Safeguards At Risk:

John Graham and Corporate America's Back Door to the Bush White House

March 2001

Acknowledgments

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EXECUTIVE SUMMARY

News reports published the week of March 5, 2001 indicate that John Graham, founding director of the Harvard Center for Risk Analysis (HCRA), was nominated by President Bush for a position as the new regulatory czar in the White House Office and Management and Budget (OMB). Most Americans have never heard of John Graham, but if the U.S. Senate approves, he will be in a position to wield enormous power, and to undercut public health, safety and environmental protections for years to come.

Graham would head the Office of Information and Regulatory Affairs (OIRA), which vets any significant or controversial regulation before it can be implemented. Over the past decade, Graham has been a prominent figure in the fight to halt or delay the issuance of protective safeguards by federal regulatory agencies, working with and receiving funds for his activities from dozens of major corporations. At OMB, he would be able to impose his will on the agencies, perhaps even on behalf of his former industry supporters, by blocking the development of standards and eviscerating the government's regulatory framework.

There are three major problems with Graham's potential rise to power within OMB. First, Graham is certain to favor the regulated industries that have handsomely supported his Center. Graham has amply demonstrated his willingness to ignore, or gloss over, his own conflicts of interest. This report shows that Graham's Center has accepted money from chemical companies, auto manufacturers, energy and oil interests, and other industries hostile to regulation.[1] Yet, invoking the prestige of Harvard University, he has consistently testified before Congress and been widely quoted by the media as though he is a neutral academic "expert," with no disclosure of the sources of his Center's funding in the article or testimony.[2]

As discussed in *Part One: Who Is John Graham?*, Graham's research has been used to lend a "scientific" veneer to corporate efforts to roll back safety and environmental standards, and to push for a top-down reorganization of the government's basic regulatory scheme. Graham's Center is funded by more than 100 large corporations and trade associations, including such known environmental offenders as Dow, 3M, DuPont, Monsanto and Exxon, in addition to the Chlorine Chemistry Council, the American Automobile Manufacturers Association, the American Petroleum Institute, and the Chemical Manufacturers Association, now called the American Chemistry Council.[3] High-ranking corporate officers from Oxford Oil, the National Association of Manufacturers, Eastman Chemical, Tenneco Inc., CK Witco Corp., and Novartis Corp. sit on the Center's Executive Board.[4] The HCRA Advisory Council includes executives from DuPont and the Grocery Manufacturers Association, and the chief attorney for environmental affairs at Exxon Chemical Americas.[5]

Second, Graham's methodology appears to be informed more by the wishes of his corporate backers than by anything recognizable as "science." Although he often calls himself a "scientist," Graham's field of risk analysis is a discipline within the field of public policy, and he does not in fact hold any degrees in the hard science disciplines that often form the basis for regulatory policy.[6] As this report demonstrates, Graham's research conclusions are frequently marred by his inflation of industry costs and underestimations of the public benefits of safeguards. The practice of cost-benefit analysis also omits or downplays ethical and moral factors such as justice, consent and equity, and inappropriately discounts the value of human life and the environment.

Graham's Center, acting under the auspices of the Harvard School of Public Health, churns out research in support of industries that have a keen financial interest in seeing health and environmental safeguards dismantled or delayed. In *Part II*, we examine three case studies of his work and show that:

- Graham solicited financial contributions from tobacco giant Philip Morris in the early 1990s and invited the company's public relations officials to review a draft chapter of Graham's book on the subject of second-hand smoke. Internal company memos show that Big Tobacco relied on Graham as part of its strategy to generally discredit the Environmental Protection Agency (EPA) and to undermine an EPA risk assessment of the cancer-causing effects of second-hand smoke.

- In July 2000, as many cities and states were considering outlawing the use of cell phones while driving, Graham published a study (funded by AT&T Wireless Communications for $300,000) assessing the risks. The study came out against a ban on using cellular phones while driving, concluding that such a ban *would be more costly than air bags* and that there was "not enough reliable information on which to base reasonable policy." As Tom and Ray Magliozzi, hosts of Car Talk from National Public Radio put it in response to a similar study by Robert Hahn, Graham's intellectual and political ally at the American Enterprise Institute-Brookings Joint Center for Regulatory Studies, "This seems to us to be a clear case of cost/benefit analysis run amok."[7]

- Graham has wildly distorted the facts when advocating industry positions in the media. For example, amid fierce controversy over defectively designed air bags in 1997, he wrongly told the Associated Press that "most" of the 38 children killed by air bags had been decapitated. The same year, he appeared on ABC's Good Morning America to report that a Harvard Center for Risk Analysis study had found that the "cost" of passenger side air bags was $399,000 for each year of life saved. After harsh criticism, the study was peer reviewed. When it was finally published in the *Journal of the American Medical Association*, Graham had flip-flopped — revising that estimate down to $61,000 per life year saved, and concluding that air bags were, in fact, a worthwhile and life-saving investment.

The third reason Graham is unfit to serve at OMB is because of his long-standing strategic and research services to an entire network of anti-regulatory corporate interests, who would expect to call upon his sympathy. *Part III: Science for Sale*, explains six of Graham's public relations techniques, showing how an anti-regulation political strategy is packaged as "necessary" information about human health and the environment.

For example, Graham was a member of the EPA Science Advisory Board that reviewed the agency's risk assessment on dioxin, an industrial contaminant, in 1994 and 2000.[8] In June 2000, the EPA announced a draft of its study, which showed that exposure to the level of dioxin currently in our environment causes an increase in the average American's lifetime cancer risk to as high as 1 in 100. The EPA's reassessment also found that dioxin, even at very low levels of exposure, is linked to infertility, immune system damage and learning disabilities.[9]

But rather than acknowledging that dioxin poses an *additional* threat to human health, in his comments to the media Graham misleadingly downplayed the risk by comparing the EPA's findings to other types of risks, such as the risk of dying in a car crash.[10] When compared with these risks, Graham suggested, the risk posed by dioxin appears "normal."

The National Public Radio report containing Graham's comments failed to mention his position on the Science Advisory Board and failed to disclose that his Center is supported by money from 48 different dioxin producers, including incinerator companies, pulp and paper companies, cement kilns, copper smelters, PVC manufacturers, PCB producers and the petroleum industry.[11]

Graham's tight connections to the chemical industry have also influenced his legislative work. Graham spoke at a panel discussion held around 1994 at the Chemical Industry Institute of Toxicology (CIIT) alongside executives from Eastman Kodak, the American Industrial Health Council, Air Products and Chemicals, E.I. DuPont de Nemours, and the Chemical Manufacturers Association (now called the American Chemistry Council).[12]

The topic was a Congressional bill that would have imposed rigid cost-benefit criteria on federal regulatory agencies in order to deter the development of new public health, safety and environmental protections. Graham commented on the relationship between the rollback "reform" bill and the chlorine's industry's support for institutions such as CIIT: "Those of us advocating reform could not be as effective as we have been in advocating the role of science in risk assessment if we did not have the underlying data and methodologies that were created here at CIIT," he said.[13] All of the trade associations and companies listed above are also funders of Graham's Center.[14]

Graham has been a critical player in a decade-long, multi-industry campaign to discredit federal agencies and to block the regulatory process, and his use of the Harvard name helped to legitimize these attempts to rewrite the rules on public health and environmental issues. As this report shows, debates over the safety of pesticides, injury prevention, pollution, second-hand smoke, toxic chemicals and contamination of our food and water have all been victims of these efforts.[15] If Graham goes to the OMB, he could serve as the back-door conduit for a new corporate assault on public and environmental health.

Health, Safety and Environmental Regulations Are At Risk

Under a standing Executive Order, a primary function of the Office of Information and Regulatory Affairs is to "review" cost-benefit calculations produced by federal agencies before new standards and rules can be issued. In theory, the OIRA director should serve as an honest broker, reviewing regulatory proposals from federal agencies and deferring to agency expertise on most technical and scientific matters.

However, the OMB's "review" process has been used in the past to block the issuance of key health and safety standards.[16] During the Reagan-Bush I years, political appointees within OMB, in conjunction with councils run by Vice President Bush and Vice President Quayle, were given broad discretion to review and block new standards created by federal agencies, often at the direct request of chemical companies, auto manufacturers and other regulated interests.

It is clear that Corporate America is expecting the same treatment from Bush II. The U.S. Chamber of Commerce told *The Washington Post* in February 2001 that it has drafted a presidential "executive order of its own that it hopes the new administration will use as a template for rewriting its policy on regulation."[17] The draft order lays out the process for "how rules should be reviewed, the role of the Office of Management and Budget, and the economic and scientific criteria that agencies should apply to rule-making."[18] "If you fix [OMB], you rein in all the agencies," said Bruce Josten, the Chamber's executive vice president for government affairs.[19]

The "fix" may be in. In 1996, Graham told political strategists at the Heritage Foundation that "environmental regulation should be depicted *as an incredible intervention in the operation of society*."[20] He has said that support for the regulation of chemicals in our water supply shows the public's affliction with "a syndrome of paranoia and neglect."[21] According to news reports, Graham also explained to attendees at a conference at Duke University in 1996 that he believed that "government agencies should be required to depend on expert analyses, rather than public views, in deciding which threats to regulate."[22]

Graham's record on public health issues is clear. For the past decade, Graham has vigorously promoted a set of economic tools called "risk analysis" in regulatory decision-making,[23] and has pushed for omnibus legislation that would rank all activities by the federal agencies according to their cost to businesses and impose onerous, industry-favoring additional requirements on every new regulation.[24] In 1999, Graham supported S.746, which would have invited litigation over an agency's implementation of cost-benefit rules, and thus further hold up the process of establishing safeguards.

Important regulations are at risk. Graham recently joined a group of economists who argued to the Supreme Court that EPA action under the Clean Air Act did not pass muster on cost-benefit grounds.[25] Their argument was found meritless by a unanimous Court, but at OMB Graham could impose the same requirements the Court struck down, behind closed doors and out of public view. In 1997, Graham announced that passenger air bags were not cost-effective, and in 1999 he supported the passage of a "reform" bill that likely would have prevented any air bag regulation from being developed, if the law had been in place at the time a rule was considered.[26] According to government records, the air bags rule alone has saved 6,733 lives to date.[27]

If Graham is approved by the U.S. Senate for OIRA Director, he will be in the catbird seat; overseeing the entire executive regulatory process. Only the independent regulatory agencies, which are considered an arm of the Congress, will be outside his direct regulatory reach. No significant safety, health, environmental or any other proposed or final rules can be issued without approval through this office in the OMB. Nor, under the Paperwork Reduction Act, can any government agency gather information from ten or more entities, a move which often is essential for the research that justifies regulation, without approval from OIRA.

Through these mechanisms, OIRA can slow, stall, weaken or stop regulatory proposals and final rules that the regulated industry opposes. Graham's first move at OIRA would likely be to draft a new executive order that could immobilize the issuance of new health, safety and environmental safeguards. Graham's prescriptions on the application of risk analysis have been sweeping; it appears that there is little agency action that would remain beyond his purview.[28] And Graham's "comparative risk" approach could easily drown the agencies in a sea of red tape. In short, Graham would become the new master of "paralysis by analysis."

Graham's philosophy, well demonstrated by his years of advocacy for industry interests, is that federal agencies must wait to impose rules until near-perfect estimates of the precise causes and effects of the hazards to be regulated are known. But regulators often know that a substance or product is dangerous long before they can measure the exact magnitude of the harm, extent of the exposure, or exact mechanism by which a substance acts on the human body or environment. Collecting this secondary information can take years — years during which the public will continue to be exposed.

At the same time that OIRA under Graham's direction could impose endless analytical requirements on government agencies, another office within the OMB undoubtedly will be cutting the already paltry agency budgets, essentially making it impossible for them to keep up with the public needs for industry oversight and law enforcement. The combination is a sure recipe for public health and environmental disasters.

Given his public statements on the subject and his efforts over the past decade, Graham would likely quash any safety or health rule that his numbers indicate is not the most economically "efficient" option. As were Vice President Dan Quayle's "Council on Competitiveness" and Vice President Bush's "Task Force on Regulatory Relief," the OMB would once again become a black hole into which our national safeguards disappear. For all of the reasons documented by this report, Graham should not be approved by the U.S. Senate to head the Office of Information and Regulatory Affairs in the Office of Management and Budget.

PART ONE

WHO IS JOHN GRAHAM?

Introduction

Patricia Pena didn't know what hit her. Just three days after she left her job to become a full-time mother, her car was broadsided at an intersection and her only child, a 3-year-old girl, was killed. The police investigation revealed that the driver who hit her car was dialing a number on his cellular phone when the crash occurred. Pena has since become a national advocate for banning the use of cellular phones while driving, traveling to Washington, D.C., to speak with legislators and writing about her story in *USA Today*.[29]

Opposing her are the wealthy cellular communications industry and a well-coordinated network of corporate lobbyists, conservative public policy think tanks and industry-funded academics. One of these academics is John D. Graham, whose Harvard Center for Risk Analysis (HCRA) accepted $300,000 from AT&T Wireless Communications to do research on driver distraction and cell phones. Graham's study concluded that a ban on cell phones while driving was too "costly" to be worthwhile.

Graham's cell phone cost-benefit analysis misapplied basic statistical methods and weighed projections of the public's injuries and fatalities against lost industry profits and other consequences of a ban.[30] This approach to matters of public health and safety is typical of his work, this report shows. Now, Graham has been nominated to be the regulatory gatekeeper of the Bush administration in the Office of Management and Budget (OMB) regulatory affairs office, with the power to undermine standards set by federal agencies under congressional mandates.

Graham's appointment to the Office of Regulatory Affairs within OMB represents a serious threat to public health and environmental protections. Graham worships at the altar of economic analysis, proposing that all government regulatory actions conform to a methodologically suspect system of decision-making. Although it is marketed as "sound science," in fact his approach is perfectly aligned with the financial interests of regulated industries, such as chemicals, oil and gas, agribusiness and industrial metals. More than a hundred major companies have provided direct, unrestricted funding for his Center over the past decade (*see* p. 12).

Acting as a political strategist for these companies, Graham has advocated that the government give economic factors (like the cost to industry of complying with new regulations) the virtual trump card in any decision involving the enactment of new safeguards.[31] His paradigm for regulatory decision-making is anti-consumer, anti-environment, and hostile to preventive measures in public health. As a practical matter, Graham's regulatory proposals will also make it far more difficult for the federal agencies to act to protect public health and safety.

Graham's Credentials

Graham is currently the director of the Harvard Center for Risk Analysis (HCRA), which is connected to Harvard University as a separate sub-unit of the Harvard School of Public Health. The Center offers some twelve courses in a field called "decision analysis" to Harvard students but does not itself grant degrees. In addition to the student courses, the Center also offers, at a fee, short courses and multi-day seminars that grant "continuing executive education" credits to corporate officers. Graham teaches several of the courses, which train business executives to, among other things, "identify subgroups of lay people who are likely to be particularly outraged or tolerant about a potential risk."[32]

The Center also publishes a monthly newsletter called *Risk in Perspective*.[33] One recent issue suggested that "speculative, minor" risks to children include pesticides, Bisphenol-A and phthalates (toxic chemicals found in plastics and some children's toys), without acknowledging that funders of HCRA make these products. Another issue of the newsletter from April 1999 was titled, "*Toxic Pollution from Power Plants: Large Emissions, Little Risk*."

Although Graham himself has sometimes been called a "scientist," and he often uses the honorific "Dr." to the press while invoking the name of Harvard's School of Public Health, he has earned no degrees in medicine, public health or the hard sciences.[34] The subjects of his degrees are omitted from his resume on the HCRA Web site, but Graham has previously told Congress that both his undergraduate and master's degrees are in public policy.[35] We called Wake Forest University, where Graham earned his bachelor's degree, and were told by staff in the alumni office that there is no undergraduate program in public policy and that, according to their records, Graham earned his B.A. in economics.[36] Graham's doctorate from Carnegie Mellon is in a subset of public policy called "decision analysis."

For the uninitiated, the name of Graham's Center for Risk Analysis might be a bit misleading. "Risk Analysis" is a broad, umbrella term that includes at least two sub-disciplines: "risk assessment" and "risk management." *Risk assessments* survey hazards from human exposure to a substance (or an activity) and the effects upon human health or the environment, and often involve original research in an area of the hard sciences, such as biology, chemistry, toxicology, etc. Risk assessment also uses estimates and theoretical models, because the scientific data are often lacking.

Risk assessment asks an objective question: "How risky is this situation?" However, the results of risk assessments are hardly "objective." As Mark Shere, a conservative lawyer who represents industrial clients in pollution cases, noted, "A typical risk assessment consists of about 50 separate assumptions and extrapolations, each of which may skew the analysis by a factor of 10 or more. These assumptions and extrapolations can alter the final numeric estimate of risk by a multiple of billions, and this result is again, unverifiable."[37]

Risk management, on the other hand, is a field of public policy that uses the results of risk assessments, as well as information about social and political values and data and statistical modeling tools, to come up with recommendations about risk policy. Risk management is a normative inquiry, asking "What should we *do* about the risk?" Graham also frequently invokes concepts that rightly belong under the rubric of "cost-benefit analysis" or "risk-benefit analysis." These phrases refer to two closely related sets of public policy tools that weigh either projected *costs* or *risks* against the projected *benefits* of some activity or rule.

Most — if not all — of Graham's work falls into the risk management category, meaning that it is informed by public policy as well as by data from the underlying hard science discipline. Many risk managers do have degrees in biology, or chemistry, etc., and the federal regulatory agencies employ them to make policy recommendations based on the science they know. Crafting regulations that protect health, safety and the environment is normally viewed as a highly specialized endeavor.

I. THE MONEY: GRAHAM'S "SOUND SCIENCE" IS BROUGHT TO YOU BY . . .

Graham's Center is funded by more than 100 large corporations and trade associations, including such known environmental offenders as Dow, 3M, DuPont, Monsanto and Exxon, in addition to the Chlorine Chemistry Council, the American Automobile Manufacturers Association, the American Petroleum Institute, and the Chemical Manufacturers Association, now called the American Chemistry Council.[38]

High-ranking corporate officers from Oxford Oil, the National Association of Manufacturers, Eastman Chemical, Tenneco Inc., CK Witco Corp., and Novartis Corp. sit on the Center's Executive Board.[39] C. Boyden Gray serves on the Center's executive board and regularly joins strategic huddles at the corporate-backed Heritage Foundation.[40] Gray is a prominent lobbyist for chemical, steel and energy interests[41] and was former White House counsel for Bush I, and a transition adviser to Bush II. The HCRA Advisory Council includes executives from DuPont, the Grocery Manufacturers Association and the Chief Attorney for Environmental Affairs at Exxon Chemical Americas.[42] Gray also served as "Group Chair" of the "Harvard Group on Risk Management Reform," a 15-member group which headed a 1995 effort for regulatory rollback.[43]

Documents made public by the state attorneys general tobacco litigation in 1997 and 1998 show that in the mid-1990s, Graham personally solicited large donations in support of his Center from Philip Morris and its subsidiary, Kraft, in sums from $25,000 to $50,000 — while criticizing the EPA's conclusion that second hand smoke causes lung cancer.[44] Graham has also repeatedly spoken out against fuel economy standards, often without acknowledging that his Center receives large donations from many oil and gas companies, including Mobil, BP America, Chevron, Unocal and Amoco, and motor vehicle manufacturers such as Ford, General Motors and Goodyear.

Harvard Center for Risk Analysis (HCRA) Funders

As Posted on the HCRA Web site, March 6, 2001

Unrestricted	Unrestricted	Restricted
3M	The Goodyear Tire & Rubber Company	Alfred P. Sloan Foundation
Aetna Life & Casualty Company	Grocery Manufacturers of America	American Crop Protection Association
Air Products and Chemicals, Inc.	Hoechst Celanese Corporation	American Industrial Health Council
Alcoa Foundation	Hoechst Marion Roussel	Andrew Mellon Foundation
American Automobile Manufacturers Association	Hoffman-LaRoche Inc.	Bradley Foundation
American Crop Protection Association	ICI Americas Inc.	Brookings Institution
American Petroleum Institute	Inland Steel Industries	California Avocado Commission
Amoco Corporation	International Paper	Chemical Manufacturers Association
ARCO Chemical Company	The James River Corporation Foundation	Chiang Ching-Kuo Foundation for International Scholarly Exchange
ASARCO Inc.	Janssen Pharmaceutical	Chlorine Chemistry Council
Ashland Inc. Foundation	Johnson & Johnson	Congressional Research Service
Association of American Railroads	Kraft Foods	Electric Power Research Institute
Astra AB	Louisiana Chemical Association	Elsa U. Pardee Foundation
Atlantic Richfield Corporation	Lyondell Chemical Company	International Life Science Institute/Risk Science Institute
BASF	Mead Corporation Foundation	Health and Environmental Sciences Group
Bethlehem Steel Corporation	Merck & Company	National Association of Home Builders
Boatmen's Trust	Millenium Chemical Company	National Institute of Justice
Boise Cascade Corporation	Mobil Foundation, Inc.	Pfizer, Inc.
BP America Inc.	Monsanto Company	Society for Risk Analysis
Cabot Corporation Foundation	National Food Processors Association	U.S. Centers for Disease Control
Carolina Power and Light	National Steel	U.S. Department of Agriculture
Cement Kiln Recycling Coalition	New England Power Service — New England Electric System	U.S. Department of Energy
Charles G. Koch Foundation	Nippon Yakin Kogyo	U.S. Department of Health and Human Services
Chemical Manufacturers Association	North American Insulation Manufacturers Association	U.S. Department of Transportation.
Chevron Research & Technology Company	Novartis Corporation	U.S. Environmental Protection Agency
CIBA-GEIGY Corporation	Novartis International	U.S. National Oceanic Atmospheric Administration
Ciba Geigy Limited	Olin Corporation Charitable Trust	U.S. National Science Foundation
CITGO Petroleum Company	Oxford Oil	
The Coca-Cola Company	Oxygenated Fuels Association	
Cytec Industries	PepsiCo Inc.	
Dow Chemical Company	The Pittston Company	
DowElanco	Pfizer	
DuPont Agricultural Products	Pharmacia Upjohn	
Eastman Chemical Company	Potlatch Corporation	
Eastman Kodak Company	Praxair, Inc.	
Edison Electric Institute	Procter & Gamble Company	
E.I. DuPont de Nemours & Company	Reynolds Metals Company Foundation	
Electric Power Research Institute	Rhone-Poulenc, Inc.	
Emerson Electric	Rohm and Haas Company	
Exxon Corporation	Schering-Plough Corporation	
FBC Chemical Corporation	Shell Oil Company Foundation	
FMC Corporation	Texaco Foundation	
Ford Motor Company	Union Carbide Foundation	
Fort James	Unocal	
Frito-Lay	USX Corporation	
General Electric Fund	Westinghouse Electric Corporation	
General Motors Corporation	Westvaco	
The Geon Company	WMX Technologies, Inc.	
Georgia-Pacific Corporation		
Glaxo-Wellcome, Inc.		

HCRA's conflict of interest policy (published on its Web site) primarily concerns protocols for research and does not appear to extend to media work. In reference to the disclosure of funding it provides only that "[a]ll sources of financial support for the Center's activities are disclosed publicly on this site, in our annual report, and *on every publication of HCRA scientific research*."[45] But as to scientific research, the HCRA policy imposes only spotty coverage: While it does contain specifications for "restricted grants," no mention is made of the much larger category of funds received by the Center that are "unrestricted." The funding list also does not reveal when funding was received by the Center, the amount of the funding, or how often a donor has given money.

Graham Is At the Center of An Anti-Regulation, Corporate-Funded Network

After a decade of criticizing the EPA and other agencies for being overly cautious in calculating risks, industry forces decided in the 1980s to co-opt the regulatory language of risk assessment, and to re-write the rules of the game from within. As this report shows in Parts Two and Three, large corporations established and funded pseudo-science front groups, fake grassroots organizations and anti-regulatory think tanks; spread wildly distorted anecdotes about runaway regulators and costly bureaucracies; and, under the misleading language of "sound science," plotted counterattacks to government-funded studies on issues such as second-hand smoke and styrene. Their goal was to generally discredit the enterprise of protective regulation. They sought to exploit any breach in the public's confidence about the wisdom of federal agencies by instituting the rule of risk "experts" — whose calculations they could control by rigging the technical rules of the game and whose decisions would trump the democratic development of health and safety protections.

Graham is a bridge figure in this network. He has a place on highly technical university-based committees and on the boards of international "professional" societies, while regularly advising political strategists at the Heritage Foundation[46] and serving on the board of the American Enterprise Institute-Brookings Joint Center on Regulatory Affairs. In this way, Graham helps to coordinate strategic and tactical decisions of the moment; by promoting the concept that government regulation has been based on "junk science," or emphasizing cost-benefit tradeoffs in order to obscure his allies' opposition to regulation across the board.[47]

Through Graham's behind-the-scenes participation in the regulatory debates on the part of Philip Morris, and his assistance to the media campaigns of counter-spin front groups like the American Council on Science and Health, Graham lent his Harvard credentials to the cause and helped to legitimize industry's attack on public health, safety and environmental objectives.[48] Besides regularly marketing his anti-regulatory paradigm to the "paranoid yet neglectful" public,[49] and working on regulatory rollback bills with lawmakers on Capitol Hill,[50] Graham also gets directly involved with the regulatory process by serving on Science Advisory Boards involved with particular risk assessments, as he did with the EPA's work on dioxin. A more complete summary of his organizational affiliations and a brief description of their involvement in the regulatory debate is found at the end of this chapter.

The astonishing growth and media savvy of this corporate-funded "regulation defense" has been chronicled in several books and articles.[51] In *Toxic Sludge Is Good For You*, co-authors John Stauber and Sheldon Rampton describe how the National Agricultural Chemical Association, now called the American Crop Protection Association (ACPA), created a multi-layered buffer of pseudo-science front groups and public relations offensives to offset the anticipated negative publicity from publication in 1962 of Rachel Carson's environmental classic, *Silent Spring*.

Their techniques have been refined and now serve as the model for other counter-assaults, as detailed in Part Three, Sellout #5: *Concocting "Science" For Corporate Counter-Spin*. The same corporate trade group that refined those tactics, the ACPA, supports Graham's operation at Harvard. More importantly, Graham has been extensively cited in the media coverage of chemical policy issues,[52] and his comments routinely downplay the health risks posed by chemicals. He was also cited in several articles about the publication of a book on dioxin and other hormone disrupting chemicals, *Our Stolen Future,* by Theo Colborn, Dianne Dumanoski and John Peterson Myers. His funding by ACPA was undisclosed in the coverage.

II. THE OBJECTIVE: CORPORATE REGULATORY CONTROL THROUGH OMB

Graham's Role in the Push for Regulatory Rollback

The same companies that provide funding for Graham's Center have been the chief promoters of a wholesale revision of the federal regulatory process, along lines more favorable to their interests.[53] Unsurprisingly, Graham was a major participant in these efforts. For example, Graham was regularly communicating with Big Tobacco during the early 1990s push for regulatory rollback as well as its precursor, Bush I's 1992 draft Executive Order (*see* Part Two, Case Study #1).[54]

Then again in late 1994, Graham became a prominent figure in the Washington establishment debate over the merits of so-called regulatory "reform." Under the Contract With America, Republicans had pledged to subject most new regulation on the part of a dozen federal agencies — and especially the EPA — to an obstacle course of hurdles like risk-benefit analysis and cost-benefit analysis, along terms drafted by business interests.[55] There were several bills floated on the topic, but only fragments of the rollback initiative were eventually signed into law.

In the fall of 1994, Graham was commissioned by the conservative American Enterprise Institute to, according to his own later testimony before the Senate, "write a blueprint for regulatory reform legislation. This blueprint influenced the regulatory legislation that passed the House of Representatives in March of 1995."[56] (The bill failed to pass the Senate.) Graham's claim is probably an exaggeration, but it is true that he had a distinct media presence in the debate over regulatory rollback.[57] Graham told an audience at the Heritage Foundation in 1996, "*I don't think there's any more passionate advocate of regulatory reform than myself*."[58]

An article in the *National Journal* in 1995 described Graham's promotion to the Chamber of Commerce of a sweeping, inter-agency requirement: [59]

> John D. Graham . . . predicted that the risk assessment legislation will be the first installment in a 10-year overhaul of federal health, safety and environmental policies. During that time, he said, Congress should rank all the risks with which the federal departments and agencies must deal and shift resources to focus on the most dangerous ones.

As OIRA Administrator, Graham would be perfectly positioned to implement an anti-regulatory agenda. A bill from the last Congress, S. 746, the "Regulatory Improvement Act of 1999,"[60] clearly aligns with recommendations from Graham's 1996 chapter in a book on cost-benefit analysis called an "Agenda for Congress."[61] In testimony before the Senate, Graham offered his "enthusiastic support for the measure."[62]

S. 746 would have harnessed every agency to the same rigid risk assessment and cost-benefit formulas, subjected new rules to mandatory "peer review" by committees that likely would have a strong pro-industry bias, permitted the OMB to nix a rule without any written explanation, and, in a "judicial review" clause, invited industry litigation over whether the agency had properly done its job under the new requirements.[63] According to a Public Citizen report, *The Unintended Consequences of the S. 746 Regulatory Obstacle Course*, the 1999 rollback bill would have threatened, eliminated or considerably delayed critical regulatory programs like nursing home safety, disability rights, factory farm pollution controls, youth smoking prevention and food safety, just to name a few.[64]

Since the advent of Bush II, the Chamber of Commerce has proposed a new draft executive order that would give far greater power to the OMB. Under the order, OMB could insist that federal agencies weigh "compliance costs" (which are often comprised mainly of foregone profits) much more heavily, direct the agencies to give preference to "flexibility" and "market-based" approaches, and require that the projected benefits of a regulation outweigh the "costs," without looking at factors like justice, or social goals other than "efficiency."

Regardless of the many, unresolved moral and methodological questions, Graham and his industry allies want to do more with tools like cost-benefit analysis. They want the ability to use "economics," rigged their way, to block agency implementation of legislation that is unpopular with business, under the guise of "maximizing efficiency" and "prioritizing" all regulation within the OMB. Under some of their proposals, the cost-efficiency of any new regulation must be compared to — and appear justified against — every other possible program to regulate that risk.[65]

Graham believes that virtually any hazard-related agency action should pass through a formal review by the White House. In 1997, Graham advocated a sweeping requirement that would have imposed *upon all risk-related determinations* a "peer review" by committees likely to be staffed with industry-friendly "experts" and centralized clearance through the White House Office of Science and Technology Policy. These red tape burdens would apply even if the agency was merely publicizing information on a hazard that had not been not part of any formal rulemaking, such as a pronouncement by the Surgeon General on the risks of smoking.[66] In short, Graham proposes a near stranglehold on the government's ability to communicate public health information.

Graham has also repeatedly suggested that congressional regulatory rollback legislation should be so sweeping that it over-rides every existing agency mandate and *requires* an exhaustive cost-benefit and risk-benefit analysis before any safeguard can be finalized.[67] In his over-reaching prescription, the results of the economic analysis would determine the survival of a rule. In 1997, Graham told Congress that when a reviewer's cost-benefit calculus collides with the agency's Congressional mandate, the democratic process must give way. Graham said that all the agencies' "enabling statutes *should be superseded by the general requirement* that each rule's identified benefits must justify its identified costs."[68]

A very similar proposal related to the role of cost-benefit analysis in protective regulation was soundly rejected by a unanimous Supreme Court in a February 28, 2001 decision. The American Trucking Associations sued the EPA to block new requirements issued under the Clear Air Act.[69] Graham and other anti-regulatory "economists" from the American Enterprise Institute-Brookings Joint Center for Regulatory Studies (AEI-Brookings) submitted a brief to the Court on the side of the trucking industry, arguing that requiring cost-benefit analysis would "improve regulatory decisionmaking."[70]

Justice Scalia, writing for the full Court, held that *neither the Clean Air Act nor the U.S. Constitution requires that corporate compliance costs be considered when EPA writes a rule to protect health and the environment*. Even Bush II's new head of the EPA, Christine Todd Whitman, supported the Supreme Court's decision, calling it "*a solid endorsement of EPA's efforts to protect the health of millions of Americans from the dangers of air pollution*."[71]

Graham's Risk Tradeoffs Are Political Cover For An Anti-Regulation Agenda

A 1995 article in *The Boston Globe* described the Superfund cleanup of chemical contamination of Love Canal, New York.[72] After the EPA filed a lawsuit over the cleanup, Occidental Chemical Corporation and the government reached an agreement that Occidental would reimburse taxpayers for $129 million of the costs.

Thanks to EPA's efforts, Occidental — which inherited the legal liability for 20,000 tons of chemicals that were dumped in Niagara Falls, N.Y., over the course of nine years — and *not* taxpayers were footing the bill. Yet Graham was quoted in the article as saying, "Does it really make sense to spend, say, $50 million on speculative risks *when you don't have the resources to provide violence prevention or pregnancy prevention in the schools?*"[73] Graham failed to mention — or the reporter failed to report — that two of his Center's funders, Millenium Chemical and Lyondell Chemical, are Occidental's petrochemical business partners.[74] Graham's comments are also misleading because reducing costs to industry does not free up money for government programs that address other risks, as Graham implies. Instead, the money goes back into shareholders' pockets.

Graham often argues that risks should be compared, for policymaking purposes, *with other risks*. In the parlance, this is called comparative risk analysis or risk-benefit analysis. Graham promoted this approach as a media strategy at a Heritage Foundation meeting in 1996, arguing that conservatives would appear more environmentally friendly if they couched regulatory rollback arguments in efficiency terms.[75] Graham had just returned from a weekend conference held by the National Wildlife Federation, an environmental organization, and was full of spin ideas for his conservative colleagues.[76]

In order to move the anti-regulatory agenda along more politically acceptable lines, Graham suggested to the strategists at Heritage that: "We ought to make the case that if these agencies were smarter and more scientific, we could reallocate resources, save more lives, and do more for the environment at no increased cost to the taxpayer. . . This basic principle of comparative risk, using our resources better, is one that I think we should force some [congressional] votes on — *not linked to congressional review of regulations, not linked to costs and benefits, just that specific issue of comparing risks*."[77] In other words, because industry interests are not persuasive if they merely oppose all protective regulation, conservatives should hone in on regulatory "errors" and argue that regulators have the wrong *priorities*.

Comparing risks in a vacuum is still one of Graham's major rhetorical techniques. A National Public Radio (NPR) story on dioxin last year reported that EPA scientists had determined that dioxin causes the average American "an *additional* lifetime risk of cancer as high as one in a hundred."[78] The story also indulged Graham's sleight-of-hand: "That would put dioxin *on par* with other common risks," said Graham. 'The average American in their lifetime has about one chance in a hundred of dying in a car crash . . . So this type of risk they're talking about here, if true, would be a significant risk, but it would not be something that would be out of the norm of what people experience in daily life.' "[79]

The catch? The risks demonstrated by the EPA are cumulative to existing risks, not merely "on par." Although Graham did not say so, these data reveal that we now have *both* a 1 percent chance of dying in a car crash *and* a 1 percent chance of contracting cancer from dioxin — for a 2 percent overall fatality rate. The NPR program also failed to mention that Graham has received funding from dioxin interests such as Dow, the Chlorine Chemistry Council, Du Pont, and the American Chemistry Council.[80]

Notably, Graham's approach also fails to account for the non-cancer effects of dioxin that were not measured in that particular EPA study, or for the interactive effects that dioxin may have with other chemicals added to the environment. In addition, if, following Graham's advice, we merely compare the *magnitude* of one risk to another— 1% to 1% — and declare that a one in a hundred risk of dying from a particular hazard is "normal," what would stop the manufacturers of unsafe products and polluters from adding just one more "normal" risk? The more risky the world gets, the lower our benchmark of "normal" will go — into a downward spiral. This is a classic example of the kind of "race to the bottom" that our tradition of strong health and safety regulation is intended to prevent.

The Senate regulatory rollback bill of 1995 would have required that federal agencies also run through this rather spurious exercise in comparing species of risk — by mandating that agencies must publicly compare a risk they wish to regulate with commonly known risks.[81] But comparing risks to other risks like that is dicey. It matters whether a risk is assumed voluntarily or is forced upon an unwilling person. For example, while we choose to drive a car, we do not choose to be exposed to dioxin contamination in the environment. And the fairness of a person's exposure to the risk matters as well. (For more explanation of this flaw in Graham's risk comparisons, *see* Part Three, Sellout #4.)

III. GRAHAM'S METHODS ARE DEEPLY FLAWED AND ANTITHETICAL TO ENVIRONMENTAL AND PUBLIC HEALTH SAFEGUARDS

At OMB, Graham Would Imbalance the Regulatory Process

Graham has repeatedly supported regulatory rollback proposals that would add cumbersome and dilatory steps to what is already a carefully scrutinized process.[82] When Congress enacts protective legislation (such as the Food Quality Protection Act and the National Traffic and Motor Vehicle Safety Act), it delegates to particular federal agencies the responsibility for implementing the legislation's goals. These agencies have the hard science and technical expertise and the authority to develop regulations that will accomplish congressional objectives.

After a congressional mandate and before any regulatory proposal is issued, all of the stakeholders — the public, regulated businesses, health experts and advocacy groups — have the opportunity to express their positions through the agencies' notice and comment process. When a final rule is published, agencies must publicly explain and justify their decisions based upon years, and sometimes decades, of study and experience. Final regulations can be appealed within agencies or to the courts, or both, and can be attacked legislatively, as was the recent ergonomics regulation.

Before proposing any new rule, federal agencies look at the likely costs, as well as the benefits, of implementing the regulation. Most agencies also undertake some form of formal cost-benefit analysis for any regulation judged to be "economically significant."[83]

Expanding the Role of Cost-Benefit Analysis and Risk Analysis Undermines Public Health

Graham has often suggested that virtually *any* misallocation of the government's risk-reduction resources is, in his words, "statistical murder" — that is, if we choose to put seat belts on school buses instead of to deliver vaccinations we are guilty of murdering children.[84] That is an astonishing overstatement of the ability of economic tools to come up with objective, politically neutral answers.[85]

First, even the agencies' current, limited use of risk and cost-benefit analysis suffers from widespread and persistent difficulties, such as the unreliability of the cost data submitted by the regulated industries, the inadequacy of benefit data (and lack of funding to get better data). Second, there is a basic methodological and political problem in that the costs of regulatory programs typically occur up front, and are concentrated within industries, while benefits accrue over time and are often diffuse.[86] Rather than accounting for these difficulties — and for the risk of political capture by regulated industries — Graham has repeatedly supported legislative proposals that would concentrate "review" power within OMB or other White House offices[87] and give far greater weight to industry compliance costs.[88] Both of these proposals would greatly magnify the serious distortions discussed above.

While Graham is certainly not unaware of the problems in his methodology, his legislative prescriptions are so sweeping that he may as well be. Specific critiques of cost-benefit methodology and its negative implications for public health decision-making include the following:

! **Economic "efficiency" is not the only goal of health and safety regulation.** Relying on an OMB cost-benefit analysis to decide the level of public protection is inappropriate and undemocratic. Cost-benefit analysis is usually confined to producing estimates of economic "efficiency," within the serious limitations of whatever data are available. Because it is an economic tool, it takes little or no account of factors such as fairness and equality, or the value of more intangible resources, such as a pristine environment. The catch is that while Graham and his business friends would like economic considerations to be foremost in the equation, most government agencies are charged by Congress with accomplishing goals that, by their nature, will not maximize "efficiency." For example, requiring compliance with the Americans with Disabilities Act may be economically "inefficient" in the short-term. But it is critical for the access of millions of Americans to basic services such as education, employment and mobility, which can provide a boost to the economy as well as to our goal of living independently in an open, free society. Likewise, establishing safe workplaces can be economically inefficient in the short-term, but employers and society in general reap greater long-term benefits from healthier workers.

! **There are persistent problems in calculating the costs of regulation**. The real "costs" of acting — or of failing to act — are unclear and can be highly controversial.[89] Industries who resist regulation are well known for vastly overestimating the costs of compliance as technology improvements or as "foregone profits" while fighting the regulation, and then finding much more cost-effective ways of complying once the rule is actually in place.[90] While complying with some regulations may be costly for industry, not all costs are passed on to consumers. Some costs may be one-time compliance costs, or the government's regulatory program may even stimulate the economy by creating an incentive for cleaner technologies.[91] In some cases, the gains from regulation-induced technology make operations so efficient that regulation has no cost at all.[92]

! **There are also problems in calculating the benefits of regulation.** We have very limited information about the health effects of many potential hazards, and scientists frequently disagree on the meaning of the data that are available. An EPA official explains: "For the vast majority of chemicals, we simply have very little data on low exposures and non-cancer effects."[93] These "non-cancer" effects include such important health considerations as neurological impacts, fertility problems, birth defects and gastrointestinal ailments.[94] For some substances, such as saccharin, assessments of carcinogenic potency differ by more than 1 billion.[95] As an article in *Business Week* put it: "The inescapable conclusion: Science is decades away from being able to pinpoint the hazards of the thousands of chemicals that permeate our environment."[96]

- **Limited scientific information will yield poor results and require political and ethical judgment.** The value of risk decision-making is limited by the types and quality of the information that researchers use as an input— garbage in, garbage out.[97] In areas where researchers have incomplete information, the costs of gathering better information may be considerable, even prohibitive.[98] In the meantime, delaying action may carry its own risks. At that point, our shared values should inform our public policies, because, as any scientist will tell you, we will need to make a judgment call, informed— but not controlled— by the numbers we have available at the time.[99]

- **Like the underlying science, the risk assessment *process* is also plagued by uncertainties which require policy judgment.** Despite Graham's confident presentation to the media,[100] the risk assessment process can only very rarely produce a single answer. According to an EPA report, "depending on the data selected, scientific assumptions, policy calls and perspectives, different experts or organizations may describe risk differently . . . The risk assessment process has an enormous capacity to expand and contract in line with the available data, science policies, and problems."[101] In fact, the risk assessment process involves many separate levels of uncertainty, and researchers must make or use specific *policy* assumptions at virtually every step — any of which may be disputed.[102]

- **Risks— and their potential harm— are understated in a typical risk assessment.** Risk assessments frequently examine the impact of chemicals such as pesticides in isolation, rather than looking for the cumulative or interactive effect of that substance with other materials in the environment. Additionally, assessments typically measure the effect of a chemical upon the average person, which may not accurately predict its impact upon vulnerable populations such as children or the elderly.[103] When the EPA attempted to solve these problems by using protective assumptions in its risk calculations, business and corporate think tanks attacked the government's efforts as "junk science."[104]

- **Practitioners of risk *assessment* find there is *no consensus* for its proper use in policy making for risk *management*.** The hard sciences are characterized — perhaps even defined— by the methodological consensus that practitioners share: To be a scientist is to use well-recognized and agreed-upon set of research tools. The field of "risk analysis" is too new to have generated this kind of agreement.[105] The National Academy of Sciences' National Research Council, an academic and scientific body which answers to Congress, was appointed to evaluate risk assessment methods and concluded that "among agency decision makers, the courts, Congress, and analysts, there is *no consensus regarding the use of a specific set of analytical techniques for a specific purpose"*[106] — that is to say, there is no consensus on the proper use of the results of risk *assessments* in risk *management*.

! **Every value must be represented in monetary terms, or cannot be calculated.** In order to compare costs and benefits, any risk management scheme employing cost-benefit analysis will require that every social value be given a dollar price. Such calculations have a hard time measuring, for example, the value of plants, animals, unspoiled places, scenic views and our natural amenities such as clean air and water. As Gilbert Omenn, dean of the University of Washington School of Public Health has pointed out, "[t]his makes reliable estimates of the risk of ecosystem damage from global warming, ozone depletion, or ocean pollution hard to quantify."[107] The public and decision makers often choose to value and protect those things regardless of any calculation. But if the end result of a risk management decision is to override a valued piece of protective legislation, pseudo-science "experts" can take over this democratic process. To his credit, Graham has occasionally acknowledged the importance of these so-called "intangibles;"[108] allowing for the possibility that a bill which fails on strict cost-benefit grounds may still be enacted by a regulator who is able to show a compelling reason for the rule outside the cost-benefit calculus. But Graham's partial and somewhat begrudging solution fails to explain why regulators must re-justify an action which a Congressional mandate, and the democratic process, has already more than fully authorized.

! **Risk management involves combining many incompatible factors and values.** Besides the results of risk assessments, decision makers consider information from the fields of *economics, political science, law and other indicators of our social values and concerns, such as directions encoded in statutes written by Congress*.[109] Because of complexities in the data, "best estimates" of various studies are often impossible. A Senate Bill from 1995 that was similar to an idea that Graham has suggested[110] required researchers to combine all of the different risk assessment studies, from potentially different scientific disciplines, into one definitive number that could be used in an overarching risk formulation. Graham also encouraged these "working scientists" to formulate a "central" or "best" estimate by "going beyond the available hard data and *offering speculative forecasts* of what is most likely to prove to be true when the uncertainty about chemical carcinogenesis is resolved."[111] But even if we had that kind of crystal ball, Graham's approach of averaging risk estimates from different fields of the hard sciences just wouldn't work.

As toxicologist Ellen Silbergeld testified before the Senate in 1995:[112]

> Calculating a "central estimate" of risk is like "averaging the winning percentage of all Los Angeles sports teams — basketball, football, hockey, and baseball— *to derive a central estimate of likely success for an athlete playing in that city.*

! **Where risk management involves cost-benefit analysis, it can leave ethical and democratic values far behind.** A common convention in cost-benefit analysis is to cost out the value of a human life *in monetary terms*. To make matters worse, it is also accepted practice to then "discount" the value of a life by the number of years that it will take before the regulation benefits the individual. For example, because there is typically a 30- to 40- year lag time between exposure to a harmful substance such as asbestos, and a person's death from cancer, a life saved 40 years from now is calculated as a mere fraction of that person's present value. This custom is anti-democratic, because it is fundamentally out of step with our support for environmentally sound regulation, and our desire to preserve the earth for our children and future generations.[113]

> *The idea that a harm prevented in the future is **worth less** than a harm prevented today turns the ethical and practical rationale for protective health and environmental regulation on its head.*

! **The basic morality of converting the risks to human beings into monetary values is hotly disputed within political and academic circles**.[114] As Professor Douglas Maclean observed, assigning an exchange price to such benefits of regulation as human health, safety and the environment "is to treat them as commodities when they really have a *different kind of value — a sacred value perhaps* — and should be treated as such."[115] The point is that statistical numbers in the aggregate fail to respect individual rights and the freedom to live free of harm. If the public knew that the federal agencies would be required under Graham to do a "bean-count" that measures corporate profits against public suffering prior to issuing regulations — citizens such as Patricia Pena would likely be outraged.

! **Graham has been criticized for his arrogant and misleading presentation of risk issues.** Risk *communication* has suffered greatly from the one-sided presentation of risk analysis as an "objective" and "scientific" tool. As Law Professor Thomas McGarity, from the University of Texas at Austin, wrote in a direct reference to Graham's work:[116]

> Many professional risk assessors are inclined *arrogantly to dismiss the fears of ordinary people who are actually exposed to risk and to blame the news media and environmental groups for stirring up public anxiety.*

A coalition of environmentalists from Environmental Working Group and the National Campaign for Pesticide Policy Reform wrote to *Dateline* following an appearance by Graham:[117]

> The express intent of the Harvard Center for Risk Analysis (HCRA) is to conduct research and advocacy on behalf of an unproven regulatory model. *Often mistaken for science itself, comparative risk analysis is in fact a policy tool, commonly used today as one of many tools at regulators' disposal . . . .* [HCRA] would make comparative risk analysis the paramount method, even though the practice has been widely questioned . . . [and uses] speculative comparisons of costs and hard-to-measure benefits.

Our legislative and regulatory processes wisely incorporate many values, as well as ethical and moral concerns, that have little or nothing to do with cost-efficiency. And our experience shows that democratic institutions *should* respond to the developing concerns of the public, regardless of the prevailing fads in economic analysis or the arrogance of industry-funded "experts" — or the government's legitimacy to make decisions on behalf of the public could be threatened. Enlarging the role of risk "experts" would merely exacerbate current difficulties regarding public access to the regulatory process. As Jay Wexler, a Law Professor at Duke University, noted:[118]

> Our current risk management system is not democratic. Despite a few examples to the contrary, laypeople are generally excluded from the risk assessment process, and their opinions are generally ignored by risk managers. The process is enveloped in secrecy, and nonexperts provide little input into the many crucial decisions made every day by administrative decisionmakers. This lack of popular access to the process severely undermines both the efficacy and the legitimacy of the regulatory system.

In addition to being undemocratic, using economic analysis to vote regulations up or down would create another layer of unnecessary bureaucracy, would add very little useful information to the process and could threaten much-needed health, safety and environmental protections.

Graham's Policy Recommendations Block A More Protective Approach to Public Health

One casualty of Graham's notion that we should rank all risks and put a premium on cost-efficiency is that his emphasis forecloses more just and sound approaches to science and health policy debates. *There is a solution to the bottomlessness and compounded uncertainty of a risk-to-risk comparison.* Rather than asking — "what is a 'normal' level of acceptable risk?" — some groups of environmentalists and policymakers apply a more protective policy, used in Europe, that is called the "precautionary principle."

The precautionary principle suggests a paradigm shift in regulation to a "safety first" approach, and away from the cost-benefit straitjacket. Research in risk perception has persistently demonstrated that the public is far more concerned with prevention (and preventative action) than are the so-called "experts."[119] The precautionary principle follows the public's intuition, stating that: **"***When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically."*[120]

This age-old wisdom is also captured in the adage: *an ounce of prevention is worth a pound of cure.*[121]

The precautionary principle is grounded in the following ethical and political concepts:

- People have a duty to take anticipatory action to prevent harm.
- The burden of proof lies with the proponents of a technology, not with the public.
- Before using a new technology, process, or chemical, or starting a new activity, people have an obligation to examine a full range of alternatives, and an obligation to address the certainty or uncertainty associated with understanding the threats of harm from a proposed activity or substance.
- Decisions applying the precautionary principle must be open, informed, and democratic and must include affected parties.

This approach is 180 degrees away from Graham's approach, yet its philosophy is the underpinning of many of the regulatory statutes that Graham seeks to undermine, such as the U.S. pre-market testing of pharmaceuticals. Because of the threat that precautionary thinking poses to industries' power over regulatory policy, Graham has already hatched a plan to hijack the principle. According to the HCRA Web site: "In the next two years, Center Director John Graham is planning to write a new, scholarly book that will *redefine the precautionary principle with insights from disciplines of decision analysis, risk analysis and cost-benefit analysis.* This refined version of the precautionary principle will be compared, in the context of real-world case studies, to the more simplistic versions of the principle now being advocated in policy debates."[122]

The workshop on the precautionary principle that was held by HCRA in June 1999 was supported in part by grants from the American Chemistry Council, the Chlorine Chemistry Council, and the Koch Foundation, a fund backed by Koch Industries, the nation's largest privately held energy and oil company.[123] Just as industry has managed, through manipulation of terms like "sound science," to co-opt risk assessment and cost-benefit analysis, Graham evidently hopes to co-opt the language of the precautionary principle while at the same time gutting its animating concepts.

Once again, however, Graham is speaking mainly for corporate self-interest. In contrast, Republicans such as Bush's new head of EPA, Christine Todd Whitman, have publicly urged the further application of the precautionary principle in environmental policy: [124]

> We must acknowledge that uncertainty is inherent in managing natural resources, recognize it is usually easier to prevent environmental damage than to repair it later, and *shift the burden of proof away from those advocating protection toward those proposing an action that may be harmful.*

IV. GRAHAM'S PROBLEMATIC HISTORY OF NON-DISCLOSURE

Graham is a leading spokesman to the media on regulatory issues, yet he consistently downplays the risks that are the subject of the discussion. As he recommended to attendees at a Heritage Foundation seminar in 1996, Graham frequently disputes the need for a particular regulation indirectly — by claiming that *X* is not the *best* possible use of our resources.[125] He asks, in essence, why should we be concerned with toxic chemicals from a Superfund cleanup site when we could pay for cancer screening tests instead?[126]

When Graham appears in print or on television, there is frequently no disclosure of the fact that much of his Center's funding is derived from industry sources. More specifically, it is also unmentioned that the regulation being discussed could directly impact the companies that financially support his Center.[127]

There are three distinct problems with Graham's statements to the media along these lines. The first is that his (or the reporter's) failure to disclose the funding relevant to the subject of the article is very misleading, given Graham's consistent depiction as a Harvard-based academic presumed to be a neutral "expert" on risk-related issues. The second problem is that many of the tradeoffs Graham discusses are false dichotomies— of course we can, and do, choose to worry about both poisoning prevention and poisoning from petrochemicals in our water or air (*see* Part Three, Science Sellout #4).

The third problem is that risk management would have a hard time doing what Graham promises it can. As Law Professor Thomas McGarity put it, the notion that risk-benefit or cost-benefit analysis is "ready for prime time" is just wrong on the facts:[128]

> It is simply wrong to suggest, . . . as do regulatory reformers, that a consensus exists that thousands of lives or billion of dollars could easily be saved if Congress and the agencies merely made more effective use of cost-benefit analysis in setting priorities.

The following chart depicts some of the phony risk tradeoffs that Graham has promoted over the past decade and shows whether Graham's pertinent funders were disclosed in the coverage.[129] This list addresses specific, potential conflicts of interest. However, we note that to the extent that Graham's comments are about "risk" or "fear" in general, they serve the anti-regulatory purposes of most of his funders.

Public Citizen called HCRA to inquire about the timeliness of the Center's posted list of funders, and the person at HCRA who answered the phone stated that the list on the HCRA Web site was a "cumulative" list of all funders of HCRA, both past and present.[130] Thus, we are unable to define whether Graham's funding from a particular source was contemporaneous with his comments. Also we found at least one source that was missing: it is well-documented that HCRA accepted $300,000 in the year 2000 from AT&T Wireless Communications for the cell phone study discussed in Part Two, Case Study #2, yet it is not listed on the HCRA Web site as providers of either restricted or unrestricted funds.

A Comparison of Graham's Risk Tradeoffs and the Corporations That Fund the Harvard Center for Risk Analysis

Source, date, and title of news article	Regulatory subject/s discussed in the article	The regulatory programs that Graham recommends instead	Sources of HCRA funding relevant to the article's subject	Disclosure of any of Graham's funding sources?
Dolores Kong, "Scientists Warn Against Panic Over Electromagnetic Field Effect,"*The Boston Globe*, Nov. 13, 1992.	Electromagnetic fields (EMFs) and child leukemia. The article also mentions studies that have suggested a link between EMFs and brain tumors and leukemia from cell phones, electric blankets, television and hair dryers. The article discussed new Swedish research indicating that children who live near high-voltage power transmission lines had 4 times the normal risk for leukemia.	Bicycle helmets, poisoning prevention, and immunization The article quotes Graham as saying that "the highest priority for our children should be preventing the known risks before we become paralyzed by speculation. So let's get on with bicycle helmets, poisoning prevention, and immunizations." The article also states that "in the spectrum of risk, getting cancer from electromagnetic fields would be slim, even if a connection were proven, say scientists." [This is because childhood cancer is rare in general— an observation which does nothing to counter the prospect of *additional* risks posed by EMFs.]	Carolina Power and Light, Charles G. Koch Foundation, Edison Electric Institute, Electric Power Research Institute, New England Power Service, New England Electric System, Union Carbide Foundation, Westinghouse Electric Corporation, Emerson Electric, General Electric Fund	**No Disclosure**
Child Health Alert, Inc., "More Worrisone News About Electromagnetic Fields," *Child Health Alert,* Dec. 1992.	Electromagnetic fields According to this article, the Swedish EMF findings "produced anxiety ranging from caution to outright panic among those who care for children."	Preventable accidents, poisonings The article states, "Another perspective, and one we've shared for some time, is provided by Dr. John Graham of the Harvard School of Public Health . . . he notes that compared to the number of children who die from preventable accidents and poisonings, leukemia claims far fewer lives," and quotes Graham as above in *The Boston Globe*.	Carolina Power and Light, Charles G. Koch Foundation, Edison Electric Institute, Electric Power Research Institute, New England Power Service, New England Electric System, Union Carbide Foundation, Westinghouse Electric Corporation, Emerson Electric, General Electric Fund	**No Disclosure**
J. Madeleine Nash, "Keeping Cool About Risk," *Time*, Sept. 19, 1994.	Dioxin and Alar (a pesticide), radon, asbestos **Not mentioned in the article**: The 1994 EPA draft Reassessment had concluded that dioxin was an extraordinarily potent environmental hormone, caused a wide variety of toxic effects, and that background exposures may already be causing health effects.	Vaccinations, bicycle helmets The article quotes Graham, "Phantom risks and real risks compete not only for our resources but also for our attention . . . It's a shame when a mother worries about toxic chemicals, and yet her kids are running around unvaccinated and without bicycle helmets."	Dow (the leading producer of dioxin), Chlorine Chemistry Council, CIBA-Geigy, General Electric, DuPont, Georgia-Pacific, Hoescht-Celanese, ICI Americas, Kodak, Monsanto, Olin, BASF, ARCO Chemical Co,, FBC Chemical Corp., 3M **See below in chart for a complete list of dioxin producing companies that fund HCRA.**	**No Disclosure** In fact, Graham was actively and directly critical of the EPA's report during his presentations to the EPA's Reassessment Science Advisory Board.[131] And a month prior he had organized a high-profile conference on drinking water and health risks financed by the Chemical Manufacturer's Assoc. and the Chlorine Chemistry Council.[132]

Source, date, and title of article	Regulatory subject/s discussed in the article	The regulatory programs that Graham recommends instead	Sources of HCRA funding relevant to the article's subject	Disclosure of any of Graham's funding sources?
Patricia Braus, "Everyday Fears,"*American Demographics*, Dec. 1994.	Benzene and agricultural pesticides Discusses the general topic of risk, and "misconceptions" about risk, from the perspective that expert risk assessment should guide public policy.	Vaccinations, bicycle helmets, trauma centers To quote: "Harvard's John Graham criticizes what he calls excessive regulation of industrial substances such as benzene and certain agricultural pesticides. He believes that more lives would be saved if regulators increased funding for trauma facilities that help victims of traffic accidents and violent crime. He also favors vaccination, expanded use of bicycle helmets, and other preventive actions that benefit those who have the most living to lose — children."	American Petroleum Institute, Amoco Corporation, ARCO, Ashland Inc., Foundation, BASF, BP America, Inc., Chevron Research and Technology Company, CITGO Petroleum Corporation, Exxon, Mobil Foundation, Inc., Oxford Oil, Oxygenated Fuels Association, Shell Oil Company Foundation, Unocal	**No Disclosure**
Curt Suplee, "Assessing the Risk in Contract's 'Cost-Benefit' Curb on Regulations," *Washington Post*, Feb. 28, 1995.	Benzene in outdoor air, pesticides, fuel economy standards. The article was about the proposed risk assessment "regulatory reform" bill in general.	Community violence reduction, lead paint from old homes, increasing preventive health services — *and airline safety* In response to an EPA rule concerning a one in a million *additional* chance of getting cancer from pesticides, Graham argued that "a baby born today, at current mortality rates, incurs a risk of four in a million of being struck and killed on the ground by a crashing airplane."	American Petroleum Institute, Amoco Corporation, ARCO, Ashland Inc., Foundation, BASF, BP America, Inc., Chevron Research and Technology Company, CITGO Petroleum Corporation, Exxon, Mobil Foundation, Inc., Oxford Oil, Oxygenated Fuels Association, Shell Oil Company Foundation, Unocal	**No Disclosure**
Emily T. Smith, "Voodoo Regulation?" *Business Week*, Mar. 13, 1995.	Benzene, environmental regulation in general. The article discussed whether risk assessment-based regulatory "reform" should be enacted.	Screenings for breast and cervical cancer "This country, says Graham, "is paranoid and neglectful about risk at the same time."Graham also said on the regulatory rollback bill: "We need a bill if we want to improve risk assessment . . .it will force the bureaucracy and private sector to improve the process."	American Petroleum Institute, Amoco Corporation, ARCO, Ashland Inc., Foundation, BASF, BP America, Inc., Chevron Research and Technology Company, CITGO Petroleum Corporation, Exxon, Mobil Foundation, Inc., Oxford Oil, Oxygenated Fuels Association, Shell Oil Company Foundation, Unocal	**No Disclosure**
"Science Advisory Board Questions Major Parts of EPA Dioxin Report," Air Water Pollution Report, May 22, 1995.	Dioxin. The subject was the Science Advisory Board's response to EPA's 1994 draft risk assessment on dioxin.	Graham generally criticized the EPA's findings: "The report overstates the carcinogenic risks that dioxins and related compounds may pose and fails to seriously analyze uncertainties about these chemicals and to show how incremental changes in exposure could affect health, said John Graham."	Philip Morris documents specifically suggested that the EPA's approach to risk assessment in areas other than tobacco should be criticized. **HCRA is funded by 48 dioxin producers. See below.**	**No disclosure**

Source, date, and title of article	Regulatory subject/s discussed in the article	The regulatory programs that Graham recommends instead	Sources of HCRA funding relevant to the article's subject	Disclosure of any of Graham's funding sources?
Stuart Anderson ("policy director" of the Alexis De Tocqueville Institute), "Measuring the cost of regulation: How to save More Lives for the Money," *The San Diego Tribune*, Oct. 1, 1995.	Fuel economy standards	Graham suggests that fuel economy standards have resulted in smaller cars which cause 3,900 additional traffic fatalities and 20,000 serious injuries.	Amoco Corp., American Petroleum Institute, Bethlehem Steel Corp., BP America, Chevron, CITGO Petroleum, Exxon, Ford Motor Co., GM, Mobil, Oxford Oil, Oxygenated Fuels Assoc., Shell Oil, Texaco, Union Carbide, Unocal, Automobile Manufacturers Assoc.	**No disclosure**
David Lore, "Determining Toxic Risks is Costly Voodoo, Lawyer Says," *The Columbus Dispatch,* Nov. 24, 1995.	Toxin control rules (chemicals)	Health care and injury prevention Graham says, "The failure to compare the costs of toxin control rules to rules on health care and injury prevention and to allocate resources based on those comparisons is resulting in 'statistical murder.'"	Dow, DuPont, American Chemistry Council., Millenium Chemical Co., Monsanto, Atlantic Richfield Corp., ARCO Chemical Co., FBC Chemical Corp., Eastman Chemical Co., Louisiana Chemical Co., Air Products and Chemicals, Inc. Chlorine Chemistry Council, Rohm and Haas Co., and many others	**No disclosure**
Scott Allen, "US Accepts $129 M for Cleanup of Love Canal; Some Say Set a Wrong Course," *The Boston Globe*, Dec. 22, 1995.	Superfund cleanup of Love Canal paid for by Occidental Chemical Corp. 20,000 tons of chemicals were dumped into Love Canal in Niagara Falls, NY from 1942 to 1953.	Violence prevention and pregnancy prevention. "'Does it really make sense to spend, say $50 million on speculative risks when you don't have the resources to provide violence prevention or pregnancy prevention in the schools?' asks John Graham . . . Graham said his review of more than 100 Superfund cases found 'a basic reluctance to apply basic principles of cost-benefit analysis.'"	Graham generally attacked the Superfund program, which affects many funders. Specifically, according to its Web site, Occidental's partners in its petrochemicals operations are Lyondell Chemical Co. and Millenium Chemicals. Both are donors to HCRA.	**No disclosure**
Rick Weiss & Gary Lee, "Pollution's Effect on Human Hormones," *The Washington Post*, Mar. 31, 1996.	Endocrine disruptors, DDT, PCBs, DDE, pesticides, dioxin (also mentions electromagnetic fields and global warming) The article described reactions to the publication of *Our Stolen Future*, a book on endocrine disruptors, which detailed the evidence that they may cause reproductive problems, childhood hyperactivity and a decline in global intelligence.	"'True or not, the idea that chemicals are wreaking havoc with our reproductive systems has all the elements needed to provoke a public panic,'said John Graham." A quote from Graham also ended the article: "'We are just beginning to understand why we are so paranoid about some risks and tragically neglectful of others,' [Graham] said. 'But in the final analysis, it often comes down to, Who do we trust? *And that makes risk management very difficult these days, because people aren't inclined to trust anyone*.'"	**American Crop Protection Association**, **American Chemistry Council (formerly the Chemical Manufacturers Association), Chlorine Chemistry Council**, Dow (the leading producer of dioxin), CIBA-Geigy, General Electric, DuPont, Georgia-Pacific, Hoescht-Celanese, ICI Americas, Kodak, Monsanto, Olin, Kraft Foods, Frito-Lay, PepsiCo Inc., Coca-cola, DowElanco, Grocery Manufacturers of America, International Paper, National Food Processors Association	**No disclosure** The article also described the chemical industry's proactive plans to "counterattack against the issue of endocrine disruptors" in anticipation of the book's publication: "Among those in the huddle were the **Chemical Manufacturers Association, the Chlorine Chemistry Council . . . and the American Crop Protection Association**."

Source, date, and title of article	Regulatory subject/s discussed in the article	The regulatory programs that Graham recommends instead	Sources of HCRA funding relevant to the article's subject	Disclosure of any of Graham's funding sources?
John Graham, "There's a Deadly Confusion About Health Risks,"*The Houston Chronicle*, Nov. 29, 1996.	Electro-magnetic fields (EMFs), silicone breast implants, Superfund and abandoned industrial waste sites, cancer	Bicycle helmets, injury prevention (accidental crashes and falls), lead in peeling paint [removal is mostly the responsibility of individual landowners], firearm violence, encouraging regular physical exercise	On EMFs only: Edison Electric Institute, General Electric, Electric Power Research Institute, Emerson Electric, New England Power Service, England Electric System	**No disclosure--** Note that Graham is the author
Steve Schenck, "The Chemical Flood," *Alt HealthWatch*, Oct. 1996.	Endocrine disruptors, including dioxin, and cosmetics, DDT, PCBs, Bisphenol-A (used in canned foods and dental sealants), Phthalates (plastics), estrogen pills, hormone replacement therapy	Said Graham, "'We are just beginning to understand why we are so paranoid about some risks and tragically neglectful of others,' [Graham] said. 'But in the final analysis, it often comes down to, Who do we trust? And that makes risk management very difficult these days, because people aren't inclined to trust anyone.'"	Dioxin-Producing Companies:[133] Air Products and Chemicals Inc., Eastman Kodak Company, WMX Technologies Inc., Fort James International Paper, The James River Corporation Foundation, Mead Corporation, Potlatch Corporation, Westvaco Corporation, Boise Cascade, Georgia Pacific, Asarco Inc., Bethlehem Steel, Inland Steel, National Steel Nippon Yakin Kogyo, Alcoa Foundation, Reynolds Metals Company Foundation, Cement Kiln Recycling Coalition, American Crop Protection Association, Arco Chemical Corporation, Ashland Inc. Foundation, BASF, Cabot Corporation Foundation, Chemical Manufacturers Association, (aka American Chemistry Council), Chlorine Chemistry Council, CIBA-GEIGY, Cytec Industries, Dow Chemical Corporation/Union Carbide, DowElanco (Dow AgroSciences), DuPont Agricultural Products, FBC Chemical Corporation, FMC Corporation, Hoechst AG, ICI Americas, Louisiana Chemical Association, Lyondell Chemical, Olin Corporation, 3M, Praxair Inc., The Geon Company, Rohm & Haas Company, Petroleum Industry, American Petroleum Institute, Amoco, BP America Inc., Charles G. Koch Foundation, Chevron Corporation CITGO Petroleum, ExxonMobil, Oxford Oil, Oxygenated Fuels Association, Shell Oil Foundation, Texaco Foundation, Unocal Corporation, Edison Electric Institute, Electric Power Research Institute, General Electric Foundation, Monsanto Company, New England Power Service, Westinghouse Electric Corporation	**No Disclosure**

Source, date, and title of article	Regulatory subject/s discussed in the article	The regulatory programs that Graham recommends instead	Sources of HCRA funding relevant to the article's subject	Disclosure of any of Graham's funding sources?
Hilary Shenfield, "The Environment Often Seems Far More Hazardous To Your Health Than It Really Is," *Chicago Daily Herald*, Mar. 15, 1999.	The topic was our irrational "fears" — mentions our fears of toxins and chemicals in general, toxic waste, creosote (a coal-byproduct), pesticides, EMFs, power lines, tap water, cell phones, Alar, benzene, EDB, asbestos, amalgam dental fillings	Graham said, "We should strive to spend our *mental health budget* on prevention of the big killers and not be distracted by the syndrome of the month." ACSH also weighed in: "'We have a limited capacity for dealing with health scares,' said Jeff Steier, associate director of ACSH. 'So we have to prioritize.'"	Pesticides, power lines, benzene and EMFs are elsewhere in the table. Creosote from coal: 3M, American Petroleum Institute, BASF, Amoco, BP America, Koch Foundation, CITGO Petroleum, Exxonmobil, Unocal, Shell Oil	**No disclosure of HCRA or ACSH sources** This article makes repeated use of especially suspect conclusions. One example suggests that asbestos should not be feared (i.e., regulated) because its removal can sometimes stir up greater level of the toxin.
Noah Adams, "EPA Report on Dioxin is Released and Confirms a Cancer Risk Exists to All Americans," *All Things Considered, National Public Radio*, June 15, 2000.	Dioxin. EPA scientists found dioxin could cause the average American "an *additional* lifetime risk of cancer as high as one in a hundred."	The story continued, "That would put dioxin *on par* with other common risks," said Graham. 'The average American in their lifetime has about one chance in a hundred of dying in a car crash. . .So this type of risk they're talking about here, if true, would be a significant risk, but it would not be something that would be out of the norm of what people experience in daily life.'"	Dow (the leading producer of dioxin), Chlorine Chemistry Council, CIBA-Geigy, General Electric, DuPont, Georgia-Pacific, Hoescht-Celanese, ICI Americas, Kodak, Monsanto, Olin Corp., American Crop Protection Association, American Chemistry Council. **HCRA is funded by 48 dioxin producers.**	**No disclosure** And the risks are cumulative (not merely "on par"). Although Graham did not say so, according to these data, we now know that we have *both* a 1 % chance of dying in a car crash *and* a 1 % chance of contracting cancer from dioxin.

FOLLOWING THE MONEY: GRAHAM'S AFFILIATIONS WITH OTHER ORGANIZATIONS

There is an interlocking network of "think tanks," pseudo-science industry front groups and university-based institutions that provide the intellectual and public relations underpinning to the corporate anti-regulation campaign. Graham has played a critical role in this network and is one of its most consistent public voices.

Industry's funneling of tax-exempt dollars into this system of organizations was at least partially outlined in a report by Sally Covington of the Center for Responsive Philanthropy in 1997 entitled *Moving A Public Policy Agenda: The Strategic Philanthropy of Conservative Foundations*. As early as 1981, journalist Karen Rothmeyer described the hydra-headed nature of these groups and the overwhelming influence of their corporate funders in setting the terms of the debate in an article called "Citizen Scaife" published in the *Columbia Journalism Review*.[134]

Below is a list of Graham's affiliations. Graham's corporate funders also financially support many other organizations that use Graham's studies in their public policy work. Moreover, the companies promote his research and analysis on their Web sites and in public relations materials. It is worth noting that many of these organizations are the same companies that support HCRA.

Information is taken from the organizations' 990 tax forms and their official Web sites, unless otherwise noted.

The American Council on Science and Health (ACSH)

Graham serves on the ACSH Board of Scientific and Policy Advisors and is extensively quoted in the group's campaigns. ACSH defines itself as a "consumer education institution concerned with issues related to food, nutrition, chemicals, pharmaceuticals, lifestyle, health and the environment" and cites its mission as promoting sound science and the free enterprise system.[135]

ACSH Media updates from 1997 to the present include the following titles:

- Why the National Toxicology Program Cancer List Does More Harm Than Good
- The Fuzzy Science Behind Clean-Air Rules
- Eat Beef, America
- Evidence Lacking That PCB Levels Harm Health
- At Christmas Dinner, Let Us Be Thankful for Pesticides and Safe Food

Funding for ACSH from 1986-1999 was provided by donations from:[136] American Cyanamid, American Meat Institute, BP Amoco, Anheuser-Busch, Archer Daniels Midland, Boise Cascade, Burger King, Chevron, Ciba-Geigy, Coca-Cola, Coors, Dow Chemical, DuPont, Exxon, Ford Motor Co., General Mills, General Motors, Kraft General Foods, National Agricultural Chemicals Association, Nestle, Monsanto, Pepsi-Cola, Shell Oil, Sugar Association, Texaco Foundation, Union Carbide Corp., Uniroyal Chemical, USX Corp., ConAgra Foundation Inc., Abbottt Laboratories, Achelis Foundation, Bristol-Myers Squibb Foundation, GE Fund, Kirby Foundation, Inc., The Robert Wood Johnson Foundation, Rollin M. Gerstacker Foundation, Crystal Trust, Kellogg's Corporate Citizenship Fund, Klingenstein Fund Inc., National Starch and Chemical Foundation, Olin Foundation, Procter & Gamble Fund, Samuels Foundation, Starr Foundation, Leavey Foundation, Sarah Scaife Foundation, and the David Koch Charitable Foundation.

The Advancement of Sound Science Coalition (TASSC)

Graham served on the policy advisory board of TASSC and was extensively quoted in the group's media efforts.[137] The group operated from 1993 to 1998. TASSC argued that federal and local environmental public policy is based on "junk science." The group was funded by start-up money from Philip Morris and run by the public relations firm APCO & Associates, a Washington, D.C., public relations firm that generates positive corporate spin by founding front groups and fake grassroots organizations.[138] TASSC was involved in Philip Morris's international public relations effort through a European sister organization, as documented by Elisa Ong in *The Lancet*.[139]

From 1993 to 1996, according the group's press release, TASSC engineered counter-spins on nutrition issues raised by the Center for Science in the Public Interest and a pesticide study by Environmental Working Group, and defended the genetically engineered Flavr Savr tomato as well as the use of bovine growth hormones.[140]

TASSC eventually grew to over 400 corporate "members" including: 3M, Amoco, Chevron, Dow Chemical, Exxon, General Motors, Occidental Petroleum, Santa FE Pacific Gold Corp., Louisiana Chemical Assoc., National Pest Control Association, Lawrence Livermore National Laboratory, Lorillard Tobacco, W.R. Grace & Co. and Procter & Gamble.[141]

Public Health Policy Advisory Board (PHPAB)

Graham serves as a "distinguished fellow" on the PHPAB. According to the group's tax forms, in 1997, he received $8,333 in compensation for his service and another $30,000 in 1998. PHPAB is funded primarily by industry sources such as the American Chemistry Council (formerly the Chemical Manufacturers Association), Chlorine Chemistry Council, and Procter & Gamble as well as grants from a few government agencies.[142]

Biological Effects of Low Level Exposures (BELLE)

Graham is a member of the advisory committee of Biological Effects of Low Level Exposures (BELLE), a group that claims to evaluate the existing scientific literature on the biological effects of low doses of chemicals and radioactivity. In particular, the group emphasizes "paradoxical dose-response relationships," in which, it is argued, increasing the concentrations of a toxin do not produce a proportional increase in biological harm. In 1998, Exxon provided $75,000 for BELLE activities.

Society for Risk Analysis (SRA)

Graham served as elected president of the SRA from 1995-1996. Following his term as president, he became a "Fellow of the Society." The Society for Risk Analysis posted an Internet list of corporate "sustaining members" that includes Amoco, the Chemical Manufacturing Association, Chevron, DuPont, Exxon, Procter & Gamble and the "Sapphire Group," an organization composed of chemical, cosmetic, food and health care interests.[143]

National Council on Radiation Protection and Measurements (NCRP)

Graham is a year 2000 "Council Member" of NCRP, which seeks to formulate and widely disseminate information, guidance and recommendations on radiation protection and measurements which represent the consensus of leading scientific thinking." NCRP's current corporate sponsors include 3M, Commonwealth Edison, Consolidated Edison, Duke Power, Florida Power Corporation, ICN Biomedicals, Inc., Landauer, Inc., New York Power Authority, Nuclear Energy Institute, Nycomed Amersham Corporation, and Southern California Edison Corporation. Past sponsors include Motorola Foundation, Inc.

American Enterprise Institute (AEI)-Brookings Joint Center for Regulatory Studies

Graham is a member of the Center's Advisory Board.[144] Established by the American Enterprise Institute in conjunction with the Brookings Institute, the AEI-Brookings Joint Center for Regulatory Studies' primary purpose is to "provide objective analysis of existing regulatory programs as well as new regulatory initiatives." Donors to AEI and the Joint Center include many corporate-backed foundations, including the Olin Foundation, Charles Stewart Mott Foundation, Sarah Scaife Foundation, Castle Rock Foundation, Bradley Foundation, Carthage Foundation, Earhart Foundation, Smith Richardson Foundation, and the Phillip M. McKenna Foundation.[145] A partial list of corporate sponsors from 1998 Brookings annual report includes Alcoa, Archer Daniels Midland, AT&T, Exxon, KPMG Peat, Ford, Chase Manhattan, Toyota, Johnson & Johnson, E.I. du Pont de Nemours, Microsoft, Texaco, Pfizer, CIGNA Corp., Mobil, Coca Cola and Boeing.

Ketchum Communications

Graham serves on Ketchum's advisory board of consultants in legal media relations.[146] Ketchum is "a public relations and marketing agency which specializes in corporate and product positioning." Case studies on the company's Web site include work for BP Amoco, British Telecom, Nokia, Dow Chemical, Esso, ITT Industries, and American Dairy Brands.

Wharton School of Business Risk Management and Decision Processes Center, University of Pennsylvania

Graham is on the Advisory Committee for the Center. Corporate "Associates" of the Wharton Risk Management Center include: American Re-Insurance Co., Dow Chemical, Du Pont, Elf Atochem North America, ECS, INc., ICI Americas, Inc., Institute for Business and Home Safety, Price Waterhouse, Rohm and Haas Co., State Farm Fire and Casualty Co., Sun Co., Inc., Union Carbide, Zurich Insurance Co., and Air Products and Chemicals.

PART TWO

Case Study #1:
GRAHAM JOINS THE CAMPAIGN TO DEFEND SECOND-HAND SMOKE

Where there's smoke. . .

Thousands of internal business documents belonging to Philip Morris were made public as part of the tobacco litigation settlement agreements and are available over the Internet.[147] Public Citizen's research shows that in the 1990s, Philip Morris was extremely concerned about the effect of scientific findings that "environmental tobacco smoke" (ETS), also known as second-hand smoke, was dangerous to the non-smoking public. Philip Morris realized that non-smokers would be angered by the news that their health was being endangered by smokers, and that the imposition of bans on smoking in public areas and workplaces would reduce the use of their products and be a legal and public relations disaster for the industry.

Hundreds of Philip Morris strategy documents reflect a highly coordinated effort to fund more industry-friendly "science," to "create and exploit" contacts at the Office of Management and Budget (OMB) and OSHA, and to influence the ETS debate and regulatory efforts at every conceivable level.[148] Philip Morris established an internal task force to manage these efforts, calling it the "Corporate Affairs Scientific Department."[149]

Philip Morris and the Push for Risk Assessment*:* **"We are right! We shall fight!"**

A Philip Morris document on ETS strategy from this period listed these items:[150]

Objectives

- Protect the franchise.
- Discredit the EPA report on ETS specifically and the EPA generally.
- Demonstrate the scientific weaknesses of the EPA conclusions in consequential terms.
- Put the risk in perspective.

Recommendations

- Establish the strongest possible input into OSHA deliberations.
- Point to EPA excesses and mistakes unrelated to tobacco.
- Demonstrate EPA "corruption."
- Re-evaluate the risk assessment process.
- Assess scientists' availability for public service. The D-Day precedent of making scientists available should be continued and expanded, with scientists playing not only a reactive role, but a pro-active one as well. This is our best bet for credibility.
- Discuss additional scientific recruitment/inoculation. Explore a broader base of potential scientific allies, some of whom would speak to the issue of ETS, others who would address science, scientific methodologies, the science at EPA, and risk assessments in a broader sense. This is where we start to put the science of EPA into perspective.

The memo also noted that a possible avenue of defense for Philip Morris was litigation: *"Sue the Bastards! . . . In [litigation] is defined the substance and the symbolism of our principal message: We are right! We shall fight!"*[151]

One overriding purpose of Philip Morris's efforts on risk assessment was to interfere in any way possible with the anticipated results of an ongoing EPA test of the carcinogenicity of ETS for nonsmokers. Philip Morris predicted unfavorable results from EPA's tests, and was busy trying to prevent or change the verdict of the tests by changing in mid-stream the risk assessment rules that would have to be used by the agency. As one memo on ways to influence EPA's determination stated, " the key question is — which approach is most likely to prevent classification of ETS as a class A carcinogen?"[152]

Risk Assessment and the Bush I Executive Order

As an integral part of this campaign, in 1992 Philip Morris was tracking political developments with regard to a sweeping "risk assessment" executive order that was awaiting signature by then-President Bush.[153] The executive order would have imposed a requirement on all government agencies to decide the validity and priority of regulatory proposals in terms of rigid risk estimates and would have mandated clearance of all regulations through a centralized office, in violation of many agencies' direct authorization from Congress to act to protect the public health and safety.

Philip Morris was working closely with governmental officials on the precise terms of the executive order. Corporate documents reflect ongoing conversations between Philip Morris and Thorne Auchter, who was a former Administrator of OSHA and was appointed in 1992 to the President's Risk Assessment and Management Commission and has been affiliated with the anti-regulation group, the Institute for Regulatory Policy (IRP).[154] According to *PR Watch*, Philip Morris had given Jim Tozzi, of Multinational Business Services, $880,00 to establish IRP, a non-profit "think tank "which would work with both Philip Morris and APCO & Associates.[155]

Philip Morris documents reflect a *monthly* donation to IRP of $25,000 in 1993, and record gifts of $40,000 per month for Multinational Business Services (MBS), an organization headed by Auchter's close associate Jim Tozzi, who was working on "the need for scientific standards" in the areas of ETS, radon in water, chlorinated water and electro-magnetic fields.[156] According to *PR Watch*, "Junk Man" Steven Milloy also worked with Tozzi at MBS.[157]

While still at IRP, Auchter wrote to Philip Morris officials on the letterhead of his "Coalition for Uniform Risk Evaluation (CURE)" to discuss a White House meeting that he had attended regarding the 1991 draft of the executive order. Auchter's 1991 memo contains his handwritten notes addressed to Philip Morris officials, in which he points out an inconsistency in the text of the draft executive order and suggests that the highlighted language might enable Philip Morris to re-open the EPA's pending risk assessment on ETS.[158]

Graham's Associations with Thorne Auchter, Philip Morris and Regulatory "Reform"

Mayada Logue, a Philip Morris official assigned to risk assessment/ETS issues from the company's "Worldwide Regulatory Affairs" group, reported on her monthly activities for February 1992. Philip Morris officials were evidently very interested in risk assessment. She provided the details of several ongoing studies of ETS and cancer risks, and indicated her concern that one study might demonstrate that ETS does incur serious health problems.[159]

Logue also wrote that a comprehensive "Risk Assessment Project" notebook "describing the activities of approximately 40 groups involved in risk assessment" had been completed, and mentioned that she had gone to a lunch meeting with John Graham. At their meeting, Graham had provided Logue with "specifics" about two meetings that he recently had. One of Graham's meetings was with "Thorne Auchter concerning the Executive Order and the other [was] with [C.] Boyden Gray, President Bush's General Council."

Both Auchter and Gray were very involved with the early and mid-90s regulatory "reform" efforts. Gray held a position on Reagan's regulatory "relief" commission and as White House Counsel for Bush I.[160] Gray now serves on HCRA's Executive Council, and he is an adviser on the transition of Bush II.

Logue's memorandum continued:[161]

> John Graham is writing a book about the unintended risks we take when attempting to avoid other risks. There will be a chapter on smoking in the book. He said that most of the information in that chapter is from the Surgeon General's Report and asked if we would review it for accuracy. Bob Pages has agreed to review it.

Pages was an employee of Philip Morris in the company's "Scientific Affairs" division. One may wonder why a corporate executive from Philip Morris was asked by Graham to review his research on ETS.

Graham to Philip Morris: *Please Send Cash*

It appears that Graham first became involved with Philip Morris in October 1991. On October 18 of that year, he called Logue to set up a meeting in Washington, and the meeting was duly scheduled. On October 21, Graham solicited donations from Philip Morris to HCRA.[162] Graham's letter noted that the Center had "major projects underway in carcinogen classification, risk assessment, public health priorities, and the use (and misuse) of risk numbers in environmental legislation."

Graham went on:[163]

> The Center has been launched primarily with gifts from the following corporations: the Amoco Company, Bethlehem Steel Corporation, British Petroleum, Chevron Corporation, The Coca Cola Company, Dow Chemical Company, Eastman Kodak Company, Exxon Corporation, General Electric Corporation, General Motors, Inland Steel Industries, Merck and Company, Mobil Oil Corporation, the Monsanto Company, Pepsico Incorporated, Rohm and Haas Company, Texaco, Union Carbide Corporation, and Westinghouse Corporation.

Stating that the "Center is now looking to a broader base of industrial sources to supply critical funding for the years ahead," Graham asked for a meeting with the Vice President of Government Affairs at Philip Morris and the sum of $25,000:[164]

> in financial support in 1992 and 1993 that can help the Center expand its public policy activities. *It is important for me to learn more about the risk-related challenges that you face.*

In an internal memorandum, Bob Pages supported the idea of getting acquainted with Graham and learning about the Center based upon this last sentence from Graham's letter, writing to Steve Parrish, General Counsel for Philip Morris, that:[165]

> Why not take him up on the offer? Sure, he's after $ to help support his Center, but whether or not PM [Philip Morris] decides to contribute it's more important to meet him and perhaps get 'looped in' better with his activities. From all that Mayada [Logue] has learned, [Graham] is a key player in all this risk analysis stuff that's currently going on in the government.

Subsequent documents show that Graham was probably successful in his bid. Philip Morris drafted a check in the amount of $25,000.[166] Strangely, the company later, evidently at Graham's request, placed a stop payment on that check.[167] But in August 1992 Graham received $20,000 to be spent over two years from Philip Morris's subsidiary, Kraft General Foods. The letter from Kraft's Vice President of Scientific Relations, Enrique Guardia, stated that the money was intended "to support the work of the Center, in general, *and your contributions to the food safety debate (Pesticides)*. I would like to meet from time to time to discuss topics of mutual interest."[168]

Thinking Big

Kraft executive Guardia also responded in another letter to a funding proposal from Graham, in which Graham announced the launch of an "effort to increase food industry support for work on food safety legislation."[169] Graham's letter evidently had asked Guardia for the names of other potential corporate donors for the new project and had named the sum to be solicited from the food sector as $25 million. This amount of money was so grossly high that Guardia demurred: "You know fund raising better than I, *but your request of $25 M strikes me as excessive in a year like 1992.* Ask yourself whether you would not be better off asking for $10 M."[170]

Graham Writes to the Bush White House

What did Philip Morris get for its money and bit of assistance locating additional funding sources for Graham? One item contained in the Philip Morris files is a letter on HCRA letterhead from Graham to Jonathan Wiener in June 1992. At the time, Wiener was the policy counsel of the Bush I White House Office of Science and Technology Policy and the senior staff economist for environmental and regulatory issues at the White House Council of Economic Advisors. Wiener was also working on Bush I's draft executive order on economic analysis and later would assist Clinton in crafting his Executive Order on Regulatory Review.[171]

The subject line of Graham's letter to Wiener read: "The Release of Risk Assessment as a Regulatory or Policy Action: The Case of ETS."[172] In the letter, Graham suggested that the EPA's recent risk assessment process on ETS should have been part of a formal rulemaking. Despite having very recently solicited money from Philip Morris, Graham wrote to Wiener: "since I am not an expert on ETS, I don't know whether EPA's report is based on good science . . . If one is trying to make a case against smoking, the EPA risk assessment is certainly good ammunition."[173]

Graham's letter to Wiener continued:[174]

> In light of this example, think more broadly about future EPA risk assessments of electromagnetic fields, video display monitors, styrene, formaldehyde, carbon dioxide emissions, and so forth. As matters stand now, the White House and the nation are very vulnerable to EPA (or other agency) risk assessments that are not based on sound science or do not adequately convey the degree of uncertainty in the science. . . A small, yet well-qualified group of risk assessors in the White House could make an enormous difference on these issues, particularly if they established credibility among agency risk assessors.

Graham's letter did not disclose his relationship with Philip Morris, which was relevant to his framing of the EPA's work on ETS. Nor did Graham's letter mention the considerable funding that Graham has received from: 1) power companies and utilities, which closely monitor the debate over the safety of electromagnetic fields, 2) many chemical conglomerates, including DuPont, the American Chemistry Council and Dow, which makes styrene, and 3) numerous auto makers and energy and oil concerns with a direct stake in the fight over carbon dioxide emissions.[175]

Philip Morris Writes the Handbook for "Good Epidemiological Practices"

Elisa Ong, in an article in *The Lancet*, a leading British medical journal, further detailed Philip Morris's efforts to promote so-called "sound science" through the development of industry-favorable guidelines, marketed under the guise of analytical rigor.[176]

Following the lead of the Chemical Manufacturers Association, (now called the American Chemistry Council) which also funds Graham's HCRA, Philip Morris's World Regulatory Affairs division considered the usefulness of publishing its own guidelines for "Good Epidemiology Practices." As Logue's close associate, Thomas Borelli, commented, Philip Morris thought it would a "good offensive strategy" for Philip Morris-affiliated scientists to undertake the revision of "standard epidemiological practice,"[177] so Philip Morris issued new guidelines for endorsement by a "sound science coalition" and planned seminars with carefully screened groups of epidemiologists.[178]

A document entitled "The Need for Good Epidemiology Practices (GEPs) in Studies Used by Regulatory Agencies" was presented at an OSHA public meeting in November 1994 by Thorne Auchter, who at that stage was working for IRP.[179] The Auchter "GEP" report included highly specific and technical recommendations for a re-working of OSHA's epidemiological standards, including a determined emphasis on the role of so-called "negative studies." (*See* Part Three, Sellout #6). It is not clear whether the document reflects the Chemical Manufacturers Association guidelines, Philip Morris's, both in combination, or neither of the companies' blueprints, but a copy of the Auchter submission was found among the Philip Morris files.

Notes on a revised agenda from an August 1993 meeting that included Logue and other members of Philip Morris's "Worldwide Regulatory Affairs" group reflected their brainstorming about further avenues to discredit the European study. Scrawled writing indicates that those at the meeting had plans for Graham's participation: *"Need a war of words European v. USA Studies, etc. — J. Graham Ast. Symposium."*[180]

The Verdict

The EPA's risk assessment of environmental tobacco smoke was published in 1993. It estimated that secondhand smoke causes some 150,000 to 300,000 cases per year of lower respiratory tract infections such as bronchitis and pneumonia in children up to 18 months of age, resulting in 7,5000 to 15,000 hospitalizations, plus somewhere between 400,000 and 1 million cases of asthma.

The EPA also decided, for the first time, that secondhand smoke should be labeled a "Class A carcinogen" — a government term which means that ETS is not merely suspected but *known* to cause lung cancer. The impact of secondhand smoke is small compared to the effect of direct smoking in cancer terms, but EPA estimated that some 3,000 lung cancer deaths per year among U.S. nonsmokers should be attributed to secondhand cigarette smoke.

Graham's Other Work on ETS

Graham's work was also connected with the ETS debates in the U.S. and with the counter-spin of the EPA's results on ETS. Graham was quoted in a 1994 report by the Alexis de Tocqueville Institute (ADT) that was found in the Philip Morris files, an anti-regulation group.[181]

The ADT report was entitled "Science, Economics and Environmental Policy: A Critical Examination." The report quotes Graham's criticisms of the EPA and his promotion of "good science": "But as Dr. John Graham, of the Harvard Center on Risk Analysis notes 'While it may seem obvious that EPA should use good science, students of the Agency have documented that the Agency's leadership, when preoccupied with public fears and legal pressures, has sometimes allowed good science to be neglected.' "[182]

The report's "case study" of EPA "abuses" targeted the agency's decisions on ETS, accusing the agency of poor science and biased results:

> Unfortunately, in [the EPA's] zeal to abolish smoking, science has been sacrificed. . . In short, the EPA study relied on methodologies different from those which have been historically used in such analyses. *Scientific standards were seriously violated in order to produce a report to ban smoking in public settings.*

Other contacts between Graham and Philip Morris/Kraft

- Mayada Logue, of Philip Morris' regulatory affairs bureau, received promotional materials from a 1992 conference featuring Graham and Duke University's Kip Viscusi, as well as Aaron Wildavsky, who is mentioned in Part Three in connection with a campaign on the issue of Alar, a pesticide. The conference was called "Making Sense of Safety." The cover quotes Wildavsky as saying, "There can be no guarantee that the dangers people seek to avoid are the ones that will harm them the most." Heritage Foundation documents credit Wildavsky with development of the idea that risks should be compared to other risks as a political strategy that masks a general anti-regulatory agenda.[183]
- On Aug. 31, 1992, Logue wrote that "the meeting between myself . . . and Graham was beneficial in that the Harvard Center for Risk Analysis has launched an effort to address issues in food safety legislation. I am pleased with this development and hope that we can continue to work with and support Dr. Graham's work on issues that involve Risk Analysis."[184]
- Logue also records that in February 1992, Philip Morris had sent a check to the Center for Risk Analysis for an unspecified amount, and that Philip Morris would be asking for Graham's assistance on a project for a Philip Morris official on "Weak Relative Risk."[185]
- In May 1992 Logue met with Graham and Guardia "concerning the Center for Risk Analysis" and attended a Harvard School of Public Health Symposium on Occupational Health Risk Assessment. In June 1992, another meeting with Graham and a Philip Morris official was planned.[186]
- Logue had meetings with Graham in February 1993, and attended the Winter Toxicology Forum Meeting in Washington, D.C., "where Dr. John Graham presented a novel approach to risk assessment."[187]

More Recent Graham/Philip Morris Activity

Graham's projects eventually went global. In June 1998, Graham and two others from the Society for Risk Analysis wrote to Thomas Borelli of Philip Morris on HCRA letterhead to solicit $50,000 of a total funding schedule of $250,000 for an international symposium in Brussels.

The Society for Risk Analysis posted an Internet list of corporate "sustaining members" that includes Amoco, the Chemical Manufacturers Association, Chevron, DuPont, Exxon, Procter & Gamble and the Sapphire Group, which is made up of chemical, cosmetic, food and health care interests.[188]

The objectives of the conference were to set the stage for a first World Congress on Risk Analysis by helping:

> 1) to articulate the state of the field of risk analysis, including a review of what is happening worldwide and where the field should be going, and 2) to build and catalyze the international community of scientists, practitioners and decision makers who are dedicated to risk-based decision making and related processes of risk assessment, management and communication."[189]

Graham's letter continued:[190]

> the fields of application to be addressed at the symposium will be broad: *food and product safety, chemical risk management, global climate change, natural hazards management, medical technology assessment, insurance, energy development, and injury prevention.* We are open to suggestions of specific issues that you would like to see addressed at this rather unique gathering of international leaders in the field of risk analysis. We are also open to suggestions of possible participants who you believe would make a significant contribution.

As in his other fund-raising letters, Graham closed by saying that someone would call soon to follow up.[191] Philip Morris is not on the HCRA Web site list of funders. Kraft Foods is named as a contributor of "unrestricted" funds.[192]

Case Study #2:

GRAHAM WEIGHS IN ON THE SAFETY OF CELL PHONES

Driver Concentration Is the Problem . . .

In a recent *Dallas Morning News* article about the causes of recent traffic deaths in Texas, Graham emphasized his faith in the driving ability of ordinary citizens, indicating that "virtually everyone, except people who have significant health problems, is capable of being a safe, competent driver."[193] Graham implied that unnecessary traffic deaths could be prevented by increasing the level of driver concentration — saying that "the problem we have is maintaining people's level of attention."[194]

. . .But Driver Distraction Is Not the Problem.

Despite this statement, Graham has come down against eliminating one possible source of driver distraction: the use of a cellular phone while driving.

One week after the National Highway Traffic Safety Administration (NHTSA) held a public hearing on driver distraction and recommended that drivers pull over before using cell phones,[195] the Harvard Center for Risk Analysis, using Graham's name, self-published a report funded with $300,000 from AT&T Wireless Communications which assessed the risks of using a cell phone while driving.[196]

The report, released in July 2000, was very timely. Communities and states all over the country were in the midst of considering whether to enact bans on the use of cell phones while driving. Just prior to the study, the township of Marlboro, New Jersey, banned drivers from using cell phones, and Brooklyn, Ohio, had passed the country's first such law in March of 1999.[197] While twenty-two states had considered bans, none had been passed at the time of the report's release.[198] As in the battle over environmental tobacco smoke described above, industries that anticipate that new laws and public attitudes may discourage the use of their products take these threats very seriously indeed.

The HCRA report surveyed existing data and concluded that because the level of risk to drivers was not *clearly* indicated, further regulation in this area was unwarranted. HCRA's report stated that "*although there is evidence* that using a cellular phone while driving poses risks to both the driver and others, it may be premature to enact substantial restrictions at this time. We simply do not have enough reliable information on which to base reasonable policy."[199]

The report also made use of a "collateral benefits" theory of risk tradeoffs. According to the report, the benefits of cell phone use while driving may actually outweigh the potential dangers of using them. The report attributed gains to users such as "peace of mind," "expanding productive time," and "strengthening social networking."[200] The obvious problem is that these benefits are difficult to quantify so as to weigh them against the risk to human life from driver distraction. And to the extent that the benefit of "peace of mind" derives from having a phone in the car for emergencies, a ban on using a phone while driving could be crafted to preserve this benefit entirely.

The HCRA study drew the main power of its conclusion that the risks of driving and cell phones had not been adequately demonstrated using *general* data that showed that while "cellular phone use has grown 17-fold between 1990-1998, U.S. traffic fatalities have continued a steady decline."[201] These data did not include any specific information on cellular phone use *while driving*, nor did the study analyze crash records to ascertain whether cellular phone use was a cause of the crash, as NHTSA has done.[202]

HCRA's comparison of gross figures on cell phone use with gross crash data does not account for recent innovations in air bags and increased use of seat belts that were likely major contributors to recent declines in fatalities. Yet these data form the basis of the study's position against banning the use of cell phones while driving.

Comparing Apples and Oranges

The central problem in Graham's study actually relates to the evidence presented in support of his conclusion that the risks are undemonstrated. In a media interview about the study, Graham applied a misleading risk tradeoff: "Based on the information to date, the risks [of driving while talking on a cell phone] look fairly small *compared to risks people face in daily life*."[203] But the central question is whether the activity creates an *additional* or unnecessary risk, not whether it comprises just yet another risk that we should learn to live with.

This simple problem plagues each part of his analysis. According to Graham's study, driving while using a cell phone *causes fatalities of 6.4 deaths per million drivers annually.*[204] But instead of comparing this figure with drivers under similar conditions who do not use cell phones, the study spuriously compares this data to cases involving extreme risk factors, such as driving with a blood alcohol concentration of .10, which causes annual fatalities of 30.9 per million drivers, and driving without wearing a lap and shoulder belt, which causes 49.3 annual fatalities per million drivers.[205] This choice of methodology shows a basic lack of commitment to elementary standards of research. As Charles Osgood said on *The Osgood File* when reporting on the study, these categories of data are "apples and oranges."[206]

It is true that, when compared with these few circumstances, driving while talking on a cellular phone may appear relatively safe— but the study fails to compare driving with a cell phone to the risks of *driving without a cell phone under normal conditions*. In addition, these comparisons are wrong because the risks could be cumulative — for example, drivers may be at risk from *both* talking on a cell phone *and* being intoxicated while driving.

Therefore, regulation banning the use of cell phones while driving might help to eliminate an *additional* risk on the road, as many communities appear to believe. Fundamentally, comparisons like the ones in the Graham study are flawed because comparing the riskiness of some activity *to some other risk* makes little sense if we can choose to live with no additional risk at all.

My Study vs. Your Study

As the media framed it upon its release, the HCRA study "contradicted the finding by another study done in 1997." That other research, published after full peer review in the *New England Journal of Medicine*, avoided such ridiculous comparisons, and had concluded *that the risk of car crashes is four times greater when a driver uses a cell phone*.[207]

Dr. Donald Redelmeier was one of the authors of the *New England Journal of Medicine* study. In an attempt to approximate something like peer review, which is the accepted practice in the sciences to assure the validity of a study, Graham asked 12 independent specialists to "peer review" Graham's study, Redelmeier among them. After reviewing it, Redelmeier publicly disapproved. But the study was published and amply advertised regardless, thus demonstrating the toothlessness of Graham's "independent peer review" process.

Redelmeier publicly criticized Graham's assessment of cell phone risk, suggesting that the HCRA report lacked rigor because it "provides no new data, gives no new expertise and provides no new analysis."[208] Redelmeier also told reporters that the "*Harvard researchers left the report open to conflict-of-interest questions because they didn't publish it in a scientific journal or take other steps to demonstrate the study's fairness*."[209]

Other Problems With the Data

The policy conclusions in Graham's study appear to assume that cell phone use while driving will not increase in the future.[210] This factor is taken account into a recent NHTSA study of the issue, which noted that "with a growth rate of about 40 percent per year, it is estimated that by the year 2000 there will likely be about 80 million cellular telephone users in the United States."[211] For comparison, that NHTSA study concluded that *using a cell phone while driving does increase the risk of a crash*.[212]

From a Dubious Risk "Assessment" To Even More Suspect Public Policy

The report's policy evaluation of bans on cell phone use while driving is even more questionable than the risk "assessment" piece. The report suggests that such restrictions are "inefficient," because the net cost per life-year of the regulation is alleged to be significantly greater than the use of lap/shoulder belts, daytime running lights, and even greater than the use of air bags. The HCRA study asserts that it would cost approximately $700,000 per life year-saved to restrict cell phone usage while driving, compared to $24,000 for front-crash air bags for drivers, and less than $0 for lap and shoulder belts.[213]

These conclusions are highly suspect, as a relatively expensive but life-saving safety system such as an air bag requires a financial outlay for development and implementation of new technology. Passing a ban on cell phone use while driving requires no such initial resources.

Moreover, HCRA assumes that regulation must be *cost-effective* in order to be warranted. But the proposition that using a cellular phones while driving is distracting and potentially dangerous is common sense. It relates to a common experience — driving — and requires little technical expertise to evaluate as a hazard in comparison to, say, varying levels of toxic chemicals.

Without saying so explicitly, the HCRA study assumes that *regulators* alone must carry the burden of proof on the cost-effectiveness of their recommendations: It requires that a ban be justified on cost efficiency grounds (based on the limited information that we have available) before we can act. In so doing, it leaves common sense, the rights of other drivers and pedestrians not to be injured or killed by a distracted driver, and the precautionary logic and experience of individual communities, far behind. As the eminently logical Tom and Ray Magliozzi, hosts of Car Talk from National Public Radio, put it in response to a similar study by Robert Hahn, Graham's ally at the American Enterprise Institute-Brookings Joint Center for Regulatory Studies, "This seems to us to be a clear case of cost/benefit analysis run amok."

The timing of the study in relation to the NHTSA recommendation about limiting cell phone use while driving was surely no accident — and the study's conclusion concerned the *political wisdom* of enacting a ban. This assumption that risk "experts" should quash good sense by finding regulation is unjustified *unless the harm of an activity has already been demonstrated* blatantly favors business interests and the status quo, given the political context of the study.

Often, incomplete information on risks means that *the benefits of preventive regulation can appear very small, when in fact they could actually be enormous.* Unless we are very careful about adjusting cost-benefit equations to account for our uncertainties, it will always turn out that regulation which prevents a future risk is not cost-efficient.[214] Until there are demonstrated risks, such as bodies on the highway, cost-benefit analysis can tell us that protecting safety (or health, or the environment) is just not worth a dime.

And because up-front prevention often must occur in the absence of complete information, using a cost-benefit approach to evaluate health policy at the outset will doom us to forever locking the barn door after the horses are gone. The recklessness of these conclusions — and the study's lack of a protective attitude towards human life — is stunning.

LETTER FROM TOM AND RAY MAGLIOZZI, HOSTS OF CAR TALK FROM NATIONAL PUBLIC RADIO, TO THE NEW YORK TIMES ABOUT AEI-BROOKINGS' ROBERT HAHN'S STUDY ON COST BENEFIT ANALYSIS AND CELLULAR PHONES[215]

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18 November 1999

Letters to the Editor, The New York Times

229 West 43d Street

New York, NY 10036

Re: "Driving and Talking Do Mix" (New York Times, November 12, 1999)

To the Editor:

As proponents of "Drive Now, Talk Later," we must take issue with the op-ed piece by Robert Hahn. This seems to us to be a clear case of cost/benefit analysis run amok.

Just what is this guy thinking? First, he refers to accident reports — which for the most part do not even record the use or nonuse of cellular phones. Then he cites his own estimates of the mere "10,000 people (who will be) in serious accidents and the minuscule number of "100 people who will die" due to cell phone use.

And the benefits associated with these accidents and deaths? First is the ability to summon help on a lonely highway. Are we a little short of logic here? Just how would a ban on cell phone use while driving prevent one from using the phone from the breakdown lane? The almost invaluable benefit is the convenience of reminding your spouse of your daughter's school play. But not if you happen to be Patricia Pena. Her two-and-a-half-year-old daughter, Morgan Lee, was killed by one of Robert Hahn's new breed of highly productive citizens. What price has Mr. Hahn plugged into his nice, clean economic model to account for the misery and tears that such outright selfishness has wrought?

Mr. Hahn, you're just not that important that you need to talk and drive, and endanger the lives of innocent people on the roads. And next time you consider writing an op-ed piece, please remember the admonishment of Ted Williams to one of his not-too-bright teammates: "If you don't think too good, then don't think too much."

Tom and Ray Magliozzi, Co-hosts

Car Talk, on National Public Radio

Update from the Web Site of Tom and Ray Magliozzi
Co-hosts, Car Talk, on National Public Radio
About the Cell Phone Issue

A couple of interesting developments that you might be interested in.

1. That Great Newspaper and arbiter of what's "fit to print" — the "New York Times" — opted to print a guest op-ed column on November 12 ("Driving and Talking Do Mix") by some guy named Robert Hahn from the American Enterprise Institute.

We wanted to reprint it so you could read it yourself, but the NYT wants $250 for permission to reprint. Instead, we'll paraphrase. Mr. Hahn says that it's silly to ban the use of cell phones while driving. In fact, according to his personal estimates, cell phones will cause only 10,000 serious accidents this year, leading to (a mere) 100 fatalities.

Then this moron (in our opinion) goes on to explain to us that he has done a cost/benefit analysis, and in his opinion 100 deaths and 10,000 serious accidents is a small price to pay for the enormous benefits we derive from using the cell phone.

Here are a couple of his benefits:

#1. The ability to call for help when your car breaks down. (Right away one has to wonder if this guy is playing with a full deck. If your car breaks down, you'd hardly be using the cell phone AND driving. Duh, Mr. Hahn.)

And this one is a beauty. The 10,000 serious accidents and 100 fatalities are a small price to pay (says Mr. Hahn) for "the ability to remind your spouse that your daughter's school play starts in 20 minutes." At this point you know that he is DEFINITELY not playing with a full deck.

Naturally we immediately penned a letter to the editor, who apparently did not consider it to be "fit to print." (Admittedly, the letter was a little short on tact and diplomacy. We didn't think such moronic thinking deserved tact and diplomacy.)

Fortunately the NYT did print a couple of letters that did address the issues. One said, "Does he really consider a cell phone call from a car to "remind your spouse that your daughter's school play starts in 20 minutes" more important than even one life? Since when do small conveniences rank above human life?"

#2. A few weeks ago, we at Car Talk Plaza were approached by NBC News. They had heard our ranting and seen the feature here on the site, so they wanted to do an interview with Tom and Ray on the cell phone issue. We generally eschew the media whenever possible. But this seemed like an opportunity to help a good cause, so we agreed to do it. Everything was arranged; a date, time and location for the taping were set up.

But...a few days before the event, we were informed that "the producer in New York had decided not to do it."

#2 part 2. We were approached by CBS with a similar request.

Again, mysteriously, the "producer in New York decided not to do it."

Now, it's certainly possible that there's a simple explanation for these two incidents. The most likely--even we admit it--is that the producer had never seen or heard of us before. I mean, that would certainly explain it. If you were a producer of a major network show and...well, you get the idea.

On the other hand, there's a distinct possibility that the news that's fit to print and the news that's fit to put on the air are very much influenced by big bucks. Let's face it: there's a lot of money involved in the cell phone industry--and lots of it goes to advertising.

Just a thought.

— Tom Magliozzi

Case Study #3

GRAHAM OPINES ON PASSENGER-SIDE AIR BAGS

Graham Flips Over On Air bags

As Good Morning America commented, it was big news when Graham went before the National Transportation Safety Board (NTSB) on March 17, 1997, and announced that he was changing his tune on the safety benefits of passenger-side air bags.[216]

Graham's early research on air bags in the 1980s was cited in a footnote to a 1983 Supreme Court case and cited by the Secretary of Transportation, Elizabeth Dole, in support of a passive restraint mandate.[217] And in December 1996, Graham told *The Boston Globe* that public fear over the dangers of air bags was exaggerated and could produce a harmful over-reaction: "People are getting the idea that drivers are getting killed, and they're getting a lot of specifics wrong . . . . *I have the sense that the benefit side of air bags isn't being shown in as compelling a fashion as the risks have been.*"[218]

But in March 1997, Graham dramatically renounced his earlier position, telling a stunned group of safety advocates and government regulators that a new, as-yet-unpublished study done by his Center had convinced him that passenger air bags were not cost-effective enough to justify the requirement, when compared to the cost-efficiency of driver-side air bags or seatbelts.

That same day, prior to testifying at the NTSB hearing, HCRA released a consumer survey on public attitudes about air bags, called *The Airbag's Teflon Image: A National Survey of Knowledge and Attitudes*. The morning of the NTSB hearing, Graham went on ABC's Good Morning America to talk about both the survey and the unpublished HCRA study.

Good Morning America anchor Charles Gibson introduced the segment: "Today, the researcher whose analysis helped get air bags into cars 20 years ago is coming forward to say that they don't save enough lives to justify their risk or their cost." Reporter Steve Filmer further dramatized Graham's turn-around: "We can't overstate what a big deal this headline is. Dr. Graham's research set policy on air bags over the past 10 years. What have you found in your research now? Why have you changed your mind?"

Graham stated that the news from his research on the cost-effectiveness of passenger-side air bags was "sobering" and that they "kill three times as many children *as they save*." Yet in other articles, including one that ran in the *Atlanta Journal and Constitution*, Graham said, in an apparent contradiction, that "there are *no* documented cases of a child being saved by an air bag."

The Associated Press (AP) also put out a story on March 17, in which Graham claimed that "most" of the 38 children killed by air bags had been decapitated.[219] The comment was picked up by several newspapers — in articles giving a prominent position to HCRA survey findings that America was misinformed on air bags[220]— but Graham's statement was actually a frightening exaggeration that later had to be corrected by AP. According to the National Highway Traffic Safety Administration (NHTSA), *three* of the 38 children killed by air bags had met with such a terrible death.[221]

Bad Science in Graham's First Study on Air Bags' Cost-Effectiveness

On Good Morning America, and later at the NTSB meeting, Graham reported that a HCRA study had demonstrated that the relative cost of passenger-side air bags was, he suggested, an unreasonably high $399,000 for each year of life saved, whereas driver-side air bags cost a more reasonable, but still high, $70,000 per life-year saved.

The announcement came at a critical time. NHTSA was preparing to issue a proposed rule permitting vehicle owners to depower air bags, which would be subject to review for cost-effectiveness by the Office of Management and Budget (OMB) before its public release.[222] Graham knew that his remarks would likely be controversial given the pending rulemaking and because air bags have for the past three decades remained a highly contentious area of debate between public safety advocates and the motor vehicle manufacturers.

Speaking before the NTSB, Graham qualified his findings significantly more than he did on Good Morning America. For example, he told the NTSB that the high cost of passenger-side air bags could be a result of differences in occupancy rates between the driver and passenger side. While all cars, and thus all crashes, must have a driver, passenger-side occupancy rates are much lower. Thus, passenger side air bags are utilized far less frequently than those on the driver's side.

In fact, passengers accounted for 189 of the lives saved by air bags in crashes considered in Graham's study, compared to around 1,600 drivers whose lives were saved by air bags between 1989 and March 1997.[223] That makes the size of the statistical sample for passenger-side crashes very low, which in turn makes it likely that the study's conclusions would be affected by any small change in other factors.

Before the NTSB, Graham also acknowledged that the passenger numbers were high because of the number of child fatalities attributed to air bags. Children sit only on the passenger's side and the air bags' effectiveness was measured by the number of life-years saved (the loss of a child's life is represented by a negative 75 years of life expectancy, whereas an adult driver loses, on average, 35 years of life expectancy per fatality). Therefore, the information on childhood fatalities and injuries greatly impacted Graham's conclusions.

Graham failed to release the study that he announced in March until May 1997, despite the loud outcry from consumer advocates for his presentation of a study to the media that was incomplete. When it was finally made available, the flaws in his research were obvious to concerned safety experts and engineers.

It turned out that the data Graham chose to use in his study were not internally consistent. Michael Finkelstein, a transportation safety expert who had headed NHTSA's motor vehicle safety office for years and whose clients include air bag manufacturers, pointed out in a letter to Graham and federal regulators that Graham's study had not been peer-reviewed, and that his data choices would be unlikely to survive that process.[224] According to Finkelstein, there were grave problems with both the information on benefits and Graham's research on costs.

Because risk management frequently combines the outcome of several different studies, it is critical to make logical choices and to keep the numbers coherent. Graham had, it appears, combined information from two different studies, picking inconsistently from each. Finkelstein wrote that, after reviewing the two studies which had served as the basis for Graham's conclusions about fatalities and air bag effectiveness: "*Your choices with respect to airbag effectiveness estimates were hard to understand.*"

As Graham's conclusions on passenger-side air bags were very vulnerable to changes in the data, his choice to use a particular number changes the study's outcome. Finkelstein wrote that, unlike the data on the driver's side air bag effectiveness, "the cost-effectiveness of passenger air bags is extraordinarily sensitive to small shifts. Thus, if you had used the 13.5 percent effectiveness estimate from [one of the two studies], rather than the 11 percent estimate that you did use, that by itself would have cut the cost [of a life-year saved] in half."

Finkelstein also found "questionable" the data Graham had used on cost, which dated from 1992. Finkelstein observed that more recent data should have been used because:

> The cost of most technology declines as the technology matures. . . . Using a government tear-down study of 1992 technology to estimate the cost of air bags in 1997 would be the same as using the cost of a 1992 laptop computer to estimate the cost of current technology. *I think that, at a minimum, your cost estimate overstates current costs by a factor of two*.

An overstatement of that magnitude, needless to say, would have a considerable impact upon the study's ability to accurately measure air bag technology's cost-effectiveness.

Furthermore, Finkelstein wrote, his own calculations using Graham's numbers had revealed that the conclusions did not stand up to scrutiny (this kind of testing for validity, or "robustness," is called "sensitivity analysis"):

> After conducting a sensitivity analysis, I found it hard to believe that you still released your findings to the media. . . . Sensitivity analysis is used to reinforce a finding by demonstrating that an outcome is robust, *i.e.*, that the conclusion is not very sensitive to potential changes in the variables upon which the result rests. And for the driver air bag analysis, that is in fact confirmed. *But for passenger air bags, the sensitivity analysis should have produced a conclusion that the findings are just not robust enough to release.*

At the least, according to Finkelstein, because of the shakiness of the data, Graham should have *waited* to go public out of a sense of scientific responsibility:

> Your own research results should have raised so many questions that, at a minimum, you would have delayed the release of your findings until they had been subject to peer review.

Consumer advocates and safety groups were also upset by Graham's presentation of poorly analyzed data at the NTSB hearing. In particular, they were critical of Graham's omission of any comparison of the advantages and disadvantages of differing air bags systems (top-mounted, dual inflation, etc.), as this dramatically impacts the number of fatalities and injuries, particularly those concerning children and small adults, who are more vulnerable to injury than a statistically "typical" adult male. This was critical for a valid study of air bag effectiveness, the groups argued, because some types of air bag systems, such as those installed in Hondas, had not killed any children.

This fact, ignored by Graham, revealed that safer air bag systems were actually within the reach of any manufacturer who chose to install them. The key issue on air bag safety was in fact the poor design of many passenger air bag systems, which varies by vehicle make and model. Sorting the data according to that information would have yielded far more specific and useful results on effectiveness, cost and risk than did Graham's study, which lumped together all types of passenger air bags and all types of passengers.

Additionally, the groups, including the Center for Auto Safety, the National Safety Council, and Public Citizen, noted that Graham's results "were based on preliminary research which should have been available for review by experts before being released via national television."[225] Clarence Ditlow, Executive Director of the Center for Auto Safety, commented that:

> *For someone who claims to be a respected scientist, John Graham makes a mockery of the scientific process by going for sensationalized and misleading headlines which would be refuted by a peer review of his paper.*

Flopping Back: Graham's Revised Study on Air Bags' Cost-Effectiveness

Ditlow's instincts about the impact of a peer review on Graham's study would turn out to be prophetic. In fact, Graham's conclusions did not survive scientific treatment, and when the same study was finally published in the prestigious *Journal of the American Medical Association* (*JAMA*) in November 1997, following a peer review, both the numbers *and* the study's ultimate policy conclusion had experienced a miraculous transformation.

The new numbers were far lower than the ones released the day of the NTSB hearing. The *JAMA* study authored by Graham concluded that driver-side air bags cost $24,000 for each life-year saved, rather than the $70,000 originally stated.[226] And the estimate for passenger-side air bags, which originally had been set at just under $400,000, *was reduced to only $61,000* — well within the range of affordability sometimes used to measure the costs of health and medical interventions.

The new numbers required a U-turn in the study's conclusion as well. This time around, the press release, sent out on Harvard School of Public Health letterhead, was titled: *"Study Shows Air bags a Worthwhile Investment: Risk to Children Must be Addressed*."[227]

Despite these improvements, the *JAMA* study still had several serious deficiencies. For example, the method of cost-benefit analysis used in the *JAMA* study assumed that all the costs and benefits should be weighed against each other, regardless of any consideration about *who* pays a cost and *who* benefits.[228] This approach puts industry first and our safety goals a distant second — because it assumes that the benefit of saving a human life can and should be measured against the cost to the auto makers of coming up with better safeguards. Current costs, and technological capacity, are input as the given. A better approach would be to project what improvements in safety are within the reach of the industry, and to measure the kind of investment needed to get us there.

Researchers also assumed that fairness plays little or no part in the results, because they assumed that any cost on the part of the companies could be measured against the "benefits" to the public in the form of reduced death and injury. That is like saying that money out of General Motors' pocket is the same as the medical bills, personal loss, and grief felt by a driver of a GM car that is involved in a crash. This assumption ignores important policy questions, such as whether the public *would* pay more for safer air bags if we were educated about the options, whether it is ethical to balance corporate profits against public suffering, and whether some compromise of profits should be required in order to preserve human life.

In addition, the *JAMA* version of the study, like its predecessor, failed to distinguish between different models of air bags and types of air bag release systems — a failing which threatens the validity of the results because, for example, top-mounted, vertically deploying air bags hit the windshield before impacting with occupants and had not caused *any* fatalities at the time the study was completed.[229]

Instead of analyzing the causes of the problems with specific air bags, which could have put the burden on industry to fix the problem, Graham's official spin on the *JAMA* study emphasized a typical motor vehicle industry "line" that the solution for air bag injuries is to *fix the public* by passing a law that would prohibit parents from putting young children in the front seat.[230]

Although Graham has been quick to point out risk tradeoffs in the past, he missed the opportunity as to this issue. A law putting all children in the back seat runs the risk that weak front seatbacks may collapse in a rear-end crash and send adults rocketing backwards, injuring or potentially even killing their children. This ongoing hazard was the subject of a February 2001 *60 Minutes II* report.

In the political context of the day, the suggestion that a law should require children to be seated in back was often used to deflect any further regulation of air bags. Advanced air bag rules could have required automobile manufacturers to design and install more sophisticated, and potentially more costly, air bag systems. In addition, a law prohibiting children from sitting in the front seat could be used as a liability shield, depending upon how the law was drafted. Under such a law, auto companies would likely argue that the primary responsibility for a child's injury rests with the parent, rather than with the air bag system or the motor vehicle manufacturer.

In contrast, another study published in the same issue of *JAMA* by Dr. Elisa Braver and her team emphasized technological solutions and concluded that, to reduce at least some of the risks to children, "modifications in air bag technology [are] needed. Making air bag inflators deploy with less force should reduce, but not eliminate, the risks to children *and can be readily developed by car manufacturers in the near future.* . . . In the longer term, more sophisticated air bags are being developed that will detect occupant characteristics and crash severity and then tailor deployment characteristics to maximize protection for all occupants regardless of their sizes or seating positions."[231] That study concluded that passenger side air bags effectively reduced deaths by 18 percent in frontal crashes and by 11 percent in all crashes.

However, in at least one notable aspect Graham's *JAMA* study was a vast improvement over his earlier comments. Whereas in March Graham had breezily told reporters that passenger air bags were not "cost-effective,"[232] the *JAMA* study correctly stated that:[233]

> *No consensus currently exists about what levels of expenditures are cost-effective, and consequently it is difficult to make absolute statements about whether an intervention is a worthwhile safety investment.*

Graham's Failure to Correct His Earlier Conclusions

Public Citizen's investigation failed to uncover any attempt by Graham to correct the March 1997 news coverage of his charges about the allegedly dismal cost-effectiveness of passenger air bags. Instead, Graham seized the opportunity presented by release of the *JAMA* study to promote a new angle which emphasized a misleading air bag risk "tradeoff" between adults and children.

The Boston Herald reported Graham's new twist: "Passenger-side bags are saving the lives of adults but for every 10 saved, there is one child killed, according to today's studies . . . . 'That kind of ratio is not very impressive,' said John Graham of the Harvard School of Public Health . . . '*If we had a mandatory vaccine program in the country that would require children to be placed at risk so adults could be saved, it would be unacceptable*,' he said."[234]

Of course, the ratio between the number of adults saved and number of children killed is far from immutable. To use his analogy, we could adjust Graham's "vaccine" to very rarely injure fewer people, including children, by mandating the use of advanced air bag inflation and sensing technology, or we could refuse to administer the air bag "vaccine" to children altogether, which would be the equivalent of moving them into the backseat or technologically suppressing them for smaller occupants. As so frequently happens in Graham's work, his comments to the media cover up far more information than they reveal.

Although the HCRA Web site lists Ford Motor Company, General Motors, and the Goodyear Tire & Rubber Company as providers of unrestricted funds, these potentially relevant sources of funding were not mentioned in the articles describing either Graham's performance before the NTSB, on Good Morning America, or in the media coverage of the *JAMA* study. We note that, according to *JAMA*, funding for the study itself was provided by the Centers for Disease Control and Prevention to the Harvard Injury Control Center at the Harvard School of Public Health, and not to HCRA directly.

Survey Says: The Expert Knows Best

There were also serious problems with the survey results that Graham had announced in March 1997. The survey was called *The Airbag's Teflon Image* and a March 13 HCRA press release summarized its conclusion that a "Survey of Americans Shows Air bags are Misunderstood." The report's press release contended that Americans' widespread support for air bags was founded upon bad information:

> Despite recent news reports that highlight the danger for young children of passenger side air bags, Americans overwhelmingly favor the use of air bags. *However, their support is based on a variety of misperceptions about their use and safety*. The findings come from a survey reported today by the Harvard School of Public Health.

The survey was full of rather complicated questions. For example, to test public knowledge on child seats, the survey asked: "True or False: *Air bags are not a danger to an infant in the front seat if the infant is restrained in an approved, rear-facing child restraint device*." Despite the potentially confusing use of the word "approved," nearly 70 percent of the survey's respondents answered "False," which is the correct response.

The survey did manage to trip up the public in some areas — but in some of them, the survey was part of the problem. Its so-called "findings" could have easily contributed to, rather than alleviated, the public's misunderstanding of air bag safety issues.

For example, the press release on Graham's survey emphasized that Americans had gotten the following question wrong: "True or False: A majority of the lives that have been saved by air bags have been among people who were not wearing seatbelts." The answer, according to the survey, was "true." But the question's "majority" was tricky. According to the extremely rough calculations used for the survey, the survey tested the public's knowledge of a 59 percent margin — a bare majority, and hardly a good indicator of public awareness about air bag safety.

In a repeat of the poor scholarship applied in the cellular phone study, *see* Case Study #2, HCRA came up with the 59 percent figure number by comparing the *total number* of belted and unbelted crashes with NHTSA's general data on the effectiveness of air bags — without examining the type of crash, *whether there was an air bag in the vehicle* and the type of air bag, or the placement of the occupant. Obviously, many older cars lack air bags, so this extrapolation is, to say the least, highly suspect.

And their numbers don't match up with the more in-depth analysis published in *JAMA* by Dr. Braver and her team. That study concluded that "the risk of frontal crash death for right front passengers in cars with driver and passenger air bags was reduced 14 percent among those reported to be using belts and 23 percent among belt nonusers." The data in that study shows that the number of fatalities that were probably prevented by the presence of a passenger air bag during a frontal crash was similar for both belted and unbelted occupants.[235]

So why was a test on this kind of sloppily worked out detail promoted as evidence of American ignorance on air bag issues? In addition to the media-ripe timing of the survey's release, it appears that the survey's conclusions were a great fit with the political strategy of the motor vehicle industry.

According to safety experts such as Joan Claybrook, President of Public Citizen and former Administrator of NHTSA, the motor vehicle industry was, at that time, waging a campaign to deflect attention from the need for more advanced air bag systems by focusing on the public's knowledge of safety issues involving air bags. A survey such as Graham's would thus have perfectly dovetailed with the industry's interest in preventing the development of additional, safety-motivated air bag requirements.

Information that allegedly shows public ignorance about risk is also politically useful as general evidence in support of rule by "experts." The implication, of course, is that whenever the public disagrees with the "experts," it is the needs of the public that must take a back seat.

Graham has used this technique again more recently. In 1999, he announced the results of a survey on risk perception that he helped design in an article in *American Health Line.* His study concluded, unsurprisingly, that the public considerably overestimates health risks, such as disease, and hazards, as well as accidents and injury. The public's overestimation of risk is dangerous, said Graham, because it "can trigger *unreasonable* demands for expensive policies which are not cost-effective."[236]

In fact, it is well known that the public generally has a more precautionary attitude toward risk than do most risk experts.[237] Some risk assessment and risk management specialists are very attentive to the importance of this divide between the experts and the public, and argue that any government action or policy must take meaningful account of these kinds of differences as a matter of both practical and moral legitimacy.[238]

Ellen Silbergeld, a toxicologist with the Natural Resources Defense Council, has emphasized that questions on the magnitude of a controversial risk have no "right" answer, saying that "*We don't want to turn our democracy over to a priesthood of people who have Ph.D.'s*."[239] Against the backdrop of this critical discussion within his own field, Graham's repeatedly pejorative characterization of our public "fears" as irrational and uninformed suggests his message has a premeditated purpose.

The Real Agenda: Graham's Air Bag Testimony in Support of Regulatory Rollback

In May 1999 Congress was considering the enactment of Senate Bill 746, the so-called "Regulatory Improvement Act of 1999." The bill was a dream for industry because it would have laid out a nearly impossible regulatory obstacle course for most of the federal agencies to jump through *before* they could finish a rule. Among other things, the regulatory rollback bill required the agencies' rulemaking to:[240]

- Include a uniform, formal risk assessment before acting to protect human health or safety, according to detailed specifications in the law that were developed for evaluation of chemicals but are inappropriate for other health and safety problems;
- Wait for full submission of the industry's data — with no time limits on submissions, this was an invitation for corporate abuse;
- After a complicated cost-benefit analysis, ensure that the chosen regulatory program was the most cost-effective for industry of all the possible options, or prove why the rule should be adopted anyway;
- Pass muster with a secret, and likely industry-funded cadre of peer review "scientists" — under the law, government scientists were barred on conflict of interest grounds, but industry "experts" were given free rein;
- Escape the "black hole" of OMB — the law would have allowed the OMB to avoid putting in writing why it failed to approve a proposed rule; and
- Survive an invitation in the law for "judicial review" that could have allowed courts to overturn an agency rule based on a disagreement over risk assessment or cost-benefit analysis *methods*.

Predictably, Graham came out in support of the rollback initiative, and used the example of NHTSA's air bag regulations as a poster child for rulemaking gone wrong.[241] Graham told Congress that the law's requirement for risk assessments would probably have torpedoed NHTSA's earlier air bag regulation, and that its "peer review" requirement would have produced a better rule.

But NHTSA had undertaken extensive research prior to issuing its air bag rule, including a complete risk assessment, and also had looked to the body of outside research, such as the economic analysis performed by Graham himself.[242] As he told reporters in 1997, in the 1980s Graham had "argued that . . . air bags were a good idea on cost-benefit grounds."[243]

Speaking before the Senate, Graham called attention to the number of children killed by air bags but failed to mention the 2,620 lives that air bags had saved between 1987 and 1997.[244] But contrary to his argument, nothing in S. 746 would have made air bags safer for children. In fact, in some areas, S.746 would ensure that NHTSA could only have implemented far more dangerous regulations.

For example, the 1999 rollback bill required agencies to give a preference to "flexible regulatory options," such as "outcome-oriented performance-based standards." The standards that NHTSA issued on air bags measured air bag performance protecting occupants in certain crash tests, and did not make specific design requirements, just as S.746 recommended. S.746 would have done nothing to save children on that front.

The bill would also have forced NHTSA to give far more consideration, even determinative weight, to the industry's costs in complying with the rule. This section of S.746 would have prevented NHTSA from issuing a more protective standard with better results for children, because more sophisticated systems would surely have driven up the compliance costs for manufacturers.

In the 1980s, NHTSA already contracted with many outside groups in formulating its air bag requirements, and looked to the results of outside research, including Graham's, in writing the standard. But due to the lack conflict of interest provisions for industry-paid experts, the "peer review" requirement of S.746 would merely have ensured that the reviewing panels were staffed with industry-friendly experts, who would likely have resisted the development of any rule at all.

Contrary to Graham's claims, the preventable tragedy of child deaths from air bags was not a perverse result of bad regulation. It was a direct consequence of choices by automobile manufacturers to install less protective, cheaper air bag systems.[245] The evidence shows that the choices made by the manufacturers were ruled by cost-cutting incentives despite their knowledge that such air bag systems could be dangerous to children and smaller occupants and knowledge of far safer designs, including dual inflation and top-mounted, vertically deploying air bags.[246]

Air bags have saved well over 6,000 lives thus far.[247] Although Graham called the bill a victory for safety, the regulatory "flexibility" and other rollback provisions of S.746 would have done nothing to improve the situation for children, and could easily have been used to halt or block the issuance of the standard and the further development of this life-saving technology.

PART THREE

A CORPORATE AGENDA TAKES OVER THE PUBLIC HEALTH, SAFETY AND ENVIRONMENTAL DEBATES

After a decade of criticizing the EPA and other agencies for being overly cautious in calculating risks, industry forces decided in the 1980s to co-opt the regulatory language of risk and cost-benefit analysis and to re-write the rules of the game. Chemical companies and their allies in the pseudo-science community even developed elaborate advance plans to counter-spin the publication of a single book, *Our Stolen Future*, by Theo Colborn, Dianne Dumanoski and John Peterson Myers, which describes the disastrous effects of endocrine disrupters upon human reproductive health and intelligence.

Their goal was to generally discredit the enterprise of protective regulation. They sought to exploit any breach in the public's confidence about the wisdom of our federal agencies by instituting rule by risk "experts" — whose calculations they could control by rigging the technical rules of the game and whose decisions would trump the democratic development of health and safety protections.

Graham has been an integral part of this campaign. Throughout his behind-the-scenes participation in the regulatory debates on the part of Philip Morris, and his work with corporate counter-spin front groups like the American Council on Science and Health, Graham lent his Harvard credentials to the cause and helped to legitimize the industry attack on public health, safety and environmental objectives.

Below are six of the science sellouts used by Graham in contacts with the media:

Science Sellout #1: *The Counterfeit Science of Graham's Risk Analysis*

Science Sellout #2: *Flack Science: Manipulating the Media Pays Off*

Science Sellout#3: *Selling Half the Story*

Science Sellout #4: *Misleading Risk Communication: The Difference Between Falling and Being Pushed*

Science Sellout #5: *Concocting "Science" for Corporate Counter-Spin*

Science Sellout #6: *The Misuse of Scientific Uncertainty*

Science Sellout #1

THE COUNTERFEIT SCIENCE OF GRAHAM'S RISK ANALYSIS

We give scientists considerable credibility because of the supposed stringency of their tools for acquiring knowledge, and we expect and trust that they will speak clearly about the limitations of the information they convey to the public. While Graham has been described as a "scientist" numerous times,[248] his approach to his field is profoundly unscientific.

As we suggest below, by failing to make critical disclosures about the limits of his supposed "science" and the sources of funding for his Center, Graham has positioned himself as primarily a political actor — but he is a political strategist who uses Harvard's prestigious name and operates under the cover of a false objectivity.

One 1996 article discussed a Graham strategy session with colleagues at the Heritage Foundation, a conservative think tank.[249] Entitled "*Risk-Expert Graham as Political Guru: GOP Must Change Reg-Reform Pitch*," the article began:[250]

> Harvard University risk-analysis expert John Graham moved from policy development to political strategist last week, telling a seminar that the stalled Republican regulatory-reform effort needs to reframe its arguments to appeal to public opinion and change the way people think about environmental issues . . . *Graham said "environmental regulations should be depicted as an 'incredible intervention' in the operation of society*. . . [Graham also said that] In order to sway public opinion to their side, conservatives' focus should be on comparative risk assessment: reallocating resources to address the biggest environmental risks."

This passage shows Graham's hostility to environmental regulation across the board, and how that hostility is deliberately obscured by a public focus on comparative risk tradeoffs. Graham has provided political mentoring and research support for anti-regulatory conservatives at the industry-funded Heritage Foundation more than once, and lent his name to media campaigns on anti-regulatory topics dozens, if not hundreds, of times.[251]

Graham has also, it appears, absorbed lessons from other strategists. Many of Graham's media "tricks" were wholly encapsulated by two 1996 "talking points" reports, one of which was called *How To Talk About Risk: How Well-Intentioned Regulations Can Kill*, written by Heritage Foundation analyst John Shanahan, who citing Graham, recommends that conservatives emphasize the themes of prioritizing risks, the failure of "liberal" environmental policies and the idea that "badly designed policies can kill."[252]

In all of Graham's dealings with the media that were assembled by Public Citizen, he has never been quoted pointing out any of the limitations of his risk assessment tools.[253] Nor does Graham typically term his policy recommendations in the context of *real* political trade-offs and institutions. In fact, he frequently suggests the opposite — that our societal failure to apply sweeping risk management and cost-benefit principles across every level of political decision results in perverse resource allocations and is equivalent to "statistical murder."[254]

Graham fails to indicate the highly contested nature of his assumptions and the considerable opposition that he faces even within his own field,[255] or to qualify his suggestions in any manner appropriate to the limitations of his research.[256] The real risk here is that someone who merely presents results without discussing the assumptions underlying his or her research may produce a very distorted picture.

The hard sciences are characterized — perhaps even defined — by the methodological consensus that practitioners share: To be a scientist is to use a well-recognized and agreed-upon set of research tools. However, Graham's field of "risk analysis" is too new to have generated this kind of agreement.[257] The National Academy of Sciences' National Research Council, an academic and scientific body that answers to Congress, was appointed to evaluate risk assessment methods and concluded that "among agency decision makers, the courts, Congress, and analysts, there is *no consensus regarding the use of a specific set of analytical techniques for a specific purpose"* — that is to say, there is no consensus on the proper use of the results of risk assessments in risk management.[258]

The still-developing nature of his field no doubt contributes to Graham's demonstrated ability to be loose with his tools and facts. Indeed, as Linda-Jo Schierow explained in a year 2000 Congressional Research Service brief to Congress, "[p]rofessional risk analysts do not agree on how key terms should be defined."[259]

Scientific knowledge is mostly accomplished in incremental, baby steps — and most scientists are therefore concerned with answering the next logical question, rather than with cutting off the pursuit of further knowledge. In contrast, Graham's statements to the media often imply that no additional work on the subject of, for example, pesticides, is necessary and that, in fact, we've been wasting our money bothering with all the research thus far.[260]

The misinformation that results from a partial or self-serving treatment of public health information is critical for the industry's strategy of rule by economic "experts." This is a serious matter of ethics in public policy, in risk communication and in the social sciences generally. As Law Professor Tom McGarity has noted, omissions related to risk assessment in the public health debates obscure problems with the data and the uncertainty of policy conclusions:[261]

> Given the huge uncertainties involved in risk assessment and the extent to which policy fills the factual gaps, the confident portrayal of risks as point estimates in terms of deaths-per-year or dollars-per-death-avoided *do not so much inform decisionmakers and the public as mislead them. . . .*

Graham's attitude is also dangerous because many of the problems addressed in his work are extraordinarily complex. For example, Graham has repeatedly criticized the government's standards for the fuel economy of motor vehicles on "safety" grounds. Yet the collateral benefits of pollution controls is one of the most compelling cases for a risk tradeoff argument, as it is clear that vehicle emissions make a large contribution to air pollution, which has a significant role in global warming.

Global warming is precisely the sort of problem that specific risk assessments (which form the basis of risk management decisions) have trouble addressing, due to the complicated interaction of enormous and subtle factors such as ocean temperature and atmospheric alterations. Solutions to challenges like global warming are often dependent on the continuing development of better monitoring systems and pollution data, but the consequences of inaction while we study the issue could be devastating for the planet as a whole. Acting in accordance with the precautionary principle, in this context, could save us. Graham's "wait and see" approach will not.

As in this example, the value of a risk assessment, or of decisions in risk management, is limited by the types and quality of the information that researchers use as an input — garbage in, garbage out.[262] In areas where researchers have incomplete information, the costs of gathering better information may be considerable, even prohibitive.[263] In the meantime, delaying action may carry its own risks. At that point, our shared values should inform our public policies, because, as any scientist will tell you, we will need to make a judgment call, informed — but not controlled — by the numbers we have available at the time.[264]

Despite Graham's repeated expressions of confidence,[265] the risk assessment process can only very rarely produce a single answer. According to an EPA report on the subject, "depending on the data selected, scientific assumptions, policy calls and perspectives, different experts or organizations may describe risk differently . . . *The risk assessment process has an enormous capacity to expand and contract in line with the available data, science policies, and problems*."[266] In fact, the risk assessment process involves many separate levels of uncertainty, and researchers must make or use specific *policy* assumptions at virtually every step — each of which may be disputed.[267]

Even if Graham were in fact a "scientist," some risk managers have repudiated the determinative role to which Graham aspires. For example, Kristin S. Shrader-Frechette wrote in the journal *Risk* that:[268]

> Because risks do not affect merely current health and safety, but also human autonomy, consent, distributive equity, equal opportunity, future generations, civil liberties, social stability and so on, scientific experts ought not be the sole assessors. Assessments of multi-attribute risks should be the products of social, ethical, cultural and legal rationality— not merely the projects of a bounded scientific rationality.

Science Sellout #2

FLACK SCIENCE:

MANIPULATING THE MEDIA PAYS OFF

If Graham and the other proponents of sweeping regulatory rollback legislation were not as successful as they hoped in 1995, it was not for lack of trying. Alongside conservative think tanks like the Heritage Foundation,[269] third-party "experts" with dubious credentials sought to establish public support for the rollback efforts, among them a corporate front group called the American Council on Science and Health (ACSH). ACSH is still very much in business, and in fact is listed by *USA Today* as one of the most-cited sources in the country.[270] Like Graham's Center, much of the budget for ACSH comes from large corporate donors.[271]

Graham serves on the ACSH board, and in 1994 and 1997 his work and public statements were an integral part of their "Facts, not Fear" campaign to support industry's anti-regulatory efforts on Capitol Hill.[272] In many of the articles covering the ACSH spin, Graham was quoted extensively. Graham also served on the board of The Advancement of Sound Science Coalition (TASSC), a fake grassroots anti-regulatory group founded by APCO & Associates that ran an identical, multi-pronged "Facts, not Fear" campaign.[273]

An article by Sheldon Rampton and Juhn Stauber entitled "The Junkyard Dogs of Science" described the *modus operandi* of third-party pseudo-science groups like ACSH:[274]

> Although ACSH styles itself as a 'scientific' organization, it does very little independent primary research. Instead, it specializes in generating media advisories that criticize or praise scientists depending on their philosophical position. It has mastered the modern sound-bite, issuing a regular stream of news releases with catchy, quotable phrases responding to hot-button environmental issues.

As just one example of Graham and ACSH's handiwork, at the height of the regulatory rollback battles in 1994, ACSH bragged about the success of its "Facts, not Fear" campaign and successful placement of "the ACSH message" in an ABC News special program that failed to mention ACSH's name, saying that "our behind the scenes work and insight were the program's foundation."

ACSH boasted that it had literally put its words in the mouth of ABC reporter John Stossel,[275] who "*after spending lots of time conferring with ACSH and other public health professionals about the true risks to health in America today*,"[276] ran a two-part, prime time, national program suggesting that public fears about chemical and pollution-related threats to health were vastly overblown.

True to their claims, Stossel's piece was called *Are We Scaring Ourselves to Death?* and opened with the following announcer voiceover:[277]

> Fear— it's one our most powerful and complex emotions. Some of us master it and take big risks. It's helped to build America into exploring new frontiers. But others seem almost paralyzed by fear. We're afraid of the air we breathe, the water we drink, the food we eat.

The hour-long special was comprehensive, suggesting that the public was overly fearful about everything from pesticides and cellular phones to crime. Attacking the need for the EPA's Superfund cleanup program, both the ACSH article[278] and the ABC television special included statements of opinion by Graham. The article said:

> Dr. John Graham . . . confirmed that pursuing hypothetical risks is causing 'statistical murder.' For every million we spend to clean up a 'Superfund' site, we could be giving more cancer screening tests, making prenatal care more widely available, funding non-smoking campaigns and testing AIDS drugs.

The program quoted Graham as saying that "[t]he evidence on pesticide residues on food as a health problem is virtually nonexistent. It's speculation."[279] While the chemical industry could not have said it better itself, ABC never mentioned that funding for Graham's Center is provided by more than fifty agribusiness and chemical conglomerates.[280] The corporate-backed ACSH got stealth treatment as well. As they told supporters in their press release, "*Although our name and efforts were sanitized from the ABC program*, the message that ACSH has been reaffirming for over 15 years reached millions of viewers."[281]

Double Feature

In 1996, Graham and the anti-regulation forces repeated the feat on Dateline, in a story focused on the cancer risks of cellular phones. Dateline reporter Robert Bazell stated on the show that "the scare over cellular telephones shouldn't surprise us. Many of us have been confused for years about what causes cancer and convinced that our environment is loaded with agents that are killing us. Trouble is, experts say, that just isn't so."[282]

The program included lengthy comments from Graham, who called himself a scientist, and it failed to mention his potential conflicts of interest. A group of environmentalists pointed out this problem directly to Dateline, complaining in a letter that:[283]

> The report was riddled with factual and interpretive errors, and important omissions. . . . You failed to tell viewers that Dr. Graham's HCRA receives a large portion of its funding directly from chemical and other industrial companies with an enormous financial interest in minimizing public concerns over chemical and pesticide risks — funding sources that even HCRA itself acknowledges openly. The omission is especially ironic given Dr. Graham's allegations during the segment about other scientists' biased or ulterior motivations. You also let stand Dr. Graham's highly misleading reference to 'us scientists,' when in fact his doctorate is in public policy, not science. . . .

The letter also flagged a few of the errors in the report:

NBC Dateline:	Environmentalists respond:
There is no cancer epidemic in the U.S.	According to the National Cancer Institute, cancer of the kidney has increased 116%, liver cancer increased 88%, brain cancer increased 74%, and thyroid cancer increased 102% since 1950. These cancers have been shown in lab tests to be specifically prone to tumor development following exposure to carcinogenic chemicals.
Aging is a 'cause' of cancer.	In fact, a greater percentage of children are developing cancer than ever before. Childhood incidences of leukemia and brain cancer have grown by a third since 1973. Cancer kills more kids under 14 than any other disease.
Graham claims that our understanding of unsafe chemicals is often based on studies that expose animals to unusually high dosages.	According to a recent review by the National Toxicology Program, 94% of all chemicals that cause cancer at high doses are known to cause cancer in low doses as well. In most instances, the cancers simply take longer to develop.

When asked, a Dateline public relations staff member told *Pesticide and Toxic Chemical News* that officials would "let the series speak for itself."[284]

Deja Vu All over Again: Public Health Information in the Hall of Mirrors

Replication of the ACSH message was achieved by a similar campaign launched under the same "Facts, not Fears" title by the Washington, D.C.-based group TASSC. A press release from the group's third anniversary lauded its efforts to help "the public separate sound scientific data from narrow special interest agendas by launching a national "Facts, not Fear" campaign to set the record straight when certain groups seek to accomplish political goals by distorting or ignoring solid scientific data."

As the TASSC brag sheet made clear, Graham served on the group's Advisory Board,[285] which was founded in 1993 by APCO & Associates, a D.C. public relations firm, with money from Philip Morris.[286] TASSC closed up shop in 1998, but was just one of the many front groups for industries hostile to regulation established by APCO in Washington.[287] Public Citizen has previously reported on APCO's systematic creation of fake grassroots (or "astroturf") groups that do political battle on behalf of business for limits on tort liability, an approach that was extremely successful in Texas under then-governor George W. Bush.[288]

APCO advertising material promoted the firm's backdoor approach:[289]

> "You won't read about APCO on the front page of the newspaper talking about our work, but that doesn't mean that our work is not making the front page. Our coalitions speak for themselves and the results speak volumes."
>
> Other promotional literature stated that the firm uses "*campaign tactics to create an environment in support of client's legislative and regulatory goals.* Our staff has written the direct mail, managed the telephone lines [and] crafted the television commercials."

In 1996, TASSC and its organizer Steven Milloy[290] announced a fight to combat "unfounded scares," in which it conducted polls, concocted awards to generate media, and wrote a "series of opinion articles that [were] published in newspapers around the country."[291] As part of the "Facts not Fear" campaign, TASSC gave a "Vindication of Science" Award to silicone breast implants and a "Potential Exaggerated Scare of 1996 Award" to electromagnetic fields.[292]

Science Sellout #3:

SELLING HALF THE STORY

In an attempt to repeat the media whitewash documented in Sellout #2, a pamphlet called "*Facts, not Fears: A Review of the 20 Greatest Unfounded Health Scares of Recent Times*" was sent in 1997 directly to journalists all over the country by the ultraconservative American Council on Science and Health (ACSH). As mentioned above, Graham enjoys a prominent position on the ACSH board and actively participates in its media campaigns.

The ACSH brochure consisted of approximately a page and a half of "research" devoted to each of 20 unfounded "scares," which, according to the group, included the chemical contamination of Love Canal, the Alar pesticide "crisis," the dioxin spill at Times Beach and the removal of asbestos from the public schools.[293]

The propaganda sent out by ACSH *looked* real based on the sheer number of footnotes, but a closer investigation reveals that most cite to books written by Elizabeth Whelan, the director of ACSH. The mailing garnered amazing amounts of media coverage — and yet it was absolutely riddled with factual errors, half-truths, faulty logic and drastic overstatements.[294]

For example, Jane Brody in the New York Times in 1997,[295] and Hilary Shenfield in 1999 in the Chicago Daily Herald,[296] faithfully repeated ACSH's observation in the pamphlet that Unfounded Scare #17, the Alar "crisis," was an overblown, fear-crazed response driven by an irrational public.[297]

Graham was quoted in at least three articles containing the ACSH spin on Alar and gave his endorsement to the notion of the fear-driven public.[298] For example, in a *Time* magazine article called "Keeping Cool About Risk" that mentioned Alar, Graham said: "Phantom risks and real risks compete not only for our resources but also for our attention . . . It's a shame when a mother worries about toxic chemicals, and yet her kids are running around unvaccinated and without bicycle helmets."[299]

Use of the events surrounding Alar as a lesson in anti-regulatory politics was pioneered by anti-regulatory researcher Aaron Wildavsky, in his book, "But Is It True? A Citizen's Guide to Environmental Health and Safety Standards." As OSHA risk assessor Adam Finkel has clarified, that book's various assertions about Alar are "untrue, irrelevant, or at best half-true."[300] Much of the same information on Alar from Wildavsky's book was repeated verbatim in the ACSH brochure, despite the criticism Wildavsky received after the book was published.

For example, citing only to Whelan's book, *Toxic Terror*, the 1998 third edition of ACSH's brochure states:

> Back on the apple farm the effects of Alar's loss are still being felt. Farmers from Ohio to New York are reporting decimation of their crops, and ironically, a need to use additional pesticides to enable the trees to hold their fruit.

In fact, apple sales after Alar recovered nicely. As Finkel wrote in *Who's Really Crying Wolf?,* the truth about the Alar story was far from the way Wildavsky had recounted it. Two of the book's more significant "half-truths" about Alar are below:[301]

Assertions about Alar from Wildavsky's book	Adam Finkel responds:
"It is likely that no child has been harmed by drinking apple juice with trace elements of an Alar metabolite."	A child who drank only four glasses of apple juice each day containing a typical level of UDMH contamination would have eaten nearly 1/100th the amount that caused half of all mice to develop cancer — hardly a 'trace.'
Apple growers in just one state lost at least $125 million after the 1989 'Alar scare.'	By 1991, consumer demand for apples and industry revenues had doubled over 1989 levels, for a net gain of nearly $1 billion in constant dollars.

The ACSH's coverage of Alar was particularly misguided when it came to the risks that the pesticide poses to children. The Natural Resources Defense Council, which first blew the whistle on Alar, explains that "more than half of the lifetime risk of developing cancer from exposure to carcinogenic pesticide use on fruit is typically incurred by the time a child reaches age six." And while apples account for around 2.5 percent of the average diet of North Americans, they are nearly 13 percent of the diet of children.[302]

Seven out of twenty-two of the footnotes in the Alar section cite to Whelan's own books. Yet at least one journalist, Paul Harvey, described the ACSH pamphlet as "meticulously researched."[303] And ABC reporter John Stossel, whose anti-regulatory work is discussed in Sellout #1, was still trotting out the Alar example during talks last year as indicative of government regulation gone amuck.[304] Notably, Graham also features the Alar example in an upcoming HCRA "executive education" course on risk perception and risk communication.[305]

The brochure by ACSH claims:

As the public followed the Alar story, it learned of the basis for the government's risk estimates — and it began to see how poorly such tests actually predicted human cancer risks. More generally, many consumers started to grow skeptical of the countless health scares popping up almost daily in the media.

If only it was not so.

Science Sellout #4:

MISLEADING RISK COMMUNICATION:

THE DIFFERENCE BETWEEN FALLING AND BEING PUSHED

Graham has said that "the difficulty we face in our culture is that we don't have highly reliable, trustworthy sources of information about what are the biggest risks in life. So many people are confused; they're bombarded with information."[306] Another article, on the risks posed by electromagnetic fields, quotes Graham as saying that "the highest priority for our children should be preventing the known risks before we become paralyzed by speculation. So let's get on with bicycle helmets, poisoning prevention, and immunizations."[307]

Graham frequently has called attention to what he labels a "syndrome of paranoia and neglect" that afflicts the public's response to risk.[308] Graham and his allies frequently suggest that we simply fear too much — that we pay too much attention to some risks while ignoring others. Graham goes pretty far with this — literally calling the misallocation of our "risk" resources "statistical murder."[309] While there is a kernel of truth in the observation that we may pay considerable attention to certain kinds of health risks and under-react to others, Graham exploits that kernel.[310]

In the real world, of course, we are fully capable of both choosing to wear a bicycle helmet *and* worrying about that messy Superfund site next door. Studies in a field of research called *risk perception* have turned up interesting results.

The public knows, for example, that it is cheaper to avoid some risks at the outset than to deal with them later, and that if we allow companies to make a toxic mess, chances are we might all have to pay to clean it up.[311] Studies show that the public expects the government and industry to cover some risks, *i.e.*, toxic chemicals, while individuals should take care of others, such as those which involve matters of personal choice.[312] And risks that are assumed voluntarily are morally distinct from those imposed upon us against our will. As environmentalist Mark Sagoff put it: "*There is an ethical difference between falling and being pushed — even if the risks and benefits are the same."*[313]

Research also shows that the public most wants the government to act when it is helpless about preventing risks and needs good information about exposure and possible health consequences.[314] This makes sense because the government has the resources to collect the information and the obligation to share it with the public. That kind of protection, in a fundamental sense, is what government is for.

Additionally, if the public did not cause the risk and did not benefit from it, we in the public rightly expect not to be harmed at all. This is reflected in research that shows that we expect the distribution of costs for the cleanup to be fair.[315] If a company has polluted, we expect that company to clean it up, because it profited when it made the mess.[316]

We also expect the government to encourage and enforce safe behavior by individual people and corporations, because it makes financial sense to concentrate our efforts in that way.[317] And where we may not be certain of the safety of some chemical or activity, but the possible health consequences are awful, we expect the government to step in until we know that the situation is safe.[318]

Falling Versus Being Pushed:
Factors That Influence Our Feelings About Risk

- **Catastrophic potential:** We believe that some risks are worth extra money to avoid because the possible consequences are awful.
- **Fairness:** It is important to know who benefits from the risk-creating activity and who is exposed to the risk. Risk research shows that the public believes that even small risks should not be borne by those who have not benefited from the risky activity.
- **Control:** It matters who is in charge of controlling the exposure or hazard, and whether the public trusts that organization or individual.
- **Voluntariness:** Our sense of the reasonableness of a risk also depends upon whether exposure to it occurs without the public's knowledge or consent.

As one researcher on risk perception notes, "knowledge and ignorance exist for both laypeople and experts."[319] When being asked to think about a risk/risk tradeoff, it is critical to ask what kinds of risk we are being asked to compare and how justified we are in thinking: *those risks refer to different things*.[320]

When we understand the importance of factors like control, fairness and voluntariness, pesticides and bicycle helmets might as well be penguins and bathtubs. This shows us that ordinary citizens — and the regulators in the government — are actually much more sophisticated and discerning than Graham's analysis. In fact, we can and do worry about toxic chemicals and preventing injuries at the same time, and still can sleep at night.[321]

Bicycle Helmets All Around

According to the Web site of Graham's Harvard Center for Risk Analysis (HCRA), the general population has a 1 in 385 chance of dying of heart disease, a 1 in 519 chance of dying of cancer, a 1 in 65,116 chance of death by drowning, and, coming in last on HCRA's list, a 1 in 369,881 chance of dying in a bicycle accident.[322]

Despite these slim odds, Graham has often suggested that purchasing bicycle helmets for children would be the best expenditure of our limited risk resources.[323] To find out the extent of Graham's support for reducing risks by asking children to wear bicycle helmets *instead of* worrying their parents about pesticides, we looked at the record of his participation in the congressional debates over these issues.

From 1993 to 1996, regulatory rollback efforts on Capitol Hill were gathering steam. Graham testified to least four committee meetings on rollback proposals, and his statements on the issues found their way into several of the key floor debates.[324] The bills generally addressed the concentration of regulatory review power in the OMB and would mandate priorities on a cost-efficiency basis. Graham devoted the September 1993 issue of the HCRA newsletter to an EPA regulatory rollback bill that was under consideration by Congress, and, following a discussion, that newsletter was added to the Congressional Record on September 13, 1993.

On November 11, 1993, Graham testified at a meeting of the Senate Committee on Energy and Natural Resources "on the use of risk management and cost-benefit analysis in setting environmental policy priorities."[325] Graham also testified at a joint hearing on pesticides on September 21, 1993.

Other issues were also moving on the Hill. Nine days after the regulatory rollback hearing, on November 20, 1993, the Senate passed the Child Safety Protection Act, the second section of which was known as the Children's Bicycle Helmet Safety Act of 1994.

The Act provides funding for the promotion of bicycle helmets to children and authorizes the Consumer Product Safety Commission (CPSC) to create consumer standards for the helmets. Based upon a search of the Congressional Record, Graham was not involved with any of the hearings or floor debate on the Children's Bicycle Helmet Safety Act.[326]

The Child Safety Protection Act was signed into law by President Clinton on June 16, 1994. But in an article published in *Time* magazine in September 1994, Graham failed to mention this great leap forward for risk reduction, saying instead only that: "Phantom risks and real risks compete not only for our resources but also for our attention . . . *It's a shame when a mother worries about toxic chemicals, and yet her kids are running around unvaccinated and without bicycle helmets.*"[327]

We decided to ignore the distributional questions — parents, and not the government, usually purchase bicycle helmets — and looked into whether we could figure out how valuable bicycle helmets are, and how many helmets, as a society, we would need by collecting data about the number of children that currently have bicycles but ride them without a helmet on.[328] We found that this kind of information can be hard to come by.

An audit by the General Accounting Office (GAO) in 1997 showed, in fact, that the kind of risk management that Graham has promoted for all these years, and presumably, that he relied upon for his recommendations about the use of bicycle helmets, has thus far proved nearly impossible for the Consumer Product Safety Commission itself to do.[329] The CPSC has jurisdiction over bicycle helmets, children's toys and poisoning prevention (another Graham favorite), as well as many other areas.

But a GAO study called "Consumer Product Safety Commission — Better Data Needed to Help Identify and Analyze Potential Hazards," concluded that, due to the lack of good data on the hazards to consumers, the CPSC is actually unable, as an agency, to do very meaningful risk assessment or cost-benefit analysis:

> CPSC's data are often insufficient to support a thorough application of . . . both risk assessment and cost-benefit analysis. . . . *CPSC's imprecise and incomplete death and injury data make risk assessment and cost-benefit analysis at best less reliable and at worst impossible to do.*

Lest it be thought that the GAO's evaluation methods were incomplete, it should be noted that Graham was himself consulted about the appropriate methods for GAO investigators to use in their study.[330]

Science Sellout #5:

CONCOCTING "SCIENCE"

FOR CORPORATE COUNTER-SPIN

Billions of pounds of styrene are produced each year to make products such as rubber, plastic, insulation, fiberglass, pipes, automobile parts, food containers and carpet backing.[331] The public is routinely exposed to low levels of styrene in consumer products, cigarettes, and our water and air.[332]

Studies have shown that someone who breathes high levels of styrene for even a short period of time is likely to experience nervous system effects such as depression, concentration problems, muscle weakness, fatigue and nausea. Other research involving workers has shown that breathing styrene over a longer time may cause leukemia.[333] Based on this research and our other experience with the chemical, government agencies have determined that styrene is dangerous in high doses and regulated it accordingly.[334]

But just in case the public was concerned that these regulations might be a little too strict for our own good, Dow Chemical and the Harvard Center have got us covered.

Dow's official Web page whitewashes what we know about the health effects of styrene and mentions that the company has funded a study by HCRA, timed to be released alongside the EPA's upcoming risk assessment:[335]

> For many years, Dow and the global styrene industry have supported extended and continuing research on styrene . . . even though most government studies conclude that if exposure guidelines are followed, the substance does not pose a danger to human health. . . .One such effort is a cooperative effort between the U.S. Environmental Protection Agency (EPA) and the Styrene Information and Research Center (SIRC) to fully review all the scientific data, and to develop a hazard assessment for all potential health effects. . . .
>
> Additionally, the Harvard Center for Risk Analysis is conducting a full risk assessment of styrene, which will look at all potential health effects and exposures. This risk assessment will better determine whether or not existing regulations adequately protect public health. The Harvard review was made possible with the assistance of a grant from SIRC. We will study carefully both the EPA styrene recommendations and the Harvard risk assessment, both due for publication by mid-2000.

The EPA's study has not yet been released; unsurprisingly, neither has HCRA's.

It is typical for industry to proactively combat the anticipated findings of government regulators by funding their own research, the release of which is timed to coincide with the publicity given to government findings on health risks. The corporations know that in their search for balance, journalists are likely to cover both studies in the same article.

What the public hears is the mixed message that while some government scientists are saying, "cancer," other scientists are saying, "no cancer." The net effect is that the studies' conflicting results muddy the waters, canceling out some of the negative information and associations for the companies whose profits — and public relations — are on the line.

Industry will go to surprising lengths for this effect. There have likely been such efforts on behalf of the cell phone industry (see Case Study #2), and there was a similar, all-out assault on a World Health Organization (WHO) study of the carcinogenic effects of second-hand smoke.

Elisa Ong described the major onslaught planned and carried out by Philip Morris and big tobacco to blunt the impact of the long-awaited WHO study (by a group called the International Agency for Research on Cancer, or IARC), with a kind of awe:[336]

> The massive effort launched across the tobacco industry against one scientific study is remarkable. Whereas over ten years the IARC study is estimated to have cost 1.5 to 3 million, PM alone budgeted at least $2 million for "IARC" plans for just one year (1994) and proposed $4 million for studies to help discredit IARC's work. *The elaborate plans were developed by PM's top management, implemented by an elite task force, and designed to coordinate the international tobacco industry. The complex plan relied on third-party vehicles that did not reveal the extent of the industry's efforts to shape the scientific, communications, and government relations issues of secondhand smoke on a worldwide basis.*

As Case Study #1 details, Graham was involved in the domestic effort on behalf of Philip Morris during this period. He was also on the board of the APCO's & Associates, Philip Morris-founded group TASSC, which, as Ong documents, put together a European "TASSC" sister group for the IARC study media miseducation campaign in Europe.[337]

Stealing the Future

A related practice is the full-on counter-spin of the anticipated publication of an environmentally friendly book or major article. Having seen the consciousness-raising that can result from a single book in the cases of Ralph Nader's *Unsafe at Any Speed*, and Rachel Carson's *Silent Spring*, industries awaiting a new, potentially informative book can afford to take no chances.

The publication of the book *Our Stolen Future: Are We Threatening Our Fertility, Intelligence, and Survival? A Scientific Detective Story* by Theo Colborn, Dianne Dumanoski and John Peterson Myers, which addressed the potential health effects of dioxin and other hormone-disrupting chemicals and contained a foreword written by then-Vice President Gore, threatened to be another potential watershed in public education over health hazards. The book documented such chemical-induced health effects as widespread reproductive problems, childhood hyperactivity and a decline in global intelligence.

So the flack army went to war. A timely *Washington Post* article by Rick Weiss and Gary Lee focused mostly on the counter-spin. Entitled "Pollution's Effect on Human Hormones: When Fear Exceeds Evidence," the article gave a prominent position to comments from Graham:[338]

> " 'True or not, the idea that chemicals are wreaking havoc with our reproductive systems has all the elements needed to provoke a public panic,' said John Graham."
>
> Graham had the last word in the article: " 'We are just beginning to understand why we are so paranoid about some risks and tragically neglectful of others,' [Graham] said. 'But in the final analysis, it often comes down to, who do we trust? *And that makes risk management very difficult these days, because people aren't inclined to trust anyone*.'"

Shifting attention away from a potential health threat to the public's irrational response is a time-honored tactic. Scary things show that the public can be scared, the *Post* editorialized: "Like similar controversies over global warming and the health effects of electromagnetic fields, concerns over endocrine disrupters *show how easily people can be persuaded to worry about a potential health threat when scientific evidence is incomplete*."[339]

Following a partial description of the book's findings, the *Post* also reported on the turf battle:[340]

> That kind of talk has set off alarms in the chemical industry. Almost immediately after the book was released, the Chemical Manufacturers Association sent journalists *a 23-page sheaf of paper citing scientific studies that contradict the findings mentioned in the book*. The Competitive Enterprise Institute, a conservative Washington-based think tank, held a briefing to attack the book. And the American Council on Science and Health, a new York-based group funded by food and chemical interests including the National Agricultural Chemicals Association, *distributed a 13-page point-by-point rebuttal of the book's claims*.

In anticipation of the book's release, the chemical industry had concocted elaborate plans to "counterattack against the issue of endocrine disruptors. . . . Among those in the huddle were the Chemical Manufacturers Association [now called the American Chemistry Council], the Chlorine Chemistry Council . . . and the American Crop Protection Association." All three are HCRA funders, as are Dow, Du Pont and many other chemical and agribusiness conglomerates, but Graham's conflicts of interest were not disclosed in the *Post*.

The chemical industry's other flack scientists jumped on the bandwagon as well. *PR Newswire* reported that in 1996 "TASSC established a scientific 'truth squad' in response to unfounded environmental doomsday predictions in the book 'Our Stolen Future.' "[341]

The TASSC press release described the set-up:[342]

> It is often difficult for the public and the news media to get at the scientific facts. To help, TASSC brought together 10 scientists to produce a fact sheet, "What Scientists Are Saying," in reference to the book "Our Stolen Future." *TASSC was concerned that news media coverage of the book would prompt an unnecessary public health scare.* The statements provided by toxicologists, endocrinologists and others attracted significant media interests.

Steven Milloy, the former president of TASSC, directs a "junkscience.com" Web site that still contains a mockumentary of the 60 Minutes coverage of the book, complete with pejorative cartoons of the 60 Minutes staff under the heading "Our Swollen Future."[343]

The American Council on Science and Health (ACSH), another Graham-affiliated group, summed up the success of the counter-spin effort in an aside to their write-up of the Alar issue, commending the many "balanced journalists" who had, thanks to the efforts of ACSH and other front groups, given equal air time to the environmentalist message of *Our Stolen Future* and to the industry's flack science assault.[344]

Of course, the replication of the message is the point. The way a corporate "fun-house hall of mirrors" is used to pre-determine the political atmosphere in support of a particular agenda was first captured in 1981 by Karen Rothmeyer in an article for *Columbia Journalism Review*:[345]

> Layer upon layer of seminars, studies, conferences, and interviews, [can] do much to push along if not create, the issues, which then become the national agenda of debate . . . . *By multiplying the authorities to whom the media are prepared to give a friendly hearing, [corporate dollars] have helped to create an illusion of diversity where none exists.* The result could be an increasing number of one-sided debates in which the challengers are far outnumbered, if indeed they are heard from at all.

Science Sellout #6:

THE MISUSE OF SCIENTIFIC UNCERTAINTY

Graham has attempted to institutionalize an emphasis on studies that return inconclusive results, which he called "negative studies." According to a memorandum written by a member of Philip Morris' regulatory monitoring team in 1992, at a conference on Occupational Health and Safety Risk Assessment, Graham recommended that a panel be created that would be required to "review" all of the "negative," as well as the positive, epidemiological findings on a particular issue *before* a risk assessment could begin to be conducted by OSHA.[346]

While this may sound reasonable at first, merely adding up the studies that produced results suggesting "no correlation" and allocating research resources accordingly may cut off the inquiry far too soon. For example, cigarette research required 100 years before a link between cigarette smoke and lung cancer was established, while asbestos research took 80 years to make the link to cancer.[347]

And Graham's insistence upon calling inconclusive results a "negative" study is itself misleading. People are generally aware that a poll that asks 50 people a question will not produce results that are as significant — or "powerful" — as a poll that asks 400 hundred people the same question.

In the same way, the meaning of a research project can be determined by many factors, including the number of people or animals included in the study and the relative commonness of the disease being studied. A study with very little "statistical power" should not be labeled a "negative" study *just because it failed to detect a correlation that it had very little power to find*.

In those cases, it is always possible that a more powerful study would detect a cause-effect relationship between a person's exposure to a harmful substance and a particular disease or symptom. Because the power of the study always matters, counting the number of inconclusive studies provides little or no useful information — and it is very misleading to suggest that studies can be just added up to conclude that a substance is safe. Graham's "review" process may add needless delay, confuse the issues, and, depending upon whether such a review was used to shut down the inquiry, place undue emphasis upon low-power studies that are inconclusive, rather than "negative."

Suspicion of Graham's suggestion may be justified by past experience on such issues. Even when a study is not negative, industry has sometimes seized upon inconclusive results to suggest that we are risk-free. Elisa Ong reported in *The Lancet*, the leading British medical journal, that a major study by the World Health Organization (WHO) demonstrating that second-hand smoke increases cancer risks by 16 percent was frequently mischaracterized in the media as not showing *any* increase in risk, due to a multimillion-dollar, decade-long spin campaign that was conducted by Philip Morris and its tobacco industry allies in anticipation of the WHO results.[348]

How did the study's real results get blurred? The industry hired guns interviewed by the media on the issue repeatedly suggested that *inconclusive* numbers meant that the study showed *no risk.*

Graham was affiliated with the organization that helped to carry out this smear campaign by Philip Morris.[349] More importantly, however, this example shows the technique that allows companies to seize upon the findings of a single study to proclaim that a product is safe for all time and all uses

In contrast, a recent article about a Danish research project that showed no link between cellular phones and cancer properly contextualized the study's inconclusive finding. Despite a flack science attempt to spin the results — a Washington, D.C., science group disseminated an "editorial" with the Danish study "derid[ing] the 'fear merchants' who say links to cancer exist" — the *Washington Post* was careful to clearly explain what the Danish study did, and did not, mean.[350]

First, the article specifically noted the limitations of the study by saying that it "did not address whether users [of cell phones] might be susceptible to other diseases." Second, the study noted that there was a major distinction between characterizing the results as conclusive evidence that cell phones are now "safe" and saying, correctly, that the study suggests that "there is increasing evidence against the hypothesis that use of cellular telephones causes cancer."[351]

This is a critical distinction for the clarity of communication with the public. George Carlo, who has tangled with Graham over his cellular phone research,[352] explained in the article that "[t]he idea that there is 'increasing evidence' against health risks is 'a lot different than implying to consumers that there is *no* risk.'"[353]

No Comment I:

CONSUMERS UNION LETTER TO EPA AND USDA

ABOUT A HCRA PESTICIDE STUDY[354]

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April 19, 2000

The Honorable Dan Glickman
Secretary
United States Department of Agriculture
14th Street and Independence Avenue, SW
Washington, DC 20250

The Honorable Carol M. Browner
Administrator
Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

Dear Secretary Glickman and Administrator Browner:

We are writing to express our concerns about a recent study by the Harvard Center for Risk Analysis (HCRA) concerning purported economic effects of pesticide regulation. The study, Risk/Risk Tradeoffs in Pesticide Regulation: Evaluating the Public Health Effects of a Ban on Organophosphate and Carbamate Pesticides, is biased and fundamentally flawed, and reaches conclusions that are not remotely credible. Nevertheless, this study, and the prestigious name of Harvard, are being used to frighten the public about potential consequences of implementing the Food Quality Protection Act (FQPA), and to generate support in Congress for rolling back the FQPA's key public-health provisions.

The HCRA study was paid for by the American Farm Bureau Federation (AFBF), which has waged a vociferous campaign to undercut the FQPA. The study rests upon admittedly unrealistic assumptions and a remarkably shallow analysis, yet reaches blatantly inflammatory conclusions. For example, the study asserts that FQPA implementation could result in up to 1,000 premature deaths per year due to decreased food consumption, an incredible claim. Nevertheless, assertions that the FQPA will kill the very children it aims to protect have been cited as "The Truth from Harvard" in partisan editorials in the agricultural and pesticide industry trade press. The HCRA study is also cited in a letter from several members of Congress to Administrator Browner that warns of unintended adverse public-health effects of FQPA implementation.

We urge you, Administrator Browner, to firmly resist political pressure based on this severely flawed study. We also understand that USDA has been asked to meet with the authors of the study, to hear a presentation of its findings. Secretary Glickman, we hope you will take great care to ensure that USDA does nothing to enhance the credibility of this partisan and unsound research. We urge that any meeting between the authors of the Harvard study and USDA staff be structured so that USDA experts on pesticide risk analysis have "equal time" to point out the mistakes and flawed assumptions of the study.

The most prominent flaws of the Harvard study are: (1) the authors assume that implementation of the FQPA would result in a catastrophic loss of insecticides available to farmers for control of crop pests, and (2) they ignore the availability of alternative chemical and non-chemical pest control options, which would replace FQPA-curtailed uses of high-risk chemicals and largely offset economic impacts of restrictions on the highest-risk insecticides.

(1) Unrealistic Assumptions About Loss of Insecticides

The authors assume that EPA will ban all uses of all organophosphate (OP) and carbamate insecticides. This scenario, a complete ban of more than 50 chemicals, has never been even a remote possibility; it is far outside the scope of any action EPA has ever considered necessary to attain the FQPA's goals. The study's authors acknowledge this fact, then base their analysis on what they concede is a false assumption. They justify their decision on account of its "analytic virtue" (i.e., simplicity).

Of the 35 economically important OP and carbamate insecticides used in food production, only about 15 leave detectable residues in foods, based on several years of data from the USDA Pesticide Data Program. Well over half of the 600+ current uses of OPs and carbamates pose minimal risks of dietary exposure and are likely to survive EPA's review. Consumers Union's analyses of residue and toxicity data have repeatedly shown that only about 100 of those 600+ uses account for more than 99 percent of dietary risk. (See for example, D*o You Know What You're Eating? An Analysis of U.S. Government Data on Pesticide Residues in Foods*, by Consumers Union, January 1999. This and other analyses of the PDP data are on CU's FQPA project web site, at http://www.ecologic-ipm.com.) Our analyses have shown that EPA could eliminate most of the risk associated with dietary OP and carbamate residues by targeting its regulatory actions against selected uses of just eight to ten pesticides.

(2) Failure to Consider Available Alternatives

Consumers Union has also shown in published analyses that multiple and cost-effective alternative pest-management options are available for nearly all high-risk OP and carbamate uses. (*See Worst First: High-Risk Insecticides, Children's Foods and Safer Alternatives*, Consumers Union, September 1998, also available at the web address above.)

The Harvard analysis-like an earlier AFBF-sponsored study by Texas A&M University, on which the HCRA analysts relied-dismisses alternatives to OP and carbamate insecticides as more costly, and makes no effort to assess chemical or non-chemical control options that would replace specific banned uses. The study assumes massive losses of effective pest control, with severe associated economic losses and food cost increases. These assumptions are unfounded, and the projected economic impacts are completely unrealistic.

There are many existing, proven alternatives to high-risk insecticides. Some of these are lower-risk OP and carbamate uses that will survive FQPA reassessments, which the Harvard study assumed out of existence. In addition, spurred in part by pressure the FQPA has created to phase out older, high-risk chemicals, the pest-control industry has been introducing new products at a record pace. EPA's just released biennial report lists over 50 new active ingredients registered, more than half of which meet the agency's "reduced risk" criteria. The HCRA analysis ignores these effects of market-driven innovation and progress made by growers in adopting biointensive Integrated Pest Management (IPM). (See ***Pest Management at the Crossroads***, Consumers Union, October 1996; also see, http://www.pmac.net.)

The HCRA assertion that alternatives are "too costly" is based on no analysis of actual costs and is simply not credible. The facts are that pesticide prices and expenditures in the U.S. are falling across the board. The dozens of new products registered in most crop markets have unleashed something of a price war, with some new products discounted to gain market share. In other crop markets, new products are more costly per acre but they are worth more because they work better and are less disruptive to beneficial organisms on the farm.

In summary, we hope both USDA and EPA will look very critically at the flaws in this alarmist Harvard study and widely publish your criticisms. The FQPA was passed unanimously by both houses of Congress, a testament to the hard work its sponsors devoted to reaching a consensus that all sides could live with. The reforms embodied in the FQPA were urgently needed to replace a regulatory system that all agreed was outdated and ineffective in protecting the health of children. It is the AFBF's overt attempts to undermine that compromise, and the willingness of academic researchers to lend their prestige and biased analysis to that campaign, that pose a danger to public health, not the FQPA itself.

We urge USDA and EPA to redouble your efforts to fully and fairly implement the Food Quality Protection Act. The nation's children need you to carry this fight forward on their behalf.

Thank you very much.

Sincerely,

Adam J. Goldberg	Edward Groth III, Ph.D.	Charles M. Benbrook, Ph.D.
Pesticide Policy Analyst	Senior Scientist	FQPA Consultant
Consumers Union	Consumers Union	

No Comment II:

NATURAL RESOURCES DEFENSE COUNCIL LETTER TO THE WASHINGTON POST ABOUT HCRA'S DAVID ROPEIK[355]

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10 August 2000

Letters to the Editor, *The Washington Post*

1150 15th Street, NW

Washington, D.C. 20071-0070

Dear Editor:

Science for Sale?

Isn't it ironic that David Ropeik in his August 6 op-ed ("Let's Get Real About Risk") calls for the creation of a trustworthy, unbiased, non-governmental risk assessment institute when his own organization breaches this ethical code?

While Mr. Ropeik taps the credibility that comes with his affiliation with Harvard University, he fails to publicly disclose his center's corporate ties. Most of the funders of the Harvard Center for Risk Analysis are industry groups including the Chemical Manufacturers Association, Chlorine Chemistry Council, American Crop Protection Association, Monsanto, and International Paper.

The Harvard Center for Risk Analysis recently completed a study which concluded that the hazards of talking on a cell phone while driving are relatively small. The study was funded by AT&T Wireless Communications. Earlier this year the Center issued a report in which its comparative analysis of pollution from diesel and natural gas heavy duty trucks echoed the position of the company that paid for the report - Navistar - one of the few diesel engine manufacturers that does not make natural gas engines. Furthermore, a 1999 Center report, based on admittedly extreme assumptions, concluded that stopping the use of older, highly toxic pesticides would oddly result in an increase in premature deaths. This study was widely criticized for its twisted application of risk assessment techniques. The study was funded by the American Farm Bureau Federation, which opposes restrictions on pesticides.

An openly neutral evaluation of risk cannot be accomplished in the presence of financial conflicts of interest. Ropeik and his center appear to be satisfied with the veiled appearance of such neutrality. And on that disingenuous count they invite our trust.

Steven Gurney, M.S.

Gina Solomon, M.D., M.P.H.

Health & Environment Program, Natural Resources Defense Council

PART FOUR

Appendix A
In His Own Words

John Graham has a somewhat unique view of the world. A sample of his statements to the media and Congress on risk issues over the past decade is presented below.

On the value of human life:

"We do hold, as a society, I think a noble myth that life is priceless but we shouldn't confuse that with reality. Everyday in our lives, we make decisions that put ourselves at risk in exchange for other benefits that we desire." Andrew Holtz, "Risk Analysis Aims to Help People Assess Danger," *CNN Health Works*, July 19, 1993 (quoting Graham).

On the role of environmental regulation:

"[E]nvironmental regulation should be depicted as an incredible intervention in the operation of society." "Risk-Expert Graham as Political Guru," *Air/Water Pollution Report's Environment Week*, Feb. 2, 1996 (quoting Graham's talk at a Heritage Foundation event).

On the public's affliction with a risk "syndrome":

"The public's general reaction to health, safety and environmental dangers may best be described as a syndrome of paranoia and neglect." John D. Graham, "Making Sense of Risk: An Agenda for Congress," in Risks, Costs and Lives Saved (Robert Hahn, ed., Oxford University Press 1996).

On the tradeoffs between "our" environmental protection resources (i.e., industry's foregone profits) and other social and political goals:

"[T]he reality of scarcity is more apparent today than ever before. Indeed, the scarce human and material resources devoted to environmental protection are resources that we cannot use to combat crime, educate our children, reduce poverty, improve health care, strengthen national defense, and meet the basic needs of citizens and their families." Testimony of John D. Graham before the Senate Energy And Natural Resources Committee on Risk Analysis in Environmental Policy-Making, Nov. 9, 1993.

On the 'statistical murder' committed by environmental controls:

"The failure to compare the costs of toxin control rules to rules on health care and injury prevention and to allocate resources based on those comparisons is resulting in 'statistical murder.' " David Lore, "Determining Toxic Risks Is Costly Voodoo, Lawyer Says," *The Columbus Dispatch*, Nov. 24, 1995 (quoting Graham).

On the "statistical murder" of statistical citizens:

"The real cost of making ill-informed public health decisions is the 'statistical murder' of citizens who die or suffer from proven, yet neglected hazards." John D. Graham, "There's A Deadly Confusion About Health Risks," *The Houston Chronicle*, Nov. 29, 1996.

On the paralysis that could be caused by speculation about risks:

"[T]he highest priority for our children should be preventing the known risks before we become paralyzed by speculation. So let's get on with bicycle helmets, poisoning prevention, and immunizations." "More Worrisome News About Electromagnetic Fields," *Child Health Alert*, Dec. 1992 (quoting Graham).

On the importance for public health of cheap, but pesticide-laden, fruits and vegetables:

Graham was quoted as concurring with the author's suggestion that pesticide regulation will backfire because it raises food prices. Graham said, "The economics is at the most basic level. If the prices of fruits and vegetables go up, people are likely to eat fewer fruits and vegetables. This is not rocket science [and] journalists do not need advanced degrees from Harvard" to conclude that raising prices will make the population less healthy. David Shaw, "It's All So Scary: Americans A Bunch of Chicken Littles: Is It the Media's Fault," *The Plain Dealer*, Oct. 2, 1994.

On problems in public understanding and the role of "powerful interests":

Graham said the results of a risk perception survey he did in 1999 were due to "the intuitive problems that people have understanding probabilities. It may also reflect the fact that there are powerful interests in society who benefit from efforts to frighten people. Furthermore, the media has a tendency to focus on all the bad things that could happen to people." "Health Risks: Public Overestimates, Says New Poll," *American Health Line*, Jan. 28, 1999.

On women and a study that showed their more protective attitude toward risk:

In a study that purported to show that women believe in "widely reported, but unproven, 'hazards,' " Graham found that women were more likely than men to believe in these kinds of risks by a margin of 10 points or more, and stated, "Some suggest that because women give birth, protect and care for their children, they may naturally tend to be more nurturing than men, therefore they may be more concerned about hazards that may harm their families . . . Another possible explanation is that women are less familiar with science and technology than men, and are generally more fearful of it, especially in relation to nuclear power and chemicals." Special Report, "Women's Magazines: A Liberal Pipeline to Soccer Mom," *Media Research Center*, Nov. 21, 1996 (see <www.mediaresearch.org/scripts/temp/Doc3892.html>).

On the Clean Air Act's lack of sufficient indoor pollution controls:

"Congress recently wrote a 1,000 page law aimed at cleaning up the last 10 percent or so of pollutants in outdoor air, even though public health is more determined by the quality of air indoors, where people spend most of their time." Testimony of John D. Graham before the House Government Affairs Committee on Regulatory Revision, Feb 15, 1995.

On the risk of several members of Congress being hit by a crashing airplane near the U.S. Capitol during a hearing:

To demonstrate how small a one in a million risk of cancer from pesticides is, Graham told a Senate committee: "How small is this risk? By way of comparison, there is a tiny yet non-zero chance that during this hearing an airplane will inadvertently miss National Airport, crash near the Capitol, and strike several Members of Congress. It turns out that a baby born today has not one chance but roughly five chances in a million of suffering this outcome in his or her lifetime." Testimony of John D. Graham before the Senate Energy and Natural Resources Committee on Risk Analysis in Environmental Policy-Making, Nov. 9, 1993.

On the EPA's emphasis upon safety (rather than "willingness to pay," an industry-slanted economic tool that asks how much the public would pay polluters to stop polluting):

"Unfortunately, EPA is often guilty of 'asking the wrong questions' (such as asking what is 'safe' rather than considering how much we are willing to pay for various amounts of risk reduction)." Testimony of John D. Graham before the Senate Energy and Natural Resources Committee on Risk Analysis in Environmental Policy-Making, Nov. 9, 1993.

Appendix B

LIST OF HARVARD CENTER FOR RISK ANALYSIS

FUNDING SOURCES

The Harvard Center for Risk Analysis receives financial support from a vast number of private corporations and trade associations, as well as a few government agencies and conservative advocacy groups. According to information provided over the phone by staff at HCRA and the Center's Conflict of Interest policy, these lists are "cumulative," showing all HCRA donors, past and future. There is no mention of the amount of the donation, or list of companies that support the Center on a regular basis. Therefore, the presence of an entity on this list could represent a single donation or a tradition of ongoing support. These organizations provide funding to the HCRA either in the form of restricted or unrestricted grants. The information on products and companies below is from the named corporation's official Web site, unless otherwise specified. Information on dioxin producers is from a partial list created by the Center for Health, Environment and Justice. Unrestricted grants are sorted by industry. Funders may be listed in more than one category.

Unrestricted Grants: List of Donors

Agribusiness

- American Crop Protection Association *(Dioxin Producer)*
- Dow Chemical Company *(Dioxin Producer)*
- DowElanco (Dioxin Producer)
- DuPont Agricultural Products *(Dioxin Producer)*
- E.I. DuPont de Nemours & Company
- Hoeschst Marion Roussel *(Dioxin Producer)*
- Monsanto Company *(Dioxin Producer)*
- Novartis Corporation
- Novartis International
- Pharmacia

Chemicals

- Air Products and Chemicals, Inc. *(Dioxin Producer)*
- 3M *(Dioxin Producer)*
- ARCO (Atlantic Richfield Company) Chemical Company *(Dioxin Producer)*
- BASF *(Dioxin Producer)*
- BP America Inc. *(Dioxin Producer)*
- Cabot Corporation Foundation *(Dioxin Producer)*
- Chemical Manufacturing Association (now the American Chemistry Council) *(Dioxin Producer)*
- CIBA-GEIGY Corporation *(Dioxin Producer)*
- Cytec Industries *(Dioxin Producer)*

- Dow Chemical Company *(Dioxin Producer)*
- Eastman Chemical Company
- E.I. DuPont de Nemours & Company
- Exxon Corporation *(Dioxin Producer)*
- FBC Chemical Corporation *(Dioxin Producer)*
- The Geon Corporation *(Dioxin Producer)*
- Hoeschst Celanese Corpration
- Hoeschst Marion Roussel
- Hoffman-LaRoche Inc.
- ICI Americas Inc. *(Dioxin Producer)*
- Louisiana Chemical Association *(Dioxin Producer)*
- Lyondell Chemical Company *(Dioxin Producer)*
- Millennium Chemical Company
- Mobil Foundation, Inc. *(Dioxin Producer)*
- Olin Company Charitable Trust *(Dioxin Producer)*
- Praxair, Inc. *(Dioxin Producer)*
- Rohm and Haas Company *(Dioxin Producer)*
- Union Carbide Foundation ($10,000 to HCRA) *(Dioxin Producer)*

Consumer Products

- Eastman Kodak Company *(Dioxin Producer)*
- Procter & Gamble Company
- Reynolds Metals Company Foundation *(Dioxin Producer)*
- Rohm and Haas Company *(Dioxin Producer)*

Financial Services and Insurance Companies

- Aetna Life & Casualty Company
- Boatmen's Trust

Food

- E.I. DuPont de Nemours & Company
- The Coca-Cola Company
- Frito-Lay
- Grocery Manufacturers of America
- Kraft Foods
- National Food Processors Association
- PepsiCo Inc.
- Procter & Gamble Company

Heavy Industrial

- Alcoa Foundation *(Dioxin Producer)*
- American Automobile Manufacturers Association
- Astra AB
- Bethlehem Steel Corporation *(Dioxin Producer)*
- Cement Kiln Recycling Coalition *(Dioxin Producer)*
- Emerson Electric
- Ford Motor Company
- General Electric Fund
- Inland Steel Industries *(Dioxin Producer)*
- National Steel *(Dioxin Producer)*
- Nippon Yakin Kogyo *(Dioxin Producer)*
- North American Insulation Manufacturers Association
- Westinghouse Electric Corporation *(Dioxin Producer)*

Mining

- Alcoa Foundation *(Dioxin Producer)*
- ASARCO
- Reynolds Metals Company Foundation *(Dioxin Producer)*

Oil & Gas

! American Petroleum Institute *(Dioxin Producer)*

From the API Web Site: The API's "most pressing issues today revolve around public perceptions and government policies toward the industry." The API "strives to reduce the financial impact of government oversight on industry operations." Under a section entitled "FIGHTING UNNECESSARY REGULATION," API celebrates three victories over the EPA:

1) API "saved" the industry $9 billion, most of it in the upstream sector, by demonstrating why the US EPA should exempt most oil and gas production facilities and service stations from unnecessary risk management regulations.

2) At API's urging, the EPA changed gasoline detergent certification rules, "saving" the industry $2.5 billion in needless upgrades to terminal equipment.

3) API won a federal court decision overturning EPA's attempts to require the use of ethanol in reformulated gasoline, "saving" the industry almost $1 billion annually.

! ARCO (Atlantic Richfield Company) Chemical Company *(Dioxin Producer)*

! Ashland Inc. Foundation

! BASF *(Dioxin Producer)*

! BP America Inc. *(Dioxin Producer)*

! Charles G. Koch Foundation *(Dioxin Producer)*

! Chevron Research & Technology Company *(Dioxin Producer)*

! CITGO Petroleum Company *(Dioxin Producer)*

! Exxon Corporation *(Dioxin Producer)*

! Mobil Foundation, Inc. *(Dioxin Producer)*

! Oxford Oil *(Dioxin Producer)*

! Oxygenated Fuels Association *(Dioxin Producer)*

! Shell Oil Company Foundation ($15,000 to HCRA) *(Dioxin Producer)*

! Texaco Foundation *(Dioxin Producer)*

! Unocal *(Dioxin Producer)*

Paper and Lumber

! Boise Cascade Corporation *(Dioxin Producer)*

! Fort-James *(Dioxin Producer)*

! Georgia-Pacific Corporation *(Dioxin Producer)*

! International Paper *(Dioxin Producer)*

! The James River Corporation Foundation *(Dioxin Producer)*

! Mead Corporation Foundation *(Dioxin Producer)*

! Potlatch Corporation *(Dioxin Producer)*

! Westvaco *(Dioxin Producer)*

Power Utilities

- Carolina Power and Light
- Edison Electric Instititute
- Electric Power Research Institute *(Dioxin Producer)*
- New England Power Service *(Dioxin Producer)*
- New England Electric Service

Pharmaceuticals

- E.I. DuPont de Nemours & Company *(Dioxin Producer)*
- Glaxo-Wellcome, Inc.
- Hoffman-LaRoche Inc.
- Janssen Pharmaceutical
- Johnson & Johnson
- Merck & Company
- Monsanto Company
- Novartis Corporation
- Novartis International
- Pfizer
- Pharmacia
- Procter & Gamble Company
- Schering-Plough Corporation

Transportation

- American Automobile Manufacturers Association
- Association of American Railroads
- Ford Motor Company
- General Motors Corporation
- The Goodyear Tire & Rubber Company
- USX Corporation

Waste Management

- WMX Technologies, Inc. *(Dioxin Producer)*

Restricted Grants: List of Donors

- Alfred P. Sloan Foundation
- American Crop Protection Association

  The ACPA, which was formed in 1933, is a nonprofit trade organization representing the major manufacturers, formulators and distributors of crop protection, pest control, and biotechnology products.
- American Industrial Health Council

  The American Industrial Health Council assesses the regulation of risks associated with human health effects and ecological effects.
- Andrew Mellon Foundation
- Bradley Foundation

  The Lynde and Harry Bradley Foundation are devoted to the support of limited government and an open economic market.
- Brookings Institution
- California Avocado Commission
- Chemical Manufacturers Association

  The CMA is now called the American Chemistry Council (ACC). "The ACC is the voice of the U.S. Chemical Industry."
- Chiang Ching-Kuo Foundation for International Scholarly Exchange
- Chlorine Chemistry Council
- "The Chlorine Chemistry Council was established in 1993 to participate in the public policy debate surrounding chlorine chemistry." "It facilitates comparative risk and risk benefit analyses through the collection, development, and use of scientific data on health and environmental issues surrounding chlorine chemistry. CCC believes that public policy, regulatory actions and industry stewardship regarding chlorine chemistry should be based on sound science and focus on comparative risk assessment."
- Congressional Research Service
- Electric Power Research Institute
- Elsa U. Pardee Foundation
- International Life Science Institute/Risk Science Institute
- Health and Environmental Sciences Group
- National Association of Home Builders
- Pfizer, Inc.
- Society for Risk Analysis (corporate-funded — *see* list of Graham's affiliations).

Government Funding

- National Institute of Justice
- U.S. Centers for Disease Control
- U.S. Department of Agriculture
- U.S. Department of Energy
- U.S. Department of Health and Human Services
- U.S. Department of Transportation
- U.S Environmental Protection Agency
- U.S. National Oceanic Atmospheric Administration
- U.S. National Science Foundation

Appendix C
Graham's Record on the EPA's Dioxin Science Advisory Board

Dioxin is the name given to a group of highly toxic chemicals that are produced when chlorine is burned, and were made infamous as an ingredient in Agent Orange.[356] The draft EPA risk assessment that was released last year showed that, even at very low levels of exposure, dioxin is linked to cancer, infertility, immune system damage and learning disabilities. More than 90 percent of dioxin exposure comes through the food we eat, especially fish, meat and dairy products. The agency has been completing its reassessment of dioxin since 1995.

The EPA's draft dioxin reassessment document found that the public faces much higher risks of cancer and noncancer health harms from dioxin than was previously understood and over a hundred studies in animals and humans show that dioxin causes cancer at low doses. The assessment is currently undergoing routine review by the agency's Science Advisory Board (SAB), on which Graham serves as a consultant. Citing only two studies, at a meeting of the SAB in November 2000, Graham claimed that the studies showed that low levels of dioxin can actually protect against cancer, and urged the SAB to include in its official comments language stating that dioxin may be an "anti-carcinogen."

Graham suggested drawing this conclusion based on two very limited, outlying studies. Based on the transcript of the meeting, Graham wanted the SAB to tell EPA to revise its report to include the following statement: "It is not clear whether further reductions in background body burdens of TCDD [dioxin][357] will cause a net reduction in cancer incidence, a net increase in cancer incidence, or have no net change in cancer incidence."[358] If EPA were to adopt this approach in spite of the agency's overwhelming evidence to the contrary, the EPA's risk assessment on dioxin may have failed to provide a basis for federal regulators to ask companies to curtail dioxin emissions.[359]

Other scientists on the panel acknowledged that there were scientific gaps in the EPA's draft risk assessment, but argued that those gaps do not prevent the recognition of dioxin as a human carcinogen and that, in fact, testing for anti-carcinogens was out of step with normal EPA practice and resources. In response to Graham, another SAB member, Dr. Thomas Umbreit, stated: "If you're now going to start looking for competing good effects, then we start getting into the imaginary or least as far as our assays [tests] can detect things. But I don't think we really have too much that we can say about that, not too much that we can analyze for that. *And I think to try to impose on or to suggest to EPA that they discuss this is going to be difficult because its a whole new field essentially*. So I think if EPA takes a cautious approach in discussing the risks, that's about as well as they can do." [360]

The EPA has not yet issued its final risk assessment on dioxin.

Appendix D
RISK ASSESSMENT AND RISK MANAGEMENT

Three Steps From Hard Science to Risk Analysis

***STEP 1*: Scientific Laboratory and Field Work:** Exposure data from Chemistry, Biology, Geology, Physics, Toxicology, Epidemiology, etc.	***STEP 2*: Risk Assessment** Combines data from chemistry, etc., with statistics, medicine, data modeling, science policies to produce risk estimate	***STEP 3*: Risk Management** Combines risk assessment and economics, politics, political science, law, social values to produce regulatory policy

Step 2
Risk Assessment

Risk assessment uses data produced by chemists, biologists, geologists, toxicologists, physicists, epidemiologists and other scientists to ascertain the risk of an activity or substance to human health. In human health terms, risk is a measure of the chance that a person or population will experience injury, disease, or death (a hazard) under certain circumstances or exposures. It is a combination of the probability that an undesired event will occur and the consequences of that event. The practice of risk assessment is rife with policy judgments about particular issues. Risk assessments use four steps in the analysis:

- **Hazard Identification:** What health problems are caused by the pollutant?
- **Exposure Assessment:** How much of the pollutant do people inhale during a time period? How many people are exposed? What is the route for exposure?
- **Dose-Response Assessment:** What are the health problems of different exposures?
- **Risk Characterization:** What is the extra risk of health problems in the exposed population?

Risk assessment tools are useful in some situations, but in order to better understand what the numbers mean, many qualifications are in order. For example:

- ***To whom* does the risk data apply?** Data that describe the risk to the general population (an "**average exposed person**" who, for example, has eaten some amount of contaminated food) have different policy implications than data that describe the risk to a known group of people with a high exposure to the risky substance (i.e., workers in a highly contaminated area, known as the "**most exposed individuals**").

- **In the first case**, policy solutions may involve a large-scale intervention such as a general regulation. Also, in the first case, the risks may be more difficult to measure due to the "background," or pre-existing, exposure of individuals to a wide variety of substances and the difficulty of determining the precise amount of risky substance that a person has eaten.
- **In the second case**, policy solutions might be more workplace or site-specific. Health testing of the exposed people might be possible and cost-effective, and there would likely be more data about the kinds of vulnerabilities in that population (asbestos workers who also smoke cigarettes, for example, have greatly increased risks of asbestos-related cancer due to interactive effects of asbestos and tobacco).[361]
- As the EPA points out, to understand risk information it is critical to know **which kinds of data** are at issue: "*Omitting the qualifier 'average' or 'most exposed' incompletely describes the risk and* ***would mean a failure in risk communication***."[362]

! **What do the numbers mean?** Each part of the risk assessment involves many estimates and extrapolations, which at worst can make the results uncertain, and at best reflect numerous *policy choices*. A researcher at the EPA noted that, "Rarely is there a single answer to an environmental risk assessment question."[363]

- Some questions that will determine the *quality and meaning* of a risk assessment are:[364]
  - How extensive is the database used for the risk assessment?
  - Do the data include human epidemiological data and experimental data?
  - What endpoints are included?
  - Do they include test data on more than one species?
  - Where are the 'data gaps'-- the missing pieces or next questions?
  - What are the scientific uncertainties?
  - What 'default assumptions" were used to fill in uncertainties and gaps?
  - What science policy decisions informed these assumptions?
  - Based on all of this and any other relevant factors, what is the overall "confidence level" of the assessment results?

- **What kinds of uncertainty can affect the risk assessment?**
  - **Measurement uncertainty** affects the predictive range of the data or a particular value, and can reflect a normal variance that will have different implications depending on the policy choices that the problem or exposure involves.
  - **Data gaps** can result from a lack of information on the precise effects of a substance, from missing pieces of specific information, or from a fundamental lack of understanding about a scientific phenomenon.
  - **Variability in results** can be caused by the use of data from different disciplines that use different assumptions, or by varying interpretations of the same data.

Step 3

Risk Management:

Is Graham's risk "analysis" actually "sound science"?

What is risk management?

As everyone is aware, statistical information can be used in deceptive ways. Because of this problem, it is imperative that decision makers and the public have access to the best — and most complete— information available. Graham's field of "risk *management*" uses statistical and other data and modeling methods, including the results of risk *assessments*, to examine our choices about assessing risks to public health and safety.[365] As in any other statistical method, the assumptions that researchers use affect the validity of the result.[366] Because any evaluation of the end result depends upon knowing the precise policy decisions and information criteria that were used in the beginning — *conclusions in risk management are based on policy values and categories that have little to do with science.*

Risk management is a "social science" like economics, not a hard science like biology or chemistry, or even a public health-based science like epidemiology or toxicology.[367] Although risk managers may use data collected by toxicologists or physicists, practitioners deal exclusively with numbers, not with a lab or actual patients. And unlike the practice in medicine, statisticians do not promise, in a Hippocratic oath, to do no harm.

Risk Assessment Versus Risk Management:

- **A risk *assessment*** is an estimate of the likelihood that some activity or substance will harm human health or the environment, using epidemiological, toxicological or other data. Risk assessment asks: "How risky is this situation?"
- **Risk *management*** refers to a scheme of policy decision making that uses the results of risk assessments to recommend specific policy choices. Risk management asks a normative question: "What should we *do* about the risk?

Objectivity Spectrum:
Risk Management is Political

SCIENCE ----- POLICY ----- POLITICS

"Hard" Sciences:	**Risk Assessment:**	**Risk *Management*:**
Biology, Chemistry, Physics, etc.	*Policies* Fill in Gaps, But Require Judgment	Too Many Unknowns Makes Answers Political
Science Asks: What Information Do We Have?		***Politics Asks:*** What Should We ***Do*** With That Information?

Appendix E
The Misuse of Comparative Risk "Analysis"

Enlarging the role of comparative risk management at OMB is a deeply flawed idea.

Graham and his allies have frequently proposed the centralization of comparative risk management in a manner that would essentially grant a regulatory veto to the OMB. The over-broad application of this still-developing economic tool should strain the credulity of even the most optimistic proponents of risk assessment and risk management.

! **Institutionalizing more economic analysis at OMB would hinder the further development of risk management and risk assessment as social science tools.** The lack of consensus on risk management principles is an insurmountable stumbling block for its broader application. As the National Academy of Sciences observed: "Formal cost-benefit analysis of health and safety risks in regulation is at present *only a limited and incomplete part* of a large, complex analytic and decision-making process."[368] The Carnegie Commission on Science, Technology and Government is another group that opposes the idea of centralizing risk assessments done by the government.[369] In 1993, the Carnegie Commission noted that:[370]

> Centralizing risk assessment in a single entity would be likely to diminish substantially *the healthy diversity of views about risk* that is found in our current multiagency system.

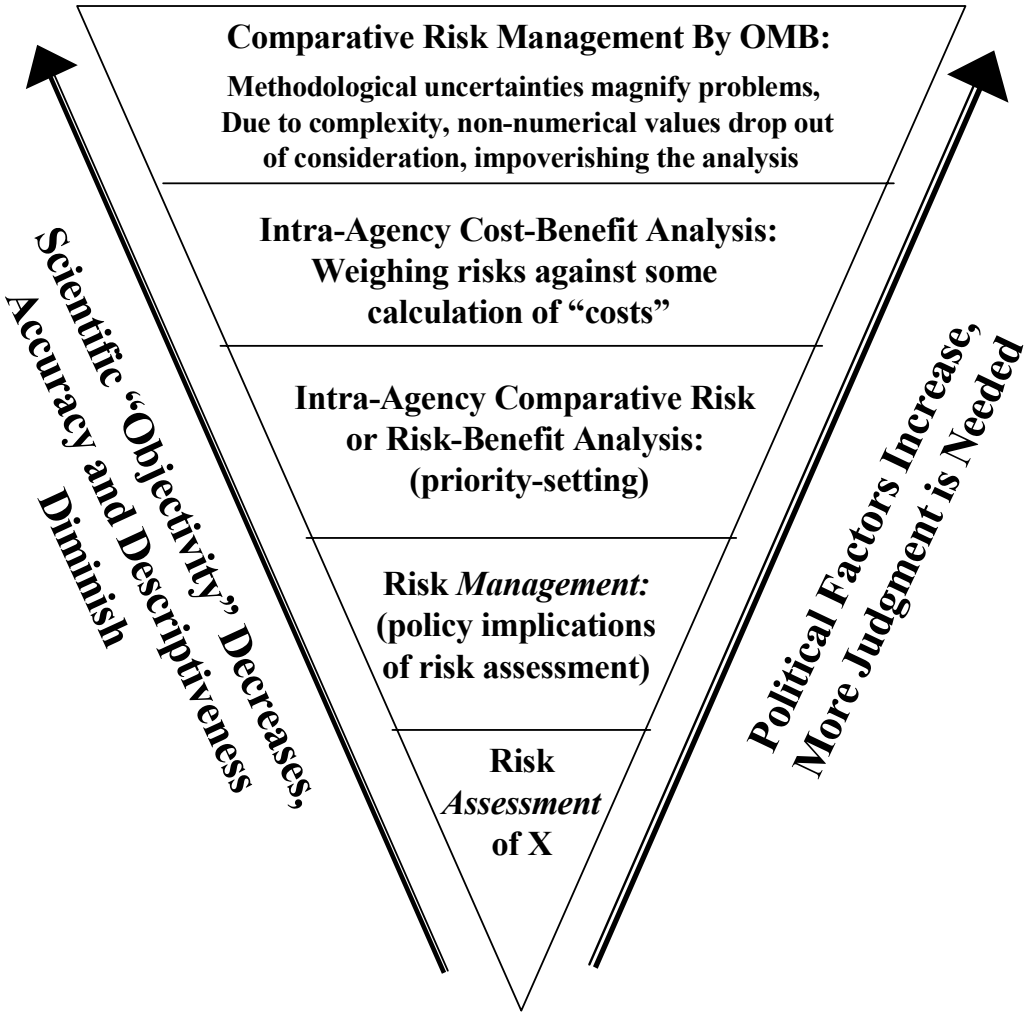
! **The complexity of the issues quickly outgrows the ability of risk management to provide useful information.** As the chart on the next page depicts, the value of a risk assessment decreases dramatically as more is asked of it. When risk assessment tools are more narrowly applied to one particular substance or activity, uncertainties or gaps in the data can be clearly flagged and may even be accounted for by data modeling or other techniques. As more and more information crowds the picture, however, there is less and less room for the caveats and qualifications that make those data valuable. And as the accuracy of the project decreases, there is more room for pure politics to charade as "scientific" conclusions. *Each level of additional complexity diminishes objectivity, and increases exponentially the number of non-scientific judgments and possibilities for political influence of the outcome.*

! **OMB-administered economic analysis is not science but politics.** Proponents of economic analysis would like decision makers to believe that it is a one-size-fits-all tool — but this is a fallacy. *At its broadest application, it is actually politics, masquerading as science.* This is why risk management proposals are the ideal third-party vehicle for industries that want to save their energy — and lobbying efforts — for influencing the "risk experts" who lay down the rules of the game.

How A Social Science Becomes Swiss Cheese

The Value of Risk Assessment and Risk Management Diminishes With Complexity

Larger Questions = More Politics, Little Objectivity



Narrower Application = (Relatively) Better "Science"*

* Within the field of risk assessment, the quality of the data used as inputs and the nature of the default assumptions varies widely. Thus, different risk assessments will vary widely in quality and usefulness. Non-numerical values, such as non-cancer health risks, scenic views, etc., are described in the text but cannot be calculated accurately.

ENDNOTES

1. HCRA funders are listed within this document and on the HCRA Web site at <www.hcra.harvard.edu>.
2. Quotations in the media are at least partially listed in the conflicts chart at the end of Part One. For examples of his testimony before Congress without disclosure of funding sources for HCRA, see, e.g., Testimony of John D. Graham before the Senate Energy & Natural Resources Committee on Risk Analysis in Environmental Policy-Making, Nov. 9, 1993; Testimony of John D. Graham, before the House Government Affairs Committee on Regulatory Revision, Feb. 15, 1995 (Graham said only "In response to requests from federal agencies, state agencies and private industry, I have offered advice on the importance of risk analysis to sound decision making"); Testimony of John D. Graham, before the Senate Governmental Affairs Committee, Hearing on S. 981, "The Regulatory Improvement Act of 1997," Sept. 12, 1997. In his testimony before Congress, Graham has repeatedly said that his comments represented his own opinion and not those of Harvard. Therefore, his failure to disclose could be viewed as less problematic. However, the subject of his testimony often involved highly specific discussions on topics such as air bags, MTBE additives to gasoline, etc., and regulations regarding which would directly impact his funders. See, e.g., Testimony of John D. Graham before the Senate Committee on Regulatory Affairs on S. 746, April 29, 1999. In his comments to the media that are analyzed within this report, no such qualification on his part was reported. Indeed, he was widely represented by the media as a neutral "expert" from the Center or the Harvard School of Public Health.
3. See <www.hcra.harvard.edu/unrestricted.html>; <www.hcra.harvard.edu/restricted.html>.
4. See <www.hcra.harvard.edu/executive.html>.
5. See < www.hcra.harvard.edu/advisory.html>.
6. See Testimony of John D. Graham before the Senate Committee on Governmental Affairs on S. 746, the "Regulatory Improvement Act of 1999," April 21, 1999 (Graham said: "I earned my BA and MA degrees in public policy from Wake Forest University (1978) and Duke University (1980), respectively).
7. See letter at the end of Case Study #2.
8. On the SAB, Graham criticized the EPA draft report. See "Science Advisory Board Questions Major Parts of EPA Dioxin Report," *Air Water Pollution Report*, May 22, 1995.
9. Dioxin is the name given to a group of highly toxic chemicals that are produced when chlorine is burned. Dioxin is produced during incineration, the manufacturing of paper, metal smelting and refining, the manufacturing of chlorinated chemicals including pesticides, herbicides and polyvinyl chloride plastic, petroleum refining and industrial and utility oil and coal combustion. The draft EPA risk assessment, released in 2000, showed that, even at very low levels of exposure, dioxin is linked to cancer, infertility, immune system damage and learning disabilities. More than 90 percent of dioxin exposure comes through the food we eat, especially fish, meat and dairy products. The US EPA has been finalizing its reassessment of dioxin since 1995.
10. Noah Adams, "EPA Report on Dioxin is Released and Confirms a Cancer Risk Exists to All Americans," *All Things Considered, National Public Radio*, June 15, 2000.
11. See the conflicts chart at the end of Part One for a list of HCRA funders that are dioxin producers.
12. The settlement requires the documents to be available at www.pmdocs.com, and are searchable by "bates" no, the number used to mark legal documents. The citation is therefore: Bates no. 2050240317.
13. Bates no. 2050240317.
14. Bates no. 2050240317. CIIT does not directly fund HCRA. But CIIT is itself supported by many of the same companies that fund HCRA, such as Air Products and Chemicals, BASF, Celanese, Chevron, Dow Chemical, E.I. du Pont de Nemours, Eastman Chemical, ExxonMobil, General Electric, Lyondell, Rohm and Haas, Texaco, Union Carbide and Unocal. See <www.ciit.org/SUPPC/suppc.html>.
15. For just one example, in 1995 Margaret Kriz wrote in the National Journal that "[s]ome conservative think tanks, including the Cato Institute and the Competitive Enterprise Institute, say they hope that today's risk assessment debate will pave the way for a revolution in environmental policy. They suggest *eliminating all federal environmental laws* and substituting a system of personal responsibility." Margaret Kriz, "Risky Business," *National Journal*, Feb. 18, 1995.
16. The OMB analyzes the agencies' "regulatory impact analyses" or RIAs. Clinton's Executive Order 12866 requires RIAs that are, for the most part, cost-benefit analyses and the OMB's OIRA produces a "Best Practices" document that provides guidelines for the RIAs.
17. Cindy Skrzycki, "Lining Up to Lobby for Rule Recision," *The Washington Post*, Feb. 6, 2001.
18. Id.

19. Id. The *Post* wrote that his comments reflected "the sentiment of the business community that the agencies have been over-aggressive regulators over the past eight years."
20. "Risk-Expert Graham as Political Guru," *Air/Water Pollution Report's Environment Week*, Feb. 2, 1996 (emphasis added).
21. John D. Graham, "Making Regulatory Reform a Reality," *Heritage Foundation Reports,* Jan. 31, 1996.
22. "Excessive Reports of Health Risks Examined," *The Patriot Ledger*, Nov. 28, 1996, at 12.
23. See Case Study #1 on Philip Morris.
24. See Testimony of John D. Graham before the Senate Committee on Governmental Affairs, Hearing on S. 981, "The Regulatory Improvement Act of 1997," Sept. 12, 1997; John D. Graham, "Making Sense of Risk: An Agenda for Congress," in *Risks, Costs and Lives Saved* (Robert W. Han, ed., Oxford University 1996).
25. Brief of Robert E. Litan, Counsel of Record for the AEI-Brookings Joint Center For Regulatory Studies, in the case American Trucking Associations, Inc., et al,. v. Carol M. Browner, Administrator of the EPA, On Writ of Certiorarti To the United States Court of Appeals (for Cross Petitioners, the American Trucking Association).
26. See discussion of S. 746 at the end of Case Study #3.
27. According to the Insurance Institute for Highway Safety, NHTSA records show that air bags have saved 6,377 lives through Dec. 2000.
28. In 1997, Graham advocated for a sweeping requirement that would have imposed a formal risk assessment, including a "peer review" by committees likely to be staffed with industry-friendly "experts" and centralized clearance through the White House Office of Science and Technology Policy for all risk-related determinations — even if the federal agency was merely sharing information on a hazard which had not been not part of any formal rulemaking.
29. Patricia Pena, "We Need Laws For Cell Phones," *USA Today*, April 27, 2000.
30. See discussion of Graham's study in Case Study #2.
31. In his view, before issuing a regulation, a federal regulatory agency should be required to: 1) estimate the scope of the health, safety or environmental problem to be regulated and the improvements likely to result from regulation; 2) estimate the cost of the regulation; 3) express these benefits and expenses in common units, and 4) weigh the costs of the proposed regulation against the expected benefits. Testimony of John D. Graham before the Senate Committee on Regulatory Affairs on S. 746, April 29, 1999. At each step, of course, it matters greatly who is empowered to write the technical rules about what kinds of costs and benefits are considered.
32. See <www.hcra.harvard.edu/executive_education.html>.
33. Kimberly Thompson, "Kids at Risk," *Risk in Perspective*, Harvard Center for Risk Analysis, April 2000.
34. See, e.g., Child Health Alert, Inc., "More Worrisome News About Electromagnetic Fields," *Child Health Alert*, Dec. 1992.
35. In his testimony on April 21, 1999, Graham told the Senate Governmental Affairs Committee in a hearing on cost/benefit analysis of federal regulations: "I earned my BA and MA degrees in public policy from Wake Forest University (1978) and Duke University (1980), respectively. My Ph.D. dissertation at Carnegie-Mellon University (1983) was a benefit-cost analysis of automobile airbag technology and was conducted while in residence at the Brookings Institution in Washington, D.C." Testimony, John D. Graham, Senate Governmental Affairs Committee, Hearing on Cost/benefit Analysis of Federal Regulations, April 21, 1999.
36. Conversation between Public Citizen and representative of the Wake Forest University alumni office, Feb. 7, 2001. See also <www.wfu.edu/academic_resources/acad_dir.html#e>, which lists Wake Forest's undergraduate academic departments.
37. David Lore, "Determining Toxic Risks is Costly Voodoo, Lawyer Says," *The Columbus Dispatch*, Nov. 24, 1995.
38. See <www.hcra.harvard.edu/unrestricted.html>; <www.hcra.harvard.edu/restricted.html>.
39. See <www.hcra.harvard.edu/executive.html>.
40. Id. On Gray's role in the transition, see Lee Walczak & Richard S. Dunham, "The Man Who Would Be Reagan," *Business Week*, Jan. 29, 2001. Gray was also counsel to a Reagan administration task force on "regulatory relief," see Neil Strassman, "Critics: Bush May Favor Industry," *Chattanooga Times*, Dec. 24, 2000. A panel Feb 8, 2001 at the Heritage Foundation that included Gray addressed "how best to deal with some of the more substantive problems dumped on President Bush's doorstep during the waning days of the old Clinton regime: *executive orders*, recess appointments, land grabs and treaties." John MacCaslin, *The Washington Times*, Jan. 30, 2001 (emphasis added).
41.Gray's many connections to chemical, agribusiness and industrial interests were well documented by a 1998 profile in *The New Republic.* As Hanna Rosin wrote, "So many different money trails lead to, by and through Gray it is bewildering."
42. See < www.hcra.harvard.edu/advisory.html>.

43. See Testimony of John D. Graham, before the Senate Committee on Environment and Public Works, hearing on "Impacts of Regulatory Reform on Environmental Law," Mar. 22, 1995. The Harvard group proposed, among other things, the authorization of a science advisor to assess and rank all risks addressed by federal agencies, requiring flexibility for industry to comply with rules, and devolvement of regulation to states and localities. Graham also advocated for a bill which over-rides agency mandates to impose cost-benefit and risk-benefit criteria, regardless of an agency's direction from Congress.
44. See section on Graham and Philip Morris at Case Study #1.
45. See <www.hcra.harvard.edu/conflict.html>.
46. See the list of Graham's affiliations at the end of Part One.
47. Making Regulatory Reform a Reality, Heritage Foundation Reports, A Heritage Foundation Symposium, No. 559, Jan. 31, 1996 (quoting Graham).
48. Industries' funneling of tax-exempt dollars into this system of organizations was at least partially outlined in a report by the Center for Responsive Philanthropy in 1997 entitled *Moving A Public Policy Agenda: The Strategic Philanthropy of Conservative Foundations*. Sally Covington, "Moving A Public Policy Agenda: The Strategic Philanthropy of Conservative Foundations," *National Committee for Responsive Philanthropy*, July 1997.
49. "Making Regulatory Reform a Reality," Heritage Foundation Reports, A Heritage Foundation Symposium, No. 559, Jan. 31, 1996 (quoting Graham).
50. Testimony of John D. Graham before the Senate Committee on Regulatory Affairs on S. 746, April 29, 1999.
51. Id. Many of the others are cited in this endnotes to this report.
52. See the conflicts of interest chart at the end of Part One.
53. See, e.g., Statement of Frederick Webber, President and Chief Executive Officer, Chemical Manufacturers Association, Hearing on Regulatory Reform before the Senate Committee on Governmental Affairs, Mar. 8, 1995 (citing Graham's testimony). In relation to later "rollback" efforts, see also Statement of Thomas F. Walton, General Motors Corp., on behalf of Alliance USA: The Alliance for Understandable, Sensible, and Accountable Government Rules, on S.981, the "Regulatory Improvement Act of 1997," before the Senate Committee on Governmental Affairs, Sept. 12, 1997 (Walton cites Graham's research in his testimony. Alliance USA was a group that included the Business Roundtable, the National Association of Manufacturers, the U.S. Chamber of Commerce, the American Plastics Council, and the Chemical Manufacturers Association.).
54. See Case Study #1 on Philip Morris.
55. Curt Suplee, "Assessing the Risk in Contract's 'Cost-Benefit' Curb on Regulations," *The Washington Post*, Feb. 28, 1995. For example, one House bill, the "Risk Assessment and Cost-Benefit Act of 1995," required a formal risk assessment for any proposed rule likely to result in annual increases in costs to government, industry and consumers, of more than $25 million annually, or "about 10 cents per American per year." Id. Based on the assessment, the agency could regulate only if: 1) the risk reduction or benefits are "likely to justify, and be reasonably related to, the incremental costs," and 2) all other alternatives are "less cost-effective," or provide "less flexibility" to those being regulated, such as businesses. Id. The bill also had a *comparative* risk component, requiring federal agencies to compare any risk they estimate with other risks in daily life, and to take account of "substitute risks" — which are hazards that happen because of efforts to eliminate risk.
56. Testimony of John D. Graham before the Senate Committee on Regulatory Affairs on S. 746, April 29, 1999. Although his testimony specifically criticized regulatory programs affecting the gasoline additive MTBE, fuel economy standards, and the controversy over passenger-seat air bags, he did not identify any of the funders of his Center.
57. See, e.g., Emily T. Smith, "Voodoo Regulation?" *Business Week*, Mar. 13, 1995; Curt Suplee, "Assessing the Risk in Contract's 'Cost-Benefit' Curb on Regulations," *The Washington Post*, Feb. 28, 1995; see also Irv Chapman, "GOP Bill Would Repeal Ban on Some Pesticides," *CNN Moneyline*, July 12, 1995 (quoting Graham as a "scientist" who supported Sen Dole's reform bill as "based upon sound scientific principles").
58. Making Regulatory Reform a Reality, *Heritage Foundation Reports: A Heritage Foundation Symposium; No. 559*, Jan. 31, 1996.
59. Margaret Kriz, "Risky Business," *National Journal*, Feb. 18, 1995. As is typical, the article does not disclose any of the relevant sources of funding for Graham's Center. Other groups with an interest in opposing regulation argued that the responsibility for reviewing the effectiveness of regulation should be given to OMB, rather than Congress. Id.
60. Id.
61. John D. Graham, "Making Sense of Risk: An Agenda for Congress," in *Risks, Costs and Lives Saved* (Robert W. Han, ed., Oxford University 1996).
62. Testimony of John D. Graham before the Senate Committee on Regulatory Affairs on S. 746, April 29, 1999.
63. Id.

64. "Unintended Consequences of the S.746 Regulatory Obstacle Course," Public Citizen's Congress Watch, May 1999.
65. What constitutes justification is unclear, as are the benchmarks for cost-efficiency. Real benchmarks of economic efficiency would have be different for each kind of regulation that is examined. For example, the HCRA study on air bags discussed in Case Study #3 uses the cost-efficiency of seat belts as the "comparator" for the cost-efficiency of air bags. That means, in practice, that the existing state of technology, and protection, can function as the baseline on costs, rather than some, future, more protective goal.
66. Testimony of John D. Graham before the Senate Committee on Governmental Affairs, Hearing on S. 981, "The Regulatory Improvement Act of 1997," Sept. 12, 1997.
67. See Testimony of John D. Graham, before the Senate Committee on Environment and Public Works, hearing on "Impacts of Regulatory Reform on Environmental Law," Mar. 22, 1995. The Harvard group proposed, among other things, the authorization of a science advisor to assess and rank all risks addressed by federal agencies, requiring flexibility for industry to comply with rules, and devolvement of regulation to states and localities. Graham also advocated for a bill which over-rides agency mandates to impose cost-benefit and risk-benefit criteria, regardless of an agency's direction from Congress.
68. See Testimony of John D. Graham before the Senate Governmental Affairs Committee, Hearing on "The Role of Risk Analysis and Benefit-Cost Analysis In regulatory Reform Legislation (S.291)," Feb. 15, 1995 ("Enabling statutes should be superseded by the general requirement that each rule's identified benefits must justify its identified costs.").
69. American Trucking Associations, Inc., et al,. v. Whitman, Administrator of the EPA, No. 99-1257 (slip. op.) Feb. 27, 2001.
70. Brief of Robert E. Litan, Counsel of Record for the AEI-Brookings Joint Center For Regulatory Studies, in the case American Trucking Associations, Inc., et al,. v. Carol M. Browner, Administrator of the EPA, On Writ of Certiorarti To the United States Court of Appeals (for Cross Petitioners, the American Trucking Association).
71. Charles Lane, "Clean-Air Authority of EPA Is Upheld, Court: Law Bars Costs Consideration," *The Washington Post*, Feb. 28, 2001.
72. Scott Allen, "US Accepts $129 M for Cleanup of Love Canal; Some Say Set a Wrong Course," *The Boston Globe*, Dec. 22, 1995.
73. Id.
74. See the conflict of interest chart at the end of Part One.
75. Making Regulatory Reform a Reality, *Heritage Foundation Reports: A Heritage Foundation Symposium; No. 559*, Jan. 31, 1996.
76. Id.
77. Id.
78. Noah Adams, "EPA Report on Dioxin is Released and Confirms a Cancer Risk Exists to All Americans," *All Things Considered,* National Public Radio, June 15, 2000.
79. Id. (emphasis added).
80. Listed on the HCRA Web site by its former name, the Chemical Manufacturers Association.
81. Thomas O. McGarity, "A Cost-Benefit State" 50 Ad. L. Rev. 1 (1998).
82. John D. Graham, "Making Sense of Risk: An Agenda for Congress," in Risks, Costs and Lives Saved (Robert W. Han, ed., Oxford University 1996).
83. See Clinton's Executive Order 12866 (defining "economically significant").
84. ABC News Special, Transcript #346, April 21, 1994; A rehash of John Stossel's ABC News show posted on the Web at <www.ewtn.com/library/BUSINESS/SCARE.HTM> pits Graham against Ralph Nader: "Reason is not always politically correct and point to a government mandate: Ralph Nader thinks that $1800 more to put belts on school buses is money well spent. But the Harvard school of public health found that belts would not make much of a difference. Children are much more likely to get killed when they get off the bus. Reason also deals with truthful facts and reaches logical conclusions: if school bus belts could save about 12 lives a year aren't [they] worth it? No says Dr. Graham: 'You are engaging in statistical murder. When you decided to spend $50 millions to save a few lives when you could spend the $50 million to save a hundred lives or a thousand lives, that's statistical murder." See also conflicts chart the end of Part One.
85. See chart at Appendix C, which depicts how the relative objectivity of a simple risk assessment is greatly complicated by its aggrandizement to the risk analysis context. Because of the increasing complexity of the inquiry, many of the qualifications which make risk assessment valuable must drop out as the risk analysis grows more ambitious.
86. See Thomas O. McGarity, "A Cost-Benefit State" 50 Ad. L. Rev. 1 (1998) at 55.

87. See Testimony of John D. Graham, before the House Government Affairs Committee on Regulatory Revision, Feb. 15, 1995 (recommending that guidelines for the agencies' risk assessment and risk characterization be subject to review, revision and approval by the President's Office of Science and Technology Policy).
88. Testimony of John D. Graham, before the Senate Governmental Affairs Committee, Hearing on S. 981, "The Regulatory Improvement Act of 1997," Sept. 12, 1997.
89. Thomas O. McGarity, "A Cost-Benefit State" 50 Ad. L. Rev. 1 (1998) at 55.
90. Id.
91. Id.
92. This was true in the cotton dust case handled by OSHA.
93. Curt Suplee, "Assessing the Risk in Contract's 'Cost-Benefit' Curb on Regulation," *The Washington Post*, Feb. 26, 1995 (quoting EPA spokeswoman Sylvia K. Lowrance).
94. Id. (quoting Gregory Wetstone of the National Resources Defense Council).
95. John Carey, "So Many Chemicals, So Few Answers," *Business Week*, Mar. 13, 1995.
96. Id.
97. Adam Finkel, "Who's Really Crying Wolf?" *American Scientist*, Sept.-Oct. 1996.
98. Thomas O. McGarity, "A Cost-Benefit State" 50 Ad. L. Rev. 1 (1998).
99. Id.
100. See Appendix A.
101. Dorothy Patton, "The ABCs of Risk Assessment," *EPA Journal*, Jan/Feb/Mar 1993. (emphasis added).
102. Id.
103. Adam Finkel, "Who's Really Crying Wolf?" *American Scientist*, Sept.-Oct. 1996.
104. Milloy's position on EPA's more protective risk numbers can be found in his book, Science Without Sense, and is indicated in many places on the www.junkscience.com Web site.
105. The National Academy of Sciences' National Research Council is a private, non-partisan organization of outside academics and researchers chartered by Congress to advise the government.
106. *Conclusions*, in Valuing Health Risks, Costs, and Benefits for Environmental Decision Making by the National Academy of Sciences' National Research Council at 189, 206 (1990).
107. Emily T. Smith, "Voodoo Regulation?" *Business Week*, Mar. 13, 1995.
108. Testimony of John D. Graham, before the House Government Affairs Committee on Regulatory Revision, Feb. 15, 1995.
109. Id.
110. John D. Graham, et al, In Search of Safety: Chemicals and Cancer Risk, at 177 (1988).
111. Id. at 204. Graham's suggestion was intended to provide a remedy for what he viewed as a history of overly precautionary risk assessment decisions on the part of regulators. Id. See also Thomas O. McGarity, "A Cost-Benefit State" 50 Ad. L. Rev. 1 (1998) at 27.
112. Hearings Before the Subcomm. on Health and Environment and the Subcomm. on Commerce, Trade and Hazardous Materials of the House Comm. on Commerce, 104th Congress (1995) (statement of Ellen Silbergeld) (emphasis added).
113. Ellen K. Silbergeld, "The Risks of Comparing Risks," N.Y.U. Environ. Law. J. 3 (1994).
114. Thomas O. McGarity, "A Cost-Benefit State" 50 Ad. L. Rev. 1 (1998).
115. Douglas E. MacLean, "Comparing Values in Environmental Policies: Moral Issues and Moral Arguments," in Valuing Health Risks, Valuing Health Risks, Costs, and Benefits for Environmental Decision Making (1990). See also, e.g., Lisa Heinzerling, "Reductionist Regulatory Reform," 8 Fordham Envtl. Law J. 459 (1997); Richard L. Revesz, "Environmental Regulation, Cost-Benefit Analysis, And the Discounting of Human Lives," 99 Colum. L. Rev. 941 (May 1999); David A. Wirth & Ellen K. Silbergeld, "Book Review: Risky Reform," 95 Colum. L. Rev. 1857 (Nov. 1995); Mark Sagoff, The Economy of the Earth 46 (1988), Margaret Radin, Contested Commodities; Lisa Heinzerling "Discounting Our Future," (unpublished manuscript on file with Public Citizen).
116. Thomas O. McGarity, "A Cost-Benefit State" 50 Ad. L. Rev. 1 (1998) at 24, (emphasis added), and 59 (citing to a portion of Graham's Congressional testimony) (emphasis added).
117. "'Dateline' Story Riddled With Errors, Environmentalists Say," *Pesticide and Toxic Chemical News*, Oct. 2, 1996.
118. Jay D. Wexler, Book Review, 30 Conn. L. Rev. 225, 248 (Fall 1997).
119. Branden Johnson, "Advancing Understanding of Knowledge's Role in Lay Risk Perception," *Risk*, Summer, vol. 4 (2000). On the Internet at <www.fplc.edu/risk/vol4/summer/johnson.htm>. See also Ellen K. Silbergeld, "The Risks of Comparing Risks," N.Y.U. Environ. Law. J. 3 (1994).

120. Wingspan Conference on Implementing the Precautionary Principle, January 1998. For more information on the precautionary principle, see the Science and Environmental Health Network Web site: <www.sehn.org>.
121. See <www.sehn.org>.
122. See <www.hcra.harvard.edu/precautionary.html>.
123. John D. Graham, "The Precautionary Principle: Refine it or Replace It?" *Risk in Perspective*, May 1999; <www.mediatransparency.org/funders/koch_family_foundations.asp>.
124. "EPA: Here's Hoping Whitman Brings Much-Needed Balance to the Job," *Charleston Daily Mail*, Feb. 1, 2001.
125. "Risk-Expert Graham as Political Guru," *Air/Water Pollution Report's Environment Week*, Feb. 2, 1996 (emphasis added).
126. ABC News Special, Transcript #346, April 21, 1994.
127. An exception to this pattern of non-disclosure is the cell phone study that was funded by AT&T and is discussed in *Science for Sale*, Case Study #2.
128. Thomas O. McGarity, "A Cost-Benefit State" 50 Ad. L. Rev. 1 (1998) at 54.
129. The companies listed are HCRA supporters. See <www.hcra.harvard.edu/restricted.html>; <www.hcra.harvard.edu/unrestricted.html>.
130. Telephone conversation, Feb. 16, 2001, between Public Citizen and the Harvard Center for Risk Analysis.
131. "Science Advisory Board Questions Major Parts of EPA Dioxin Report," *Air/Water Pollution Report,* May 22, 1995. Graham was reported as saying that "[t]he report overstates the carcinogenic risks that dioxins and related compounds may pose and fails to seriously analyze uncertainties about these chemical sand to show how incremental changes in exposure could affect health."
132. A report on dioxin posted on the Greenpeace Web site describes Graham's participation in the EPA process on the dioxin reassessment. See <www.enviroweb.org/issues/dioxin/dow_brand_dioxin.txt>.
133. Dioxin producers were identified by the Center for Health and Environmental Justice.
134. Several projects have attempted to map the reach and finances of this corporate network. A Web-based project in its early stages is being developed by NCRP/Media Transparency on the Web site <www.mediatransparency.org>. Another project on the part of the Clearinghouse on Environmental Advocacy and Research (CLEAR), now abandoned, can be found on the Web at <www.ewg.org/pub/home/clear> and <www.ewg.org/pub/home/clear/by_clear/ShowMe.html>. PR Watch also frequently publishes exposes of particular groups or campaigns, *see* <www.prwatch.org>.
135. See <www.ewg.org/pub/home/clear/by_clear/ShowMe.html>.
136. See note 133. These numbers are according to Clearinghouse on Environmental Advocacy and Research (CLEAR), Media Transparency, a grants search from the Foundations Center, and an article by Sheldon Rampton & John Stauber, "The Junkyard Dogs of Science," *New Internationalist*, July 1999.
137. "Science Watchdog Group Celebrates Third Anniversary With Renewed Commitment to Exposing Use of Junk Science," *PR Newswire*, Dec. 3, 1996.
138. As Public Citizen extensively documented in relation to the debate over limits on corporate liability (called "tort reform" by corporate allies. "The CALA Files: The Secret Campaign by Big Tobacco and Other Major Industries to Take Away Your Rights," Public Citizen and the Center for Justice & Democracy, July 26, 2000; "Smoke and Mirrors: The Tobacco Industry's Influence on the Phony 'Grassroots' Campaign for Liability Limits" (March 1996); see also <www.prwatch.org/prwissues/1996Q3/cohen.html>; Sheldon Rampton and John Stauber, "How Big Tobacco Helped Create the Junkman," *PR Watch*, Third Quarter 2000, <www/prwatch/org/prwissues.2000Q3/junkman.html>.
139. Elisa K. Ong, "Tobacco Industry's Efforts Subverting International Agency for Research on Cancer's Second-Hand Smoke Study," *The Lancet*, April 8, 2000.
140. "Science Watchdog Group Celebrates Third Anniversary With Renewed Commitment to Exposing Use of Junk Science," *PR Newswire*, Dec. 3, 1996.
141. John Stauber and Sheldon Rampton, Tobacco's Secondhand Science and Smoke-filled Rooms," *PR Watch*, Third Quarter 2000. See <www.prwatch.org/prwissues/2000Q3/secondhand.html>.
142. See <http://jama.ama-assn.org/issues/v281n4/ffull/jmn0127-3.html>.
143. The list is no longer posted, but was available on the SRA Web site at <www.sra.org> a year ago. There is a printed copy on file with Public Citizen.
144. See <www.aei.brookings.org/about/advisory.asp>.
145. See <www.mediatransparency.org.>.
146. Jack O'Dwyer, "Ketchum Launches Litigation Practice," *Jack O'Dwyer's Newsletter*, Jan. 26, 2000.
147. The Philip Morris documents Web site is located at <www.pmdocs.com> and is searchable by the Bates number, a legal identifier, of the document. Therefore, the Bates number is provided in the cites below.

148. 2023012753
149. Id.
150. 2024713141
151. 2024713155
152. Id. (emphasis in original).
153. Id.
154. 2023029219, 2024224722
155. 2046597149; <www.prwatch.org.prwissues/2000Q3/junkman.html>.
156. 2046597149
157. See <http.www.prwatch.org/prwissues/2000Q3/junkman/html>.
158. 2024224722.
159. Logue's position is identified in 2024102916.
160. Gray's role is explained above, in the footnotes to Part One.
161. 2025535614.
162. 2023545705
163. Id.
164. Id. (emphasis added).
165. 202354707
166. The document that shows the check is 2025534593 and the stop payment is 2025534592.
167. It is speculation, but it is possible that Graham had reconsidered whether he wanted to publicly accept money directly from Philip Morris.
168. 2025534554 (emphasis added) (the notes was cc'd to Logue); see also 2025534553 (indicating that Logue supports the efforts).
169. 2025534555
170. 2025534555
171. Regarding the Executive Order 12886, issued Sept. 1993). Jonathan Wiener's Faculty Profile on the Duke University School of Law Web site www.law.duke.edu/fac/wiener/profile.html
172. 2025477181
173. 2025477181
174. 2025477181
175. See the HCRA Web site's full list of funders. Graham and Wiener would later write a book together on comparative risk assessment, called *Risk v. Risk: Tradeoffs in Protecting Health and the Environment*, and both testified in 1995 on regulatory reform before the Senate Committee on Governmental Affairs.
176. Elisa K. Ong, "Tobacco Industry's Efforts Subverting International Agency for Research on Cancer's Second-Hand Smoke Study," *The Lancet*, April 8, 2000.
177. Id.
178. Id. In 1994, Philip Morris (PM) and its public relations firm, Burson Marsteller, was organizing a "sound science" front group in Europe that would favorably influence politicians and legitimize the company's position on second-hand smoke and other issues. Anne Landman, American Lung Association of Colorado, "Daily Doc: Philip Morris' Sound Science Project," Aug. 2, 2000, see <www.tobacco.org/Documents/dd/ddsoundscience.html>. A memorandum written by Stig Albinus, of Burson-Marstellar, to several PM officials was called the "Sound Science Project and European Seminar in the Autumn." Memorandum from Stig Albinus to David Bushong and Matt Winokur, Burson-Marsteller Copenhagen, Re: Sound Science Project and European Seminar in the Autumn, June 17, 1994. See <www.pmdocs.com/getallimg.asp?DOCID=2025493066/3069>.

Albinus recounted the results of his interviews with several scientists, and attached 45 pages of faxed notes. The interviews were designed to scope out the receptiveness of the scientists to a networking project that would standardize "sound science" and "good epidemiology" practices. Although Albinus neglected to mention in the interviews that funding for the project was provided by PM, it appears that a few scientists had perhaps smelled a rat and mentioned the issue on their own. Albinus noted that "some of the scientists have themselves raised the question of relations to the tobacco industry as a critical issue." Because the interviews were done on the sly, Albinus cautioned PM not to publicly mention his results, which would have revealed PM's involvement to the targeted scientists: "Please note that you must not use the outcome of this research and references to the interviews with scientists in a Philip Morris approach to the identified scientists *because that could distort and jeopardize the entire operation.*"

Any tobacco industry taint could render the study and the seminar's impact worthless as science, thus destroying the value of Philip Morris' investment in the research. Therefore, Albinus wrote, securing a broader base of funding for the planned seminar was critical for its credibility: "It is absolutely vital that we succeed in

getting funding of the seminar from a broader group of sponsors than just PM and Tetra Pak, because otherwise we would not be able to ensure the credibility of the seminar in relation to the scientists. And if the seminar has not got that credibility, the outcome of the meeting will not have great value."

The corporations that hope to fund industry-friendly science often find themselves dependent on great secrecy and stealth because of a dilemma. Without controlling the scope and substance of a study, their corporate investment could be "wasted," or even made counterproductive, if results are unfavorable to their profits. But if a corporation does appear to exercise control, the results will not be accepted as independent research because they lack credibility. That is one reason why it was necessary for Albinus to carefully vet all of the scientists before floating any real proposal. It appears that the easiest way for industry to have its cake and eat it too is to handpick, in advance, a stable of industry-friendly scientists who are willing to do their bidding.

179. 2050240421
180. 2024102916
181. 2040303701
182. 2040303701
183. John D. Graham, et al., "Making Regulatory Reform a Reality," *The Heritage Foundation Reports*, No. 559, Jan. 31, 1996 at 8.
184. 2025534553
185. 2023551159
186. 2025535594
187. 2023551078
188. It was posted last year on the Web at <http://ww.sra.org/fellows.htm>.
189. 2060579190
190. Id.
191. Id.
192. See <www.hcra.harvard.edu>.
193. Christine Wicker, "Common road habits can take deadly toll; Food-eaters, phone-talkers, radio-dialers among 'good' drivers causing fatal crashes" *Dallas Morning News*, Jan. 31, 1999.
194. Id.
195. "Drivers Not Risking Much on the Horn, Study Says," *The Providence Journal-Bulletin*, July 25, 2000.
196. Peter J. Howe, "Harvard Study Downplays Risk of Cell Phone Use by Drivers," Boston Globe 7/24/2000, a3
197. "Drivers Not Risking Much on the Horn, Study Says," *The Providence Journal-Bulletin*, July 25, 2000.
198. Id.
199. *Risk in Perspective:* Cellular Phones and Driving: Weighing the Risks and Benefits, Harvard Center for Risk Analysis, July 24, 2000, at 2 (emphasis added).
200. Id. at 5.
201. Id. at 3.
202. See "Introduction" at <www.nhtsa.dot.gov/people/injury/research/wireless/#exec>.
203. "Drivers Not Risking Much on the Horn, Study Says," *The Providence Journal-Bulletin*, July 25, 2000.
204. Id. at 4.
205. Id. at 4.
206. Charles Osgood, "New Study Funded by AT&T Says That Using Cell Phones While Driving is Safer Than Driving Without a Seat Belt On," *The Osgood File*, July 25, 2000.
207. Jay Lindsay "Harvard study says risks of driving with cell phones are overstated," *Associated Press*, July 24, 2000.
208. Id.
209. "Drivers Not Risking Much on the Horn, Study Says," *The Providence Journal-Bulletin*, July 25, 2000 (emphasis added).
210. The study is based on current cell phone use and does not account for the rapidly increasing purchase and use of cell phone by U.S. drivers.
211. See "Introduction" at <www.nhtsa.dot.gov/people/injury/research/wireless/#exec>.
212. Id.
213. *Risk in Perspective:* Cellular Phones and Driving: Weighing the Risks and Benefits, Harvard Center for Risk Analysis, July 24, 2000, at 2 (emphasis added) at 6.
214. This is also due to discounting, as is discussed in Appendix B.
215. Used with permission from Car Talk.
216. Steve Filmer & Charles Gibson, "Highlight: Questions About Passenger Airbag Safety,"ABC Good Morning America, Mar. 17 1997, Transcript # 97031706-j01.

217. "Air Bag Pioneer Reverses Support; Costs, risk to children too great, he says," *The Atlanta Journal and Constitution*, Mar. 17, 1997.
218. Aaron Zitner, "Air-bag Fears Could Threaten Common Sense," *The Boston Globe*, Dec. 1, 1996.
219. "Air Bag Pioneer Reverses Support; Costs, risk to children too great, he says," *The Atlanta Journal and Constitution*, Mar. 17, 1997.
220. Id.
221. Id.; Corrections, *Star Tribune*, April 5, 1997.
222. Warren Brown, "Air Bags More Cost Effective for Drivers Than Passengers, Study Says" *The Washington Post*, Nov. 5, 1997; "One Size Doesn't Fit All: Washington Should Let Motorists Turn Their Air Bags Off," *The Kansas City Star*, Oct. 15, 1997.
223. Janet Fix, "Air Bags Killing More Children Than They're Saving, Expert Says," *Knight Ridder/Tribune News Service*, Mar. 19, 1997.
224. Letter from Michael Finkelstein to John Graham, May 13, 1997 (on file with Public Citizen).
225. Public Citizen Auto Safety Alert, Released Weds. Mar. 19, 1997 (on file with Public Citizen).
226. John D. Graham, et al, "The Cost-Effectiveness of Air Bags by Seating Position," *Journal of the American Medical Association*, Nov. 5, 1997.
227. Press Release, "Study Shows Air bags a Worthwhile Investment: Risk to Children Must Be Addressed," Harvard School of Public Health, Embargoed for Nov. 4, 1997 (on file with Public Citizen).
228. John D. Graham, et al, "The Cost-Effectiveness of Air Bags by Seating Position," *Journal of the American Medical Association*, Nov. 5, 1997, at 1419 ("the analysis adopts the societal perspective and incorporates information on all risks, costs, and benefits resulting from these strategies, regardless of who incurs them).
229. Letter to the Editor of the Journal of the American Medical Association from Joan Claybrook, President of Public Citizen, Nov. 14, 1997 (on file with Public Citizen).
230. Press Release, "Study Shows Air bags a Worthwhile Investment: Risk to Children Must Be Addressed," Harvard School of Public Health, Embargoed for Nov. 4, 1997, at 2 (quoting Graham) (on file with Public Citizen).
231. Elisa R. Braver, et al, "Reductions in Deaths in Frontal Crashes Among Right Front Passengers in Vehicles Equipped With Passenger Air Bags," *Journal of the American Medical Association*, Nov. 5 1997.
232. "Air Bag Pioneer Reverses Support; Costs, risk to children too great, he says," *The Atlanta Journal and Constitution*, Mar. 17, 1997.
233. John D. Graham, et al, "The Cost-Effectiveness of Air Bags by Seating Position," *Journal of the American Medical Association*, Nov. 5, 1997, at 1424.
234. Michael Lasalandra, "Air Bags Kill More Kids Than They Save," *The Boston Herald*, Nov. 5, 1997.
235. Id. See chart at 1439.
236. "Health Risks: Public Overestimates, Says New Poll," *American Health Line*, Jan. 28, 1999.
237. Branden Johnson, "Advancing Understanding of Knowledge's Role in Lay Risk Perception," *Risk*, Summer, vol. 4 (2000).
238. Patricia Braus, "Everyday Fears," *American Demographics*, Dec, 1994; Branden Johnson, "Advancing Understanding of Knowledge's Role in Lay Risk Perception," *Risk*, Summer, vol. 4 (2000).
239. Richard Saltus, "Gender Called Factor in Scientists' View of Technological Perils," *The Boston Globe*, Feb. 8, 1999.
240. *Unintended Consequences of the S. 746 Regulatory Obstacle Course*, Public Citizen Congress Watch, May 1999.
241. Testimony, John D. Graham before the Senate Governmental Affairs Committee, "Cost/Benefit Analysis of Federal Regulations," April 21, 1999 (Federal Document Clearing House Congressional Testimony).
242. Graham admits as much in his testimony, saving the thrust of his argument on air bags for the peer review portion of the bill. Id.
243. Kathy Boccella, "Expert Campaigning for Public Awareness," *The Sunday Gazette Mail*, Mar. 23, 1997.
244. Warren Brown, "Air Bags More Cost-Effective for Drivers Than Passengers, Study Says," *The Washington Post*, Nov. 5, 1997.
245. Joan Claybrook, "The Auto Industry, The Air Bag," *The Washington Post*, Dec. 1, 1996; Joan Claybrook, "The Safest Air Bag of All," *The Washington Post*, Aug. 12, 1997.
246. Id.
247. According to the Insurance Institute for Highway Safety, NHTSA records that air bags have saved 6,377 lives through Dec. 2000.
248. "'Dateline' Story Riddled With Errors, Environmentalists Say," *Pesticide and Toxic Chemical News*, Oct. 2, 1996.

249. Sally Covington, "Moving A Public Policy Agenda: The Strategic Philanthropy of Conservative Foundations," *National Committee for Responsive Philanthropy*, July 1997.
250. "Risk-Expert Graham as Political Guru," *Air/Water Pollution Report's Environment Week*, Feb. 2, 1996 (*emphasis added)*.
251. John D. Graham, "Making Regulatory Reform A Reality," *Heritage Foundation Reports*, Jan. 31, 1996.
252. See John Shanahan, "How to Talk About the Environment," Heritage Talking Points: Heritage Foundation Reports, Sept. 6, 1996; John Shanahan & Adam Thierer, "How to Talk About Risk: How Well-Intentioned Regulations Can Kill," Heritage Talking Points: Heritage Foundation Reports, April 23, 1996. On media articles, see e.g., L. Brent Bozell III, "When the Media Looks At Risk," *The Washington Times*, Oct. 17, 1994 (quoting Graham on the limits of the EPA). Bozell works for the "Media Research Center," a corporate-funded media "watch" group allied with Consumer Alert. See also David Shaw, "It's All So Scary: Americans A Bunch of Chicken Littles: Is It the Media's Fault," *The Plain Dealer*, Oct. 2, 1994 (quoting Graham as arguing that pesticide controls raise food prices and "if the prices of fruits and vegetables go up, people are likely to eat fewer fruits and vegetables," which will make them less healthy); Bob Sector, "Confusing Health Advice Has Public Scared Sick," *Chicago Sun-Times*, July 31, 1994 (quoting Graham, as well as Whelan of ACSH and conservative biochemist Bruce Ames); Andrew Holtz, "Risk Analysis Aims To Help People Assess Danger." *CNN Health Works*, June 19, 1993. Other examples of Graham's media handiwork can be found in the conflicts chart at the end of Part One.
253. See the conflicts chart at the end of Part One.
254. David Lore, "Determining Toxic Risks is Costly Voodoo," *The Columbus Dispatch*, Nov. 24, 1995.
255. For example, within risk management disputes there are such articles as: Adam Finkel, "A Second Opinion on An Environmental Misdiagnosis: The Risky Prescriptions of Breaking the Vicious Cycle," NYU. Env. L . J. (1995); on the divide between experts and the public over preventive and precautionary approaches, see, e.g., Kristin S. Frechette, "Evaluating the Expertise of Experts," Risk, vol. 6, see www.fplc.edu/risk/vol6/spring/shafrec/htm>; Jeanette M. Trauth, "A Case Study of Health Risk Communication: What the Public Wants and What It Gets," Risk, Vol. 5 <www.flpc.edu/risk/vol5/winter/trauth.htm>; Jeffrey J. Rachlinski, "Book Review," 6 Cornell J.L. & Pub. Pol'y 673 (Spring 1997)." The above is but a small sampling of the rich academic literature on risk issues.
256. Douglas E. MacLean, "Comparing Values in Environmental Policies: Moral Issues and Moral Arguments," in Valuing Health Risks, Valuing Health Risks, Costs, and Benefits for Environmental Decision Making (1990). See also, e.g., Lisa Heinzerling, "Reductionist Regulatory Reform," 8 Fordham Envtl. Law J. 459 (1997); Richard L. Revesz, "Environmental Regulation, Cost-Benefit Analysis, And the Discounting of Human Lives," 99 Colum. L. Rev. 941 (May 1999); David A. Wirth & Ellen K. Silbergeld, "Book Review: Risky Reform," 95 Colum. L. Rev. 1857 (Nov. 1995); Mark Sagoff, The Economy of the Earth 46 (1988), Margaret Radin, Contested Commodities.
257. The National Academy of Sciences' National Research Council is a private, non-partisan organization of outside academics and researchers chartered by Congress to advise the government.
258. *Conclusions*, in Valuing Health Risks, Costs, and Benefits for Environmental Decision Making 189, 206 1990; Thomas O. McGarity, "A Cost-Benefit State" 50 Ad. L. Rev. 1 (1998).
259. Linda-Jo Schierow, "The Role of Risk Analysis and Risk Management in Environmental Protection," *CRS Issue Brief*, Updated Feb. 17, 2000.
260. See Dolores Kong, "Scientists Warn Against Panic Over Electromagnetic Field Effect," *The Boston Globe*, Nov. 13, 1992.
261. Thomas O. McGarity, "A Cost-Benefit State" 50 Ad. L. Rev. 1 (1998).
262. Adam Finkel, "Who's Really Crying Wolf?" *American Scientist*, Sept.-Oct. 1996.
263. Thomas O. McGarity, "A Cost-Benefit State" 50 Ad. L. Rev. 1 (1998).
264. Id.
265. See list of articles in which he is quoted in the conflicts chart at the end of Part One.
266. Dorothy Patton, "The ABCs of Risk Assessment," *EPA Journal*, Jan/Feb/Mar 1993. (emphasis added).
267. Id.
268. Kristin S. Frechette, "Evaluating the Expertise of Experts," Risk, vol. 16, see <www.fplc.edu/risk/vol6/spring/shafrec/htm>.
269. See list of Graham's affiliations at the end of Part One.
270. See <www.prwatch.org>.
271. See list of Graham's affiliations at the end of Part One.
272. See Case, Andrea Golaine, "ACSH's Message Reaches Millions . . . .Anonymously," *Alt HealthWatch*, June 30, 1994 (quoting Graham). As the May 1994 issue of Consumer Reports noted, ACSH derives much of its funding from industry groups, including but not limited to the following companies: American Cynamid, American Meat Institute, Amoco, Bristol-Myers Squibb, Burger King, Chevron, Coca-Cola, Dow Chemical, DuPont, Exxon, Ford,

Mobil, Monsanto, National Agricultural Chemicals Association, Nestle, Pepsi-Cola, Pfizer, Procter and Gamble, Shell, Union Carbide and Uniroyal Chemical. Many of these companies also provide funding for Graham's HCRA.
273. See list of Graham's affiliations at the end of Part One.
274. See Sheldon Rampton & John Stauber, "The Junkyard Dogs of Science," *New Internationalist*, July 1999.
275. This is not the only time that ABC's reporter Stossel has served as a mouthpiece for the agenda of organizations like Graham's HCRA or ACSH. To get across his pro-industry ideological message, Stossel shows have also suggested that Mother Teresa was insufficiently greedy and have misquoted, in a way that reversed his meaning, the liberal economist James Galbraith. Ted Rose, "Laissez_faire TV: ABC's John Stossel is A Man on A Mission: To teach Americans About the Evils of Government Regulation and the Rewards of Free Enterprise," *Brill's Content*, Mar. 2000. Stossel has also been accused of unethical investigative conduct in a case involving a 1989 story on dentistry, see Robert Schmidt, "Stossel in Court," *Brill's Content*, Mar. 2000, an attack piece on Ben & Jerry's ice cream's alleged dioxin problem, see <www.ewg.org/pub/home/reports/givemeafaje/marash11032000.html>, and a "sting" involving a doctor who specializes in chemical sensitivity disorders, see Mark Schapiro, "Strange Bedfellows: Journalists as Corporate Shills," *Salon*, 1996, <www.salon.com/media/media961022.html>. Stossel's angle should come as no surprise. He has received speaking fees as high as $11,000 from the American Industrial Health Council, a trade association that includes Du Pont, Pfizer, and Procter & Gamble, and is also a HCRA funder. Id. *Brill's Content* reported that Stossel got $263,000 from 1998 to 2000 for speaking engagements before such groups as the Federalist Society, the National Petrochemical and Refiners Association and the Michigan Petroleum Society. Id. More recently, Stossel has come under fire for working with the ultraconservative Palmer R. Chitester Fund and the corporate-backed Olin Foundation, which is also a HCRA funder, to turn his antiregulatory programming into video and classroom study guides. The videos and guides, which are produced under the ABC logo and sent out to schools, draw almost exclusively on materials from conservative sources such as the Heritage Foundation and Young Americas Foundation. ABC has said that Stossel donates the money to charities. But the charity he has claimed donating to is the same Palmer Chitester Fund that has arranged with him to make the video and classroom guides. Donna Ladd, "Cyberfugtive: Beleagured Stossel Takes Shelter Under Right Wing," *The Village Voice*, Sept. 20-26, 2000. According to Media Transparency, the Chitester Fund was created with startup funding from the Bradley Foundation to create right wing "popular media." The Fund's "Idea Channel" distributes videos depicting conversations between mostly members of the right wing discussing politics and economics. See Media Transparency Project at <www.mediatransparency.org/recipients/pcf.asp>. This arrangement was recently questioned by Salon magazine. See David Mastio, "Prime-time Propagandist: Is ABC's John Stossel a reporter or a right-wing apparatchik?" *Salon*, Feb. 25, 2000, <www.salon.com/media/feature/2000/02/25/stossel/index.html>.

And last August, after running a show which suggested that eating organic foods could be fatal, ABC admitted that Stossel's report referred to testing that had never occurred in one instance and that the show had badly distorted test results in another. According to the *New Haven Register*, "Stossel and his producer knew that they didn't have the proof three months before the attack piece on organic food first aired, but ran (and then re-ran) the piece anyway." Brendan DeMelle, 20/20 Journalists Debunked," *New Haven Register*, Feb.20, 2001. Brian Halwell, a staff researcher at Worldwatch Institute, has traced this particular piece of misinformation to Dennis Avery, of the agribusiness funded Hudson Institute. Halwell wrote in the *San Francisco Chronicle*: "Last year, Avery manipulated data from the Centers for Disease Control in order to back his claim that organic produce carries a greater risk of E. coli than nonorganic produce. CDC officials have stated that their data do not support Avery's claim— a fact that might deter most journalists (even TV journalists) from relying on Avery as a source." Brian Halwell, "Cultivating the Truth About Organics," *San Francisco Chronicle*, Aug. 21, 2000.

Following a reprimand, Stossel was required to apologize on the air for the mistake but was not fired. Stossel's notoriously halfhearted apology is available on abc.com: <http://www.abcnews.go.com/onair/2020/2020_000811_stossel_apology_feature.html>. See also David Bauder, "Stossel, Producer Disciplined for 20/20 Report," *The Washington Post*, Aug. 10, 2000."Stossel Reprimanded But Not Fired," *Environmental Working Group*, Nov. 3 2000, <http://www.ewg.org/pub/home/reports/givemeafake/home.html>; Donna Ladd, "Cyberfugtive: Beleagured Stossel Takes Shelter Under Right Wing," *The Village Voice*, Sept. 20-26, 2000. More on Stossel's history of omissions and mischaracterizations in the service of a right-wing agenda can be found on the Fairness and Accuracy in Reporting Web site, the Environmental Working Group Web site, and TomPaine.common sense.

How valuable for the antiregulatory movement is Stossel? Stephen Moore, of the libertarian Cato Institute, says, "I think one John Stossel segment taking a skeptical look at government is worth a million dollars to the movement." See Ted Rose, "Laissez_faire TV: ABC's John Stossel is A Man on A Mission: To teach Americans About the Evils of Government Regulation and the Rewards of Free Enterprise," *Brill's Content*, Mar. 2000. After environmentalists protested the weakness of the ABC reprimand, the corporate Competitive Enterprise

Institute set up a Web site: *www.SaveJohnStossel.com*. And just to bring the issue full circle, what can Web surfers find behind a link on the site labeled "nomorescares.com"? A 74-page treatise on so-called "Fear Profiteers" written by Elizabeth Whelan, the Director of ACSH, and Steven Milloy, the former Executive Director of TASSC. The report purports to show that public interest groups such as Public Citizen "profit" from health and safety-related "scares." Stossel used to win Emmys for his coverage of consumer affairs. But in an interview with *Brill's Content*, Stossel pointed to a risk assessment chart behind his desk as his way of explaining his conversion from consumer reporter to regulation critic. See Ted Rose, "Laissez_faire TV: ABC's John Stossel is A Man on A Mission: To teach Americans About the Evils of Government Regulation and the Rewards of Free Enterprise," *Brill's Content*, Mar. 2000. His first show after that "conversion" was the hour-long special featuring Graham.
276. According to Fairness and Accuracy in Reporting, the other "public health experts" that consulted with Stossel were probably from the conservative Manhattan Institute, which had produced a book called "Health, Lifestyle and Environment: Countering the Panic." Peter Huber of the Manhattan Institute appeared on Stossel's late-evening follow-up show. Karl Grossman, "Victor Neufield's Anti-Environmental Spin Continues," *Extra! Update*, June 1994, <www.fair.org/extra/9406/neufield-stossel.html>.
277. ABC News Special, Transcript #346, April 21, 1994.
278. See Case, Andrea Golaine, "ACSH's Message Reaches Millions . . . .Anonymously," *Alt HealthWatch*, June 30, 1994.
279. ABC News Special, Transcript #346, April 21, 1994.
280. See list of Graham's affiliations at the end of Part One.
281. *Id.* (emphasis added)
282. "'Dateline' Story Riddled With Errors, Environmentalists Say," *Pesticide and Toxic Chemical News*, Oct. 2, 1996.
283. Id.
284. Id.
285. "Science Watchdog Group Celebrates Third Anniversary With Renewed Commitment to Exposing Use of Junk Science," *PR Newswire*, Dec. 3, 1996.
286. Elisa Ong writes: "From 1993 to 1994, PM and public relations firm APCO Associates worked to launch The Advancement of Sound Science Coalition (TASSC), a "grassroots" organisation advocating "sound science" in policy decision making." Elisa K. Ong, "Tobacco Industry's Efforts Subverting International Agency for Research on Cancer's Second-Hand Smoke Study," *The Lancet*, April 8, 2000.
287. See Ken Silverstein, Smoke and Mirrors, Public Citizen's Congress Watch 1996.
288. See The CALA Files: The Secret Campaign by Big Tobacco and Other Major Industries to Take Away Your Rights, Public Citizen and the Center for Justice & Democracy, July 26, 2000.
Ken Silverstein, Smoke and Mirrors, Public Citizen's Congress Watch 1996, at 3 ("APCO Associates [is] a Washington consulting firm which concocts "grassroots" support for its corporate clients, including several big tobacco firms and insurance companies.").
289. Id. (emphasis added).
290. Milloy and TASSC
291. "Science Watchdog Group Celebrates Third Anniversary With Renewed Commitment to Exposing Use of Junk Science," *PR Newswire*, Dec. 3, 1996.
292. Milloy does not stop there, however. His Web site, *www.junkscience.com*, still posts drippingly sarcastic ridicule about environmental, health and safety issues, and hocks such items as a poster entitled "*The Earth is Fine, Save Yourself*" as an educational tool which relieves "consumer fears." Other postings on the site argue that there are no demonstrated negative health effects from pesticides, second-hand smoke, global warming, the widespread use of antibiotics, cellular phones, beef growth hormones or dioxin, just to name a few. Milloy also contends that the U.S. ban on the pesticide DDT "kills," and in an echo of Stossel's program, puts down the health benefits of organic food. Sadly, Malloy's Web site at least claims that "Junkscience.com was the sixth most popular web site in the category "General Science" in January 2001, according to Top9.com. Junkscience.com had 168,000 unique visitors, ranking behind only NationalGeographic.com, Discover.com, SciAm.com (*Scientific American*), Sciencemag.org (the journal *Science*) and Lycaeum.com."
293. See "Panic Attack: ACSH Fears Nothing But Fear Itself: Fear not Facts," *PR Watch*, <www.prwatch.org/prwissues/1998Q4/panic.html>. The pamphlet can be downloaded from the ACSH Web site at <www.acsh.org/publications/reports/factsfears.html>.
294. Id. *PR Watch* also refutes the charges made in the pamphlet that DDT restrictions have triggered a worldwide growth in mosquito-borne malaria, responding to an argument made by Whelan in her book, *Toxic Terror*.
295. Jane Brody, "Health Scares That Weren't So Scary," *The New York Times*, Aug. 18, 1998.

296. Hilary Shenfield, "The Environment Often Seems Far More Hazardous to Your Health Than It Really Is," *Chicago Daily Herald*, Mar. 15, 1999.
297. See, e.g., J. Madeleine Nash, "Keeping Cool About Risk," *Time*, Sept. 19, 1994.
298. See conflicts chart at the end of Part One for two of these; see also Bonar Menninger, "Creating A Zero-Risk Environment," *Kansas City Business Journal*, Nov. 25, 1994 (mentioning Alar but not ACSH and quoting Graham as saying, "We go after minuscule risks, such as pesticide residue in food, and at the same we're tolerant and neglectful of major problems in daily life.")
299. J. Madeleine Nash, "Keeping Cool About Risk," *Time*, Sept. 19, 1994.
300. Adam Finkel, "Who's Really Crying Wolf?" *American Scientist*, Sept.-Oct. 1996.
301. Id.
302.. Peter De Groot, "Review," *New Scientist*, Jan. 6, 1996.
303. See <www.prwatch.org/prwissues/1998Q4/panic.html>. In fact, the main author of the report, Adam Lieberman, has since recanted and published an explanation of his indoctrination as a conservative ideologue in *Mother Jones*. Lieberman's name still appears on the ACSH Web site version of the report although with a parenthetical date that indicates his departure from the project. Id.
304. See, for example, the advertisement for a talk he gave in June 2000 to the Pacific Research Institute, on the Web at <www.pacificresearch.org/events/june00.html>.
305. See <www.hcra.harvard.edu>.
306. Dan Holtz, "Risk Analysis Aims to Help People," *CNN Health Works*, June 19, 1993.
307. Dolores Kong, "Scientists Warn Against Panic Over Electromagnetic Field Effect,"*The Boston Globe*, Nov. 13, 1992.
308. See John D. Graham, "Making Sense of Risk: An Agenda for Congress," in *Risks, Costs and Lives Saved*, (Robert W. Hahn, ed., Oxford University Press 1996).
309. David Lore, "Determining Toxic Risks is Costly Voodoo, Lawyer Says," *The Columbus Dispatch*, Nov. 24, 1995.
310. Graham frequently suggests that we not worry about a health risk potentially caused by a company which provides funding for his operation, and that we worry instead about a diffuse or controversial health problem which, studies have shown, the public views as a matter of personal responsibility.
311. See "Risk. Health and Environment. Facing Our Fears," *Consumer Reports*, Dec. 1996.
312. Id.
313. Mark Sagoff, The Economy of the Earth 46 (1988).
314. Id. (pointing out the factors of control over the risk and the voluntary assumption of the risk are important for risk perception).
315. Id. (Quoting Roger Kasperson, a researcher on risk perception from Clark University, discussing the fairness of risk distribution: "the public is saying that if you're benefiting from that activity, but I'm being exposed to the risk, have been told nothing about it, and have no recourse, I'm outraged that there's any risk at all.")
316. Patricia Braus, "Everyday Fears," *American Demographics*, Dec. 1994 (discussing risk perception findings that there is greater public outrage where hazards are involuntary or the result of profit-making ventures).
317. See "Risk. Health and Environment. Facing Our Fears," *Consumer Reports*, Dec. 1996.
318. Id. (discussing prevention of catastrophic risks.
319. Branden Johnson, "Advancing Understanding of Knowledge's Role in Lay Risk Perception," *Risk*, Summer, vol. 4 (2000), at 4.
320. In contrast, Graham's research efforts are sometimes directed at depicting the differences between lay and expert perceptions of risk as a justification for expert-directed risk analysis. See, e.g., "Surveys & Polls," *America Health Line*, Jan. 28, 1999; Richard Saltus, "Gender Called Factor in Scientists' View of Technological Perils," *The Boston Globe*, Feb. 8, 1999.
321. Some risk assessment specialists are very attentive to the importance of these and other aspects of risk perception, arguing that any government action must take meaningful account of these factors on both practical and moral grounds. Branden Johnson, "Advancing Understanding of Knowledge's Role in Lay Risk Perception," *Risk*, Summer, vol. 4 (2000). In the face of this critical debate within his own field, Graham's repeatedly pejorative characterization of our public "fears" as irrational appears callous and not a little arrogant.
322. See <www.hcra.harvard.edu>.
323. Dolores Kong, "Scientists Warn Against Panic Over Electromagnetic Field Effect," *The Boston Globe*, Nov. 13, 1992.

324. Graham testified at hearings on regulatory rollback and risk assessment proposals Nov. 11, 1993, Feb. 15, 1995, Mar. 25, 1995. He also testified at a joint hearing on pesticides Sept. 21, 1993. Graham was mentioned in the floor debate on May 18, 1994, in the debate on the Department of Energy Risk Management Act of 1995 on Feb. 2, 1995, and on the Risk Assessment and Cost-Benefit Act of 1995 on Feb. 27 and 28, 1995.
325. Graham testified at hearings on regulatory rollback and risk assessment proposals Nov. 11, 1993, Feb. 15, 1995, Mar. 25, 1995.
326. H.R. 965, as signed into law, provides funds for the National Highway Traffic Safety Administration to make grants that encourage the use of bicycle helmets by children, and authorizes the Consumer Product Safety Commission to set standards for helmets.
327. J. Madeleine Nash, "Keeping Cool About Risk," *Time*, Sept. 19, 1994.
328. Thomas O. McGarity, "A Cost-Benefit State" 50 Ad. L. Rev. 1 (1998).
329. "Consumer Product Safety Commission— Better Data Needed to Help Identify and Analyze Potential Hazards," *General Accounting Office*, Sept. 19, 1997, GAO/HEHA-97-147.
330. Id. at 29.
331. See <www.atsdr.cdc.gov/tfacts53.html>. The Agency for Toxic Substances and Disease Registry.
332. Exposure occurs when people breath residential and indoor air contaminated with styrene vapors from building materials, use consumer products with styrene, are exposed to tobacco smoke; drink contaminated water; live near industrial facilities or hazardous waste sites; smoke cigarettes or eat a lot of food packaged in polystyrene containers. www.atsdr.cdc.gov/tfacts53.html. The Agency for Toxic Substances and Disease Registry.
333. Id. When animals breathed styrene vapors in short-term studies, they damaged the lining of their noses. Long-term exposure damaged their livers.
334. Styrene is also known as vinylbenzene, ethenylbenzene, cinnamene, or phenylethylene. It's a colorless liquid that evaporates easily. <www.atsdr.cdc.gov/tfacts53.html.> The Agency for Toxic Substances and Disease. Registry, Department of Health and Human Services. The Environmental Protection Agency (EPA) set a maximum limit of 0.1 part of styrene per million parts of water (0.1 ppm) for drinking water. The EPA requires that all spills or accidental releases into the environment of 1,000 pounds or more of styrene be reported. The Occupational Health and Safety Administration (OSHA) has limited workers' exposure to an average of 100 ppm for an 8-hour workday, 40-hour work week.
335. See <www.dow.com/environment/debate/d8.html> (emphasis added). A search of the HCRA Web site did not turn up a copy of the Dow styrene study.
336. Elisa K. Ong, "Tobacco Industry's Efforts Subverting International Agency for Research on Cancer's Second-Hand Smoke Study," *The Lancet*, April 8, 2000.
337. Id. According to Ong, TASSC and its European counterpart, also established by APCO, issued joint press releases and published at least one opinion piece in the European Wall Street Journal calling the health risk from the anticipated EST study "trivial or nonexistent." Graham was on the Advisory Board of TASSC, according to a 1996 news report entitled "Science Watchdog Group Celebrates Third Anniversary With Renewed Commitment to Exposing Use of Junk Science," *PR Newswire*, Dec. 3, 1996.
338. Rick Weiss & Gary Lee, "Pollution's Effect on Human Hormones," *The Washington Post*, Mar. 31, 1996.
339. Id. (emphasis added).
340. Id. (emphasis added).
341. "Science Watchdog Group Celebrates Third Anniversary With Renewed Commitment to Exposing Use of Junk Science," *PR Newswire*, Dec. 3, 1996.
342. Id.
343. See <www.junkscience.com/jan00/osf.htm>.
344. See the ACSH Web site for a copy of the "Fact, not Fear report."
345. Karen Rothmeyer, "Citizen Scaife," *Columbia Journalism Review*, (July/August, 1981): at 48-50.
346. Trip Report by Mayada Logue of Philip Morris, June 1, 1992, Bates no. 2025523685.
347. Mike Musgrove, "Cancer-Risk Study Clears Cell Phones," *The Washington Post*, Feb. 7, 2001 (quoting George Carlo).
348. Elisa Ong described PM's coordinated attack upon the largest European study of the relationship between second-hand smoke and lung cancer rates in non-smokers. The study was funded by a branch of the World Health Organization and results showed a 16 percent increase from ETS in estimated risk in lung cancer for nonsmokers. Nonetheless, as Ong documents, due in part to the efforts of PM, these results were obfuscated— and the study was widely misreported as *not* having demonstrated any increased cancer risk. Elisa K. Ong, "Tobacco Industry's Efforts Subverting International Agency for Research on Cancer's Second-Hand Smoke Study," *The Lancet*, April 8, 2000.

349. According to Ong, TASSC and its European counterpart, also established by APCO, issued joint press releases and published at least one opinion piece in the European *Wall Street Journal* calling the health risk from the anticipated EST study "trivial or nonexistent." Id. Graham was on the Advisory Board of TASSC, according to a 1996 news report entitled "Science Watchdog Group Celebrates Third Anniversary With Renewed Commitment to Exposing Use of Junk Science," *PR Newswire*, Dec. 3, 1996. According to previous Public Citizen reports on APCO, the organization was registered as a lobbyist for Philip Morris until 1993. See Ken Silverstein, *Smoke and Mirrors*, Public Citizen's Congress Watch 1996, at 3 ("APCO & Associates [is] a Washington consulting firm which concocts "grassroots" support for its corporate clients, including several big tobacco firms and insurance companies.").
350. Mike Musgrove, "Cancer-Risk Study Clears Cell Phones," *The Washington Post*, Feb. 7, 2001.
351. Id.
352. See Case Study #2.
353. Mike Musgrove, "Cancer-Risk Study Clears Cell Phones," *The Washington Post*, Feb. 7, 2001 (emphasis added).
354. Used with permission from Consumers Union.
355. Used with permission from the Natural Resources Defense Council.
356. Dioxin is produced during incineration, the manufacturing of paper, metal smelting and refining, the manufacturing of chlorinated chemicals including pesticides, herbicides and polyvinyl chloride plastic, petroleum refining and industrial and utility oil and coal combustion.
357. According to the National Institutes for Health Web site, TCDD stands for "TETRACHLORODIBENZO-*p*-DIOXIN." See <ntp-server.niehs.nih.gov/htdocs/8_RoC/RAC/TCDD.html>. The center for Health and Environmental Justice Web site at www.chej.org/policy.html: Dioxin belongs to a family of chemicals with related properties and toxicity. There are 75 different dioxins, or polychlorinated dibenzodioxins (PCDDs), 135 different furans, or polychlorinated dibenzofurans (PCDFs), and 209 different polychlorinated biphenyls (PCBs). Each different form is called a "congener." Not all of the "dioxin-like" chemicals have dioxin-like toxicity, and the toxic ones are not equally toxic. Only 7 of the 75 dioxins, 10 of the 135 furans, and 12 of the 209 PCBs have dioxin-like toxicity. These 29 different dioxins, furans, and PCBs all exhibit similar toxic effects caused by a common mechanism: binding to a particular molecule known as the aryl hydrocarbon or "Ah" receptor (see Chapter 5 of the TSD). It is believed that the tighter the binding to the Ah receptor, the more toxic the chemical. The most potent member of this family is 2,3,7,8-tetrachlorodibenzo-p-dioxin or TCDD, which also has the greatest affinity for the Ah receptor. The word "dioxin" is often used imprecisely. Some people restrict its use only to 2,3,7,8-TCDD, the most toxic and most studied dioxin. Others extend its use to the whole class of chemicals with similar toxicity and whose effects are controlled or triggered by the Ah receptor. In this report, the terms "dioxin" and "dioxins" are used to refer to any of the dioxin family members that bind to the Ah receptor and elicit dioxin like effects.
358. US EPA, SCIENCE ADVISORY BOARD DIOXIN REASSESSMENT SUBCOMMITTEE OF THE EXECUTIVE COMMITTEE, Nov. 1-2, 2000 at 512.
359. When Graham was asked at an SAB meeting about his potential conflicts of interest in regard to this dioxin issue, according to conversations with attendees at the SAB meeting, he responded that there was no conflict of interest between his funding and his independence as an SAB consultant. He emphasized that he does not personally receive money from dioxin emitting companies. Instead, the funding from those companies goes to his Center. *See* list of dioxin emitting funders of HCRA in the conflicts graph at the end of Part One.
360. US EPA, SCIENCE ADVISORY BOARD DIOXIN REASSESSMENT SUBCOMMITTEE OF THE EXECUTIVE COMMITTEE, Nov. 1-2, 2000 at 618 (emphasis added).
361. Ellen K. Silbergeld, "The Risks of Comparing Risks," N.Y.U. Environ. Law. J. 3 (1994).
362. Dorothy Patton, "The ABCs of Risk Assessment," *EPA Journal*, Jan/Feb/Mar 1993.
363. Id.
364. Id.
365. Id.
366. Id.
367. Id. (distinguishing risk assessment from sciences like biology and chemistry).
368. Carnegie Commission on Science, Technology and Government, *Risk and the Environment: Improving Regulatory Decision Making* (1993) at 206.
369. Thomas O. McGarity, "A Cost-Benefit State" 50 Ad. L. Rev. 1 (1998).
370. Carnegie Commission on Science, Technology and Government, *Risk and the Environment: Improving Regulatory Decision Making* (1993), at 83.