll and Richard Peto apportioned 2 percent of cancer cases to causation by all environmental pollutants found in the air, water, and food and 35 percent of all cancers to dietary factors.<sup>11</sup>
- Accordingly, the World Health Organization advocates increased intake of fruits and vegetables, to reduce the cancer incidence rate by 30 percent across the board.<sup>12</sup>
- The quarter of the U.S. population consuming the least amount of fruits and vegetables has a cancer rate twice as high as the quarter of the population consuming the most fruits and vegetables.<sup>13</sup>
- Moreover, only 36 percent of Americans older than two consume the U.S. Department

10. Robert S. Lichter and Stanley Rothman, *Environmental Cancer: A Political Disease?* (New Haven, CT: Yale University Press, 1999).

11. Richard Doll and Richard Peto, “The Causes of Cancer: Quantitative Estimates of Avoidable Risks of Cancer in the United States Today,” *Journal of the National Cancer Institute* 66, no. 1192 (1981): 1235, 1251. In addition, Doll and Peto estimate that tobacco use is responsible for 30 percent of the cancer cases in the United States. For more information on cancer risks, see “The True Causes of Cancer” and “Cancer Trends,” in *The Environmental Source*.

12. World Health Organization, Programme for Cancer Control, *Developing a Global Strategy for Cancer* (Geneva: World Health Organization, 2000).

13. Bruce N. Ames, and Lois Swirsky Gold, “Environmental Pollution, Pesticides, and the Prevention of Cancer: Misconceptions,” *FASEB Journal* 11, no. 3 (1997): 1041–52.

of Agriculture–recommended amount of five servings of fruits and vegetables a day.<sup>14</sup> Hence, if we want to reduce cancer risks, we should focus on consuming more produce.

## Pesticides Promote Health through Affordable Produce

To promote public health, policy should work to ensure that families—particularly lower-income families—are able to afford fresh produce. Pesticides play a key role in increasing supply and thereby keeping these products affordable.

- Use of modern agricultural technology and chemicals has reduced the cost of food, thereby improving nutrition, particularly for lower-income families. In fact, at the turn of the 20th century, before the use of modern agricultural practices, Americans spent 20 percent of their income on food. Now, the average American family spends approximately 10 percent of its disposable income on food.<sup>15</sup>
- Affordability is a key concern for most Americans. Consumers who say that they would pay for residue-free foods are willing to pay only a small increase. In one survey, 46 percent said they would pay more for such products, but only 15 percent of those respondents would pay more than 10 percent extra.<sup>16</sup>

14. “Achievements in Public Health, 1900–1999: Safer and Healthier Foods,” *Morbidity and Mortality Weekly Report* 48, no. 40 (1999): 905–13, <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4840a1.htm>.

15. International Food Information Council Foundation, *IFIC Review*.

16. National Research Council, Commission on Life Sciences, *The Future Role of Pesticides in U.S. Agri-*

- Without pesticides, the price of raising a crop could increase 5 to 200 times, and those costs would be transferred to consumers in the prices of the goods, according to one estimate.<sup>17</sup>
- Scientist Philip Abelson warned that continued banning of pesticides and fungicides could lead to food scarcities.<sup>18</sup>
- Cooking food produces 2,000 milligrams of burnt material per person per day. Burnt material contains many rodent carcinogens and mutagens.
- A person consumes only 0.09 milligrams per day of the residues of 200 synthetic chemicals that the FDA measures.<sup>20</sup>
- As Ames and Gold point out, there is little difference between naturally occurring chemicals and man-made chemicals. They find that 99.99 percent of the chemicals that we eat are natural. Plants produce such chemicals to defend themselves against insects, fungi, and other predators. Ames and Gold estimate that “on average Americans ingest roughly 5,000 to 10,000 different natural pesticides and their breakdown products.”<sup>21</sup> Hence, we consume far more naturally occurring pesticides on plants than we do manmade ones—without ill effect. This reality underscores the fact that current exposure to manmade chemicals is not significant and poses a very low-level risk. Ames and Gold specifically note: “The possible carcinogenic hazards from synthetic pesticides (at average exposures) are minimal compared to the background of nature’s pesticides, though neither may present a hazard at the low doses consumed.”<sup>22</sup>

### “Carcinogens” in Perspective

Environmentalists have long claimed that we should avoid all pesticides because these chemicals cause cancer in rodents and, hence, must be dangerous to humans. But even if pesticides were not used, every time people eat they would shovel in these “rodent carcinogens.” People consume such natural rodent carcinogens without ill effects, and the same is true for low-level pesticide exposures. Consider these facts:

- Bruce Ames and Lois Swirsky Gold of the University of California at Berkeley estimate that the amount of residual carcinogenic pesticides in food is 1,800 times less than the amount of carcinogens derived from 54 natural plant chemicals that are found in food.<sup>19</sup>

*culture* (Washington, DC: National Academy Press, 2000), 85, [http://www.nap.edu/openbook.php?record\\_id=9598&page=R1](http://www.nap.edu/openbook.php?record_id=9598&page=R1).

17. Stare and Whelan, *Fad-Free Nutrition*, 92, citing J. G. Edwards, “Antipesticide Ads’ Lies Are Hazardous to Our Health,” *Priorities* 4, no. 4 (1995): 45–46.

18. Philip Abelson, “Adequate Supplies of Fruits and Vegetables: Fungicide Ban Would Reduce Supply of Healthy Foods,” *Science* 266, no. 5189 (1994): 1303.

19. Bruce Ames and Lois Swirsky Gold, “Chemical Carcinogenesis: Too Many Rodent Carcinogens,” *Proceedings of the National Academy of Science* 87, no. 19 (1990): 7772–76.

### Key Experts

Angela Logomasini, Director of Risk and Environmental Policy, Competitive Enterprise Institute, [alogomasini@cei.org](mailto:alogomasini@cei.org).

20. Ames and Gold, “Environmental Pollution, Pesticides, and the Prevention of Cancer,” 1045.

21. *Ibid.*, 1044.

22. Ames and Gold, “Environmental Pollution, Pesticides, and the Prevention of Cancer,” 1147.

Dennis Avery, Hudson Institute, cgfi@rica.net.

### **Recommended Readings**

Avery, Dennis. 1995. "Saving the Planet with Pesticides: Increasing Food Supplies while Preserving the Earth's Diversity." In *True State of the Planet*, ed. Ronald Bailey, 49–82. New York: Free Press.

Morris, Julian, and Roger Bate, eds. 1999. *Fearing Food: Risk, Health, and Environment*. Boston: Butterworth-Heinemann, 1999.

Smith, Kenneth, and Jack Raso. 1999. "An Unhappy Anniversary: The Alar 'Scare' Ten Years Later." New York: American Council on Science and Health. [http://www.acsh.org/publications/pubID.865/pub\\_detail.asp](http://www.acsh.org/publications/pubID.865/pub_detail.asp).



# Pesticides and Public Health

Angela Logomasini and Jennifer Zambone

In recent years, public health authorities have expressed serious concerns regarding what they call the trend of “emerging infections.” They fear that many diseases transmitted by various pests—collectively called “vectors”—are on the rise. Even diseases eradicated from the United States are reemerging as increased travel and trade create more opportunities for diseases to cross international boundaries. Even diseases that have never been seen in the United States have emerged, such as the West Nile virus in 1999.

In the past, we have been able to keep these diseases at bay with the use of pesticides and other measures, but today government regulations limit access to much-needed pesticides. In addition, environmental activists have waged attack campaigns on pesticide use, scaring the

public about the risks of pesticides and failing to inform them of the far more serious risks associated with disease vectors. As a result, individuals and public health agencies have fewer options to control serious and expanding risks associated with vector-borne diseases.

## Background

Throughout history, one of the most serious risks to public health has been disease transmitted by vectors. Vectors include any organism that carries pathogens that can then be transferred to humans. Most commonly we think of mosquitoes and other insects, but rodents and other animals can transmit disease as well. We should learn from history that vector-borne risks are not isolated to tropical areas and that

they can reemerge in the United States. Consider a few historical cases:

- In the summer of 1793, an epidemic of yellow fever, a disease carried by mosquitoes, struck Philadelphia. Yellow fever killed 5,500 people that summer and plagued the city for seven years.<sup>1</sup>
- Malaria was endemic in most of the United States and remained so in many states until right after the end of World War II.<sup>2</sup>
- Dengue fever periodically emerged the U.S. Gulf Coast states for decades including recent outbreaks in the 1980s, and it continues to pose a threat.<sup>3</sup> Tick-borne diseases have affected the population as well.<sup>4</sup>
- The research of Paul Reiter, chief of the entomology section of the Dengue Branch of the Centers for Disease Control and Prevention (CDC), demonstrates that, contrary to popular wisdom, most mosquito-borne diseases are not tropical. For example, he notes that until modern times, malaria was endemic in nearly all states east of the Rock-

ies, as well as in Canada, Norway, Sweden, and northern Russia.<sup>5</sup>

### Adverse Impacts of Vector-Borne Disease Today

Vector-borne diseases continue to plague the world. The developing world suffers the greatest toll because many nations cannot afford pesticides and other control methods. Consider these facts:

- According to the World Health Organization, malaria alone infects 500 million and kills more than 1 million.<sup>6</sup> Most of its victims are children.
- In the United States, Lyme disease is the number one vector-borne disease. According to the CDC, “During 1992–1998, a total of 88,967 cases of Lyme disease were reported by 49 states, the District of Columbia, and Guam (2 cases), for a crude mean annual incidence of 5.1 reported cases/100,000 persons/year. The number of reported cases increased 70%, from 9,909 in 1992 to 16,802 in 1998. Ninety-two percent of cases were reported by 10 states. Over the 7-year period, crude annual incidence per 100,000 persons increased from 4.0 to 6.7.”<sup>7</sup> The CDC notes that reported cases have

1. Andrew A. Spielman and Michael D’Antonio, *Mosquito: A Natural History of Our Most Persistent and Deadly Foe* (New York: Hyperion, 2001), 61.

2. In fact, one of the fundamental reasons for the establishment of the Centers for Disease Control and Prevention in 1945 was the eradication of endemic malaria in the United States. Happily, that goal was achieved.

3. Ricardo Alonso-Zaldivar, “Dengue Fever is Not Quite Dead,” *Los Angeles Times*, January 14, 2008.

4. Researchers believe that although Lyme disease was only recently identified (1975), the disease has been around for about 100 years. National Institute of Allergy and Infectious Disease, *Lyme Disease: The Facts, the Challenge*, NIH Pub. 98-3193 (Bethesda, MD: National Institutes of Health, 1998), [www3.niaid.nih.gov/topics/lymeDisease/PDF/LymeDisease.pdf](http://www3.niaid.nih.gov/topics/lymeDisease/PDF/LymeDisease.pdf).

5. Paul Reiter, “Global Warming and Vector-Borne Disease: Is Warmer Sicker?” Cooler Heads Coalition Briefing, Competitive Enterprise Institute, Washington, DC, July 28, 1998.

6. World Health Organization, “Malaria,” Fact Sheet 94, World Health Organization, Geneva, 2007, <http://www.who.int/mediacentre/factsheets/fs094/en>.

7. Kathleen A. Orloski, Edward B. Hayes, Grant L. Campbell, and David T. Dennis, “Surveillance for Lyme Disease: United States, 1992–1998,” *Morbidity and Mortality Weekly Report* 49, no. SS03 (2000): 1–11, <http://www.cdc.gov/mmwr/preview/mmwrhtml/ss4903a1.htm>.



increased probably because of both better surveillance and true increases of incidence. Still, the CDC believes overall incidence is underreported, noting that more intensive studies in both Maryland and Connecticut find that there are 7 to 17 unreported cases for each reported case.

- In 1999, the West Nile virus appeared in the United States for the first time. Since then, it has killed nearly 800 people and made nearly 20,000 people seriously ill.<sup>8</sup> The illness can be severe, leading to months of suffering and paralysis for some. The CDC estimates that thousands of cases were probably never reported.
- Vectors also promote serious problems related to allergies and asthma. According to one study, “Allergens associated with dust mites (DM) and cockroaches (CR) are probably important in both onset and worsening of asthma symptoms for children who are chronically exposed to these agents. Young children spend a great deal of time on or near the floor where these allergens are concentrated in dust. Of children (2–10 years of age) living in metropolitan Washington, DC, 60% were found to be sensitive to CR and 72% were allergic to DM.”<sup>9</sup>
- Other mosquito-borne diseases currently endemic in the United States are Western equine encephalitis, Eastern equine encephalitis, St. Louis encephalitis, and LaCrosse virus. As noted, malaria, yellow fever, and

dengue have been endemic in the past. In addition, mosquitoes transmit canine heartworms.<sup>10</sup>

### **Role of Pesticides in Promoting Health throughout History**

Pesticides have proven critical in protecting public health:

- In 1966, St. Louis encephalitis (SLE), a mosquito-transmitted form of viral encephalitis, broke out in Dallas. In the space of a few weeks, mosquitoes infected up to 690 people. Dallas then aerially sprayed 475,000 acres with the pesticide malathion. The mosquito populations and the number of new SLE cases dropped dramatically. As the National Academy of Sciences (NAS) committee stated, “The economic and public health consequences would certainly have been greater had pesticides not been available.”<sup>11</sup>
- In 1914, when few pesticides were available, there were 600,000 cases of malaria in the United States. By 1995, when pesticides had long been a staple of public health control, the number of annual cases had shrunk to 1,167.<sup>12</sup>

8. Centers for Disease Control and Prevention, Division of Vector-Borne Infectious Diseases, West Nile Virus Web page, [http://www.cdc.gov/ncidod/dvbid/westnile/surv&controlCaseCount06\\_detailed.htm](http://www.cdc.gov/ncidod/dvbid/westnile/surv&controlCaseCount06_detailed.htm).

9. Floyd J. Malveau and Sheryl A. Fletcher-Vincent, “Environmental Factors of Childhood Asthma in Urban Centers,” *Environmental Health Perspectives* 103, Suppl. 6 (1995): 59.

10. P. G. Koehler and F. M. Oi, “Mosquitoes and Other Biting Flies,” Entomology and Nematology Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL, 2003, <http://edis.ifas.ufl.edu/Ig081>.

11. Joshua Lederberg, Robert E. Shope, and Stanley C. Oaks Jr., eds., *Emerging Infections: Microbial Threats to Health in the United States* (Washington, DC: National Academies Press, 1992), 166.

12. Holly Ann Williams, Jacqueline Roberts, S. Patrick Kachur, Ann M. Barber, Lawrence M. Barat, Peter B. Bloland, Trenton K. Ruebush, and Elizabeth B. Wolfe,

- In 1995, dengue spread to the Mexico-Texas border. On the Mexican side of the border, where pesticides were largely not available, approximately 4,700 individuals contracted dengue. On the Texas side, where public health officials applied pesticides (and where more people have screened homes), there were only 29 cases. Only seven of the Texas cases occurred among individuals who had no history of travel outside the state.<sup>13</sup>

### **Freedom to Develop and Use Pesticides Is Key to Disease Control**

Numerous experts in the field of vector control fear that government regulation jeopardizes public health by reducing the development of and access to much needed pesticides. Consider some observations from the scientific community and vector control experts:

- In 1992, an NAS report warned: “A growing problem in controlling vector-borne diseases is the diminishing supply of effective pesticides.” Because all pesticides must go through an onerous registration process at the U.S. Environmental Protection Agency (EPA), “some manufacturers have chosen not to reregister their products because of the expenses of gathering safety data. Partly as a result, many effective pesticides over the past 40 years to control agricultural pests

and vectors of human disease are no longer available.”<sup>14</sup>

- The NAS report noted, “The potential for vector-borne disease to emerge in the United States still exists ... [and] any reduction in vector control efforts is likely to be followed by a resurgence of the vector population. For a disease agent that is known or suspected to be transmitted by an arthropod vector, efforts to control the vector can be crucial in containing or halting an outbreak.”<sup>15</sup>
- The NAS report continued, “The primary goal at the onset of mosquito-borne disease epidemics is to eliminate the infective mosquitoes as quickly as possible. Transmission can only be stopped by the effective application of a pesticide that kills adult mosquitoes.”<sup>16</sup>

### **Issues of Safety: Pesticides versus Alternatives**

Environmental activists suggest that pesticide risks are too high and that there are “more natural” means to control pests. However, the risks of disease are far greater than the risks of pesticides, and alternative controls are not nearly as effective:

- Activists provide no scientifically validated information documenting deaths or illnesses related to proper application of pesticides. In contrast, there are millions of documented deaths and illnesses related to vector-borne

“Malaria Surveillance—United States, 1995,” *Morbidity and Mortality Weekly Report* 48, no. SS-1 (1999): 1–21.

13. Centers for Disease Control and Prevention, “Dengue Fever at the U.S.-Mexico Border, 1995–1996,” *Morbidity and Mortality Weekly Report* 45, no. 39 (1996): 841–44, <http://www.cdc.gov/mmwr/preview/mmwrhtml/00043962.htm>.

14. Lederberg, Shope, and Oaks, *Emerging Infections*, 160.

15. *Ibid.*, 160–61

16. *Ibid.*, 166.

diseases (see the preceding section for the statistics).<sup>17</sup>

- Despite what activists say about the risks associated with pesticides, the EPA has studied these chemicals extensively and determined them to be safe under even the most severe exposure assumptions.
- Environmentalists claim that pesticides are so toxic they lead to wide-scale killing of wildlife, particularly birds. Accordingly, they think that pesticides should be eliminated. Although we should continue to study to find ways to reduce the impacts of pesticides on wildlife, we should not neglect the fact that wildlife is also at considerable risk from the vector-borne diseases that the pesticides control.<sup>18</sup>
- It appears that wildlife may be at greater risk from vector-borne diseases than from pesticides. In fact, the data indicate that the number of bird deaths related to West Nile and other diseases greatly outnumber the number related to pesticides.<sup>19</sup>
- In addition, environmentalists claimed that pesticide spraying led to a massive lobster die-off on Long Island in 1999. However, these claims have been shown to be unlikely according to data and studies conducted on the topic.<sup>20</sup>
- Electronic repellents, citronella plants, bug zappers, bats, and purple martins are not effective in controlling or repelling mosqui-

toes. Wayne J. Crans, research professor of entomology at Rutgers University, notes that these items and actors have limited value in actually controlling the targeted pests, and many manufacturers of such products simply take advantage of consumers by overselling the effectiveness of these products.<sup>21</sup>

### Key Expert

Angela Logomasini, Director of Risk and Environmental Policy, Competitive Enterprise Institute, [alogomasini@cei.org](mailto:alogomasini@cei.org).

### Recommended Readings

- Logomasini, Angela. 2005. "Pesticides and the West Nile Virus: An Examination of Environmentalist Claims," Competitive Enterprise Institute, Washington, DC. <http://www.cei.org/pdf/3893.pdf>.
- Reiter, Paul. "Global Warming and Vector-Borne Disease: Is Warmer Sicker?" Cooler Heads Coalition Briefing, Competitive Enterprise Institute, Washington, DC, July 28, 1998.
- Tren, Richard, and Roger Bate. "When Politics Kills: Malaria and the DDT Story." Competitive Enterprise Institute, Washington, DC, December 2000, <http://www.cei.org/PDFs/malaria.pdf>.

For more information on malaria, see <http://www.fightingmalaria.org>, the Web site of Africa Fighting Malaria.

17. Angela Logomasini, "Pesticides and the West Nile Virus: An Examination of Environmentalist Claims," Competitive Enterprise Institute, Washington, DC, 2005, <http://www.cei.org/pdf/3893.pdf>.

18. "West Nile Virus Threatens Backyard Birds," *Science Daily*, May 17, 2007, <http://www.sciencedaily.com/releases/2007/05/070516161231.htm>.

19. Logomasini, "Pesticides and the West Nile Virus."

20. Ibid.

21. Wayne Crans, "Products and Promotions That Have Limited Value for Mosquito Control," Department of Entomology, Rutgers University, New Brunswick, NJ, <http://www.rci.rutgers.edu/~insects/promprom.htm>.



# Pesticides in Schools

Angela Logomasini

In recent years, policymakers have been confronted with claims that children face dire public health risks associated with the use of pesticide products in schools. Accordingly, on several occasions Congress has considered regulating such uses, and many states have passed laws governing pesticide use. Although these laws may be well intended, they could actually create more serious health hazards for children associated with increased risks from pests.

## **Congressional Action**

By unanimous consent, the Senate passed legislation that would have regulated the use of pesticides in schools as an amendment to the 2001 “No Child Left Behind” education bill. The legislation would have changed the fed-

eral pesticide law to require schools to notify parents of pesticide use three times a year and allow them to be placed on a registry for additional notification. The House removed the language from the bill. Although the issue has not emerged recently in Congress, more than 20 states have “pesticide in schools” notification bills, and pressure continues to mount for federal action. In the Northeast, nearly all states have some form of notification. The Massachusetts law is one of the more extensive. It requires schools and day care facilities to develop Integrated Pest Management Plans, with the goal of reducing pesticide use. It also regulates what pesticides can be used and requires notification of parents and employees.

These laws present numerous problems for schools. Perhaps most important, these laws

create incentives for schools to halt pesticide use rather than deal with red tape and bad public relations. Unfortunately, laws that undermine responsible use of pesticides can increase risks of diseases and other health problems posed by pests. In addition, such laws prevent urgent responses to problems that demand such responses. For example, many require schools to wait 48 to 72 hours after a notification before controlling a pest problem. But if a school has a problem with rats, wasps, or other vectors of disease, the goals of public health and safety often demand a rapid response. In addition, these laws have proven expensive for schools that already face tight budgets. According to testimony offered by the National School Boards Association, such laws would cost one Virginia school district \$350,000 to \$400,000 a year.<sup>1</sup>

### **Pesticide Risks Are Manageable**

Despite claims to the contrary, pesticides can be—and usually are—used in a relatively safe manner in schools, minimizing risks associated with pests without creating significant risks from exposure to the products. One reason is that public exposure is short term and low level and thus unlikely to have any long-term or cancerous effects.<sup>2</sup> In addition, federal laws require

products to be thousands of times safer than actual safe levels.<sup>3</sup>

Products must, however, be used according to label directions to ensure that misuse does not harm applicators or others who may be exposed. Fortunately, the data show an impressive safety record associated with pesticide use in schools. Data compiled by the Association of Poison Control Centers indicates few problems. The association's report on the topic from 2003 includes a sample of about 2.4 million reports from 60 poison centers around the nation and covers the 50 states plus the District of Columbia and Puerto Rico.<sup>4</sup>

According to this report, pesticide poisoning problems are not school-based problems: 92 percent of all poisonings occur in the home, and only 1.5 percent of all poisonings occur at school (it is unclear how many of these poisonings are related to pesticides and what the degree of severity is). Of the 41 pesticide-related deaths reported, the report finds that none involved school-age children and most involved intentional poisoning. Only five deaths were reported as accidental—two were preschool-age children and three were adults.

In addition, the *Journal of the American Medical Association* assessed data collected from federal medical surveillance efforts, such as data collected from telephone calls to poison control centers.<sup>5</sup> Despite the hype presented

1. Statement of Marshall Trammell, chairman, Chesterfield County School Board, Chester, Virginia, on behalf of the National School Boards Associations, in School Pesticide Provision to H.R. 1, Hearing Before the Subcommittee on Department Operations, Oversight, Nutrition, and Forestry of the Committee on Agriculture House of Representatives, 107th Congress, First Session, July 18, 2001, Serial No. 107-12, [http://commdocs.house.gov/committees/ag/hag10712.000/hag10712\\_of.htm](http://commdocs.house.gov/committees/ag/hag10712.000/hag10712_of.htm).

2. See the policy brief titled “The True Causes of Cancer.”

3. See the policy brief titled “The Food Quality Protection Act.”

4. William A. Watson, Tony L. Litovitz, Wendy Klein-Schwartz, George C. Rodgers, Jessica Youniss, Nicole Reid, Wayne G. Rouse, Rebecca S. Rembert, and Douglas Borys, “2003 Annual Report of the American Association of Poison Control Centers Toxic Exposure Surveillance System,” *Toxicology* 22, no. 95 (2002): 335–404.

5. Walter A. Alarcon, Geoffrey M. Calvert, Jerome M. Blondell, Louise N. Mehler, Jennifer Sievert, Maria



in the press about this report, the findings are anything but alarming. The data indicate very few problems associated with pesticide use in or near schools. Over a four-year period, the report finds no fatalities and only three serious cases of pesticide exposure-related illnesses. We have no details on these three cases, but the “high severity” category indicates unfortunate accidents that may have been life threatening or required hospitalization.

The rest of the nearly 2,600 cases involved temporary reactions to chemicals that left no long-term effects. The vast majority—89 percent of the cases—were categorized as “low severity,” involving such things as skin irritation, dizziness, headaches, or possible emotional stress associated with exposure to chemicals. Given that the study measures four years of incidents among about 50 million school-age children, these data indicate an incredibly impressive safety record, despite the spin to the contrary.

### **Risks Associated with Uncontrolled Pest Problems**

In contrast to the relative safety of pesticide use in schools, problems related to pests remain significant. Consider just some of the risks.

#### **Cockroaches**

According to *School Planning and Management*, cockroaches “often infest schools” and they can “carry pathogens that can cause pneumonia, diarrhea, and food poisoning. Their droppings can inflame allergic or asthmatic

conditions, especially in young children.”<sup>6</sup> Cockroaches are indeed a serious problem in schools.

According to one study published in *Environmental Health Perspectives* in 1995, “Allergens associated with dust mites and cockroaches are probably important in both onset and worsening of asthma symptoms for children who are chronically exposed to these agents.”<sup>7</sup> Cockroaches appear to be a large part of the problems related to childhood asthma and allergies. Researchers reported in the *New England Journal of Medicine* that 36 percent of children in a sample of 476 suffered from cockroach-related allergies.<sup>8</sup> Children who suffered from this type of allergy missed more days of school, had more unscheduled hospital and doctors’ office visits, and lost more sleep than children suffering from other allergies. Other reports have found that early exposure to cockroach allergens may contribute to the development of asthma for some children.

The Centers for Disease Control and Prevention (CDC) has reported that 12 percent of children in 2004—9 million children—had at some point in their lives been diagnosed with asthma, and that year four million had suffered

6. Zia Siddiqi, “Don’t Let a Pest Problem Be Your Biggest News,” *School Planning and Management* 43, no. 5 (2004): 42–49.

7. Floyd J. Malveaux and Sheryl A. Fletcher-Vincent, “Environmental Risk Factors of Childhood Asthma in Urban Centers,” *Environmental Health Perspectives* 103, suppl. 6 (1995): 59–62.

8. David Rosenstreich, Peyton Eggleston, Meyer Kattan, Dean Baker, Raymond G. Slavin, Peter Gergen, Herman Mitchell, Kathleen McNiff-Mortimer, Henry Lynn, Dennis Ownby, and Floyd Malveaux, “The Role of Cockroach Allergy and Exposure to Cockroach Allergen in Causing Morbidity Among Inner-City Children with Asthma,” *New England Journal of Medicine* 336, no. 19 (1997): 1356–63.

Propeck, Dorothy S. Tibbetts, Alan Becker, Michelle Lackovic, Shannon B. Soileau, Rupali Das, John Beckman, Dorilee P. Male, Catherine L. Thomsen, and Martha Stanbury, “Acute Illnesses Associated with Pesticide Exposure at Schools,” *Journal of the American Medical Association* 294, no. 4 (2005): 455–65.



from asthma attacks. Poor children (14 percent) suffer more often from asthma than children from other households.<sup>9</sup>

Prudent use of chemicals—not reduced pesticide use—can be a big part of the solution. A study last year in the *Journal of Allergies and Clinical Immunology* showed that use of chemical baits and regular cleaning can reduce indoor cockroach allergens to levels below that which causes allergies and reduce the number of trapped cockroaches by 96 percent.<sup>10</sup>

### Fire Ants

Consider that illnesses caused by fire ants in just one state dwarf the number of health problems associated with pesticides in schools. The *Journal of the South Carolina Medical Association* notes, “In 1998, there were an estimated 660,000 cases of fire ant stings in South Carolina, of which approximately 33,000 sought medical treatment for an estimated cost of \$2.4 million.”<sup>11</sup> Hence, South Carolina’s fire ants caused more than 10 times the illnesses in one year than did pesticide use in every school in the nation over four years, as reported in the *Journal of the American Medical Association* article discussed earlier.<sup>12</sup>

9. B. Bloom and A. N. Dey, National Center for Health Statistics, “Summary Health Statistics for U.S. Children: National Health Interview, 2004,” *Vital Health Statistics* 10, no. 227 (February 2006), [http://www.cdc.gov/nchs/data/series/sr\\_10/sr10\\_227.pdf](http://www.cdc.gov/nchs/data/series/sr_10/sr10_227.pdf).

10. Samuel J. Arbes, “Abatement of Cockroach Allergen (Blag 1) in Low-Income, Urban Housing: A Randomized Controlled Trial,” *Journal of Allergies and Clinical Immunology* 112, no. 2 (2003): 339–45.

11. Samuel T. Caldwell, Stanley H. Schuman, and William M. Simpson, “Fire Ants: A Continuing Community Health Threat in South Carolina,” *Journal of the South Carolina Medical Association* 95 (1999): 231–35.

12. Alarcon, et. al., “Acute Illnesses Associated with Pesticide Exposure at Schools.”

It is true that not all these fire ant illnesses occurred in schools, but the data indicate the scope of that one pest problem, which also affects children at school. Texas’s agricultural extension service notes, “Red imported fire ants can be a serious problem for teachers and children cultivating schoolyard gardens in Texas.”<sup>13</sup>

### Rats and Mice

Students are also at risk from rats, which not only carry disease but also can pose fire hazards by chewing electrical lines. Unfortunately, rat infestations are not as uncommon as one might think. In 2004, the city of Chicago had to shut down 13 cafeterias and begin an intensive \$4 million effort to control rats and mice at 600 schools because of rat infestations.<sup>14</sup>

### Various Other Problems

Other problems arise from poison ivy, disease-carrying mosquitoes breeding on or near school grounds, dust mites, food-borne illness, molds, bee stings, and other sources—all of which can be reduced with the use of pesticides and disinfectants. Even the common fly can be a problem. According to an article in *Planning and School Management*, “because of their natural attraction to decaying material, flies are among the filthiest insects around, carrying more than 100 known pathogens. They slough off bacteria every time they land on a desk or a cafeteria plate, so prevention is a serious health issue.”<sup>15</sup>

13. Nathan Riggs, “Managing Fire Ants in Texas Schoolyard and Butterfly Gardens,” Texas Cooperative Extension, Bexar County, 2002, [http://fireant.tamu.edu/materials/factsheets\\_pubs/pdf/FAPFS016.2002rev.pdf](http://fireant.tamu.edu/materials/factsheets_pubs/pdf/FAPFS016.2002rev.pdf).

14. Siddiqi, “Don’t Let a Pest Problem Be Your Biggest News.”

15. Ibid.

### **Conclusion**

Children around the nation do indeed face some serious public health risks. Schools should implement programs that apply a variety of means to control these problems—an approach called integrated pest management. The prudent use of public health pesticides is often a key tool in any such program. Unfortunately, media hype and resulting legislation about the impact of pesticides that does not consider the risks they help control promises only to undermine public health in the nation's schools.

### **Key Expert**

Angela Logomasini, Director of Risk and Environmental Policy Competitive Enterprise Institute, [alogomasini@cei.org](mailto:alogomasini@cei.org).

### **Recommended Reading**

Logomasini, Angela. 2005. "Pesticides and the West Nile Virus: An Examination of Environmentalist Claims," Competitive Enterprise Institute, Washington, DC. <http://www.cei.org/pdf/3893.pdf>.



---

# **Safe Drinking Water Act**

---



# Safe Drinking Water Act Overview

Angela Logomasini

Since passage of the Safe Drinking Water Act (SDWA) in 1974, localities struggle to meet federal mandates that do not make sense in all drinking water systems. The U.S. Environmental Protection Agency (EPA) has based many of its rules on weak science, leading to needlessly onerous federal standards. As a result, localities are forced to spend limited resources on misguided federal priorities. Small systems are particularly hard hit, paying for standards that provide no verifiable benefits while diverting resources from legitimate needs (e.g., infrastructure upgrades and repairs, expansion of the water supply system). Unfortunately, 1996 amendments to the law failed to fix these fundamental flaws. Congress should focus on ways to give states and localities more power in setting priorities. After all, each locality has a better grasp of its particular needs and can better

express preferences about how the community wants to expend limited resources.

## Statutory Scheme

The SDWA regulates about 54,000 existing public and private “public water systems.” These systems provide piped drinking water for 60 or more days a year to at least 25 individuals or to at least 15 service connections.<sup>1</sup> Approximately 15 million Americans draw water from unregulated “nonpublic water systems,” such as private wells.<sup>2</sup>

---

1. U.S. Environmental Protection Agency, *Drinking Water Infrastructure Needs Survey: Third Report to Congress* (Washington, DC: EPA, 2005), 1, <http://www.epa.gov/safewater/needssurvey>.

2. *Ibid.*

The EPA regulates more than 80 drinking water contaminants that might be found in the water of public water systems. For each regulated contaminant, the EPA usually specifies a maximum contaminant level goal (MCLG), which represents the level of a contaminant that the EPA ideally wants to allow in drinking water. The EPA uses the MCLG as a guide in setting the enforceable standard, the maximum contaminant level (MCL). The MCL represents the amount of that contaminant that systems may legally allow in tap water. For example, the EPA allows systems to provide only drinking water that contains no more than 0.005 milligrams of benzene per liter of water. When the EPA determines that it is technically or economically infeasible to monitor for a contaminant, it is directed by Congress to promulgate mandatory “treatment techniques,” such as mandatory installation of filtration devices.

### History

Many fear that returning drinking water regulatory authority to the states will create more waterborne-related illnesses. However, history shows that states and localities were doing a commendable job long before federal involvement began. Local government and private industry created the drinking water supply system that we have today; the federal government did not get involved until well after the infrastructure and treatment technology had produced enormous health benefits.<sup>3</sup> Long before the adoption of the SDWA, localities and private industry made much progress.

3. Michael J. LaNier, “Historical Development of Municipal Water Systems in the United States, 1876–1976,” *Journal of the American Water Works Association* 68, no. 4 (1976): 173–80.

Localities and the private sector had developed and used sand and carbon filtration; advanced water purification technologies (such as coagulation, rapid filtration, and chlorination); and copper sulfate additives (to improve taste and odor).

Deaths related to waterborne illnesses in the United States dropped from 75 to 100 per 100,000 people at the turn of the 20<sup>th</sup> century to fewer than 0.1 deaths per 100,000 annually by 1950, a result of local governments and industry having introduced chlorination in the 1880s.<sup>4</sup> In the late 1960s and early 1970s, political pressure began to mount for the passage of enforceable federal standards. The federal government and others issued a number of studies indicating that drinking water quality was less than perfect. While Washington was debating the issue in 1973, a Gallup public opinion poll sponsored by the American Water Works Association (AWWA) indicated that 70 percent of those polled were happy with the quality of their drinking water.<sup>5</sup> Some contend that public apathy began to change after the League of Women Voters, Ralph Nader groups, and even the AWWA worked to raise public “awareness” (i.e., fears).<sup>6</sup> Despite the hype that led up to the passage of the SDWA in 1974, it appears that drinking water was not necessarily any worse than it had been in the past. Data from the EPA and the Centers for Disease Control and Prevention indicate that, overall, waterborne illnesses had most likely remained

4. *Ibid.*, 177.

5. “Water Quality and Public Opinion,” *Journal of the American Water Works Association* 65, no. 8 (1973): 513–19.

6. Peter N. Kyros, “Legislative History of the Safe Drinking Water Act,” *Journal of the American Water Works Association* 66, no. 10 (1974): 566–69.



level since 1920.<sup>7</sup> And in some categories, serious outbreaks of waterborne illnesses such as typhoid fever declined.

In recent history, the largest and most serious outbreaks (in Milwaukee in 1993 and in Las Vegas in 1994) arose within large systems that regularly meet standards, indicating that federal regulation is inadequate for predicting and preventing new challenges. Unfortunately, such events occur without warning. But history indicates that drinking water suppliers have always been better than federal regulators at dealing with and eventually solving such problems.

### **Welfare Costs of Uniform Federal Standards**

Giving states and localities greater authority in setting drinking water standards would allow them to spend their limited resources in a way that maximizes public health and well-being. Indeed, the circumstances facing the 200,000 public water systems around the nation vary tremendously. The U.S. Congressional Budget Office (CBO) notes that a system that allows localities flexibility would reduce costs.<sup>8</sup> Currently, the financial resources involved are considerable:

- According to the CBO, the overall annual cost to comply with the SDWA ranges from \$1.4 billion to more than \$4 billion.<sup>9</sup> How-

ever, recent estimates from the EPA indicate that the costs are likely much higher.

- Furthermore, the EPA estimates additional funds are necessary to upgrade infrastructure to meet drinking water needs, both for basic infrastructure and to meet regulatory costs. According to the agency, water supply systems will need a total of \$278.8 billion for infrastructure upgrades over the next 20 years.<sup>10</sup> This estimate—which is 60 percent higher than EPA estimates in two earlier reports—indicates that infrastructure costs are growing faster than anticipated.<sup>11</sup>
- EPA notes that \$45.1 billion of the 20-year costs may be “directly attributable” to regulatory mandates.<sup>12</sup> Of that amount, water systems need \$35.2 billion immediately to meet existing standards, and they will need an additional \$9.9 billion to cover the costs of recently promulgated regulations.<sup>13</sup>
- According to a 1999 report by the U.S. General Accounting Office (now the Government Accountability Office), compliance with current regulations costs about \$20 a year per household (about \$145 a year for systems serving 25 to 100 people).<sup>14</sup> However, costs have increased substantially since this report came out, and they will continue to multiply many times over as new regulations come on line.

7. Gunther F. Craun, “Waterborne Disease Outbreaks in the United States of America: Causes and Prevention,” *World Health Statistics Quarterly* 45, no. 2–3 (1992) 192–95.

8. CBO, *Federalism and Environmental Protection: Case Studies for Drinking Water and Ground-Level Ozone* (Washington, DC: CBO, 1997), 18, <http://www.cbo.gov/ftpdoc.cfm?index=250&ctype=0&sequence=0>.

9. *Ibid.*, 17.

10. EPA, *Drinking Water Infrastructure Needs Survey*, 15.

11. *Ibid.*, 5.

12. *Ibid.*, 29.

13. *Ibid.* These estimates cover the disinfection byproducts phase I rule, the radon rule, the arsenic rule, and others.

14. U.S. General Accounting Office, *Safe Drinking Water Act: Progress and Future Challenges in Implementing the 1996 Amendments*, GAO.RCED-99-31 (Washington, DC: U.S. General Accounting Office, January 1999), 7.

## Drinking Water and Cancer

In addition to addressing acute drinking water illnesses, the SDWA was designed to reduce cancer risks. But are cancer risks really significant, and can EPA actually eliminate them?<sup>15</sup> Consider some facts:

- Using very conservative estimates, the EPA estimated in *Unfinished Business* that drinking water contamination causes between 400 and 1,000 annual cancer cases.<sup>16</sup> However, it is important to note that the EPA numbers are largely based on cancer risks as determined by rodent studies that may be seriously flawed.
- Using the EPA's estimates, which likely overstate the risks, scientist Michael Gough converted those estimates into actual cancer deaths, because not all cancers result in death, and came out with 240 to 591 possible annual drinking water deaths.<sup>17</sup>
- Using the U.S. Food and Drug Administration's (FDA) process for assessing risks, Gough found that annual cancer deaths caused by drinking water contamination might range somewhere between 56 and 407 a year.<sup>18</sup> These estimates indicate that cancer risks from drinking water are extremely small and difficult to address through regulation.
- In their landmark study on cancer, scientists Richard Doll and Richard Peto noted "with

15. See also "Chemical Risk" in *The Environmental Source*.

16. U.S. Environmental Protection Agency, *Unfinished Business: A Comparative Assessment of Environmental Problems—Overview Report* (Washington, DC: EPA, February 1987), 30.

17. Michael Gough, "How Much Cancer Can EPA Regulate Anyway?" *Risk Analysis* 10, no. 1 (1990): 5.

18. *Ibid.*

the possible exception of asbestos in a few water supplies, we know of no established human carcinogen that is ever present in sufficient quantities in large U.S. water supplies to account for any material percentage of the total risk of cancer."<sup>19</sup>

## The Worst Is Yet to Come

Many of the contaminants regulated in the past—most of which were industrial chemicals that accidentally entered water supplies—did not appear in most water supplies. Hence, although these contaminants carry with them expensive monitoring mandates, they did not all trigger the need to invest in expensive infrastructure. But several upcoming regulations will soon demand astronomical investments. Many of these rules address naturally occurring contaminants,<sup>20</sup> which are more prevalent in drinking water systems nationwide and will require very expensive efforts to eliminate. To add insult to injury, localities may reap no benefits from these rules because the EPA science underlying them is seriously flawed. Three such cases are detailed in these briefs: the disinfection byproduct rule, the radon rule, and the arsenic rule.

## Legislative Solutions

The best solution would be to return full authority for standard setting to the states and to allow states to work with localities to meet

19. Richard Doll and Richard Peto, "The Causes of Cancer: Quantitative Estimates of Avoidable Risks of Cancer in the United States Today," *Journal of the National Cancer Institute* 66, no. 6 (June 1981): 1249.

20. These contaminants are largely byproducts of nature, such as radon, which is radiation that results from the decomposition of radium and uranium present in soil and rock.

their specific needs. However, if the federal government remains involved, there are ways to help empower localities within a federal framework. Congress should engage in greater congressional review of safe drinking water rules to ensure that the EPA has indeed used the “best available science,” as demanded under

the law. If large questions remain over science and standards are likely to impose considerable costs, Congress should preempt the overly stringent standard. Congress also could amend the drinking water law to grant states discretion on how they regulate naturally occurring contaminants, such as radon and arsenic.



# Arsenic

Angela Logomasini

The debate over whether to tighten the drinking water standard for arsenic highlighted a key problem with federal drinking water regulation: the inappropriateness of the federal government's setting local priorities. At any time, local governments and utilities can monitor and control any contaminant they choose, and they know better where to devote their scarce resources. Nonetheless, as the case of arsenic demonstrates, the Safe Drinking Water Act (SDWA) allows federal regulators to impose priorities even when they promise a net loss to public health and well-being.

## Background

Arsenic is an element that is a natural part of Earth's crust. It exists in organic and

inorganic forms, but the U.S. Environmental Protection Agency (EPA) regulations focus on inorganic arsenic because it is more prevalent in drinking water. Traditionally, many critics have contended that inorganic arsenic was the principal danger to public health. But the EPA Science Advisory Board (SAB) pointed out that the research is actually far less clear. Recent research indicates that at least some forms of organic arsenic are carcinogenic, and some may be more toxic than inorganic forms.<sup>1</sup>

---

1. SAB, *Arsenic Proposed Drinking Water Regulation: A Science Advisory Board Review of Certain Elements of the Proposal*, EPA-SAB-DWC-01-001 (Washington, DC: EPA, December 2000), 10–11.

## Legislative History

The drinking water standard for most regulated substances is specified as a “maximum contaminant level,” or MCL. The MCL sets the maximum amount of a substance that the EPA will allow in tap water. Between 1975 and 2002, the EPA used an MCL of 50 parts per billion for arsenic, which meant that it allowed no more than 50 parts per billion of arsenic per liter of tap water. This standard was set as an “interim standard” after the passage of the SDWA. The 1986 revisions to the law mandated that the agency set a final standard by 1989.

After the agency missed the legislative deadline and a court-ordered deadline, amendments to the SDWA in 1996 extended the deadlines for the rule. The amendments required the agency to propose a standard by January 2000 and to finalize the rule by January 2001. In June 2000—five months later than legislatively mandated—the agency proposed a new standard of five parts per billion.<sup>2</sup> Because EPA proposed the rule late, lawmakers, water providers, and local officials expressed concern that there was not enough time to consider fully the proposed rule and its implications. Congress responded by including language in a fiscal year 2000 appropriations bill that extended the deadline for six additional months.

But in the waning days of the Clinton administration, the EPA published a final standard of 10 parts per billion in the *Federal Register*.<sup>3</sup> The standard would have been effective starting March 23, 2001, although water systems would have had until 2006 to comply. Senator Pete

Domenici (R-NM) responded by introducing S. 223, which would void the new rule. In March 2001, the Bush administration announced that it would delay the effective date of the standard for 60 days to review the rule and the underlying science. In April 2001, the administration issued a notice announcing that it would delay the final rule until 2002, after further scientific review and a cost analysis were complete.<sup>4</sup> The delay of the rule proved controversial, as the Democratic National Committee and environmental activists suggested that the delay would threaten public health. The administration completed its review and issued the Clinton standard in the fall of 2001.

## Welfare Losses

The debate on arsenic largely focused on the public health consequences of arsenic in drinking water, but it failed to consider the public health impacts of the rule itself. According to a U.S. Congressional Budget Office study, federal drinking water regulations can impose “welfare losses”—a phrase that highlights the possibility of shortsighted federal standards reducing the overall public welfare.<sup>5</sup>

With the arsenic rule, the welfare losses will likely be high, because the costs fall disproportionately on low-income rural Americans, mainly in the Southwest. In fact, the SAB highlights these very points, noting that an overly expensive arsenic rule “might force tradeoffs that do not maximize the gains to public health.” For example, “allocation of income to arsenic

2. *Federal Register* 65, no. 121 (June 22, 2000): 38888–983.

3. *Federal Register* 66, no. 14 (January 22, 2001): 6976–7066.

4. *Federal Register* 66, no. 78 (April 23, 2001): 20580–84.

5. U.S. Congressional Budget Office, *Federalism and Environmental Protection: Case Studies for Drinking Water and Ground-Level Ozone* (Washington, DC: U.S. Congressional Budget Office, November 1997).

might preclude addressing nutritional factors” because the standard could make it difficult for low-income families to put food on the table. In addition, the SAB noted that high treatment costs could lead communities to disconnect systems and access water from potentially more dangerous sources, such as from poorly designed wells or untreated surface water.<sup>6</sup> The statistics on how much the law will cost reveal that welfare losses are likely to be high:

- According to the EPA, per household costs of this rule alone could add \$326 annually to water bills in systems that serve fewer than 100 connections and up to \$162 in systems that serve between 100 and 100,000 residents. Even residents in larger systems that serve up to a million residents might see water bills increase by \$20 per year.<sup>7</sup>
- According to conservative EPA estimates, the total annual costs of the rule could range from \$180 million to \$205 million.<sup>8</sup> Water suppliers and independent academic experts estimate the costs would be far higher—\$604 million over and above any estimated benefits each year, with an initial investment cost of \$5 billion.<sup>9</sup> Independent researchers have found that the costs would exceed benefits by \$600 million annually.<sup>10</sup>

6. *Ibid.*, 38.

7. *Federal Register* 65, no. 14 (January 22, 2001): 7011.

8. *Federal Register* 65, no. 14 (January 22, 2001): 7010.

9. “Environmental Group Asks Court to Force OMB to Issue Arsenic Proposal,” *Daily Environment Report* no. 92 (May 11, 2000): A1.

10. Robert S. Raucher, *Public Interest Comment on the U.S. Environmental Protection Agency’s Proposed National Primary Drinking Water Regulations: Arsenic Rule* (Arlington, VA: Mercatus Center, 2000).

## Problems with the Underlying Science

Because tightening the standard would force people to make serious sacrifices, one might assume that, before issuing its rule, the EPA had clear evidence indicating that the current standard is not safe. Yet even after the Bush administration reviewed the science, it is still far from clear that the rule would provide any benefit. According to the National Research Council, “No human studies of sufficient statistical power or scope have examined whether consumption of arsenic in drinking water at the current MCL [the standard before the Clinton administration acted] results in the incidence of cancer or no cancer effects.”<sup>11</sup>

Most of what scientists do know relates to a few studies that reveal one thing: relatively high-level exposure to arsenic for long periods of time can cause cancer and other ailments. The EPA based its risk assessment on studies of Taiwanese populations in 42 villages who were exposed to relatively high levels of arsenic. From these studies, the EPA has extrapolated risks of low-level arsenic exposures in drinking water to the U.S. population. But the SAB and the National Research Council have pointed out serious flaws. Among them are the following:

- Although the Taiwanese studies found an association between high exposures and cancer, these data do not necessarily support any link between low-level exposures and cancer in the United States.<sup>12</sup>

11. National Research Council, *Arsenic in Drinking Water* (Washington, DC: National Academies Press, 1999), 7, [http://www.nap.edu/catalog.php?record\\_id=6444](http://www.nap.edu/catalog.php?record_id=6444).

12. SAB, *Review of the Draft Criteria Document on Inorganic Arsenic*, EPA-SAB-DWC-94-004 (Washington, DC: U.S. EPA, November 1993).



- The EPA failed to consider poor nutrition among the Taiwanese, which very likely exaggerates agency risk estimates. Dietary deficiencies, arsenic ingestion from other food sources, and heavy smoking may increase the toxicity of arsenic as well as the incidence of lung and bladder cancers.<sup>13</sup>
- Similarly, the SAB noted that the EPA did not adequately consider studies of U.S. populations in Utah exposed over decades to levels of up to 200 parts per billion—20 times the Clinton standard—that failed to find bladder cancers.<sup>14</sup>
- The SAB concluded that the EPA approach likely biases “U.S. risk estimates toward overestimates. ... The magnitude of this bias is likely to be large.”<sup>15</sup>
- However, the agency fails to consider loss of life because of the burdens placed on the public from the standard. Considering such factors, a study by the American Enterprise Institute and the Brookings Institution estimates that the rule could lead to a net loss of 10 lives per year.<sup>17</sup>
- The SAB notes that any substantial benefits of tightening the arsenic standard would occur in communities that have arsenic levels approaching the current 50 parts per billion standard—mostly rural southwestern areas of the country. However, the SAB report highlights the fact that any benefits may be overridden by the costs to these communities of meeting the standard. In fact, such costs may lead to a net reduction in public health.<sup>18</sup>

### Benefits or Net Public Health Loss?

Ironically, even if the EPA’s risk assessment were accurate, the benefits of its rule are so small that its costs likely will lead to a net reduction in public health and quality of life.

- According to EPA estimates, a standard set at 10 parts per billion will eliminate 23 to 33 cancer deaths each year (lung and bladder cancers combined).<sup>16</sup> The agency speculates that there would be other benefits, but it cannot quantify them because it lacks solid evidence for such claims.

13. SAB, *Arsenic Proposed Drinking Water Regulation*, 26, 30–31. The SAB notes substantial deficiencies in selenium, methyl donors, zinc, and other substances as key confounding factors.

14. *Ibid.*, 30.

15. *Ibid.*

16. *Federal Register* 65, no. 14 (January 22, 2001): 7011. The EPA estimates that benefits will come to \$140 to \$198 per year and \$6.1 million per life saved.

### Arsenic Rule Implementation

After the EPA finalized the arsenic rule in late 2001, Congress directed it to review its affordability standards, develop policies to address “undue economic hardships” on small communities, and report to Congress on these issues in March 2002.<sup>19</sup> In March 2002, the

17. Jason Burnett and Robert W. Hahn, *EPA’s Arsenic Rule: The Benefits of the Standard Do Not Justify the Costs* (Washington, DC: American Enterprise Institute-Brookings Joint Center for Regulatory Studies, 2001).

18. SAB, *Arsenic Proposed Drinking Water Regulation*, 37–39.

19. 107th Congress, House of Representatives, *Making Appropriations for the Departments of Veterans Affairs and Housing and Urban Development, and for Sundry Independent Agencies, Boards, Commissions, Corporations, and Offices for the Fiscal Year Ending September 30, 2002, and for Other Purposes*, Conference Report 107-272, November 2001, 175, [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=107\\_cong\\_reports&docid=f:hr272.107.pdf](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=107_cong_reports&docid=f:hr272.107.pdf).

EPA produced its report, but the report simply offered calculations showing how the EPA arrived at its affordability standards.<sup>20</sup>

The EPA then requested that the SAB and the National Drinking Water Advisory Council review the affordability issue. The SAB released a report suggesting that the EPA find a better device than median income to decide affordability—one that better reflected the finances of lower-income households. It also recommended that the EPA consider lowering the percentage of income that it believed acceptable as an annual expense for a drinking water regulation from 2.5 percent to a significantly lower, more reasonable level.<sup>21</sup> The council recommended that the EPA reduce acceptable drinking water costs to 1 percent of the median income.<sup>22</sup>

The EPA has not implemented any such suggestions. It has continued to reject variance and exemption requests on the basis of its misguided affordability criteria.<sup>23</sup> As a result, Representative Butch Otter (R-ID) and eight cosponsors introduced H.R. 4717 in 2004 and H.R. 1315 in 2005, which would allow small, nonprofit public water systems (serving 10,000 homes or fewer) to exempt themselves from the drinking water rules related to naturally occurring substances such as arsenic and radon. The goal was to help alleviate excessive burdens and allow

communities to allocate resources according to their greatest needs. However, no legislation has passed to address affordability issues.

In March 2006, EPA proposed more reasonable affordability criteria, but these will not apply to existing regulations, such as arsenic, but instead to future rules.<sup>24</sup> EPA has yet to finalize this proposal.<sup>25</sup>

## Legal Challenge

There have been attempts to challenge the rule in the courts. Most interesting was the attempt to cast the SDWA as unconstitutional. In 2003, the state of Nebraska challenged the arsenic rule as a violation of the Commerce Clause, which limits Congress to regulation only in cases involving interstate commerce.<sup>26</sup> The state essentially argued that because most drinking water systems do not cross state lines, the entire SDWA was unconstitutional because Congress has no authority to regulate intrastate commerce. The court held that the EPA showed that there is enough interstate commerce of drinking water to justify regulation. However, it left open the possibility that individual systems involved exclusively in intrastate activity might be able to successfully challenge the rule.

## Key Expert

Angela Logomasini, Director of Risk and Environmental Policy, Competitive Enterprise Institute, [alogomasini@cei.org](mailto:alogomasini@cei.org)

20. EPA, *Report to Congress: Small Systems Arsenic Implementation Issues* (Washington, DC: EPA, March 2002).

21. SAB, *Affordability for Small Drinking Water Systems*, (Washington, DC: EPA, December 2002), 4.

22. National Drinking Water Advisory Council, *Recommendation of the National Drinking Water Advisory Council to the EPA on Its National Small Systems Affordability Criteria* (Washington, DC: EPA, July 2003), 87, [http://www.epa.gov/safewater/ndwac/pdfs/report\\_ndwac\\_affordabilitywg\\_final\\_08-08-03.pdf](http://www.epa.gov/safewater/ndwac/pdfs/report_ndwac_affordabilitywg_final_08-08-03.pdf).

23. Personal conversation with Mike Keegan of the National Rural Water Association on July 27, 2004.

24. *Federal Register* 71, no. 41, (March 4, 2006): 10671-10685.

25. For more information see EPA's website <http://epa.gov/OGWDW/smallsys/affordability.html>.

26. *State of Nebraska et al. v. Environmental Protection Agency*, 331 F.3d 995, 998 (DC Cir., 2003).

### Recommended Readings

Burnett, Jason, and Robert W. Hahn. 2001. *EPA's Arsenic Rule: The Benefits of the Standard Do Not Justify the Costs*. Washington, DC: American Enterprise Institute–Brookings Joint Center for Regulatory Studies.

Dudley, Susan. 2001. *Public Interest Comment on the U.S. Environmental Protection Agency Proposed National Primary Drinking Water Regulations: Arsenic and Clarifications to Compliance and New Source*

*Contaminants Monitoring*. Arlington VA: Mercatus Center, <http://www.mercatus.org>.

Logomasini, Angela. 2001. “Arsenic and Old Politics.” *OnPoint* 80, Competitive Enterprise Institute, Washington, DC, <http://www.cei.org/gencon/004,02034.cfm>.

Raucher, Robert S. 2000. *Public Interest Comment on the U.S. Environmental Protection Agency's Proposed National Primary Drinking Water Regulations: Arsenic Rule*. Arlington, VA: Mercatus Center.

# Chlorine and the Disinfection Byproducts Rule

Angela Logomasini

For many years, the U.S. Environmental Protection Agency (EPA) has attempted to develop standards to regulate disinfection by-products, a group of microbial contaminants that result when public water is purified with chlorine. The EPA is working on congressionally mandated deadlines to issue a series of rules to regulate these contaminants. According to the General Accounting Office (GAO), now the Government Accountability Office, the first of two stages of these rules will cost \$700 million a year.<sup>1</sup> Because the science used to justify these rules is very weak, it is likely that the public will pay billions in exchange for little or no benefit. Because the rules cause reduced use of

chlorination to keep water supplies clean, the public may suffer adverse health impacts.

## Regulatory Status

The EPA proposed a rule in 1994,<sup>2</sup> but Congress extended the deadline until November 1998. The EPA issued stage 1 of the rule on schedule. The law required the EPA to finalize stage 2 of the rule by May 2002, but it did not actually finalize the rule until January 2006. For each regulated contaminant under the Safe Drinking Water Act (SDWA), the EPA usually specifies a maximum contaminant level goal (MCLG), which represents the level of a contaminant that the EPA

1. GAO, *Safe Drinking Water Act: Progress and Future Challenges in Implementing the 1996 Amendments*, GAO. RCED-99-31, 6 (Washington, DC: GAO, January 1999).

2. *Federal Register* 59, no. 145 (July 29, 1994): 38668–829.

ideally wants to allow in drinking water.<sup>3</sup> The EPA uses the MCLG as a guide in setting the enforceable standard, the maximum contaminant level (MCL). The MCL represents the amount of a contaminant that systems may legally allow in tap water. In 1998, controversy emerged when the EPA issued its first set of standards for disinfection byproducts. The EPA set a zero MCLG and a 0.08 MCL for a group of four disinfection byproducts called “total trihalomethanes,” of which chloroform is one.<sup>4</sup> A federal court reversed the MCLG for chloroform.

### The Science

After the passage of the 1996 SDWA amendments, the EPA set up an advisory committee on the rule and cosponsored a study with the International Life Sciences Institute Expert Panel. Consisting of 10 experts from government and industry, this panel concluded that cancer related to chloroform “is expected to involve a dose response relationship, which is nonlinear and probably exhibits an exposure threshold.”<sup>5</sup> Hence, the best science indicates that under a given level, chloroform poses zero risk, which would enable the agency to set a less stringent standard than if the substance posed a risk at any level (as is assumed under the linear risk model).<sup>6</sup>

On the basis of those findings, the EPA released a notice in the *Federal Register* (called a Notice of Data Availability, or NODA) stating that it was considering revisions to the 1994 rule because it “concluded that a nonlinear approach is more appropriate for extrapolating low-dose cancer risk rather than the low-dose linear approach.”<sup>7</sup> EPA then requested comments. Setting a goal above zero would have been the first time the agency had set a MCLG above zero for a substance it considered carcinogenic and would have enabled the agency to ease the stringency of the standard.

Nine months later, the EPA caved in to political pressures and reversed its position. It set a zero MCLG for chloroform in the final rule.<sup>8</sup> The EPA had failed to use the “best available science,” which the 1996 law demands that it observe, and a federal court subsequently vacated the MCLG (but not the final MCL), calling the MCLG “arbitrary and capricious.”<sup>9</sup> The EPA subsequently removed the zero goal.<sup>10</sup> Although the EPA has not promulgated a new MCLG, the enforceable MCL that it set remains in effect.

The EPA’s flip-flop is difficult to explain on scientific grounds. The final regulations and the NODA are full of disclaimers, noting that there

3. An MCLG is an unenforceable standard that is used as a guide for setting the enforceable standard, the MCL. For more information, see the policy brief titled “Safe Drinking Water Act Overview.”

4. Under this standard, water providers must ensure that tap water contains no more than 0.08 mg/L of the combined concentration of these substances.

5. *Federal Register* 63, no. 61 (March 31, 1998): 15685.

6. For more information on threshold models versus linear models, see the policy brief titled “The True Source of Cancer in the Environmental Source.”

7. *Federal Register* 63, no. 61 (March 31, 1998): 15685. The regulations for chloroform would not be affected by a zero MCLG because the enforceable MCL would not have changed. Also, the standard does not simply regulate chloroform. It regulates the level of total trihalomethanes; chloroform is one of four such contaminants.

8. *Federal Register* 63, no. 241 (December 16, 1998): 69390–476.

9. *Chlorine Chemistry Council v. Environmental Protection Agency*, 98-1627, 99-1023, and 99-1056 (DC Cir., March 31, 2000).

10. *Federal Register* 65, no. 104 (May 30, 2000): 34404–05.

is little hard evidence that disinfectant byproducts are even carcinogenic.

- In the final rule, the EPA notes, “a causal relationship between exposure to chlorinated surface water and cancer has not yet been demonstrated. However, several studies have suggested a weak association in various subgroups ... these studies found a weak association for bladder cancer, although findings were not consistent within and among studies.”<sup>11</sup>
- In the NODA, the EPA noted that studies it used for the 1994 rule<sup>12</sup> generally showed results that had weak statistical significance and were not always consistent. For example, some reviewers believe that two studies showed statistically significant effects only for male smokers, while two other studies showed higher effects for nonsmokers. One study showed a significant association with exposure to chlorinated surface water but with exposure to chlorinated groundwater, while others showed the opposite result.<sup>13</sup>

Setting such standards without scientific consensus or any verified alternative to chlorination is very risky. Disinfection byproduct regulations could curtail the use of disinfectants that are vital to the protection of consumers against microbial contamination, a cause of approximately 50,000 deaths daily worldwide.<sup>14</sup> Underscoring that concern, the

11. *Federal Register* 63, no. 241 (December 16, 1998): 69407.

12. *Federal Register* 63, no. 61 (March 31, 1998): 15679–80.

13. *Federal Register* 63, no. 241 (December 16, 1998): 69408.

14. “As Control Efforts Reach Turning Point, Water Suppliers Press Congress to Boost Disinfection

EPA’s own Science Advisory Board (SAB) reported in 1993 that the EPA lacked the hard data necessary to justify passing a disinfection byproduct regulation. The SAB warned, “A key concern is the possibility that chlorination ... may be replaced by processes with poorly understood health impacts, both chemically and microbiologically.”<sup>15</sup>

Failure to properly disinfect water has already resulted in serious public health impacts. In 1991, the government in Peru reduced chlorine levels in their water supply because of fears about cancer risks resulting from EPA actions to regulate disinfection byproducts.<sup>16</sup> Inadequate chlorination in Peru has been cited in scientific literature<sup>17</sup> as a key factor in a cholera epidemic that started in Peru and spread then throughout the hemisphere, leading to 533,000 cases of cholera and 4,700 deaths.

### Key Experts

Angela Logomasini, Director of Risk and Environmental Policy, Competitive Enterprise Institute, [alogomasini@cei.org](mailto:alogomasini@cei.org).

Bonner Cohen, National Center for Public Policy Research, [bonnercohen@comcast.net](mailto:bonnercohen@comcast.net).

By-product Research,” *Water Policy Report*, May 12, 1993, 30.

15. SAB, *Drinking Water Committee Commentary on Negotiated Regulation for Disinfection Byproducts*, EPA-SAV-DWC-COM-94-002 (Washington, DC: EPA, November 8, 1993), 3.

16. Michael Fumento, “Will the U.S. Repeat Peru’s Deadly Chlorine Folly?,” [www.fumento.com](http://www.fumento.com), 1996, <http://www.fumento.com/bomis34.html>.

17. For example, see David L. Swerdlow et al., “Waterborne Transmission of Epidemic Cholera in Trujillo, Peru: Lessons for a Continent at Risk,” *The Lancet*, July 4, 1992; and “Of Cabbages and Chlorine: Causes of Cholera Epidemic in Peru,” *The Lancet*, July 4, 1992.

### **Recommended Readings**

Michelle Malkin and Michael Fumento, *Rachell's Folly: The End of Chlorine* (Washington, DC: Competitive Enterprise Institute: March 1996), <http://fumento.com/rachel.pdf>.

Enrique Ghersi and Hector Naupari, "Dirty Water: Chlera in Peru," in *Environmental Health: Third World Problems—First World Preoccupations*, Roger Bate and Lorraine Mooney eds. (New York: Butterworth-Heinemann, 1999), 17-46.



# Radon

Angela Logomasini

The Environmental Protection Agency (EPA) has been working to promulgate a drinking water rule on radon for more than a decade. As with many other rules, the debate focuses on whether science proves that the rule is necessary to protect public health, given its very high costs, particularly to rural America. Costs to small communities may force them to make huge sacrifices. The only solution for such communities might be to discontinue drinking water service, which could lead residents to turn to dangerous sources such as untreated surface waters.

## Regulatory and Legislative History

The drinking water standard for most regulated substances is specified as a “maximum

contaminant level” or MCL. The MCL sets the maximum amount of a substance that the EPA will allow in tap water. Currently, EPA regulations set a MCL of 4,000 picocuries per liter for radon. In 1991, the EPA proposed changing the MCL to 300 picocuries per liter on the basis of 1991 findings of an agency report on radon.<sup>1</sup> Because of controversies regarding EPA science and the potential costs of the rule, Congress placed a hold on the EPA’s promulgation of the rule until it reauthorized the SDWA. But rather than reining in the EPA and preventing it from setting a ridiculously stringent standard, the 1996 SDWA amendments required the agency

---

1. U.S. Environmental Protection Agency, *Report to Congress on Radon in Drinking Water: Multimedia Risk and Cost Assessment of Radon* (Washington, DC: EPA, 1994).

to issue a final rule within four years after reviewing the findings of a government-funded National Academy of Sciences (NAS) risk assessment of radon. An affiliate of the NAS—the National Research Council (NRC)—produced a report in 1998.<sup>2</sup> The EPA proposed a rule in 1999, again suggesting an MCL of 300 picocuries per liter. However, under the 1996 SDWA amendments, the EPA rule would allow localities and states to meet a less stringent standard if they used programs to regulate radon in indoor air. Despite a mandate to finalize the rule in 2002, the EPA has not yet produced a final rule.

### Aggregate Costs and Benefits

Aggregate costs and benefits of the radon rule are as follows:

- The EPA estimates that the rule would cost \$407.6 million per year.<sup>3</sup>
- The EPA claims that the rule will yield \$362 million in benefits, or \$5.8 million per theoretical life saved and \$538,000 per theoretical nonfatal cancer prevented.<sup>4</sup>

### Science

Early on, the EPA’s own Science Advisory Board (SAB) expressed serious concern regarding the agency’s claims about radon:

- Back in 1993, EPA science adviser William Raub warned the agency that it was relying on “inconclusive epidemiological findings as to whether radon (either ingested or inhaled) actually presents an appreciable risk within the typical American household if none of the occupants smokes tobacco products.”<sup>5</sup>
- The agency, however, essentially ignored Raub’s admonition and issued a draft report on radon (which it ultimately adopted as the final report with few changes), sticking by its radon alarmism.
- The SAB criticized the EPA’s draft report findings noting: “There is no direct epidemiological or laboratory evidence of cancer being caused by ingestion of radon in drinking water ... it is not possible to exclude the possibility of zero risks for ingested radon.”<sup>6</sup>
- After reviewing the scientific literature, the chairman of the SAB review committee overseeing the EPA radon report, Roger McClellan, concluded that an MCL of 3,000 picocuries per liter—10 times less stringent than the proposed EPA standard—would prove sufficient to protect public health.<sup>7</sup>
- In 1998, the NRC issued the congressionally mandated risk assessment, which EPA and others hailed as a new definitive finding on radon. But the NRC assessment is not based on new information. The report uses the same data that raised questions in the past among the SAB members and others.<sup>8</sup>

2. National Research Council, *Risk Assessment of Radon in Drinking Water* (Washington, DC: National Academies Press, 1998), <http://www.nap.edu/openbook.php?isbn=0309062926>.

3. *Federal Register* 64, no. 211 (November 2, 1999): 59269. Figures represent 1997 dollars.

4. *Ibid.*

5. Richard Stone, “EPA Analysis of Radon in Water Is Hard to Swallow,” *Science* 261, no. 5128 (1993): 1514–16.

6. *Ibid.*

7. *Ibid.*

8. J. H. Lubin, J. J. Boice, C. Edling, R. W. Hornung, G. Howe, E. Kunz, R. A. Kusiak, H. I. Morrison, E. P. Radford, J. M. Samet, M. Tirmarche, A. Woodward, Y. S. Xiang, and

- The data show elevated cancer levels among miners who smoked heavily and were exposed to very high levels of radon as well as of nitrogen oxides and mineral dusts in mines. The relevance of these studies to low-level residential exposures is unknown.
- Neither the NRC nor the EPA has been able to establish that low-level radiation in homes causes cancer in nonsmokers or even in smokers. Accordingly, the NRC risk assessment indicates that the risks from ingestion could be zero, “depending on the validity of the linear non-threshold dose response hypothesis.”<sup>9</sup>
- Despite these very serious weaknesses in the data, the NRC claimed that radon in drinking water might cause as many as 180 deaths a year.<sup>10</sup>
- On the basis of the NRC estimates, the EPA claims that its 1999 proposal would save 62 lives.<sup>11</sup>

The EPA and the 1998 NRC report ignore not only that radon may be safe under a given exposure level but also that low-level exposures might even be beneficial. Some studies indicate

that our bodies may create defense mechanisms against chemicals when we are exposed at low doses. So, rather than causing cancer, low-dose exposures may help us fight off cancer and other illnesses. According to a number of researchers:

- Studies have found instances in which people exposed to low levels of radiation actually experienced less incidence of leukemia than the general population, while highly exposed individuals experienced elevated rates of leukemia.<sup>12</sup>
- Some studies have found that increasing levels of low-level radon exposure are linked to decreasing cancer rates.<sup>13</sup>
- Nonetheless, even using its dubious science to exaggerate risks, the EPA’s proposed rule still promises more costs than benefits. (As already mentioned, the EPA estimates annual costs at \$407.6 million and benefits at \$362 million.)<sup>14</sup>

Having failed the cost-benefit test, the EPA justified its proposed rule on the basis of a provision of the SDWA that attempted to make the new law flexible and multimedia oriented.

---

D. A. Pierce, *Radon and Lung Cancer Risk: A Joint Analysis of 11 Underground Miners Studies*, NIH publication 94-3644 (Bethesda, MD: National Institutes of Health, 1994). See also NRC, *Health Risks of Radon and Other Deposited Alpha-Emitters (BEIR IV)* (Washington, DC: National Academies Press, 1988); NRC, *Health Effects of Exposures to Radon (BEIR VI)*, (Washington, DC: National Academies Press, 1999).

9. National Research Council, *Risk Assessment of Radon in Drinking Water*.

10. Ibid, the estimate includes 160 theoretical deaths from inhaling radon gas emitted from tap water, plus 20 theoretical bladder cancers resulting from ingestion of radon in water, 6.

11. *Federal Register* 64, no. 211 (November 2, 1999): 59269.

---

12. Jay Lehr, “Good News about Radon: The Linear Nonthreshold Model Is Wrong,” May 1996, <http://www.junkscience.com/news/lehr.html>. Dr. Lehr cites the following studies: T. D. Luckey, *Radiation Hormesis* (Boca Raton, FL: CRC Press, 1991); T. Sugahara, L. A. Sagan, and T. Aoyama, *Low Dose Irradiation and Biological Defense Mechanisms* (Amsterdam: *Excerpta Medica*, 1992); and E. J. Calabrese, *Biological Effects of Low-Level Exposures to Chemicals and Radiation* (Boca Raton, FL: CRC Lewis Publishers, 1994).

13. B. L. Cohen, “Test of the Linear–No Threshold Theory of Radiation Carcinogenesis for Inhaled Radon Decay Products,” *Health Physics* 68, no. 2 (1995): 157–74.

14. *Federal Register* 64, no. 211 (November 2, 1999): 59269.

This provision allows public water systems to meet a less stringent standard—the “alternative maximum contaminant level” (AMCL)—if the state, locality, or public water system sets up a multimedia mitigation program (MMM). States must gain EPA approval of an MMM by outlining measures that they will take to control radon in indoor air. If a state does not submit a plan, then localities and public water systems may propose plans to the EPA. Accordingly, in 1999, the EPA proposed a radon rule that includes an MCL of 300 picocuries per liter, an AMCL of 4,000 picocuries per liter, and a set of requirements for MMMs. The EPA estimated that if states chose the MMM route, the regulation would cost only \$80 million.<sup>15</sup>

However, rather than being more flexible, this provision gives the EPA an excuse to enter an entirely new area of government regulation: control over levels of radon in indoor air. In fact, the language in the EPA’s rule indicates that the agency set the MCL high to promote MMMs, not because the MCL was necessary to protect public health. The agency explained that it needed the higher MCL because “the equal or greater reduction required to be achieved through the AMCL/MMM option would be diminished as the MCL approaches the AMCL of 4,000 [picocuries per liter] and that fewer states and [community water systems] would select this option. Further, the AMCL/MMM would be eliminated entirely if the MCL were set at the AMCL.”<sup>16</sup> In other words, the EPA

was setting a needlessly high standard so that it could regulate indoor air quality.

Moreover, this approach may not be any less expensive. In fact, attempts to control indoor radon in the past have been expensive and have produced mixed results. Poorly designed or installed mitigation technology can increase radon levels, and successful technology has cost thousands of dollars per home. In addition, state-led programs implemented during the 1980s have proved costly. A New Jersey program during the 1980s proved disastrous, permanently displacing residents from their homes after the government removed soil from under the houses. The New Jersey government then spent years and millions of dollars trying to dispose of the soil as political debates raged over disposal sites.<sup>17</sup>

### Key Expert

Angela Logomasini, Director of Risk and Environmental Policy, Competitive Enterprise Institute, [alogomasini@cei.org](mailto:alogomasini@cei.org)

### Recommended Readings

- Cole, Leonard A. 1993. *Element of Risk: The Politics of Radon*. New York: Oxford University Press.
- Stone, Richard. 1993. “EPA Analysis of Radon in Water Is Hard to Swallow.” *Science* 261, no. 5128: 1514–16.

---

15. Ibid.

16. Ibid., 59270.

---

17. For more information on disastrous radon policies, see Leonard A. Cole, *Element of Risk: The Politics of Radon* (New York: Oxford University Press, 1993).

# Rural Drinking Water

Angela Logomasini

Rural communities face heavy burdens under uniform federal drinking water standards that force them to make considerable sacrifices. The executive director of the Maine Rural Water Association provides some examples:

Tiny Hebron Water Company, with all of its 26 customers, must spend \$350,000 to meet this rule [the Surface Water Treatment Rule (SWTR)]. Milo Water District's 700 customers have spent \$7.3 million to meet the SDWA [Safe Drinking Water Act] and SWTR requirements. This cost puts the viability of the town in jeopardy. There is a tax lien on one out of ten homes. We are rapidly approaching a time when people on fixed incomes can expect to pay

10 percent of their income for just water and sewer.<sup>1</sup>

Controlling costs is critical because standards can produce net negative benefits. A U.S. Congressional Budget Office (CBO) study notes that uniform federal standards translate into what CBO calls “welfare costs”—which basically means that a regulation costs more than the benefits it returns. The reason for using the word *welfare* is to remind us that those financial losses translate into reductions in quality of life. As the law is now written, the U.S. Environ-

---

1. Statement of Steve Levy, executive director of the Maine Rural Water Association, on behalf of the National Rural Water Association, before the Subcommittee on Health and the Environment, Commerce Committee, U.S. House of Representatives, January 31, 1996.

mental Protection Agency (EPA) considers costs to large systems when conducting cost-benefit analyses, but because of the economies of scale, the costs to households in small systems are far higher than those of the large systems on which the standards are based. Heavy burdens on rural communities have not disappeared under the 1996 law:

- According to the General Accounting Office, now the Government Accountability Office, the annual existing compliance cost (not the total water bill, just compliance) of systems serving 100 to 250 people is \$145 a year, and that number is expected to multiply as new rules come out.<sup>2</sup>
- A representative from the National Rural Water Association noted to Congress that the some households must pay as much as \$50 per month to receive water service.<sup>3</sup> Such costs are not affordable for many rural Americans who are living on fixed incomes.
- Systems must spend thousands of dollars every year to test water for the presence of contaminants that pose very little risk or that are very rare. Yet many systems might find it more logical to test for those contaminants less often and to use the funds that would have gone to testing to address pressing needs.

2. General Accounting Office, *Safe Drinking Water: Progress and Future Challenges in Implementing the 1996 Amendments* (Washington, DC: General Accounting Office, January 1999), 7.

3. Statement of Steve Levy, executive director of the Maine Rural Water Association, on behalf of the National Rural Water Association before the Subcommittee on Fisheries, Wildlife, and Drinking Water of the Senate Environment and Public Works Committee, March 3, 1999.

- A 1994 National Rural Water Association survey found that monitoring regulations would prevent 80 percent of small communities from devoting resources to hook up more families, to provide routine maintenance and systems improvements, to engage in pollution prevention activities, to pay for additional training for systems operators, and to make improvements in water treatment and in operation and maintenance activities.<sup>4</sup>

### Regulatory Relief or Mirage?

The law gives the EPA specific authority to provide some regulatory relief to small systems. Systems that cannot afford to meet the rule can request variances, exemptions, or both. Variances allow a system to delay meeting a standard if the system uses EPA-designated “variance technologies.” The EPA has a process to directly grant variances to communities serving 3,300 households or fewer when a standard is not deemed affordable. States can also issue variances—provided that they obtain EPA approval—to systems serving between 3,300 and 10,000 customers. Communities can also apply for exemptions to a rule if they do not have the financial resources to meet it and if they have taken “all practical steps” to meet the rule.<sup>5</sup>

Yet EPA implementation of the law makes these provisions practically useless. For example, even though the EPA is supposed to consider affordability to small systems, these criteria are based on what the agency deems acceptable costs for the typical American household—which is

4. Statement of Dan Keil on behalf of the National Rural Water Association before the Environment and Public Works Committee, U.S. Senate, October 19, 1995.

5. Scott Rubin, *Affordability of Water Service* (Duncan, OK: National Rural Water Association, 2001).



not particularly relevant to the low-income rural Americans served by small systems. The EPA deems that a standard passes the affordability test if it keeps the total water bill costs at 2.5 percent of a *median* family income. This amount seems high even for median income Americans. With an estimated median family income at about \$40,000 a year, 2.5 percent amounts to \$1,000 a year per household.<sup>6</sup> EPA has proposed more reasonable standards, but they will only to future rules, keeping the unreasonable standard in place for all existing regulations. EPA has yet to finalize its proposal.<sup>7</sup>

In theory, the affordability test means that if households are estimated to spend \$500 a year for water, the EPA could add a total of \$500 in regulatory costs. However, it is not clear that that EPA fully considers existing regulatory costs when adding new ones.

In any case, \$1,000 might be affordable for some Americans, but it is not affordable for the families that the affordability provisions are supposed to benefit. This amount is too much for low-income Americans, and it is certainly more than 2.5 percent of their incomes.<sup>8</sup> Given such ridiculous affordability assumptions, it is not surprising that the EPA issues few variances or exemptions.

On top of that, procedures for obtaining variances and exemptions are so bureaucratic

that few communities ever benefit, and state government find the process too complex to implement well.<sup>9</sup> The CBO notes that between 1990 and 1994, public water systems obtained no variances and only 15 exemptions. “Given that approximately 200,000 public water systems are subject to federal regulations (of which over 85 percent are small), that is a strikingly small number,” noted the CBO.<sup>10</sup> Little has changed since the passage of the 1996 amendments. In a compliance report published in 2000, the EPA stated that “few public water systems were operating under a variance or exemption, and only 8 new variances or exemptions were granted.”<sup>11</sup>

### Legislative Bias against Rural America

In addition to the high costs of uniform standards to existing systems, the law has several provisions that actually prevent many communities from gaining access to piped water. Allegedly, these provisions are designed to help systems come on line, but instead they erect high hurdles:

- One of these provisions specifies that states may use federal drinking water loans only to assist “public water systems,” denying

6. Personal conversation with Mike Keegan, National Rural Water Association, July 27, 2004. See also the Rural Water Washington News Blog at <http://www.rural-water.org>, which posts letters documenting EPA variance rejections, and Scott Rubin, *Economic Characteristics of Small Systems* (Duncan, OK: National Rural Water Association, 2001).

7. *Federal Register* 71, no. 41, (March 4, 2006): 10671-10685; For more information see EPA’s website: <http://epa.gov/OGWDW/smallsys/affordability.html>.

8. Rubin, *Economic Characteristics of Small Systems*.

9. EPA, *Report to Congress: Small Systems Arsenic Implementation Issues* (Washington, DC: EPA, 2002), 7, [http://www.epa.gov/OGWDW/arsenic/pdfs/congr\\_ars\\_mar\\_02.pdf](http://www.epa.gov/OGWDW/arsenic/pdfs/congr_ars_mar_02.pdf).

10. CBO, *Federalism and Environmental Protection: Case Studies for Drinking Water and Ground-Level Ozone* (Washington, DC: CBO, 1997), 20, <http://www.cbo.gov/ftpdocs/2xx/doc250/drinkwat.pdf>.

11. EPA, Office of Enforcement and Compliance Assurance, *Providing Safe Drinking Water in America: 1998 National Public Water Systems Compliance Report* (Washington, DC: U.S. EPA, 2000), 4.



states the flexibility to assist communities with nonpiped water supplies.<sup>12</sup>

- Another provision holds that the federal government will reduce federal funding to states that help communities develop new systems if those systems cannot immediately meet all 80-plus SDWA standards.<sup>13</sup> Though this provision has been lauded as a “capacity development policy,” one public official revealed its real purpose in testimony to Congress. He praised the program for producing “five state programs to prevent the formation of new non-viable water systems.”<sup>14</sup> Thirty-six similar programs were “on track,” he noted. This provision is essentially equivalent to telling the poor that if they cannot afford caviar they should starve.

If Congress does anything in the near future about drinking water, it should be to find means to provide regulatory relief to rural Americans.

Among the reforms might be a proposal to grant states full authority (without any EPA approval) to issue variances and exemptions and to decide how to expend revolving loan funds. In addition, Congress should engage in vigorous review of all upcoming standards to prevent the agency from passing new regulations that are not supported by strong science. The costs of misguided rules, particularly to rural communities, can reduce quality of life and public health.

### **Key Experts**

Angela Logomasini, Director of Risk and Environmental Policy, Competitive Enterprise Institute, [alogomasini@cei.org](mailto:alogomasini@cei.org)

Mike Keegan, National Rural Water Association, [keegan@bookcase.com](mailto:keegan@bookcase.com)

For additional information, see <http://www.ruralwater.org>.

---

12. 42 USC §300j-12(a)(2).

13. 42 USC §300g-9(a), §300j-12(a)(1)(G).

14. Testimony of Gerry C. Biberstine on implementation of the SDWA of 1996 before the Committee on the Environment and Public Works, prepared by the Association of State Drinking Water Administrators, U.S. Senate, March 1, 1999.

# Lead in Drinking Water

Angela Logomasini

During the winter of 2004, the District of Columbia discovered elevated levels of lead in its drinking water—levels that exceeded federal standards by many times. The issue raised concerns about lead’s potential impact on children’s learning abilities. Sensationalist coverage in the media captured the attention of Washington policymakers by fostering the impression that there was a serious public health threat in the District and possibly in cities around the nation. After the D.C. story broke, a handful of other cities discovered that they too had excess lead in their drinking water, although at lower levels than were found in D.C. The issue forced both Congress and regulators to examine public health concerns about lead levels. However, the science clearly shows that no action was nec-

essary because the public health threat was minimal.

## Statutory Scheme

The federal drinking water regulations on lead established a treatment practice rather than setting a numeric standard as is done for other water contaminants. The rule calls for “optimum corrosion control,” which is defined as public education and lead service line replacement. Systems must use this practice if lead levels in drinking water exceed 15 parts per billion in 10 percent of samples. Systems must periodically collect and test tap water samples from homes where lead concentration would likely be the highest, such as homes that receive their water through lead pipes.

## Legislative History and Background

After the D.C. story broke, members of Congress held hearings and began considering beefing up the nation's drinking water law. Legislation (H.R. 4268) offered by D.C. delegate Eleanor Holmes Norton and a companion Senate bill (S. 2377) offered by Rep. James Jeffords (I-VT) in 2004 would have demanded that public water systems begin programs to replace lead service lines—replacing portions annually until such lines are eliminated. Administration officials argued at these hearings that new federal regulations for lead were premature.<sup>1</sup> The U.S. Environmental Protection Agency (EPA) pledged to review compliance with the lead rule around the nation and to issue revisions to the rule. In March 2005, it reported that 96 percent of the nation's drinking water systems were in compliance.<sup>2</sup> The EPA produced a new rule for lead, which was finalized in 2006. The new rule made modest revisions—while keeping the action level at 15 parts per billion—with the hope of improving communication and compliance with the rule.<sup>3</sup>

## Lead and Public Health

A study conducted by the Centers for Disease Control and Prevention (CDC) reinforced the EPA view that the situation did not present a public health threat. Nor did the case warrant

panic-driven regulation.<sup>4</sup> In fact, according to the CDC, the lead discovered in D.C. water did not raise the level of lead in anyone's blood to a point of concern. It noted that the amount of lead found in individuals' blood today is largely the result of other exposures—particularly peeling lead paint and dust from such paint. Fortunately, we have seen progress in that area. The average lead blood level has declined substantially (80 percent) since the late 1970s, according to the CDC.<sup>5</sup>

Not surprisingly, the District government and the CDC discovered that every child with elevated lead levels whom they found in D.C. lived in a home with peeling lead paint or lead-containing dust from renovations. Daniel R. Lucey, the District's interim chief medical officer, reported to the *Washington Post* that in tests of about 1,100 children, 14 children were found with elevated lead levels. Six of these children did not even live in homes with lead service lines. Moreover, tests on about 200 people of all ages from homes with the highest lead levels in the water did not find anyone with blood containing lead at levels of concern.<sup>6</sup> Lucey explained, "We are not seeing any widespread lead toxicity attributable to the water in D.C."<sup>7</sup>

1. Statement of Ben Grumbles, acting administrator for water, U.S. Environmental Protection Agency, before the House Committee on Government Reform, May 21, 2004.

2. Patricia Ware, "OMB Concludes Review of Lead, Copper Rule That Would Revise Existing EPA Regulation," *Daily Environment Report*, May 11, 2006, A-4.

3. 40 CFR §141.81-91

4. CDC, "Blood Lead Levels in Residents of Homes with Elevated Lead in Tap Water—District of Columbia, 2004," *Morbidity and Mortality Weekly Report* 53, no. 30 (2004): 268–70.

5. CDC, "Blood Lead Levels in Young Children—United States and Selected States, 1996–1999," *Morbidity and Mortality Weekly Report* 49, no. 50 (December 22, 2000): 1133–37.

6. Avram Goldstein, "Blood Levels Affected by Disinfectant: Study Cites Impact on D.C. Children," *Washington Post*, March 31, 2004, B01.

7. *Ibid.*

## Regulatory Issues

D.C. appears to have the worst case of elevated lead levels yet discovered in the nation—yet it did not present a public health problem. Accordingly, if the federal government had mandated lead service line replacements around the nation, it would have imposed an enormous cost on the public without any effect on lead blood levels. For example, the cost to replace lead service lines in D.C. alone was estimated at \$300 million to \$500 million, plus an additional cost for upgrading lines owned by homeowners of \$50 million to \$60 million, according to the Association of Metropolitan Water Agencies during other hearings on this issue.<sup>8</sup> If communities were forced into such expenditures, they would have much less money available to allocate to other needs, such as upgrading schools and providing essential services to the community. Hence, new, more stringent lead regulations would likely produce significant welfare losses.

The D.C. lead case illustrates why these issues demand local solutions. The city investigated several potential causes of the problem

and potential solutions that do not warrant or require line replacement. In particular, the problem appears to have resulted from an EPA regulation that caused city officials to switch its disinfection products from chlorine gas to liquid chlorine—which potentially led to more corrosion of the pipes, releasing additional lead.

Moreover, a federally mandated policy promoting lead service line replacements assumes that there was a simple solution: replace lines and lead problems would disappear. But the reality is quite different. Because many homes may still have lead lines inside, replacement of service lines might still have failed to provide measurable benefits in many instances. One problem is that lead problems may come not from service lines but directly from the tap.<sup>9</sup> In addition, mandated line replacement means systems do not have any flexibility in determining whether better options exist.

## Key Expert

Angela Logomasini, Director of Risk and Environmental Policy, Competitive Enterprise Institute, [alogomasini@cei.org](mailto:alogomasini@cei.org).

---

8. Patricia Ware, “Aging Water Pipes Cause High Lead Levels, Water Utilities Tell House Subcommittee,” *Daily Environment Report*, 29 April 2004, A-8.

---

9. American Water Works Association, “Comments on EPA’s Proposed Minor Revisions to the Lead and Copper Rule,” July 11, 1996.



---

# **Solid and Hazardous Waste**

---





# Solid and Hazardous Waste Overview

Angela Logomasini

Federal regulation of solid and hazardous waste includes a complicated set of regulations for hazardous waste disposal, transport, and cleanup. Regulation of nonhazardous household waste has largely remained a state-level concern, but members of Congress have made repeated efforts to expand the federal role in that area as well. The key waste debates of recent years include:

- **Superfund.** The federal Superfund law is designed to promote cleanups at contaminated property. After several decades in operation, the program is widely recognized as one of the greatest failures of federal environmental policy. Yet attempts to reform the law have stalled.
- **Brownfields.** The “brownfield” issue is a result of the faulty liability scheme of the federal Superfund law. In general, brownfields are abandoned, idle, former industrial sites that no one will redevelop because developers fear costly liability associated with the Superfund law. Congress passed a brownfields law to address this problem in 2002. At question is whether the law has improved or exacerbated brownfield cleanup efforts.
- **Interstate commerce.** This section focuses on recent debates to regulate interstate movements of municipal solid waste. The issue heated up in recent years when New York City announced plans to increase its waste exports to other states. Members of Congress have responded by offering legislation to restrict trade in this industry.
- **Toxics release inventory (TRI).** This topic is included in solid and hazardous waste

because, in theory, this law is designed to inform the public of the byproducts of industry. Under the TRI program, companies must report all releases of waste products into air, land, and water. However, as the policy brief on TRI indicates, these reports do not convey information on actual waste produced or the risks associated with such byproducts.

- **Waste management.** During the past decade, Congress considered legislation to regulate household waste through recycling mandates, bottle deposit bills, and similar measures. As noted in the brief on waste management, these proposed policies have been based largely on myths about solid waste.

Another controversial area not covered in this book is the management of hazardous waste under the Resource Conservation and

Recovery Act. For information on that issue, see the following recommended readings.

### Recommended Readings

- Adler, Jonathan. 1993. "The Hazards of Regulating Hazardous Waste." *Regulation* 16, no. 2. <http://www.cato.org/pubs/regulation/reg16n2g.html>.
- Bovard, James. 1991. "RCRA: Origin of an Environmental Debacle." *Journal of Regulation and Social Costs* 1, no. 2: 46.
- Hahn, Robert. 1991. "Reshaping Environmental Policy: The Test Case of Hazardous Waste." *American Enterprise* 2 (May–June): 72–80.
- Volokh, Alexander. 1995. *Recycling Hazardous Waste: How RCRA Has Recyclers Running around in CERCLAs*. Los Angeles: Reason Public Policy Institute.

# Superfund

Angela Logomasini

Perhaps no other environmental program has been cited more often as a failure than the federal Superfund law. Because of excessive litigation promoted by the law's faulty liability scheme and needlessly expensive cleanup standards, the program has produced scant cleanups. Yet for about two decades attempts to reform the law have failed.<sup>1</sup> Meanwhile, states have created and eventually reformed their own cleanup laws, resulting in thousands of state-led cleanups. This history makes strik-

ingly clear that Congress needs to devolve all Superfund responsibilities to the states, where sites will eventually be cleaned.

## Statutory Scheme

The federal Superfund law<sup>2</sup> (also known as the Comprehensive Environmental Response, Compensation, and Liability Act, or CERCLA) is allegedly designed to hold parties responsible for polluting property. Instead, the law arbitrarily holds anyone remotely connected to a contaminated site liable for cleanup. Responsible parties include waste generators (anyone who produced waste that eventually contami-

---

1. Although legislation to address federal superfund sites has all failed in the past couple decades, Congress did pass the Small Business Liability Relief and Brownfields Revitalization Act in 2002. It created an additional waste clean up program for non-superfund sites or so-called "brownfields." This law is discussed in the "Brownfields" brief in the Environmental Source.

---

2. The law is usually referred to as the "Superfund" law, after the name of the government fund created to assist with cleanups.

nated property), arrangers for transport of waste, waste transporters (anyone who simply transports wastes for legal disposal), operators (those who manage waste landfills), and property owners (anyone who owns the land). Under the law's strict joint and several liability scheme, each party can be held liable for 100 percent of the cleanup costs. Liability also is retroactive, applying to situations that occurred long before Congress passed the law. Accordingly, parties ranging from small businesses, schools, and churches to large manufacturing plants have been held accountable for sites that were contaminated decades before Superfund became law.

Cleanups can proceed in a number of ways. First, sites that the U.S. Environmental Protection Agency (EPA) deems a priority for cleanup are listed on the National Priorities List (NPL). After listing a site, the EPA can clean it (paying with funds from the federal Superfund, which was created by taxes on crude oil and other chemicals); then it can seek reimbursement from the Superfund by suing what the law called "potentially responsible parties." Often, the EPA engages in long and expensive litigation beforehand to collect funds from parties, and cleanup follows. In addition, parties found responsible may sue other parties to gain compensation for their costs. As a result, Superfund has produced a web of lawsuits, and it can take a decade or more to reach the cleanup stage.

The cleanup process entails setting cleanup standards that are based on "applicable, relevant, and appropriate requirements." The EPA sets the standards for each site based on state, local, and federal laws. For example, sometimes the EPA will use federal drinking water standards to decide how clean water supplies at a site must be. Because the EPA uses extremely

conservative assumptions when assessing risk, the cleanup standards usually demand very expensive cleanups.

## Legislation and History

Although Superfund was created as a temporary program in 1980 to clean up 400 sites, the NPL now contains more than 1,635 active, proposed, and former sites.<sup>3</sup> The program and its taxing authority expired in 1995. Since then, members of Congress have battled over whether to restore taxing authority, with fiscal conservatives blocking Superfund reauthorization bills on tax issues alone. In addition, reform efforts have consisted of legislation designed to serve various lobbies, each seeking liability exemptions, leaving other parties to hold the bag.<sup>4</sup>

During recent congressional sessions, Superfund reform has been high on the agenda, but it has repeatedly fallen victim to intense politics. During the 107th Congress, Congress did manage to pass a bill designed to solve problems created by Superfund, the so-called brownfields bill, which is discussed in another policy brief. During the past several congressional sessions, the Superfund debate has revolved around whether to restore the Superfund tax, which expired in 1995.

Superfund grew out of the controversies of Love Canal—the toxic waste site that released chemicals into a community in Niagara Falls,

3. Database list of NPL sites was accessed on the U.S. Environmental Protection Agency website on February 26, 2008, at <http://cfpub.epa.gov/supercpad/cursites/srchsites.cfm>.

4. For example, see David B. Kopel, *Privileged Polluters: The Case against Exempting Municipalities from Superfund* (Washington, DC: Competitive Enterprise Institute, 1988), <http://www.cei.org/gencon/025,01195.cfm>.

New York. Love Canal was a symbol of corporate wrongdoing, and it raised calls for federal efforts to force industry to pay for cleanup at contaminated properties. But it is not surprising that the birth of this failed law would have emerged from a lie.<sup>5</sup>

In the case, Hooker Chemical Company selected the site in the early 1940s because, at the time, it was well suited for a waste site (low population, largely impermeable clay soil). But the local school board forced Hooker to sell the land by threatening to condemn the property. Under pressure, the company agreed in 1953 to donate the property to the school board for one dollar. Hooker attempted to set agreed-upon conditions for safe use (surface use only, no construction that would break the lining), and the deed stated that the liability would transfer to the school board and subsequent owners. The school board proceeded to build a school and then sell part of the land to developers—over Hooker’s objections. Construction entailed digging into the clay cap, removing tons of soil, and building sewer lines that ran through the landfill, puncturing it and releasing waste throughout the community.

Panic ensued regarding the risks, resulting in a fear campaign about toxic waste. This campaign eventually led to the passage of Superfund, based on the alleged need for governmental action to control industry (even though the local government should have borne blame at Love Canal) and hold it accountable. Ironically, the chemicals at the site did not pose the risks claimed. Although there were some controversial studies that postulated risks, the

best studies eventually refuted numerous claims about health impacts.<sup>6</sup>

### Status of Cleanups

Federal Superfund cleanups can take decades. The EPA is still trying to clean sites 20 years after they were first listed. In fact, only a handful of sites have actually reached the level of “complete.” According to the U.S. General Accounting Office (GAO), now the Government Accountability Office, it takes about 10 years to clean up a Superfund site, and some sites require an additional stage—for monitoring groundwater and the like—that can last an additional 30 years.<sup>7</sup>

Of the 1,635 sites listed on the NPL, only 324 have been removed or “deleted,” 1,245 are active NPL sites (meaning cleanup in occurring or pending), and 67 are on the “proposed” list. Of the sites currently on the NPL, 592—or 47 percent—were listed more than 20 years ago (between 1983 and 1988), 1,047—or 84 percent—were listed more than ten years ago (1983-1998). At this pace, it will take many more decades to address all the NPL sites.

### So What Are the Risks?

Although they are often depicted as cancer hot spots, there is little evidence that Superfund sites pose chronic health risks. In fact, it is very

5. For an excellent exposé of the Love Canal myth, see Eric Zuess, “Love Canal: The Truth Seeps Out,” *Reason* February 1981, 16–33, <http://www.reason.com/news/show/29319.html>.

6. For overviews of the scientific studies, see Aaron Wildavsky, “Love Canal,” in *But Is It True? A Citizen’s Guide to Environmental Health and Safety Issues* (Cambridge, MA: Harvard University Press, 1995), 127–152, and Elizabeth Whelan, “The ‘Disaster’ of Love Canal,” in *Toxic Terror* (Ottawa, IL: Jameson Books, 1985).

7. *Superfund—Information on the Program’s Funding and Status*, GAO/RCED-00-25 (Washington, DC: GAO, October 1999), <http://www.gao.gov/docdb/lite/summary.php?rptno=RCED-00-25&accno=163047>.

difficult to determine risks associated with any low-level exposures to chemicals in the environment, and the best research indicates that such risks are likely to be so low that they are undetectable. For example:

- In their landmark study on cancer risks, Richard Doll and Richard Peto concluded that chemicals in the environment cause about 2 percent of cancer cases.<sup>8</sup>
- The National Research Council concluded in 1991, “Whether Superfund and other hazardous waste programs protect human health is a critical question.... Based on its review of the literature on the subject, the committee finds that the question cannot be answered.”<sup>9</sup>

In addition, the EPA’s risk assessments grossly exaggerate the risks of these sites, thereby leading to needlessly expensive cleanup standards. Researchers highlight some problems with EPA assumptions.<sup>10</sup> Consider a few:

- The EPA assumes that chemicals that cause cancer in animals also cause cancer in hu-

mans. However, these animals are usually bred to be susceptible to cancer and are exposed to massive doses. Milloy notes, “Without this assumption, few substances (only 24 according to the National Toxicology Program) would be considered human carcinogens. According to EPA, this assumption ‘contributes to a high level of uncertainty,’ and actual risks calculated on this basis may be as low as zero.”<sup>11</sup>

- In the book *Calculating Risks?*, James T. Hamilton and W. Kip Viscusi assess risks at 150 Superfund sites (selected because risk assessment data were available). They find that even using the EPA’s unrealistically conservative risk assumptions, 140 of these sites would generate no increase of cancer. Hence, spending millions—perhaps billions—to clean these sites would produce zero benefit.<sup>12</sup>
- Hamilton and Viscusi find that 10 sites might produce a total of 731 cancers over 30 years.<sup>13</sup> But this number is probably far higher than real risks, because it is based on EPA assumptions about exposure and risk. One site would allegedly generate 652 cancers related to exposure to polychlorinated biphenyls (PCBs). But scientist Michael Gough points out, “Given the results for the largest population of PCB-exposed workers ever studied, which show that PCBs have not caused cancer in humans, the 652 expected cancer cases may be overestimated

8. Richard Doll and Richard Peto, “The Causes of Cancer: Quantitative Estimates of Avoidable Risks of Cancer in the United States Today,” *Journal of the National Cancer Institute* 66, no. 6 (1981): 1257. For more details see the policy brief titled “Chemical Risk Overview.”

9. While noting the serious limitations of the studies, the National Research Council says that risks might exist. The National Research Council proceeds to make a plea for additional research funding in this area. National Research Council, *Environmental Epidemiology, Vol. 1: Public Health and Hazardous Waste* (Washington, DC: National Academies Press, 1991), <http://www.nap.edu/openbook.php?isbn=0309044960>.

10. Steve Milloy, *Science-Based Risk Assessment: A Piece of the Superfund Puzzle* (Washington, DC: National Environmental Policy Institute, 1995).

11. *Ibid.*, 22.

12. James T. Hamilton and W. Kip Viscusi, *Calculating Risks? The Spatial and Political Dimensions of Hazardous Waste Policy* (Boston: Massachusetts Institute of Technology, 1999).

13. *Ibid.*



by 652.”<sup>14</sup> Plus, as Gough notes, the site is a parking lot—with all the chemicals under asphalt. Only if one digs up the asphalt and builds playgrounds, homes, or the like will there be risk of exposure.

### At What Price?

The costs are enormous:

- According to the GAO, taxes paid into the Superfund between 1981 and 1998 came to \$13.5 billion, and the fund had a balance of \$1.4 billion at the end of fiscal year 1999.<sup>15</sup>
- The GAO estimates that responsible parties’ cleanup costs came to \$13 billion from 1980 to 1998.<sup>16</sup>
- Transaction costs incurred by responsible parties (for litigation and the like) ranged from \$3.2 billion to \$7.6 billion between 1980 and 1998.<sup>17</sup>
- Total costs (both transaction and cleanup) to private parties are estimated to range from \$19 billion to \$23 billion.<sup>18</sup>
- Congress also appropriated funds from general tax revenues for the EPA to administer the program.
- In addition, the law demands that states kick in 10 percent for the cleanup of private sites and 15 percent for publicly owned sites.

14. Michael Gough, “Superfund: The High Cost of Environmental Alarmism,” *Regulation* 23, no. 2 (2000): 58–60.

15. GAO, *Superfund—Information on the Program’s Funding and Status*.

16. *Ibid.*

17. *Ibid.*

18. *Ibid.*

### Devolution Solution: State-Level Successes

Although the federal government’s record with respect to Superfund is an abysmal failure, state governments are doing much better. In fact, they take much less time to clean more sites at far lower costs. Consider some figures collected in 1995 by the former EPA assistant administrator for solid waste, Dr. J. Winston Porter:<sup>19</sup>

- Although the EPA spent about \$1 billion working on about 1,000 sites, states were spending about \$700 million annually cleaning about 11,000 sites.
- States clean sites in a fraction of the time it takes the federal government to clean sites, and states do so at far lower cost. For example, Minnesota cleans sites in two to three years at costs of less than \$5 million per site.
- Although the federal government had cleaned very few sites by 1994, states had reached “construction completion” on 2,844 sites.

State programs have proven more successful because they focus on setting more realistic cleanup standards (assessing risks with more realistic assumptions, considering future use of the property, etc.) and provide fairer liability policies that promote voluntary cleanup activities by the private sector. Superfund’s history confirms a basic point: those closer to a problem are better suited to fix it. Superfund sites are exclusively a state and local concern. Given the demonstrated successes of states (in stark

19. J. Winston Porter, *Cleaning Up Superfund: A Case for Environmental Leadership* (Los Angeles: Reason Public Policy Institute, 1995).



contrast to serious federal failure), there is little reason for Congress to “reform” federal Superfund. Instead, members should seek ways to completely devolve the program to the states.

### Key Experts

Angela Logomasini, Director of Risk and Environmental Policy, Competitive Enterprise Institute, [alogomasini@cei.org](mailto:alogomasini@cei.org).

### Recommended Readings

DeLong, James V. 1997. *Superfund XVII: The Pathology of Environmental Policy*. Washington, DC: Competitive Enterprise Institute, [www.cei.org/pdf/1197.pdf](http://www.cei.org/pdf/1197.pdf).  
Gattuso, Dana Joel. 1999. “Superfund Legislation: True Reform or a Hazardous Waste?”

CEI On Point 51, Competitive Enterprise Institute, Washington, DC, <http://www.cei.org/utills/printer.cfm?AID=2411>.

Kopel, David B. 1998. *Privileged Polluters: The Case against Exempting Municipalities from Superfund*. Washington, DC: Competitive Enterprise Institute, <http://www.cei.org/gencon/025,01195.cfm>.

Logomasini, Angela. 2003. “EPA Uses Superfund Tax to Target the Innocent.” *Atlanta Journal Constitution*, September 3. <http://www.cei.org/gencon/019,03653.cfm>.

Milloy, Steve. 1995. *Science-Based Risk Assessment: A Piece of the Superfund Puzzle*. Washington, DC: National Environmental Policy Institute.

Porter, J. Winston. 1995. *Cleaning Up Superfund: A Case for Environmental Leadership*. Los Angeles: Reason Public Policy Institute.

# Brownfields

Angela Logomasini

U.S. cities are home to hundreds of thousands of old, abandoned commercial and industrial sites called *brownfields*. Developers avoid these sites for fear that they might be contaminated and could fall under the jurisdiction of the federal Superfund law, which would demand expensive cleanup. Rather than risk Superfund liability, many firms choose to develop in the so-called greenfields—property in suburban and even more rural areas that have not been developed. To promote redevelopment of urban areas, many states have passed brownfield laws that attempt to release developers from liability for state cleanup laws. However, these programs have been of limited value because the sites have still been subject to federal Superfund liability. Congress attempted to fix that problem by its own Brownfields legislation. Unfortunately, rather

than remove federal controls over the lands and thereby allow state-level cleanup and private development, the federal government set up a complicated and bureaucratic brownfield program.

## State Successes

Most states have passed laws modeled after the federal Superfund program, and those laws have created problems similar to those caused by the federal law. Fortunately, state governments have made enormous strides in reforming their laws to allow more flexible standards<sup>1</sup>—

---

1. For more complete documentation of state successes, see Dana Joel Gattuso, *Revitalizing Urban America: Cleaning Up the Brownfields* (Washington, DC, Competitive Enterprise Institute, 2000), <http://www.cei.org/pdf/1782.pdf>.

producing 40,000 site cleanups, according to one estimate.<sup>2</sup> In recent years, states have begun passing brownfield laws that provide liability relief to parties that voluntarily clean sites, as well as flexible cleanup standards and financial incentives. Nearly all states operate some form of voluntary brownfield cleanup program.<sup>3</sup>

### The Federal Brownfield Program

Initially, the U.S. Environmental Protection Agency (EPA) operated several brownfield programs under the authority of, and with some financial support from, the federal Superfund law. In addition, Congress had appropriated special funds for brownfield grants programs before passing a brownfield law. These programs accomplished little more than the creation of a few showcase communities that the EPA and politicians have used for political purposes.<sup>4</sup> Meanwhile, few sites were actually cleaned under these programs, funds were abused, and grant recipients found themselves bound in federal red tape.<sup>5</sup>

In January 2002, President George W. Bush signed the Small Business Liability Relief and Brownfields Revitalization Act. Despite some serious documented failures of the EPA brown-

field program,<sup>6</sup> the law expands this program and federalizes brownfield development. The law authorizes spending \$200 million a year—more than double past spending levels—for EPA brownfield grants of various kinds. Under the program, the EPA is required to produce guidance for grant applications, which basically allows the EPA to set standards for brownfield cleanups. Another section of the law specifically gives the EPA authority to apply any Superfund cleanup standards that the agency deems “necessary and appropriate” for grant recipients.

In addition to enabling the EPA to set standards at specific sites, the law basically pays, under yet another grant provision, state governments to implement uniform federal standards for brownfields rather than allow states to experiment with various approaches. To be eligible for a grant, states must either enter into a memorandum of agreement with the EPA regarding the structure of their programs or follow specific EPA regulations. The regulations demand that states create inventories of brownfield sites—creating lists comparable to Superfund’s National Priority List (NPL). As has been the case with the NPL, listing brownfields could increase disincentives for cleanups at those sites because listing highlights potential liability concerns. In addition, states have to ensure that cleanups meet all relevant state and federal standards—which subjects these sites to Superfund’s onerous standards rather than the more reasonable and flexible standards that states had applied in the past.

Also in the section on state programs is a provision that supposedly would prevent the EPA from taking enforcement actions at sites cleaned up under these programs. This provision has been marketed as an effort to turn

2. Environmental Law Institute, “Developments in State Programs,” in *An Analysis of State Superfund Programs: 50-State Study*, (Washington, DC: Environmental Law Institute, October 1998).

3. Charlie Bartsch and Christine Anderson, *Matrix of Brownfield Programs by State* (Washington, DC: Northeast-Midwest Institute, September 1998).

4. For example, see Dana Joel Gattuso, “Father of Deception: Gore Is the Anti-reformer,” *Washington Times*, August 31, 2000, A19.

5. For specifics, see Gattuso, *Revitalizing Urban America*.

6. See Gattuso, *Revitalizing Urban America*.

brownfield responsibilities over to the states and to spur private cleanups by providing federal recognition for state liability relief policies. Yet the exceptions in the law undermine the value of this provision.

The law notes that the EPA can intercede with an enforcement action if the agency determines that “a release or threatened release may present an imminent and substantial endangerment to public health, welfare, or the environment.” The EPA uses this same standard to become involved in Superfund sites, which gives the EPA as much control over state-led brownfield cleanups as it has over cleanups under Superfund. Hence, the new law fails to provide what has been called “finality”—the assurance that a private party will gain liability relief if it voluntarily acquires and cleans a contaminated site.<sup>7</sup> Without such assurances, many private parties will not want to get into the business of cleaning brownfields.

Because it misses opportunities to spur private cleanup efforts, the new grant program is exclusive to government-led cleanups. The parties eligible for grants include state and local governmental entities, quasi-governmental entities, and nonprofit organizations. The only private parties that can obtain grants are Native Americans. This public emphasis goes against the main goal of state-level brownfield programs. States recognized that the private sector has the greatest resources for site cleanup and development. Hence, state programs wisely focused on

spurring private investment by removing government-created barriers to redevelopment.

### **Unclear Liability “Clarifications”**

The 2002 brownfield law includes several provisions that are supposed to provide liability relief to some parties who assume ownership of a contaminated site or whose land is contaminated by an adjoining property. Again, the goal is to spur cleanup efforts by both public and private groups, but the exceptions greatly undermine the usefulness of the provisions.

In question is whether this new scheme will, on balance, prove more just and whether it will reduce distortions in the marketplace such as the perverse incentives that prevent development. It is difficult to measure the complete impacts of this new law; some developers have already cited it as inadequate in their decisions not to develop brownfield sites.<sup>8</sup>

One legal analysis notes the potential downsides:

This relief does not come without strings attached. In fact, so significant are these ‘strings’ that they raise serious questions about the ability of the amendments to achieve their intended purpose.... The amendments could actually serve to increase liability risks or other problems for parties involved in brownfield transactions by creating a new due care standard that may be used to impose Superfund liability where it could not have been imposed previously.<sup>9</sup>

7. For more discussion on the finality issue, see Dana Joel Gattuso, “Senate Brownfields Bill Needs a Cleanup,” *CEI OnPoint* no. 79, Competitive Enterprise Institute, Washington, DC, April 23, 2001, <http://www.cei.org/gencon/004,02019.cfm>, and Dana Joel Gattuso “Superfund Legislation: True Reform or a Hazardous Waste?” *OnPoint* 51, Competitive Enterprise Institute, Washington, DC, November 23, 1999, <http://www.cei.org/gencon/004,02411.cfm>.

8. For example, see “Brownfields Redevelopment Hampered by Poor Economic Viability for Owners,” *Hazardous Waste News* 24, no. 16 (2002).

9. Steven L. Humphreys, “Taming the Superfund Juggernaut: Impacts of the Small Business Liability Relief

Before the brownfield law passed, Superfund already included a provision to protect “innocent landowners.” However, requirements for demonstrating such innocence have made the defense nearly impossible to use successfully. Key among those mandates was that the party had to demonstrate that it was not responsible for the release in any way and that it was not, and could not have been, aware of the release. The new law adds “clarifications” for the innocent owner defense that actually raise the bar—requiring the innocent purchaser to meet additional obligations.

The law also adds two new liability relief claims for “owners of contiguous properties” and “bonafide prospective purchasers.”<sup>10</sup> The bonafide prospective purchaser defense allows purchasers to be aware of the contamination and still not be liable when they obtain the land. All three parties—innocent owners, bonafide prospective purchasers, and owners of contiguous properties—must meet numerous requirements to qualify, some of which demand ongoing activities in order to retain liability relief. Unfortunately, these criteria may make these three defenses more complex than the innocent landowner defense under the old law.<sup>11</sup> As a result, the liability changes may not do much to create the stable and secure business environment that is necessary for efficiently functioning markets.

For example, to obtain liability relief, purchasers must not only show that all disposal and contamination occurred before they took

ownership, they must also demonstrate that they made all “appropriate inquiries” into the previous ownership and uses of the property in conformance with existing commercial standards. The EPA promulgated regulations to define “appropriate inquiries” in November 2005.<sup>12</sup> The new rule may clarify when the bonafide prospective purchaser defense applies, but the defense will likely remain difficult and certainly is bureaucratic.

In addition, some of the mandates require ongoing efforts to maintain liability. For example, to use any of the three defenses, the owner must show that he or she provides all legally mandated notices related to any discovered hazardous substances or releases on the property. Hence, simple failure to meet a paperwork mandate could undermine a liability claim. Given the myriad laws and regulations in this area, it is not unlikely that at least some paperwork errors would result. Similarly, the purchaser must take “appropriate care” to stop, prevent, and limit human exposure and environmental impact from any substance or release discovered on the property—a new mandate that seems to go far beyond the requirements of the old law.

Despite all these and other concerns, the EPA says in its guidance on prospective purchaser provisions that this liability exemption reduces, if not eliminates, the need for prospective purchaser agreements. The EPA began issuing such agreements in 1989. These legal documents granted permanent liability relief from existing contamination to parties that purchased contaminated land. But unlike prospective purchaser agreements, the bonafide

---

and Brownfields Revitalization Act, Part I,” *Metropolitan Corporate Counsel* 10, no. 5 (2002), 5.

10. For more details on this topic, see Steven L. Humphreys, “Taming the Superfund Juggernaut.”

11. Jeffrey Alan Bolin and Allan Clifford Lawton “‘All Appropriate Inquiries’—New ... and Improved?” *Michigan Lawyers Weekly*, February 13, 2006.

---

12. *Federal Register* 70, no. 210 (November 1, 2005): 66070–113.

prospective purchaser standard offers no guarantee of relief.<sup>13</sup>

Another concern for bonafide prospective purchasers is that the new law gives the EPA a windfall lien on brownfield properties that it cleans.<sup>14</sup> This provision requires that bonafide prospective purchasers pay the EPA an amount equal to the value added from EPA's cleanup when the EPA cannot locate a responsible party to cover those costs. This policy substantially adds to investment risk and increases transaction costs—both of which will create redevelopment disincentives.

Uncertainties result because it is unclear how this policy will work and how it will affect profits. In particular, whether and when the EPA would seek compensation is unknown to potential buyers. The lien remains in effect until the EPA recovers all its costs. Potential developers are basically in the dark regarding whether or when the EPA will make a claim and how much it might cost. For example, an innocent party could purchase an EPA-cleaned brownfield while the EPA is suing other parties for cleanup costs. The EPA might collect from other parties and leave the new owner alone. If, however, it failed to collect from the other parties, it could then demand compensation from the new owner. But exactly how will the EPA and the courts determine the value of an EPA cleanup? Could it be enough to absorb all profits from developing the property?

13. For further discussion of the pitfalls of eliminating prospective purchaser agreements under the new law, see Stacy A. Mitchell, "Prospective Purchaser Agreements May Become a Thing of the Past," *The Legal Intelligencer* 227, no. 11 (2002), 5.

14. For more information on liens, see Kermit L. Rader, "New Brownfield Windfall Liens: Pitfalls for Developers?" *The Legal Intelligencer* 227, no. 33 (August 15, 2002), 5.

Prospective purchasers could invest time and money to investigate whether the EPA had already recovered costs at a site and, if so, try to settle the lien with the agency before buying the site. Such agreements may prove difficult in the future because the EPA has recently stated that it is less likely to enter into similar prospective purchaser agreements. If a company cannot come to an agreement with the EPA, it may find that it incurred a substantial transaction cost for nothing. The other option for a purchaser is to buy the site and risk having to pay the EPA a windfall lien that could eventually wipe out the profits.

Other transaction costs related to obtaining and developing EPA-cleaned sites may add to disincentives for redevelopment. Lenders may be reluctant to extend financing when such liens are present and may require additional paperwork and investigations. The cost and time necessary to obtain title insurance also may increase because title companies will also want to assess the likelihood that EPA will claim a lien.

### Special Liability Exemptions

The new law provides special exemptions for two categories of parties: de minimis contributors and small businesses. The de minimis exemption covers transporters and generators of fewer than 110 gallons of liquid waste or 200 pounds of solid waste to sites that subsequently were added to the NPL. After all, it does not make much sense to hold generators and transporters responsible when they disposed of the waste legally and did not manage the property or disposal. However, the law includes some exceptions to this exemption that could undermine it completely. For example, the EPA can still bring an action against these parties if it deems that the parties' waste "significantly



contributed or could have significantly contributed” to the cost of the response action—an exception that gives the EPA broad discretion to pursue actions against *di minimis* contributors.

The liability exemption for small businesses applies to generators of municipal solid waste (basically household waste) in the following categories: residential property owners, small businesses with 100 or fewer full-time employees, and nonprofit organizations that employed 100 or fewer full-time people at the site where the waste was generated.

These provisions do provide some justice for those parties that legally generated or transported relatively small amounts of waste to disposal sites. After all, those parties are not responsible if someone mismanaged the waste at the disposal site. However, many other parties are subject to Superfund liability unjustly. Skimming out certain parties only shifts the burden to other innocent parties. A just liability scheme would focus solely on parties that mismanaged waste. Although such provisions do make the law more just for some, they make the law less just for others, who end up bearing a larger share of the costs.

### Conclusion

It is true that brownfields are being redeveloped under the new program—despite its many flaws. But the transaction costs of the program are quite high, and the amount of redevelopment is likely much lower than it would have been in a truly free market. In the future, problems associated with the many exemptions to liability relief could come back to haunt those who decided to risk doing business under this program.

Unfortunately, the federal law represents a missed opportunity to fix problems created

by the Superfund law. Because the brown-field problem is simply a government-created problem, the obvious solution is to remove federal impediments to cleanup (where necessary) and to development of brownfields. To that end, Congress could have simply relinquished control of the properties, thereby allowing states to address liability issues and allowing private parties to do the development. The costs of this solution to the federal government would have been zero, and the costs of redevelopment would have been much lower than under the current federal program; hence, there would have been more cleanups and redevelopment had the federal government simply removed the obstacles to development that it had created.

### Key Experts

Dana Joel Gattuso, Adjunct Scholar, Competitive Enterprise Institute, [dgattuso@cei.org](mailto:dgattuso@cei.org).

Angela Logomasini, Ph.D., Director of Risk and Environmental Policy, Competitive Enterprise Institute, [alogomasini@cei.org](mailto:alogomasini@cei.org).

### Recommended Readings

Gattuso, Dana Joel. 2000. *Revitalizing Urban America: Cleaning Up the Brownfields*. Washington, DC: Competitive Enterprise Institute. <http://www.cei.org/pdf/1782.pdf>.

———. 2001. “Senate Brownfields Bill Needs a Clean-Up.” *OnPoint* 79, Competitive Enterprise Institute, Washington, DC. <http://www.cei.org/gencon/004,02019.cfm>.

———. 1999. “Superfund Legislation: True Reform or a Hazardous Waste?” *OnPoint* 51, Competitive Enterprise Institute, Washington, DC. <http://www.cei.org/gencon/004,02411.cfm>.



# Interstate Waste Commerce

Angela Logomasini

For more than two decades, various states and localities have battled over interstate and intrastate movements of municipal solid waste. States have passed import bans, out-of-state trash taxes, and other policies to block imports. Localities have passed laws preempting the movement of wastes outside their boundaries for disposal under so-called flow-control laws. Federal courts have struck down both types of laws as protectionist policies that violate the U.S. Constitution's Commerce Clause, which gives only Congress the authority to regulate interstate commerce. Yet some federal lawmakers want to pass a federal law to give states the authority to regulate trade in the waste disposal industry.

## Legislative History

Congress has attempted to deal with this issue on several occasions, starting with the 1992 attempt to reauthorize the Resource Conservation and Recovery Act (RCRA). Bills dealing with interstate commerce and flow control have been advanced during every Congress since 1992, but none have passed into law. The issue heated up in the late 1990s when New York City decided to send increasing amounts of waste to Virginia for disposal. When localities agreed to take the waste to collect "host fees," state legislators objected. As a result, several bills were introduced in Congress that would institute complicated schemes

under which state lawmakers could regulate waste imports and flow control.<sup>1</sup> Since then, members of Congress have continued to introduce legislation to regulate interstate waste disposal. In 2005, Rep. Jo Ann Davis (R-VA) introduced H.R. 274, which allows shipments to “host communities,” but it applies needless regulatory red tape and bureaucracy that could complicate such agreements.

### Host Communities

In recent years, many communities chose to host regional landfills, agreeing to allow waste imports in exchange for free trash disposal and a cut of the landfill profits. These agreements have enabled communities nationwide to cut taxes, repair and upgrade infrastructure, give pay raises to teachers, and build schools and courthouses, as well as close and clean up old, substandard landfills.<sup>2</sup>

### Flow Control

The debates over interstate waste became more complicated when the Supreme Court ruled on the constitutionality of solid waste flow-control ordinances. Local governments passed these ordinances to mandate that haulers take all trash generated within the locality’s jurisdiction to government-designated facilities. Bureaucrats used these ordinances to prevent competition with facilities that local governments owned or backed with bonds. But in

1994, the Supreme Court ruled in *C & A Carbone Inc. v. Town of Clarkston, NY* that solid waste flow-control laws were unconstitutional because they violated the Commerce Clause.<sup>3</sup>

*Carbone* has resulted in more economically sound public policy. Flow-control laws forced trash haulers to take wastes to the most expensive facilities. As a result, the public faced higher disposal costs, and cities were encouraged to invest in inefficient and otherwise uncompetitive waste disposal facilities. After *Carbone*, many localities argued that they needed flow-control laws to protect their investments in government-bonded facilities that were built with the assumption that localities could ensure revenues by directing all waste business to those facilities. They claimed that these plants would go out of business and their communities would pay high taxes to cover the debt. In an open market, some firms go out of business when they are not efficient. That is considered a good thing because it means only the best providers survive. However, *Carbone* did not result in this alleged financial “disaster.”

Communities benefit from a competitive environment because they must find ways to compete with more efficient operations, and haulers may conduct business with the lowest-cost providers. Under these circumstances, localities must make sounder decisions based on market realities, which helps their constituents avoid more faulty government investments.<sup>4</sup>

1. For a more complete overview of these bills, see Angela Logomasini, *Trashing the Poor: The Interstate Garbage Dispute* (Washington, DC: Competitive Enterprise Institute, 1999), 11–14. <http://www.cei.org/gencon/025,01659.cfm>.

2. For a sampling of such benefits, see Logomasini, *Trashing the Poor*.

3. *C & A Carbone Inc. v. Town of Clarkstown, NY*, 511 U.S. 383 (1994).

4. For a more detailed discussion of the problems with flow control, see Jonathan Adler, “The Failure of Flow Control,” *Regulation* 2 (1995); National Economic Research Associates, *The Cost of Flow Control* (Washington, DC: National Economic Research Associates, 1995); and Angela Logomasini, *Going against the Flow: The Case for Competition in Solid Waste Management* (Washington, DC: Citizens for a Sound Economy Foundation, 1995), <http://www.heartland.org/Article.cfm?artId=4026>.

However, a 1997 Supreme Court case undercut *Carbone* to a limited extent. In 2007 the court ruled in *United Haulers v. Oneida-Herkimer Solid Waste Management Authority* that localities could direct waste to government-owned landfills or other disposal facilities. Because most landfills are privately owned, this ruling has limited impact, but unfortunately, may encourage governments to invest in new, inefficient government facilities so that they can essentially operate a garbage disposal monopoly, which will likely be needlessly costly to taxpayers.

### Public Safety

During 1999, public officials claimed that regional landfills posed a host of health and safety problems. The landfills allegedly would lead to cancer clusters in the future. Officials in the District of Columbia, Maryland, and Virginia conducted an investigation of trucks transporting waste from state to state, which they alleged showed that transporting wastes created severe highway hazards. They also argued that garbage barges were not a safe means of transporting the waste because waste would allegedly spill and pollute waterways. Finally, they claimed that medical waste was being dumped illegally into Virginia landfills, thereby creating dire health hazards. All these claims proved specious:

- Rather than increasing public health and safety risks, these landfills enable communities to close substandard landfills and construct safe, modern landfills.
- It is estimated that modern landfills pose cancer risks as small as one in a billion, an extremely low risk level.<sup>5</sup>

5. Jennifer Chilton and Kenneth Chilton, “A Critique of Risk Modeling and Risk Assessment of Municipal Landfills Based on U.S. Environmental Protection Agency Techniques,” *Waste Management and Research* 10 (1992): 505–16. For some additional facts on landfill risks, see the policy brief titled “Solid Waste Management.” See also Logomasini, *Trashing the Poor*, 18–20.

- People should be concerned about truck safety—particularly those in the industry who drive the trucks and employ others who do—but the problems were not as severe as suggested.
- During the 1999 government investigation, of the 417 trucks stopped and inspected in the District of Columbia, Maryland, and Virginia, 37 experienced violations. That number represented a 9 percent violation rate—an above average performance, considering the 25 percent rate nationwide.<sup>6</sup>
- Virginia’s “solution” to the traffic problem—banning garbage barges—could put more truckers on the road and prevent industry from using a safer transportation option.
- Barges not only reduce traffic; they also carry cargo nine times farther using the same amount of energy, emit less than one-seventh of the air pollution, and have the fewest accidents and spills of any other mode of transportation, according to a 1994 U.S. Department of Transportation study.<sup>7</sup>
- Medical waste is not more dangerous than household waste. According to the Centers for Disease Control and Prevention, “medical waste does not contain any greater

6. Craig Timber and Eric Lipton, “7 States, D.C., Crack Down on Trash Haulers,” *Washington Post*, February 9, 1999, B1. See also *Motor Carrier Safety Analysis, Facts & Evaluation* 3, no. 3 (Washington, DC: U.S. Department of Transportation, 1998).

7. U.S. Department of Transportation, U.S. Maritime Administration, *Environmental Advantages of Inland Barge Transportation* (Washington, DC: Department of Transportation, 1994).

quantity or different type of microbiologic agents than residential waste.”<sup>8</sup>

Finally, one key concern raised by the landfill debates involves the externalities landfills create for people who live either near them or along transportation routes. Clearly, problems can arise, and lawmakers should be concerned about odors, litter, and traffic. These are the real issues that demand local government attention, requiring trespass and local nuisance laws.<sup>9</sup> However, these local concerns are not an excuse to ban free enterprise in any industry.

### Conclusion

Public officials need to learn that the best way to manage our trash is to stop trying to micromanage the entire trash disposal economy. In recent years, market forces have begun to correct many of the problems caused by faulty government planning schemes. With the Supreme Court restoring competition, the resulting trade has proved beneficial to both host communities and states that lack landfill capacity. Allowing states to impose import limits or flow-control laws will only turn back

the progress that the private sector has made. These policies will mean a return to a system in which lawmakers impede market efficiencies, thereby increasing costs and reducing economic opportunity. Those who will feel the real pain of these policies will be the many poor, rural communities that desperately seek ways to improve their infrastructure and quality of life.

### Key Expert

Angela Logomasini, Ph.D., Director of Risk and Environmental Policy Competitive Enterprise Institute, [alogomasini@cei.org](mailto:alogomasini@cei.org).

### Recommended Readings

Logomasini, Angela. 1999. *Trashing the Poor: The Interstate Garbage Dispute*. Washington, DC: Competitive Enterprise Institute. <http://www.cei.org/gencon/025,01659.cfm>

———. 1995. *Going against the Flow: The Case for Competition in Solid Waste Management*. Washington, DC: Citizens for a Sound Economy Foundation. <http://www.heartland.org/Article.cfm?artId=4026>.

---

8. Centers for Disease Control and Prevention, “Perspectives in Disease Prevention and Health Promotion Summary of the Agency for Toxic Substances and Disease Registry Report to Congress: The Public Health Implications of Medical Waste,” *Morbidity and Mortality Weekly Report* 39, no. 45 (1990): 822–24.

9. See Bruce Yandle, *Common Sense and Common Law for the Environment* (Lanham, MD: Rowman and Littlefield, 1997).

# Toxics Release Inventory

Angela Logomasini

Several states and the federal government have in place various “right-to-know” laws. Based on the idea that the public has a right to know about chemical risks they face, these programs require that private sector entities report chemicals that they release, use, and sell. Some environmentalists suggest that supporting these regulations gives the public enough information to demand lower-risk facilities that pollute less. Although these laws seem straightforward and reasonable, an analysis of one key federal program—the Toxics Release Inventory (TRI)—demonstrates serious flaws.

## Statutory Scheme

TRI requires that firms<sup>1</sup> that have 10 or more employees and annually manufacture or process more than 25,000 pounds (or otherwise use 10,000 pounds) of a TRI-listed chemical<sup>2</sup> report the release or transfer of such chemicals. The law currently covers about 650 chemicals, and the U.S. Environmental Protection Agency (EPA) has the authority to add and delete chemicals. Releases include emissions, discharges into bodies of water, releases to land, materials recycled, and disposals into underground injection wells. Transfers include movement of chemicals

---

1. For a list of regulated industries, see <http://www.epa.gov/tri/report/siccode.htm>.

2. For the lists of chemicals regulated under TRI, see <http://www.epa.gov/tri/chemical/index.htm>.

off site for recycling, incineration, treatment (such as in a water treatment facility), or land-fill disposal.

### Regulatory and Legislative Activity

In October 2005, EPA proposed a couple of rules to reform the TRI and to reduce its regulatory burden. One proposal would change the frequency of TRI reporting, possibility shifting to biannual rather than annual reporting.<sup>3</sup> Another would allow more firms to report on a shorter form than under existing regulations.<sup>4</sup> Currently, the EPA allows expedited reporting on what it calls “Form A” for firms that handle fewer than 500 pounds of TRI-listed chemicals. The goal is to reduce the regulatory burden for firms that “release” low levels of TRI chemicals. The EPA proposed allowing all firms that produce fewer than 5,000 pounds to use Form A, hoping to lift the TRI regulatory burden for more firms. According to the EPA, this change would save firms 165,000 hours of paperwork preparation time and still ensure that 99 percent of TRI releases would be reported on the longer form.<sup>5</sup>

These changes were designed to save firms—mostly small businesses—time and money without significantly changing the quality of data collected under TRI. EPA finalized the rule in December 2006, allowing firms to apply it to their emission reports covering that

year. EPA released the 2006 data in February 2008, noting that TRI indicates that emissions have gone down in most places, yet environmentalists questioned those findings because they maintain that the rule limited reporting.<sup>6</sup> In addition, some members of Congress have proposed legislation to overturn the rule, and in November 2007, twelve state attorney generals commenced a lawsuit challenging the rule.

Despite all the political hype about the EPA rule and TRI reporting, the law is actually not very informative and its benefit are questionable as documented in subsequent sections of this brief.

### TRI’s Regulatory Burden

TRI is often marketed as a low-cost program. But the burden placed on the private sector is significant. For example, electric utilities have to report on 30 chemicals—with a separate TRI form for each chemical and each plant.<sup>7</sup> Estimated total costs of the TRI program range up to nearly a billion dollars a year. The estimated costs of all EPA “right-to-know” regulations from TRI, and various other programs, range up to \$3.4 billion.<sup>8</sup>

Individual examples indicate that the regulatory burden is unreasonably high for some

3. *Federal Register* 70, no. 191 (October 4, 2005): 57871–72.

4. *Federal Register* 70, no. 191 (October 4, 2005): 57822–47.

5. EPA, “Toxic Release Inventory Burden Reduction—Fact Sheet: Reducing Burden While Ensuring Public Access to High Quality Information,” EPA, Washington, DC, 2005, [http://www.epa.gov/tri/tridata/modrule/phase2/Fact\\_Sheet.pdf](http://www.epa.gov/tri/tridata/modrule/phase2/Fact_Sheet.pdf)

6. Katherine Boyle, “Toxic Emissions Declined in 2006,” *Greenwire*, February 22, 2008.

7. J. Winston Porter, *Utilities and TRI: A Primer on Electric Utility Companies and EPA’s Toxics Release Inventory* (Washington, DC: Edison Electric Institute, March 1999), 2, [http://www.eei.org/industry\\_issues/environment/air/Toxics\\_Release\\_Inventory/primer.pdf](http://www.eei.org/industry_issues/environment/air/Toxics_Release_Inventory/primer.pdf).

8. Alexander Volokh, Kenneth Green, and Lynn Scarlett, “Environmental Information: The Toxics Release Inventory, Stakeholder Participation, and the Right to Know, Part 1 of 2: Shortcomings of the Current Right-to-Know Structure,” Policy Study 246, Reason Foundation, Los Angeles, 1998.



businesses. Nancy Klinefelter, who owns a ceramic decorating business with 15 employees, detailed to a congressional committee the impacts of the then proposed TRI rule on lead. Her firm's lead "releases" included the lead paint used on the ceramics. She noted that lead paint applied to ceramics was actually a use, not a release, but she has to report it anyway. She has to track how much lead paint her firm uses on a daily basis—by color, because each color contains a different level of lead. Then she has to calculate how much lead is contained in those paints. She noted that the EPA estimated that meeting the rule would require 124 hours for tracking lead usage. But the EPA estimates still represent a "gross underestimate," she explained. Her story clearly illustrates the insanity of many TRI regulations. Klinefelter noted:

I have personally spent 95 hours trying to understand the TRI forms and requirements ... and I am still nowhere near the point where I can complete the forms with confidence. In addition, I have spent 60 hours or more reconstructing retroactive color usage data [the EPA required firms to calculate usage for the three and a half months before it finalized the rule]. We are now spending about 4 to 5 hours per week tracking lead usage to enable us to have confidence in our 2002 TRI filing.<sup>9</sup>

### The Problematic Nature of TRI Data

Among TRI's most serious flaws is that it creates the illusion that the mere release of a chemical is equivalent to risk, when, in fact,

9. Nancy Klinefelter, "The Lead TRI Rule: Costs, Compliance, and Science," prepared remarks before the House Committee on Small Business, June 13, 2002.

low-level releases and subsequent low-level exposures likely pose no significant risks.<sup>10</sup> Some suggest that the EPA could address TRI's failure to provide meaningful information on risk. But devising a risk-based system is practically impossible and, given the investment required, not desirable. Building such a system would require billions of dollars in expenditures—billions that would be diverted from other wealth-creating, quality-of-life-improving uses. Despite this very high quality-of-life cost, this program would likely return few benefits because chemical risks overall are relatively low.<sup>11</sup> It is unfortunate that Congress chose to inhibit these modest changes to the program. TRI had proven to be a needless bureaucratic burden affecting many small businesses that have difficulties meeting the costs.

Other problems prevent TRI data from providing meaningful information:

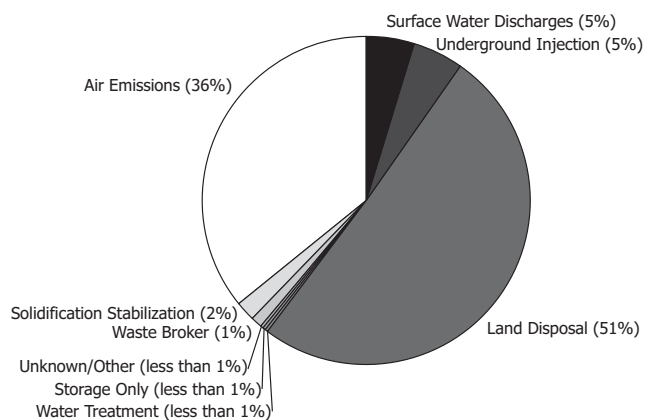
- Safe disposal of waste is counted as a "release"—conjuring up images of dumping sewage into rivers or releasing pollutants into the air—even if the disposal method is virtually harmless and far from most people's intuitive understanding of what constitutes a release. For example, TRI counts underground injection of liquid wastes as a "release into the environment" (see figure 1). Yet underground injection is one of the safest means to dispose of liquid waste: the waste is injected 4,000 to 5,000 feet below Earth's surface, far from places where it could damage the environment and far from underground drinking water sources.

10. For a discussion of low-level exposures and chemical risks, see the policy brief titled "The True Causes of Cancer."

11. See the policy brief titled "The True Causes of Cancer."



**Figure 1. TRI "Releases," 2003**



Source: EPA, "TRI Explorer," <http://www.epa.gov/triexplorer/>.

Because underground injection is called a release, it hikes TRI numbers and has become the target of environmental campaigns. As a result, companies are eliminating underground injection and instead are releasing wastes directly into surface waters—a far less environmentally sound option.<sup>12</sup>

- TRI also counts disposal of waste in safe, sanitary landfills as a "release." Such TRI "releases" into landfills represent most releases (see figure 1), but landfilling offers a safe and effective way to manage waste without any significant public exposure to the chemicals.
- TRI counts the reuse of chemicals within a production process as an additional chemical use. This policy wrongly inflates TRI numbers by counting materials every time they go through the recycling process.

12. For additional information on underground injection and TRI, call the Ground Water Protection Council at (405) 516-4972.

- Large firms emit more pollution because of their size and hence are labeled the "biggest polluters."<sup>13</sup>
- Likewise, a firm might emit a large amount of an innocuous substance, but it can still be listed as a bigger polluter than one that emits a small amount of a highly toxic substance.

In addition, TRI and other "right-to-know" programs carry other tradeoffs:

- Right-to-know data may jeopardize some firms' trade secrets by making information available to their competitors. Of particular concern was a 1997 EPA proposed expansion of TRI to include materials accounting—which requires firms to report on the materials they merely use, not just the ones they "release." Moreover, the EPA is posting online numerous databases containing information that it collects under various laws.<sup>14</sup>

Finally, TRI data are often misused by those who want to scare the public about chemical use rather than to educate the public. The following excerpt from a Reason Foundation study details one example:<sup>15</sup>

In 1994, Wisconsin Citizen Action and Citizens for a Better Environment released a

13. For example, Eastman Kodak has carried the label in New York simply because it happens to be the largest facility in the Northeast; see "Eastman Kodak Again New York's Biggest Polluter 1997 Data Show," Associated Press State and Local Wire, May 14, 1999.

14. U.S. General Accounting Office, "Environmental Information: EPA Could Better Address Concerns about Disseminating Sensitive Business Information," GAO/RCED-99-156 (Washington, DC: U.S. General Accounting Office, June 1999).

15. Volokh, Green, and Scarlett, "Environmental Information," 7.

study called *Poisons in our Neighborhoods: Toxic Pollution in Wisconsin*. According to the study, Wisconsin manufacturers “released over 55 million pounds of toxic chemicals into air, water, and land in 1992.” The study also used TRI data to compile a list of the “Dirty Dozen” facilities—the 13 (baker’s dozen facilities) with the largest combined air, water, and land releases along with discharges for sewage treatment.

Number 2 of the “Dirty Dozen” was Charter Steel of Saukville, Wisconsin, which released 2,645,088 pounds. “This is the amount of toxic waste we are *certain* is being thrown into Wisconsin’s environment,” said a spokesperson for the environmental groups, indicating that the TRI numbers could be interpreted as a lower bound on pollution. Charter Steel disagreed. The “toxic waste” it was releasing was spent pickle liquor, a byproduct of steel manufacture which contains sulfuric acid. But its pickle liquor was not being “thrown into Wisconsin’s environment,” as the environmental report suggested. Instead it was being given for free to sewage treatment plants, which used the sulfuric acid in the pickle liquor to help treat their sewage water. The Milwaukee Metropolitan Sewerage District, which gets 6 percent of its pickle liquor from Charter Steel and more pickle liquor from eight other companies, saves \$300,000 per year because of Charter Steel’s production of this “hazardous waste.”

### **TRI Is Not a Reliable Source for Measuring Pollution Trends**

TRI’s most often cited achievement is its ability to measure pollution trends. Supporters say that TRI gives firms the incentive to reduce

toxic releases and that data reveal that those incentives have indeed led to reductions of these emissions. According to the EPA, total TRI releases have declined 45 percent between 1989 and 1998.<sup>16</sup> At question is whether all declines can be attributed to TRI. Consider some potential problems:

- The U.S. General Accounting Office (GAO), now the Government Accountability Office, notes, “EPA cannot determine whether reported reductions in waste are due to improved environmental performance or to other factors, such as annual changes in companies’ production or methods of estimating waste.”<sup>17</sup>
- The GAO notes that reductions also may be a result of firms switching to “alternative chemicals that may be as harmful as those for which reductions are reported.”<sup>18</sup>
- Because estimating TRI emissions often is a subjective task, some firms may work on how they measure emissions to justify lower numbers each year, to ensure that they can report lower emissions in their annual reports. The GAO notes, “Companies often change their estimation techniques from one year to the next, preventing data users from accurately evaluating the progress of source reduction.”<sup>19</sup>
- Rather than measuring environmental performance, TRI can simply measure changes

16. EPA, *1998 Toxics Release Inventory Data and 1995–1998 Trends* (Washington, DC: EPA, May 2000), 2–23.

17. GAO, *Toxic Substances: EPA Needs More Reliable Source Reduction Data and Progress Measures*, GAO/RECD-94-93 (Washington, DC: GAO, September 1994).

18. *Ibid.*

19. *Ibid.*

in the economy. Declining TRI releases can result as facilities close or downsize during a recession. Likewise, if a facility expands, TRI may indicate a “poor performance” as “releases” go up.<sup>20</sup>

- EPA databases, such as TRI, are unreliable. The GAO notes, “In various reviews, we and others have identified persistent concerns about the accuracy of the data in many of EPA’s information systems.”<sup>21</sup>

However, it is not unreasonable to assume that pollution and materials use have in fact declined. Even with increases in market activity, reduced pollution and more efficient materials use should be expected without TRI. The main reason is that market incentives to cut waste are a stronger influence on materials use because such reductions translate into a financial gain. The Reason Foundation compiled some examples of such market-driven source reduction:<sup>22</sup>

- To construct a skyscraper today, builders need 35 percent less material than they did a few decades ago.
- The amount of aluminum required to produce an aluminum can has declined by 30 percent from 1972 to 1995.
- The average weight of a stove declined by 17 percent between 1972 and 1987.

20. Although TRI data may appear to indicate otherwise, as wealth improves environmental well-being improves. See the policy brief titled “Environmental Trends.”

21. Statement of Peter F. Guerrero, director, environmental protection issues, GAO, before the Senate Committee on Environment and Public Works, October 3, 2000, GAO-01-97T.

22. Volokh, Green, and Scarlett, “Environmental Information,” 12.

## The Right to Terrorism?

A federal “right-to-know” provision in the Clean Air Act demonstrates how far activists will go in their quest to publicize environmental data. Under the federal Clean Air Act, certain industrial facilities must prepare risk management plans that detail accidental release prevention and management plans. These plans include a section outlining the potential impacts (including such things as the number of fatalities and injuries to the surrounding community) that would result under the “worst-case scenario” from a catastrophic accidental chemical release. The law demanded that the EPA make the information available to the public.

When the EPA announced that it would post this information on the Internet, the Federal Bureau of Investigation, the Central Intelligence Agency, and other security organizations pointed out that such posting could give terrorists anonymous access to a searchable database for potential targets—enabling them to select the targets that would produce the highest number of fatalities. When the EPA agreed not to post the information, “right-to-know” advocates said that they would get the information and post it on the Internet themselves.

Congress passed a law in 1999 asking the Department of Justice and the EPA to issue a rule to minimize security risks. The final rule makes the information available in at least 50 “reading rooms” throughout the nation and at state and local emergency planning committee offices, where potential terrorists can view the information and where activists can copy it down and eventually post it online. In any case, the rule allowed the EPA to post the bulk of the risk management plan information online, with offsite consequence analysis summaries included on every facility. After 2001, the EPA pulled the

data from its website, but anti-chemical activists had already downloaded the executive summaries and posted them online, where they remain today. In addition, the EPA continues to provide access to the plans at federal libraries.

### Conclusion

The TRI program is simply not equipped to perform the function for which it was designed: TRI data fail to offer meaningful information to the public; TRI's ability to prompt pollution reduction is questionable; and the costs of the program are substantial, particularly for small businesses. Unfortunately, members of Congress have failed to recognize the pitfalls of the program, rejecting even the most modest attempts to ease the program's regulatory burden.

### Key Experts

Angela Logomasini, Director of Risk and Environmental Policy, Competitive Enterprise Institute, [alogomasini@cei.org](mailto:alogomasini@cei.org)

Alexander Volokh, Reason Foundation, [volokh@fas.harvard.edu](mailto:volokh@fas.harvard.edu)

J. Winston Porter, Waste Policy Center, [jwp@winporter.com](mailto:jwp@winporter.com)

### Recommended Readings

Dudley, Susan. 1999. *Persistent Bioaccumulative Toxic Chemicals—Toxic Release Inventory (TRI)*. RSP Comment 1999-2. Arlington, VA: Mercatus Center. <http://www.mercatus.org>.

———. 1999. *TRI Reporting of Lead and Lead Compounds*. RSP Comment 1999-13. Arlington, VA: Mercatus Center. <http://www.mercatus.org>.

Logomasini, Angela. 1999. "The Clean Air Act's Federal Terrorist Assistance Program." *OnPoint* 37, Competitive Enterprise Institute, Washington, DC. <http://www.cei.org/utills/printer.cfm?AID=1600>.

Volokh, Alexander, Kenneth Green, and Lynn Scarlett. 1998. "Environmental Information: The Toxics Release Inventory, Stakeholder Participation, and the Right to Know, Part 1 of 2: Shortcomings of the Current Right-to-Know Structure." Policy Study 246, Reason Foundation, Los Angeles.



# Solid Waste Management

Angela Logomasini

Americans like to recycle, and recycling is indeed an important part of our integrated waste management system. This system recognizes that some portions of our waste are most efficiently recycled, some are most efficiently placed in landfills, and some should be burned in incinerators. The key is finding the mix of options that conserves the most resources, while protecting the environment. Market-driven competition is the best way to achieve this goal. Each option represents its costs to society: the value of the water, energy, land, labor, and other resources that the disposal option requires. Hence, by allowing competition between disposal options, we enable the most resource-efficient (the least expensive) option to win in any given case. Yet state and local governments do not follow this advice. They try to manage their

waste with plans similar to the economic plans of the former socialist nations, creating a host of economic and environmental problems.

## Legislative Background

For the most part, state and local laws govern waste management. However, federal law has an important effect on how they operate. The federal Resource Conservation and Recovery Act (RCRA) sets voluntary guidelines for states to develop solid waste management plans. When devising these plans, state and local officials estimate how much waste they expect each community to create over a 5- to 30-year period; then they plan ways to manage that waste. Because the federal government provides financial assistance to state bureaucracies that gain approval of their

plans from the U.S. Environmental Protection Agency (EPA), nearly all states and localities use waste management planning.

### Misplaced Political Priorities

Relying on 30-year waste management plans presents serious problems. Public officials cannot possibly estimate future waste generation, nor can they envision future disposal technology. As a result, they often make poor decisions, invest in the wrong technologies, and choose less efficient disposal options.<sup>1</sup>

In addition, with more government involvement, waste management increasingly serves politically popular goals at the expense of safe and efficient disposal. In particular, the EPA's system of politically preferred waste disposal options, called the *waste management hierarchy*, governs most state and local waste management plans. According to the hierarchy, waste policy should first focus on reducing the amount of trash that people make—so-called source reduction. Second, it should emphasize recycling. And wastes that we cannot reduce or recycle should go to the politically unpopular options: to the landfill (third on the list) or to an incinerator (fourth on the list). By relying on this political formula, bureaucrats often work to promote source reduction and recycling at any cost to the environment and consumers.

In contrast, private sector recycling is always driven toward the most efficient mix of disposal options. Professor Pierre Desrochers documents

that recycling and reuse of materials have always been a part of industrial processes because wasting resources does not make economic sense.<sup>2</sup> It is also true that private markets promote recycling only when it makes sense, whereas the government regulates recycling even when it requires more resources than it saves.

### Source Reduction

The desire to reduce waste—defining *waste* as not using our resources efficiently—is a worthy goal. But source reduction confuses waste reduction with plans to abolish useful products. Ironically, attempts to eliminate useful products can increase refuse by eliminating packaging that prevents spoilage or product damage. For example, developing countries experience food spoilage of 30 percent to 50 percent because of inadequate packaging, storage, and distribution. With sophisticated packaging, storage, and distribution, developed nations experience food spoilage of only 2 percent to 3 percent.<sup>3</sup> Manufacturers know that more efficient packaging—rather than its elimination—saves resources.

It makes more sense to use such market forces than to assume that government bureaucrats can mandate more efficient options. For example, between 1980 and 1998, manufacturers reduced the material necessary to make a two-liter plastic bottle from 65 grams to 48 grams, an aluminum can from 19 grams to 14 grams, a glass bottle from 255 grams to 170 grams, a steel can from

1. Numerous states and localities have invested in waste disposal facilities—primarily waste-to-energy incinerators—only to find that these facilities are not economically efficient. As a result, states and localities went so far as to ban competition with these plants, until the Supreme Court ruled such laws unconstitutional. See the policy brief titled “Interstate Waste Commerce.”

2. Pierre Desrochers, “Natural Capitalists’ Indictment of Traditional Capitalism: A Reappraisal,” *Business Strategy for the Environment* 11, no. 4 (2002): 203–20.

3. “Packaging in Perspective: Environmental Economics of Packaging, Packaging and the Environment, Special Report,” *Packaging Week* 5, no. 39 (February 21, 1990): S17. The report cites the World Health Organization for these figures.



48 grams to 36 grams, and a plastic grocery sack from 9 grams to 6 grams.<sup>4</sup>

In the rush to serve the politically preferred goal of source reduction, some public officials seek to reduce disposable products, such as paper cups and utensils. But a Waste Policy Center report that reviewed 34 studies on disposable packaging highlights why this policy does not necessarily serve public health or environmental goals.<sup>5</sup> The study found that disposables reduce exposure to dangerous bacteria. For example, one study examined a sample of utensils from restaurants, hotels, medical institutions, and schools. It found, on average, 410 bacterial colonies on reusable utensils compared with 2 bacterial colonies on disposable utensils.

Because it does not require washing, disposable packaging uses less water and produces less wastewater. For example, the Waste Policy Center study found that washing a china cup in the dishwasher just once produces more water pollution than the entire life cycle of a disposable cup. Reusable products are better for the environment (in regard to solid waste disposal, air pollution, and energy usage) only if they are used several hundred times.

## Recycling

Similarly, because recycling is so politically popular, public officials developed goals as part of their waste management plans to recycle a specific percentage of household waste. To meet these goals, local governments have used mandated recycling programs and required that cer-

tain products contain a percentage of recycled content.<sup>6</sup> As a result, local governments expend enormous resources to promote recycling, even when that means using more resources than recycling saves. Note the following facts:

- Despite conventional wisdom, recycling has environmental tradeoffs. In many cases it can be the less environmentally sound option, because recycling can use more energy and water and can emit more air pollution than other alternatives.<sup>7</sup> States spend \$322 million annually to subsidize recycling, according to one study.<sup>8</sup>
- Recycling costs are passed to the consumer through trash bills or taxes. One study found that the average cost per household with curbside recycling was \$144 annually; without recycling, the cost of trash disposal was \$119.<sup>9</sup> These costs can consume a considerable amount of a city's budget. For example, Sanford, Maine, spent \$90,990 to

6. For information on why recycled content laws cannot promote efficient recycling, see Jerry Taylor, "Minimum Content, Minimum Sense," *This Just In*, April 25, 1997, [http://cato.org/pub\\_display.php?pub\\_id=6158](http://cato.org/pub_display.php?pub_id=6158), and Ken Chilton, *Do We Need a Federal Garbage Man?* (Los Angeles: Reason Public Policy Institute, March 1992), <http://www.reason.org/ps137.html>.

7. Mathew A. Leach, Austilio Bauen, and Nigel J. D. Lucas, "A Systems Approach to Materials Flow in Sustainable Cities: A Case Study of Paper," *Journal of Environmental Planning and Management* 40, no. 6 (1997): 705–23. The study contends that recycling paper can mean more of various emissions and more energy use.

8. Christopher Douglas, *Government Hand in the Recycling Market: A New Decade* (St. Louis, MO: Washington University, Center for the Study of American Business, September 1998), 7. The Center for the Study of American Business (CSAB) is now called the Weidenbaum Center on the Economy, Government, and Public Policy. CSAB studies are available at <http://csab.wustl.edu/>.

9. *Ibid.*, 14.

4. J. Winston Porter, *Trash Facts—In a Small Package* (Leesburg, VA: Waste Policy Center, 1999), <http://www.winporter.com>.

5. J. Winston Porter, *Environmental and Public Health Aspects of Food Service Packaging* (Leesburg, VA: Waste Policy Center, 1996).

recycle waste that it could have safely placed in landfills for \$13,365.<sup>10</sup>

- As citizens sort their trash for recycling, most assume that those materials then go to a recycling facility. But many times, local governments cannot find markets for all the goods they collect, and much of the material ends up in a landfill.<sup>11</sup> It is very difficult to determine how much governments actually recycle.

### Landfills and Incinerators

Recycling is pushed largely to avoid using landfills or incinerating waste. Anti-landfill sentiments arose because many needlessly feared that we would run out of landfill space. The battle against landfills heated up in the 1990s when public officials wrongly proclaimed that we faced a garbage crisis because we were running out of landfill space. One reason for this problem, they said, was that existing landfills would close in 5 to 10 years.<sup>12</sup> But that is true at any point in time, because landfills last only that long. Problems arise when states fail to permit new facilities.

There was in the 1990s (and still is) plenty of land on which to place new landfills. During the alleged landfill crisis, A. Clark Wiseman of Gonzaga University pointed out that, given projected waste increases, we would still be able to fit the next 1,000 years of trash in a single

landfill 120 feet deep, with 44-mile sides.<sup>13</sup> Wiseman's point is clear: land disposal needs are small compared with the land available in the 3 million square miles of the contiguous United States.

The real landfill problem is political. Fears about the effects of landfills on the local environment have led to the rise of the not-in-my-backyard (NIMBY) syndrome, which has made permitting facilities difficult. Actual landfill capacity is not running out. The market response to this problem is the construction of larger landfills, creating greater disposal capacity even with fewer landfills.<sup>14</sup>

Landfills are politically unpopular because many citizens fear the public health risks. But estimates of landfill risks—based on EPA assumptions that “maximally exposed” individuals face a cancer risk of one in a million—reveal that the risks to public health are not significant. When compared with most other forms of business and activities that we experience in daily living, the risks posed by landfills to the surrounding communities are miniscule (see chart).

### Key Experts

Angela Logomasini, Director of Risk and Environmental Policy, Competitive Enterprise Institute, [alogomasini@cei.org](mailto:alogomasini@cei.org).

J. Winston Porter, Waste Policy Center, [jwp@winporter.com](mailto:jwp@winporter.com).

Jerry Taylor, Cato Institute, [jtaylor@cato.org](mailto:jtaylor@cato.org).

10. Ibid.

11. Bruce Van Voorst, “Recycling Stalled at Curbside: More and More People Are Sorting Their Garbage; But Industry Often Can’t Handle the Volume,” *Time*, October 18, 1993, 78.

12. For example, see Office of Technology Assessment, *Facing America’s Trash: What Next for Municipal Solid Waste?* (Washington, DC: U.S. Government Printing Office, 1998), 283.

13. A. Clark Wiseman, *U.S. Wastepaper Recycling Policies: Issues and Effects* (Washington, DC: Resources for the Future, 1990), 2.

14. The growth of the regional landfill industry has led to increased interstate movement of wastes. See the policy brief titled “Interstate Waste Commerce.”

<b>Cancer Risks</b> (assumes 70 years of maximum exposure)	<b>One-in-a-Million Risks of Death</b> (assumes one year of exposure)
60 percent of landfills pose a one-in-10-billion risk. 6 percent pose a one-in-a-billion risk. 17 percent pose one-in-a-million risk. Incinerators pose one-in-a-million risk. Modern landfills pose lowest of risks.	Smoking 1.4 cigarettes Drinking half liter of wine Living two days in New York or Boston Traveling 6 minutes by canoe Traveling 10 miles by bicycle Traveling 300 miles by car Flying 1,000 miles by jet One chest x-ray Eating 40 tablespoons of peanut butter

*Sources:* Jennifer Chilton and Kenneth Chilton, "A Critique of Risk Modeling and Risk Assessment of Municipal Landfills Based on U.S. Environmental Protection Agency Techniques," *Waste Management and Research* 10 (1992): pp. 505–16 (landfills). Richard Wilson, "Analyzing the Daily Risks of Life," in *Readings in Risk*, ed. Theodore S. Glickman and Michael Gough (Washington, D.C.: Resources for the Future, 1990), p. 57 (one-in-a-million risk comparisons).

### Recommended Readings

Benjamin, Daniel K. 2003. "Eight Great Myths of Recycling." PERC Policy Series 28. Bozeman MT: Property Environment Research Center.

Desrochers, Pierre. 2002. "Natural Capitalists' Indictment of Traditional Capitalism: A Reappraisal." *Business Strategy for the Environment* 11, no. 4: 203–20.

Delong, James V. 1994. *Wasting Away: Mismanaging Municipal Solid Waste*. Washington, DC: Competitive Enterprise Institute.

Douglas, Christopher. 1998. *Government Hand in the Recycling Market: A New Decade*. St. Louis, MO: Washington University, Center for the Study of American Business.



# Electronic Waste

Angela Logomasini\*

Increasingly, news reports and environmental activists are claiming that we are facing a new solid waste crisis. “Electronic junk [is] piling up everywhere, creating what some experts predict will be the largest toxic waste problem of the 21st century,” reads an article in *Environmental Health Perspectives*.<sup>1</sup> Similarly, Greenpeace claims, “The world is consuming more and more electronic products every year. This has caused a dangerous explosion in electronic scrap (e-waste) containing toxic chemi-

cals and heavy metals that cannot be disposed of or recycled safely.”<sup>2</sup> As a result of such rhetoric, Europe has passed several “e-waste” laws, U.S. states have begun looking into their own regulations, and members of Congress have proposed legislation. Unfortunately, misinformation about the issue and the naive belief that government is positioned to improve electronic waste handling is leading to misguided policies and legislation.

## Background

In 2003, the European Union (EU) passed a couple of e-waste policies that are becoming

---

\* This brief is largely a summary of: Dana Joel Gattuso, “Mandated Recycling of Electronics: A Lose-Lose Proposition,” Issue Analysis 2, Competitive Enterprise Institute, Washington, DC, 2005, <http://www.cei.org/pdf/4386.pdf>.

1. Charles W. Schmidt, “E-Junk Explosion,” *Environmental Health Perspectives*, April 4, 2002.

---

2. Greenpeace International, “Eliminate Toxic Chemicals,” <http://www.greenpeace.org/international/campaigns/toxics>.

models for U.S. regulation. The Directive on the Restriction of the Use of Certain Hazardous Substances (RoHS) phases out certain “hazardous substances”—lead, mercury, cadmium, hexavalent chromium, bromated flame retardants—that are used in electronics. The other directive, the Waste Electronic and Electrical Equipment Directive, mandates that companies take back electronic equipment for disposal starting in 2005.

The costs of these programs are likely to be significant. The EU government estimates that both programs will cost €500 million to €900 million,<sup>3</sup> and industry estimates costs of up to €62.5 billion.<sup>4</sup> According to Gartner Inc., a U.K.-based technology analysis company, the cost of the two directives will raise personal computer prices by about \$60.<sup>5</sup>

The benefits of the programs are assumed, rather than assessed through any comprehensive study. Instead, these programs are based on the precautionary principle, which assumes that in the absence of information about risk, regulators should act to prevent potential risks.

Following Europe’s lead, several members of Congress formed an e-waste task force in 2005 to study the issue and produce legislation. Members of this task force are basing

their policy on misinformation, as is apparent from their comments on the topic in the press.<sup>6</sup>

During the 109th Congress, several members offered e-waste legislation. Representative Juanita Millender-McDonald (D-CA) introduced H.R. 4316 and Senator Ron Wyden (D-OR) introduced S. 510, both of which would provide tax credits for recycling computers and would ban disposal of computer monitors in landfills, among other things. Representative Mike Thompson (D-CA) offered H.R. 425, which would impose a tax on electronic equipment sales, levying up to \$10 per item. The funds would go to the U.S. Environmental Protection Agency (EPA), which would use them to award grants to parties working to recycle computers.

In addition, numerous states are following Europe’s lead. For example, in 2001, California banned the disposal of computer monitors in landfills, and in 2003, it passed a law to place a sales tax on computers—which lawmakers euphemistically call an “advance disposal fee.” This new tax is supposed to fund a state computer recycling program, but if costs of the program grow, the state can increase the tax to cover its costs. The fee is likely to grow, because it costs about \$20 to \$25 to recycle each unit. Some program supporters advocate increasing the tax to as much as \$60 per computer sold. E-waste policies are also in place in Maine, Maryland, Minnesota, Washington

3. U.K. Department of Trade and Industry, “Explanatory Memorandum on European Community Legislation: The Common Position on a Proposal for a European Parliament and Council Directive on Waste from Electrical and Electronic Equipment,” U.K. Department of Trade and Industry, London, March 2002, 7.

4. Orgalime, “Detailed Position of Orgalime’s Electrical and Electronic Liaison Committee in Cooperation with European Sector Committees,” Brussels, September 5, 2000, 1.

5. Meike Escherich, “EU’s New Recycling Rules Could Drive Up European PC Prices,” Gartner Inc., January 6, 2004, as quoted in Fiona Harvey, “The Greening of Your PC,” *National Post*, February 5, 2004.

6. For example, see Representatives Mike Thompson, Louise Slaughter, Randy Duke Cunningham, and Mary Bono, “Electronic Waste,” Letters to the Editor, *Washington Times*, July 14, 2005, responding to Dana Joel Gattuso, “E-Waste: Electronic Paperweight Crisis?” *Washington Times*, July 12, 2005. See also Gattuso’s response, “Straight Scoop on E-Waste,” Letter to the Editor, *Washington Times*, August 21, 2005.

State, Connecticut, Oregon, North Carolina, and Texas.

### Fundamental Problems with These Policies

Despite claims to the contrary, there are many problems with the EU e-waste programs and the U.S. versions of these laws. The recycling mandates, like those under Europe's WEEE program, may actually mean more air, water, and solid waste pollution as products are collected, sorted, and recycled. In fact, the U.K. Department of Trade and Industry notes, "For certain items, [the directive] may not be the best practicable environmental option."<sup>7</sup>

In addition, WEEE presents some serious practical problems associated with collecting and recycling all the products concerned. When the EU implemented a similar program for refrigerators in 1998, the products were collected but there was nowhere to recycle them, leading to a massive stockpiling of refrigerators, now known as the "fridge fiasco." An estimated 6,500 refrigerators piled up daily—2.4 million annually. According to the U.K. government, the cost of managing these wastes was £75 million.<sup>8</sup> WEEE's impacts could be much worse. According to the U.K. Environment Agency, "Fridges are just one tiny part of the WEEE directive—if we think we have problems now, then we ain't seen noth-

ing yet."<sup>9</sup> Retailers are already having a problem complying with WEEE's take back and recycling mandates.<sup>10</sup> California had similar problems associated with stockpiling when it banned the disposal in landfills of computer monitors.

Likewise, RoHS-styled bans on substances used in electronic products are problematic for a number of reasons. First, they ignore important benefits of the so-called hazardous substances that are being banned—benefits that may make final products safer and longer lasting. Moreover, the risks of these substances can be managed without banning them completely.

Ironically, the risks created by the RoHS program itself may be more problematic than the risks it attempts to control. Consider the ban on using lead as solder in computers. Lead is banned for this purpose even though there are no proven problems associated with using lead in computers. However, the substance conveys many benefits, which substitute substances might not deliver.

For one thing, lead solder is very energy efficient; it requires less energy than alternatives because it melts at low temperatures. According to a U.K. Trade and Industry study, substitutes increase energy usage by 6 to 18 percent.<sup>11</sup> Similarly, a University of Stuttgart study of substitutes for lead solder indicates that the envi-

7. U.K. Department of Trade and Industry, "Consultation Paper: Proposed EC Directive on Waste Electrical and Electronic Equipment and Proposed EC Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment," U.K. Department of Trade and Industry, London, August 11, 2000, 52.

8. Nicholas Watt, "Taskforce to Tackle #75m 'Fridge Mountain,'" *Guardian*, January 21, 2002.

9. "Government Warned to Avoid Fridge-like Crisis for Electronic Directive," *letsrecycle.com*, January 30, 2002, <http://www.letsrecycle.com/news/news.jsp?story=1002>.

10. Graham Grant, "Phony War on Waste: Scots Face Huge Bill for Growing Mountain of Discarded Electrical Goods as Shops Fail to Comply with New Recycling Directive," *Daily Mail* (UK), January 4, 2008.

11. U.K. Department of Trade and Industry, *Consultation Paper*, U.K. Department of Trade and Industry, London, 48.



ronmental impacts of the substitutes—carbon emissions, acidification, human toxicity, and ozone depletion—are all significantly higher than those for lead.<sup>12</sup>

Moreover, substitutes are likely to reduce product performance and reliability. For example, tin solder forms tiny strains called whiskers when too much moisture is present; these whiskers can spread along circuit boards and produce short-out failures. Other substitute solders are not strong enough; they consistently fail stress tests and shorten computer life, thereby increasing e-waste.<sup>13</sup> Such problems are currently being cited as firms attempt to comply with RoHS. For example, one firm notes:

“Worse still, standards bodies have already discovered some serious technical misgivings about the long-term performance of lead-free, high tin alternatives such as SAC alloys. What is known so far is that lead-free solders are certainly not a “drop in” solution for their lead forefathers. This presents a daunting prospect for many manufacturers, particularly those making high-reliability products used in safety critical applications where failure puts lives at risk ... Independen-

dent studies—involving exhaustive test programs to evaluate the performance of lead-free alloys in high reliability systems—have revealed situations where lead-free alloys directly compromise electronic circuit reliability.”<sup>14</sup>

Similar problems are associated with the ban on bromated flame retardants. These were banned because they allegedly release dangerous levels of dioxin. Yet the EU risk assessment on the topic found “no identifiable risk.”<sup>15</sup> There were similar findings in studies conducted by the National Academy of Sciences,<sup>16</sup> the World Health Organization,<sup>17</sup> and the U.S. Consumer Product Safety Commission.<sup>18</sup> Yet the absence of such flame retardants presents an increased risk of fires. A Swedish study found that existing limits on the flame retardants in Europe may explain a higher number of television fires in Europe: There are currently about 165 fires per million televisions in Europe. Meanwhile, in the United States, where flame retardants are used in televisions, there are only five fires per million television sets.<sup>19</sup>

12. N. Warburg, C. Herrmann, P. Eyerer, “Lead-Free Soldering Paste from Different Stakeholders’ Point of View,” Keynote presentation, APEX Conference, Anaheim, CA, March 31–April 2, 2003. For more on this issue, see Erik de Kluizenaar, *Environmental Impact of Solder and Solderable Finishes*, Philips CFT Electronic Packaging & Joining, Eindhoven, Netherlands; and Jack Geibig and Maria Socolof, *Summary of Activities for a Life-Cycle Environmental Impact Evaluation of Tin-Lead and Lead-Free Solder*, Center for Clean Products and Clean Technology, University of Tennessee, Knoxville, TN, April 2003.

13. Raymond A. Fournelle, “Lead-Free Solders and Processing Issues Relevant to Microelectronics Packaging,” *Journal of Electronic Materials* 56, no. 6 (2004): 33–49.

14. Graham Naisbitt (Managing Director of UK-based Gen3 Systems), “Learning from the RoHS Experience,” *Electronic News* (Australia), November 1, 2007.

15. Kara Sissell, “EU Finds Deca-BDE Poses No Health Risk,” *Chemical Week*, June 9, 2004.

16. Bromine Science and Environmental Forum, “Study Finds Very Low Detection of DecaBDE,” press release, June 10, 2004.

17. World Health Organization, International Programme on Chemical Safety, “Environmental Health Criteria 172: Tetrabromobisphenol A and Derivatives,” World Health Organization, Geneva, 1995.

18. Bromine Science and Environmental Forum, “Study Finds Very Low Detection of DecaBDE.”

19. Margaret Simonson and Hakan Stripple, “LCA Study of Flame Retardants in TV Enclosures,” Swedish

## Ongoing Private Computer Recycling

In contrast to the many problems with government recycling programs, private efforts to recycle computers have proven much more effective. In 2004, Dell, Hewlett-Packard, and IBM collected and recycled 160 million pounds of computer equipment. These programs are voluntary, fee-based, and affordable. At this point, Dell recycles computers for \$10. (This service provides users with an airway bill for shipping the computer to Dell.)

Ironically, Representative Thompson's bill would tax consumers who buy computers to provide grants to fund computer recycling—but computer recycling is already occurring in the private sector. The difference is that the private initiatives operate without taxing consumers and charge only those who dispose of waste, not everyone who buys a computer. If the Thompson bill passed into law, it could have undermined the productive private efforts by replacing them with a less efficient government program.

## Conclusions

Despite claims to the contrary, there is no real e-waste crisis, and the risks and costs of e-waste are manageable. Government programs promise to promote inefficiencies, increase environmental problems, and hinder market solutions. Market forces can and will produce optimal management of e-waste—if only the regulators allow them.

## Experts

Dana Joel Gattuso, Adjunct Scholar, Competitive Enterprise Institute.

Angela Logomasini, Director of Risk and Environmental Policy, Competitive Enterprise Institute, [alogomasini@cei.org](mailto:aologomasini@cei.org)

## Recommended Reading

Gattuso, Dana Joel. 2005. "Mandated Recycling of Electronics: A Lose-Lose-Lose Proposition." Issue Analysis 2, Competitive Enterprise Institute, Washington, DC, 2005. <http://www.cei.org/pdf/4386.pdf>.

---

National Research and Testing Unit, Borås, Sweden, February 2, 2000, 3–4, 8.



## About the Authors

*Fred L. Smith Jr.* is the Founder and President of the Competitive Enterprise Institute (CEI). Before founding CEI, Mr. Smith served as the Director of Government Relations for the Council for a Competitive Economy, as a senior economist for the Association of American Railroads, and for five years as a Senior Policy Analyst at the Environmental Protection Agency. Mr. Smith holds a BS degree in Theoretical Mathematics and Political Science from Tulane University where he earned the Arts and Sciences Medal (Tulane's highest academic award) and was elected to Phi Beta Kappa. He has also done graduate work in mathematics and applied mathematical economics at Harvard, SUNY Buffalo, and the University of Pennsylvania.

*Gregory Conko* is the Director of Food Safety Policy at CEI. Before joining CEI, Mr. Conko was

a research associate with the Capital Research Center. He graduated from the American University with a BA in political science and history. He holds a JD from George Mason University.

*Michael De Alessi* is the Director of Natural Resource Policy at Reason Foundation. He worked on *The Environmental Source* while he was a policy analyst at CEI. Mr. De Alessi holds a MS in Engineering Economic Systems and a BA in Economics from Stanford University. He also has a MA in Marine Policy from the Rosenstiel School of Marine and Atmospheric Science at the University of Miami.

*J. Bishop Grewell* practices law at Mayer Brown LLP in Chicago. He contributed to this book while a visiting fellow at CEI.

*Sam Kazman* is General Counsel of CEI. In 1992, Mr. Kazman won a federal appeals court

ruling that the National Highway Traffic Safety Administration had illegally concealed the lethal effects on highway safety of its auto fuel economy standards, the first judicial overturning of a fuel economy standard in the program's history.

*Ben Lieberman* is a Senior Policy Analyst, Energy and Environment, Thomas A. Roe Institute for Economic Policy Studies at the Heritage Foundation. He received his JD from the George Washington University.

*Angela Logomasini* is Director of Risk and Environmental Policy at CEI. Ms. Logomasini served as legislative assistant to Senator Sam Brownback from 1996 through 1998, advising the senator on energy and environmental issues. She has a PhD in Politics from the Catholic University of America.

*Iain Murray* is Director of Projects and Analysis and Senior Fellow in Energy, Science and Technology at CEI. Before coming to CEI, Mr. Murray was Senior Analyst and then Director of Research at the Statistical Assessment Service, and he worked as an advisor to the British Department of Transport. Mr. Murray holds a BA and MA from the University of Oxford, an MBA from the University of London and the Diploma of Imperial College of Science, Technology and Medicine.

*Jennifer Zambone* is Publications Manager at the Mercatus Center. Ms. Zambone has a BA in Biology and English from Washington and Lee University, where she also earned her JD. She contributed to this book as a policy analyst at CEI.

The Competitive Enterprise Institute is a non-profit public policy organization dedicated to the principles of free enterprise and limited government. We believe that consumers are best helped not by government regulation but by being allowed to make their own choices in a free marketplace. Since its founding in 1984, CEI has grown into an influential Washington institution.

We are nationally recognized as a leading voice on a broad range of regulatory issues ranging from environmental laws to antitrust policy to regulatory risk. CEI is not a traditional “think tank.” We frequently produce groundbreaking research on regulatory issues, but our work does not stop there. It is not enough to simply identify and articulate solutions to public policy problems; it is also necessary to defend and promote those solutions. For that reason, we are actively engaged in many phases of the public policy debate.

We reach out to the public and the media to ensure that our ideas are heard, work with policymakers to ensure that they are implemented and, when necessary, take our arguments to court to ensure the law is upheld. This “full service approach” to public policy makes us an effective and powerful force for economic freedom.



## Competitive Enterprise Institute

1001 Connecticut Avenue, NW  
Suite 1250  
Washington, DC 20036  
202-331-1010  
Fax 202-331-0640  
[www.cei.org](http://www.cei.org)