Study Overview and Major Conclusions 1

This study is broadly concerned with the processes and methods that the Occupational Safety and Health Administration (OSHA) employs to examine control technology options and to estimate compliance costs and other regulatory impacts in support of its major regulatory actions.[1] This report responds to Congress's interest in better understanding the nature and soundness of the analytical procedures OSHA conducts in these substantive areas.

In general, the findings and estimates the agency produces on these matters can significantly influence the course of the policy debate and the specifics of the health and safety standards ultimately promulgated. In addition, the process of soliciting comments on drafts of these analyses from stakeholders and other interested parties represents one of the principal channels through which competing interests are engaged in rulemakings. Thus, the drafting and completion of these analyses in an adequate and credible way are essential in OSHA's performance of its regulatory mission.

In brief, this study reviewed the analytical methods (related to technology options and regulatory impacts) employed by OSHA in a substantial number of past rulemakings; compared actual industry outcomes with the prior rulemaking estimates in a selected number of cases; examined the organization and resources supporting the agency's analytical efforts; and compared the agency's practices with those of other regulatory organizations. OTA's broad appraisal of OSHA's capabilities and procedures arises from findings in each of these areas.

THE CONTEXT FOR THIS STUDY

The Occupational Safety and Health Act of 1970 (29 *USC* section 651–678) signaled Congress's intent that occupational injuries and illnesses should, as much as possible, be eliminated from American workplaces. This legislative action was taken in view of the existing incidence of

[1] Health and safety risk assessments are also of central importance in OSHA's rulemakings. Nonetheless, the agency's analytical procedures in this respect are not a chief focus of this project, and little comment is provided on them here. OSHA is also required to prepare an Environmental Impact Statement to accompany rulemakings, in accordance with the Environmental Policy Act of 1969. However, in the vast majority of rulemakings this is a relatively minor aspect of the regulatory analysis effort, and this report makes no comment on the preparation of these statements.

occupational fatalities, injuries, and illnesses that was widely regarded as unacceptable. (Box 1-1 provides some background on the magnitude of workplace fatalities, injuries, and illnesses.) At the same time, Congress also recognized that workplace injuries and illnesses imposed a

BOX 1-1: The Trends In Workplace Fatalities, Injuries, and Illnesses

The principal motivation for enactment of the OSH Act and subsequent establishment of OSHA stemmed from unacceptably high incidence rates of workplace fatalities, injuries, and illnesses. The discussion below briefly reviews some of the estimates of these rates over the now more than 20 years since the OSH Act became law.

It should be recognized at the outset, however, that the task of measurement is more difficult than might first be imagined. In 1985, the Office of Technology Assessment (OTA) discussed the shortcomings of the data that go into workplace fatality, injury and illness rates. Two years later, the National Research Council drew attention to the deficiencies in data gathering and reporting and suggested a number of changes in procedures. Improvements have been made since, but varying sources still produce rate estimates that differ widely.

Workplace Fatalities

Year	Fatality rate (per 100,000 workers)	Injury and Illness rate (per 100 workers)	Injury rate (per 100 workers)
1972	17.2	10.9	—
1973	17.0	11.0	10.6
1974	15.7	10.4	10.0
1975	15.3	9.1	8.8
1976	14.2	9.2	8.9
1977	14.1	9.3	9.0
1978	13.7	9.4	9.2
1979	13.2	9.5	9.2
1980	13.4	8.7	8.5
1981	12.5	8.3	8.1
1982	12.0	7.7	7.6
1983	11.7	7.6	7.5
1984	11.0	8.0	7.8
1985	10.8	7.9	7.7
1986	10.2	7.9	7.7
1987	10.1	8.3	8.0
1988	9.6	8.6	8.3
1989	9.2	8.6	8.2
1990	8.7	8.8	8.3
1991	8.4	8.4	7.9
1992	7.9	8.9	8.3
1993	7.7	8.5	7.9

SOURCES: Fatality rates—National Safety Council, 1994. *Accident Facts: 1994 Edition.* National Safety Council: Chicago, p. 37. Injury and illness rates—U.S. Department of Labor, Bureau of Labor Statistics, 1994. *Workplace Injuries and Illnesses in 1993,* USDL-94-600, Table 3.

(continued)

BOX 1-1: The Trends In Workplace Fatalities, Injuries, and Illnesses (Cont'd.)

The National Safety Council (NSC) publishes the most comprehensive estimates of occupational fatalities that cover the entire period of OSHA's existence. These figures are based on information from death certificates and from workers' compensation data from state programs. They are intended to reflect all unintentional injury-related deaths in the civilian workforce, 14 years and older, with the exception of private household workers. (NSC's figures exclude workplace deaths from homicides and suicides.)

A 1994 NSC report indicates that the estimated workplace fatality rate dropped from about 17 per 100,000 workers in 1972 to a little less than 8 per 100,000 workers in 1993—a decrease of about 57 percent since establishment of OSHA. Generally speaking, workplace dangers are greatest in the construction and heavy-industry sectors. Overall, however, motor vehicle accidents continue to be the single largest component of the fatalities identified by NSC, accounting for 35 percent of all occupational mortality in 1993, up from 31 percent in 1972. (Other major causes include falls, being struck by various objects, electrocutions, fires and explosions.)

The National Institute of Occupational Safety and Health (NIOSH) and the Department of Labor's Bureau of Labor Statistics (BLS) also have prepared surveys of occupational fatalities. Both of these also indicate a long-run decrease in workplace fatality rates.

NIOSH's figures show the death rate as falling from around 9 per 100,000 workers in 1980 to about 5.8 per 100,000 in 1989—a decrease of about 35 percent, similar to the 31 percent decrease in the NSC estimates over the same period. Nonetheless, NSC's year-to-year figures are consistently a good deal higher. In part, NIOSH's figures are based on reviews of death certificates, not all of which contain sufficient information to identify work associations, especially motor vehicle accidents.

BLS changed its method for collecting information on workplace fatalities in 1992, and it now characterizes its prior estimates as too low. Nonetheless, its existing figures for 1970 through 1991 show a generally downward trend. The present BLS system estimated there were 6,083 workplace deaths in 1992, as compared with NSC's estimate of 9,200. Unlike the NSC's figures, however, BLS includes workplace homicides (associated with robberies, for the most part), which account for 16 percent of the total (now second only to motor vehicles as a source of fatalities in BLS's data).

Generally, measurement problems are endemic to all of these estimates. It is important to note that deaths from workplace illnesses (e.g., health effects like cancer) are not included in either the NSC, NIOSH, or BLS data. Sorting out whether a particular death was the result of a workplace exposure or incident that may have occurred years or decades earlier is often very difficult. Thus, in all probability, the cited workplace fatality rates are underestimates of the actual incidences—and perhaps so to a considerable degree.

Workplace Injuries and Illnesses

The table also lists BLS's reported rates of workplace injury and illnesses from 1972 through 1993 (injuries are also listed as a subset). As is apparent, the general trend was one of declining rates over the 1972-1983 period—from an average of around 10.8 per 100 workers in the 1972-74 period down to an average of 7.7 in 1982-83, a cumulative decrease of about 21 percent. However, the annual rate rose somewhat (to the mid 8's per 100 workers) thereafter, although remaining well below the much higher levels that prevailed in the early 1970s.

Factors other than increased attention to health and safety, no doubt, contributed to some of these movements in the rate levels. For example, in the early 1970s, some employers entered "first aid cases"—minor injuries that involved essentially no lost time—into the records. BLS did not in fact require that such cases be recorded, and as employers quit entering them, the observed rates fell. For another, the recession of the early 1980s resulted in some workforce layoffs, and, as a rule, younger, less experienced workers (who tend to have higher accident rates) are laid off first. The modest increase in rates in the second half of the 1980s was a departure from the previous prevailing trend. However, this increase in rates also coincides with OSHA's increased emphasis on the accuracy of recordkeeping, and some of the upward movement is no doubt reflective of this development.

(continued)

BOX 1-1: The Trends In Workplace Fatalities, Injuries, and Illnesses (Cont'd.)

Undercounting is a problem in workplace-related illnesses, just as it is with fatalities. There are various reasons, including the difficulty of distinguishing workplace- and non-workplace-related illnesses, lengthy latency periods (including long after exposures have ceased), or diagnoses made without investigations of possible workplace associations. But the magnitude of the undercounting is simply unclear. (However, in 1992, BLS reported 2.3 million injuries and illnesses that caused workers to miss work beyond the day of injury or illness onset. Only 105,000 of those lost-day cases related to illnesses. The vast majority were directly attributable to the workplace, for example, contact dermatitis and repetitive motion task injuries.)

Identifying OSHA's Impact

Measuring the direct effect of OSHA regulations is a difficult analytical task, given the numerous confounding factors that need to be considered in identifying cause and effect. In part, the share of workers in higher-risk occupations has been shifting, as manufacturing jobs have ebbed and the services sector has ascended. Business cycles are also part of the story, in that economic downturns tend to remove less experienced, and typically higher-risk, workers from the workplace. Employer actions to improve health and safety conditions taken independent of OSHA's requirements need to be distinguished. The effect of worker's compensation payments on employee behaviors needs to be examined. Changes in record-keeping practices generally complicate the examination of time series trends. And the undercounting thought to be endemic in the available incidence data simply leaves a basic gap.

The generally falling workplace fatality rate reported by NCS, NIOSH, and BLS alike since the early 1970s at least provides room for finding an OSHA effect. And in some industries where reasonable data are available, there is strongly suggestive evidence of an OSHA impact (e.g., nearly 60 percent fewer deaths from dust-related fires and explosions in the grain-handling sector since OSHA's 1987 standard addressing these hazards, around 35 percent fewer deaths from trench cave-ins since the agency's 1989 standard addressing excavation practices in the construction industry).

Various non-OSHA factors have been suggested to explain the apparent long-run decline in injury and illness rates—including changes in record collection practices, employer actions taken independent of OSHA, and business cycle effects. Nonetheless, one well-regarded analyst of the agency's policies (Viscusi, 1992) has drawn a preliminary conclusion from examination of a number of specific industry sectors that OSHA regulations during the 1972–83 period have indeed contributed to reduced injury rates. (However, he also cautions that these conclusions "must necessarily be guarded," with further research needed to verify and separate the effects of OSHA from other factors.) One graphic example is the textile manufacturing sector, where reductions of dust levels in compliance with OSHA's 1978 cotton dust standard cut the incidence of crippling respiratory diseases from 20 percent of the workforce to about 1 percent.

SOURCES: M.J. Moore and W.K. Viscusi, *Compensation Mechanisms for Job Risks.* (Princeton, NJ: Princeton University Press, 1990). W.K. Viscusi, *Fatal Tradeoffs: Public and Private Responsibilities for Risk.* (New York: Oxford University Press, 1992). National Research Council, *Counting Injuries and Illnesses in the Workplace: Proposals for a Better System.* (Washington DC: National Academy Press, 1987). National Safety Council, *Accident Facts: 1994 Edition.* (Chicago: National Safety Council, 1994). U.S. Congress, Office of Technology Assessment. *Preventing Illness and Injury in the Workplace.* (Washington DC: U.S. Government Printing Office, 1985). U.S. Department of Labor, Bureau of Labor Statistics, *News: Workplace Injuries and Illnesses in 1992,* Washington, DC, December 15, 1993. U.S. Department of Labor, Bureau of Labor Statistics, *Fatal Workplace Injuries in 1992: A Collection of Data and Analysis,* Washington, DC, 1994. U.S. Department of Labor, National Institute for Occupational Safety and Health, *Fatal Injuries to Workers in the United States, 1980–1989: A Decade of Surveillance,* Department of Health and Human Services, Washington DC, 1993.

sizable, systemic burden on the national economy in the form of lost production, lost wages, added medical expenses, and compensation for disabilities.

The OSH Act created OSHA, placed it within the Department of Labor, and charged the Secretary with the responsibility for setting and enforcing safety and health standards mandatory for all businesses in order to secure and maintain workplaces free from preventable accidents and occupational diseases. Since 1970, OSHA has promulgated some two dozen major standards dealing with health hazards, and nearly five dozen in the safety arena (see box 1-2). At the time of this report's completion (late summer 1995), another three dozen new rulemakings are at varying stages of development (see box 1-3).

OSHA's mission principally involves identifying health and safety hazards that exist at unacceptable levels in the workplace and promoting their removal. Nonetheless, in promulgating rules, the agency is obliged to consider and present reasoned evidence concerning the economic consequences of the standards it issues, the regulatory benefits it anticipates, and, where compliance involves a technological element (many, but not all, provisions do), the technical feasibility of the required actions by the affected industries. In the course of a rulemaking, OSHA normally conducts various analyses addressing these issues: such as, assessments of prospective control technologies and the steps necessary to meet other requirements, estimates of the incremental costs to be incurred to achieve compliance, examinations of the cost burdens imposed on the directly affected industries and the economy at large, estimates of expected benefits, and the justification for agency intervention into the workings of the marketplace.

OSHA's conclusions on these matters are subject to considerable review and oversight. The public—including workers, employers, their representatives, the professional health and safety communities, and others with interest in the public policy outcome—has input via established hearing and comment procedures. Executive orders have provided the executive branch—particularly the Office of Management and Budget (OMB)—with the means to oversee and influence the form and content of intended regulatory actions. In many cases, promulgated standards are subsequently contested (in whole or part) in the courts, giving judges the opportunity to examine the agency's rulemaking rationale and corroborating evidence in some detail.

OSHA has long been one of the most criticized regulatory agencies in the federal bureaucracy. This unenviable position is, no doubt, an inevitable consequence of the agency's fundamental mission. Establishing, and enforcing, occupational safety and health regulations invariably pits individuals and groups with strongly held beliefs and vital interests against one another in what is often perceived as a zero-sum game, where as two analysts put it "any decision that significantly affects workers interests will just as significantly affect employers interests in the opposite direction."[2] Furthermore, the frictions that have long been attendant to labor and management relations in the United States—which certainly predate OSHA by well over a century—are often a palpable undercurrent.

The principal criticisms of the agency today span a wide range of issues. Many in the labor and the professional safety and health communities complain about the slow pace and low productivity of the agency's rulemaking effort—asserting that although important hazards have been addressed over the last two decades, many still remain. Concern is also expressed about the extent of protection the agency has been targeting in its rulemakings, particularly since the early 1980s. Businesses and those specialists concerned with the impacts of government intervention on the workings of the nation's economy often question whether the agency pays enough attention to the balance between the benefits and the new cost burdens expected to result from its regulatory actions. Stakeholders on both sides of issues and the courts alike often question

[2] S.A. Shapiro and T.O. McGarity, "Reorienting OSHA: Regulatory Alternatives and Legislative Reform," *Yale Journal on Regulation* 6 (1): 1-63, 1989.

BOX 1-2: Permanent Standards Promulgated By OSHA

HEALTH

Permanent rule	Promulgation date	Federal Register citation
Asbestos	June 7, 1972	37 FR 3155
Fourteen carcinogens	Jan. 29, 1974	39 FR 3755
Vinyl chloride	Oct. 4, 1974	39 FR 35890
Coke oven emissions	Oct. 22, 1976	41 FR 46741
1,2-Dibromo-3-chloropropane	Mar. 17, 1978	43 FR 11530
Inorganic arsenic	May 5, 1978	43 FR 19584
Cotton dust	June 23, 1978	43 FR 27350
Acrylonitrile	Oct. 3, 1978	43 FR 45762
Occupational exposures to lead	Nov. 14, 1978	43 FR 52952
Medical records	May 23, 1980	45 FR 35212
Noise exposure	Mar. 8, 1983	48 FR 9738
Hazard communications	Nov. 25, 1983	48 FR 53280
Ethylene oxide	June 22, 1984	49 FR 25734
Asbestos (NOTE: this action substantially amended the 1972 standard)	June 20, 1986	51 FR 22612
Benzene (NOTE: the benzene standard the agency promulgated in 1978 was set aside by the courts in 1980)	Sept. 11, 1987	52 FR 34460
Formaldehyde	Dec. 4, 1987	52 FR 46168
Air contaminants	Jan. 19, 1989	54 FR 2332
Lead, non-ferrous foundries	Jan. 30, 1990	55 FR 3146
Toxic substances in laboratories	Jan. 31, 1990	55 FR 3300
Bloodborne pathogens	Dec. 6, 1991	56 FR 64004
Cadmium	Sept. 14, 1992	57 FR 42102
Hazard communications (NOTE: this action extended the 1983 standard)	Feb. 9, 1994	59 FR 6126

SAFETY

Permanent rule	Promulgation date	Federal Register citation
Construction safety and health regulations	Apr. 17, 1971	36 FR 7340
General industry standards	May 29, 1971	36 FR 10466
Construction—roll-over protective structures	Apr. 5, 1972	37 FR 6837
Power transmission and distribution	Nov. 23, 1972	37 FR 24880
Scaffolds	Dec. 2, 1972	37 FR 25712
Lab accreditation	Sept. 11, 1973	38 FR 25149
Temporary flooring—steel	July 2, 1974	39 FR 24360
Mechanical power presses	Dec. 3, 1974	39 FR 41841
Agricultural tractors—roll-over protective structures	Apr. 25, 1975	40 FR 18253
Industrial slings	June 27, 1975	40 FR 27367
Guarding of farm field equipment, farmstead equipment, and cotton gins	Mar. 9, 1976	41 FR 10189

(continued)

BOX 1-2: Permanent Standards Promulgated By OSHA (Cont'd.)

SAFETY

Permanent rule	Promulgation date	Federal Register citation
Ground fault circuit interrupters	Dec. 21, 1976	41 FR 55695
Commercial diving operations	July 22, 1977	42 FR 37649
Fire prevention	Sept. 12, 1980	45 FR 60656
Guarding of low-pitched roof perimeters during performance of built-up roofing work	Nov. 14, 1980	45 FR 75618
Electrical safety requirements	Jan. 16, 1981	46 FR 4034
Shipyard consolidation	Apr. 20, 1982	47 FR 16984
Gasoline dispensing nozzles, removal of ban on latch open devices	Sept. 7, 1982	47 FR 39161
Marine terminals	July 5, 1983	48 FR 30886
Servicing multi- and single-piece rim wheels	Feb. 3, 1984	49 FR 4338
Power lawnmowers	Feb. 1, 1985	50 FR 4648
Electrical standards for construction	July 11, 1986	51 FR 25294
Accident prevention tags	Sept. 19, 1986	51 FR 33251
Recordkeeping requirements for tests, inspections, and maintenance checks	Sept. 29, 1986	51 FR 34552
Field sanitation	May 1, 1987	52 FR 16050
Grain handling facilities	Dec. 31, 1987	52 FR 49592
Presence sensing device initiation of mechanical power presses	Mar. 14, 1988	53 FR 8322
Safety testing/certification of workplace equipment and materials	Apr. 12, 1988	53 FR 12102
Concrete masonry construction safety	June 16, 1988	53 FR 22612
Crane or derrick suspended personnel platforms	Aug. 2, 1988	53 FR 29116
Hazardous waste operations and emergency response training	Mar. 6, 1989	54 FR 9294
Underground construction	June 2, 1989	54 FR 23824
Powered platforms for building maintenance	July 28, 1989	54 FR 31408
Control of hazardous energy (lockout/tagout)	Sept. 1, 1989	54 FR 36644
Excavations, trenching	Oct. 31, 1989	54 FR 45894
Welding, cutting, and brazing	Apr. 11, 1990	55 FR 13694
Electrical work practices	Aug. 6, 1990	55 FR 31984
Lift slab construction	Oct. 18, 1990	55 FR 42306
Stairways and ladders in construction	Nov. 14, 1990	55 FR 47660
Process safety management	Feb. 24, 1992	57 FR 6356
Confined spaces	Jan. 14, 1993	58 FR 4462
Electric power generation, transmission, and distribution	Jan. 31, 1994	59 FR 4320
Face, head, eye, and foot protection	Apr. 6, 1994	59 FR 16334
Reporting of fatality or multiple hospitalizations	May 2, 1994	59 FR 15594
Logging operations	Oct. 12, 1994	59 FR 19745

SOURCE: Compiled by Office of Technology Assessment from *Federal Register* citations and other sources.

BOX 1-3: OSHA Rulemakings in Progress

Title	Status
HEALTH	
Respiratory protection	Proposed rule stage
Occupational exposure to hexavalent chromium	Proposed rule stage
Occupational exposure to tuberculosis	Proposed rule stage
1,3-Butadiene	Final rule stage
Glycol ethers: 2-methoxyethanol, 2-ethoxyethanol, and their acetates	Final rule stage
Methylene chloride	Final rule stage
Air contaminants rule for construction, agriculture, and maritime	Final rule stage
Indoor air quality in the workplace	Final rule stage
SAFETY	
Steel erection	Proposed rule stage
Control of hazardous energy (lockout/tagout)—construction	Proposed rule stage
Powered industrial truck operator training	Proposed rule stage
Ergonomic protection	Proposed rule stage[1]
Comprehensive occupational safety and health programs	Proposed rule stage
Confined spaces—construction	Proposed rule stage
Miscellaneous amendments to the safety standards for the construction industry	Proposed rule stage
General working conditions in shipyards	Proposed rule stage
Fire protection in shipyard employment	Proposed rule stage
Permit required confined spaces (amendment to existing standard)	Proposed rule stage
Scaffolds—construction	Final rule stage
Safety and health regulations for longshoring and marine terminals	Final rule stage
Scaffolds in shipyards	Final rule stage
Access and egress in shipyards	Final rule stage
Personal protective equipment in shipyards	Final rule stage
Walking working surfaces and personal fall protection systems	Final rule stage
Accreditation of training programs for hazardous waste operations	Final rule stage
OTHER	
Recording and reporting occupational injuries and illnesses	Proposed rule stage
Abatement verification	Final rule stage

[1] In June 1995 the OSHA director placed the ongoing Ergonomics rulemaking on hold.

SOURCE: Department of Labor, Occupational Safety and Health Administration, "Unified Agenda of Regulations," *Federal Register* 60: 23571–23583, May 8, 1995.

whether the agency adequately understands the extent of hazards at hand and the pertinent facts and considerations essential to forming sound policy. Some believe the agency spends too little time probing the potential of new technology for removing constraints in the way of workplace

hazard reductions. Many of these complaints are widely shared, but interested parties differ—often radically—in the specifics of their fault finding and prescriptions for remedies.

STUDY REQUEST AND QUESTIONS ADDRESSED

This study stems from a May 1992 request from members of the House Committee on Education and Labor[3] and the Senate Committee on Labor and Human Resources that the Office of Technology Assessment (OTA) prepare a report "evaluating OSHA's methods for selecting and examining the feasibility of engineering and other process changes to limit worker exposures to occupational hazards."[4] The request went on to express interest in also knowing how well the agency's rulemaking estimates of the methods of control, associated costs, and other economic effects typically matched the outcomes actually experienced as affected industries adjusted to the new compliance requirements.

To satisfy this request, OTA established a research effort that addressed a number of questions:

- What is the basic nature—tasks, procedures, methods—of the technology assessment, cost, and regulatory impact analyses OSHA normally conducts? Does the agency execute these efforts soundly?
- What are the principal criticisms of the agency's current analyses in these arenas? What has the agency done to address these concerns? What remains to be done?
- How reliable are the agency's rulemaking estimates of actual outcomes? What are the apparent major sources of disparities?
- What organizational capabilities and resources does the agency bring to its analytical tasks, and are these adequate?
- How do the agency's analytical approach and methods compare with those of other organizations with safety and health regulatory responsibilities?

The nature of the research and of the resources drawn upon is discussed further in chapter 3 of this report, which also contains the major evaluative findings. In brief, however, the effort encompassed four main areas. First, more than a dozen of OSHA's major health and safety standards were examined—a few of the major rules issued in the 1970s, but most from the early 1980s up through the early 1990s. This effort was intended to appraise the characteristic methods, data foundations, and uses of the feasibility and regulatory impact analyses prepared for the agency's rulemakings. Second, for eight of the standards, OTA assembled data on the nature of affected industries' actual adjustment to the compliance provisions and examined the accuracy of the rulemaking estimates (vis-à-vis predominant control measures adopted, compliance costs, and other economic impacts) against these post-promulgation outcomes. Third, to gain a better appreciation of the agency's internal procedures and capabilities for conducting technology and regulatory impact analyses, the operation and budgetary resources of the parts of the agency principally involved in these efforts were reviewed. Finally, to judge how OSHA's practices compared with those of other government organizations, the health and safety decisionmaking approaches of other federal agencies and those of some of the major trading partners of the United States were examined.

[3] In the 104th Congress, the responsibilities of this committee have been assumed by the House Committee on Economic and Educational Opportunities.

[4] William D. Ford, Chairman, House Committee on Education and Labor, and Edward M. Kennedy, Chairman, Senate Committee on Labor and Human Resources, letter to the Director, Office of Technology Assessment, U.S. Congress, Washington, DC, May 27, 1992.

MAJOR CONCLUSIONS

As a preview of the lengthier discussion in chapter 3, the principal findings from OTA's evaluative research are tabulated in box 1-4. The overall conclusions that OTA draws from these are as follows:

1. The 1970 OSH Act, particularly as the courts have subsequently interpreted its procedural requirements, executive orders (mandating the conduct of "regulatory analyses"), and other legislation (in particular, the 1980 Regulatory Flexibility Act) combine to impose an extensive set of analysis and evidentiary stipulations concerning hazard control options and regulatory impacts that OSHA must satisfy in promulgating its health and safety standards. By and large, the agency has developed a coherent and credible set of procedures and methods that are responsive to these various requirements—and which generally provide a reasonable channel for engagement of the views of direct stakeholders and other interested parties.
2. The agency's findings and estimates on hazard control options and regulatory impacts are often the subject of vigorous review and challenge by stakeholders and various experts on all sides of rulemaking issues. But this reaction does not generally indicate underlying agency analytical neglect. The agency's rulemakings are often lightning rods for controversy and are conducted in a politically polarized setting. The stakeholders, industrial health and safety professionals, and various government bodies involved in rulemakings often diverge widely when it comes to such basic issues as the intrinsic need for enhanced protection, the likely efficacy of new compliance measures, and the benefits and costs to arise. Furthermore, the analytical questions with greatest bearing on these matters are often not amenable to fully conclusive determination for various reasons: the complexity of the technical considerations involved (e.g., to what extent will risk be reduced as a result of the installation of particular control measures on an existing production process); the inevitable shortages of data on important parameters (which arise because, as a practical matter, the agency often does not have the budget, work calendar, or access to industry needed to collect all relevant data on the many technical factors involved); and attendant imponderables (such as what pertinent operating conditions will prevail over time in affected or otherwise involved industries).
3. OSHA's examinations of prospective control measures and the possible economic effects of their adoption occur principally in the course of procedurally obliged demonstrations that the compliance provisions of an intended standard are generally feasible in technical and economic terms for affected industries. It appears from the sample of existing standards OTA examined for this report, that the agency has generally performed this task with workable accuracy—that is, standards determined by OSHA to be "feasible" in the course of its analytical deliberations have usually proved to be so when industries took the necessary steps to comply. (However, a few failures in this respect were evident in the cases, and point to some analytical deficiencies the agency should consider in future work.)

   Nonetheless, the agency's demonstrations of feasibility are often based on conservative assumptions about what compliance responses will predominate across affected industries. As a result, 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 good number of the cases that OTA examined, the actual compliance response that was observed included advanced or innovative control measures that had not been emphasized in the rulemaking analyses, and the actual cost burden proved to be considerably less than what OSHA had estimated.
4. Benefit-cost comparisons are not at present a formal basis on which OSHA sets its stan-

dards—the result of Congress's original crafting of the 1970 OSH Act and the various interpretations and guidelines provided by the courts in the years since. Nonetheless, as a practical matter of policymaking, such comparisons are often an informal medium through which the debate among OSHA, stakeholders, oversight bodies (such as OMB), and other interested parties proceeds. In light of this (and the executive order mandate for conduct of regulatory impact analyses), the agency normally assembles considerable analytical information on both estimated costs and benefits for an intended standard—and has done so largely irrespective of the expected magnitude of the overall economic impact on the economy.

Nonetheless, the figures the agency typically provides are, at best, an imperfect estimate of what is likely to actually transpire. The agency's quantification of benefits in rulemakings tends to focus on only the most important sources, rather than on the full spectrum of effects expected. Costs are usually comprehensively quantified, but the estimates are captive (as discussed earlier and immediately below) of the typically conservative assumptions about the control measures adopted.

5. The rulemaking cases OTA examined largely confirmed one of the stronger criticisms of OSHA's analytical priorities and practice: that the agency devotes relatively little attention to examining the potential of advanced technologies or the prospect of regulation-induced innovation to provide technologically and economically superior options for hazard control. Most attention does appear to be placed on "conventional" control measures (e.g., increased ventilation and production equipment enclosure), rather than on "new technology" (ranging from sophisticated emissions control devices to technologies capable of supporting basic shifts in production processes, including process redesigns, product reformulations, and material substitutions).

   Such a bias is not surprising, given the "feasibility demonstration" orientation of the agency's rulemaking logic and the need for control technology assumptions capable of standing up well under "substantial evidence" scrutiny by the courts later. But this narrowed focus leaves a significant gap in the vision of the potentially available control options that OSHA can bring to the policymaking debate. Furthermore, in a few of the rulemakings OTA examined, it appears that greater attention to the potential of new technology during the rulemaking might have supported more stringent hazard reduction provisions than were actually promulgated.

   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.

   In OTA's opinion, this is a substantive deficit that particularly deserves OSHA's consideration. Moreover, it is an area to which Congress may wish to consider encouraging and facilitating the agency's more substantial attention.

6. Finally, it is surprising, given the long-standing and contentious public debate about the benefits and costs of OSHA's regulatory interventions, how little systematic knowledge exists about the actual effects of the agency's standards. OSHA would, no doubt, significantly benefit from a more routine effort to collect and interpret information pertaining to actual regulatory outcomes and impacts—to aid the agency in identifying possible needs for mid-course policy adjustments, to better inform the public on the balance between new

BOX 1-4: Summary of Principal Evaluative Findings

Appraisal of Methods and Process

- OSHA's examination of control measures and the impacts of new compliance requirements arises chiefly in preparing the procedurally mandated feasibility determinations and regulatory analyses. Within the confines of these tasks, the broad elements of what the agency prepares are generally coherent and credible. However, there is a "narrowness" in the questions addressed and findings provided that needs to be recognized.
- Typically, the considerations most influential in shaping feasibility and impact findings require substantial factual information about the characteristics of affected industries. Data collection to meet these needs is generally among the most challenging aspects of the agency's analytic effort for a rulemaking.
- A closely related point is that OSHA's feasibility and regulatory impact findings are often criticized as lacking empirical depth. This is a matter not easily dismissed, given the procedural importance of these findings and the threat of subsequent judicial remand, but it reflects an analytical challenge with few simple solutions.
- Explicit benefit-cost comparisons are not at present a formal basis for OSHA's rulemaking actions. Nonetheless, the agency normally prepares substantial information on the benefits and costs of intended standards—and, as a practical matter, stakeholders' competing perceptions about the benefit-cost balance likely to result are often a major focus of debate in the course of a rulemaking.
- For the most part, OSHA's current feasibility analyses devote little attention to the potential of advanced or emerging technologies to yield technically and economically superior methods for achieving reductions in workplace hazards. Much of this circumstance reflects the procedural priorities of the rulemaking process, as well as the nature of the hazard reductions the agency has targeted since the early 1980s. But a good case can be made that a lack of continuing insights on the potential of leading-edge technology hinders the agency in performing its mission.

Lessons from the Retrospective Case Studies

- Straightforward comparisons of the industry response and regulatory impact circumstances that have actually occurred with those projected by OSHA in promulgating standards exhibit both "hits" and "misses." But most all of the cases contain at least some significant disparities.
- Nonetheless, if the cases examined are judged on the basis of the accuracy with which feasibility was determined, OSHA's rulemaking estimates appear in a more favorable light.
- A number of larger lessons are suggested by these comparative findings:
  - — Based on the cases examined for this report, OSHA's rulemakings are not generally imposing an unworkable compliance burden on industry.
  - — OSHA's present procedures for estimating compliance responses and the associated economic consequences provide considerable room for actual adjustment outcomes to differ.
  - — Too narrow a concept of the feasible technology can hinder the agency in establishing justifiable health and safety protections.
  - — Feasibility analysis can be short of influence in driving consideration of competing policy options.
- One additional lesson from OTA's case research for this project is that it is surprising how little systematic information on the actual outcomes and impacts of the agency's standards is available.

(continued)

BOX 1-4: Summary of Principal Evaluative Findings (Cont'd.)

Organizational and Resource Considerations

- The level of resources supporting the agency's technology and regulatory analysis efforts is hard to pin down precisely, but it is apparent that demand has long been substantial and the resources thin.
- The existing resource constraints notwithstanding, developments on the horizon portend the need for an even larger regulatory analysis effort:
  - — increased pace of rulemaking;
  - — new analytic support for priority setting;
  - — increasing rulemaking controversy;
  - — an enlarged scope for judicial review;
  - — expanded analysis of control options and impacts.
- A number of ways to improve the agency's existing procedures for conducting and using regulatory analyses appear to merit consideration:
  - — improved interoffice integration within OSHA;
  - — expanded interaction with NIOSH;
  - — links with new-technology research at EPA;
  - — renewal of Department of Labor Policy Office inputs;
  - — increased interdisciplinarity at OSHA's Office of Regulatory Analysis.

Observations from Benchmarking

- OSHA's regulatory analysis tasks are, in some respects, more complicated than those of its counterparts elsewhere in the U.S. federal bureaucracy. Nonetheless, the agency's work is generally comparable to the best practices of other health and safety regulatory agencies.
- OSHA's regulatory analysis tasks are far more demanding than its foreign counterparts because the United States requires far more detailed economic and technological analysis to promulgate occupational safety and health regulations.
- Occupational safety and health regulators in other nations seem to be able to promulgate standards more quickly than OSHA and without the discord and rancor that often arises in OSHA proceedings. However, applying the means used elsewhere to limit conflict in U.S. rulemakings is problematic.
- Some of the initiatives related to safety and health standard setting now underway at EPA, an agency with similar regulatory analysis requirements, may merit OSHA's attention and consideration.

SOURCE: Office of Technology Assessment. See chapter 3 for a fuller discussion of each of these findings.

costs and new benefits being realized, and to provide insights that might help OSHA shape the content of future rulemakings.

To be sure, complete answers to these questions imply data collection and analysis efforts that are probably beyond practical reach (and beyond beneficial return for the agency's primary responsibilities). But the experience of the few existing evaluative studies on past rulemakings suggest that informative and useful findings (on industry compliance responses, incurred costs, and extent of hazard reductions) can be derived from something less than exhaustive studies. What is needed is

a more systematic effort on the agency's part to develop this kind of information.

Nonetheless, the tight constraints of the agency's present budget appear to make initiation of such a new evaluative research program difficult without undesirably diverting resources from other high-priority activities. Congress may wish to consider how it could best encourage and facilitate OSHA's greater attention to this task.

THE REST OF THIS REPORT

Chapter 2 provides some essential background on the features of OSHA's rulemaking procedures, the roles for control technology and regulatory impact analyses, and basic nature of the data collection and analytic steps taken. *Chapter 3* summarizes the major findings from OTA's evaluative research, along the four lines of inquiry just outlined above. *Chapter 4* discusses the policy implications of these findings, with particular attention to a number of issues of current Congressional attention regarding OSHA. *Appendices A and B* at the end contain further findings on the eight standards examined retrospectively and citations to the principal working papers and research reports prepared over the course of the project.

This entire report is principally a *summary* of a larger body of documented material prepared in the course of the research for the project. Readers interested in more details on the findings should consult the aforementioned working papers and research reports. OTA is making all these documents available through the National Technical Information Service (NTIS) in Springfield, VA.