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cc:

Subject: Public Citizen's Comments

Attached are Public Citizen's Comments to the 2004 Draft Report to Congress on the Costs and Benefits of Federal Regulations.

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Buyers Up • Congress Watch • Critical Mass • Global Trade Watch • Health Research Group • Litigation Group  
**Joan Claybrook, President**

May 20, 2004

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**Re: Comments to the 2004 Draft Report to Congress on the Costs and Benefits  
Of Federal Regulations**

Dear Administrator Graham:

Public Citizen is a 160,000 member national public interest organization that represents consumer interests through lobbying, litigation, regulatory oversight, research and public education. For 33 years, Public Citizen has had direct, practical involvement with a wide variety of federal health and safety protections and has represented consumer groups, labor unions, and public health organizations in standard-setting proceedings and in litigation involving the Occupational Safety and Health Administration (OSHA), the Environmental Protection Agency (EPA), the Food and Drug Administration (FDA), the Consumer Product Safety Commission (CPSC), the U.S. Department of Agriculture (USDA), the National Highway Traffic Safety Administration (NHTSA), the Federal Motor Carrier Safety Administration (FMCSA) and other health and safety agencies.

We are writing in response to the February 20, 2004 notice in the Federal Register requesting comments on the Draft 2004 Report to Congress on the Costs and Benefits of Federal Regulations (hereinafter 2004 Draft Report).<sup>1</sup> The Report continues to be published despite a growing body of evidence establishing the bankruptcy of regulatory accounting as a useful tool for public policy. Each successive cost/benefit Report to Congress is increasingly hostile to good government and the well-being of the public. Public Citizen continues to object to the use of regulatory accounting and objects to use of the annual report by the Office of Management and Budget (OMB) as a vehicle for furthering the Administration's campaign agenda through solicitation of nominations for a new "hit list" of regulations that affect manufacturing.

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<sup>1</sup> 69 Fed. Reg. 7987.

## **I. The Track Record of Regulatory Accounting Demonstrates that It Is a Resounding Failure.**

Regulatory accounting involves monetizing and totaling both the costs and the benefits of public protections and then subtracting one from the other. It suffers from fatal flaws that make it useless for any purpose other than lending a false appearance of technical objectivity to a political decision to benefit regulated interests over the public's interest.

However, even with all the intrinsic distortions of regulatory accounting, OMB's Reports to Congress have established one thing: the benefits of federal regulations far outweigh the costs. If the point of the exercise were to assess the value produced by federal regulatory activity, it could end now, having proven the effectiveness of a framework under which Congress establishes public policy and the agencies, with public participation, work out the necessary details of implementation. Unfortunately, the real objective appears to be to subvert that framework.

### *A. OMB's 2004 Draft Report to Congress Perpetuates the Underlying Limitations of Regulatory Accounting and Demonstrates the Manipulability of the Numbers.*

As has become customary with OMB's Reports to Congress, the 2004 Draft Report begins by perfunctorily acknowledging its serious shortcomings:

- Monetized costs and benefits could be calculated for only six rules, half of the 12 "social regulations" to which OMB has chosen to limit its report.<sup>2</sup>
- In many instances, agencies were unable to quantify all benefits and costs. The monetized estimates that OMB presents necessarily exclude the unquantified benefits.<sup>3</sup>
- It is difficult to estimate and aggregate the costs and benefits of different regulations over long time periods and across many agencies using different methodologies. Any such aggregation involves the assemblage of benefit and cost estimates that are not strictly comparable.<sup>4</sup>

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<sup>2</sup> "Informing Regulatory Decisions: 2004 Draft Report to Congress on the Costs and Benefits of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities" (2004 Draft Report), p. 3.

<sup>3</sup> *Id.* For example, nonmonetized benefits of EPA's Standards for Concentrated Animal Feeding Operations include reduced contamination of coastal and estuarine waters, reduced pathogen contamination of groundwater, reduced human and ecological risks from antibiotics, hormones, metals, and salts, improved soil properties, etc. *Id.*, p. 15, Table 4. Unquantified benefits of EPA's National Primary Drinking Water Regulations include possible reductions in rectal and colon cancer and adverse reproductive and developmental effects. *Id.*, p. 24.

Nonmonetized benefits of OSHA's Lead Exposure in Construction rule include thousands fewer cases per year of adverse health effects such as reduced nerve conduction velocity, blood-lead levels above MRP trigger, stroke, and renal disease. *Id.*, p. 43. Not estimated benefits of EPA's Water Quality Standards regulation include potential decreased incidence of systemic toxicity to vital organs such as liver and kidney, decreased extent of learning disability and intellectual impairment, decreased risk of adverse reproductive effects and genotoxicity, and protection of fresh and salt water organisms as well as wildlife that consume aquatic organisms. *Id.*, p. 45.

<sup>4</sup> *Id.*, p. 3. OMB states that it expects costs and benefits to become more comparable across agencies and programs as agencies adopt its guidance on best practices in regulatory analysis that took effect on January 1, 2004. If this happens, however, it will merely represent a consistent use of a defective calculus. Moreover, instead of helping agencies understand how to meet existing analytical requirements, OMB has introduced a new level of complexity.

- The benefits of a reduced risk of terrorism have proven very difficult to quantify and monetize.<sup>5</sup>

Despite its admission of the incompleteness and unreliability of the data, OMB nonetheless proceeds to present what it calls “Estimates of the Total Annual Benefits and Costs of Major Federal Rules” for two time periods, the year ending in September 2003 and the ten year period from October 1993 to September 2003. What is perhaps most remarkable about these aggregate numbers is the difference between the 10-year benefit total in the 2004 Draft Report and the 10-year benefit total in OMB’s 2003 Report to Congress last year.

OMB’s 10-Year Cost/Benefit Analyses:  
(in millions of dollars)

	Benefits	Costs
2004 Report: Oct. 1993 to Sept. 2003	\$62,091 - \$168,098	\$34,156 – \$38,958 <sup>6</sup>
2003 Report: Oct. 1992 to Sept. 2002	\$146,812 – \$230,896	\$36,625 - \$42,813 <sup>7</sup>

For both 10-year periods, the cost figures are roughly comparable, but for the period ending in September 2003 the benefits have decreased dramatically. OMB accomplished this drastic reduction on the benefit side by eliminating the \$80 billion per year of benefits produced by the sulfur dioxide limits of the acid rain rules. OMB’s explanation for dropping these benefits is that the rule dates to 1992 and so now falls outside the 10-year period that OMB has chosen to include in its report.

Of course, the rule did not abruptly stop producing benefits on September 30, 1993. This highlights one of the analytical problems with this process. Costs are often incurred in a relatively short period of time and are comparatively measurable. Benefits, on the other hand, can be experienced over a considerable period of time. Thus, presenting cost/benefit information in 10-year intervals can weight costs more heavily and cause benefits to disappear. What is the point of this 2004 “total” cost/benefit table except to mislead the public about the relative benefits produced by federal regulatory activity?

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For rules involving annual economic effects of \$1 billion, agencies will now be required to “try to provide some estimate of the probability distribution of regulatory benefits and costs.” OMB Circular A-4, Regulatory Analysis, p. 40. Strikingly, a note of caution was sounded by anti-regulation law professor Kip Viscusi who, in the role of peer reviewer, expressed concern that the emphasis on probability distribution “may lead to dismissal of risks that cannot be proven conclusively” and made the point that “[i]f risks are required to be shown to be statistically significant based on classical tests, then we should close down our homeland security operation because its policies will never pass such a test.” April 14, 2003 Memo to John D. Graham, Administrator, OIRA, from W. Kip Viscusi, p. 8.

<sup>5</sup> 2004 Draft Report., p. 5.

<sup>6</sup> Id., p. 5, Table 2.

<sup>7</sup> “Informing Regulatory Decisions: 2003 Report to Congress on the Costs and Benefits of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities,” Office of Management and Budget, Office of Information and Regulatory Affairs, p. 7.

The malleability of the numbers produced by regulatory accounting is also highlighted by the about-face of John Graham, Administrator of OMB's Office of Information and Regulatory Affairs (OIRA), regarding the cost estimates produced by Mark Crain and Thomas Hopkins,<sup>8</sup> which are used in the 2004 Draft Report to justify OMB's invitation to create a new "hit list" of regulations affecting the manufacturing sector to be delayed, weakened or killed.

In Congressional testimony in July 2003, Administrator Graham left no doubt about his opinion of the usefulness of the Crain and Hopkins study. To support his argument, with which we agree, that it is not workable to require an estimate of the costs and benefits of all existing rules and paperwork requirements, Administrator Graham criticized the study in these terms:

The fact that attempts to estimate the aggregate costs of regulations have been made in the past, such as the Crain and Hopkins estimate of \$843 billion mentioned in Finding 5, is not an indication that such estimates are appropriate or accurate enough for regulatory accounting. Although the Crain and Hopkins estimate is the best available for its purpose, it is a rough indicator of regulatory activity, best viewed as an overall measure of the magnitude of the overall impact of regulatory activity on the macro economy. The estimate, which was produced in 2001 under contract for the Office of Advocacy of the Small Business Administration, is based on a previous estimate by Hopkins done in 1995, which itself was based on summary estimates done in 1991 and earlier, as far back as the 1970s. The underlying studies were mainly done by academics using a variety of techniques, some peer reviewed and some not. Most importantly, they were based on data collected ten, twenty, and even thirty years ago. Much has changed in those years and those estimates may no longer be sufficiently accurate or appropriate for an official accounting statement. Moreover, the cost estimates used in these aggregate estimates combine diverse types of regulations, including financial, communications, and environmental, some of which impose real costs and others that cause mainly transfers of income from one group to another. Information by agency and by program is spotty and benefit information is nonexistent. These estimates might not pass OMB's information quality guidelines.<sup>9</sup>

Amazingly, less than seven months later, this same report is described by Administrator Graham in the 2004 Draft Report as a "recently sponsored" study, "[a]mong the more recent and comprehensive sources of estimates of the overall burden of regulation on specific economic sectors."<sup>10</sup> Although Administrator Graham correctly points out that the Crain and Hopkins data do not indicate whether reducing regulatory requirements on small firms would produce net positive benefits, he nonetheless cites the study in support of his solicitation of nominations of regulations affecting the manufacturing sector to be cut back.

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<sup>8</sup> W. Mark Crain and Thomas D. Hopkins, "The Impact of Regulatory Costs on Small Firms," Report for The Office of Advocacy, U.S. Small Business Administration," RFP No. SBAHQ-00-R-0027 (Crain and Hopkins Study).

<sup>9</sup> H.R. 2432, Paperwork and Regulatory Improvements Act of 2003, July 22, 2003 Transcript, p. 21.

<sup>10</sup> 2004 Draft Report to Congress, pp. 26 and 52.

As Administrator Graham said last July, the only thing new or recent about the Crain and Hopkins study is that incomplete and inaccurate data from years ago has been updated to account for inflation. But this merely serves to exaggerate the underlying distortions that are embedded in this type of estimate. Moreover, even Administrator Graham's sweeping explication of the problems with the Crain and Hopkins study does not reveal all of its shortcomings. For example, the cost estimates on workplace regulations used by Crain and Hopkins come from a 2001 study by Joseph Johnson of the industry-funded Mercatus Center.<sup>11</sup> In a painstaking, in-depth, look at the research on regulatory costs, law professor Thomas McGarity and economist Ruth Rutenberg found major weaknesses in Johnson's data.<sup>12</sup>

Johnson's research begins with the original cost estimates provided to OSHA by representatives of affected industries, makes no attempt to evaluate these estimates retrospectively or adjust for possible bias in the source of information, and then subjects the resulting total to a "multiplier" of 5.55, meant to represent the additional cost of non-major regulations and *finer imposed by OSHA*. This "multiplier" in turn comes from a 1996 report by a postdoctoral fellow at the Center for the Study of American Business (now Weidenbaum Center) who took it from an unpublished and otherwise unavailable and undocumented 1974 estimate provided by the National Association of Manufacturers. Thus, a figure based on an unverifiable 30-year-old estimate, that includes fines paid by scofflaw companies for violating existing law, is now being put forward by the government as evidence of excessive regulatory burden.

*B. There Is a Growing Body of Evidence Establishing the Defects of Regulatory Analysis as It Is Currently Practiced Under OMB's Direction.*

Four recent publications and studies document the inaccurate and ultimately meaningless data regarding regulatory costs, the specious rubric that underlies cost/benefit analysis, and the increasing threat to the integrity of the scientific information used by regulatory agencies.

1. Not Too Costly, After All: An Examination of the Inflated Cost-Estimates of Health, Safety and Environmental Protections

"Not Too Costly, After All," by Ruth Rutenberg and Associates,<sup>13</sup> is an exhaustive examination of the reasons federal agencies regularly and admittedly overestimate regulatory costs, thus weighting the scales of cost-benefit analysis against regulation. Looking back over a thirty year period, the report examines over 28 regulations and finds that cost exaggerations are the result of three inherent flaws in agency practice. First, cost information is normally provided to agencies by regulated industry, which has financial incentives to skew the cost-benefit

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<sup>11</sup> Crain and Hopkins Study, p. 12.

<sup>12</sup> Thomas O. McGarity and Ruth Rutenberg, "Counting the Cost of Health, Safety, and Environmental Regulation," 80 Tex. L. Rev. 1997 (2002), p. 2017.

<sup>13</sup> Ruth Rutenberg and Associates, Inc., "Not Too Costly, After All: An Examination of the Inflated Cost-Estimates of Health, Safety and Environmental Protections," Public Citizen Foundation, Inc., 2004 ("Not Too Costly, After All"). Ruth Rutenberg, Ph.D., is an economist with 28 years of experience on the economics of regulation. She has been a senior economist at OSHA, a consultant to OSHA, EPA and the Congressional Office of Technology Assessment, and regularly testifies before the U.S. Congress and federal regulatory agencies and advisory bodies. A copy of the report is attached as Appendix A.

analysis against the proposed regulation. Informational surveys on cost are often limited to a small number of companies, meaning that the results may not be representative of industry as a whole. This problem is compounded by the fact that industry data sources are often confidential, making it difficult or impossible to verify their factual validity. Moreover, there are very limited sources - other than regulated industries - from which agencies can obtain cost information and such information is costly to acquire.

The second major flaw is the agencies' tendency to base estimates on conservative and/or inappropriate assumptions. Numerous problems present themselves in attempting to determine cost, the resolution of which invariably reflects the decision maker's bias. For example, it may be difficult to distinguish regulatory compliance costs and other capital expenditures by the company, or to avoid double counting regulatory costs when more than one regulation is involved. Problems also arise in measuring incremental cost differences between what would have been spent prior to regulation and what must be spent after regulation.

Finally, agencies apply only static market analysis, failing to consider new and innovative ways that industry can, and regularly does, comply with new regulations. Yet there is substantial evidence that new processes and improved products are the result of new regulation and create subsequent new profits for the company. Also, cost estimates often fail to consider the offsetting economic gains caused, for example, by the license and sale of pollution abatement equipment or the avoidance of problems arising later in the marketplace. Similarly, cost savings resulting from safer substitutes and the elimination of hazards are often omitted from regulatory cost estimates.

These omissions and distortions further impoverish the usefulness of cost-benefit analysis and result in cost figures that are significantly inflated.<sup>14</sup>

## 2. Priceless: On Knowing the Price of Everything and the Value Of Nothing

In this recently published book, economist Frank Ackerman and law professor Lisa Heinzerling expose the myths that underlie cost/benefit analysis and the pernicious effects of its use in public policy.<sup>15</sup> For example, the oft-repeated accusation that federal regulations cause the "statistical murder" of 60,000 Americans every year is based on a study by John D. Graham and Tammy Tengs of the Harvard Center for Risk Analysis. "Priceless" reveals that 79 of the 90 regulatory measures cited by Graham and Tengs were never actually in effect, and that this

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<sup>14</sup> See, also, "Cry Wolf - Predicted Costs by Industry in the Face of New Regulations," Report 6:04 published by the International Chemical Secretariat, April 2004 - a retrospective study of five European and American environmental regulations that documents systematic and often deliberate overstatement of costs by affected industries, along with dire predictions of job loss and other adverse economic consequences that did not materialize. [Http://www.chemsec.org/documents/Cry%20wolf%20final%20220404.pdf](http://www.chemsec.org/documents/Cry%20wolf%20final%20220404.pdf). A copy of the report is attached as Appendix B.

<sup>15</sup> <sup>15</sup> Frank Ackerman & Lisa Heinzerling, "Priceless: On Knowing the Price of Everything and the Value of Nothing," (Priceless), The New Press, 2004. Lisa Heinzerling is a professor at Georgetown University Law Center specializing in environmental law. Frank Ackerman is an economist at the Global Development and Environment Institute at Tufts University.

inflammatory and mythical figure is thus based on a misrepresentation of actual federal regulatory activity.<sup>16</sup>

The authors explain how OMB forced EPA to understate the benefits of a regulation requiring power plants to reduce the number of fish killed by their intake cooling systems. Only a small number of the fish could be “monetized,” *i.e.*, those that were caught and sold in the marketplace and so had a readily ascertainable commercial value. No value at all was assigned to fish that people do not catch or even to the commercially desirable fish that escape capture, but whose continuing existence ensures that there will be a catch next year.

A stark example illustrates both the absurdity of treating human lives as if they were financial investments and the arbitrariness of the resulting numbers:

If cancer were the same as money, one could equally say that one hundred cancer cases expected twenty years from now have a present value of only fifty-five cancers today at a 3 percent discount rate, or only twenty-six cancers today at 7 percent. Don't laugh yet: this is exactly what is done in contemporary cost-benefit analyses.<sup>17</sup>

People do not value human life this way. When the public became aware of the “senior death discount” (OIRA’s “age-adjustment factor”), their outrage was so great that OMB was forced to abandon the practice of assigning a lesser dollar value to older people.<sup>18</sup> It can be anticipated that Americans who read Priceless will be as offended by economists’ dismissive assumptions and infuriated at their government’s acceptance of such repugnant methodology.

As Professors Ackerman and Heinzerling conclude in Priceless:

Cost-benefit analysis of health and environmental policies trivializes the very values that gave rise to those policies in the first place. Moreover, through opaque and intimidating concepts like willingness to pay, quality-adjusted life-years, and discounting, economic analysts have managed to hide the moral and political questions lying just under the surface of their precise and scientific-looking numbers. It is time to blow their cover.<sup>19</sup>

### 3. Grading the Government

Building on Professor Heinzerling’s pioneering work, law professor Richard W. Parker has taken a microscope to three influential sets of studies that are often cited in support of the argument that federal regulations are excessively costly.<sup>20</sup> Professor Parker uses the term

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<sup>16</sup> *Id.*, p. 55.

<sup>17</sup> *Id.*, p. 188.

<sup>18</sup> Memorandum to the President’s Management Council from John D. Graham, Ph.D., May 30, 2003.

<sup>19</sup> Priceless, p. 234.

<sup>20</sup> Richard W. Parker, “Grading the Government,” 70 *U. Chi. L. Rev.* 1345 (2003). Richard W. Parker is a professor at the University of Connecticut School of Law, where he teaches Environmental Law, International Environmental Law, and the International Law of Trade and Environment.



“scorecard” to describe the presentation of regulatory cost and benefit information in summary statistical form that is often reduced to a single “cost-per-life-saved” figure.

The three scorecards that Professor Parker comprehensively examines are: the 1987 table created by OMB economist John Morrall, suggesting that federal regulations cost up to \$72 billion per life saved; two studies by Graham and Tengs at the Harvard Center for Risk Analysis, one showing a range of less than zero up to \$1 trillion per life saved from federal regulations, and the other positing that 60,000 additional lives could be saved each year if money were spent on different interventions; and Robert Hahn’s 2000 update of his 1996 study claiming that fewer than half of all federal regulations pass “a neutral economist’s benefit-cost test.”

Professor Parker finds all three scorecards to be rife with errors, which he divides into two categories, avoidable errors and ones that are inherent in the process. In the avoidable error category, all three sets of studies are found to contain undisclosed data and non-replicable calculations, guesses presented as facts, and gross under-estimates of the number of lives saved and/or their value. Morrall altered agency estimates by several orders of magnitude in some cases. Hahn also adjusted agency figures, excluded many benefits, used his own discount rates, and set an arbitrary baseline year of 1996.

Professor Parker’s requests for access to the Graham and Tengs worksheets were denied, making replication of their work impossible. Their sample was limited to studies for which estimates for full-implementation costs and benefits had been produced, with the result, for example, that only seven of thousands of regulated toxic chemicals were included.

The catalog of errors judged by Professor Parker to be endemic to the scorecard enterprise includes exclusion of unquantified costs and benefits (and of many quantified benefits, as well), disregard of distributive and equitable impacts, and failure to reveal the actual level of uncertainty in the analysis.

The annual OMB Reports to Congress present scorecards of this type and suffer from all the defects exposed in the article.

4. Scientific Integrity in Policymaking, An Investigation into the Bush Administration’s Misuse of Science

In Congressional testimony last July, Administrator Graham disclosed a “strategy of trying to induce more sound science as a check on regulatory power” and said “[w]e have to have more science and peer review check from the outside community on the power at agencies ...”<sup>21</sup>

The Administration’s strategy of using science to “check” agency power is exposed at length in a report by the Union of Concerned Scientists.<sup>22</sup> The report describes a pattern of suppression and distortion of scientific findings, manipulation of the scientific advisory system

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<sup>21</sup> H.R. 2432, Paperwork and Regulatory Improvements Act of 2003, July 22, 2003 Transcript, pp. 17 and 41.

<sup>22</sup> Union of Concerned Scientists, “Scientific Integrity in Policymaking, An Investigation into the Bush Administration’s Misuse of Science,” (2004), [http://www.ucsusa.org/global\\_environment/rsi/report.html](http://www.ucsusa.org/global_environment/rsi/report.html).

to silence opinion not in line with Administration policy, and censorship of government employees.

The scientists caution that distorting the scientific underpinnings of the policymaking process “runs the risk that decision makers will not have access to the factual information needed to help them make informed decisions that affect human health, public safety, and the wellbeing of our communities.”<sup>23</sup>

In furtherance of his stated goal of using peer review to “check” agency power, Administrator Graham issued a proposed Peer Review Bulletin in September 2003.<sup>24</sup> Peer review is a process commonly used to confirm that new research conforms to accepted scientific methods. It is widely used in various forms by federal agencies that address scientific and technical research in their work.

What Administrator Graham proposed, however, is a form of peer review unknown to the scientific community. All scientific and technical information would have to go through peer review before it could be disseminated to the public and certain categories of information would have to be reviewed by external peer review panels, put together under selection criteria patently skewed to favor the appointment of industry-funded scientists over publicly-funded scientists.

Objections to the proposal from the scientific and academic communities proved so overwhelming that OIRA has had to issue a substantially revised draft that moderates somewhat the extraordinary hostility toward publicly-funded scientists of the original.<sup>25</sup> However, this new proposal still holds scientists whose research is funded by federal agencies to much stricter standards of independence than industry-funded scientists, still sets far higher requirements for government science than for industry science, and would still cause inevitable and unnecessary delay in development of needed health, safety and environmental protections.

## **II. OMB’s 2004 Draft Report Ignores the Costs to the Public of Weakened and Blocked Regulations**

The usefulness of the cost/benefit report as a picture of federal regulatory activity is further undermined by its failure to account for the following:

- The use of regulatory analysis to delay and distort new safety protections, such as the tire pressure monitoring and hours of service rules discussed below.
- OMB’s use of its reviews of draft regulations to decrease public health and safety protections that were or might have been proposed by regulatory agencies.
- The increasing harm to the public that is being caused by the systematic delay and weakening of needed health, safety and environmental protections.

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<sup>23</sup> Id., p. 4.

<sup>24</sup> Proposed Bulletin on Peer Review and Information Quality, 68 Fed. Reg. 54023 (September 15, 2003).

<sup>25</sup> Revised Information Quality Bulletin on Peer Review, 69 Fed. Reg. 23230 (April 28, 2004).

A. *Regulatory Analysis Is Being Used to Undermine Congressionally Mandated Public Safety Measures, but OMB Repeatedly Fails to Disclose the Mounting Costs to the Public.*

1. The Tire Pressure Monitoring Systems Rule

Two years ago, Public Citizen objected to OIRA's decision to "return" the draft final rule on tire pressure monitoring systems (TPMS) required by the TREAD Act and informed Administrator Graham that his attempt to force NHTSA to adopt a proposed rule based on his manipulated analysis amounted to obstructing the intent of Congress.<sup>26</sup> In August 2003, in a ruling in a case brought by Public Citizen and other consumer groups, the Second Circuit Court of Appeals agreed.<sup>27</sup> Administrator Graham has not accounted for the costs of his interference in either the September 2003 Report to Congress or the 2004 Draft Report. He does not mention the litigation in either report and leaves out of his accounting the injuries and loss of life that would have been prevented if he had not delayed the rule, as well as the squandering of agency and judicial resources occasioned by his meddling on behalf of the auto industry.

Congress enacted the TREAD Act in November 2000, following the recall of over 14 million Bridgestone/Firestone tires due to tread separation. The Act directed NHTSA to complete a rule *within one year* to require a warning system in new vehicles that would indicate when a tire is significantly underinflated. NHTSA issued a proposed rule for public comment in July, 2001 and submitted a draft final rule to OMB in December, 2001. The final rule would have allowed either direct or indirect systems for an interim period, but required that direct tire pressure monitoring systems be installed on all new vehicles after November 1, 2006. Direct systems can detect underinflation in any of four tires all of the time. Indirect systems are capable of detecting underinflated tires only 50 percent as frequently as direct systems.

On February 12, 2002, Administrator Graham sent the final rule back to NHTSA. Performing the type of analytical leap that characterizes regulatory accounting, Administrator Graham told the agency: "[W]e believe that an incentive to install anti-lock brakes should be considered as part of the regulatory solution;" and noted that "[a]llowing indirect systems as well as direct systems effectively reduces the cost of installing anti-lock brakes by 22 percent."<sup>28</sup>

When NHTSA reissued its final rule in June 2002, it did not explicitly adopt Administrator Graham's suggested rationale for maintaining the considerably less effective indirect system. Rather, NHTSA properly pointed out that the TREAD Act directs the agency to address tire safety, and noted that there is no reason to believe either that allowing indirect systems would lead to an increase in installation of anti-lock brakes or that anti-lock brakes reduce fatalities. Nevertheless, the agency backed down from its earlier decision to require that the much more effective direct systems be installed in all new cars after November 1, 2006. The post-OIRA version of the rule had no requirements for vehicles manufactured after October 31, 2006. Instead, NHTSA stated that: "[I]t is possible that the agency may obtain or receive new

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<sup>26</sup> March 11, 2002 letter from Joan Claybrook to Dr. Graham, Appendix A to Public's Citizen's Comments to Draft Report to Congress on the Costs and Benefits of Federal Regulations (67 FR 15014), May 30, 2002.

<sup>27</sup> *Public Citizen v. Mineta*, 340 F.3d 39 (2<sup>nd</sup> Cir. 2003).

<sup>28</sup> February 12, 2002, "Return Letter," [http://www.whitehouse.gov/omb/inforeg/return/dot\\_revised\\_tire\\_rtnltr.pdf](http://www.whitehouse.gov/omb/inforeg/return/dot_revised_tire_rtnltr.pdf).

information that is sufficient to justify a continuation of the options established by this first part of this rule ...”<sup>29</sup>

This failure to complete the task assigned to the agency by Congress earned accolades from Administrator Graham, who wrote the agency that “OIRA appreciates the significant improvements NHTSA made in the regulatory analysis” and, ominously, that “OIRA wants to work closely with NHTSA to develop analysis sufficient to inform and support NHTSA’s ultimate decision.”<sup>30</sup> No mention was made of the egregious delay in implementing this lifesaving mandate from Congress. According to NHTSA’s own figures, this delay has contributed to the needless deaths of 79 people, as well as thousands of unnecessary injuries, each year.<sup>31</sup>

The Court that vacated the TPMS rule found that OIRA’s interference had caused the agency to violate the intent of Congress by promulgating a rule that permitted either of two systems, despite the fact that one was 50 percent less safe than the other. In its decision, the Court reminded NHTSA that “cheapest is best” is contrary to Supreme Court precedent and that the agency is supposed to “place a thumb on the safety side of the scale.”<sup>32</sup>

Though others recognized the ruling as a significant rebuke to Administrator Graham and a repudiation of OMB/OIRA’s insistence on analysis of every conceivable alternative, Administrator Graham chose publicly to characterize the decision as an endorsement of cost-effectiveness analysis, telling a reporter “We were encouraged that the court recognized an important role for cost-effectiveness analysis in safety regulation.”<sup>33</sup>

## 2. The Hours of Service Rule

Congress enacted the Motor Carrier Safety Improvement Act in 1999 due to considerable alarm over mounting truck-crash fatalities, administrative delay in revising rules governing truck drivers’ hours of service, and lax enforcement of existing regulations. The Act directs the Federal Motor Carrier Safety Administration (FMCSA) to “consider the assignment and maintenance of safety as the highest priority.”<sup>34</sup>

Prior rules limited consecutive driving hours to 10, with 8 required off-duty hours, but allowed the off-duty time to be taken in split shifts if the driver rested in the truck’s sleeper berth. Work/rest cycles could be as short as 18 hours if drivers maximized driving time. In 2001, 409,000 large trucks were involved in crashes; 5,082 people were killed; and 131,000 were injured in truck crashes.<sup>35</sup>

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<sup>29</sup> 67 Fed. Reg. at 38704..

<sup>30</sup> June 28, 2002 letter from John D. Graham, Ph.D., Administrator, OIRA to Hon. Jeffrey W. Runge, M.D., Administrator, NHTSA

<sup>31</sup> Tire Pressure Monitoring Systems: Controls and Displays, Notice of Proposed Rulemaking, 66 Fed. Reg. 38982, July 26, 2001.

<sup>32</sup> *Public Citizen v. Mineta*, 340 F.3d at 58.

<sup>33</sup> Cindy Skrzycki, “NHTSA Tries to Deal with the Pressure - Again,” *Washington Post*, September 23, 2003.

<sup>34</sup> 49 U.S.C. §113(b).

<sup>35</sup> *2001 Large Truck Crash Stats at-a-Glance* and *2001 Large Truck Crash Overview*, <http://ai.volpe.dot.gov/CrashProfile/NationalCrashProfileMain.asp>.

Over a period of years, the agency accumulated research that demonstrated the importance of uninterrupted blocks of sleep and rest periods that accommodate the human body's 24-hour circadian rhythms; documented the widespread practice in the industry of falsifying logbooks; and established the relationship between crash risk and hours of service violations. On the basis of this research, FMCSA's proposed rulemaking would have allowed 12 on-duty hours and required a minimum of 10 hours off-duty and a weekly recovery period of two nights and the intervening day. The proposed rule abolished split sleep schedules for solo drivers and would have required use of electronic onboard recorders to verify compliance.

Using the grisly calculus of cost-benefit analysis, FMCSA estimated that its proposed rule would have benefits of "\$6.8 billion," that is, 115 fewer fatalities and 2,995 fewer injuries annually. Because of the need for additional drivers, cost estimates were substantial, but the rule was projected to have enormous net benefits of approximately \$3.4 billion over a period of ten years.<sup>36</sup>

The final rule that was issued on April 28, 2003, however, ignored the Congressional mandate and abandoned virtually every precept of the proposed rulemaking. Incredibly, the rule increased the number of permitted driving hours (from 10 to 11), increased weekly driving time by 26-28 percent, abandoned the proposed schedule based on the body's 24-hour circadian rhythms, and did not require onboard electronic recorders. The final rule reduced the number of needed long-haul drivers by 58,500 and fattened the trucking industry's bottom line by \$1 billion annually.<sup>37</sup>

Furthermore, although FMCSA is required by statute to ensure that driving "does not have a deleterious effect on the physical condition" of drivers, the final rule did not satisfy, or even acknowledge, this mandate.<sup>38</sup> The key question is: how did FMCSA move from trying to improve public safety to keeping rolling sweatshops on the highways?

The regulatory impact analysis (RIA) was outsourced to an independent contractor who met with industry representatives, but not safety organizations.<sup>39</sup> The RIA excluded from its analysis the safety effects of increased daily and weekly driving hours. In legal briefs, FMCSA attempts to explain this away by claiming that it was reasonable to disregard the effect of time-on-task because there are no reliable data on the effect of driving 11 consecutive hours.

But the reason there are no such data is that the law has prohibited truckers from driving more than 10 hours for decades. While many drivers did exceed the legal limit because of the built-in incentive of the industry's pay per mile-driven model, they certainly did not reflect this in their records or participate in research. But research clearly shows that increasing the number of driving hours increases the exposure of every driver to additional crashes. FMCSA allowed concern for industry productivity to trump both driver health and public safety.

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<sup>36</sup> 65 FR 25567, *et seq.*, May 2, 2000.

<sup>37</sup> 68 Fed. Reg. 22455, 22495 (April 28, 2003).

<sup>38</sup> 49 U.S.C. §31136(a)(4).

<sup>39</sup> 68 Fed. Reg. at 22490; "Regulatory Impact Analysis and Small Business Analysis for HOS Options," December 2002, Appendix K, Docket FMCSA-97-2350-23302.

FMCSA failed to include the RIA document in the public docket until after the rule was issued, thus denying the public any opportunity to comment on its faulty assumptions and unjustified conclusions. Public Citizen has since sued the agency on the merits of the rule and the case is now pending in federal court.

*B. OIRA is Pressuring Agencies to Alter Draft Rules to Decrease Public Health and Safety Protections.*

A recent report by the U.S. General Accounting Office (GAO) has documented the effect of OIRA's pre-publication review of new rules over a one year period from July 2001 to June 2002.<sup>40</sup> GAO examined 85 health, safety and environmental rules that were changed, returned, or withdrawn at the point of OIRA review and found that OIRA had significantly affected 25 of them. Among the effects of OIRA's intervention were the following:

- EPA delayed the compliance date for states to report on two types of emissions.
- EPA deleted provisions covering marine and highway motorcycle engines from a proposed rule on emissions from nonroad large spark-ignition engines.
- EPA eliminated manganese from the list of hazardous constituents in a hazardous waste rule.
- EPA lowered the performance standards of its proposed rule on pollutant discharge elimination systems at existing power generating facilities.<sup>41</sup>

GAO found that clear and complete documentation of all the elements required by the Executive Order governing OIRA review (E.O. 12866) was available for only 45-65 percent of the rules examined.

Moreover, OIRA refuses to disclose the full extent of its intervention. GAO found that more and more frequently OIRA is counseling agencies to alter the language of regulations prior to formal submission of the rules for review. While E.O. 12866 requires agencies to "identify for the public those changes in the regulatory action that were made at the suggestion or recommendation of OIRA," OIRA takes the position that "informal" reviews are not governed by those disclosure requirements.

GAO recommended that OMB:

Define the transparency requirements applicable to the agencies and OIRA in section 6 of Executive Order 12866 in such a way that they include not only the formal review period, but also the informal review period when OIRA says it can have its most important impact on agencies [sic] rules.<sup>42</sup>

OMB rejected the recommendation.

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<sup>40</sup> U.S. General Accounting Office, "Rulemaking, OMB's Role in Reviews of Agencies Draft Rules and the Transparency of Those Reviews," GAO-03-929 (2003).

<sup>41</sup> Id., pp. 76-77.

<sup>42</sup> Id., pp. 15-16.

Despite the clear intent and unambiguous language of E.O. 12866, the public often discovers what OIRA has done only when the press comes into possession of agency documents. For example, the *New York Times* reported that White House and OMB officials altered the language of the recently proposed rule on emissions from coal-fired electric utility steam generating plants to downplay the findings of the National Academy of Sciences concerning the seriously toxic effects of mercury.<sup>43</sup> Among the alterations, the National Academy's finding that:

Recent published studies have shown an association between methylmercury exposure and an increased risk of heart attacks and coronary disease in adult men;

was changed to:

[I]t has been hypothesized that there is an association between methylmercury exposure and an increased risk of coronary disease in adults; however, this hypothesis warrants further study as the few studies currently available present conflicting results;<sup>44</sup>

As documented by the Union of Concerned Scientists in the report discussed above,<sup>45</sup> OMB and other political actors operate behind closed doors to distort the scientific underpinnings of regulations on which society depends for protection of public health and safety.

*C. Scores of Public Health, Safety and Environmental Protections Have Been Rolled Back, Weakened, or Delayed.*

Scores of regulations that were providing substantial benefits to Americans have been rescinded, delayed, weakened or abandoned over the last three years. Yet, in OMB's reports to Congress there is no accounting for these deregulatory actions that have affected critical safeguards designed, among other things, to prevent the destruction of the ozone layer, reduce air pollution linked to asthma attacks, bronchitis, heart disease and premature deaths, prevent neurological harm to children, reduce public exposure to toxins and contaminants, protect the natural landscape, preserve crucial habitat for endangered species, provide clean drinking water, prevent flooding, and protect workers from occupational disease and injury.

A partial listing of deregulatory actions is included in Appendix C.

**III. Instead of Inviting Nominations for a Manufacturing Regulations “Hit List,” OIRA Should Make it Easier for Agencies to Issue the Many Health and Safety Protections For Which the Need Has Already Been Identified.**

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<sup>43</sup> Jennifer 8. Lee, “White House Minimized the Risks of Mercury in Proposed Rules, Scientists Say,” *New York Times*, April 7, 2004.

<sup>44</sup> *Id.*

<sup>45</sup> “Scientific Integrity in Policymaking, An Investigation into the Bush Administration’s Misuse of Science,” *See*, Section IB. 4. above.

In 2001, when OIRA invited the public to nominate regulations for rescission or change, its motivation appeared totally political. Of the 23 “nominations” that OIRA labeled “high priority,” 14 came from the corporate-funded Mercatus Center alone. Now, at a time when the disappearance of manufacturing jobs has become a heated political issue, OIRA is soliciting nominations for a new “hit list” of regulations affecting manufacturing.

In an attempt to justify this political pandering, OIRA asserts that “[r]egulatory compliance costs impose a burden on manufacturers that has the potential to lower the viability of U.S. manufacturers and the competitiveness of U.S. manufacturing relative to our international trading partners.”<sup>46</sup> However, not only is this bald statement presented with no factual support, it is seemingly contradicted by the findings of two studies cited in the 2004 Draft Report. The World Bank reportedly studied 130 countries and found that the United States is among the 10 least regulated of the richest countries of the world.<sup>47</sup> Similarly, OIRA reports that the Organization for Economic Cooperation and Development found the United States to be one of the five countries with the least regulation among 30 mostly high-income democracies.<sup>48</sup>

Stripping American workers and the American public of hard-won health, safety and environmental protections is not sound manufacturing policy. Instead of cynically using the very real issue of job loss as an occasion to further its anti-regulatory agenda, OIRA should be pushing for enhanced health and safety protections and making a priority of regulatory actions that save lives.

#### A. *Auto Safety*

For example, although motor vehicle crashes are the leading cause of death for Americans aged 4 to 33,<sup>49</sup> OMB has remained largely silent on this key priority, and has even undermined pending rules, as discussed above. Yet automobile crashes cost \$230.6 billion a year in lost productivity and other direct costs in year 2000 dollars, or \$820 for every man, woman and child in America.<sup>50</sup> And these numbers omit the incalculable suffering of family and friends. NHTSA does not, as a practice, place a dollar value on human life.

There are key safety standards which could reduce these astounding costs and unneeded suffering. Below is a list of some of the long-standing needs that should be addressed by new safeguards, particularly given the burgeoning population of sports utility vehicles and pick-up trucks as vehicles for family transportation:

- An occupant ejection safety standard that takes into account advanced window glazing, side curtain and side impact airbags and increases the strength of door locks and latches.
- A vehicle compatibility safety standard, including a standard rating metric to evaluate vehicle mismatch and to increase the compatibility of all passenger vehicles by

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<sup>46</sup> 2004 Draft Report, p. 50.

<sup>47</sup> Id., at 30.

<sup>48</sup> Id., at 31.

<sup>49</sup> <http://www-nrd.nhtsa.dot.gov/pdf/nrd-30/NCSA/RNotes/2003/809-695.pdf>.

<sup>50</sup> L. Blincoe, A. Seay, E. Zaloshnja, T. Millar, E. Romano, S. Luchtner, R. Spicer, *The Economic Impact of Motor Vehicle Crashes, 2000*, (DOT HS 809 446), Washington: NHTSA, May 2002.



establishing compatible bumper heights and mitigating harm done by “aggressive” design.

- A rollover crashworthiness safety standard, including a dynamic roof strength standard that requires improved seat structure and safety belt design (including belt rollover pretensioners), side impact head protection airbags and roof injury prevention padding.
- A rollover prevention safety standard to increase vehicle resistance to rollover.
- The coverage of 15-passenger vans by all NHTSA safety standards applicable to light trucks and SUVs and inclusion in the New Car Assessment Consumer Information Program.

These proposals would address a major problem: 10,680 lost lives a year, or 25 percent of all highway deaths, result from rollover crashes.<sup>51</sup> Yet, instead of helping to ensure that these protections are enacted, the Statement of Administration Policy, signed by Secretary Mineta, on the pending transportation bill that passed the Senate on February 12, 2004 (S. 1072), opposed them all on cost-benefit grounds. The Administration’s anti-regulatory bias, and hypocrisy when it comes to lifesaving rules, could not be more clear.

#### *B. Food Safety*

In many areas, food safety regulations have not kept pace with critical needs or have been undermined:

- The potential effects of Bovine Spongiform Encephalopathy (BSE) are devastating, yet USDA has failed to mandate known safety measures to protect against human exposure.
- Many of the largest ground beef plants in the United States have been allowed to continue to send ground beef stamped USDA-approved to market after tests repeatedly showed the presence of *Salmonella*.
- USDA has issued directives constraining inspectors’ ability to implement the “zero tolerance” policy for fecal contamination.
- Although no long-term studies have been done of the effect of eating irradiated food and it is known that irradiation produces new chemical compounds that have been found to cause cellular damage, USDA has approved irradiated beef for the school lunch program.

Sorely needed measures to increase food safety include:

- A total ban on the use of Advanced Meat Recovery.
- A ban on all brains, spinal cords, and other significant risk materials from cows of any age.
- Continuation of the bar against imports from Canada, for both live animals and meat products.
- A BSE testing program that ensures that appropriate animals are tested at an adequate rate and includes testing of all non-ambulatory, disabled animals and testing of all cattle 20 months or older.

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<sup>51</sup> 2003 *Early Assessment Estimates of Motor Vehicle Crashes*, NHTSA, National Center for Statistics and Analysis, April 28., 2004.

- A ban on feeding of mammalian parts to other animals and poultry.
- Daily microbial tests for *Salmonella* and appropriate government action as soon as plants fail the tests.
- Enforcement of “zero tolerance” for fecal contamination under any and all circumstances and withdrawal of directives that weaken enforcement.
- Withdrawal of the approval of irradiated meat for the school lunch program
- Mandatory recall authority for USDA.
- Authority to ensure the enforceability of microbial testing performance standards and standard sanitation operating procedures.

### C. *Drug and Supplement Safety*

Key loopholes abound in the area regulated by the Food and Drug Administration , including:

- Compounded drugs can be sold without FDA approval.
- Unregulated dietary supplements can interfere with the effectiveness of medications, affect blood pressure, and pose even greater risks when used by pregnant women.
- Off-label promotion of drugs has lead to such disastrous results as the widespread heart valve damage caused by use of “fen/phen” as a diet drug.

Needed measures to increase drug and supplement safety include:

- Authority to treat compounded drugs as unapproved new drugs.
- Mandatory reporting by pharmacists of adverse effects from compounded drugs.
- Authority to regulate off-label promotion.
- Mandatory pre-market studies and post-marketing adverse reports for dietary supplements.

### D. *Workplace Safety*

There are well-documented workplace safety measures that would substantially reduce the number of injuries and illnesses incurred on the job, saving billions of dollars in lost work time and contributing to a major improvement in quality of life for millions of workers. For example, ergonomic injuries and illnesses are the nation’s biggest workplace safety and health problem, with musculoskeletal disorders of the low back and upper extremities alone causing approximately one million people to lose time from work each year,<sup>52</sup> but feasible protections are not in place. OSHA has failed to follow the recommendations of the U.S. Chemical Safety and Hazard Investigation Board to amend the process safety management standards to protect workers from reactive chemical hazards, a position designated as an “unacceptable response” by the Board<sup>53</sup> By OSHA’s estimate, over 5 million workers are at risk of TB infection from on-

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<sup>52</sup> National Research Council/Institute of Medicine, “Musculoskeletal Disorders and the Workplace,” National Academy Press (2001), p. 364.

<sup>53</sup> Letter from Carolyn W. Merritt, Chairman, U.S. Chemical Safety and Hazard Investigation Board to John Henshaw, Assistant Secretary of Labor, Occupational Safety and Health Administration, <http://www.csb.gov>.

the-job exposure.<sup>54</sup> Approximately 30,000 U.S. workers have been exposed to beryllium through industrial use, and the number is likely to be increasing due to growing use of beryllium in the electronics industry, but OSHA has failed to amend its 50 year old standard.<sup>55</sup>

Needed measures to increase workplace safety include:

- A rule to prevent ergonomic injuries.
- Amendment of the Process Safety Management Standards to achieve more comprehensive control of reactive hazards.
- A rule to protect workers who handle metalworking fluids.
- A rule to protect workers who are at risk of exposure to TB infection.
- A requirement that employers pay for all required personal protective equipment.
- A revised beryllium standard that is adequate to protect workers, together with medical surveillance and engineering controls to reduce exposure.

It is particularly ironic that injury-prevention measures would be opposed and ignored when comparative studies by Graham and others repeatedly highlight that they are the most cost-effective type of rules. Where industrial interests are opposed to new injury-prevention rules, conclusions about their relative cost-effectiveness are quickly and conveniently shunted aside by this OMB.

#### **IV. Conclusion**

If OIRA does proceed with its compilation of a manufacturing regulations hit list, it should, at a minimum, require that any nomination of a regulation for modification or rescission must be accompanied by an analysis of the effect of the proposed rule change on public health, safety and the environment.

Before the point at which proposed rules are subjected to cost-benefit analysis, enormous and substantial proof of ongoing harm and risk to life and health has propelled action by Congress or the regulatory agencies. Factual testimony and hearings, agency dockets and public discussion, media investigations, and the experience of thousands or even millions of Americans have been the driving force for development of a remedy.

The bare language of economics turns out to be a very impoverished substitute for the morally rich and democratic discourse and consensus that gives rise to health, safety and environmental protections. The claim of regulatory accounting to intellectual objectivity is little more than pretense. It does not bear up under scrutiny of any rigor, and has only been perpetuated by a form of academic fraud on the part of self-interested corporate front groups and mouthpieces. It is time to relegate the discredited practice of regulatory accounting to the dustbin of history where it belongs.

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<sup>54</sup> 62 Fed. Reg. 54159-54309 (October 17, 1997).

<sup>55</sup> Lang L., "Beryllium: A chronic problem," *Environmental Health Perspectives*, 1994;102:526-531; Roe S. "Decades of risk: Part 1: Weapons over workers," *Toledo Blade*. March 28, 1999..

Sincerely,

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President

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## **APPENDIX A**



**NOT TOO COSTLY, AFTER ALL:  
AN EXAMINATION OF THE INFLATED COST-  
ESTIMATES OF HEALTH, SAFETY AND  
ENVIRONMENTAL PROTECTIONS**

**February 2004**

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NOT TOO COSTLY, AFTER ALL: AN EXAMINATION OF THE INFLATED COST-ESTIMATES OF HEALTH, SAFETY AND ENVIRONMENTAL PROTECTIONS

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NOT TOO COSTLY, AFTER ALL: AN EXAMINATION OF THE ACTUAL COSTS  
OF HEALTH, SAFETY AND ENVIRONMENTAL PROTECTIONS

**FEBRUARY 2004**

*Federal agencies frequently overestimate the costs of their regulations. They often use poor quality data, conservative assumptions, and static analysis. Overestimates emerge — be it from OSHA’s analysis of the costs of a proposed Vinyl Chloride Standard, EPA’s regulation of acid rain, NHTSA’s regulation of test procedures for advanced air bags, FDA’s efforts to reduce the risk of an outbreak of transmissible spongiform encephalopathis, or CPSC’s cost estimate for flammable upholstered furniture. Despite concerns of industry with cost and feasibility before a standard is promulgated, the paths toward compliance predictably lead to lower cost alternatives, often far lower than predicted. Sometimes regulatory compliance even promotes increases in productivity.*

## **Introduction**

“This regulation will put us out of business.” “Our industry will not be able to compete.” Statements like these from industry representatives are heard whenever federal agencies are considering environmental, occupational, auto safety, or other consumer protection regulations. For years, opponents of protective regulations have argued that the benefits of regulation are far outweighed by the costs to regulated industries and to society as a whole. Are they right?

An examination of thirty years of federal regulatory activity demonstrates conclusively that predictions of devastating costs have been wrong. When estimated costs at the front end are compared to actual compliance costs, the projections turn out to have been radically inflated. Rarely, if ever, have actual compliance costs risen to the levels estimated by the regulating agency – and never to the levels estimated by private sector industry.

Far from bringing economic doom and gloom, regulatory requirements to protect the environment, workers, and consumers have often led to innovation and increased productivity. Regulation spawned many new businesses, especially companies providing hazard abatement and pollution control services. In many cases, there is no conflict between economic competitiveness and regulation.

So, why have estimates of the cost of a pending regulation consistently been higher than the actual costs turn out to be? The question is not academic. High projected compliance costs continue to cause agencies not to proceed with planned safety regulations, leaving the public unprotected. Obviously, industries wishing to evade regulation have a vested

interest in exaggerating the costs of pending safeguards, which they provide to federal agencies and use in public relations campaigns. Moreover, there are fundamental flaws built into the methodology and assumptions of government studies – associated with poor data, overly conservative assumptions, and static analysis. This study examines details of analytic methods and assumptions used in regulatory analysis over the past thirty years to uncover many of the flaws that have led to persistent overestimation of compliance costs.

## **Why Do Federal Agencies Overestimate Potential Regulatory Compliance Costs?**

Agencies rely heavily on industry self-reporting, which often leads to limited and biased data. Estimates of compliance cost are often based on poor data and a faulty analytic framework. Assumptions are usually conservative and analysis static.

### **A. Information Provided to the Agencies by the Regulated Industries Is Often Poor and Inaccurate**

If information used in regulatory analyses is poor and inaccurate, then the results are likely to be poor and inaccurate as well. In fact, the U.S. Office of Management and Budget (OMB),<sup>1</sup> in defending its use of high cost estimates acknowledged that there were problems with the analyses upon which it relied,<sup>2</sup> but they used them because they were the only comprehensive cost estimates available.<sup>3</sup>

As late as 1998, OMB, discussing the state of cost-benefit analysis across Federal regulatory agencies, concluded that “there is not yet a professional consensus on methods that would permit a complete and consistent accounting of total costs and benefits of Federal regulation.”<sup>4</sup> OMB continues to recognize data limitations. A 2000 report from OMB states: “Any estimate of total annual costs and benefits can only be rough at best.”<sup>5</sup> The report states, “We lack good information about the complex interactions between the different regulations and the economy. A variety of estimation problems for individual and aggregate estimates distort the results in different ways.”<sup>6</sup> In its 2003 report to Congress, OMB acknowledges that “the total costs and benefits of all Federal rules ... could easily be a factor of ten or more larger” than presented and flatly states that “[m]ore research is necessary to provide a stronger analytic foundation for comprehensive estimates of total costs and benefits by agency and program.”<sup>7</sup>

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<sup>1</sup> The U.S. Office of Management and Budget oversees regulation, the budget, information collection and dissemination, proposed legislation, and testimony by federal agencies.

<sup>2</sup> Robert Hahn and John Hird, “The Costs and Benefits of Regulation: Review and Synthesis,” Yale Journal on Regulation, Vol. 8, 1990.

<sup>3</sup> U.S. Office of Management and Budget, 2000 Report to Congress on the Costs and Benefits of Federal Regulations, 2000, p. 11.

<sup>4</sup> U.S. Office of Management and Budget, 1998 Report of OMB to Congress on the Costs and Benefits of Federal Regulations, 1998, p. 1.

<sup>5</sup> OMB, 2000 Report..., p. 12.

<sup>6</sup> Ibid.

<sup>7</sup> U.S. Office of Management and Budget, Informing Regulatory Decisions: 2003 Report to Congress on the Costs and Benefits of Federal Regulations, 2003, p. 8. In its 2002 Report, OMB presented aggregate costs as falling within the range of estimated benefits. The 2003 Report, by contrast, shows the aggregate benefits of regulations to be “roughly three to five times the aggregate costs.” OMB ascribes this startling transformation to its correction of an inadvertent error and to extension of the time period of its review to 10 years from six and a half. 2003 Report, pp. 7-8.

A.1. Industries insist on confidentiality, making it impossible to verify the data or hold sources accountable.

Often, the only data that a regulatory agency can obtain is provided by the about to be regulated industry, and only when confidentiality is assured. If the company providing the data can in any way be identified, the data are not provided. As soon as studies or data are labeled confidential or proprietary, outsiders are unable to verify findings or challenge methodology and assumptions. In fact, it may be difficult for an agency to verify data provided by its own contractors. The proprietary data may belong to the contractor doing a regulatory analysis, or it may belong to companies surveyed by the contractor. The widespread use of confidential data sources opens the opportunity for companies to exaggerate their cost estimates (to potentially avoid regulation) without the possibility of data verification by outside analysts. When these data are questioned during rulemaking, which they inevitably are, agencies and their consultants can and do hide behind promises of complete confidentiality.

An economic assessment by the National Highway Traffic Safety Administration (NHTSA) of the costs of compliance with a tire pressure monitoring system (to provide a warning system for low tire pressure) used “NHTSA-derived estimates mainly based on confidential discussions with a variety of suppliers and manufacturers.”<sup>8</sup>

Industry may use its need for confidentiality to justify non-participation. In studying the costs to the auto industry of complying with the 2000 NHTSA rule to install advanced air bag systems in automobiles, the General Accounting Office (GAO) reported that “individual vehicle manufacturers did not provide information on their expenditures because they consider this information confidential.”<sup>9</sup>

When considering new performance requirements and test procedures for advanced air bag systems, NHTSA received “confidential information from GM and Ford concerning their plans, as well as confidential information from other auto manufacturers concerning their latest plans to introduce various advanced technologies.”<sup>10</sup> NHTSA did not make the information public because it came to the agency with strings attached – with confidentiality. Public statements by GM and Ford, however, indicated significant advancements in technology, and yet, NHTSA assumed that manufacturers would make the fewest possible changes to comply with the regulation. These concurrent statements should be confounding to readers of the analysis.

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<sup>8</sup> U.S. Department of Transportation, National Highway Traffic Safety Administration, Office of Regulatory Analysis and Evaluation Plans and Policy, “Tire Pressure Monitoring System, FMVSS No. 138,” Chapter VI, July 2001.

<sup>9</sup> U.S. General Accounting Office, Vehicle Safety: Technologies, Challenges, and Research and Development Expenditures for Advanced Air Bags, GAO-01-596, June 2001, p. 3.

<sup>10</sup> U.S. Department of Transportation, National Highway Traffic Safety Administration, Office of Regulatory Analysis & Evaluation Plans and Policy, “Preliminary Economic Assessment: SNPRM, FMVSS No. 208 Advanced Air Bags,” October 1999, Introduction, p. 2.

Regulatory analyses for the Coast Guard, to assess the economic impact of vessel response regulations for oil spills in Prince William Sound, also relied significantly on proprietary information, that could not be verified for representativeness, accuracy, or underlying assumptions. A proprietary data base of worldwide tanker incidents was used to project future spills. This data base presumably was the basis for allocating spillage between Alaska pipeline vessels (TAPS) and non-TAPS vessels. This allocation was the key factor in the analysis, which concluded that non-TAPS vessel response planning had a negative cost-benefit ratio.<sup>11</sup> Proprietary studies were used to develop estimates for Natural Resource Damage Assessments. And, the economic studies conducted by the Trustee Council for the Exxon Valdez oil spill damage assessment process were not available to the public, and so could not be used by those reviewing the Coast Guard documents to challenge or confirm regulatory impact analysis (RIA) assumptions.

Reliance on industry data can prove problematic for an agency during public discussions and after rule-making hearings, especially when the data are confidential and the sample is small and skewed. Confidential data cannot be verified. Samples that are small and skewed are likely to be unrepresentative. An example is the Formaldehyde Institute sponsored Heiden Associates' economic analysis for a proposed Occupational Safety and Health Administration (OSHA) Formaldehyde Standard, based on an industry survey and limited conversations with industry contacts. After reviewing published evidence submitted to OSHA by the United Auto Workers, the Motor Vehicle Manufacturers Association, Centaur Associates, and the International Molders and Allied Workers Union, OSHA made a number of changes in its assumptions, and reversed its own consultant's work on the number of affected foundries, the amount of emission controls already in place, and the cost of using alternative technologies.<sup>12</sup> OSHA was able to adjust inflated cost estimates and make them more accurate because of objections and subsequent submissions by the public.

When the Food and Drug Administration analyzed costs associated with reducing the risk of an outbreak of transmissible spongiform encephalopathies (TSEs), its consultant, unable to collect adequate data, relied on a small amount of anecdotal information to reach conclusions. The consultant could not identify sufficient data on the profit levels of very small meatpacking operations to determine the impact of the change in renderer charges, so it reported on the statement of one company official that a decline in payments would cut noticeably into its profit margin, but he expected to remain in business. Of the other small meatpackers contacted by the consultant, "none predicted

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<sup>11</sup> Marine Spill Response Corporation, News Releases, October 30, 1991, in Straube and Ruttenberg, p. 22.

<sup>12</sup> Robert Stone, Three Case Studies of OSHA's Regulatory Impact Analysis in Support of Recent Rulemaking, prepared for the U.S. Congress, Office of Technology Assessment, K3-0306, February 1994, p. 10. OSHA used a study prepared for the Formaldehyde Institute by Heiden Associates as the starting point for its estimates of foundry compliance costs. The agency did not get the data it needed from its consultant.

that they would shut down.”<sup>13</sup> Yet the consultant somehow, and certainly not scientifically, concluded that “some of the smallest meatpackers ... are vulnerable ... and, in the context of a poor economic environment for these businesses, might cease

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<sup>13</sup> U.S. Department of Health and Human Services, Food and Drug Administration, Office of Planning and Evaluation, “Cost Analysis of Regulatory Options to Reduce the Risk of an Outbreak of Transmissible Spongiform Encephalopathies (TSEs) in the United States,” Addendum to the Final Report, for U.S. Food and Drug Administration, Contract No. 223-94-8031, April 30, 1997, p. 33.



operations.”<sup>14</sup> When data are poor and inadequate, government analysts and consultants are left to draw conclusions from assumptions, generalizations, and questionable and unverifiable information.

#### A.2. Extrapolation is often from an extremely small sample.

Surveys of industry usually include a small number, sometimes a very small number, of the universe of affected companies. Sometimes the sample is small because analysts cannot obtain data from a sufficiently large number of companies. Sometimes there are so many different and varied uses for a product that no industry sector receives sufficient attention. Asbestos, for example, is used in many industry sectors and in a myriad of ways. Excess noise is a factor in many and varied environments, both for workers and community residents. Hazwoper affects a wide range of industry sectors -- building trades, transportation service and industrial. Sometimes an RIA will have an in-depth study of just a few companies, and sometimes the extrapolation is from just one or two companies.

“Model” firms, which are chosen to represent an average firm in a group of affected industries, cannot reflect all the differences within an industry or across industries. Ranges in size of company, number of facilities per company, age of equipment, and plant-specific production variations are just a few examples of variations that can significantly alter a cost estimate. OSHA, by its own admission, says “one problem with the model plant approach is that actual plants may be too diverse to be described by one model.”<sup>15</sup>

When OSHA considered a Formaldehyde Standard, it used, as the foundation for its cost estimates for foundry compliance, cost estimates provided by a Formaldehyde Institute consultant (Heiden), and just two site visits to foundries (of an estimated 4,004 foundry establishments) done by OSHA’s consultant Centaur Associates.<sup>16</sup> The Formaldehyde Institute study was particularly flawed because the Institute had no members representing foundries and foundry compliance accounted for the largest single cost category.

In 1977, OSHA proposed a Generic Cancer Policy, which consisted of a four-part scheme for categorizing work place chemicals and a set of model regulations to match that scheme. The aim of the policy was to speed up decision making for health standards.<sup>17</sup>

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<sup>14</sup> Eastern Research Group, Inc, for U.S. Food and Drug Administration, Office of Planning and Evaluation, “Cost Analysis of Regulatory Options to Reduce the Risk of an Outbreak of Transmissible Spongiform Encephalopathies (TSEs) in the United States,” Final Report, December 31, 1996, pp. 33-34.

<sup>15</sup> U.S. Department of Labor, Occupational Safety and Health Administration, Preliminary Regulatory Impact and Regulatory Flexibility Analysis of the 1, 3-Butadiene Standard, June 1989, p. VI-2.

<sup>16</sup> Robert Stone, Three Case Studies..., pp. 6, 9.

<sup>17</sup> Thomas McGarity and Sidney Shapiro, Workers At Risk: The Failed Promise of the Occupational Safety and Health Administration, Praeger, Connecticut and London, 1993, pp. 53-54.

When the American Industrial Health Council (AIHC) in 1977 set out to supply OSHA with a cost of the proposed regulation for a generic cancer policy, cost estimates were based on the study of just seven chemicals, chosen by AIHC to show maximum burden, from thousands that are suspected carcinogens. Compliance in the pesticide category was based on eight pesticides, making up only six percent of the pesticide market. Under cross-examination at OSHA hearings, AIHC admitted that the choice of different cases could lead to different cost estimates.<sup>18</sup>

When the National Highway Traffic Safety Administration considered the impact of new performance requirements and test procedures for advanced air bag systems, it found that in many cases it was making decisions on very limited data. In one part of the analysis, for example, the agency stated, “there are such limited data available that the impact is uncertain.”<sup>19</sup>

### A.3. Industries often fail to respond to agencies’ requests for information.

A GAO retrospective analysis<sup>20</sup> of EPA regulatory impact studies found “difficulties in obtaining valid cost data.” Because all reporting by industry for RIAs and similar studies is voluntary, firms may choose not to participate. Many firms simply do not return survey forms or phone calls, leading to a skewed study. This was the case in a GAO study on measuring regulatory burden. Most of the companies that GAO contacted declined to participate in the study, and in the end GAO, for that study, worked with only 15 companies willing to provide information,<sup>21</sup> from a universe of hundreds of thousands.

In 1986, OSHA’s contractor overestimated the costs of compliance for a proposed Concrete and Masonry Construction Safety Standard. The study overestimated the number of affected firms in establishing its baseline, and overestimated costs for masonry and formwork removal.<sup>22</sup>

A study by a former Deputy Administrator of OMB’s Office of Information and Regulatory Affairs concluded about cost estimation that “in many cases it was not

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<sup>18</sup> Cited in Ruth Ruttenberg, “Statement of Ruth Ruttenberg on Behalf of the AFL-CIO, ‘Occupational Safety and Health Administration Hearings on the Proposed Regulation for the Identification, Classification and Regulation of Toxic Substances Posing a Potential Occupational Carcinogenic Risk,’” July 10, 1978, p. 13.

<sup>19</sup> U.S. Department of Transportation, National Highway Traffic Safety Administration, “Preliminary Economic Assessment: SNPRM, FMVSS No. 208 Advanced Air Bags,” p. E-5.

<sup>20</sup> U.S. General Accounting Office, Environmental Protection: Assessing the Impacts of EPA’s Regulations Through Retrospective Studies, GAO/RCED-99-250, September 1999, p. 8.

<sup>21</sup> U.S. General Accounting Office, Regulatory Burden: Measurement Challenges and Concerns Raised by Selected Companies, GAO/GGD-97-2, November 1996, p. 3.

<sup>22</sup> “Testimony of Dr. Ruth Ruttenberg, On Behalf of the Building and Construction Trades Department, AFL-CIO, Before the Occupational Safety and Health Administration, Public Hearings on the Concrete and Masonry Construction Safety Standard,” June 17, 1986, pp. 20-21.

possible to get the data” and “data support is thin indeed.”<sup>23</sup> In its 1998 report to congress on the costs and benefits of Federal regulations, OMB said, “There are still enormous data gaps in the information available on regulatory benefits and costs ... accurate data is still sparse.”<sup>24</sup>

Regulatory analysis by Mercer Management Consulting for the Coast Guard, to assess the economic impact of proposed vessel response regulations for oil spills in Prince William Sound, discussed some of the problems with its data set, leading it to estimate based on its knowledge of the industry rather than with specific information:<sup>25</sup>

“The methodology employed to develop costs for each cost component varied according to the availability and quality of data. For most cost components, Mercer Management had to develop rough estimates based on partial information from a variety of sources. For some items, such as estimated contractor and co-op costs for the inland barge industry, quantifiable data were not available. In such cases, Mercer Management used its industry knowledge to estimate costs that would address the expected requirements.”

When NHTSA estimated costs for compliance with its Child Restraint Systems and Child Restraint Anchorage Systems, the estimates used were less than solid. They were “a combination of cost estimates from Ludtke and Associates, information provided by child restraint and vehicle manufacturers to NHTSA at meetings, and judgment by NHTSA when other data were not available.”<sup>26</sup>

A study for the Office of Technology Assessment (OTA) criticized data collection at OSHA because (1) only a small fraction of the establishments affected by a standard can be visited and (2) those facilities willing to be surveyed might not be representative. These facts “make it difficult to construe the data derived through this means as an adequately representative sample.”<sup>27</sup> In addition, a member of OTA’s advisory board for the project pointed out that even when a facility is willing to supply information, it may be supplied in one instance by an engineer, in another instance by someone in operations

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<sup>23</sup> Thomas Hopkins, “The Costs of Federal Regulation,” Journal of Regulation and Social Costs, March 1992, pp. 9, 19.

<sup>24</sup> OMB, 1998 Report..., p. 2.

<sup>25</sup> Mercer Management Consulting, “Preliminary Regulatory Impact Analysis for Vessel Response Plans,” for the U.S. Coast Guard, April 21, 1992.

<sup>26</sup> U.S. Department of Transportation, National Highway Traffic Safety Administration, Office of Regulatory Analysis and Evaluation Plans and Policy, “Final Economic Assessment, VMVSS No. 213, FMVS No. 225, Child Restraint Systems, Child Restraint Anchorage Systems,” February 1999.

<sup>27</sup> U.S. Congress, Office of Technology Assessment, Gauging Control Technology and Regulatory Impacts in Occupational Safety and Health: An Appraisal of OSHA’s Analytic Approach, OTA-ENV-635 (Washington, DC: U.S. Government Printing Office), GPO stock #052-003-01445-9, September 1995, p. 47.

or accounting or the legal or regulatory affairs divisions – further compromising the uniformity and comparability of one data set to another.<sup>28</sup>

A.4. Self-reporting gives industry an incentive to overestimate.

Cost estimating studies rely primarily on information provided by the companies facing potential regulation. When these companies self-report, they have a built-in incentive to overestimate cost. All comprehensive data sources used in regulatory analyses emanate from industry files, with industry usually in full knowledge of the purposes. Thus, industry has a vested interest in the cost estimates being as high as possible, so as to discourage the regulatory body from promulgating a regulation.

Several factors lead to the likelihood of overestimation. Sometimes the only source of data to estimate compliance costs is the affected industry and the data collected are confidential, and not verifiable. In addition, sometimes industry hires its own consultants to develop cost estimates. Some go so far to suggest that when industry does not have the requested data for regulatory assessment, that data may be created, and, if that happens, there is every incentive to inflate the numbers. Resources for the Future (RFF)<sup>29</sup> simply says: “Finding bias in the cost estimates from industry...sources is perhaps to be expected.”<sup>30</sup>

One example of industry overestimation came during consideration of the Toxic Substances Control Act (TSCA). GAO reviewed economic impact analyses done for TSCA and analyzed an industry study by Dow Chemical. The Dow study estimated that compliance would cost \$2 billion per year. An EPA study for the same Act found costs 25 times lower than the Dow projections. GAO found the Dow numbers to be unreliable,<sup>31</sup> yet because they existed and were submitted into the rulemaking record, they had to be part of EPA consideration.

Staff from the Organization for Economic Cooperation and Development (OECD), talked with GAO about conducting a business survey. OECD staff said “that asking businesses to self-report capital costs would not be valid because the data would not be verifiable or consistent.”<sup>32</sup> Self-reporting is simply not a reliable way to collect accurate information.

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<sup>28</sup> Author’s personal notes from Advisory Committee meeting.

<sup>29</sup> Resources for the Future is a non-profit corporation for research and education in the development, conservation, and use of natural resources and the improvement of the quality of the environment.

<sup>30</sup> Winston Harrington, Richard Morgenstern, and Peter Nelson, “On the Accuracy of Regulatory Cost Estimates,” Discussion Paper 99-18, Resources for the Future, Washington, DC, January 1999, p. 2.

<sup>31</sup> U.S. Senate, Subcommittee on the Environment, Committee on Commerce, “Hearing to Regulate Commerce and Protect Human Health and the Environment by Requiring Testing and Necessary Use Restrictions on Certain Chemical Substances, and for Other Purposes,” Part 2, Serial No. 94-24, Government Printing Office, Washington, DC, October 24, 1975, p. 93.

<sup>32</sup> GAO, Environmental Protection..., pp. 8-9.

Sometimes a government agency relies almost exclusively on industry sources. An example, is the 1997 cost analysis by the Food and Drug Administration (FDA) of regulatory options to reduce the risk of an outbreak of transmissible spongiform encephalopathies.<sup>33</sup> All FDA sources were from industry except for one consulting firm for FDA, which in turn relied on industry statistics and some statistics from the Bureau of the Census. The main focus was a study sponsored by the rendering industry. The government consultant, the Eastern Research Group (ERG), based its cost analysis almost exclusively on industry sources – and those were mostly telephone interviews with industry association officials.<sup>34</sup>

## **B. Conservative Assumptions**

Assumptions and baselines set the framework for data collection and analysis, strongly influencing the outcome of a regulatory impact analysis. Conservative or inappropriate baselines and double counting lead to overestimated regulatory compliance costs. How is cost defined? From what level of safety to compliance is cost measured? When one agency requires compliance, and then another regulates part of what is already required, which regulation bears the cost burden for clean-up or correction? If disease, injury, and death are significantly underreported, how does one responsibly estimate the offsetting value of prevention? If the alternative to regulation would be product liability lawsuits, then it is inaccurate to use zero cost as the baseline. These are just a few of the critical questions and issues leading to assumptions and baselines that influence, even control the results of any economic analysis. In some ways, the outcome is determined by the assumptions that define a study. According to OTA, a frequent estimating problem in OSHA's RIAs is "conservatism in OSHA's assumptions."<sup>35</sup>

### **B.1. Problems defining cost**

When, for example, a nonferrous smelting and refining facility comes into operation, what part of the capital cost of that facility should be expressed as costs of regulation? In the R&D process, how does one differentiate between "compliance R&D" and "innovative R&D"? Experience demonstrates that integrating regulatory compliance into overall criteria for the success of an R&D project is often possible and almost always cost-efficient. It may not be possible to separate out compliance costs from other capital expenditures, but this should be considered success rather than a problem. Safety and health when integrated into the full design of new equipment, if it cannot be separated from other parts of the technology, is likely to be supporting overall equipment improvement and productivity as well as efforts to protect workers and the environment.

Another example of difficulty defining cost involves the compliance cost estimation for constructing coal-burning generating units to meet environmental regulations. A study

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<sup>33</sup> U.S. Department of Health and Human Services, "... Transmissible Spongiform ...," 1997.

<sup>34</sup> Eastern Research Group, Inc., 1996.

<sup>35</sup> OTA, Gauging Control Technology..., p. 64.

found that while real costs of generating units have increased dramatically since the late 1960s, “the cost increases are only partially attributable to easily measurable responses to environmental restrictions.”<sup>36</sup> Which costs are attributable to environmental regulations? What methodology should be used to determine the share?

Another element in defining cost is determining “true” cost when one subsidiary or branch of the same company sells its products to another subsidiary or branch of that same corporation. What determines the selling price (cost)? One division of a corporation becomes the market for the pollution control technology of another division. Allison is the world’s largest supplier of automatic transmissions for commercial and military vehicles. When the Allison Transmission Division of General Motors, for example, leads the way to cleaner air with hybrid propulsion systems for heavy-duty vehicles, it creates a market outside of General Motors, but also within General Motors production plants. Its E System boasts reducing fuel consumption by 50 percent and emitting 90 percent less particulates and 50 percent less nitrogen oxide than a standard diesel-powered bus.<sup>37</sup> Which part of the price of such a transmission is to meet regulatory requirements? What is the price at which the product should be sold internally to other GM divisions? In such pricing, the internal sale becomes an accounting detail as much as a representation of transferred value. If, for example, a pollution control device is sold internally within a corporation, it would benefit the corporation to sell that device at a very high price to show healthy profits in the environmental division and blame high costs in the other division on regulation. If environmental, occupational, and consumer

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<sup>36</sup> Paul Joskow and Nancy Rose, “The Effects of Technological Change, Experience, and Environmental Regulation on the Construction Cost of Coal-Burning Generating Units,” Rand Journal of Economics, abstract, Vol. 16, No. 1, Spring 1985.

<sup>37</sup> General Motors, Annual Report, 2000, p. 36.

safety and health issues and other targeted goals of social regulatory policy are to be successfully integrated into plant decisions, then there needs to be an integrated framework for analyzing economic activities among the subsidiaries of a corporation.

According to government economists at the Department of Agriculture,<sup>38</sup> there are pitfalls of deciding what should be counted as a cost. Each approach, they say, “will tally a different set of costs and benefits.” Each approach that they discuss in their paper “defines costs and benefits differently. Each approach is sufficiently different so that the choice of approach will influence the guidance given to policymakers.” Defining cost is a major determining factor in what the cost estimates will be.

The U.S. Department of Transportation (DOT), early on, formally recognized problems with defining costs and the need to explicitly describe all assumptions in its regulatory assessments. In a 1984 handbook for those doing benefit-cost analysis, DOT officials wrote:<sup>39</sup> “Both the analyst and decisionmaker must recognize ... that assigning a numerical or dollar value to an uncertain impact does not remove the uncertainty, but could conceal it from the unwary. Therefore, complete information should be provided on any subjective judgments or relatively uncertain assumptions in the analysis.” The handbook went on to describe how, because of uncertainty, the costs associated with regulatory compliance with airbag rules varied by 50 percent or more, depending on the sources. Sometimes important costs are left out altogether. When the Consumer Product Safety Commission (CPSC) considered the costs and benefits of replacing circuit breakers with newer-technology arc-fault circuit interrupters (AFCIs), the Commission significantly underestimated, by its own admission, the electrical fire cost to society. After estimating the costs associated with death, injury, disease, and property damage, the Commission report stated: “Deaths and injuries sustained by fire personnel and the cost of fighting fires were not included in the society cost estimate.”<sup>40</sup> How can one leave these offsetting cost savings from an equation? Not only are the deaths, injuries, and costs real and quantifiable, but when public servants are killed or hurt on the job, society bears most of these costs, and of associated survivor and disability payments directly.

Similarly, when CPSC considered the costs and benefits of a proposal for additional Ground Fault Circuit Interrupters (GFCIs) in new residential installations, it only considered the offsetting costs saved from reduced fatalities. Why? In the Commission’s words, “Since the number and severity of these injuries is not now known, we have not included injury costs in the calculation of societal costs associated with residential

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<sup>38</sup> Fred Kuchler and Elise Golan, Assigning Values to Life: Comparing Methods for Valuing Health Risks, Agricultural Economics Report No. 784, U.S. Department of Agriculture, December 1999.

<sup>39</sup> U.S. Department of Transportation, Office of Industry Policy, “Guidance for Regulatory Evaluations: A Handbook for DOT Benefit-Cost Analysis,” April 1984, pp. 16, 17.

<sup>40</sup> U.S. Consumer Product Safety Commission, Memorandum to William King, from Terrance Karels, through Warren Prunella, Associate Executive Director for Economic Analysis, “Economic Considerations --- AFCI Replacements,” March 10, 2003.

electrocution.”<sup>41</sup>

When faced with the need to monetize all costs, NHTSA acknowledged that cost savings were more than just fatalities, so in addition to putting a dollar value on human life, based on current interest rates, it also developed a formula of various types of injuries to establish the nebulous concept but specific dollar value associated with “equivalent lives saved.”<sup>42</sup> This nebulous concept is translated into specific dollar values, that in turn are used in cost estimates.

## B.2. Difficulty of estimating only the costs of incremental differences

It is important to define regulatory compliance cost as only the incremental difference between what would have been spent without a regulation and what must be spent after regulation. OMB in 1996 discussed “best practices” for estimating costs, saying that they must be measured against a baseline, which is the best assessment of the way the world would look absent the proposed regulation.<sup>43</sup> All costs calculated should be incremental, representing changes in costs that would occur if the regulatory option is chosen compared to costs in the base case (ordinarily no regulation or the existing regulation) or under a less stringent alternative.<sup>44</sup> GAO, reflecting on the OMB description, concluded that “OMB recommends calculation of regulatory costs in incremental terms, not the total expenditures in a regulatory area.” This is in striking contrast to the highly publicized work of Thomas Hopkins (often used by OMB), which, without clearly defining incremental or a consistent baseline, attempts to estimate the cost of regulations to the economy as a whole.<sup>45</sup>

Even with the best of intent, estimating the costs of incremental regulatory costs is an extremely difficult task. A 1996 GAO study concluded that companies included in its study could not identify the incremental costs that were attributable to regulatory requirements because they could not determine the costs they would incur in the absence of regulation.<sup>46</sup> The GAO study went on to comment on the problem of determining industry spending in the absence of a regulation. GAO concluded that the baseline should not be zero, and further concluded that costs are often overestimated because a

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<sup>41</sup> U.S. Consumer Product Safety Commission, Memorandum to William King, from Terrance Karels, through Warren Prunella, Associate Executive Director for Economic Analysis, “Economic Considerations --- GFCIs,” March 10, 2003.

<sup>42</sup> One example of this can be found in U.S. Department of Transportation, National Highway Traffic Safety Administration, Office of Regulatory Analysis and Evaluation Plans and Policy, “Final Economic Assessment: FMVSS No. 208, Advanced Air Bags,” May 2000.

<sup>43</sup> U.S. Office of Management and Budget, “Economic Analysis of Federal Regulations Under Executive Order 12866,” January 11, 1996.

<sup>44</sup> Cited in GAO, Regulatory Burden..., p. 46.

<sup>45</sup> Ibid.

<sup>46</sup> Reported in GAO, Regulatory Burden..., pp. 5, 45-46.



zero baseline is used. For example, cost studies often include all of a company's expenditures in safety and health, implicitly assuming that the company would have spent nothing on worker training and equipment during that year in the absence of regulatory requirements. Because companies probably spend some amount of money to protect their workers in the normal course of business, attributing those expenditures to regulatory requirements is erroneous and overstates the burden of regulations.

### B.3. Not using a baseline of what is already mandated

Compliance costs should be estimated with a baseline of what is already mandated by law. Cost estimates are often made from the baseline of where an industry's actual level of compliance is, rather than where it is supposed to be. In other words, if a mandated noise level of 90 dBA were to be reduced to 85 dBA, the proper baseline would be the cost to move from 90 dBA to 85 dBA. If a company had an eight-hour time-weighted level of 95 dBA, it would be inappropriate to estimate costs from 95 dBA to 85 dBA.<sup>47</sup> A company should not be "rewarded" for being out of compliance. Nonetheless, these inappropriate baselines are frequently used. A study for OSHA by ICF, citing examples of inappropriate baselines for noise, coke oven emissions, and cotton dust confirmed that the baseline should be existing regulation, not existing practice:<sup>48</sup>

"The noise statement was developed from a baseline of existing practices; the coke-oven statement was developed from existing standards ... In the cotton dust statement, it was stated that the baseline was the existing standard, but the cost estimating method and the gap between existing standards and existing practices in the textile industry raises doubts about the validity of this statement."

In fact, an OSHA contractor assessing economic impact of the Coke Oven Standard testified that: "No attempt has been made to exclude from cost calculations the costs associated with items that might have been used to achieve compliance with the existing standard, but were not used."<sup>49</sup>

In October 1999, the National Highway Traffic Safety Administration published a preliminary regulatory analysis on the impact of new performance requirements and test procedures for advanced air bag systems.<sup>50</sup> In testing one alternative and its cost,

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<sup>47</sup> Ruth Ruttenberg, "Statement of Ruth Ruttenberg on Behalf of the AFL-CIO Before the Occupational Safety and Health Administration's Public Hearings on Proposed Noise Standards," Washington, DC, July 1975.

<sup>48</sup> ICF, Inc. and MIT Center for Policy Alternatives, Regulatory Analysis Methods: A Review of Past Health-Related Efforts, July 1979, pp. 2-5.

<sup>49</sup> Cited in United Steel Workers of America, AFL-CIO CLC, "Post-Hearing Brief of United Steelworkers of America, AFL-CIO on Standard for Coke Oven Emissions," June 16, 1976, p. D3.

<sup>50</sup> U.S. Department of Transportation, NHTSA, "... Advanced Air Bags," 1999.

NHTSA determined the cost of protecting unbelted occupants.<sup>51</sup> Since it is a law that occupants wear seat belts, the costs associated with this alternative are from an inappropriate baseline. In its final economic analysis, published in May 2000, NHTSA did no better. It actually continued the double counting of compliance cost with a previous standard. In this new regulation it considered cost to be what was needed to be in compliance with the previous regulation plus what is needed to fulfill the requirements of the pending regulation. Hence a table: “Estimated Per Vehicle Consumer Costs for Meeting Specific Tests (Not weighted by current compliance rates).”<sup>52</sup>

#### B.4. Not including costs that have already been expended

Compliance costs should not include expenditures to fix problems before the promulgation of regulations. Regulatory analysis for the Coast Guard on the estimated cost of vessel response to oil spills in Prince William Sound, for example, was prepared in 1992 by the Volpe National Transportation Systems Center of the U.S. Department of Transportation. Volpe included all post-Valdez costs as compliance costs for a regulation that had not been proposed until later, and even though Volpe acknowledged that the capability was already in place before the Oil Pollution Act of 1990 was passed.<sup>53</sup>

#### B.5. Estimating maximum cost

The estimated mean compliance cost for an industry, not the maximum cost, best expresses the cost of regulatory compliance. Yet, many agencies skew their estimates to maximum cost. The problem at EPA of using maximum cost estimates was identified and discussed by economists writing for Resources for the Future, who concluded:<sup>54</sup>

“There is a tendency, sometimes inadvertent and sometimes deliberate, for a regulatory cost analysis to produce an estimate of the maximum cost, rather than the mean.”

In discussing its own regulatory analysis for hazardous waste operations and emergency response (Hazwoper), the U.S. Department of Labor said:

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<sup>51</sup> Ibid, p. E-2.

<sup>52</sup> U.S. Department of Transportation, NHTSA, “... Advanced Air Bags,” May 2000, Chapter VII, p. 7.

<sup>53</sup> Volpe National Transportation Systems Center, Research and Special Programs Administration, U.S. Department of Transportation, “Preliminary Regulatory Impact Analysis for the Oil Pollution Act of 1990, Section 5005, Equipment and Personnel Requirements Under Vessel Response Plans For Tank Vessels Operating in Prince William Sound,” for Coast Guard, April 1992, p. 13.

<sup>54</sup> Harrington, Morgenstern, and Nelson, p. 21.

“OSHA’s estimates show maximum potential economic cost that will be needed to comply with this standard.”<sup>55</sup>

OSHA did the same cost maximizing in its regulatory analysis of methylene chloride: “OSHA’s methodology tends to overestimate the economic impacts of the standard in a number of ways, and this, in turn, increases the agency’s confidence that the standard is economically feasible for firms in the affected industries.”<sup>56</sup> The OSHA regulatory analysis for methylene chloride (MC) provides specific examples of why the official analysis overestimates costs:<sup>57</sup>

“OSHA’s cost methodology does not take into account reductions in employee exposures to MC that many establishments could attain by making simple, virtually costless improvements in employee work practices and housekeeping procedures. For example, OSHA assumed that any establishment that has even one job classification with exposures above the PEL would need to spend a substantial sum of money to come into compliance with the PEL. In reality, some establishments will not incur the estimated costs of compliance because they will adopt no-cost or low-cost approaches to achieve control ... Making ... housekeeping changes will enable many employers to avoid any impact on their bottom line.”

In making assumptions about exposure levels and compliance strategies for methylene chloride, the OSHA regulatory analysis comments: “This approach to cost estimation tends to overestimate costs.”<sup>58</sup>

An OTA study found OSHA targeting cost estimates above the mean:<sup>59</sup>

“Because the agency’s normal assumptions about control measures are usually ‘conservative’ in this way and because the ‘work smarter’ prospect is not normally explicitly accounted in analytic estimates, it is reasonable, in principle, to expect that the actual costs of compliance (for the ‘average’ establishment or the industry in aggregate) will in many cases be somewhat (or even substantially) less than what OSHA’s rulemaking estimates imply.”

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<sup>55</sup> U.S. Department of Labor, Occupational Safety and Health Administration, Regulatory Impact and Regulatory Flexibility Analysis of the Occupational Safety and Health Standard for Hazardous Waste Operations and Emergency Response (29 CFR Part 1910), December 14, 1988, p. I-5.

<sup>56</sup> U.S. Department of Labor, Occupational Safety and Health Administration, Final Economic and Regulatory Flexibility Analysis for OSHA’s Standard for Occupational Exposure to Methylene Chloride, January 7, 1996, p. VI-8.

<sup>57</sup> Ibid., pp. VI-8-9.

<sup>58</sup> OSHA, ...Methylene Chloride, 1996, p. V-7.

<sup>59</sup> OTA, Gauging Control Technology..., p. 69.

## B.6. Double counting

Cost estimates for a proposed standard should not include the cost of regulatory compliance already mandated by another regulation. Safety and health training for workers is required by an array of standards. Because the safety and health training program and record keeping systems are similar in most cases, counting training as a full cost in each standard clearly overestimates cost. Respirator requirements for specific industries predated the newer OSHA Respirator Standard. The baseline for those industries should not be zero.

There are economies of scale when medical surveillance is required for more than one substance. Some hazardous substances are regulated by multiple agencies. Asbestos and lead are prime examples, with independent compliance cost estimates developed at CPSC, EPA, and OSHA. Formaldehyde, diesel fumes, and methylene chloride are other substances that are regulated by more than one agency. Vigilance is needed to prevent double counting.

Any standard, requiring improved ventilation, reduces multiple chemical hazards simultaneously, and the costs of such improvements should not be counted multiple times each time any substance is regulated. In the copper industry for example, arsenic and lead are both hazards and are separately regulated by OSHA. Clean-up of either hazard helps clean-up of the other. Overlapping costs of compliance should only be counted once.

Duplication of cost estimates can even occur within analysis of one rule. Take, for example, the OSHA cancer policy. In 1977, a quickly assembled American Industrial Health Council (AIHC), encompassing 90 companies and 60 trade associations, formed to battle OSHA's proposal. AIHC paid Booz, Allen & Hamilton hundreds of thousands of dollars to estimate compliance costs of the proposed policy for the "identification, classification and regulation of toxic substances posing a potential occupational carcinogenic risk." Thousands of chemicals are suspected carcinogens. Ventilation systems, monitoring devices, and showers and changing rooms necessary for compliance are the same for each suspected carcinogen so do not require new investment for each existing chemical. In some cases only a single investment is needed. The AIHC study used "study team judgment" and assumed that there was only a 50 percent chance that engineering capital requirements for each additional substance regulated would duplicate capital already invested to control other substances.<sup>60</sup>

Sometimes industry estimates (which an agency must study and respond to) include compliance costs for regulatory requirements not under consideration in that rulemaking. Such was the case when OSHA considered its 1,3-Butadiene Standard. A study on behalf of the industry estimated that costs to the monomer industry would be \$967,000. A consultant to OSHA estimated the cost to be \$108,000. Why the difference? Industry added several additional types of controls, needed to control environmental releases, but

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<sup>60</sup> Cited in Ruth Ruttenberg, "Statement of Ruth Ruttenberg...Carcinogenic Risk," p. 8.

not believed to have any significant impact on reducing occupational exposures. The industry study recommended controls that would reduce emissions in areas where workers were not even present.<sup>61</sup> Clearly those emissions should be controlled, but OSHA should not be “charged” for non-OSHA-related activities. It raises the question of whether in EPA considerations, the cost of OSHA-related activities were included. OTA concluded in 1995 that OSHA, in its rule making for lead, did not consider the existing EPA lead regulation.<sup>62</sup>

“There is little in the record to suggest that OSHA’s feasibility analysis in the rulemaking sufficiently appreciated the implications of the largely *simultaneous* compliance burden imposed by the OSHA standard and the afore-mentioned EPA regulations.”

Regulatory analyses for the Coast Guard, to assess the economic impact of vessel response regulations for oil spills in Prince William Sound separately calculated the costs of company-specific and vessel-specific response plans, even though there clearly is much that all response plans have in common. Also, the Coast Guard regulations for facility response plans were developed in concert with EPA, but the EPA work was part of a separate rule-making – with a likelihood of interagency doublecounting.<sup>63</sup>

Companies surveyed by GAO for a 1997 publication “found it difficult to distinguish between federal requirements and those of other governmental jurisdictions ... that the intertwining of federal, state, and local requirements made it difficult to separate the effects of each type of requirement.”<sup>64</sup> The likelihood for double counting among local, states, and federal government is also high.

In some regulatory areas, there may be several agencies involved, and coordination of programs, not to speak of regulatory analyses, may be difficult. As an example, for food safety, besides state and city health departments, there are at least four major federal departments and agencies: EPA, FDA, the Food Safety and Inspection Service (FSIS) in the Department of Agriculture (as well as the Animal and Plant Health Inspection Service), and the Centers for Disease Control and Prevention (CDC) in the Department of Health and Human Services. Within EPA there are at least four offices involved: the office responsible for the Food Quality Protection Act of 1996, the National Center for Environment Assessment, the Office of Pesticide Programs, and the Office of Water. Within FDA, there is the Center for Food Safety and Applied Nutrition and the Center for Veterinary Medicine. Within CDC, there are at least eight offices with responsibility for some aspect of food safety: the Division of Adolescent and School Health, the Division of Bacterial and Mycotic Diseases, the Division of Parasitic Diseases, the Division of Viral and Rickettsial Diseases, the Epidemiology Program Office, NCEH Environmental

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<sup>61</sup> OSHA, ... 1, 3-Butadiene Standard, p. VI-11.

<sup>62</sup> OTA, Gauging Control Technology..., p. 65.

<sup>63</sup> Straube and Ruttenberg, p. 7.

<sup>64</sup> U.S. General Accounting Office, Regulatory Burden..., p. 49.

Health Services, the Public Health Practice Program Office, and Travelers' Health. Most of these agencies and departments also have a number of food safety research arms associated with them. The risk of double counting in a regulatory impact analysis related to food safety is high. Jurisdictional lines may be complicated. Consider, for example, egg safety. FDA develops standards for egg producers and the states and provides oversight and enforcement on the farm; FSIS develops standards for both shell egg packers and egg products processors and provides inspection and enforcement to both; FDA and CDC conduct surveillance and monitoring activities, with CDC focusing on human health and FDA focusing on the food supply.<sup>65</sup>

#### B.7. Needing to consider alternative costs of product liability cases

The threat of tort liability cases affects the economic, as well as the moral, decisions of a company. Unlike worker health and safety problems, with workers covered by Workers' Compensation and generally not allowed to sue their employers, injured consumers are not constrained from bringing a lawsuit. The threat of lawsuits means that CPSC and NHTSA have leverage in promoting safety and health and can often work with businesses toward recalls and voluntary corrective actions, or withdrawals of hazardous products from the market. As early as 1977, the chair of the Consumer Product Safety Commission said in a speech to the Greater New York Safety Council: "The product liability debate and the concern over the economics of regulation should ultimately benefit consumers through increased safety of products on the market at competitive prices." He went on to point to "interest in the product liability area ... from the potential trade-offs between the manufacturer's costs associated with the product liability system and the costs associated with the safer design, manufacture, packaging and labeling of consumer products."<sup>66</sup>

When, for example, CPSC was investigating asbestos in hair dryers, before it took regulatory action, manufacturers told the agency they would provide asbestos-free hair dryers, refunds to consumers owning asbestos models, or retrofits for asbestos models, thus avoiding regulation as well as lawsuits.<sup>67</sup> Over the years, voluntary recalls, following discussion between CPSC and product manufacturers, have ranged from infant carriers and coffee makers to electrical extension cords, skateboards, and wood strippers. The existence of product liability threats exist in other regulatory cost analyses.

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<sup>65</sup> U.S. Department of Agriculture, Food Safety Inspection Service, "FSIS and FDA Working Together to Make Eggs Safer," April 21, 2000.

<sup>66</sup> U.S. Consumer Product Safety Commission, "Consumers to Benefit From Safety-Related Economic Trends," June 6, 1977.

<sup>67</sup> U.S. Consumer Product Safety Commission, "Corporations Provide Preliminary Data on Hair Dryers with Asbestos," April 6, 1979 and U.S. Consumer Product Safety Commission, "CPSC Accepts Corrective Actions From Major Hair Dryer Companies," May 21, 1979.

### C. Static Analysis

Most regulatory analysis is static, thus failing to consider the dynamic and often innovative ways in which industry might comply. The failures of static cost-benefit analysis were laid out clearly, by an academic, nearly 30 years ago:<sup>68</sup>

“Standard static methods of benefit-cost analysis cannot (by definition) capture the underlying time-varying behavior of a social system. It is often necessary to understand this behavior in order to make good estimates of the dynamic time path of benefits and costs of proposed programs. Therefore, if static methods are applied to evaluate programs affecting complex social systems, they are likely to lead to choices that are essentially incorrect, or choices that may even make matters worse.”

Static analysis overlooks a more realistic appraisal of costs. When a regulatory impact analysis assumes the ways in which industry will comply and rigidly adheres to a costing methodology based on those assumptions, the result will not be accurate cost estimates. The regulatory challenge to scientists and engineers to design-in abatement and controls, or to fashion techniques for prevention or substitutes for hazardous substances, can rapidly lead to changes that allow for compliance at a lower cost than assumed in an RIA using static analysis. These challenges often emanate from a rule or even from a proposed rule. Innovation may be as simple as changing a metal piece to plastic and reducing noise at a fraction of estimated cost. It may mean building lock holes into a machine to make the lock-out/tag-out process efficient and inexpensive. Or, it may cause a production process to reorganize and retool.

Another reason why most analyses are static is the assumption that compliance will rely on existing technology only, even though regulatory experience shows that scientists and engineers quickly create new processes and products to meet regulatory requirements. A static analysis incorrectly assumes a baseline where technology, production methods, and even equipment remain constant. There is no economic or legal incentive to use pollution control equipment or innovate toward prevention when there is no rule. Once there is a rule, or threat of a rule, the incentives change. Regulatory cost analyses do not offset the economic benefits from vibrant new businesses and jobs that emerge in the pollution control and hazard abatement industry – from safety shoes to catalytic converters, from waste water treatment chemicals to process safety management software. Without offsets for the cost savings when pollution or hazards are prevented altogether or safer substitutes emerge, analyses will overestimate costs.

Companies do not buy compliance equipment in a vacuum. Replaced equipment may be partly or totally depreciated. And, while a specific compliance date is given in a regulation, in many cases the dates are extended – either by agency ruling or through

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<sup>68</sup> Joseph Maciariello, Dynamic Benefit-Cost Analysis, Lexington Books, Toronto and London, 1975, p. 13.

discussions and petitions by industry to the enforcing agency – providing cost-saving time to a business.

Overestimates also occur when an agency considers only a few of the available compliance alternatives. In doing its RIA for the Process Safety Management (PSM) Standard, OSHA made an “enormous number of estimation decisions because of the large number of affected industries and because the PSM standard had more than a dozen provisions, most involving several separate requirements.” OSHA, however, evaluated only a small number of regulatory alternatives during the rulemaking.<sup>69</sup>

Considering a regulation of acrylonitrile, OSHA itself commented “...this tendency toward overestimation of costs and underestimation of benefits allows decisions to be biased on the side of the current economic situation at the expense of future benefits to society...”<sup>70</sup>

Why does static analysis lead to inaccurate results? According to a Harvard Business School professor, “the conflict between environmental protection and economic competitiveness is a false dichotomy. It stems from a narrow view of the sources of prosperity and a static view of competition.”<sup>71</sup>

### C.1. Inaccurate assumptions

Assumptions about methods of compliance have a powerful influence on cost estimation. Changing assumptions and methodologies is likely to result in a very different cost estimate. A good example, comes from two studies that estimated the costs of compliance for a proposed noise standard. In 1974, industry presented to OSHA an analysis by Bolt, Beranek, and Newman (BBN) of the estimated cost of an 85 dBA noise standard – \$31.6 billion. Another study, released to OSHA by industrial engineer Glenn Warnaka, estimated noise control compliance at \$11.7 billion. Why are the two figures so different? One explanation may be the inflated estimates developed by BBN through reliance on industrial spokespeople. In addition, the BBN study ignored new technology being developed in the noise abatement field – in sharp contrast to the Warnaka study, which made newly developing technology a key element in its costs of noise control compliance. BBN-based study estimates, according to the study’s own authors, relied on some of the most expensive procedures available. The BBN estimates assumed static treatments such as enclosures, ceiling treatments, and lead curtains, whereas Warnaka considered opportunities for redesign or substitution of noisy components of existing equipment.<sup>72</sup>

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<sup>69</sup> Stone, Three Case Studies..., p. 21.

<sup>70</sup> U.S. Department of Labor, Occupational Safety and Health Administration, Final Report: Economic Impact Assessment for Acrylonitrile, February 21, 1978, p. 3-22.

<sup>71</sup> Michael Porter, “America’s Green Strategy,” Scientific American, April 1991.

<sup>72</sup> Cited in Ruth Ruttenberg, “Statement of Ruttenberg ... Noise Standards,” pp. 5, 6.



Inaccurate assumptions were made in a regulatory analysis for the Coast Guard, to assess the economic impact of vessel response regulations for oil spills in Prince William Sound. With low levels of legal liability, there had been little incentive to develop state-of-the-art oil spill response technology. As already tested prototypes came into production and research promoted improved response techniques, costs were expected to fall.<sup>73</sup>

### C.2. Not knowing which part of a new product is for compliance

It may be difficult, perhaps impossible, to distinguish what specific new part or process is for regulatory compliance. When controls are engineered into the production process, they become integral parts of a piece of equipment or process, and the incremental cost of regulation may very well be impossible to isolate. In a 1996 GAO study, company officials said they could not provide incremental regulatory cost data because the companies' regulatory responsibilities were sometimes difficult to distinguish from their regular processes and functions – that “they had become part of the companies' standard procedures.”<sup>74</sup> Officials from a glass company said regulatory responsibilities were woven into individuals' jobs, and it was, therefore, difficult to separate what was being done strictly for regulatory reasons. Officials from a tank car company said it would take a significant amount of time and resources to separate compliance costs from their day-to-day operations costs. Officials from a petrochemical company said regulations often cause a fundamental shift in business processes that later become less distinctive. In fact, the best solutions – of designed-in safety and pollution prevention – are the most difficult for estimating compliance costs. In some cases the cost of compliance may actually be zero and the resulting solution may actually increase productivity.

### C.3. Not considering all existing available technology

Existing available technology needs to be considered, even if not currently in place in a given industry. When surveyed as part of an RIA about cost, companies may not be willing to expend resources in advance of a final regulation to determine how compliance could be achieved. Overestimates of cost may result from firms' unwillingness to devote resources to figuring out the best way to comply with a proposal that may or may not be the final rule. Asked ‘what will it cost?’ a firm's analyst may respond with the cost of an “off-the-shelf” compliance technology, and not necessarily one needing adaptation or full development. Dust control in one industry, say mining, may have lessons for dust control in grain handling or cotton textile manufacturing, but may not be considered by those estimating compliance costs.

In the early 1980s when NHTSA was considering regulations for fuel economy, U.S. car manufacturers objected, claiming the necessary technology did not exist. But what were foreign car manufacturers doing? Volvo, Toyota, Volkswagen and others were not only

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<sup>73</sup> Straube and Ruttenberg, p. 3.

<sup>74</sup> GAO, Regulatory Burden..., pp. 29, 30, 51-52.

able to comply, but they were using U.S. patented products in order to comply with U.S. fuel economy regulations.<sup>75</sup>

#### C.4. Assuming current level technology only

Assuming industry will rely solely on existing technology to achieve compliance is not a realistic assumption when estimating costs. Researchers from Resource for the Future report that “case studies support the usual explanation for regulatory cost overestimates – unanticipated technological innovation.”<sup>76</sup> Even so, in most circumstances regulatory cost estimates ignore the possibility of technological progress.<sup>77</sup> Once an incentive for compliance exists, the potential for innovation increases significantly. The requirement to comply with a regulation provides such incentives. But regulatory analyses have consistently made a methodological error when estimating costs – basing cost estimates on current level technology only. This ignores the technology-forcing provisions of regulation as well as what post-regulatory experience increasingly shows: the emergence of cost-saving, and sometimes even productivity-improving, technological improvements following the promulgation and implementation of a standard. One should not ignore industry’s capacity to learn and innovate, and thereby reduce its cost of meeting regulatory requirements based on current technology. Still, a 1981 report declared that OSHA economic impact statements estimated compliance costs relative to proven control technologies, thus limiting the cost analysis to existing technologies. Such a methodology leads to overstatements in the incremental cost of compliance and is wrong.<sup>78</sup>

One reason why emerging technology is ignored, may be the dictates of OMB and reviewing courts, who have demanded a record that points to specific innovations when reviewing cost estimates. This requires an agency to make conservative cost estimates to avoid criticism and/or reversal, even though analysts know that the pressure of avoiding regulatory costs will foster innovation. Post-regulatory technological improvements are the rule rather than the exception. Yet, because it may be difficult to predict the specific technological innovations that will occur and when they will occur, technological innovations and their cost-reducing impact remain largely ignored in calculating costs of regulation. Agencies overestimate costs.

Yet, as described in more detail in the five subsections below, companies consistently choose paths toward compliance that (a) are different than what economic analysis assumes, (b) involve innovations to existing technology, (c) involve cost reductions based on experience (and learning curves), (d) adapt technology already in place in other

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<sup>75</sup> Based on a study for NHTSA and CPSC by Dr. Nicholas Ashford, Massachusetts Institute of Technology, interview with author, December 4, 2001.

<sup>76</sup> Harrington, Morgenstern, and Nelson, p. 23.

<sup>77</sup> Ibid., p. 16.

<sup>78</sup> ICF, p. G3, cited in Ruth Ruttenberg, “New Definitions and Techniques for Assessing Costs and Benefits,” Labor Studies Journal, Spring 1981, p. 20.

industries, and (e) involve newly developed technology whose development is spurred by a regulation or the serious consideration of one.

Regulation can and should be technology-forcing. There are many instances in which regulation has literally been the “mother of invention.” Regulation can be productivity enhancing, and it is important to document and promote situations when the combination of carefully designed regulation, productivity, and technological improvements can be the rule rather than the exception.

C.4.a. Inaccurate assumptions about compliance path. Agencies often misjudge an industry’s path toward compliance. In many cases, affected industries achieve compliance through adopting control measures that differ considerably from those that rulemaking analyses presumed. When NHTSA tried to estimate the compliance costs associated with new performance requirements and test procedures for advanced air bag systems, it recognized this problem, stating: “Potential compliance costs for this proposal vary considerably and are dependent upon the method chosen by manufacturers to comply.”<sup>79</sup>

Often the regulatory agencies ask narrow questions that do not allow for identifying the possibility of new technological developments. They may not even allow for study of emerging technologies or equipment and processes already on-line, but not in the U.S. According to an OTA retrospective study, “most of the overestimates of actual overall compliance spending ... arose from the alternate paths the industries followed to achieve compliance ... “There is,” said OTA, “a ‘narrowness’ in the questions addressed and findings provided that needs to be recognized.”<sup>80</sup>

The original OSHA estimate for the cost of complying with the 1976 Coke Oven Emissions Standard was more than five times higher than post-regulatory estimates of actual costs. In a study published in 1997, the following was discovered:<sup>81</sup> OSHA’s contractor estimated that complying with the standard would cost from \$200 million to more than \$1 billion. A Council on Wage-Price Stability post-regulatory study estimated that the actual cost of the standard was \$160 million. OSHA’s contractor had estimated that three steel firms in its sample would spend \$93 million on capital equipment and \$34 million in annual operating costs to comply with the regulations. A later study by Arthur Anderson determined that the three firms actually spent between \$5 million and \$7 million in 1977 to comply with the standard, and only \$1 million to \$2 million on capital expenditures. In 1987 when EPA went to regulate coke oven emissions, the agency estimated that the cost of controlling hazardous air pollution from coke ovens would be approximately \$4 billion. By 1991 the estimate fell to between \$250 million and \$400 million. Industry clearly chose lower cost compliance paths.

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<sup>79</sup> U.S. Department of Transportation, NHTSA, “... Advanced Air Bags,” p. E-8.

<sup>80</sup> OTA, Gauging Control Technology..., pp. 44, 64.

<sup>81</sup> Eban Goodstein and Hart Hodges, “Polluted Data: Overestimating Environmental Costs,” The American Prospect, No. 35, November-December 1997.

OTA chastised OSHA for its narrow view of analysis saying:<sup>82</sup>

“Arguably, OSHA ought to be a progressive supporter of innovations and the adoption of better technology, when such measures may provide for the cost-effective application of superior hazard removal measures, work to the benefit of both industry and workers, and enhance the agency’s ability to secure additional health and safety protections in the workplace. However, the agency’s present approach and priorities in examining control options do not appear to be providing an effective means to this end.”

OTA goes on to say that OSHA’s “current estimation process is, by and large, not targeted on providing a ‘most likely’ forecast of the mix of control actions, costs, and other economic impacts,” concluding that “a lack of continuing insights on the potential of leading-edge technology hinders the agency in performing its mission.”<sup>83</sup> GAO complains that EPA’s “traditional approach toward environmental regulation has also been criticized as precluding innovation.”<sup>84</sup>

Even though an important objective of regulation is to change behavior, economic analysis does not generally seek to forecast expected behavior changes. When Arthur D. Little, Inc. (ADL) estimated the economic impact of EPA regulations on the copper industry, it assumed that there would be no changes in the cost or technology of compliance. Written in 1978, the ADL report for EPA stated, “These estimates assume that there will be no fundamental change in the relative cost and nature of pollution control technology between now and 1988.”<sup>85</sup> The assumption was not realistic, and presented a methodology guaranteed to overestimate cost. The consultant did not anticipate new technology to aid in compliance. Thus, instead of examining costs associated with creative and dynamic approaches to compliance, ADL focused on off-the-shelf, expensive, retrofit solutions. In fact, the stricter the standard, the greater can be the incentive for technological innovation.

Limited analysis leaves a significant gap in the vision of potentially available control options, and in turn can lead to significant cost overestimation. Such overestimation may in fact, cause federal policy makers to establish weaker, less protective regulations.

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<sup>82</sup> Ibid.

<sup>83</sup> Ibid., p. 50.

<sup>84</sup> U.S. General Accounting Office, Testimony Before the Subcommittee on Oversight and Investigations Committee on Commerce, House of Representatives, “Environmental Protection -- EPA’s and States’ Efforts to ‘Reinvent’ Environmental Regulation,” Statement of Peter F. Guerrero, Director, Environmental Protection Issues, Resources, Community, and Economic Development Division, T-RCED-98-33, November 4, 1997.

<sup>85</sup> Arthur D. Little, Inc., Economic Impact of Environmental Regulations on the United States Copper Industry, Summary Submitted to United States Environmental Protection Agency, Contract No. 68-01-2842, January 1978, p. 9.

OTA, studying OSHA, concluded that “greater attention to the potential of new technology during the rulemaking might have supported more stringent hazard reduction provisions than were actually promulgated.”<sup>86</sup> MIT professor Nicholas Ashford testified at hearings of the Consumer Product Safety Commission in 1981, saying “industry’s assessment of the costs can be substantially inflated for a variety of reasons, including the fact that industry usually estimates its costs according to contemporary technology.”<sup>87</sup>

Cotton dust has caused the choking death and total disability of thousands of textile workers. Industry spokespersons foretold economic disaster with promulgation of the proposed OSHA Cotton Dust Standard. What happened? Instead of disaster, the industry was virtually in compliance in a matter of months, more than a year faster than the regulation required – with the textile industry modernized and more competitive than ever. A post-regulatory review of the cost of controlling cotton dust is a very different one from the prepromulgation debate. Rather than the predicted use of retrofits, add-ons, and enclosures, compliance came primarily through the use of designed-in engineering controls.<sup>88</sup>

When considering new performance requirements and test procedures for advanced air bag systems, NHTSA acknowledged that there were a variety of potential ways for manufacturers to meet alternative test requirements and that the cost estimates of these systems “vary considerably.” It also responded that “there is no guarantee that these technologies are the ones that will actually go into production.”<sup>89</sup>

There was uncertainty about a compliance path, and NHTSA chose to estimate the costs of the most static, most conservative, and most costly option. The final regulatory analysis for the new standard, issued by NHTSA in May 2000, reiterated that the “potential compliance costs for the Final Rule vary considerably and are dependent upon the method chosen by manufacturers to comply.”<sup>90</sup>

When firms choose safety through design, cost analysis clearly needs to change. The National Safety Council’s Institute for Safety Through Design, has, as its mission, “to reduce the risk of injury, illness and environmental damage by integrating decisions affecting safety, health and the environment in all stages of the design process.” The Institute boasts that in addition to reductions in injuries, illnesses, environmental damage, and attendant costs, safety in the concept of early design stages improves productivity, decreases operating costs, and avoids expensive retrofitting to correct design

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<sup>86</sup> OTA, Gauging Control Technology..., pp. 11, 27.

<sup>87</sup> U.S. Consumer Product Safety Commission, Office of Information and Public Affairs, “Commission Initiates Formal Rule for Assessing Costs & Benefits of Its Regulations,” March 12, 1981, p. 2.

<sup>88</sup> Ruth Ruttenberg, Compliance with the OSHA Cotton Dust Rule: The Role of Productivity Improving Technology, for the Office of Technology Assessment, Contract No. 233-7050.0, March 1983.

<sup>89</sup> U.S. Department of Transportation, NHTSA, “... Advanced Air Bags,” 1999, Chapter VII, p. 4.

<sup>90</sup> U.S. Department of Transportation, NHTSA, “... Advanced Air Bags,” 2000, p. ES-4.

shortcomings.<sup>91</sup>

Safety through design is also promoted by activities of the U.S. Department of Energy. In groundbreaking work at a national hazardous materials technology center, new hazardous waste remediation technologies are studied and pilot tested for worker safety and health. Even though the federal government devotes enormous resources toward the development of new remediation technologies, only scant attention to integrating safety is evident. A workshop held at the International Union of Operating Engineers' National Hazmat Program in October 2000, studied safety through design, and "remembering the worker" in the R&D process. Workshop attendees focused on how to include the cost of safety and health compliance in cost-performance and life-cycle costs associated with technology procurement.<sup>92</sup>

Costs of new technology are overestimated when the cost of compliance activities in older, less safe technologies are not offset. A technology that eliminates the need for respirators or confined space protocols, or medical surveillance, is much cheaper than just the price tag for purchase. The compliance path is a critical element in the cost estimation process. An example of cost savings through design is a new laser technology that has been developed for use at Department of Energy Nuclear Complex locations for cleanup of hazardous waste, to remove contaminated surfaces from metal and concrete.<sup>93</sup> The existing, "competing" technology is a surface impact technique. While the laser technology alone has a higher cost than surface impact, if one adds the necessary expenditures for noise and respiratory compliance, the surface impact technology is actually more expensive. Hence, choosing the laser technology, upon life cycle cost analysis, saves money and simultaneously protects workers.

OTA, studying problems with cost estimation in regulatory analyses also concluded that estimates of economic burden have "not well reflect[ed] the compliance paths chosen by affected industries."<sup>94</sup> RFF researchers say that OSHA's demonstrations of feasibility "are often based on conservative assumptions about what compliance responses will predominate across affected industries."<sup>95</sup>

Sometimes an agency will acknowledge a logical and cheaper compliance path and still quantify a more expensive alternative. One example is when the Consumer Product Safety Commission (CPSC) in April 2003 issued a final rule on metal-cored candlewicks

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<sup>91</sup> National Safety Council, Institute for Safety Through Design, "About the Institute," <http://www.nsc.org/istd/aboutus.htm>, downloaded September 7, 2001.

<sup>92</sup> National Hazmat Program, Assessing the Full Costs of New Remediation Technologies: Preliminary Guidelines for Identifying Occupational Safety and Health Costs for Environmental Remediation Technologies, for the U.S. Department of Energy, 2001.

<sup>93</sup> Ibid.

<sup>94</sup> OTA, Gauging Control..., p. 10.

<sup>95</sup> Ibid., p. 86.

containing lead and candles with such wicks. CPSC banned a group of candles after studies following a request for such a ban by Public Citizen. Still economic analysis by CPSC was faulty. While acknowledging that shipping carton labeling might be done by direct printing onto the carton, the only cost estimates that were made were for pre-printed labels – with associated costs for labeling machines and the costs of individual labels.<sup>96</sup> Why CPSC chose to provide cost estimates for a less efficient compliance solution is not clear.

C.4.b. Innovations to existing technology not considered. While off-the-shelf technology may not be immediately available, there may be technology that could aid in compliance without much innovation. This existing technology, which only needs adaptation, is likely to be considerably cheaper than the full development of new compliance technology. The National Institute for Occupational Safety and Health (NIOSH), in an effort to advance the state of the art in pillar design – the first line of defense against rock falls in coal mines – organized an international workshop on coal pillar mechanics and design in 1999. Fifteen papers were submitted by scientists and engineers from five countries. These papers included documentation for innovative actions in numerical modeling, empirical design formulas based on case histories, field measurements, and post-failure mechanics.<sup>97</sup> Presenters offered life-saving adaptations of existing technology and methodology, all designs that by averting rock falls, save not only lives, but equipment as well as costly work stoppages.

New technology reduced estimated compliance costs with the OSHA Ethylene Oxide (EtO) Standard. Since promulgation of the standard, new EtO sterilizer models are now available for almost half the cost of the ones available in 1984, and there are no additional maintenance and operating costs for separate ventilation systems associated with them.<sup>98</sup>

When NHTSA considered new performance requirements and test procedures for advanced air bag systems, the methodology for the regulatory analysis assumed “that manufacturers would make as few changes as possible to their fleet to meet the new proposals.”<sup>99</sup> This is not particularly logical because they noted that in the year from the 1998 publication of the NPRM (notice of proposed rulemaking), “a number of events

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<sup>96</sup> U.S. Consumer Product Safety Commission, “Metal-Cored Candelwicks Containing Lead and Candles with Such Wicks,” Final Rule, in Federal Register: 16 CFR Part 1500, Vol. 68, No. 75, April 18, 2003, p. 19146.

<sup>97</sup> U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, “Proceedings of the Second International Workshop on Coal Pillar Mechanics and Design,” Information Circular (IC) 9448, Technology News – Milestone in Mining Safety and Health Technology, No. 492, August 2001.

<sup>98</sup> Meridian Research, Inc., “Ethylene Oxide: A Case Study in Hazard Identification, OSHA Regulation, and Market Response,” Final Report to OSHA, July 21, 1991 cited in Ruth Ruttenberg and Associates, “Summary of Data and Analysis for Section 610 and EO 12866 Review of OSHA’s Ethylene Oxide Standard,” Prepared for the Occupational Safety and Health Administration, April 1998, p. 33.

<sup>99</sup> U.S. Department of Transportation, NHTSA, “... Advanced Air Bags,” 1999, p. E-4.

relevant to this rulemaking have occurred ... the development of advanced air bags by suppliers and vehicle manufacturers has continued ...”<sup>100</sup>

NHTSA, in May 2000, issued a rule requiring vehicle manufacturers to install advanced air bag systems. Quickly air bag suppliers – such as Autoliv, Breed, Delphi, Takata, and TRW – found a niche in the auto safety market. In studying compliance issues, GAO, in June 2001, found that some advanced air bag technologies were being installed in vehicles and others were in development.<sup>101</sup> The impact of the NHTSA rule illustrates the positive technology-forcing aspects of regulation. Another example was when NHTSA was considering the cost of requiring air bag on-off switches and it “assumed that there is no change in air bag design.”<sup>102</sup> This was clearly an unrealistic assumption given the significant changes in air bag design that were then underway and that continued at a rapid pace thereafter – some of it spurred on by NHTSA’s own regulations.

With the infamous Ford Pinto fuel tank, which often exploded upon impact, Ford made a decision not to use an \$11 fire-prevention device, concluding that costs would be greater than benefits. The morality of that decision aside, even the \$11 cost estimate was more than double the cost of a rubber bladder for gas tanks, developed by Goodyear, whose total purchase and installation cost would have been \$5.08.<sup>103</sup>

Lee Iacocca, as vice president of Ford Motor Company, during the debate on the 1970 EPA Clean Air Act, warned that compliance with Clean Air regulations would require huge price increases for automobiles, force U.S. automobile production to a halt after January 1, 1975, and do irreparable damage to the U.S. economy.<sup>104</sup> Iacocca’s predictions were clearly wrong. In addition, a study published in the Rand Journal of Economics, concluded that experience and improved technology “have allowed increases in automobile quality so that incremental costs of recent standards are much lower than previously believed.”<sup>105</sup> Industry overestimations often influence regulatory overestimations of cost.

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<sup>100</sup> Ibid., “Introduction,” p. 2.

<sup>101</sup> GAO, Vehicle Safety..., pp. 1- 2.

<sup>102</sup> U.S. Department of Transportation, National Highway Traffic Safety Administration, Office of Regulatory Analysis & Evaluation Plans and Policy, “Final Economic Assessment: FMVSS No. 208, Air Bag On-Off Switches,” November 1997, p. 2.

<sup>103</sup> Mark Dowie, “Pinto Madness,” Mother Jones, September/October 1977, pp. 28-29.

<sup>104</sup> Michael Porter and Claas van der Linde, “Toward a New Conception of the Environment-Competitiveness Relationship,” Journal of Economic Perspectives, Volume 9, Number 4, Fall 1995, p. 107.

<sup>105</sup> Timothy Bresnahan and Dennis Yao, “The Nonpecuniary Costs of Automobile Emissions Standards,” Rand Journal of Economics, abstract, Volume 16, No. 4, Winter 1985.



C.4.c. Not considering cost reductions from experience. In addition to considering cost savings from innovation, it is also important to consider the learning curve phenomenon; i.e., that annual compliance costs decrease over time as the problems associated with compliance are solved repeatedly by employers. Also, when a company has more than one facility, solving a compliance problem in one facility makes it cheaper to solve it in others.<sup>106</sup>

Economist William Baumol and others suggest that, not only will technological innovation lower the cost of regulations, learning by doing and economies of scale can also reduce estimated costs.<sup>107</sup> Examples include the development of substitutes for CFCs, the production of photovoltaic panels, and new methods for industrial pollution control. In each case the cost of production fell faster than anticipated, and unforeseen benefits, positive externalities, have often emerged.<sup>108</sup>

C.4.d. Not considering adaptations to technology already in place in other industries. Government studies estimating compliance costs often limit their analysis to domestic technology available in the industry under study. Economic analysis for the OSHA Cotton Dust Standard failed to consider available technology overseas. Analysis for the standard also failed to consider the use of technology already in place in other industries. Another example is the OSHA Grain Handling Standard, for which grain handlers, after the standard's promulgation, adapted pneumatic vacuums and other dust control devices from other industries with more advanced technologies in place. These included the mining and chemical industries.<sup>109</sup>

C.4.e. Not anticipating regulation-induced technology. There is evidence that the 1970 Amendments to the Clean Air Act precipitated the development of new technologies for the control of automobile emissions, thus providing companies with opportunities to choose solutions that not only controlled emissions, but that did it with potentially more cost-effective solutions.<sup>110</sup>

When OSHA instituted regulations covering exposure to asbestos in the early 1970s,<sup>111</sup> it hired a consulting firm to estimate the cost of compliance. Two later studies found that the original prediction for the cost of compliance was more than double the actual cost

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<sup>106</sup> ICF, pp. 2-11.

<sup>107</sup> William J. Baumol, "Environmental Industries With Substantial Start-Up Costs as Contributors to Trade Competitiveness." Annual Review of Energy and the Environment, Vol. 20, in Hodges, p. 10.

<sup>108</sup> Hodges, Hart, "Falling Prices: Cost of Complying with Environmental Regulations Almost Always Less Than Advertised," Briefing Paper, Economic Policy Institute, #199711, 1997., p. 10.

<sup>109</sup> Ruttenberg, Compliance with the OSHA Cotton Dust Rule..., pp. 93-98.

<sup>110</sup> Eugene Seskin, "Automobile Air Pollution Policy," in Paul Portney, Ed., Current Issues in U.S. Environmental Policy, Resources for the Future, Washington, DC, 1978.

<sup>111</sup> EPA and CPSC, as well as OSHA, regulate asbestos.

because of overly static assumptions.<sup>112</sup> New glovebag regulations allow safer, cheaper asbestos removal. Glovebags offer the same or even better protections for workers and the environment. According to one mechanical maintenance supervisor at a Michigan facility: “Using glovebags, we can perform many jobs at about one-fourth the cost and with half the manpower than would be required to construct negative pressure enclosures.”<sup>113</sup>

One of the classic examples of technology-forcing is the OSHA standard for vinyl chloride. Exposure to vinyl chloride during its production greatly increases the chances of a worker developing angiosarcoma, a cancer of the liver. When OSHA began rule making, vinyl chloride producers claimed that the entire multibillion dollar industry was going to collapse and the producing firms would be forced to close down their operations.<sup>114</sup> What happened? Within 18 months of promulgating the OSHA standard, new and more productive facilities were on line, with at least six technological changes to make operations more efficient.<sup>115</sup>

- Simple housekeeping procedures, such as tightening pipe flanges and permanently welding pipes together, reduced leaks and led to increased output.
- A newly developed, large polyvinyl chloride (PVC) reactor vessel increased reactor efficiency while reducing worker exposure.
- New automated reactor cleaning systems streamlined the production process by preventing the accumulation of residue on reactor walls.
- New processes that reduced the toxicity of PVC resin used in stripping unreacted vinyl chloride from freshly polymerized PVC enabled producers to reprocess the vinyl chloride collected.
- A new PVC production technology that combined two commonly separated procedures, in order to eliminate worker exposure, led to increased efficiency.
- New and highly computerized PVC manufacturing processes produced a resin of superior quality along with production cost savings and reduced worker exposure.

An industry-financed economic impact study, by Arthur D. Little, Inc., had estimated that the cost of the standard would be \$65 billion to \$90 billion.<sup>116</sup> The study assumed that all production of vinyl chloride could cease and all PVC production facilities would close

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<sup>112</sup> Goodstein and Hodges.

<sup>113</sup> Kurt Ross, “New Glovebag Regulations Allow Safer, Cheaper Asbestos Removal,” Occupational Health and Safety, September 1966, p. 52.

<sup>114</sup> Arthur D. Little, Inc., Polyvinyl Chloride, The U.S. Industry: An Impact Analysis, Arthur D. Little, Inc., Boston, August 1974.

<sup>115</sup> Dirks-Mason and Ruttenberg, “Executive Summary,” based on numerous industry sources including Chemical Marketing Reporter, Chemical Week, and Chemical and Engineering News.

<sup>116</sup> Information in this paragraph excerpted from Ph.D. Dissertation of Ruth Ruttenberg, “The Incorporation of Prospective Technological Changes into Regulatory Analysis Which is Used in the Planning of Occupational Safety and Health Regulations,” University of Pennsylvania, 1981, pp. 32-34.

if the standard were promulgated. Regulatory analysis for OSHA, by Foster D. Snell, Inc., also concluded that the technology did not exist to meet the standard, cautioned that adoption of the standard might threaten the industry with as much as a 100 percent shutdown. Despite potential shutdown, Snell estimated a compliance cost, based on best-possible efforts by industry, of \$1.95 billion. OSHA's Vinyl Chloride Standard went into effect in April 1975, two marginal plants shut down, but several more opened or expanded their capacity. Estimates vary on the actual costs to industry of the standard. The Society of the Plastics Industry calculated that the industry invested \$200 million in capital and an additional \$100 million in research and development to meet the standard. A 1978 study by Northrup and others at the Industrial Research Unit of the Wharton School at the University of Pennsylvania estimated the combined capital costs of the OSHA standard to all vinyl chloride monomer and polyvinyl chloride producers to be \$128 million, with an effective capital cost of compliance between \$158 million to \$182 million (to make up for any lost productivity or capital replacement). The Congressional Research Service of the Library of Congress found the cost to users was \$300 million and the cost to producers only \$25 million to \$35 million. None of the retrospective studies, whether by industry, academia, or government, showed costs anywhere close to those projected prior to the promulgation of the standard. By September 1976, only 1½ years after the standard went into effect, manufacturers of vinyl chloride monomer and polyvinyl chloride proclaimed that they had solved the "OSHA problem"<sup>117</sup> – quite a contrast to the 1974 claims of an "industry shut down."

Some government agencies have acknowledged that cost-savings come from innovation once a standard is promulgated. The Department of Energy's Lawrence Livermore National Laboratory (LLNL), for example, has a stated vision of using recent innovations in remediation technology to reduce the cost of clean-up for subsurface contamination across the Department of Energy weapons complex.<sup>118</sup> Livermore has demonstrated such techniques as dynamic underground stripping. LLNL can control and pull back a distal plume of contaminants by pump-and-treat techniques. A study of an LLNL innovation of passive remediation for underground fuel tanks could save California taxpayers alone \$3 billion in the cleanup of underground storage tanks.<sup>119</sup>

The Consumer Product Safety Commission in 1977 estimated that the cost of a proposed standard for flammable upholstered furniture would be \$311 million to \$656 million per year. Only a year later, CPSC re-estimated the cost of a proposed standard and it fell more than five-fold to \$57 million to \$87 million. While part of the reduction in the compliance cost estimate was from reduced testing requirements, a CPSC press release explained that the other reason for the reduction was "technological innovations in the fabric and furniture industries which have provided less expensive ways to comply with

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<sup>117</sup> "PVC Rolls Out of Jeopardy, Into Jubilation," Chemical Week, September 15, 1976, p. 34.

<sup>118</sup> U.S. Department of Energy, Lawrence Livermore National Laboratory, "Environmental Risk Reduction," <http://www.llnl.gov/str/FFEnviro.html>, downloaded September 6, 2001.

<sup>119</sup> Ibid.

the standard.”<sup>120</sup> In less than one year, and with only the pressure of a proposed standard, technological innovations and cost saving emerged.

As head of the EPA, Carol Browner took the chronic problem of overestimation seriously when issuing new regulations to reduce permissible levels of smog and fine soot particulate pollution:<sup>121</sup>

“One staff member on the Council of Economic Advisors maintained that the regulations would cost a whopping \$60 billion, a figure quickly seized upon by industry opposition. The EPA’s own cost estimate was much more modest, between \$6 billion and \$8 billion. In making her case for the new regulations, however, Browner publicly disavowed even her own agency’s cost estimates. She argued that industry would find a way to do it cheaper.”

#### C.5. Not considering benefits to pollution control and hazard abatement industries

The impact of regulation is not limited to regulated companies. Many U.S. businesses license and sell hazard abatement technology and equipment. Pollution control and hazard abatement are among the fastest growing markets in the United States. From safety boots to air scrubbers, from improved monitoring equipment to built-in engineering controls, the genius of U.S. engineering and entrepreneurship is generating hundreds of millions of dollars in new sales and hundreds of new, mostly small, businesses. A study for the National Commission for Employment Policy concluded that in 1994 alone federal environmental policies contributed between \$3.5 billion and \$3.7 billion to the Gross Domestic Product.<sup>122</sup> Described briefly below are just a few examples of the many market niches created by regulations that protect the safety and health of community residents, consumers, and workers.

Oil spill response and prevention regulations created a growth industry in pollution control. Industry spent hundreds of millions of dollars after the wreck of the Exxon Valdez, for response vessels and pollution control equipment. In 1991, following passage of the Oil Pollution Control Act of 1990, the Marine Spill Response Corporation (MSRC) announced contracts for construction of sixteen 210 foot offshore response vessels, with firms in Mississippi and Alabama.<sup>123</sup> Sea Corps purchased 13 vessels. All vessels were to be U.S.-made, with approximately 90 percent U.S. content. MSRC also acquired sea recovery systems, containment systems, skimming systems, and booms.

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<sup>120</sup> U.S. Consumer Product Safety Commission, “CPSC Staff Recommends Safety Standard for Flammable Upholstered Furniture,” Release #78-092, November 20, 1978.

<sup>121</sup> Goodstein and Hodges.

<sup>122</sup> National Commission for Employment Policy, “Environment and Jobs: The Employment Impact of Federal Environmental Investments,” 1995, p. iii.

<sup>123</sup> Straube and Ruttenberg, p. 14.

The pollution control and hazard abatement industries provide significant benefits to the U.S. economy – even sometimes to the very companies that must themselves pay for pollution control and hazard abatement. Regulations create markets and profit potential for many businesses. Often left undiscussed in studies are the multibillion-dollar markets opened to corporations as the direct result of regulation. Sometimes when a new health and safety regulation goes into effect, it gives a firm a new competitive advantage. Without any effort on its part, a firm may find itself with a new “windfall” market. Consider the market results of auto emission and fuel economy standards. In both cases, the auto industry initially fought the regulation. In the case of emission control, the new market for catalytic converters was a boon to such companies as American Cyanamid, Englehard Minerals and Chemical Corporation, and DuPont. TRW, Inc., also a big pollution control supplier, makes hundreds of different products for reducing auto pollution and conserving energy.<sup>124</sup>

Many of the participants in these markets are the very firms that publicize the financial burdens they incur because of regulation. Many existing firms expand, or even create, special subsidiaries to handle the growing market for hazard abatement and pollution control equipment. As early as the 1970s, profits on these product lines typically exceeded profit margins on other product lines.<sup>125</sup>

The pollution control and hazard abatement industries are growth areas throughout the U.S. economy, and much of the growth is in small and emerging businesses. The contribution of regulation to this growth in sales, revenue, jobs, and economic base should not be excluded from any cost estimating matrix. Many businesses, both large and small would suffer great financial hardship if environmental, occupational, or consumer regulatory requirements were curtailed.

An EPA study on the economic impact of the Superfund program<sup>126</sup> concluded that from 1981 to 1992:

- Nationally, \$23.5 billion in output of goods and services were generated as a result of the \$7.6 billion spent by the Superfund program over the period FY81 through FY92.
- Approximately 242,000 jobs were associated with the output of those goods and services.
- Every \$1 million in Superfund expenditures created thirty-two jobs.

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<sup>124</sup> Ruttenberg, Working Papers, p. 46.

<sup>125</sup> Arthur D. Little, Inc., Economic Impact Study of the Pollution Abatement Equipment Industry, Prepared for Environmental Protection Agency, Distributed By National Technical Information Service, U.S. Department of Commerce, PB-225 841, October 1972. p. 5.

<sup>126</sup> U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Office of Program Management, Policy and Contracts Assessment Staff, Economic Impact of the Superfund Program: Fiscal Years 1981-1992, Draft, July 1994, p. i.

Air filters to reduce indoor air pollution are so important to 3M that these air filters received an entire page in its 2000 Annual Report. The message relies on EPA to help market its product:<sup>127</sup>

“Homeowners, breathe easy. 3M’s family of high-efficiency furnace filters tackle indoor air pollution with a vengeance. ... Filtrete™ Ultra Allergen Reduction Filters can help improve indoor air quality. That’s good news, since the U.S. Environmental Protection Agency has identified indoor air pollution as one of the top environmental risks to public health ... The only furnace filter to meet the guidelines of the American Lung Association’s Health House Project, the Filtrete filter is as popular as it is efficient.”

C.5.a. Companies, for decades, have acknowledged market niches, due to regulation. There are also many examples of firms profiting when a safety and health regulation automatically gives their existing products a competitive advantage. Union Carbide, as far back as 1978, wrote in its annual report:<sup>128</sup> “The increasing application of mandatory government standards has significantly increased air pollution control markets during the last several years. We have plans to enter the air pollution control area ...” Union Carbide was the leader in supply of systems that use oxygen aeration gas for the biological oxidation of wastewater. The company reported that most municipalities used its UNOX wastewater treatment system, and that the federal government had helped ensure it a steady market by budgeting \$24 billion for wastewater treatment systems over the following four years. American Cyanamid, that same year, told its stockholders a similar success story: growth in its sales of organic flocculants was due in large measure to pollution control regulations.<sup>129</sup> Stauffer Chemical similarly wrote in its Annual Report that “the longer-term prospect holds many opportunities for socially responsive and profitable development.” Stauffer not only produced hazardous chemicals, but also specialty chemicals for water treatment.<sup>130</sup> Kennecott, best known as a copper producer, wrote in its 1978 annual report:<sup>131</sup>

“New laws coming into effect, a refocusing of federal priorities to emphasize 114 special toxic and possibly carcinogenic chemicals, and a consent decree entered into by the EPA with several environmental groups are increasing the need for the advanced monitoring services Kennecott provides.”

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<sup>127</sup> 3M, Annual Report, 2000, p. 10.

<sup>128</sup> Union Carbide, Annual Report, 1978.

<sup>129</sup> American Cyanamid, Annual Report, 1978.

<sup>130</sup> Stauffer, Annual Report, 1978.

<sup>131</sup> Kennecott, Annual Report, 1978.

NHTSA consistently asked designers of traffic safety equipment for the cost of devices, such as sensing systems for air bag computer logic,<sup>132</sup> but consistently failed to consider the benefits to the designers, producers, and other manufacturers and vendors of safety equipment, whose existence was largely due to regulation.

C.5.b. Market niches, due to regulation continue to be economically important. DuPont, clearly a company with a regulatory compliance challenge, also produces products to help others with regulatory compliance. During 2000, DuPont teamed with the U.S. Centers for Disease Control and Prevention (CDC) to evaluate the role of its RiboPrinter microbial characterization system to enhance the CDC's state-of-the-art food borne bacterial surveillance network. A large and productive part of DuPont is the DuPont Protective Apparel Marketing Company, offering Tyvekbrand protective material, Tychem® chemical protective fabrics, Kevlar brand fiber, Nomex fiber and Sontara spunlaced fabric.<sup>133</sup> DuPont, in its 2000 annual report boasts of its dedicated sales force of two dozen regional managers who spread the word about protecting industrial and emergency workers.

Geoprobe Systems, in Pollution Equipment News, boasts of “designing a better way” with a National Ground Water Association Excellence in Equipment Design Award for 2000 of its Geoprobe Model 66DT that “gets you into confined spaces to open new possibilities.”<sup>134</sup>

Protecting the hearing of rail workers and families living along railroad rights of way, comes from innovations by Kelsan Friction Innovators and Portec Rail Products, Inc. In a 2001 advertisement in Railway Age, it boasted:<sup>135</sup>

“Noise abatement that’s immediate, proven! Finally, a solution that goes to the heart of the problem regarding ear-piercing wheel squeal ... the wheel/rail interface! Kelsan’s patented Keltrack Trackside top-of-rail friction modifier and Portec Rail’s Protector IV trackside application system is quieting the noisiest curves in some of the most demanding applications across North America, Europe, Australia, and Japan.

The Air Bag Center clearly owes its existence to car safety rules mandating air bags. Its mission? To locate a replacement airbag for a vehicle.<sup>136</sup>

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<sup>132</sup> U.S. Department of Transportation, NHTSA, “... Advanced Air Bags,” May 2000, Chapter 7, p. 1.

<sup>133</sup> DuPont, Annual Report, 2000, pp. 4, 8.

<sup>134</sup> Geoprobe Systems, “Designing a Better Way,” advertisement, Pollution Equipment News, August 2001.

<sup>135</sup> Kelsan Friction Innovators and Portec Rail Products, Inc., “Got an Earful of Noise,” Noise Abatement That’s ... Immediate, Proven!” Advertisement, Railway Age, August 2001.

<sup>136</sup> The Air Bag Center, <http://www.airbagcenter.com/>, downloaded September 3, 2001.

Trade associations exist to support pollution control and hazard abatement activities. The Institute of Clean Air Companies is a nonprofit national association of companies that supply air pollution monitoring and control systems, equipment and services for stationary sources. There is an Association of Local Air Pollution Control Officials, Institute of Clean Air Companies, and a Manufacturers of Emission Controls Association. There is a National Onsite Wastewater Recycling Association, an American Traffic Safety Services Association, and an Automotive Recyclers Association. There are companies that produce equipment; there are engineers, consultants, and lawyers. There are those that specialize in air pollution control, industrial wastewater treatment, clean water, personal protective equipment, dusts, fumes, mists, and a myriad of other pollutants and hazards.

The profits to companies from the licensing and sale of pollution control equipment as well as the hundreds of thousands of new jobs being created within the economy should be an integral part of any balanced RIA.

#### C.6. Not considering safer substitutes, recycling, and pollution prevention

There are significant cost savings in the regulatory process when pollution or hazards are prevented altogether or when safer substitutes emerge. A study for the Business Roundtable on the construction industry, based on research conducted at Stanford University, analyzed the costs of prevention programs and found the ratio of savings in accident costs to the cost of administering safety and health programs was 3.2 to 1.<sup>137</sup> A wealth of empirical evidence indicates that regulation is itself a major stimulus for new markets, new jobs, and a wide range of innovation activities. Prevention is rarely considered in regulatory analyses, and it can save companies money as well as solve a regulatory challenge and improve safety and health. Pollution prevention is usually accomplished through purchasing and inventory control, improved housekeeping, production modifications, product substitution, waste segregation, and reuse.<sup>138</sup>

Substitutes. Many companies profit from developing substitute products to replace hazardous ones that have been regulated. Two professors, studying the cost savings associated with substituting safer chemicals, provide many examples. Cited below are just six:<sup>139</sup>

- A Brush-Wellman metal fabrication plant in Ohio used an older manufacturing process with the highly toxic chemical perchloroethylene (PCE) to clean metal alloys. With a grant from the U.S. Department of Energy and EPA, the company

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<sup>137</sup> Stanford University, "Improving Construction Safety Performance," Report A-3, for The Business Roundtable, January 1982 in National Hazmat Program, [Assessing the Full Costs...](#)

<sup>138</sup> Environmental Compliance Assistance Center, "General Pollution Prevention Information," <http://www.hazmat.frcc.ccoes.edu/pollprev.htm>, September 7, 2001.

<sup>139</sup> Porter and van der Linde, pp. 101-103.



was able to install a new cleaning process that eliminated PCE and also saves the plant an estimated \$282,000 annually in reduced operating costs.

- Raytheon found itself required by the Montreal Protocol and the Clean Air Act to eliminate the CFCs it used to clean printed electronic circuit boards after soldering. Scientists at Raytheon initially thought that complete elimination of CFCs would be impossible. Instead a new semiaqueous, terpene-based cleaning agent that could be reused was substituted. The result? An increase in average product quality and lower operating costs.
- Because Ciba-Geigy's dyestuff plant in New Jersey needed to meet new environmental standards, the firm was forced to reexamine its waste stream. By replacing iron with a different chemical conversion agent that did not result in the formation of solid iron sludge and by eliminating the release of potentially toxic products into the wastewater stream, Ciba-Geigy boosted its yield by 40 percent and eliminated wastes for an annual cost savings of \$740,000.
- 3M discovered in producing adhesives in batches that were transferred to storage tanks, one bad batch could spoil the entire contents of a tank and cause high expenditures on hazardous waste disposal. 3M developed a technique to run quality tests more rapidly on new batches, and the company reduced hazardous wastes by ten tons a year at almost no cost, yielding an annual savings of more than \$200,000.
- 3M faced new regulations that forced many solvent users in paper, plastic, and metal coatings to reduce its solvent emissions 90 percent by 1995. The company responded by avoiding the use of solvents altogether and developing coating products with safer, water-based solutions. At another 3M plant, a change from a solvent-based to water-based carrier, used for coating tablets, eliminated 24 tons per year of air emissions. The \$60,000 investment saved \$180,000 in unneeded pollution control equipment and created annual savings of \$15,000 in solvent purchases.
- When federal and state regulations required Dow Chemical to close certain evaporation ponds used for storing and evaporating wastewater resulting from scrubbing hydrochloric gas with caustic soda, Dow redesigned its production process. By first scrubbing the hydrochloric acid with water and then with caustic soda, Dow was able to eliminate the need for evaporation ponds, reduce its use of caustic soda, and capture a portion of the waste stream for reuse as a raw material in other parts of the plant. This process change cost \$250,000 to implement, but it reduced caustic waste by 6000 tons a year and hydrochloric acid waste by 80 tons a year, for a savings to Dow of \$2.4 million per year.

Companies that mine low-sulfur and nonmetallurgical coal received "windfalls" from air pollution regulations. Fuel switching, from high sulfur to low sulfur coal, is the cheapest form of compliance with air pollution regulations. The Energy Information Administration at the U.S. Department of Energy examined compliance strategies and

costs in detail for six utilities with a total of 71 units (22.8 gigawatts of generating capacity). Most of the units were switched to lower sulfur coal to meet their SO<sub>2</sub> emissions limitations. Because fuel switching has been the compliance method used by most utilities, lower sulfur coal sales in the United States have increased substantially. In 1990, for example, low-to-medium sulfur coal accounted for 67 percent of total coal receipts at electric utilities. Five years later, it had risen to 77 percent.<sup>140</sup>

The Navy's environmental program in 1998 urged its naval installations to use two-part epoxy paints, explaining that it dramatically reduces waste paint and solvent and typically pays for itself in less than a year.<sup>141</sup>

Compliance with the OSHA Formaldehyde Standard cost approximately half of what OSHA had estimated, in part because industry adopted low-formaldehyde resins, avoiding the need for major new capital expenses for ventilation and enclosures.<sup>142</sup>

Recycling and Pollution Prevention. Recycling is an expanding area of pollution prevention and adds economic benefit to the pollution control and hazard abatement industry. The National Commission for Employment Policy, in a study of individual firms, identified net economic savings from pollution control through economic savings:<sup>143</sup>

- PPG Industries, a manufacturer of automobile coatings and paints at a Cleveland facility, needed large quantities of water to clean its manufacturing equipment and ensure product quality. Each year it produced 380,000 gallons of contaminated water and made 65 trips a year by truck to dispose of the water at the company's waste incinerator 350 miles away. By designing and installing a waste water filtration system, 95 percent of the water is reused, saving the company \$375,000 per year.
- FMC Corporation in Pasadena, Texas manufactures hydrogen peroxide. The process involves a methanol wash and soak. FMC generated more than 200,000 gallons of contaminated wash a year. Design and installation of a steam distillation methanol recovery process provided 90 percent recovery. In 1992, methanol recovery at the Texas plant was over 275,000 gallons, and annual energy savings were more than 182,000 gallons of oil equivalent. FMC saves \$512,000 per year.

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<sup>140</sup> U.S. Department of Energy, Energy Information Administration, The Effects of Title IV of the Clean Air Act Amendments of 1990 on Electric Utilities: An Update, Executive Summary, March 1997.

<sup>141</sup> U.S. Navy, Environmental Program, "Do you use two part epoxy paints?," February 1998.

<sup>142</sup> OTA, Gauging Control Technology..., p. 95.

<sup>143</sup> National Commission for Employment Policy, "The Employment Impact of Federal Environmental Investments," 1995, pp. 11-16.

- AAP St. Marys, a producer of aluminum wheels in Ohio, generates large quantities of metal chips as a by-product. Instead of transporting them to a distant recycler for cleaning, melting, and reheating into aluminum ingots, AAP installed its own recycling operation and saves \$1.9 million per year in transportation, energy costs, and production of solvents to clean the chips. (By remelting the chips on-site, AAP can use a new spinning system to separate the chips from the cutting oils, thus reducing the need for solvents to clean the chips.)

When Battelle Laboratories needed a way to control hazards from the defoliant 2, 4-D, it developed bacteria to ingest the compound. These bacteria then became a product for the company to convert into saleable items such as fertilizers.<sup>144</sup> Getty Oil built a unit at its Delmarva plant in Delaware to reduce the sulfur in fuels. The plant provides electricity and steam to a Getty refinery. The units were built to convert the sulfur dioxide pollutant into sulfuric acid, which could in turn be sold to industrial users.<sup>145</sup>

Automotive recycling is big business. Some of it helps meet environmental standards. In 1997, gross annual revenues totaled \$8.2 billion in the U.S. and Canada. Auto recyclers acquired 4.7 million vehicles and an estimated eleven million gallons of oil and six million tires. The Association is promoting steps to prevent storm water pollution by encouraging recyclers to check incoming vehicles for fluid leaks, keeping used oil separate from parts as well as capturing engine oil, windshield wiper fluid, and antifreeze for reuse. The automotive recycling business employs over 46,000 people in more than 6,000 businesses in the United States. In addition automotive recycling decreases insurance rates by purchasing inoperative vehicles from insurance companies.<sup>146</sup>

The North American Insulation Manufacturers Association advertises fiberglass and slag wool insulations to reduce air pollution and reduce energy wastes, and also to reduce demand on virgin resources. Today's fiberglass insulation contains upwards of 40 percent recycled glass.<sup>147</sup>

The benefits of recycling, or at least the lower costs of reclaiming and selling by-products, need a place in the cost estimating process.

#### C.7. Not properly accounting for depreciation, tax reductions, or the opportunity cost of capital

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<sup>144</sup> Chemical Manufacturers Association, "Protecting the Environment: What We're Doing About It," Washington, DC, 1980, p. 22.

<sup>145</sup> U.S. Environmental Protection Agency, Environment News, Boston, September 1980, p. 12.

<sup>146</sup> Automotive Recyclers Association, "General Automotive Recycling Statistics," [http://www.autorecyc.org/docs/agbout/recycle\\_statistics.htm](http://www.autorecyc.org/docs/agbout/recycle_statistics.htm) and "Stormwater Best Management Practices," <http://www.autorecyc.org/docs/govt/stormwater.htm>, downloaded August 11, 2001.

<sup>147</sup> North American Insulation Manufacturers Association (NAIMA), "Fiber Glass & Slag Wool Insulations - Materials for a Sustainable Planet," Insulation Facts #45, <http://www.naima.org/docs/N012.HTML>, downloaded August 11, 2001.

When new equipment is purchased, the partial or total depreciation of the equipment it is replacing needs to be accounted for. Much of the reported costs of regulation is for capital. Eventually, new capital would be purchased anyway. With regulation, the equipment may be redesigned to include pollution control and hazard abatement, and may even increase productivity. Regulation is likely to spur the investment process. Many of these investments would have happened sooner or later anyway. So, a primary effect of regulation may be to speed up the investment process. When this happens, much of measured compliance cost is really just early capital investments.<sup>148</sup> But, if the entire investment cost is counted as a cost of regulation, the cost figures are significantly inflated. In the case of cotton dust, the U.S. textile industry was languishing in the arena of international competition. The OSHA Cotton Dust Standard was one of the factors that pushed textile companies to trade in their old equipment with low productivity for new equipment that produced textiles much more efficiently, and also without high levels of cotton dust.<sup>149</sup> This “early” investment actually helped the industry.

While not for a specific rule-making, the drug industry in 1991 and again in 2001 significantly overstated its research and development costs by not including tax reductions or the opportunity cost of capital in its calculations. In 1991, the Tufts Center for the Study of Drug Development estimated the average cost of developing a new prescription drug was \$231 million. A new study, released in November 2001 by the Tufts Center, which receives 65 percent of its funding from drug companies, claimed that the average cost of developing a new prescription drug in ten years climbed to \$802 million.<sup>150</sup>

The Tufts Center study has two dramatic flaws, according to an analysis by Public Citizen (which, in part was based on a U.S. Office of Technology Assessment analysis). First, it is not representative of real drug industry R&D because none of the 68 drugs used in the Tufts study received any government support, even though many, if not most, drugs brought to market receive financial support from the government at some stage in their discovery and development. Therefore, the Tufts study focuses on a skewed sample of drugs and inflates the actual cost of R&D for the average drug. A National Institutes of Health (NIH) internal document, dated February 2000 and obtained by Public Citizen, showed that all of the top five selling drugs in 1995 received significant taxpayer backing in the discovery and development phases.

The second major flaw of the Tufts Center study is that it exaggerates the actual R&D expenditures for its sample of drugs. Specifically, the new Tufts Center estimate of \$802 million includes significant expenses that are tax deductible and theoretical costs that drug companies do not actually incur. For example, roughly half of the Tufts Center estimate (\$399 million) is the “opportunity cost of capital” – a theoretical calculation of

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<sup>148</sup> Goodstein and Hodges.

<sup>149</sup> Ruttenger, ...Cotton Dust...

<sup>150</sup> Public Citizen, “Tufts Drug Study Sample is Skewed; True Figure of R&D Costs Likely is 75 Percent Lower,” Press Release, December 4, 2001.

what R&D expenditures might be worth if they were invested elsewhere. Tufts calculated actual out-of-pocket R&D costs for drugs in the study at \$403 million per new drug, but those out-of-pocket expenditures are pre-tax costs. Drug companies can and do deduct 34 percent of their R&D expenses under federal tax law. Therefore, according to Public Citizen, the actual after-tax cash outlay for each drug in the new Tufts study is about \$240 million. But according to Public Citizen, the average R&D cost for each new drug brought to market is significantly less than \$240 million because that figure applies only to the drugs used in the Tufts study, and the drug industry's own data show how Tufts sample of drugs is skewed toward the most expensive new products.

#### C.8. Not considering the timing of compliance

Compliance costs decline as a company has a longer period of time to comply as existing capital is depreciated. Lower costs may come from a more natural replacement and upgrading of older equipment. Agencies often adopt delayed compliance dates. Firms often receive permission from regulatory agencies for even longer postponement. Lower costs may come from giving plant operators more time to identify and select the best technology at the lowest price, or from avoiding the higher labor costs associated with an accelerated construction schedule. Large companies and entire industries readjust slowly. Embedded but outdated technologies, existing facilities, old ways of doing things, and competitive markets are just some examples of inertia that must be overcome.<sup>151</sup>

On the other hand, industry may alter products and processes during a pre-regulatory period when facing the possibility of regulation. This pre-regulatory period allows time for an industry to change or adapt and develop compliance technologies. Analyses of the impact of regulation on technological innovation and cost seldom consider this complex pre-regulatory baseline.<sup>152</sup>

With the help of flexible timing, the overall reduction in sulfur dioxide levels was at a cost significantly lower than originally estimated.<sup>153</sup> As described by authors from Resources for the Future, the costs of sulfur dioxide reductions under Title IV attracted considerable attention because of an innovative allowance trading program. Costs declined from original estimates in large part because the program gave utilities the flexibility to exploit advantageous trends in coal markets and the cost of rail transport that have led to a drop in the cost of switching to lower sulfur coal. Originally, in the 1980s, estimated costs were as high as \$1,500 per ton. At the time of enactment, EPA estimated the costs to be \$620 per ton. While the costing methods are not totally parallel, RFF

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<sup>151</sup> Bruce Smart, ed., Beyond Compliance: A New Industry View of the Environment, World Resources Institute, April 1992, p. 6.

<sup>152</sup> Kathleen Rest and Nicholas Ashford, "Regulation and Technological Options: The Case of Occupational Exposure to Formaldehyde," Harvard Journal of Law and Technology, Volume 1, Spring Issue, 1988, p. 71.

<sup>153</sup> D. Burtraw, A. Krupnick, E. Mansur, D. Austin, and D. Farrell, The Costs and Benefits of Reducing Acid Rain, Discussion Paper 97-31-REV, Resources for the Future, Washington, DC, September 1997, p. 22.

reports cost estimates for activities between 1993 and 1995 only ranged from \$205 per ton to \$373 per ton.

A GAO study of controlling emissions from the Navajo Generating Station, in order to curb impaired visibility in the Grand Canyon National Park, concluded that delaying the initial installation of the emission control equipment by almost three years, from January 1995 to November 1997, allowed the project to be completed in a more cost-effective manner.<sup>154</sup> EPA initially proposed limiting sulfur dioxide emissions at the Navajo Generating Station by 70 percent (a reduction of about 50,000 tons of sulfur annually) at an annual cost of \$92 million to \$128 million. The negotiated agreement is expected to reduce emissions by 90 percent (64,000 tons) at an estimated cost of \$90 million.

Sometimes the condition of the economy provides an opportunity for more cost-efficient compliance. The Petroleum Technology Transfer Center (PTTC) issued a press release in 2001 suggesting that because of higher gas prices, it would be economically advantageous to invest in reductions of methane emissions.<sup>155</sup> The argument goes like this: With annual industry-wide emissions estimated at 312 Bcf and well-head prices averaging \$4.00/Mcf and higher, approximately \$1.2 billion of natural gas is lost to the atmosphere each year. “Now,” says PTTC, “is a good time to take a second look at gas leaks and losses that were not economic to address at lower prices.” A simple action such as replacing high-bleed pneumatic devices with low-bleed devices, at a cost of \$150 to \$250, can reduce lost volume from 50 to 200 Mcf per year, which, at \$4 per Mcf, will payout in 1.5 to 2.3 months. Installing static seals and maintaining pressure in off-line compressors, while costing over \$22,000, at \$4 per Mcf. will pay out in less than two months.

Sometimes, the timing for health and safety is right, even in the absence of regulation. Automobile air bag regulations have been so successful with consumers and manufacturers alike that new cars are being equipped with side airbags with head protection in the absence of any government requirement to do so.<sup>156</sup>

If the cost stream of compliance is compared to an inaccurate benefit stream, then costs will be portrayed as too high relative to benefits. Analysis, for the 1996 Department of Agriculture regulation for Hazard Analysis and Critical Control Points (HACCP) pathogen reduction for livestock and poultry slaughter and processing establishments, for some reason, assumed that benefits would only begin to accrue in year 5 of the program, even though each year 6 million to 33 million people get sick and 9,000 die from food-

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<sup>154</sup> U.S. General Accounting Office, Report to the Chairman, Subcommittee on Water and Power Resources, Committee on Resources, House of Representatives, Air Pollution – Estimated Benefits and Costs of the Navajo Generating Station’s Emissions Limit, GAO/RCED-98-28, January 1998, p. 2.

<sup>155</sup> Petroleum Technology Transfer Council, “Higher Gas Prices Mean Greater Cost Savings from Reducing Methane Emissions,” PTTC Network News, 1<sup>st</sup> Quarter 2001.

<sup>156</sup> Insurance Institute for Highway Safety, “Impressive Crash Test Performance for Vehicles With Side Airbags That Protect Occupants’ Heads,” News Release, December 14, 2000.

borne disease.<sup>157</sup> Each inspection improvement can immediately remove diseased livestock and poultry from entering the food supply. Even though the full benefits of the regulation might not occur for five years, to say that no benefits will occur in the first five years is simply inaccurate. In addition, the benefit stream in the analysis abruptly ends after 20 years.

Use of a discount rate is controversial – for the implicit value judgment about the importance of preventing diseases with long latency periods and for the degree of emphasis highlighted in a specific number. In analysis of the HACCP regulation, the Department of Agriculture regulatory analysis published in 1995 used a 7 percent discount rate, as was then recommended by the Office of Management and Budget. Economists at the Centers for Disease Control and Prevention recommended using a 3 percent rate,<sup>158</sup> with a significant change in the benefit-cost ratio.

C.9. Ignoring the fact that sometimes it is in a company's competitive interest to have a mandatory standard

Leveling the playing field in a competitive market is a frequent benefit of regulation. This was clearly the case when, on behalf of major manufacturers and importers of cigarette lighters, the Lighter Association asked the Consumer Product Safety Commission to adopt a mandatory standard for child-resistant cigarette lighters.<sup>159</sup> The rule went into effect in July 1994, with expectation that it would prevent 80 to 105 fire deaths each year, with estimated annual net benefits of nearly \$400 million per year.

In a competitive market, in the short-run, company officials may believe that trying something new, if it is not successful, could put their company at a disadvantage in the marketplace. But, if all companies in the industry are required to comply with a regulation, then the playing field is level and innovation is more likely.

C.10. Not estimating productivity increases associated with compliance

As discussed throughout this paper, on many occasions, as scientists and engineers concentrate on finding cost-efficient ways of complying with regulation, they also find ways to improve the overall productivity of an industrial process, or even an entire industry. According to one Harvard Business School professor: "Strict environmental regulations do not inevitably hinder competitive advantage against foreign rivals; indeed, they often enhance it ... the nations with the most rigorous requirements often lead in exports of affected products."<sup>160</sup>

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<sup>157</sup> Stephen Crutchfield, Jean Buzby, Tanya Roberts, and Michael Ollinger, "Assessing the Costs and Benefits of Pathogen Reduction," Food Review, Volume 22, Issue 2, May-August 1999, pp. 6-7.

<sup>158</sup> Ibid., p. 8.

<sup>159</sup> U.S. Consumer Product Safety Commission, "CPSC and Industry: Saving Lives Cost-Effectively Through Cooperation, Child-Resistant Cigarette Lighters," <http://www.cpsc.gov/CPSCPUB/PUBS/Succes/lighters.html>, downloaded August 11, 2001.

<sup>160</sup> Porter, p. 168.

In the 1970s, there was clear evidence not only of cost overestimation, but also of productivity improvements that came simultaneously with compliance to many regulations. The classic case is compliance with OSHA's Vinyl Chloride Standard. Within eighteen months of the promulgation of the OSHA regulation, over 90 percent of producing firms were in compliance with at least six developments that increased industry productivity.<sup>161</sup> (See section on regulation-induced technology.)

A retrospective study of the OSHA Cotton Dust Standard found a healthier industry in the post-regulatory period. Spurred by competition and the OSHA Cotton Dust Standard, there have been extensive technological improvements and increased productivity within the textile industry. Productivity, which had been growing at a rate of 2.5 percent per year in the 1972 to 1979 period before the standard, increased to a growth rate of 3.5 percent per year from 1979 to 1991 after the standard was issued.<sup>162</sup> In addition, compliance with the Cotton Dust Standard led to energy savings, improvements in product quality, increases in recycling, capture of resalable byproducts, reduction in needed floor space, reduction in noise and vibration, and reduction in turnover costs.<sup>163</sup>

Early estimates of costs to the textile industry of cotton dust control ranged from \$500 million to \$1 billion.<sup>164</sup> Over time, the estimated cost of compliance declined. Below are the results of three separate studies, all corroborating overestimation of cost:

Study #1: A scholar who usually authors anti-regulatory materials, studied the Cotton Dust Standard and declared that "the evidence indicates that the standard has had the expected beneficial effect on worker health, and at a cost much lower than originally anticipated."<sup>165</sup> He found that of \$428 million expected expenditures on new production equipment after promulgation of the OSHA standard in 1978, \$353 million of that amount was spent on increasing productivity rather than meeting the standard. Thus, cost estimates for new production equipment were six times higher than they turned out to be (\$428 million vs. \$75 million), leading to a readjusted total cost estimate on compliance with the Cotton Dust Standard of \$246 million.

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<sup>161</sup> Dirks-Mason and Ruttenberg, p. 6, based on U.S. Department of Labor, Occupational Safety and Health Administration, sample data reported during 1976 and 1977.

<sup>162</sup> U.S. Department of Labor, Occupational Safety and Health Administration, Regulatory Review of OSHA's Cotton Dust Standard, September 2000.

<sup>163</sup> Ruth Ruttenberg, ...Cotton Dust..., pp. 93-98.

<sup>164</sup> Morton Corn, "Cotton Dust: A Regulator's View," Studies in the Regulation of Economic Activity: The Scientific Basis of Health and Safety Regulation, The Brookings Institution, 1981, p. 113.

<sup>165</sup> W. Kip Viscusi, "Cotton Dust Regulation: An OSHA Success Story?" Journal of Policy Analysis and Management, Vol. 4, No. 3, 1985, pp. 325, 331.



Study #2: A retrospective analysis supported by OSHA, on the performance of the Cotton Dust Standard from 1978 to 1982,<sup>166</sup> estimated that to achieve full compliance, capital costs beyond 1977 would be \$269 million (in 1982 dollars) compared to an earlier OSHA funded study estimate of \$1.4 billion in (1982 dollars).<sup>167</sup>

Study # 3: In 1976, OSHA estimated compliance costs at \$700 million a year. After redrafting the proposed standard in 1978, OSHA readjusted its estimated to \$205 million. In 1982, a new study concluded that the compliance costs were \$83 million a year.<sup>168</sup>

Authors of a paper presenting empirical evidence, using financial market analysis of the OSHA Cotton Dust Standard, discovered that there were firms within the textile industry whose value increased simultaneously with regulation and the firms with the highest percentage of cotton use experienced the largest returns.<sup>169</sup> Calculating compliance costs may be difficult. Textile companies had spent \$7.4 billion on new plants and equipment since the standard began, according to a March 1984 article in Dun's Business. Was this the cost of compliance with the standard? No. Simultaneously, from 1970 through 1983, worker productivity nearly doubled and some new machines were turning out cotton at seven times the rate of their predecessors.<sup>170</sup> Most of the investment was for modernization.

OSHA's final Regulatory Impact Analysis for Mechanical Power Presses and Presence Sensing Device Initiation (PSDI) estimated the total cost of adopting PSDI for both existing and new power presses at \$49 million to \$77 million (in 1984 dollars for equipment modifications/enhancements and compliance with the other provisions of the standard, including the various certifications and validations). Cost savings from productivity improvements were estimated at about \$182 million annually – resulting in anticipated cost savings substantially exceeding the expected costs.<sup>171</sup>

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<sup>166</sup> Centaur Associates Inc., “Technical and Economic Analysis of Regulating Occupational Exposure to Cotton Dust,” Part I, Report prepared for OSHA, January 1983.

<sup>167</sup> Research Triangle Institute (RTI), Cotton Dust: Technological Feasibility Assessment and Final Inflationary Impact Statement, Part I, Report prepared for OSHA, 1976.

<sup>168</sup> Goodstein and Hodges.

<sup>169</sup> M. T. Maloney and R. E. McCormick, “A Positive Theory of Environmental Quality Regulation,” Journal of Law and Economics, Vol. XXV, April 1982, pp. 99-123.

<sup>170</sup> Jim Pinkham, “Cotton Dust Standard Endures 10 Years,” Occupational Health and Safety, May 1988, p. 24.

<sup>171</sup> OTA, Gauging Control Technology..., p. 98.

A GAO study of regulatory burden concluded that “most companies we interviewed agreed regulations have benefits.” Below are just three examples:<sup>172</sup>

- Officials from a paper company said that compliance with federal regulations had helped to improve their manufacturing process. Some of the dioxin regulations made their paper manufacturing process more effective and less costly, even though short-term costs could be high. Solid waste regulations led the company to use chemicals that were not as hazardous.
- Representatives of a hospital indicated that OSHA’s Blood-borne Pathogens Standard helped to reduce the number of needlestick injuries experienced in the hospital and that the Clinical Laboratory Improvement Amendment regulations encouraged laboratories to look more closely at the quality of their work.
- Officials from a glass company said federal regulations created business opportunities for their company. The company created its environmental products and pharmaceutical services businesses to assist others in meeting their regulatory requirements of air pollution control and product safety testing.

Among the productivity enhancing success stories from pollution prevention shared on the State of Wisconsin’s web page is a modification to painting and finishing operations by 3D Manufacturing, Inc. of Shawana, Wisconsin, a company with 150 employees. The payback period was only 22 months, with capital costs of \$39,000, and the company saving \$16,200 per month.<sup>173</sup>

The University of Minnesota reports on combining waste reduction and cost savings for wood finishers. Not only is the work environment improved, but volatile organic compounds (VOCs) and hazardous air pollutants (HAPs) are reduced, while also reducing the regulatory compliance burden and saving on materials and disposal costs. Foldcraft Company purchased two air-assisted airless guns and a high volume/low pressure (HVLP) gun and achieved a transfer efficiency increase of 29 percent. The new equipment saved the company \$9,500 per year and reduced varnish use by 33 percent. Viking switched to a HVLP spray gun for applying sealer coats and saved 1,300 gallons of sealer per year at a savings of \$10,350, and simultaneously prevented four tons of VOC emissions and two tons of HAPS.<sup>174</sup>

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<sup>172</sup> GAO, Regulatory Burden..., Chapter 3:4.2.

<sup>173</sup> Wisconsin Department of Natural Resources, Bureau of Cooperative Environmental Assistance, “Pollution Prevention Case Study, 3D Manufacturing, Inc.: Energy Conservation and Waste Reduction through Enhanced Process Management,” PUBL-CO-056, [http://www.dnr.state.wi.us/org/caer/cea/casestudy/casestudies/co\\_056.htm](http://www.dnr.state.wi.us/org/caer/cea/casestudy/casestudies/co_056.htm), downloaded September 7, 2001.

<sup>174</sup> University of Minnesota, Minnesota Technical Assistance Program, “Waste Reduction and Cost Saving Ideas for Wood Finishers,” <http://www.mnta.umn.edu/PAINT/Wood-7.htm>, downloaded September 7, 2001.

OSHA's Process Safety Management Standard requires companies with highly hazardous chemicals to design a system to prevent unwanted releases of hazardous chemicals, especially into locations which could expose employees and others to serious hazards. An effective process safety management program requires a systematic approach to evaluating the whole process – process design, technology, operational and maintenance activities and procedures, nonroutine activities and procedures, emergency preparedness plans and procedures, training programs, and other elements which impact the process. The standard targets highly hazardous chemicals that have the potential to cause catastrophic incident. According to OTA, the standard motivated productivity improvements, along with reduced worker turnover, reduced lost production, and reduced property damage, saving industry hundreds of millions of dollars.<sup>175</sup> Productivity improvements were a by-product of the standard's requirement to conduct process hazard analyses, often leading to streamlined equipment and technology, waste reduction, and standardization of operating procedures. Additional productivity enhancement came from more efficient utilization of space, labor, and equipment, reduced loss of raw materials, and increased product quality.<sup>176</sup>

The Chemical Manufacturers Association (CMA) described the commercial success that followed industry's compliance with workplace and environmental hazards as a phenomenon of "turning wastes into wealth."<sup>177</sup> A few specific examples of cost-saving experience follow:

Benzene. In the late 1970s, the chemical industry predicted that controlling benzene emissions would cost \$350,000 per plant. Shortly after these predictions were made, the plants developed a process that substituted other chemicals for benzene and virtually eliminated control costs.<sup>178</sup>

Chlorofluorocarbons (CFCs). In 1988, EPA estimated that reducing CFC production by 50 percent within 10 years would cost \$3.55 per kilogram. As the goal became much more ambitious; i.e., complete elimination of CFC production, with the deadline moved up to 1996, the estimated cost of compliance fell more than 30 percent, to \$2.45 per kilogram.<sup>179</sup> Before the ban of sprays using fluorocarbons, industry said that there was no feasible alternative available. But, even before the ban went into effect, the country had a new pump spray that did not use fluorocarbons and that was actually cheaper than aerosol cans.<sup>180</sup>

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<sup>175</sup> OTA, Gauging Control Technology..., pp. 30-31.

<sup>176</sup> Stone, Three Case Studies..., p. 22.

<sup>177</sup> Cited in Ruth Ruttenberg, "The Gold in Rules," Environmental Action, October 1981, p. 13.

<sup>178</sup> Goodstein and Hodges.

<sup>179</sup> *Ibid.*.

<sup>180</sup> Ruttenberg, Dissertation, p. 47.

In the late 1980s, when the international phase-out of ozone-destroying CFCs began, Nortel began looking for substitutes. The company, which used CFCs as a cleaning agent, invested \$1 million to purchase and employ new hardware. Once the redesigned system was in place, Nortel found it actually saved \$4 million in chemical waste-disposal costs and CFC purchases.<sup>181</sup>

Coal Dust. In the late 1970s concern about rail cars leaving trails of coal dust behind them as they traveled across the country, led Conoco to a new spray device to keep coal dust out of the environment. In the process Conoco saved an estimated eighty tons of coal per trainload.<sup>182</sup>

Grain Handling. The estimated cost of compliance for the 1987 OSHA Grain Handling Standard ranged from \$37.5 million to \$63.1 million for grain elevators and \$5.7 million for grain mills. Industry spokespersons complained that such a burden would put many small grain elevator operators out of business. A 1994, post-regulatory study for OTA<sup>183</sup> found no evidence that OSHA's Grain Handling Standard posed hardship to the industry. Employee wages and company profits were up and there was an increase in investment in renovation and new plants and equipment. There were no indications of elevator closings as a result of the standard. Grain handling facilities that had written to the Department of Labor fearing that a standard might put them out of business were still operating. A survey of union representatives found that the cost of the standard was rarely brought up by management in collective bargaining settings, a logical place to complain about such a burden. The OTA study also reported that a good preventive maintenance program could pay for itself in saved downtime and extended life of equipment, as well as reducing the chance of fire or explosion.<sup>184</sup> A former Cargill vice president, testifying at OSHA rulemaking hearings in 1984, asserted that every device installed by Cargill had to be justified financially, and all had saved money in the long-run. Cargill's emergency plan saved money; housekeeping saved money; and, he testified, would also help to prevent secondary explosions if a primary explosion occurred.<sup>185</sup>

Plastics. Researchers at Resources for the Future, in a study of what environmental protection really cost the plastics industry, concluded "the industry actually saved money

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<sup>181</sup> Goodstein and Hodges.

<sup>182</sup> Cited in Ruth Ruttenberg, "Regulation is the Mother of Invention," Working Papers, May-June 1981, p. 45.

<sup>183</sup> Ruth Ruttenberg, "Compliance With the OSHA Grain Handling Rule: Safety Measures Save Life and Dollars," for U.S. Office of Technology Assessment, Study of OSHA's Choice of Control Technology and Estimation of Economic Impacts, Contract K3-0841.0, June 1994.

<sup>184</sup> Neil Webster, "Bucket Elevators: How to Operate and Maintain Them Efficiently," Oklahoma Grain Elevator Workshop Manual, 1991, cited in Ruttenberg, "...Grain Handling..."

<sup>185</sup> Robert Hubbard, Ex-Vice President, Cargill, Statement at OSHA Rule Making Hearings, June 12, 1984.

as productivity was boosted.”<sup>186</sup> This was a far cry from the warnings of economic disaster that the industry made to try to avoid regulation.

Polychlorinated Biphenyls (PCBs). According to an MIT study of PCB applications, the substitution of alternatives, especially chlorinated rubbers, “resulted in a small technical deficit that was considerably offset by a large economic gain.”<sup>187</sup>

Powered Platforms for Building Maintenance (Alternate Systems for Horizontal Stabilization). OSHA’s cost estimate in its final RIA placed the total incremental costs of the amended standard at \$1.4 million annually (in 1987 dollars; including the various incremental expenses for both building owners and contractors). But, greater flexibility in stabilization system choice led to actual cost savings (entirely to building owners/developers) of about \$3.1 million a year. Thus adoption of the standard provided an overall cost savings of approximately \$1.7 million a year.<sup>188</sup>

#### **D. Offsetting Benefits**

When estimating the cost of a regulation, it is imperative to also estimate the benefits – both monetary and non-monetary. Offsetting benefits may be directly related to safety and health or related to other types of benefits. Not making estimates for offsetting benefits is not responsible. Ignoring them does not mean they do not exist. While not the subject of this paper, they are so important that they require mention in the overall structure of cost estimation.

##### **D.1. Offsetting safety and health benefits**

Much has been written about offsetting benefits to regulation – saving lives and health, saving health care costs and human suffering, to name a few. Quality data are often sparse for estimating benefits from regulation. Sometimes an agency will just admit that it cannot provide a value for offsetting benefits. One example is the economic assessment for NHTSA’s proposed FMVSS No. 202: Head Restraints for Passenger Vehicles. In its preliminary analysis, published in December 2000, on the summary page, NHTSA simply states: “The agency does not have data to support an estimate of the benefits of the backset requirements.”<sup>189</sup> In such a case, the estimated net costs will clearly be higher. The report goes on to say, “While the agency has some information on

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<sup>186</sup> Reported in Goodstein and Hodges.

<sup>187</sup> Center for Policy Alternatives, Massachusetts Institute of Technology, “Evaluating Chemical Regulations: Trade-Off Analysis and Impact Assessment for Environmental Decision-Making: A Case Study of Chlorinated Biphenyls,” CPA-76-3/b, April 30, 1976, p. A-5.

<sup>188</sup> OTA, Gauging Control Technology..., p. 98.

<sup>189</sup> U.S. Department of Transportation, National Highway Traffic Safety Administration, Office of Regulatory Analysis and Evaluation Plans and Policy, “Preliminary Economic Assessment and Regulatory Flexibility Analysis: FMVSS No. 202, Head Restraints for Passenger Vehicles,” December 2000, Summary page.

the distribution of head restraints in the rear seat, the information is not very complete” or “Data on non-towaway whiplash injuries are not available.”<sup>190</sup>

While such offsets for safety and health benefits are not studied in this paper, they clearly need to be considered in the overall review of regulatory agencies overestimating the compliance costs of their regulations. Work by Professor Lisa Heinzerling<sup>191</sup> demonstrates how much the overestimation is, because the benefits are so seriously underestimated. Professor Heinzerling’s analyses convincingly demonstrated that many regulatory interventions that appear to be wildly expensive when viewed from traditional perspective were not so costly because the number used in the denominator seriously underestimated the benefits of the regulations.<sup>192</sup>

#### D.2. Offsetting non-safety and health benefits should also be measured

Beyond better safety and health, there are other offsetting benefits, whose dollar values are not incorporated into regulatory impact analyses. There are many costs to pollution and hazards besides dangers to the public, consumers, and workers. A consultant for the Council on the Environment in New York City wrote that more than \$100 million in repainting alone is required in New York City every year because of air pollution. Cloth disintegrates sooner and dyes fade faster in sulfurous air. Curtains and clothing must be washed more frequently, adding considerable expense to hotels and other businesses. Air pollution damages paper, destroys trees, and reduces property values.<sup>193</sup>

Productivity is higher when workers are healthier. Formaldehyde has numerous non-malignant health effects that can interfere with work performance, including eye and nose irritation, tearing, sore throats, obstructive changes in pulmonary function, and respiratory sensitization or asthma.<sup>194</sup> Eliminating these health problems leads to lower absenteeism, and employees at work who feel better, and therefore, work more productively. Prohibiting environmental tobacco smoke is another action that allows workers to feel better, stay healthier, and work more efficiently.

According to NHTSA, parts marking showed beneficial results, with the subsequent reduction of two percent in the theft rate. A two percent reduction more than covered the \$5 cost per vehicle to mark parts. These benefits were documented in an analysis of thefts per 1,000 registered vehicles, for cars with marked parts compared with those without marked parts, from 1984 through 1995. In addition, the law enforcement

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<sup>190</sup> Ibid., p. 13.

<sup>191</sup> Lisa Heinzerling, “Regulatory Costs of Mythic Proportions,” 107 *Yale L.J.*, 1981 (1988).

<sup>192</sup> Thomas O. McGarity and Ruth Ruttenberg, “Counting the Cost of Health, Safety, and Environmental Regulation,” *Texas Law Review*, Volume 80, No. 7, June 2002.

<sup>193</sup> Michael Gerrard, “The Economic Benefits of a Clean Environment,” OpEd, *Washington Post*, July 20, 1976.

<sup>194</sup> Cited in Stone, *Three Case Studies...*, p. 13.

community and prosecutors found parts marking also assisted in making arrests and prosecuting and convicting auto thieves.<sup>195</sup>

In October 1999, when NHTSA was considering new performance requirements and test procedures for advanced air bag systems, the agency properly recognized that “property damage savings have the potential to offset all, or nearly all of the cost of meeting this proposal.”<sup>196</sup>

More importantly in the performance and test procedures regulatory analysis was the conclusion that “In addition to protecting out-of-position occupants, this test (22-35 mph using both 5<sup>th</sup> female and 50<sup>th</sup> male unbelted dummies) may result in improved vehicle structural integrity.”<sup>197</sup>

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<sup>195</sup> U.S. Department of Transportation, National Highway Traffic Safety Administration, “Evaluation Program Plan: Summaries of Completed Evaluation Reports,” 1998, [http://www.nhtsa.dot.gov/cars/rules/regrev/evaluate/EP/ Completed.htm](http://www.nhtsa.dot.gov/cars/rules/regrev/evaluate/EP/Completed.htm), downloaded August 1, 2001, Reporting on “Auto Theft and Recovery: Effects of the Anti Car Theft Act of 1992 and the Motor Vehicle Theft Law Enforcement Act of 1984, Preliminary Report.”

<sup>196</sup> U.S. Department of Transportation, NHTSA, “Preliminary Economic Assessment: SNPRM, FMVSS No. 208 Advanced Air Bags,” p. E-9.

<sup>197</sup> Ibid., “Introduction,” p. 3.

## Summary Comments

Scholars and researchers increasingly write about the reality of regulators overestimating costs.<sup>198</sup> Studies, comparing cost projections during consideration of a regulation with actual post-regulatory compliance costs, show that regulators often overestimate costs. According to one assessment of the Environmental Protection Agency (EPA),<sup>199</sup> academic and government economists, when studying the costs of regulatory compliance, have routinely overestimated the costs of reducing pollution emissions – by at least 30 percent, and generally by more than 100 percent.

When consultants for EPA compared capital expenditures for pollution control to those originally forecast by EPA, they found that EPA tended to overestimate capital costs, with forecasts as much as 156 percent above reported expenditures.<sup>200</sup> Researchers at Resources for the Future (RFF) studying more than two dozen EPA and Occupational Safety and Health Administration (OSHA) regulations found that most pollution control programs turn out to be less costly than estimated beforehand. Other Resources for the Future scholars studied the problem of accuracy of estimating regulatory costs, in 1999, and concluded:<sup>201</sup>

“Our review of more than two dozen environmental and occupational safety regulations indicates that ex ante estimates of total (direct) costs have tended to exceed actuals. The quantity errors are driven by both baseline and compliance issues.”

One study found that the underlying scientific and risk information used to analyze regulatory impact was so uncertain that it provided an insufficient basis on which to conduct an economic analysis and that the analyses which resulted were technically flawed in one or more critical ways.<sup>202</sup> In addition, the author concluded that economic analysis was not designed to address a sufficiently rich array of policy options and was thus irrelevant to actual policy and regulatory decisions.

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<sup>198</sup> David Driesen, “The Societal Cost of Environmental Regulation: Beyond Administrative Cost-Benefit Analysis,” Ecology Law Quarterly, 24 Ecology L.Q. 545, 1997, p. 23.

<sup>199</sup> Goodstein and Hodges.

<sup>200</sup> Putnam, Hayes, and Bartlett, “Comparisons of Estimated and Actual Pollution Control Capital Expenditures for Selected Industries,” 1980, cited in Winston Harrington, Richard Morgenstern, and Peter Nelson, “On the Accuracy of Regulatory Cost Estimates,” Discussion Paper 99-18, Resources for the Future, Washington, DC, January 1999, p. 6. The study was based on non-regulation specific data from the Pollution Abatement Cost and Expenditure Survey of the Bureau of the Census.

<sup>201</sup> Harrington, Morgenstern, and Nelson, p. ii.

<sup>202</sup> Richard Morgenstern, Economic Analyses at EPA: Assessing Regulatory Impact, Resources for the Future, Washington, DC, 1997, p. 3.



The U.S. Office of Technology Assessment, in a study of cost estimation at OSHA, concluded that overestimation was indeed a problem:<sup>203</sup>

“There are often sizable disparities between OSHA’s rulemaking projections of control technology adoption patterns, compliance spending, and other economic impacts, and what actually happens when affected industries respond to an enacted standard.”

In a number of cases that OTA examined, the actual compliance response included advanced or innovative control measures that were not emphasized during rulemaking, and the actual cost proved to be considerably less than what OSHA had estimated.

Two law professors, experts in the legal and economic aspects of OSHA, explain that because both OSHA and industry preimplementation cost projections rely heavily upon industry input, they are nearly always much higher than actual implementation costs.<sup>204</sup>

There are many specific examples of overestimation of cost – sometimes by hundreds of millions or even billions of dollars. This paper presents examples associated to the Consumer Product Safety Commission (CPSC), Department of Energy (DOE), Environmental Protection Agency (EPA), Federal Railroad Administration (FRA), Food Safety and Inspection Service (FSIS), Mine Safety and Health Administration (MSHA), National Highway Transportation Safety Administration (NHTSA), Occupational Safety and Health Administration (OSHA), and others.

## **Conclusions**

Regulatory agencies often overestimate the cost of regulatory compliance, sometimes substantially. There are dozens of examples of costs being inflated and the potential for innovation and productivity-enhancing activities ignored. If policy makers are to base decisions on quality work developed by their agencies, then regulatory cost studies need to have accurate information, realistic assumptions, and dynamic analysis.

Methodology and assumptions dictate the outcomes of regulatory impact analyses. If analysts develop costs for compliance paths that are not actually used, one cannot expect accurate or useful guidance for policy makers. If agencies continue to rely primarily on industry self-reporting, one cannot expect accurate information for policy makers. If cost savings are ignored, regulatory impact assessments will clearly overestimate costs.

Some key reasons for poor information are promised confidentiality to industry sources, limited access to information by agencies, small study samples, and a built-in incentive for a self-reporting industry to overstate expected costs.

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<sup>203</sup> OTA, Gauging Control Technology..., p. 10.

<sup>204</sup> McGarity and Shapiro, p. 268.

Key examples of conservative assumptions are the way cost is defined, difficulty defining appropriate baselines and double counting.

Examples of static analysis include considering only existing technology, ignoring learning curves and offsets for depreciation, and not exploring lower costs associated with pollution prevention and development of substitutes.

Benefits to some companies – mostly those providing pollution control and hazard abatement products – and the contribution they make to Gross Domestic Product and job generation are important to include in any regulatory impact analysis.

Needed is a full and fair accounting of the costs of regulation. Economists should clearly state the limitations of their methodologies and their data. Research on regulatory impact should be sure that all estimated compliance costs and benefits are included. They should probably be stated as a range, from low to high. Analysis should be dynamic and the cost estimations realistic.

**NOT TOO COSTLY, AFTER ALL:  
AN EXAMINATION OF THE INFLATED COST-  
ESTIMATES OF HEALTH, SAFETY AND  
ENVIRONMENTAL PROTECTIONS**

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## **APPENDIX B**





# Cry wolf

– predicted costs by industry  
in the face of new regulations



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## Summary

Trade organisations systematically inflate cost estimates order to combat new regulations. But regulators and environmental economists too generally overestimate costs because they underestimate the innovation potential within industry.

Recently cost estimates for compliance with REACH, the new chemical legislation proposed by the EU Commission, were presented by German and French chemical industry trade organisations. The methodology of these studies has been refuted by economists, but figures from these studies are nevertheless used in the debate.

This report reviews earlier cost estimates for compliance with regulations commissioned by specific interest groups within industry. These cost estimates are based on the same kind of assumptions used by German and French chemical industry trade organisations.

The cases studied show clearly that cost estimates from specific interest groups within industry generally overestimates anticipated compliance costs and underestimates innovation potential.

In addition, a review of cost estimates made by regulators, shows that they also tend to overestimate costs.

This report reinforces the conclusion drawn previously by the Stockholm Environmental Institute, that the EU should approach the costs presented by industry with caution, as in the past it has tended to overestimate the costs of compliance and underestimate the potential for the development of new technologies.

## 4 Introduction

After years of investigations, expert meetings and political discussions, a new set of EU legislation is taking place. It constitutes a long-awaited reform, as the current system has clearly failed to protect people's health and the environment. The EU's existing patchwork quilt of forty or so different chemical laws will be replaced by one single piece of framework legislation under the name of REACH.

Three years ago the EU Commission presented the basic elements of the reform, which were well received. The proposal was generally considered to constitute a serious attempt to maintain overall control, and make sure that hazardous substances are replaced on broad front by more environmental-friendly alternatives. Many companies also praised the reform, which they believed would make their work easier. For example, REACH would make it easier for companies to demand information from chemicals suppliers and thereby reduce the risk of future costs for decontamination and/or compensation. The new rules would also reward companies for enterprise and innovation. New markets, new consumer groups, greater confidence and reduced risks were some of the opportunities created by the reform in the law.

Unfortunately, many of the important principles and provisions that were introduced in the original proposal have disappeared altogether or been drastically altered, to a point where the benefits to the environment, chemical users and consumers will be very limited.

But what made the Commission change their own proposal so drastically? The main reason is worries about costs.

The Commission has done its own impact assessments and the costs of REACH identified in these studies are in themselves not particularly large and could quite easily be borne by the industry. But studies performed on behalf of the German and French chemical industry have concluded that these rather low administrative costs would have serious repercussions on both the chemical industry and downstream users. The methodology of these studies has been refuted by economists (see Appendix), but figures from these studies are nevertheless frequently used in the debate.

The most widely used strategy is to assume that industry does not adapt to changes (the static model). The static model is a sure-fire way to show that any regulation will incur unacceptably high costs for industry. It is also an insult to decision-makers within the industry, as it assumes that they are dimwits who are totally incapable of adapting to new situations.

The static model has been used in the German and French studies and therefore it is no surprise that this model gives rise to extremely high costs. But many earlier studies performed for trade organisations has been based on the same kinds of assumptions. How did these cost estimates compare with the actual costs incurred by regulation? Based on findings from the report "Costs and strategies presented by industry during the negotiation of environmental regulations" by Stockholm Environmental Institute (1999) and other sources, this report takes a look at the track-record of industry and to some extent regulators to answer this question.



A line that we heard frequently from economists, legislators and even from the industry itself during the research for this report is that "nobody believes these figures anyway". If that really was true then the need for this report is questionable. But current experience of the negotiations and considerations concerning REACH, which has led to a drastically altered and diluted proposal from the Commission speaks against this. It is obvious that the predicted costs presented by industry, despite the fact that they have been heavily criticized by economists, have had paramount importance in influencing the final proposal. (For more information about costs for REACH, see Appendix).

Why is this? If nobody believes them, why are they still taken seriously? One reason is that even if these predictions are built on shaky foundations, they are nonethe-

less very difficult to refute, as it is impossible to prove that they are wrong. That is the nature of predictions and this can be used strategically to kill unwanted regulation (see box below).

Another reason is that even if most of the people involved in the negotiations around new legislation are aware that the predicted estimates from specific interest groups within the industry are exaggerated, they can still instill the feeling of "no smoke without fire". In this chapter we will take a look at some cases in the past where the "smoke" has been particularly thick and see if there really was any fire.

On the following pages we will compare predicted estimates for different regulations with actual outcomes.

### Fact box

In a leaked memo from the consultancy firm Nichols-Dezenhall to the American Chemistry Council<sup>2</sup>, the U.S. chemical industry's concern over the growing acceptance of the precautionary principle in California is evident. The memo warns that the state's embracing of the precautionary principle is a threat to the entire U.S. chemical industry because "California's political climate makes the state more susceptible to policy and thinking inspired by the PP [precautionary principle] than other geographical regions... California is a bellwether state, and any success enjoyed here could readily spill over to other parts of the country."

The memo continues by listing three strategies and twelve tactics by which to stigmatize the precautionary principle. One of the tactics concerns cost estimates:

**"Tactic 2:** Conduct and publicize an economic-impact study to dramatize the potentially devastating impacts to industry and consumers should California broadly adapt PP-based legislation and regulation. The study could specify threats to both innovation and technology-development, as well as provide region-specific breakouts (e.g., LA, San Francisco, Silicon Valley, Imperial Valley) so as to create multiple media-pitch opportunities and to generate support among target audiences."

## 6 EEC Directive on vehicle emission standards (91/441/EEC)

### BACKGROUND

In the early 1980s, the European Economic Community (EEC) started a process that resulted in more stringent emission standards for cars and that also required catalytic converters on new petrol-fuelled cars.

### PREDICTIONS

The automotive industry predicted that the catalytic converter technology would cost £400 – 600 per vehicle with a fuel consumption penalty on top<sup>3</sup>.

### RESULT

A catalytic converter costs around £30 – 50 per converter. There are other costs involved that are not readily available. Overall, however, prices did not change suddenly or markedly when the directives came into force.

The catalyst requirement led to smaller, cheaper cars being equipped with more sophisticated engines and fuel management technologies, which in turn led to improved fuel efficiency in spite of the supposed fuel consumption penalty of the catalysts.

### COMMENTS

The most vocal opposition to these standards came from France, Italy and the United Kingdom; therefore it is interesting to note a recent study (see box) that shows substantial health benefits emanating from compliance with vehicle emission standards far in excess of the costs for the United Kingdom.

### Fact box

#### An Evaluation of the Environmental and Health Effects of Vehicle Exhaust Catalysts in the UK

Since 1993, all new gasoline-engine automobiles in the United Kingdom have been supplied with three-way vehicle exhaust catalytic converters (VECs) containing platinum, palladium, and rhodium, to comply with European Commission Stage I limits on emissions of regulated pollutants: carbon monoxide, hydrocarbons, and oxides of nitrogen. We conducted a physical and economic evaluation of the environmental and health

benefits from a reduction in emissions through this mandated environmental technology against the costs, with reference to urban areas in Great Britain. We made both an ex post assessment – based on available data to 1998 – and an ex ante assessment – projected to 2005, the year when full penetration of VECs into the fleet is expected. Substantial health benefits in excess of the costs of VECs were indicated: By 1998 the estimated net societal health benefits were approximately £500 million, and by 2005 they were estimated to rise to as much as £2 billion.

*Emma J. Hutchinson and Peter J. G. Pearson, Environ Health Perspect 112:132-141 (2004)*

# The European auto-oil programme

## BACKGROUND

This programme was developed jointly by the European Commission, the automotive industry and the oil industry during the 1990s. It required stricter provisions regarding emissions of pollutants from automobiles, which in turn would mean new standards for petrol introduced in 2000, with increased requirements in 2005.

## PREDICTIONS

Costs were estimated by the European Petroleum Industry Association to be roughly €50 billion each for the petroleum and automotive industries<sup>4</sup>. Shell, Esso, BP and Texaco claimed individually that the desulphurisation of diesel would entail massive new investments and the closure of refineries, creating unemployment. Both refineries at Milford Haven in South Wales would have to be closed. The major UK oil suppliers also said that it would be prohibitively expensive or even impossible to provide more than 10 percent of the UK demand. In a report from Arthur D. Little it was estimated that the regulation would cost €75-80 billion.

## RESULT

After that real life figures began to become available from countries that had already introduced higher standards (Sweden and Finland), Arthur D. Little produced radically revised projections and concluded that the costs had previously been overestimated by up to 55 percent<sup>5</sup>.

In 1999 all the major oil producers in the UK had announced that they would switch to supplying low-sulphur petrol exclusively. The refineries at Milford Haven have not been closed<sup>6</sup>.

## COMMENTS

In the beginning the oil industry and the downstream users (the automotive industry) had a common position, but as negotiations progressed the oil industry representatives and the motor industry representatives effectively took different sides.

Motor manufacturers began to question the cost estimates of the oil industry, emphasising in particular the lower costs already emerging from Swedish and Finnish experience. Motor manufacturers also began to emphasise the need for much lower sulphur levels to allow the development of more efficient engine technologies.

Even the oil industry, as new sales opportunities and new technology became available, revised their opposition and progressed with the move to "greener" fuels in line with the directive.

### Then...

*"For some industries, the impact of change can be even more dramatic. Entire industries could fold..."*

*Chemicals producer DuPont regarding regulation of CFC's 1987*

### ... and now

*"This new proposal could be devastating for the electronics, health care and personal care industries".*

*CEFIC about REACH, 2002*

RECYCLING



## 8 UN/ECE protocols on acidification and the EC Directive on air emissions from large combustion plants

### BACKGROUND

These regulations were implemented during the 1980s to reduce emissions of major groups of acidifying pollutants from energy production and other combustion plants in Europe.

### PREDICTIONS

Both certain governments and industries opposed these regulations. The General Electricity Generating Board in U.K. predicted for instance that the regulation would "increase the cost of electricity generated at the power stations by about 25 – 30 percent".<sup>7</sup>

In Germany and the Netherlands there were similar claims. The German Power Plant Association (VDEW) warned that the costs would be twice as high as estimated by the German authority Umweltbundesamt (UBA). Industry and trade unions also warned of loss of competitiveness for the energy sector and loss of jobs in the coal mining sector.

### RESULT

The sulphur reduction targets have had no significant impact on the costs of generating electricity or on consumer prices.

Pre-regulation warnings from industry proved to be way off the mark, the real costs were nowhere near the factor two over the UBA estimates. Instead, the cost figures from UBA are considered to give a reasonably good indication of what the real costs are likely to be.<sup>8</sup>

### COMMENT

Statements about compliance costs and difficulties from industry organisations were mostly general and vague. This is not specific to this case: indeed these kinds of general statements are the most common form of "estimates" in all cases.

They are easy, and at the same time very difficult, to refute: easy to refute – as they are based upon opinions and not on facts: and difficult to refute – for the same reason.

Facts can be checked and methodologies criticised, but opinions are more elusive. These general and vague statements seem to exert an unduly large influence as they are quoted frequently by politicians and included in official background papers.

#### Then...

*"Very large costs" leading to "redesign and re-equipping of large sectors of vital industry..., smaller firms going out of business... and an effect on inflation nationally and internationally".*

*CEFIC regarding regulation of ozone depleting CFC's in 1988*

#### ... and now

*"The proposal... could have serious economic impact, far beyond the chemical industry, by significantly raising prices on thousands of products on both sides of the Atlantic."*

*Cefic regarding REACH, 2002*

RECYCLING

# The US Clean Air Act

## BACKGROUND

The US Clean Air Act (CAA) was introduced in 1970. The CAA was first amended in 1977 and set new goals.

In 1990 the act was amended again, setting goals for acid rain, stratospheric ozone-depleting substances and airborne toxic substances that had not been covered by the previous provisions.

## PREDICTIONS

Industry studies in the 1990 negotiations showed that the changes alone in the amended CAA would cost US \$51 to 91 billion per year. Industry studies and less substantiated claims said that between 20,000<sup>9</sup> and 4 million<sup>10</sup> jobs would be lost.

## RESULT

In 1996 the US EPA estimated that the yearly cost for industry was \$22 billion.<sup>11</sup>

Employment has increased since the 1990 amendments of the act, especially in the sectors that were mostly affected by the amendments. Contrary to predictions, even the personal income growth in these areas increased by 22 percent.

According to a new White House study,<sup>12</sup> between 1992 and 2002 the total estimated costs to comply with reviewed standards for clean air was \$23 billion to \$26 billion. The benefits arising from these standards alone were estimated at between \$120 and \$193 billion for the same period.

### White House study concludes environmental regulations are well worth the costs

*Excerpt from Washington Post September 27, 2003*

A new White House study concludes that environmental regulations are well worth the costs they impose on industry and consumers, resulting in significant public health improvements and other benefits to society. The findings overturn a previous report that officials now say was defective.

The report, issued this month by the Office of Management and Budget, concludes that the health and social benefits of enforcing tough new clean-air regulations during the past decade were five to seven times greater in economic terms than were the costs of complying with the rules. The value of reductions in hospitalization and emergency room visits, premature deaths and lost workdays resulting from improved air quality were estimated between \$120 billion and \$193 billion from October 1992 to September 2002.

By comparison, industry, states and municipalities spent an estimated \$23 billion to \$26 billion to retrofit plants and facilities and make other changes to comply with new clean-air standards, which are designed to sharply reduce sulfur dioxide, fine-particle emissions and other health-threatening pollutants.

John D. Graham, director of OMB's Office of Information and Regulatory Affairs, which produced the study, said: "Our role at

## COMMENTS

John D. Graham (see article in box) has been industry's favourite economist on the cost of regulation. In several studies he has claimed that the cost of regulation, including the Clean Air Act, is far too high compared to the benefits (for a review and critique of these studies see Ackerman and Heinzerling<sup>13</sup>). It is obviously of great interest that an economist of his background and present status in the White House now stands behind a report that, in direct opposition to the present U.S. Administration's beliefs, concludes that the costs of environmental regulation have been low and reasonable and that the benefits for society have been significant.

OMB is to report the best available estimates of benefits and costs, regardless of whether the information favors one advocacy group or another. In this case the data show that the Environmental Protection Agency's clean-air office has issued some highly beneficial rules."

*Eric Pianin, Washington Post Staff Writer*



## 10 The Montreal Protocol on substances that deplete the ozone layer

### BACKGROUND

Under the auspices of the United Nations the global community agreed to adopt the Vienna Convention to combat the threat of ozone depletion in 1985. The provisions for phasing out the production and use of ozone-depleting substances (ODS) were laid down in the Montreal protocol in 1987.

### PREDICTIONS

In the late 1970s, the chemical industry viciously opposed any regulation. The main arguments were that there was no scientific basis for regulation and that costs were too high. No cost-estimates were presented. Instead industry pointed to the great significance to the world economy of the production of ODS.

While evidence of environmental harm was mounting, industry continued opposing regulation throughout the 1980s on economic grounds. The European chemicals producers' federation (CEFIC) claimed that a phase-out would cause *"very large" costs leading to "redesign and re-equipping of large sectors of vital industry..., smaller firms going out of business... and an effect on inflation and employment nationally and internationally"*.

The economic significance of CFCs and other ODSs was initially enhanced by the claim that there were no alternatives and that none would *"become available in the foreseeable future"*.<sup>14</sup>

### RESULT

In 1995, the Technology and Economic Assessment Panel of the Montreal Protocol concluded that virtually all of the global reduction of CFC use had come at little or no cost to consumers and that "particular examples of successful changeovers from ozone-depleting technologies are now too numerous to mention individually". In conclusion the ODS phase out has, hardly affected industry negatively at all. There are even numerous examples where "the substitute technologies have saved money and improved quality over the CFC technologies they replaced"<sup>13</sup>.

### COMMENTS

It is clear that the chemicals industry greatly exaggerated the costs and difficulties of phasing out ODSs, but it is essential to differentiate between the chemicals industry and the downstream users who depended on ODSs at the time for manufacturing their products. The downstream users initially supported the chemicals industry in opposing regulation on ODSs. However, as alternative substances and technologies became available they shifted side and started transferring to non-ODS processes. In the end, the chemicals industry caved in and followed suit.



**BACKGROUND**

The Federation of German Industries (BDI) commissioned consultancy firm Arthur D. Little to study the economic consequences of the original White Paper and the subsequent draft proposal. In a similar study, the French Chemical Industry Association (UIC) and the French government jointly commissioned consultancy firm Mercer Management to estimate the impact the implementation of the White Paper would have on the French economy.

**PREDICTIONS**

The Arthur D. Little study predicted job losses of up to 2.35 million and 6.4% reduction in the GDP in Germany<sup>16</sup>. The supplemental study for the Internet review draft predicted the loss of 1,735 million jobs and a 4.7% reduction in the GDP<sup>17</sup>. The Mercer study predicted costs of between €29 – 54 billion for French industry over a period of ten years, plus total job losses of up to 670,000 and up to 3.2% reduction in GDP per year<sup>18</sup>. An additional study on the final proposal was presented by UIC and Mercer in April 2004. It predicts that Reach will cost France €28 billion over a period of ten years, or 1.6% of its GDP and cause 360,000 job losses.

**RESULT**

As the regulation is still under preparation, the actual outcome can not be presented here.

**COMMENT**

The methods used and the extrapolations made in the Arthur D. Little report were strongly questioned by independent economic expert. The French chemical industry association has kept secret to this day the methods used for the Mercer report. However, while most estimates of the direct costs are below 0.1% of one year's GDP in the EU, both these studies have inflated these small numbers to yield final impacts of roughly 3 – 10% reductions in the GDP in Germany and France, in effect a "multiplier" of at least 30 – 100 times the direct costs. There is simply no evidence that advanced industrial economies are hypersensitive to minor administrative costs to this extent. (See also Appendix).

## 12 The ABC of overestimation

Surprisingly few studies have been made that compare predicted estimates with actual outcomes. Below we present cases compiled by Eban Goodstein, professor of economics at Lewis and Clark College and a research associate at the Economic Policy Institute<sup>20</sup>.

*"In every case we have found where researchers have calculated actual regulatory costs and then compared them to predicted estimates, the estimate exceeded the actual cost. We have uncovered a dozen such efforts, ranging from A (asbestos) to V (vinyl chloride). In all cases but one, the initial estimates were at least double the actual costs."*

### ■ Asbestos

#### PREDICTION

When the Occupational Safety and Health Administration (OSHA) instituted regulations covering exposure to asbestos in the early 1970s, they hired a consulting firm to estimate the cost of compliance.

### ■ Benzene

#### PREDICTION

In the late 1970s, the chemical industry predicted that controlling benzene emissions would cost \$350,000 per plant.

### ■ Chlorofluorocarbons (CFCs)

#### PREDICTION

In 1988, reducing CFC production by 50 percent within 10 years was estimated by the EPA to cost \$3.55 per kilogram. By 1993, the goal had become much more ambitious: complete elimination of CFC production, with the deadline moved up two years, to 1996.

### ■ CFCs in automobile air conditioners

#### PREDICTION

In 1993 car manufacturers estimated that the price of a new car would increase by \$650 to \$1,200 due to new regulations limiting the use of CFCs.

### ■ Coke ovens

#### PREDICTION

The original OSHA estimate for the cost of complying with the 1976 coke oven standard was more than five times higher than estimates of actual costs. OSHA's contractor suggested that complying with the standard would cost from \$200 million to more than \$1 billion. The OSHA consultant estimated that three steel firms in their sample would spend \$93 million on capital equipment and \$34 million in annual operating costs to comply with the regulations.

In the late 1980s, coke production again came under regulatory scrutiny, this time by the EPA. In 1987, the agency estimated that the cost of controlling hazardous air pollution from coke ovens would be roughly \$4 billion.

#### RESULT

Two later studies found that the original prediction for the cost of compliance was more than double the actual cost, because of overly static assumptions.

#### RESULT

Shortly after these predictions were made, however, the plants developed a process that substituted other chemicals for benzene and virtually eliminated control costs.

#### RESULT

Nevertheless, the estimated cost of compliance fell more than 30 percent, to \$2.45 per kilogram. And where substitutes for certain CFCs had not been expected to be available for eight or nine years, industry was able to identify and adopt substitutes in as little as two years.

#### RESULT

In 1997 the actual cost was estimated to be \$40 to \$400 per car.

#### RESULT

However, a Council on Wage-Price Stability study later estimated the actual cost of the standard to be \$160 million.

A later study by Arthur Andersen determined that the three firms actually spent between \$5 million and \$7 million in 1977 to comply with the standard, and only \$1 million to \$2 million on capital expenditures. Ultimately, firms were able to meet the standard without incurring all of the capital costs in the first year, and actual compliance costs were dramatically lower than originally predicted.

By 1991 that estimate fell to between \$250 million and \$400 million.

**Then...**

*"It would put millions of jobs at risk, put thousands of small companies out of business, further weaken our economy and limit our capacity to become energy independent."*

*National Manufacturers Association  
in the negotiations of amendments to  
the US Clean Air Act 1990*

**... and now**

*"The potential damage [of REACH] to the global economy, our employees and communities in which we operate, and yes, our shareholders, is enormous. Not to mention the possibility that otherwise safe products that have been regularly coming to market could disappear altogether or be delayed by the fog of this emerging regulatory regime."*

*Greg Lebedev, President and CEO of the American  
Chemistry Council (ACC)*

**■ Cotton dust****PREDICTION**

In 1976, OSHA proposed a maximum permissible exposure limit of 0.2 milligrams per cubic meter for cotton dust, and its consultant estimated that compliance costs would be approximately \$700 million per year.

**RESULT**

The standard promulgated in 1978 actually allowed for higher exposure levels in some sectors of the textile industry, but the small changes in the standard do not fully explain the decrease in estimated compliance costs; in 1978 the estimate fell to \$205 million per year. Moreover, a new study conducted in 1982, after the Reagan administration called for a review of the standard, concluded that compliance costs were \$83 million per year.

**■ Halons****PREDICTION**

In 1989 members of the United Nations Environment Program's Halons Technical Options Committee disagreed on whether direct halon replacements could be found and whether a phase-out was possible.

**RESULT**

However, in 1993 the committee concluded that a phase-out of halons, a substance found in fire extinguishers that destroys the ozone layer faster than chlorofluorocarbons, would be both technologically and economically feasible by 1994.

**■ Strip mining****PREDICTION**

Prior to the passage of the 1978 Surface Mining Control and Reclamation Act, estimates for compliance costs ranged from \$6 to \$12 per ton of coal.

**RESULT**

Actual costs for eastern coal operations have been in the range of 50 cents to \$1 per ton. After the regulations were adopted, the market switched away from coal deposits with high reclamation costs. Ready substitutes included surface-minable coal in flatter areas (with lower reclamation costs), and underground deposits.

**■ Vinyl chloride****PREDICTION**

OSHA's vinyl chloride standard, set in 1974, provides a final example of wildly excessive cost projections. The agency's consultant estimated that it would cost \$22 million per year to meet the permissible exposure limit of 2 to 5 parts per million (ppm) in the vinyl chloride monomer sector, and \$87 million per year to meet the 10 to 15 ppm exposure limit in the polyvinyl chloride sector. In addition, the consultant argued that the 1 ppm permissible exposure limit simply could not be attained. The president of Firestone's plastics division said that a standard of 1 ppm "puts the vinyl plastics industry on a collision course with economic disaster."

**RESULT**

In spite of these protests, OSHA did adopt the strict permissible exposure limit of 1 ppm. A study conducted several years later by researchers from the Wharton School of Business estimated that the total cost of compliance for both sectors had been about \$20 million per year. A 1976 congressional research paper also indicated that the actual cost of compliance was dramatically less than the original prediction. The early claims that the 1 ppm standard could not be met evaporated; instead, the regulatory action led to about a 6 percent rise in polyvinyl chloride prices.

## 14 Industry organisations tend to overestimate costs. What about regulators?

A frequent claim from industry organisations is that regulators tend to underestimate the costs of compliance. The reasoning is that it should lie within the self-interests of the regulator to regulate, therefore they will tend to underestimate the costs and difficulties. But history provides evidence to the contrary. The estimates of the regulators too are more often above the real costs than below.

In 1999, the U.S. institute Resources for the Future studied the accuracy of pre-regulation cost estimates in 25 cases of environmental regulation. The result was that in 12 cases the regulators had overstated the total costs, in 5 cases they had predicted the costs accurately, and only in two cases of comparatively minor regulations had they underestimated the costs (6 cases were undefined).<sup>21</sup>

### Static assumptions

In general, economic consultants and analysts have a very high regard of markets ability to adapt to new situations. But when considering new environmental regulations, analysts tend to predict future costs statically, and thereby grossly underestimate that markets adapt by uncovering substitute methods of production, and developing cheaper technologies. This underestimation of innovation potential is generally the main reason for overestimations of the costs of compliance.

### Asymmetric correction of errors

Another reason for overestimation is asymmetric correction of errors. Gross underestimations of costs by consultants or regulators are challenged at an early stage by the industry that perceives itself most threatened by the proposed regulation. Frequently this leads to revised and higher cost estimates.

Normally, there is not a corresponding pressure to correcting gross overestimates, which causes an upward bias for regulatory cost estimates (asymmetric correction of errors). However, in certain cases (e.g. Auto-Oil and CFC) downstream users enter the debate at a later stage and challenge overestimations of costs.



- Industry organisations systematically inflate cost estimates to combat new regulations.
- Regulators and environmental economists generally overestimate costs because they underestimate the innovation potential within industry.

### **Vague claims**

Most of the statements about compliance costs and difficulties from industry organisations and lobbyists are general and vague. These statements range from claims that regulation will cause the downfall of whole industry sectors to the oft-repeated story of how regulation would drive one particular (usually imaginary) small or medium-sized enterprise out of business. These kinds of statements fall outside the scope of this report as they are not quantifiable. Nevertheless, they seem to exert an unduly large influence as they are frequently quoted by politicians and included in official background papers.

### **Industry and industry**

Another important observation is that "industry" is not a homogenous entity. Even though trade organisations in general tend to oppose new regulation as a matter of course, there usually is a broad diversity of opinion amongst the individual companies affected by the legislation. A general observation is that market leaders, at least initially, are against new legislation as any change threatens their position, but that innovative, dynamic companies frequently embrace new legislation as a way to acquire a greater market share.

"Industry" in the REACH case comprises both chemical industry and downstream users. It is interesting to note that there was a similar set-up in the Auto-Oil case and the CFC case, with the oil/chemical industry and downstream users. In both these cases the downstream users initially supported the oil/chemical industry, but during the negotiations they began increasingly to question the cost estimates, and as alternative substances and technologies became available they shifted side and adapted to the new situation. In the end, the oil/chemical industry caved in and follo-

wed suit without the dire consequences of the earlier predictions.

### **Cost estimates**

The cases studied show that cost estimates from specific interest groups within industry generally overestimate predicted compliance costs and underestimate innovation potential.

The study of 25 environmental regulations confirms that regulators, too, tend to overestimate the costs to industry, although their overestimations are not as systematic or as large as those presented by industry.

### **Innovation and static assumptions**

Regulators generally tend to have a more positive view of the innovative creativity of industry than do trade organisations. Despite this the main reason for the overestimation of compliance costs by regulators is their underestimation of innovation potential.

The larger overestimations by trade organisations are mainly attributable to their use of static models, which fail to address how changes in relative prices will influence either the static supply and demand characteristics of the sector, or dynamic effects due to innovation and the opening up of new markets and opportunities.

### **Stockholm Environmental Institute**

This report reinforces the conclusions arrived at previously by the Stockholm Environmental Institute, that the EU should give careful consideration to the costs presented by industry as in the past it has tended to overestimate costs of compliance and underestimate the potential for development of new technology<sup>1</sup>.

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## REACH – What does it cost?

REACH – the political initiative for improved chemical control in the EU – has caused heated debates over many years. While there is a broad consensus on the need for safer handling and more efficient control of chemicals, the controversy over the financial implications of new measures is intensive. Chemical manufacturers foresee rising costs and unemployment, while environmentalists predict large savings plus benefits in human health and the environment. This fact sheet presents some of the most frequently cited arguments, and gives a perspective on the financial debate.

The content of REACH has gradually changed since the strategy for new controls was introduced in the 2001 White Paper. The chemical manufacturers' fears and their influence made the Commission moderate the original proposal considerably before delivering a law draft to the parliament and council in October 2003. Therefore, previous studies reflected the costs and benefits of tighter regulations compared to the recent diluted studies. The studies are based on the White Paper, the May 2003 draft proposal from an Internet consultation and the law proposal.

The extent of the studies also differs. Some only predict the direct costs for producers and importers, while others reflect direct and indirect costs for chemical users and society as a whole. The benefits of a more effective system, e.g. reduced costs for disease related healthcare and liabilities are largely ignored in the industry-sponsored studies. In studies that do estimate social and environmental benefits, it is shown that these savings largely out-weigh the predicted costs for implementation of REACH.

The chemicals that are currently on the market will be put into the REACH system over the next 11 years, and the costs have been estimated for this time frame. After this 11-year period, only new chemicals will be introduced to the system.

### The impact assessment of the October proposal

For the October proposal the Commission presented an impact assessment. The estimates of direct and indirect costs as well as savings made by implementing REACH are shown besides:

Direct costs for chemical producers for testing and registration costs over the next 11 years	€2.3 billion
Costs for downstream users over the next 11 years (including costs passed on from the chemicals sector to downstream users)	€2.8 – 4.0 billion
Possible health benefits over the next 30 years	€50 billion

#### Comment:

The October proposal includes fewer obligations and restrictions for the chemical industry, consequently, it will not protect human health and the environment as efficiently as previous proposals.

The turnover of the EU chemical industry was €417 billion<sup>1</sup> in 2000. This means that cost for implementing REACH would be 0.05% of the industry's annual turnover. The turnover of downstream users in EU is estimated at least €425.5 billion<sup>2</sup> and the costs for complying with REACH would match up to 0.09% of the annual turnover.

If we instead look at the benefits for this proposal, the Commission mentions a figure of €50 billion. This figure is based on an estimate from The World Bank that chemicals and chemical pollution cause between 0.6% and 2.5% of diseases in developed countries<sup>4</sup>. Based on these figures, the Commission calculated that if REACH could reduce diseases by 0.1% this would save society €50 billion over the next 30 years. This economic gain on health improvements would outweigh the cost of implementing REACH many times over.

#### Costs in perspective

On average, REACH is estimated to cost 0.05% of the chemical industry's turnover. What do costs of this size mean for the chemical industry? The table below shows a comparison with other costs for the chemical industry.

Cost Factor	Fluctuation in % of Turnover
Energy costs 1996-2000 <sup>3</sup>	2.6 – 3.4%
Environmental Expenditure 1996-2000 <sup>3</sup>	1.9 - 2.9%
REACH October proposal	0.05%
Fluctuation of World Market Prices (Exchange Rate Fluctuation) 1999-2002 <sup>3</sup>	+/- 20 Percentage points



## 18 Appendix: REACH – What does it cost?

### The costs and savings of the White Paper and the May draft

In the White Paper the commission estimated direct costs for the chemical industry at €2.1 billion<sup>5</sup> over 11 years. The Commission followed up with another study for four possible scenarios based on the White Paper, each with different obligations to register chemicals. The direct costs were estimated at €3.6 (1.4–7) billion<sup>6</sup> over 11 years and indirect costs at €14 – 26 billion<sup>7</sup> over 18 years.

In May 2003 the Commission published a draft proposal on their website for consultation. For it they estimated direct costs at €12.6 billion<sup>8</sup> over 11 years and estimated the cost savings for an expected reduction of occupational related cancer at €18 – 54 billion<sup>9</sup> over 30 years, due to the implementation of REACH. The benefits for other occupational sicknesses and public health were not estimated.

#### Comment:

*The highest costs are estimated for the May proposal, yet these costs are still less than 0.3% of the chemical industry's turnover. Of all the proposals, the wording in the White paper offers the highest protection for human health and the environment, but the actual benefits are not estimated.*

*The fact remains that 23% of employees in Europe ie 32 million people, are exposed to carcinogenic substances at work.<sup>10</sup> If the reality of future chemical legislation is the May proposal, the amount of occupational related cancer can be reduced, saving the community €18 – 54 billion. The benefits of reducing other diseases were not estimated, but it is obvious that stricter legislation will save more money in the long term, directly and indirectly, than weak legislation.*

### The chemical industrial predictions

The Commission diluted their proposals because of studies presented by the chemical industry. The Federation of German Industries commissioned Consultancy Arthur D. Little to study the economic consequences of the original White Paper and the later draft proposal. In a similar study, the French Chemical Industry Association and the French government jointly commissioned Consultancy Mercer Management to estimate the impact the implementation of the White Paper would have on the French economy.

The Arthur D. Little study predicted job losses of up to 2.35 million and 6.4% loss of the GDP in Germany.<sup>11</sup> The supplement study predicted losses of 1,735 million work places and a 4.7% loss of GDP for the Internet review draft.<sup>12</sup> The Mercer study predicted costs of between €29 – 54 billion for French industry over a period of ten years, plus a total job loss of up to 670,000 people and up to 3.2% loss in GDP per year.<sup>13</sup>

#### Comment:

*The methods used and the extrapolations made in the Arthur D. Little report were strongly questioned by independent economic experts.<sup>14</sup> The French chemical industrial association kept and still keeps the methods used for the Mercer report confidential. However, while most estimates of the direct costs are below 0.1% of one years GDP in the EU, both these studies have inflated these small numbers to yield final impacts of roughly 3 – 10% losses of GDP in Germany and France, in effect a "multiplier" of at least 30 – 100 times direct costs. There is simply no evidence that advanced industrial economics are hypersensitive to minor administrative costs to this extent.*

#### Overestimates – a trend

It is a trend that the costs for implementation of environmental regulations are over-estimated.

Overestimates are often made because it is forgotten that markets cut costs through innovation. For example the industry predicted the costs for the amendment in the Clean Air Act in US 1990 at \$51 – \$91 billion per annum, but the EPA estimated that in 1996 the actual costs were US \$22 billion per year.<sup>15</sup>

Furthermore, it is now proven that the socio-economic savings for cleaner air with fewer health problems have been 5 – 7 times bigger than the implementation costs.<sup>16</sup>

#### Conclusions

The benefits for wildlife and the environment have not been calculated in any of the studies. Surely 0.05% of the chemical industry's annual cost is a small price to pay for better protection of wildlife and human health? The Commission has calculated the costs for contami

nated soil in Europe and these might give an indication of potential costs that can be avoided through future prevention. It has been found that there are around two million sites with contaminated soil in the EU. For instance, in 1990 the costs associated with polluted industrial sites in the Netherlands were estimated to €23 billion.

The simple fact is, that the benefits of REACH far outweigh its implementation costs. Estimates of earlier environmental regulations have often been overestimated because innovation is not calculable. Equally importantly, these costs are relatively small compared to other chemical industry outlays. It is obvious that strong legislation will give greater socio-economic savings compared to weaker regulations. The Commission has bowed under pressure from the chemical industry and weakened its proposals on the basis of questionable industrial economic calculations.

It is vital that politicians realize that REACH will not be the burden it has been predicted to be. It is now up to the European Parliament and the Council to improve REACH, to give us a legislation that really protects humankind and the environment.

**For more information please visit our homepage: [www.chemsec.org](http://www.chemsec.org) or read additional fact sheets.**

**The International Chemical Secretariat (Chemsec) is a non-profit organization dedicated to work towards a toxic free environment.**

**The Secretariat is a cooperation between four environmental organizations in Sweden; SSNC, WWF, FoE and Fältbiologerna.**

### Less than a bar of chocolate!

The estimated costs for the chemical industry to implement REACH are €2.3 billion. This corresponds to around 50 cent per EU citizen per year – or less than the cost of a chocolate bar.

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After years of investigations, expert meetings and political discussions, a new set of EU legislation is taking place. It constitutes a long-awaited reform, as the current system has clearly failed to protect people's health and the environment.

Unfortunately, many of the important principles and provisions that were introduced in the original proposal have disappeared altogether or been drastically altered to the point where the benefits to the environment, chemical users and consumers may be in jeopardy.

The apparent reason for this is unprecedented efforts by the chemical industry to weaken the proposal. Their main tactic has been to claim that the costs of compliance could spell ruination for chemical-dependent industry and Europe itself.

This is not the first time industry has made these types of claims in the face of new regulations.

This report reviews earlier estimates produced by industry of the costs of compliance and compares these with the actual outcomes.



International Chemical Secretariat thanks WWF for its support.

## **APPENDIX C**



## APPENDIX C - Partial Listing of Deregulatory Actions

### **Department of Labor**

#### **Mine Safety and Health Administration**

- Diesel Particulate Matter Exposure of Underground Metal and Nonmetal Miners, 67 Fed. Reg. 47296-47299 (July 18, 2002).

#### **Occupational Safety and Health Administration**

- Occupational Injury and Illness Recording and Reporting Requirements: Hearing Loss, 67 Fed. Reg. 44037-44048 (July 1, 2002).
- Occupational Injury and Illness Recording and Reporting Requirements: Musculoskeletal Disorder Column, 68 Fed. Reg. 38601-38607 (June 30, 2003).
- Occupational Exposure to Tuberculosis: Termination of Rulemaking, 68 Fed. Reg. 75767-75775 (Dec. 31, 2003).

#### **Wage and Hour Division**

- Overtime: Defining and Delimiting the Exemptions for Executive, Administrative, Professional, Outside Sales and Computer Employees, 69 Fed. Reg. 22121-22170 (Apr. 23, 2004).

### **Environmental Protection Agency**

- New Source Review for Coal-Fired Power Plants, 67 Fed. Reg. 80186-80289 (Dec. 31, 2002).
- Proposed National Emissions Standards for Hazardous Air Pollutants: Mercury Emissions from Power Plants, 69 Fed. Reg. 4562-4752 (Jan. 30, 2004).
- National Emission Standards for Hazardous Air Pollutants: Mercury Emissions from Chlor-Alkali Plants, 68 Fed. Reg. 70903-70946 (Dec. 19, 2003).
- Construction Runoff: Effluent Limitations Guidelines and New Source Performance Standards for the Construction and Development Category, 69 Fed. Reg. 22472-22483 (Apr. 26, 2004).
- Effluent Limitations Guidelines and New Source Performance Standards for the Meat and Poultry Products Point Source Category, 68 Fed. Reg. 48471-48513 (Aug. 13, 2003).
- Control of Emissions of Air Pollution from Marine Diesel Engines, 67 Fed. Reg. 37547-37608 (May 29, 2002).
- Hazardous Waste Management System; Identification and Listing of Hazardous Waste: Manganese, 66 Fed. Reg. 58257-58300 (Nov. 20, 2001).
- Montreal Protocol on Substances that Deplete the Ozone Layer, Critical Use Exemptions for Methyl Bromide, [http://www.unep.org/ozone/pdfs/1ex\\_mop-3.e.pdf](http://www.unep.org/ozone/pdfs/1ex_mop-3.e.pdf); <http://www.epa.gov/spdpublic/mbr/>.
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### **Environmental Protection Agency and U.S. Army Corps of Engineers**

- Final Revisions to the Clean Water Act, Regulatory Definitions of “Fill Material,” 67 Fed. Reg. 31129-31143 (May 9, 2002).

### **U.S. Army Corps of Engineers**

- Issuance of Nationwide Permits, 67 Fed. Reg. 2019-2095 (Jan. 15, 2002).

### **Department of the Interior**

- DOI opinion on five-acre mill sites. Department of the Interior, *Memo: Mill Site Location and Patenting Under the 1872 Mining Law* (Oct. 7, 2003), available at: <http://www.doi.gov/patenting.pdf>.

### **National Park Service**

- Special Regulations; Areas of the National Park System: Snowmobiles in Yellowstone and Grand Teton National Parks, 68 Fed. Reg. 69267-69289 (Dec. 11, 2003).

### **Bureau of Land Management**

- Mining Claims under the General Mining Law: Mining Causing “Substantial Irreparable Harm,” 66 Fed. Reg. 54833-54862 (Oct. 30, 2001).

### **Office of Surface Mining and Enforcement**

- Surface Coal Mining and Reclamation Operations; Stream Buffer Zones, 69 Fed. Reg. 1035-1048 (Jan. 7, 2004).

### **United States Department of Agriculture**

#### **Forest Service**

- Roadless Area Conservation: Exemption of the Tongass National Forest from the Roadless Rule, 68 Fed. Reg. 75136-75146 (Dec. 30, 2003).

#### **Food Safety and Inspection Service**

- Control of *Listeria monocytogenes* in Ready-to-Eat Meat and Poultry Products, 68 Fed. Reg. 34207-34254 (June 6, 2003).

### **Health and Human Services**

#### **Food and Drug Administration**

- Procedures for Health Claims on the Labeling of Conventional Human Food and Human Dietary Supplements, 68 Fed. Reg. 41387-41390 (July 11, 2003).
- Food Additives Permitted for Direct Addition to Food for Human Consumption: Olestra, 68 Fed. Reg. 46363-46402 (Aug. 5, 2003).

#### **Centers for Medicare and Medicaid Services**

- Requirements for Paid Feeding Assistants in Long Term Care Facilities, 68 Fed. Reg. 55528-55539 (Sept. 26, 2003).